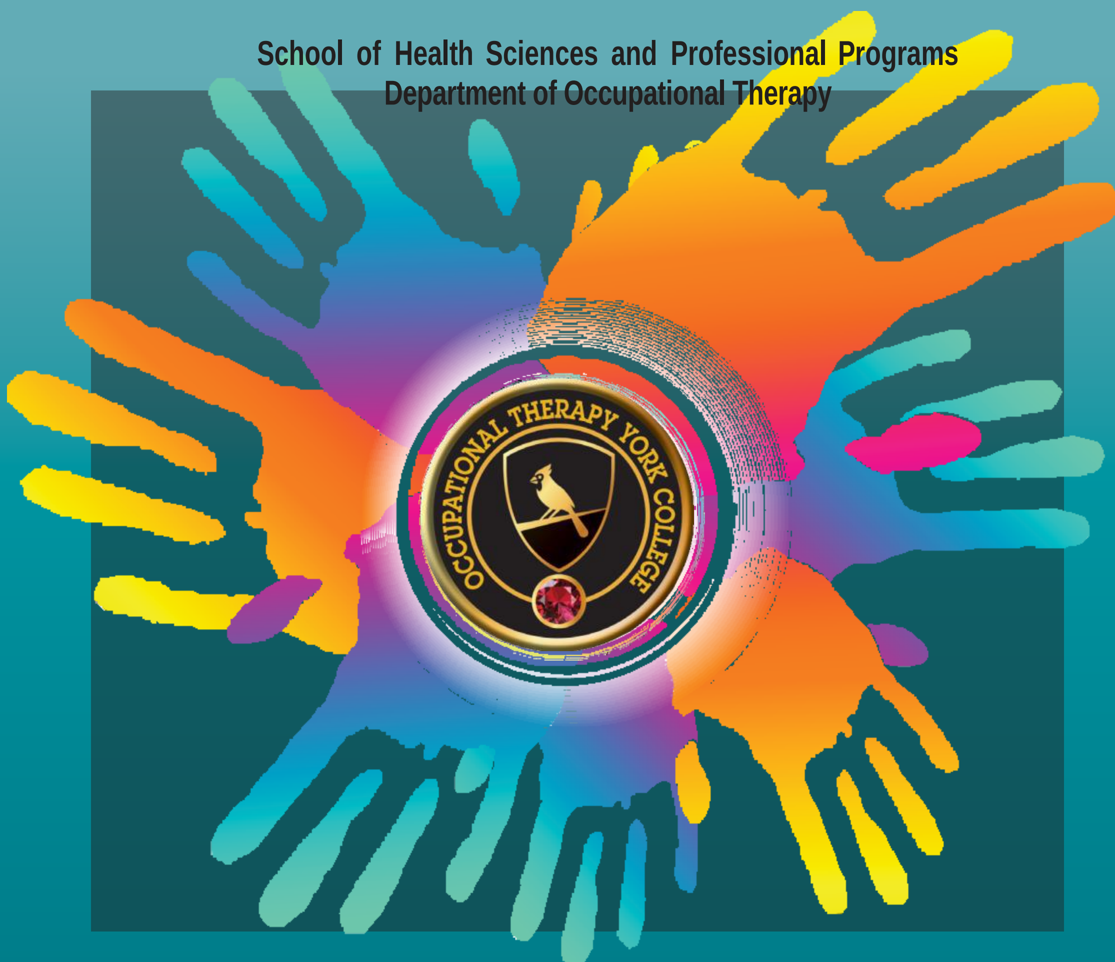
YORK College | CUNY

School of Health Sciences and Professional Programs
Department of Occupational Therapy



Student Handbook

2025-2026

York College Policy on Academic Integrity

(Excerpted from the York College Academic Integrity Policy and Procedures, 2007)

Cheating is the unauthorized use or attempted use of material, information, notes, study aids, devices or communication during an academic exercise. The following are some examples of cheating, but by no means is it an exhaustive list:	• Copying from another student during an examination or allowing another to copy your work. • Unauthorized collaboration on a take home assignment or examination. • Using notes during a closed book examination. • Taking an examination for another student, or asking or allowing another student to take an examination for you. • Changing a graded exam and returning it for more credit. • Submitting substantial portions of the same paper to more than one course without consulting with each instructor. • Preparing answers or writing notes in a blue book (exam booklet) before an examination • Allowing others to research and write assigned papers or do assigned projects, including use of commercial term paper services. • Giving assistance to acts of academic misconduct/ dishonesty. • Fabricating data (all or in part). • Submitting someone else’s work as your own. • Unauthorized use during an examination of any electronic devices such as cell phones, palm pilots, computers or other technologies to retrieve or send information.
Plagiarism is the act of presenting another person’s ideas, research or writings as your own. The following are some examples of plagiarism, but by no means is it an exhaustive list:	• Copying another person’s actual words without the use of quotation marks and footnotes attributing the words to their source • Presenting another person’s ideas or theories in your own words without acknowledging the source. • Using information that is not common knowledge without acknowledging the source. • Failing to acknowledge collaborators on homework and laboratory assignments. Internet plagiarism includes submitting downloaded term papers or parts of term papers, paraphrasing or copying information from the internet without citing the source, and “cutting & pasting” from various sources without proper attribution.

Obtaining Unfair Advantage is any activity that intentionally or unintentionally gives a student an unfair advantage in his/her academic work over another student. The following are some examples of obtaining an unfair advantage, but by no means it is exhaustive list:	• Stealing, reproducing, circulating or otherwise gaining advance access to examination materials. • Depriving other students of access to library materials by stealing, destroying, defacing, or concealing them. • Retaining, using or circulating examination materials which clearly indicate that they should be returned at the end of the exam. • Intentionally obstructing or interfering with another student's work.

I acknowledge that I have received and read the information from the York College Academic Integrity Policy and Procedures which defines cheating, plagiarism and obtaining Unfair Advantage. I understand that such action may result in penalties, including failing grades, suspension, and expulsion, as provided by the procedures of the Department and the College.

_______________________________________ _______________________

Signature____________________ Date____________________

School of Health Sciences and Professional Programs

LETTER TO OCCUPATIONAL THERAPY STUDENTS

Dear Occupational Therapy student,

On behalf of the OT faculty and department staff, we'd like to welcome you to the professional phase of your academic Occupational Therapy preparation! You are about to begin a journey that will take you from being a student to being a licensed professional occupational therapist!

This handbook is your resource guide to the policies and procedures of the Occupational Therapy Department at York College, CUNY. You must read it, complete the forms attached and email back the assigned form to Ms. Venisha Massaquoi, vmassaquoi@york.cuny.edu by August 27, 2025 This student manual should be kept as a reference for future questions throughout your professional education. This handbook complements other important published materials, such as the Department of Occupational Therapy Fieldwork manual and the York College Bulletin.

Along with the OT faculty and staff, we will be guiding you through the next three and a half years. We encourage you to take advantage of our knowledge, experience and mentorship! We are looking forward to our next three and half years together!

Donald Auriemma
Chair

Diana Daus
Program Director

York College CUNY The City University of New York

School of Health Sciences and Professional Programs

Dear Students,

A core philosophical essence of Occupational Therapy is supporting adaptations that provide maximum engagement in occupations. Inherent in this philosophical core is that Occupational Therapists believe in the value of flexibility in people for successful occupational engagement.

During times of uncertainty, the core value of flexibility is important in order for you to be successful in this program. Should events require the faculty to change over to online instruction, please be aware that the expectations of your active engagement in your learning process will be maintained. Please note that to ensure your active engagement, faculty have the academic freedom to adjust the syllabus and the assignments to reflect the online learning platform, if needed. Faculty also may implement engagement monitoring activities that may include, but not be limited to, quiz polling activities on lecture materials just presented in that specific online lecture, or require you to answer in the chat box a particular question, or ask a question about the lecture, or have you type in your name within a short specific timeline. These measures are designed to ensure that you remain engaged and active during the learning process, maintain the integrity of the program, meet standards and ensure the safety of the public. You are expected to comply and participate should the need to transition to online learning occur.

Your acknowledgement that you have received this notice indicates that you are aware of the possible noted changes in the syllabus, assignments and attendance/engagement policies for the course.

We wish you much success in your learning process,

Prof. Auriemma, Department Chairperson

Dr. Daus, Incoming Program Director

YORK College CUNY The City University of New York

School of Health Sciences and Professional Programs

The Department of Occupational Therapy adheres to the York College "Attendance" policy.

"Attendance

Students are expected to participate in each class session. There is no cut allowance. An instructor **may at any time** require that a student accounts for non-participation by giving a personal explanation (and, for SEEK students, to their counselor).

Any student who has been excessively absent from participating in a course, and does not present adequate documentation to the instructor, may receive the grade of **WU** (unofficial withdrawal), which is computed as an F.

Students not participating for illness for more than one week will be required to present to the instructor medical documentation of the illness, including an indication that they are well enough to continue participating in their classes. Students not participating for more than one week for reasons other than illness will also be required to furnish documentation of reason(s).

Instructors will be required to fill out a Verification of Enrollment (VOE) roster for their courses indicating if students have never participated in an academically related activity or have participated in the course. Any student noted as never participating will receive a grade of WN processed to his or her record, The WN grade indicates non-participation and in non-punitive.

Note: A student receiving a WN grade may still be liable for tuition and fees. Courses with WN grade will not be counted toward Financial Aid eligibility and may result in loss of aid."

https://www.york.cuny.edu/produce-and-print/contents/bulletin/academic-policies-academics

When a student is unable to attend a scheduled class, they or their representative must contact the instructor, by email, prior to the start of class. They hold the responsibility for obtaining missed content.

DEPARTMENT OF OCCUPATIONAL THERAPY
FACULTY/ STAFF CONTACT LIST
Academic Core Building - Room 1E12
Phone: (718) 262-2720
Fax: (718) 262- 2767

FACULTY & STAFF		EXTENSION 718-262-	ROOM #	YORK E-MAIL
Prof. Donald Auriemma	Chair of Dept./ Full Professor	2725	1E12C	**"Donald Auriemma" dauriemma@york.cuny.edu**
Dr. Diana Daus	Program Director/Assistant Professor	3761	1E12F	**"Diana Daus" DDaus@york.cuny.edu**
Prof. Elise Henry	Academic Fieldwork Coordinator/ Clinical Professor	3704	1E12E	**"Elise Henry" ehenry1@york.cuny.edu**
Dr. Paula Stewart	Assistant Professor	5356	1E12D	**"Paula Stewart" PStewart1@york.cuny.edu**
Dr. Clover Hutchinson	Assistant Professor	TBD	1E12G	**"Clover Hutchinson" CHutchinson@york.cuny.edu**
Dr. Marta Daly	Assistant Professor	2724	1E12B	**"Marta Daly" mdaly@york.cuny.edu**
Mr. Robert Saby	Senior College Laboratory Technician	2720	1E12H	**"Robert Saby" rsaby@york.cuny.edu**
Ms. Veniesha Massaquoi	Administrative Coordinator	2720	1E12	**"Veniesha Massaquoi" VMassaquoi@york.cuny.edu**
Mr. Andre Chandler	Office Assistant II	2721	1E12	**"Andre Chandler" AChandler@york.cuny.edu**

DIRECTORY

Academic Advisement
Room AC - 2C01
(718) 262-2280
advisement@york.cuny.edu
https://www.york.cuny.edu/academics/advisement

Admissions Room
AC - 1B07 (718)
262-2165
admissions@york.cuny.edu
https://www.york.cuny.edu/admissions

Bursar
Room AC - 1H01
(718) 262-2186
bursar@york.cuny.edu https://www.york.cuny.edu/bursar

Child Care
94-12 160th Street,
Jamaica, NY 11451
On the site of the former St. Monica's church
(718) 262-2930
yccfc@york.cuny.edu
https://www.york.cuny.edu/student-development/child-and-family-center

CUNY First
Once you have claimed your account in CUNYfirst, the CUNYfirst system will send messages only to your York College email address. Make sure that you have activated your York email account. It is imperative that you keep your CUNYfirst ID (EMPLID) handy as this uniquely identifies each person in the CUNY and York College systems
https://www.cuny.edu/about/administration/offices/cis/cunyfirst/

Center for Students with Disabilities
Room AC-1G02
(718) 262-2191
csd@york.cuny.edu https://www.york.cuny.edu/student-development/csd

Division of Student Development
Room AC-2F01
(718) 262-2415 or 718-2622191
Fax: 718-262-2216
https://www.york.cuny.edu/produce-and-print/contents/bulletin/division-of-student-development

Academic Performance: Grades and Probation (Collegewide)
https://www.york.cuny.edu/academics/policies/academic-probation-and-retention

Satisfactory Academic Progress Petition Form
https://www.york.cuny.edu/administrative/finaid/academic-progress/sap-appeal-form

Student Complaint Appeal Process and Form
https://www.york.cuny.edu/academics/policies/student-complaint-appeals-process-and-form
Student Complaint Form — York College / City University of New York (cuny.edu)

Alcohol and Drug Prevention Counseling
https://www.york.cuny.edu/produce-and-print/contents/bulletin-graduate/division-of-student-development-1

Army ROTC Military Science
Room AC-3H01D
(718) 262-3774
rotc@york.cuny.edu
https://www.york.cuny.edu/academics/departments/rotc

Career Services
Room AC- 3M01
(718) 262-2282
career@york.cuny.edu
https://www.york.cuny.edu/student-development/career-services

Counseling Center
Room AC - 1G03
(718) 262- 2272 or 718-262-2297
bpar@york.cuny.edu
https://www.york.cuny.edu/student-development/counseling-center

CUNY L.E.A.D.S. (Linking Employment Academics and Disabilities Services)
Room AC-1G02
(718) 262-2191/3732
csd@york.cuny.edu
https://www.cuny.edu/current-students/student-affairs/student-services/disability/cuny-leads/

Health Service Center
Room AC-1F01 (718)
262-2050
StudHealthSvcCtr@york.cuny.edu
https://www.york.cuny.edu/student-development/health

Male Initiative Program/Men's Center
Room AC-3M02
(718) 262-3772
jquash@york.cuny.edu
https://www.york.cuny.edu/student-development/mens-center

Office of Student Activities
Room AC-1E01
718-262-2285
https://www.york.cuny.edu/student-development/student-activities

Pandora's Box
Room AC-2C13
(718) 262-2529
https://www.york.cuny.edu/academics/departments/english/program-courses/journalism- program

Center for Student Disabilities
Room AC-1G02
(718) 262-2191/3732
csd@york.cuny.edu https://www.york.cuny.edu/student-development/csd

Student Government
Room AC-1G04
sga@york.cuny.edu
https://www.york.cuny.edu/student-development/student-activities/student-government

Women's Center
Room AC-3C01
(718) 262-2008
ejackson@york.cuny.edu
https://www.york.cuny.edu/student-development/womens-center

York College Alumni Association
Room-1B05
(718) 262-2420
alumni@york.cuny.edu
https://www.york.cuny.edu/alumni/association

York College Child and Family Center
94-12 160th Street
Jamaica, NY 11451
(718) 262-2930
yccfc@york.cuny.edu
https://www.york.cuny.edu/student-development/child-and-family-center

Financial Aid
Room AC-1M08
(718)262-2230
finaid@york.cuny.edu https://www.york.cuny.edu/administrative/finaid/frequenly-asked-questions

IT Help Desk
Contact the **IT Help Desk** if your CUNYfirst account does not appear to be working properly in the library.
Room AC-3G02
(718) 262-2023
helpdesk@york.cuny.edu
https://www.york.cuny.edu/it/service-delivery-unit/service-desk

ID Cards
Contact Public Safety on schedule Room
AC- 3rd Floor H Wing
(718) 262-2222
https://www.york.cuny.edu/administrative/public-safety/id-cards

Library
Reference Desk (718) 262.2034
Circulation and Reserve (718) 262.2033
Periodicals (718) 262.2036 library@york.cuny.edu
http://www.york.cuny.edu/library/tutorials

Office of Academic Affairs (OAA)
President
Dr. Claudia Schrader
718-262-2350
Room AC 2H02
https://www.york.cuny.edu/president

For appointments with Dr Schrader, please contact executive Assistant to President
Veronica Mariani
Room AC 2H02
(718) 262-2359
Vmerianai@york.cuny.edu

Provost
Dr. Derrick Brazill dbrazill@york.cuny.edu

Public Safety/ Parking Permits
Room AC-1M02
(718) 262-2222
parking.york.cuny.edu
https://www.york.cuny.edu/administrative/public-safety

Scholarship Office
Room AC-4DA1 (718)
262-5244
scholarships@york.cuny.edu
https://www.york.cuny.edu/centers-institutes/scholarships

Tutoring Center
As of Fall 2017, the York College Center for Academic Success began offering free online and face to face tutoring services for Occupational Therapy majors. All tutors are Occupational Therapy students. Room AC-1C18
718-262-2303 or 718-262-2494
https://www.york.cuny.edu/student/tutoring

Registrar AC-1H08 (718) 262-2145
registrar@york.cuny.edu
https://www.york.cuny.edu/registrar

Writing Center
Room AC-1C18
(718) 262-2494
writingcenter@york.cuny.edu
https://www.york.cuny.edu/academics/writing-program/come-to-the-writing-center
The Writing Center (cuny.edu)

****For contact information on any other departments go to the York website and use the directory.**

TABLE OF CONTENTS

Part 1

Student Handbook

Section 1

Program Information

Overview of the York College Occupational Therapy Program

Overview of the Program

Overview & Size

York College enrolls approximately 8,300 students—about 6,800 undergraduates and 260 graduate students—offering over 60 undergraduate majors and several graduate programs.

Campus & Location

Located on a 50-acre urban campus in Jamaica, Queens, the college is situated within a vibrant, ethnically diverse area of New York City.

Sponsorship

It is a public senior college within the City University of New York (CUNY) system, supported through public funding.

Institutional Mission

York College emphasizes undergraduate access, student success, experiential learning, and service to high-need urban populations. It is known for its strengths in health professions, allied health, aviation management, and support for first-generation students. The college also fosters faculty research and external funding through its Office of Research and Sponsored Programs.

Relevance of the Program

The college's health-sciences and professional programs—such as Occupational Therapy, Nursing, Physician Assistant studies, and Social Work—directly address the healthcare needs of Queens and the broader New York City region, particularly serving diverse and underserved communities.

Cohort & Enrollment

York admits one new cohort each fall, capped at 40 students, ensuring adequate resources and personalized instruction.

Program Length

The combined Bachelor's/Master's degree spans three and a half years and culminates in eligibility for the NBCOT certification exam.

Staffing Pattern

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These elements ensure that the program has sufficient resources—lab space, faculty supervision, and clinical partnerships—to support the full cohort of 40 students annually.

Institutional support and accreditation

The program is fully accredited by the Accreditation Council for Occupational Therapy Education (ACOTE), ensuring that its curriculum, faculty, and facilities meet national standards. Additionally, we are accredited by the Middle States Commission on Higher Education, which underscores our overall institutional quality and commitment to academic excellence.

As the only OT program within the CUNY system, the college receives dedicated funding, faculty appointments, and academic infrastructure support. The program also holds approval as a degree-granting entity from both the CUNY Board of Trustees and the New York State Education Department, ensuring alignment with state educational requirements.

This multi-layered backing—from federal and state educational authorities, a major regional accreditor, and the specialized OT accreditor—demonstrates that the program has both administrative endorsement and the necessary resources to sustain its maximum cohort capacity and uphold high educational and clinical training standards.

Mission and Program Philosophy

This section describes the Mission Statement, Educational Goals, Program Philosophy and Curriculum Design of the Occupational Therapy Program at York College.

Mission Statement

To *prepare* entry-level occupational therapy *practitioners* to provide services to diverse urban populations utilizing evidence-based education, fieldwork, and community experiences. Graduates will be prepared to grow as passionately engaged learners, growing in intellectual potential, contributing, and participating in the profession through direct service delivery, management of service delivery and research.

Educational Goals

1. Students demonstrate knowledge for entry-level occupational therapy practice.
2. Students demonstrate clinical competencies for entry-level practice measured by scores on the AOTA Fieldwork Level II Performance Evaluation.
3. Students demonstrate knowledge and skills to engage in scholarly activity.

Program Philosophy

The York Mission, in the language and form of an educational philosophy state:

"*York college enriches lives and enables students to grow as passionately engaged learners with confidence to realize their intellectual and human potential as individuals and global citizens*." The Occupational Therapy Program mission is consistent with the York College Mission, in that these two lines of thought emphasize the complexity and dynamic nature of human beings as they learn and develop. Humans interact in varied environments through participation in occupations. Dynamic participation in learning enables individuals to develop the necessary intellectual potential and skills for maturation and self-actualization.

The vision of the occupational therapy faculty for the program recognizes a changing world that requires practitioners to have the knowledge, skills and attitudes to be leaders addressing community and individual health concerns; while at the same time, promoting the human need to engage in life activities and maintaining a quality of life throughout the lifespan. The faculty believe that an individual's interests and experiences are key elements in learning; that people have an unlimited potential to develop through education. We believe that it is important for learners, graduates, and faculty to recognize the importance of being motivated and self-directed. All individuals, we believe, must take responsibility for their own learning. The conceptual framework that most closely supports this vision and set of beliefs is a combination of “Progressive” educational philosophy.

Outcomes/Goals of Program

As students progress through the curriculum, it is expected that they will intrinsically and extrinsically value the concepts of occupation and activity, not only as each pertains to theories, practices and skill-sets related to this profession, but also as they relate to the process of continuous development and well-being of all humans; thus fulfilling the mission of this professional education program.

The graduating student will have the knowledge, skills and attitude to be an entry level occupational therapist who:

- Is educated as a generalist with broad exposure to the delivery models and systems utilized in settings where occupational therapy is currently practiced and where it is emerging as a service.
- Has achieved entry-level competence through a combination of academic and fieldwork education.
- Is prepared to articulate and apply professional principles, intervention approaches and rationales, and expected outcomes as related to occupation.
- Is prepared to be a lifelong learner and keep current with best professional practices;
- Is prepared to advocate for consumers and the profession;
- Will uphold the ethical standards, values, and attitudes of the occupational therapy profession;
- Is prepared to be an effective consumer of the latest research and knowledge bases that support practice and contribute to the growth and dissemination of research and development.

Our goals for our graduates are consistent with both the York College Values and the AOTA Vision. We see our graduates as they go out into the workforce as culturally diverse critical thinkers who can *address the needs of a diverse population.* In addition, they will continue to engage in ongoing learning, to improve their skills, and contribute to the growth of the profession in practice and/or research in their communities, regionally, nationally and globally

T he Program Outcomes represent and summarize the values the core threads have within the curriculum design and how the philosophies applied are influencing what the faculty within the occupational therapy program wish to promote in the learners.

By the completion of the program at York College Occupational Therapy Program, the Occupational Therapy Graduate is a:

Reflective Practitioner who demonstrates the knowledge, skills and attitudes to provide state of the art occupational therapy services and

Lifelong Learner who actively engages in their communities, and through lifelong learning, helping them acquire knowledge while developing leadership skills to provide more effective advocacy and community empowerment opportunities for those underserved and/or underrepresented members.

Curriculum Design

The curriculum design of York College CUNY Occupational Therapy Program is based on the interaction of content knowledge concepts and occupational therapy process concepts. It is our belief that the interaction of these delineates the substance and the process of what occupational therapists know and do. As the faculty visualized the connection between the guiding principles of occupation, and the established educational and professional philosophies, a program design was created based on the common critical elements of the envisioned philosophies and guiding principles. These critical elements that the Progressive Educational Philosophy and the Occupational Therapy Education Philosophy reflect actually support the development of three core threads that are incorporated and stressed throughout the curriculum:

Procedural Reasoning/Learning (its foundation consists of skills and learning components of: Pragmatic Knowledge; Problem Solving; Experiential and Discovery Learning; Self-Directed Learning; Lifelong Learning)

Democratic Ideals (Social Action - its foundation consists of: leadership roles; advocacy roles; policy level work addressing: community needs; community development; community empowerment); Social Responsibility (its foundation consists of: enhancing occupational performance of communities and its members; social justice; ethical decision making);

Service Competency (its foundation consists of: improved delivery of services (professional and good citizenry service); more effective advocacy for the underrepresented and/or underserved groups)

References:

AOTA Commission on Practice. (2014). Occupational Therapy Practice Framework: Domain and Process, 3rd ed., *AJOT, March/April 2014, Volume 68 (Supplement 1) S1-S48.*

Anderson, L.W., and Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of Educational Objectives.* New York: Longman

Do, T. (2022). *Progressive education: Views from John Dewey's education philosophy. Wisdom*, 3S(4). Retrieved October 14, 2025, from https://cyberleninka.ru/article/n/progressive-education-views-from-john-dewey-s-education-philosophy

York College OT CURRICULUM DESIGN

University Mission:

York College enriches lives and enables students to grow as passionate, engaged learners with the confidence to realize their intellectual and human potential as individuals and global citizens.

BSHS/MSOT Philosophies

Progressive Philosophy of Education:

Purpose of education is to:
- Promote societal well-being
- Enhance an individual's effectiveness in society.

Education provides learners:
- With practical knowledge
- Problem solving skills
- Leadership & Advocacy skills

The program design stresses the importance of:
- Individuality
- Pragmatic knowledge
- Problem solving
- Experiential learning
- Empowerment
- Self-directedness
- Lifelong learning
- Democratic ideals
- Social responsibility/Service Competency

Curriculum Objectives:

Year 1

KNOWLEDGE OF: (Core: Procedural Reasoning)
- bio-mechanical concepts
- basic anatomical structures & physiological function
- human growth and developmental processes
- history of profession & core values of OT
- ethics, issues in current healthcare & universal precautions
- Activity Analyses
- Basic neuroscience concepts

SKILLS FOR: (Core: Procedural Reasoning)
- goniometry & manual muscle testing
- interviewing individuals to collect information
- establishing therapeutic relationships with consumers
- designing, implementing & conducting activity analyses
- professional writing & clinical documentation

ATTITUDES THAT LEAD TO:
- critical thinking (Democratic Ideals)
- demonstrating an understanding of professional behavior
- procedural reasoning
- responsibility & organization (Service Competency)

Curriculum Objectives:

Year 2

KNOWLEDGE OF: (Core: Procedural Reasoning)
- research methodology/developing proposals
- basic statistical analysis
- evidence based practice
- culturally competent practice
- O.T. interventions in all diagnostic categories

SKILLS FOR: (Procedural Reasoning)
- assessing strength, sensation, vision, perception & cognition
- administering standardized & non-standardized evaluations
- transfer training and functional mobility
- collecting, analyzing and interpreting data
- participation in scholarly activities

ATTITUDES THAT LEAD TO:
- interactive reasoning (Democratic Ideals; Procedural Reasoning; Service Competency)
- active collaboration within & outside of discipline (Service Competency)
- realization of individual treatment needs (Democratic Ideals; Service Competency; Procedural Reasoning)
- client-centered practice and therapeutic use of self (Democratic Ideals; Service Competency)

Year 3

KNOWLEDGE OF (Core Thread: Procedural Reasoning):
- measurement outcomes
- relationship between occupation and health
- reimbursement systems
- ethical decision making
- treatment planning

SKILLS FOR (Core Thread: Procedural Reasoning):
- application of O.T. theory/practices
- documentation that maximizes reimbursement
- seeking out information independently
- group process interventions

ATTITUDES THAT LEAD TO: (Core Threads)
- culturally competent practice (Democratic Ideals; Service Competency; Procedural Reasoning)
- self-directed learning (Democratic Ideals)
- leadership & advocacy (Service Competency;
- professional commitment (Democratic Ideals)
- self-awareness for on-going personal/professional growth (Democratic Ideals)

Year 4

KNOWLEDGE OF (core: Procedural Reasoning)
- Emerging practice areas
- Concepts of disabilities, culture and society

SKILLS FOR (Core Thread Procedural Reasoning
- Progressive application of O.T. theory/practices
- More developed documentation that maximizes reimbursement
- Seeking out information independently

ATTITUDES THAT LEAD TO:
- Culturally competent (democratic Ideals; Service Competency; Procedural reasoning)
- Self directed learning (democratic Ideals)'Leadership & Advocacy (Service competency)
- Self awareness for ongoing personal & professional growth (Democratic ideals)

Outcomes/Goals of Program

As students progress through the curriculum it is expected that they will intrinsically and extrinsically value the concepts of occupation and activity, not only as each pertains to theories, practices and skill-sets related to this profession, but also as they relate to the process of continuous development and well-being of all humans; thus fulfilling the mission of this professional education program.

The graduating student will have the knowledge, skills and attitude to be an entry level occupational therapist who:

- Is educated as a generalist with a broad exposure to the delivery models and system utilized in settings where occupational therapy is currently practiced and where it is emerging as a service.
- Has achieved entry-level competence through a combination of academic and fieldwork education.
- Is prepared to articulate and apply professional principles, intervention approaches and rationales, and expected outcomes as related to occupation.
- Is prepared to be a lifelong learner and keep current with best professional practice;
- Is prepared to advocate for consumers and the profession;
- Will uphold the ethical standards, values and attitudes of the occupational therapy profession;
- Is prepared to be an effective consumer of the latest research and knowledge bases that support practice and contribute to the growth and dissemination of research and development.

ACCREDITATION & LICENSURE

The Occupational Therapy Department at York College CUNY is accredited by the Accreditation Council for Occupational Therapy Education (ACOTE) of the American Occupational Therapy Association (AOTA), located at American Occupational Therapy 7501 **Wisconsin Avenue, Suite 510E. Bethesda, MD 20814**. AOTA's phone number is (301) 652-AOTA.

As an accredited program, students who graduate from the York College BS/MS Program in Occupational Therapy are eligible to sit for the National Certification Examination for the Occupational Therapist, administered by the National Board for Certification in Occupational Therapy (NBCOT: https://www.nbcot.org/ One Bank Street Suite 300 Gaithersburg, MD 20878 (301-990-7979). After successful completion of this examination, the graduate becomes an Occupational Therapist, Registered (OTR). In New York State, students who successfully graduate from an accredited program, pass the certification examination, and are of proven good moral character are eligible for New York State Licensure.

Federal Law limits the issuance of professional licenses, registrations and limited permits to United States citizens or qualified individuals; however, **those students who are not US citizens or qualified Individuals will not be able to take the NBCOT exam.**

To be licensed as an occupational therapist in New York State applicants must "be of good moral character." Applicants are required to answer questions that relate to their moral character including questions regarding criminal charges or convictions, whether any licensing of disciplinary authority ever revoked or cancelled a license, and whether applicants have changes pending for professional misconduct. Applicants are encouraged to read New York State licensing requirements available at: http://www.op.nysed.gov/prof/ot/otlic.html prior to applying for admission to the York College Occupational Therapy Program. **If you have a history of a felony conviction it is strongly recommended you contact NBCOT immediately** (12 South Summit Avenue, Suite 100, Gaithersburg, MD 20877 or call (301) 990-7979) to see if you will be eligible to take the certification examination. Contacting the New York State Office of Professions (http://www.op.nysed.gov/ Office of the Professions, Registration Unit, State Education Building - 2nd Floor, Albany, NY 12234) 518-474-3817) is also recommended

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NONDISCRIMINATION STATEMENT

York College is an Equal Opportunity and Affirmative Action institution. The College does not discriminate on the basis of race, color, creed, national or ethnic origin, ancestry, religion, age, gender, sexual orientation, gender identity, marital status, disability, genetic predisposition or carrier status, alienage or citizenship, military or veteran status, or as a victim of domestic violence in its student admissions, employment, access to programs, and administration of educational policies. (https://www.york.cuny.edu/president/diversity-and-compliance **Alicia Franqui, Esq.**
Chief Diversity Officer, *Title IX Coordinator* , *504/ADA Coordinator*: AFranqui@york.cuny.edu
Room AC-2H04 / 718-262-2137)

TITLE IX

Title IX is a Federal law that states, “No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subject to discrimination under any education program or activity receiving Federal financial assistance.” If you feel you have been discriminated against on the basis of sex, please immediately contact the Title IX Coordinators at https://www.york.cuny.edu/president/diversity-and-compliance/sexual-misconduct-and-harassment-prevention.

Please note that all students, as well as faculty, must complete online Title IX Training. Students must complete prior to beginning FW II experiences.
Please note that all students, as well as faculty, must complete online Title IX Training. Students must complete prior to beginning FW II experiences.

Section 2

Academic Information

ACADEMIC STANDARDS

Course Grading

A letter grade of C is the lowest acceptable grade in all Occupational Therapy (OT) courses. If a student receives a letter grade **below a C** in any Occupational Therapy course, they are required to retake that course. In addition, students will have only one opportunity to repeat a course. Obtaining a final grade below a **C** in the same course twice may be the basis for dismissal from the OT program. In addition, students are required to maintain a cumulative GPA of 3.0 or above for all **Occupational Therapy professional courses**. Students who fall below this minimum requirement will be placed on academic probation and will be given one semester to raise their **professional coursework** GPA to the minimum requirement (this may not be the same as in the **overall** York College GPA).

Course Evaluations

Students have the opportunity to complete course evaluations at the end of each course. Once the evaluations have been rated, they are returned to the Program Director and Chairperson of the department for review with the faculty. Faculty, the Chairperson of the department and the Program Director review the outcomes at the end of each semester. This information is important if any substantive changes to the program are to be in accordance with ACOTE standards.

It is only through such input that personal and professional growth and change can occur. This evaluation method not only benefits you as a student, but it assists the faculty and the program administrators in their endeavor to provide students with the best program and faculty possible. Students are encouraged to provide **constructive feedback** to the instructor about the knowledge disseminated during the course.

Providing constructive feedback is an integral part of being an occupational therapist and of professional behavior.

Procedure for appealing a Final Course grade

Historically, the university administration, faculty and graduate students have worked together toward establishing fair policies and procedures regarding graduate students' rights and responsibilities. Successful graduate education requires fairness and mutual trust in these various roles and responsibilities. All OT faculty strive to provide grading practices that are fair and transparent. However, should there be a question or a need to discuss a final grade, or any grading outcomes, this procedure should be followed:

1. Must first consult with the instructor to seek resolution. It is advisable that this meeting occur within a week of the final grade posting or the test grade in question.

2. If the matter cannot be resolved at that level, the student must request, in writing, a meeting with the chairperson to appeal the grade.

3. If the matter is still unresolved, or the student is not satisfied with the outcome of the grade appeal, he/she should follow the York College Committee on Academic Standards procedure for grade appeal. See: https://www.york.cuny.edu/academics/policies/grading-policies

Forms for appeal to this committee are obtained at the York College Committee on Academic Standards, room 4DA1, phone: 718-262-2770
https://www.york.cuny.edu/academics/departments/social-work/assets/shspp-student-appeal-form
https://www.york.cuny.edu/administrative/finaid/academic-progress/sap-appeal-form

Academic Standards for Retention

Occupational therapy program students must complete all program requirements within 5 ½ years of initial starting semester and demonstrate satisfactory academic performance.

Program Standards

- Students are required to maintain a cumulative GPA of 3.0 or above for all **Occupational Therapy professional courses**. Students who fall below this minimum requirement will be placed on academic probation and will be given one semester to raise their **professional coursework** GPA to the minimum requirement (this may not be the same as in the **overall** York College GPA). Students will be notified that they have been placed on *program academic probation* by the program director after all grades are entered at the end of the semester.

Failure to meet the minimum requirements of the probationary status may result in dismissal from the program. In addition, a student being placed on academic probation for any two semesters during the professional curriculum may be grounds for dismissal from the program.

*Students will not be eligible to graduate with an academic deficit (cumulative major GPA for all OT courses must be a minimum of 3.0).

- Please see Fieldwork Manual for Academic Standards in class work connected to Level I and II Fieldwork.

1. Students have the right to petition for readmission, retroactive withdrawals (or leave of absence), readmission. Students are strongly advised to speak with the course instructor first if there is an issue or concern about grades. If the student is not satisfied with the outcome between the course instructor and themselves, the student is encouraged to contact the Chairperson of the Department and/or the Program Director. After meeting with the Chair of the Department, the student may petition The School of Health and Professional Programs (SHPP) Progression and Retention Committee to hear the student appeal of dismissal. The recommended decision of this committee is then presented to the provost as a final action from the SHPP Committee.

   SHSPP Progression and Retention Committee Appeals Procedure, and the forms needed for appeals can be found at https://www.york.cuny.edu/academics/departments/health-and-behavioral-sciences/appeal-procedure-and-form/academics-departments-health-and-behavioral-sciences-appeal-procedure-and-form-frontpage as well as the 'Form' section of this handbook (See page 91).

Students may contact the Office of Student Academic Services to help and provide guidance throughout the petition process. They may help to ensure that the proper petition is submitted and address any questions or concerns.

https://www.york.cuny.edu/academics/academic-affairs/student-academic-services

Monitoring GPA

1. **Students and their assigned program advisor are responsible for monitoring their GPA,** which is calculated based only on the courses taken in the Occupational Therapy Program at York. During **mandatory advisement** sessions, CUNYFIRST and DegreeWorks will assist you and your academic advisor in monitoring your GPA.

- Students on *program academic probation* will be directed to meet with their advisor, and discuss the circumstances that led to their inability to demonstrate satisfactory academic performance. Students on academic probation may be required to enroll in a peer tutoring course, attend peer tutoring, complete Simulations or Case Assignments. These assignments may overlap with semester breaks (including summer breaks).

- The advisor will help the student explore the ways in which they can be more successful in the OT program, and will go over the program policies regarding probation and dismissal. The student must achieve a satisfactory GPA of 3.0 in all their OT professional courses, undergraduate and graduate.

Index values for grades are as follows:

Final Grade	Index Value	Numerical value
A+	4.0	97 – 100
A	4.0	93 – 96.9
A-	3.70	90 – 92.9
B+	3.30	87 – 89.9
B	3.	83 – 86.9
B-	2.70	80 – 82.9
C+	2.30	77 – 79.9
C	2.0	73 – 76.9
C-	1.70	70 – 72.9
D+	1.30	67 – 69.9
D	1.0	60 – 66.9
F	0	0 – 59.9

IMPORTANT: When a student is concerned about how they are doing in any given class it is their responsibility to seek out assistance from their instructor as soon as possible. It is also recommended that the student reach out to their advisor for additional guidance and support. In addition, they should seek out resources on campus such as the Collaborative Learning Center:

https://www.york.cuny.edu/academics/collaborative-learning-center

The York College Collaborative Learning Center aims to provide tutoring that assists, deepens, and enriches students' learning and understanding of course content materials. The CLC supports students academically at all levels and in all disciplines, except Physics. The Center is staffed by College Reading and Learning Association (CRLA) certified tutors and CUNY Graduate Center Writing Fellows.

Each semester the CLC offers free workshops including writing skills and anatomy and physiology.

For information, visit the Collaborative Learning Center in Room 1C18, or contact us at Tel: 718-262-2303/ 718-262-2494.

- The student will be notified in writing that they have been dismissed from the OT program by the Department Chairperson and/or the Program Director after all grades are entered at the end of the semester and GPA can be calculated. This notification may be sent through email through the student's York College email address and /or registered mail. Students need to make themselves available through the York College student email communications, and be available to meet with the School of Health and Professional Programs (SHPP) Progression and Retention Committee for the up to 3-4 weeks after final grades have been posted if they intend to petition for a formal evaluation of the outcome of their academic standing.

- Students should be aware that their academic advisor will be notified throughout the process and is available to the student for guidance on these matters. If in the event the advisor is the faculty member that is being petitioned against, then the Program Director will serve as the student's advisor during the appeal process.

Other circumstances which may result in a student being placed on Academic Probation or Dismissal from the OT program include, but not limited to:
(but not limited to)**:**

- When a student's professional course GPA within the OT program falls below 3.0.
- When a student receives 2 failing grades in any one semester. (**Note**: any grade below a **C** constitutes a failing grade).
- When a student fails any one course for a second time.
- When a student engages in misconduct (see below).
- Dismissal after failure of Fieldwork II if on probation.
- Dismissal after two failures of Fieldwork II.

The Occupational Therapy Program may dismiss a student from the program due to any infraction(s) of the rules of Student Conduct on Campus or a breach of Occupational Therapy Ethics. This includes but is not limited to, cheating, plagiarism, the use of drugs, and/or other activities mentioned under the Guide for Student Development.

Students being dismissed from the Occupational Therapy Program have the right to appeal the decision.

Procedure for Appealing a Dismissal

2. The dismissed student must meet with the program director of occupational therapy prior to appeal.
3. The student may meet with the Chair of the department after meeting with the program director should the student have further concerns with the outcomes form the meeting with the program director.
4. After meeting with the Chair of the Department, the student may petition The School of Health and Professional Programs (SHPP) Progression and Retention Committee to hear the student appeal of dismissal. The recommended decision of this committee is then presented to the provost as a final action from the SHPP Committee.

   SHSPP Progression and Retention Committee Appeals Procedure, and the forms needed for appeals can be found at https://www.york.cuny.edu/academics/departments/health-and-behavioral-sciences/appeal-procedure-and-form/academics-departments-health-and-behavioral-sciences-appeal-procedure-and-form-frontpage as well as the 'Form' section of this handbook (See page 91).

   As part of the process to appeal to the SHSPP Progression and Retention Committee, please follow these guidelines:

- The student has within five business days to respond after receiving notification to file an appeal for dismissal from the program.
- The appeal is made in writing: formally typed, double spaced, and dated with contact information including e-mail address and telephone number. The letter requesting an appeal should include any supporting documents and submitted to the Office Assistant for the School of Health Sciences and Professional Programs (AC 2H07) (addressed to the attention of Chair for SHSPP Student Progression and Retention Committee) or sent via email to SHSPPAppeals@york.cuny.edu.
- The student will be notified by the SHSPP Committee Chairperson via e-mail and two mailings via postal and certified mail of the hearing date and time.
- Students will have an opportunity to present in person all supporting materials at the scheduled SHSPP Appeal hearing.
- After the meeting, the student will be notified within five days of the Committee's decision. The Committee decision is final.

Academic Misconduct/ Breach in Academic Integrity

Academic Integrity It is the student's responsibility to know and understand policies regarding academic integrity. Ignorance of the policies is not an acceptable excuse. Examples of and sanctions for academic integrity violations are summarized in the Academic Integrity Policy on the following York College websites: https://www.york.cuny.edu/academics/academic-affairs/faculty-resources-1/academic- integrity/policy/university/view, https://www.york.cuny.edu/academics/academic-affairs/faculty-resources-1/academic-integrity ; the course syllabus, Resources are posted on the Library website, and the following York College website: https://www.york.cuny.edu/academics/departments/english/faculty-resources/300/resources-for-students .

Acts of academic misconduct, including but not limited to: plagiarism, cheating, use of drugs, violent acts and/or breach of Occupational Therapy Ethics , repeated unprofessional behaviors , may be the basis for dismissal from the OT program. See York college policy on academic integrity & plagiarism:

http://www.york.cuny.edu/academics/academic-affairs/academic-integrity-officer

A breach of academic integrity must first be discussed with the instructor.

If the issue is unresolved, the faculty is to submit a Faculty Report form (from above website) to the Academic Integrity Officer (AIO), currently Dr. Linda Grasso at lgrasso@york.cuny.edu or at 718-262-2490.

The AIO will contact the student. Please see the link above for AIO process.

The disposition of the AIO will be reported to the department for follow up as to any change in student status in the program.

Examples of breaches in academic integrity (not a full list):

Cheating

- Defined as, but not limited to the following:
- Use or giving of any unauthorized assistance in taking quizzes, tests, or examinations;

Plagiarism

- Defined as but not limited to the following:
- Submitting assignments/papers that are not written by the student
- The use of by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgement consistent with practices of the discipline;
- Unacknowledged use of materials prepared by another person or agency engaged in selling term papers or other academic materials.

Strategies to Prevent Academic Integrity Violations and Plagiarism: Students should use a variety of strategies to prevent unintentional plagiarism, including:

• Reviewing resources and policies to increase understanding of academic integrity and plagiarism.

• Documenting all information sources and their citations in preparation for writing.

• Developing a time management plan for completing assignments.

• Not giving other students a copy of your assignment without instructor permission. Unless directed otherwise, when you collaborate with another student, **you are allowed (and in fact are encouraged) to bounce ideas and questions off each other, clarify concepts, give general advice, and demonstrate techniques using examples.** You are not allowed to solve a problem for another student or to copy a solution from another student. Copying between students constitutes a serious infraction.

• Asking your instructor or the Tutoring Center if you have questions regarding academic integrity policies and strategies to prevent plagiarism.

STEPS TO HELP YOU CHECK YOUR OWN WORK:

Step 1: Review resources until you are clear you understand plagiarism. Review the Academic Integrity Policy for York College and the Academic Integrity and Plagiarism section of this handbook; this outlines the steps that are followed when plagiarism is suspected or identified.
Step 2: Read EACH sentence in your paper. Ask yourself: a) Is this sentence totally my own idea (this will be rare in assignments that ask you to review the literature) OR b) Is this sentence common knowledge or a general topic sentence that introduces the paragraph (e.g., Occupational therapy is important; or There are several risk factors for stroke.) OR c) Is any part of this sentence from one of the information or data sources I used? If you answer 'c' for any sentence, find the source and cite it at the end of the sentence. (The only exception is if you have clearly linked several sentences together for the reader using an introductory sentence. Example: Jones outlined three intervention options for stroke (2011). First,… Second,... Third,…) If you answered 'a' or 'b', then you do not need a citation.
Step 3: Re-read EACH sentence with a citation. Ask yourself:
a) Is this sentence a direct quote or exact words from a source? OR
b) Is this sentence slightly rewording a direct quote by changing just a few words or phrases? OR
c) Is this sentence explaining the idea in my own words AND sentence structure?

If you answered 'a' for any sentence, you MUST use quotation marks to identify the direct quote AND identify the source and the page number if available. If the page number is not available, put (n.p.) after the number of the source. It does not matter where you got the phrase or sentence from – if you use it in the original format without identifying it as a quote with its source, it is plagiarism.

If you answered 'b' for any sentence, this is plagiarism even if you identify the source of the citation, because you are not rewriting the direct quote in your own words.

To do 'c', read the direct quote and then put it aside. Now write the sentence or idea in your own words. If you answered 'c' for any sentence, then all you need is the citation at the end of the sentence.

Step 4: Look at EACH figure, table, graph, and photo in your report. Ask yourself:

a) Is this visual image from a source I used? OR

b) Is this visual image totally my own idea based on my own research study? (this is unlikely)

If you answer 'a' for any visual image, you MUST cite the source using APA style. This requires you to put your citation at the end of the title or in a note at the bottom of the visual image. If you were going to publish this report in a publication, you would also need to get copyright release if it is copyrighted.

If you answered 'b' for any visual image, you do not need to cite a source (again, this is very unlikely).

Step 5: Look at your Bibliography or Reference List. Ask yourself:
a) Are all my report sources cited? Remember it is very easy for someone to find sources that you did not cite

Academic Honesty Policy for Distance Education Courses

Honesty in any college class is critical to your success as a student. York College, CUNY is committed to maintaining the highest ethical standards possible related to student academic performance in our distance and face-to-face courses. As a York College Occupational Therapy student, when you are given access to Brightspace, our online course software, you are expected to keep your username and password confidential and to never allow anyone else to log-in to your account. Sharing access or passwords to Blackboard is considered a breach of academic integrity and could result in you being removed from your class. When you log-in to Brightspace, you do so with the understanding and agreement to produce your own work, to complete course activities yourself, including online discussions, and to take course exams, tests or quizzes without the assistance of others. Allowing others to complete your course work, discussions, or to take your quiz, test, and exams is considered cheating and could subject you to receiving an "F" for the course. In addition, this type of dishonesty can result in formal disciplinary action being taken against you by the college. Integrity concerns may be reported to the Academic Integrity Officer for education, Forms and all communication about integrity-related matters to integrity@york.cuny.edu.

Departmental Policy for Use of AI Tools:

Original Work Requirement:
All assignments, projects, and assessments must be the result of the student's individual effort and understanding. Submissions must be original and reflect the student's own work.

Citations and Avoiding Plagiarism:
Students should refrain from directly copying and pasting AI-generated content into their submissions. Originality and personal input are crucial components of academic work. If students utilize AI tools to generate ideas or content, they must properly cite and acknowledge the use of such tools in their work. Failure to do so may be considered a violation of academic integrity.

Consequences for Violations:
Violations of the policy may result in academic consequences, including but not limited to receiving a reduced grade for the assignment,
failing the course, or facing disciplinary actions as per the institution's academic integrity policy.

Educational Support:
Students are encouraged to seek out campus resources about academic integrity, proper citation, and responsible use of AI tools.

Review and Revision:
This policy will be periodically reviewed and revised to ensure its effectiveness in maintaining academic integrity while allowing students to benefit from emerging technologies.

Academic Deficit

Students will not be eligible to graduate with an academic deficit (e.g. GPA in professional major courses for 300, 400, 500 and 600 level OT courses must be 3.0 or higher).

Criteria for Assignments

All students are required to purchase the latest edition of *The Publication Manual of the American Psychological Association.* This text will serve as a guide for all student papers and projects that are handed in during their participation in their occupational therapy education.

Assignments are expected to be submitted on time.

Academic work must be the original work of the student. Allowing one's work to be copied, sharing answers to an exam, giving or selling term papers are prohibited. (See: York College Academic Integrity Policy)

https://www.york.cuny.edu/academics/academic-affairs/faculty-resources-1/academic-integrity

Requesting a Leave of Absence or Withdrawing from a Course

- Students are required to file a written request for a formal leave of absence with the chair of the OT department (see page 31 for instructions) prior to withdrawal. **A Formal Leave of Absence** indicates that the student is withdrawing completely from all course work for the stated time of request for a leave and formally states a time of intent to return to the program.

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- Any student requesting a **Leave of Absence is aware that this will impact their date of graduation from the program** and must follow the program's policies of the timeframe in completing all program requirements within the identified maximum time to complete the program, 5 ½ years.

- Students must receive approval from the Department Chairperson for a leave of absence.

- Prior to returning to the program, the student must contact the Department Chairperson **at least 3 weeks prior to the state of return** with a **Plan of Action** that demonstrates strategies that identifies strategies supporting successful student outcomes. This **Plan of Action must be approved by the Department Chairperson prior to the student returning to the program.**

- Students are allowed only **one** leave of absence (withdrawal from all courses) after starting the OT curriculum sequence.

Course Withdrawal

- Withdrawal from any one course in that particular semester requires permission from the Department Chairperson and Program Director.

- Students are required to submit to the Department Chairperson a plan of action that demonstrates improved study strategies and any other strategies that will support a successful outcome for the student

- Any approved withdrawal from an OT Professional course may result in a change of the original graduation date to at least one year later.

- Students will be allowed only **one withdrawal** from an OT Professional course while in the program. More than one course withdrawal may prevent the student from completing the program in the maximum time allowed as per the program policy.

Student Grievance Policy and Procedures

Historically, the university administration, faculty and graduate students have worked together toward establishing fair policies and procedures regarding graduate students' rights and responsibilities. Graduate students, faculty and administrators assume a variety of roles and responsibilities with respect to one another. Successful graduate education requires fairness and mutual trust in these various roles and responsibilities.

Below is the link for the College's policies and procedures for Student grievances:

https://www.york.cuny.edu/it/e-forms/york-college-complaint-system

We encourage all students to begin resolving grievances first with the faculty member, if the matter cannot be resolved, or the student is uncomfortable with bringing this matter to the attention of the faculty member, then the student is encouraged to present the matter to the program chairperson. A resolution of the alleged violation should be sought through a conference among the accused, the accuser, and the graduate program director, if possible. Grievances that cannot be resolved at the level of the program may be brought to the Dean of the school.

Graduation Requirements

To successfully graduate from the program, the student must have the following requirements:

- Successful completion of the course of study including all Fieldwork I and Fieldwork II experiences and requirements; and
- Approval by the student's Occupational Therapy Program Director, and the Chairperson of the Department.
- Good academic standing in the College and in the Occupational Therapy Program.
- Complete all York College and CUNY degree requirements.

Section 3

Program Professional Behaviors Policies and Procedures

POLICIES FOR PROFESSIONAL BEHAVIOR

Professional Behavior Attitude and Professional Behavior, along with knowledge and skill, are evaluated during ALL classroom and fieldwork experiences. Please remember, this is a **professional** program, in addition to also being a degree awarding academic program.

The faculty believe that students' knowledge, skills, attitudes, and behaviors exhibited in the classroom are reflective of those they will exhibit during fieldwork experiences. The faculty encourage students to view the classroom setting (lectures, laboratories) as an extension of the clinical setting. The faculty expect students to utilize their critical thinking, communication skills, and reflective reasoning at all times. Seeing these abilities on an ongoing basis assists the faculty when they are assessing the students‟ professional development".

Any student who communicates in a manner that is deemed unprofessional either through behaviors or means of communication will be spoken to first and will be placed on academic probation if this behavior should occur a second time. A formal reprimand will always be placed in the student's folder. If, after noted offenses, the student does not correct the noted unprofessional behaviors, that student may be dismissed from the program. Whether on fieldwork, attending classes on campus, or participating in special activities/events, students must remember that they are a reflection of the school, faculty, and the profession. Students are expected to be prompt, to follow the rules and regulations of the facility, to be courteous and to dress professionally. Failure to do so will result in placing the student on probation and having a formal reprimand on file.

Please be respectful to fellow students, the faculty and staff of the York College Occupational therapy Program and at the college at large. Students are expected to learn, develop and maintain the professional behaviors and competencies which are put forth in the Code of Ethics (see section 4 of this Handbook) and standards of the American Occupational Therapy Association. Behavioral expectations for Occupational Therapy students at York College CUNY are demonstrated by:

Attendance

Students are required to attend the section for which they are registered.

Attendance is mandatory for all classes. Any student that is absent must notify via email the department (ot@york.cuny.edu) and course instructor as early as possible. Department (718-262-2720) and faculty telephones all accept voicemail 24 hours a day.

More than 3 absences are considered excessive. Lateness and early departures from class are inappropriate without notification and approval of the course instructor. Attendance is taken by all instructors in every class session. The student is responsible for making up any material missed due to lateness and/or absence.

Students who are absent for a laboratory class need to attend a tutoring session with a student who attended the lab focused on the topic of the laboratory class they missed. Documentation of attendance at tutoring or proof of working with a peer must be provided to the course instructor. In addition, the student who missed the lab session may need to coordinate with the Lab Instructor alternative learning activities to address missed learning.

PLEASE NOTE: Any student who has been excessively absent from a course and does not present adequate documentation to the instructor, may receive the grade of WU (unofficial withdrawal), which is computed as an F *. Students must adhere to the attendance policies as noted in York College Bulletin:

https://www.york.cuny.edu/produce-and-print/contents/bulletin/academic-policies-academics

Students are responsible for taking examinations and quizzes on assigned days and times. Policies and procedures regarding make-up exams (e.g. quizzes, mid-term exams, short exams) are established at the discretion of the individual course instructor. Students are expected to notify the course instructor at the beginning of the course if the student requires a rescheduled time for a makeup exam/quiz. This make up time will follow the policy and procedure of absences and lateness of the program. Students will be required to provide documentation to support their reasons for requested make up exam/quiz time, if the course instructor consents to a makeup exam/quiz.

Missed FINAL examinations must follow the York College Final examination policy.

https://www.york.cuny.edu/produce-and-print/contents/bulletin/academic-policies-academics

Lateness

Punctual attendance in all classes is expected of all students. Students are expected to arrive promptly for class. Tardiness disturbs both the instructor and other members of the class.

Leaving prior to the end of class without prior course instructor approval, may be counted as lateness. Attendance is taken at each session. This includes **both** lab and lecture sessions for each course. Please note that the course instructor may have a different policy on attendance, in which case, these will be enforced for that particular course. Your academic advisor will be informed of absences, lateness and any display of unprofessional behavior or lack of participation.

Student Advisement / Professional Development Evaluation

Students are required to meet with their advisors once a semester to review the student's academic and professional progress. In the **Fall semester students are required to make appointments to see their advisors either the last week in October or first week in November; in the Spring semester appointments should be scheduled either the last week in March or the first week in April.**
To prepare for these meetings students are required to:

- Complete the professional development plan each semester prior to the meeting; program advisor may add comments at the meeting. The student and the academic advisor will also review the student's professional GPA to monitor academic standing.

- As part of students continued self-reflection, students will prepare Student Professional Development form (copy of form in appendix).

- Students' advisors will complete a Student Semester Evaluation Summary during the advisement meeting. Copies of the student self-assessment, development plan and evaluation summary will be kept in the student file (copy of form in appendix).

- Copies of all forms are available in the "Forms" section of this Handbook. Students are responsible for maintaining copies of completed forms for their personal records.

Expected Professional Behaviors

Academic Integrity: Students will be expected to comply with the York College of The City University of New York Integrity Policies. All assignments must represent new, original work developed specifically for each course. Reusing assignments or papers from previous classes will be considered equivalent to plagiarism. You may include references to material you have written for other classes, provided they are cited properly. APA style is to be utilized for references and citations.

If you have any questions about whether a specific studying technique would constitute academic dishonesty, feel free to ask Faculty. All students are referred to the previous section on **Academic Integrity Policies** for more detailed information.

Social Media

One area of professionalism is how students present themselves inside and outside of the classroom and how they represent the Department of Occupational Therapy and York College. We are aware that many York College students subscribe to online services such as Facebook, Twitter, Snapchat, Whats UP and Instagram, etc.

We encourage students who are in our professional graduate program to revisit their social media sites for pictures and information that were posted to determine whether their current content reflects appropriate professional behavior, particularly if they identify themselves on these websites as students in the York College OT program.

Students are encouraged to join the York College Occupational Therapy Alumni Facebook after graduating from the program. Students are also encouraged to create a professional LinkedIn profile and connect with faculty and peers to build a professional occupational therapy network after they have graduated from the program. Students **are not allowed** to contact any **faculty, staff member (this includes core faculty, adjunct faculty, Clinical Field Work Supervisors- both FW Level I and FW Level II, and any facility staff members**) or clients via any social type of networking while they are in the OT Program.

Often students create a Facebook/What's Up ap or any social media account group for their own cohort which becomes a valuable communication tool among the students. The following basic guidelines should be considered for all social media:

1. All information should be accurate and up to date.

2. **Confidential information of any kind should not be shared**.

3. **Complaints regarding other persons, employers, teachers, fieldwork sites, etc. should not be posted**.

4. Applications, photos, friends, and groups should be joined selectively.

5. **Do not post anything to your profile that you would not want your instructors, family, colleagues, supervisors, or future employers to see.**

6. **Do not use foul, demeaning, or discriminatory language.**

Being health care professionals, you now need to consider the following social network guidelines to ensure you are not unintentionally noncompliant with HIPPA regulations.

In addition, students are expected to maintain privacy regulations when it concerns the program and clinical sites, as well as clinical supervisors. **Students cannot post on their social network any information regarding their experiences in the program where the program or the faculty member is easily identified, or with any Clinical Supervisors or Field Work clinical sites, this also includes pictures or videos of any nature that contains any information (whether it is written, visual or auditory presentation) of the clinical site, clients, clinical staff members, or clinical supervisors.** Any comments posted on such sites are considered a violation of privacy and/or slanderous. Under **no** circumstances will such postings be acceptable behaviors by the program administration.

Such acts will be considered as unprofessional behaviors and will be addressed accordingly, including, but not limited to, removal of the student from that site, failing the student for that Field Work experience, or being immediately being placed on probation or recommended for dismissal from the program.

1. When speaking with your peers while on FW II, you must also recognize you cannot share any information related to fieldwork on Facebook, Twitter, Instagram, etc.

2. It is a HIPPA violation if you mention a client/patient with enough information that the person might be identified, even if you avoid PHI. The consequences for violations, as you know, are severe. For more information: http://www.aota.orq/-/media/Corporate/Files/Practice/Ethics/Advisory/Social-Networking.ashx

3. Names of supervisors, comments, and/ or criticism about sites or information about what is happening at sites should not be posted on public social network sites.

4. Students should not put posts or photos on social networks about fieldwork experiences (including location, clients, diagnosis, treatment, fieldwork educators and staff etc.).

5. Do not ask your supervisor or anyone at the clinical site to "friend" you while on fieldwork. You are not permitted to accept requests from these individuals. This is to protect your privacy and maintain the boundaries of the professional relationship. If

you mutually decide to do this after graduation; this is your personal choice.

6. Do not ask or receive requests on social media from the clients and/or from family members/significant others of clients you interact with while on fieldwork. If you mutually decide to do this after graduation, this is your personal choice.

7. If there are any questions or you are unsure of something regarding social networking, call the Academic Fieldwork Coordinator for advice.

8. If you are attached to your cell phone and have to look at it constantly, it is advised you leave your cell phone in your car or in the office so you are not tempted to pull it out while you are with a client, caregivers, your clinical supervisor, etc.

9. Consider what you post on any social networking site. Many potential employers go to these sites to see what you have posted and often determine if they are interested in having you as an employee. Consider Googling your name to discover what is in cyberspace that others can see about you.

Learning Accommodations: A reasonable accommodation is intended to reduce the effects that a disability may have on a student's performance. Accommodation does not lower course standards or alter degree requirements but give students a better opportunity to demonstrate their abilities. CUNY York College is committed to providing access to programs and services for qualified students with disabilities. If you are a student with a disability and require accommodations to participate and complete requirements for this program, contact the STAR Program (Specialized Testing and Academic Resources)(formerly the Office of Students with Disabilities).The STAR Program provides supportive services to York students with permanent and/or temporary documented disabilities, such as physical, learning and/or psychological, in compliance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. The program ensures access and facilitates students' academic success through the provision of appropriate educational supports including the organization and delivery of "reasonable" accommodations; academic adjustments and/or auxiliary aids such as extended time for testing, use of a tape recorder, reader/scribe, note-taker, magnification device, closed-caption television (CCTV), and use of adaptive technology. Supplemental services such as academic advisement, personal and educational counseling, advocacy, and referrals to on/off campus community resources are also provided to help meet the unique educational needs of students with disabilities.

The STAR Program is committed to fulfilling its mission of assisting students with a disability achieve their full academic potential, while encouraging self-sufficiency, and facilitating the elimination of any physical, educational or attitudinal barriers. All students with a documented disability are encouraged to self-identify to the STAR Program in a timely manner to ensure access to all course, programs, services, and activities at York College.

To determine if you are eligible for the STAR Program, please stop by the office, call, and/or email to speak with a member of the STAR staff. The STAR Program is located in Room AC-1G02, the telephone number is 718-262-2191/3732 and the email is star@york.cuny.edu. It is the student's responsibility to inform their instructor of any special needs as soon as possible if accommodation is needed.

A student should make an initial request for accommodation to the STAR Program and provide appropriate supporting documentation. The STAR Coordinator may consult with appropriate college officials such as the instructor or provost to determine the appropriateness of the requested accommodation consistent with the program requirements. Such consultation shall be confidential, and limited to those officials whose input is necessary to the decision. Students may consult with the STAR Coordinator or the 504/ADA Compliance Coordinator at any time to discuss and understand their rights under the Rehabilitation Act, the ADA, and state and local legislation, and they are encouraged to do so.

It is a student's responsibility to self-identify through established procedures. If a student approaches a faculty or staff member and discloses a disability, but does not have documentation from Disability Services, the faculty/staff person has a responsibility to direct the student to Disability Services. The faculty will make reasonable accommodations for students with documented disabilities, as determined by the Disability Services office.

Religious Accommodations: Those students who require religious accommodations or adjustments must follow CUNY procedures for requesting such accommodations by contacting the Office of Student Affairs. The Chief Student Affairs Officer, or a designee, and the student will engage in an interactive process with the goal of finding an acceptable accommodation.

https://www.york.cuny.edu/student-development

Pregnancy Policy

In the event a student is pregnant while in the program, it is important to inform the Program Chairperson to determine if the student or the baby is at risk for harm depending on the course work and any materials that are to be handled. As for accommodations for coursework or class time during or after pregnancy, it is important to discuss with the course instructors what accommodations can be made without compromising the student's quality of education. It may be possible that the student may need to take a leave of absence and step out of course sequence, and this may delay graduation by one year. The student is also referred to York College's website for more information and support:

https://www.york.cuny.edu/produce-and-print/contents/bulletin/policies-policies

Communication Policy and Procedures

Email: Within the first 2 weeks of Fall/Spring Semester courses, Students must register for a York e-mail address. This is to be reported to the OT Department**.**

Updated contacts: Students are responsible for notifying the department of any changes in their address or phone number. Students must also provide the Registrar with their updated contact information.

Cell phones: All electronic communication devices are **NOT** to be used in the classrooms during all learning activities. In the event that you are waiting for an important text or phone message, you **MUST**:

- **First**, notify your course instructor prior to class explaining the urgency of such text or phone call
- Then, with permission of your course instructor, place your phone on vibrate and step out of the room to respond. No texting or twittering during any class activities, (even if it is to post how much you love this program or course!).

Cell phones and all electronic devices may be collected by instructors prior to quizzes or exams, particularly during midterm and/or final examinations.

Email and Brightspace Accounts

Timely & efficient communication is necessary in academic and professional environments. All students must use their **York College Email Account** for all correspondence regarding school-related information. Students are also expected to check this email account daily as well as BlackBoard course accounts and Program account for any information such as registration charts and notices.

In addition, any changes in student's personal contact telephone number(s) and address must be provided to the Occupational Therapy Program to the administrative assistant immediately in order to always maintain current emergency contact information.

Professional Participation: Students are expected to actively participate in the York Student Occupational Therapy Association (YSOTA). This participation is an important start to being an active member of their professional community. ***Students are encouraged to join the American Occupational Therapy Association (AOTA) and the New York State Occupational Therapy Association (NYSOTA) during the first week of classes.***

Dress Code: Students must maintain a neat and clean appearance befitting student attending professional education. Students must adhere to dress requirements for laboratory classes and fieldwork education.
In the classroom environment and outside of the classroom students are to wear articles of clothing that are appropriate for activity. When guests are present in the classroom and laboratories the student is **expected to dress professionally.** No caps or hats in class (except for religious purposes).

Outside of the classroom when representing the Occupational Therapy Program:

The professional work environment is different from the college. Dress codes are usually written in consideration of the clients that are served, the types of services provided, the type of facility, safety, and so as not to distract from the services delivered or to offend clients, families, or other staff. Students on fieldwork or classroom assignments outside of class are expected to conform to the dress requirements of the setting. **Identification badges will be required during such experiences unless otherwise indicated.**

In general, the following constitutes appropriate "casual professional" dress:

- Skirts or slacks and tailored shirts with a collar and sleeves
- Clothing that is clean, pressed, appropriately fitted, and in good repair
- Undergarments
- Minimum jewelry
- Moderate colors and styles
- Appropriate personal hygiene
- Hair clean and groomed
- Comfortable shoes with a low or no heel (closed toe & heel for medical facilities)

Please note that at this point in your academic career, you are representing the York OT Program, York College and the profession of Occupational Therapy, your ethical and moral behaviors may be interpreted as a reflection of these institutions. This is part of professional behavior and professionalism.

OT Department Lab spaces: The Occupational Therapy Program is fortunate to have lab space and equipment dedicated to supporting student education. All students hold equal responsibility with the faculty and staff in keeping these spaces safe and clean.

- **Absolutely no equipment, supplies, testing materials may be removed** from any of the OT Labs without authorization from CLT or course instructor.
- **Students are responsible for replacing materials they borrow that become damaged.** All equipment will be examined prior to checking out, and examined again when returned**.**
- **Computer Lab (Room 1E09): Absolutely no eating or drinking** is permitted in the computer lab.
- **Absolutely no personal software,** programs, games, etc. are to be loaded on department computers, nor are any programs to be removed.
- Students are required to provide their own USB devices for saving their data files.
- Any problems with equipment should be reported immediately to CLT or course

instructor.

Please review college computer use policy: https://www.york.cuny.edu/produce-and-print/contents/bulletin/policies-policies

Due to the nature of scheduling for adequate lab space and to accommodate clinical professionals who teach within the program, the Department of Occupational Therapy reserves the right to make last minute changes to program schedules (date, time and room).

PERSONAL AND GENERAL LABORATORY SAFETY

All students must read and understand the information on laboratory safety and emergency procedures before using the laboratories. With good judgment, the chance of an accident can be minimal. Nevertheless, lab workspaces are full of potential hazards that can cause serious injury and or damage to the equipment.

General Guidelines

- Never eat, drink, or smoke while working in the laboratory.
- During Covid-19 conditions, all students are required to wear and dispose of PPE attire appropriately and maintain social distancing practices.
- Read labels carefully.
- Do not use any equipment unless you are trained and approved as a user by your instructor.
- Wear safety glasses or face shields when working with hazardous materials and/or equipment.
- Keep the work area clear of all materials except those needed for your work.
- Coats should be hung appropriately.
- Extra books, purses, etc. should be kept away from equipment that requires air flow or ventilation to prevent overheating.
- If a piece of equipment fails while being used, report it immediately to your instructor or the Lab Technician. Never try to fix the problem yourself.
- Clean up and disinfect your work area before leaving.
- Wash hands before leaving the lab and before eating.

Fire Evacuation Procedures

Excerpted from the York College Emergency Procedure Handbook. The handbook can be found in its entirety at: www.york.cuny.edu/administrative/public-safety/emergency-procedures

Know your Emergency Evacuation Route in advance. Know your Evacuation Assembly Point in advance. Also be prepared to use an alternate exit in case your primary route is obstructed. Plan how you would escape in case of a fire. Know your escape routes well enough to be able to make your way in the dark or in dense smoke.

WHEN THE EVACUATION ALARM SOUNDS, YOU MUST LEAVE THE BUILDING!

It is a violation of New York State Law to fail to leave a building when the fire alarm is sounding. Always assume it is a real emergency and leave the building. It is unlawful for any person to prevent or order another person from leaving the building when the alarm is sounding. Be aware that whenever the fire alarm sounds it may signal a very real emergency situation. Remain calm and proceed to evacuate the area in an orderly manner. Do not rush, push or panic. Rely on planning and knowledge. Assist disabled persons to evacuate the area. Be particularly aware of people with sight or hearing disabilities. If there is smoke, stay low, it will be easier to breathe. Before opening any door, touch the door with the back of your hand. Do not open a door that is warm or hot. Close doors behind you to prevent fire spread, but make sure that you can reopen them if you need to retreat.

Listen for instructions from:

- Building & Floor Coordinators
- Fire Wardens
- Security & Public Safety Officers
- Building & Grounds Personnel
- Faculty & Staff
- Never use an elevator to evacuate unless directed to do so by the NYC Fire Department

Section 4

AOTA Code of Ethics
OT Curriculum Framework

Occupational Therapy Code of Ethics (2020)

Preamble

The most recent version of the **Occupational Therapy Code of Ethics** was published by the American Occupational Therapy Association (AOTA) in 2020. This document outlines the core ethical principles and standards of conduct for occupational therapy professionals, guiding their interactions with clients, colleagues, and the community.

The key principles include:

1. **Beneficence** - Ensuring the well-being and safety of clients.
2. **Nonmaleficence** - Avoiding actions that cause harm.
3. **Autonomy** - Respecting the client's rights to self-determination and privacy.
4. **Justice** - Promoting fairness and equity in service provision.
5. **Veracity** - Providing accurate and truthful information.
6. **Fidelity** - Maintaining respectful and professional relationships.

These principles are designed to help occupational therapists navigate ethical dilemmas and ensure they practice in a manner that is consistent with the values of the profession (AOTA Research) (Join AOTA to Fuel Your Passion | AOTA).

For further details, you can access the document through the AOTA website or the American Journal of Occupational Therapy.

The Code is an AOTA Official Document and a public statement tailored to address the most prevalent ethical concerns of the occupational therapy profession. It outlines Standards of Conduct the public can expect from those in the profession. It should be applied to all areas of occupational therapy and shared with relevant stakeholders to promote ethical conduct.

The Code serves two purposes:

1. It provides aspirational Core Values that guide members toward ethical courses of action in professional and volunteer roles, and

2. It delineates enforceable Principles and Standards of Conduct that apply to AOTA members.

Whereas the Code helps guide and define decision-making parameters, ethical action goes beyond rote compliance with these Principles and is a manifestation of moral character and mindful reflection. It is a commitment to benefit others, to virtuous practice of artistry and science, to genuinely good behaviors, and to noble acts of courage. Recognizing and resolving ethical issues is a systematic process that includes analysis of the complex dynamics of situations, weighing of consequences, making reasoned decisions, taking action, and reflecting on outcomes. Occupational therapy personnel, including students in occupational therapy programs, are expected to abide by the Principles and Standards of Conduct within this Code. Personnel roles include clinicians (e.g., direct service, consultation, administration); educators; researchers; entrepreneurs; business owners; and those in elected, appointed, or other professional volunteer service.

The process for addressing ethics violations by AOTA members (and associate members, where applicable) is outlined in the Code's Enforcement Procedures (AOTA, 2014a).

Although the Code can be used in conjunction with licensure board regulations and laws that guide standards of practice, the Code is meant to be a free-standing document, guiding ethical dimensions of professional behavior, responsibility, practice, and decision making. This Code is not exhaustive; that is, the Principles and Standards of Conduct cannot address every possible situation. Therefore, before making complex ethical decisions that require further expertise, occupational therapy personnel should seek out resources to assist in resolving ethical issues not addressed in this document. Resources can include, but are not limited to, ethics committees, ethics officers, the AOTA Ethics Commission or Ethics Program Manager, or an ethics consultant.

Core Values

The profession is grounded in seven long-standing Core Values: (1) Altruism, (2) Equality, (3) Freedom, (4) Justice, (5) Dignity, (6) Truth, and (7) Prudence. *Altruism* involves demonstrating concern for the welfare of others. *Equality* refers to treating all people impartially and free of bias. *Freedom* and personal choice are paramount in a profession in which the values and desires of the client guide our interventions. *Justice* expresses a state in which diverse communities are inclusive; diverse communities are organized and structured such that all members can function, flourish, and live a satisfactory life. Occupational therapy personnel, by virtue of the specific nature of the practice of occupational therapy, have a vested interest in addressing unjust inequities that limit opportunities for participation in society (Braveman & Bass-Haugen, 2009).

Inherent in the practice of occupational therapy is the promotion and preservation of the individuality and *Dignity* of the client, by treating him or her with respect in all interactions. In all situations, occupational therapy personnel must provide accurate information in oral, written, and electronic forms (*Truth*). Occupational therapy personnel use their clinical and ethical reasoning skills, sound judgment, and reflection to make decisions in professional and volunteer roles (*Prudence).*

The seven Core Values provide a foundation to guide occupational therapy personnel in their interactions with others. Although the Core Values are not themselves enforceable standards, they should be considered when determining the most ethical course of action.

Principles and Standards of Conduct

The Principles and Standards of Conduct that are enforceable for professional behavior include (1) Beneficence, (2) Nonmaleficence, (3) Autonomy, (4) Justice, (5) Veracity, and (6) Fidelity. Reflection on the historical foundations of occupational therapy and related professions resulted in the inclusion of Principles that are consistently referenced as a guideline for ethical decision making.

Beneficence

Principle 1. Occupational therapy personnel shall demonstrate a concern for the well-being and safety of the recipients of their services.

Beneficence includes all forms of action intended to benefit other persons. The term *beneficence* connotes acts of mercy, kindness, and charity (Beauchamp & Childress, 2013). Beneficence requires taking action by helping others, in other words, by promoting good, by preventing harm, and by removing harm. Examples of beneficence include protecting and defending the rights of others, preventing harm from occurring to others, removing conditions that will cause harm to others, helping persons with disabilities, and rescuing persons in danger (Beauchamp & Childress, 2013).

Related Standards of Conduct

Occupational therapy personnel shall

A. Provide appropriate evaluation and a plan of intervention for recipients of occupational therapy services specific to their needs.

B. Reevaluate and reassess recipients of service in a timely manner to determine whether goals are being achieved and whether intervention plans should be revised.

C. Use, to the extent possible, evaluation, planning, intervention techniques, assessments, and therapeutic equipment that are evidence based, current, and within the recognized scope of occupational therapy practice.

D. Ensure that all duties delegated to other occupational therapy personnel are congruent with credentials, qualifications, experience, competency, and scope of practice with respect to service delivery, supervision, fieldwork education, and research.

E. Provide occupational therapy services, including education and training that are within each practitioner's level of competence and scope of practice.

F. Take steps (e.g., continuing education, research, supervision, training) to ensure proficiency, use careful judgment, and weigh potential for harm when generally recognized standards do not exist in emerging technology or areas of practice.

G. Maintain competency by ongoing participation in education relevant to one's practice area.

H. Terminate occupational therapy services in collaboration with the service recipient or responsible party when the services are no longer beneficial.

I. Refer to other providers when indicated by the needs of the client.

J. Conduct and disseminate research in accordance with currently accepted ethical guidelines and standards for the protection of research participants, including determination of potential risks and benefits.

Nonmaleficence

Principle 2. Occupational therapy personnel shall refrain from actions that cause harm.

Nonmaleficence "obligates us to abstain from causing harm to others" (Beauchamp & Childress, 2013, p. 150). The Principle of *Nonmaleficence* also includes an obligation to not impose risks of harm even if the potential risk is without malicious or harmful intent. This Principle often is examined under the context of due care. The standard of *due care* "requires that the goals pursued justify the risks that must be imposed to achieve those goals" (Beauchamp & Childress, 2013, p. 154). For example, in occupational therapy practice, this standard applies to situations in which the client might feel pain from a treatment intervention; however, the acute pain is justified by potential longitudinal, evidence-based benefits of the treatment.

Related Standards of Conduct

Occupational therapy personnel shall

A. Avoid inflicting harm or injury to recipients of occupational therapy services, students, research participants, or employees.

B. Avoid abandoning the service recipient by facilitating appropriate transitions when unable to provide services for any reason.

C. Recognize and take appropriate action to remedy personal problems and limitations that might cause harm to recipients of service, colleagues, students, research participants, or others.

D. Avoid any undue influences that may impair practice and compromise the ability to safely and competently provide occupational therapy services, education, or research.

E. Address impaired practice and when necessary report to the appropriate authorities.

F. Avoid dual relationships, conflicts of interest, and situations in which a practitioner, educator, student, researcher, or employer is unable to maintain clear professional boundaries or objectivity.

G. Avoid engaging in sexual activity with a recipient of service, including the client's family or significant other, student, research participant, or employee, while a professional relationship exists.

H. Avoid compromising rights or well-being of others based on arbitrary directives (e.g., unrealistic productivity expectations, falsification of documentation, inaccurate coding) by exercising professional judgment and critical analysis.

I. Avoid exploiting any relationship established as an occupational therapy clinician, educator, or researcher to further one's own physical, emotional, financial, political, or business interests at the expense of recipients of services, students, research participants, employees, or colleagues.

J. Avoid bartering for services when there is the potential for exploitation and conflict of interest.

Autonomy

Principle 3. Occupational therapy personnel shall respect the right of the individual to self-determination, privacy, confidentiality, and consent.

The Principle of *Autonomy* expresses the concept that practitioners have a duty to treat the client according to the client's desires, within the bounds of accepted standards of care, and to protect the client's confidential information. Often, respect for Autonomy is referred to as the *self-determination principle.* However, respecting a person's autonomy goes beyond acknowledging an individual as a mere agent and also acknowledges a person's right "to hold views, to make choices, and to take actions based on [his or her] values and beliefs" (Beauchamp & Childress, 2013, p. 106). Individuals have the right to make a determination regarding care decisions that directly affect their lives. In the event that a person lacks decision-making capacity, his or her autonomy should be respected through involvement of an authorized agent or surrogate decision maker.

Related Standards of Conduct

Occupational therapy personnel shall

A. Respect and honor the expressed wishes of recipients of service.

B. Fully disclose the benefits, risks, and potential outcomes of any intervention; the personnel who will be providing the intervention; and any reasonable alternatives to the proposed intervention.

C. Obtain consent after disclosing appropriate information and answering any questions posed by the recipient of service or research participant to ensure voluntariness.

D. Establish a collaborative relationship with recipients of service and relevant stakeholders, to promote shared decision making.

E. Respect the client's right to refuse occupational therapy services temporarily or permanently, even when that refusal has potential to result in poor outcomes.

F. Refrain from threatening, coercing, or deceiving clients to promote compliance with occupational therapy recommendations.

G. Respect a research participant's right to withdraw from a research study without penalty.

H. Maintain the confidentiality of all verbal, written, electronic, augmentative, and nonverbal communications, in compliance with applicable laws, including all aspects of privacy laws and exceptions thereto (e.g., Health Insurance Portability and Accountability Act, Family Educational Rights and Privacy Act).

I. Display responsible conduct and discretion when engaging in social networking, including but not limited to refraining from posting protected health information.

J. Facilitate comprehension and address barriers to communication (e.g., aphasia; differences in language, literacy, culture) with the recipient of service (or responsible party), student, or research participant.

Justice

Principle 4. Occupational therapy personnel shall promote fairness and objectivity in the provision of occupational therapy services.

The Principle of *Justice* relates to the fair, equitable, and appropriate treatment of persons (Beauchamp & Childress, 2013). Occupational therapy personnel should relate in a respectful, fair, and impartial manner to individuals and groups with whom they interact. They should also respect the applicable laws and standards related to their area of practice. Justice requires the impartial consideration and consistent following of rules to generate unbiased decisions and promote fairness. As occupational therapy personnel, we work to uphold a society in which all individuals have an equitable opportunity to achieve occupational engagement as an essential component of their life.

Related Standards of Conduct

Occupational therapy personnel shall

A. Respond to requests for occupational therapy services (e.g., a referral) in a timely manner as determined by law, regulation, or policy.

B. Assist those in need of occupational therapy services to secure access through available means.

C. Address barriers in access to occupational therapy services by offering or referring clients to financial aid, charity care, or pro bono services within the parameters of organizational policies.

D. Advocate for changes to systems and policies that are discriminatory or unfairly limit or prevent access to occupational therapy services.

E. Maintain awareness of current laws and AOTA policies and Official Documents that apply to the profession of occupational therapy.

F. Inform employers, employees, colleagues, students, and researchers of applicable policies, laws, and Official Documents.

G. Hold requisite credentials for the occupational therapy services they provide in academic, research, physical, or virtual work settings.

H. Provide appropriate supervision in accordance with AOTA Official Documents and relevant laws, regulations, policies, procedures, standards, and guidelines.

I. Obtain all necessary approvals prior to initiating research activities.

J. Refrain from accepting gifts that would unduly influence the therapeutic relationship or have the potential to blur professional boundaries, and adhere to employer policies when offered gifts.

K. Report to appropriate authorities any acts in practice, education, and research that are unethical or illegal.

L. Collaborate with employers to formulate policies and procedures in compliance with legal, regulatory, and ethical standards and work to resolve any conflicts or inconsistencies.

M. Bill and collect fees legally and justly in a manner that is fair, reasonable, and commensurate with services delivered.

N. Ensure compliance with relevant laws and promote transparency when participating in a business arrangement as owner, stockholder, partner, or employee.

O. Ensure that documentation for reimbursement purposes is done in accordance with applicable laws, guidelines, and regulations.

P. Refrain from participating in any action resulting in unauthorized access to educational content or exams (including but not limited to sharing test questions, unauthorized use of or access to content or codes, or selling access or authorization codes).

Veracity

Principle 5. Occupational therapy personnel shall provide comprehensive, accurate, and objective information when representing the profession.

Veracity is based on the virtues of truthfulness, candor, and honesty. The Principle of *Veracity* refers to comprehensive, accurate, and objective transmission of information and includes fostering understanding of such information (Beauchamp & Childress, 2013). Veracity is based on respect owed to others, including but not limited to recipients of service, colleagues, students, researchers, and research participants.

In communicating with others, occupational therapy personnel implicitly promise to be truthful and not deceptive. When entering into a therapeutic or research relationship, the recipient of service or research participant has a right to accurate information. In addition, transmission of information is incomplete without also ensuring that the recipient or participant understands the information provided.

Concepts of veracity must be carefully balanced with other potentially competing ethical principles, cultural beliefs, and organizational policies. Veracity ultimately is valued as a means to establish trust and strengthen professional relationships. Therefore, adherence to the Principle of Veracity also requires thoughtful analysis of how full disclosure of information may affect outcomes.

Related Standards of Conduct

Occupational therapy personnel shall

A. Represent credentials, qualifications, education, experience, training, roles, duties, competence, contributions, and findings accurately in all forms of communication.

B. Refrain from using or participating in the use of any form of communication that contains false, fraudulent, deceptive, misleading, or unfair statements or claims.

C. Record and report in an accurate and timely manner and in accordance with applicable regulations all information related to professional or academic documentation and activities.

D. Identify and fully disclose to all appropriate persons errors or adverse events that compromise the safety of service recipients.

E. Ensure that all marketing and advertising are truthful, accurate, and carefully presented to avoid misleading recipients of service, research participants, or the public.

F. Describe the type and duration of occupational therapy services accurately in professional contracts, including the duties and responsibilities of all involved parties.

G. Be honest, fair, accurate, respectful, and timely in gathering and reporting fact-based information regarding employee job performance and student performance.

H. Give credit and recognition when using the ideas and work of others in written, oral, or electronic media (i.e., do not plagiarize).

I. Provide students with access to accurate information regarding educational requirements and academic policies and procedures relative to the occupational therapy program or educational institution.

J. Maintain privacy and truthfulness when utilizing telecommunication in delivery of occupational therapy services.

Fidelity

Principle 6. Occupational therapy personnel shall treat clients, colleagues, and other professionals with respect, fairness, discretion, and integrity.

The Principle of *Fidelity* comes from the Latin root *fidelis,* meaning loyal. *Fidelity* refers to the duty one has to keep a commitment once it is made (Veatch, Haddad, & English, 2010). In the health professions, this commitment refers to promises made between a provider and a client or patient based on an expectation of loyalty, staying with the patient in a time of need, and compliance with a code of ethics. These promises can be implied or explicit. The duty to disclose information that is potentially meaningful in making decisions is one obligation of the moral contract between provider and client or patient (Veatch et al., 2010).

Whereas respecting Fidelity requires occupational therapy personnel to meet the client's reasonable expectations, the Principle also addresses maintaining respectful collegial and organizational relationships (Purtilo & Doherty, 2011). Professional relationships are greatly influenced by the complexity of the environment in which occupational therapy personnel work. Practitioners, educators, and researchers alike must consistently balance their duties to service recipients, students, research participants, and other professionals as well as to organizations that may influence decision making and professional practice.

Related Standards of Conduct

Occupational therapy personnel shall

A. Preserve, respect, and safeguard private information about employees, colleagues, and students unless otherwise mandated or permitted by relevant laws.

B. Address incompetent, disruptive, unethical, illegal, or impaired practice that jeopardizes the safety or well-being of others and team effectiveness.

C. Avoid conflicts of interest or conflicts of commitment in employment, volunteer roles, or research.

D. Avoid using one's position (employee or volunteer) or knowledge gained from that position in such a manner as to give rise to real or perceived conflict of interest among the person, the employer, other AOTA members, or other organizations.

E. Be diligent stewards of human, financial, and material resources of their employers, and refrain from exploiting these resources for personal gain.

F. Refrain from verbal, physical, emotional, or sexual harassment of peers or colleagues.

G. Refrain from communication that is derogatory, intimidating, or disrespectful and that unduly discourages others from participating in professional dialogue.

H. Promote collaborative actions and communication as a member of interprofessional teams to facilitate quality care and safety for clients.

I. Respect the practices, competencies, roles, and responsibilities of their own and other professions to promote a collaborative environment reflective of interprofessional teams.

J. Use conflict resolution and internal and alternative dispute resolution resources as needed to resolve organizational and interpersonal conflicts, as well as perceived institutional ethics violations.

K. Abide by policies, procedures, and protocols when serving or acting on behalf of a professional organization or employer to fully and accurately represent the organization's official and authorized positions.

L. Refrain from actions that reduce the public's trust in occupational therapy.

M. Self-identify when personal, cultural, or religious values preclude, or are anticipated to negatively affect, the professional relationship or provision of services, while adhering to organizational policies when requesting an exemption from service to an individual or group on the basis of conflict of conscience.

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Ethics Commission (EC)

The Occupational Therapy Ethics Commission is part of the American Occupational Therapy Association (AOTA) and is responsible for addressing ethical issues within the profession. The commission works on developing and updating the AOTA Code of Ethics, providing guidance on ethical dilemmas, and educating the occupational therapy community on ethical practices.

The current members of the Ethics Commission include professionals from diverse areas of the field who contribute their expertise to uphold the standards of ethical practice in occupational therapy. While the specific names of the current commission members are often updated annually, you can find the most recent list of members by visiting the AOTA website under their leadership and governance sections.

For the most accurate and updated information on the current members, you may refer to the AOTA's Leadership & Governance page (Join AOTA to Fuel Your Passion | AOTA) (Join AOTA to Fuel Your Passion | AOTA).

School of Health Sciences and Professional Programs

Occupational Therapy Student Handbook

To our Occupational Therapy Students:

For those who are new to the program, welcome to the Occupational Therapy Program at York College, and for our returning students, welcome back. This handbook has been designed as a supplement to the York College Bulletin; please note that it does not replace the information in the Bulletin. It has been prepared to assist you in the Occupational Therapy Program.

As a new student in our program one of the first responsibilities you have is to acquaint yourself with the information in this handbook. We expect that you will read this carefully. When you have completed reading the handbook please tear it off, fill it out and hand it in the bottom of this sheet. Please sign and submit this by the first day of class.
Please email form to ot@york.cuny.edu

For our returning students, we expect that you will read this carefully. Some policies and procedures may have changed, and you are expected to be aware of those changes and follow them. When you have completed reading the handbook please tear off, fill out and hand in the bottom on this sheet. Please sign and submit this by the first day of class.
Please email form to ot@york.cuny.edu

I, (print name) have read and understand the information and policies in the Occupational Therapy Student Handbook; I have read, understood, and will abide by both the standards of conduct in the Occupational Therapy Code Ethics and the policies and procedures of the most current student hand book for that academic year.

______________________________ ____________________

Signature Date

BS/MS OCCUPATIONAL THERAPY PROGRAM

Essential Functions for Admission and Matriculation to the York College

Students enrolled in the York College B.S./ M.S. Program in Occupational Therapy are expected to meet standards in addition to academic competence, that reflect personal characteristics necessary for successfully completing our course of study. These functions are not related to one's ability to function in a specific role as an occupational therapist, but rather to be able to function in any role as an occupational therapist, in any practice setting. In order to succeed in our program, students must be able to demonstrate multiple skills and abilities that span the academic, motor, emotional, and social nature of our profession.

Please review the essential functions[1] as described in this document, and verify with your signature that you have the capability to meet these standards. This document must be signed and returned to our office the first day of classes to be placed in your electronic file: ot@york.cuny.edu

If you have any questions regarding this document, please contact Dr. Diana Daus, Program Director, erodriguez14@york.cuny.edu.

[1] These standards were derived from documents prepared by the American – Occupational Therapy Association (Educating Students with Disabilities: What Academic and Fieldwork Educators Need to Know, 1997) and from the New York Institute of Technology (Technical Standards for Admission Matriculation to the Occupational Therapy Program / Student Handbook, 1998).

BS/MS OCCUPATIONAL THERAPY PROGRAM

Essential Functions for Occupational Therapy Students

• The commitment to work in an intense setting which challenges the individual to meet the needs of people of diverse cultures, age groups, and challenges. These individuals may severely injured, limited by cognitive, emotional, and functional deficits and whose behavior may create at times an aversive reaction. This ability to interact with these individuals without being judgmental or prejudiced is critical in establishing ones professionalism and therapeutic relationship.

• The ability and commitment to work with individuals without regard to the nature of their illness or disability, culture, or age group.

• The ability to communicate verbally and in writing, using appropriate grammar and vocabulary, in order to build relationships with faculty, advisors, fellow graduate students, coworkers, and client and their significant others. Proficiency I communication includes transactions with individuals and groups in learner, collegial, consultative, leadership, and task roles. Students must be able to elicit information, gather information, describe findings, and understand non-verbal behavior.

• The ability to meet the challenges of any environment that requires a readiness for immediate and appropriate response without interference of personal or medical problems. This requires training for emergencies (e.g., infection control).

• The ability to travel independently to and from classes and fieldwork assignments on time, and possess the organizational skills and stamina for performing required tasks and assignments within allotted time frames.

• Commitment to the adherence of policies of the College, the Occupational Therapy Program, and the fieldwork sites. This includes matters ranging from professional dress and behavior, to attending to the Occupational Therapy Program's academic schedule, which may differ from the college's academic calendar and is subject to change at any time.

• Emotional health for full utilization of intellect, the exercise of good judgment, prompt completion of responsibilities, and the development of mature sensitive and effective relationships with others. Working with persons in need often requires taxing workloads and adaptation to changing and challenging environments requiring flexibility and a spirit of cooperation.

• Critical thinking skills in order to able to problem solve creatively, to master abstract ideas, and to synthesize information in order to handle the challenges of the academic, laboratory, and fieldwork settings.

• Physical coordination to be able to handle moving clients and to direct clients in varied practice settings. Visual acuity and independent mobility, fine and gross movements, equilibrium, and the use of touch are essential to safety of clients, significant others, and staff.

• Commitment to the Code of Ethics of the profession and behavior that reflects a sense of right and wrong in the helping environment.

- -

I have reviewed the Essential Functions for the Occupational Therapy Program at York College. My signature below indicates that, to the best of my knowledge, I am able to meet these standards.

____ ______________________

Signature Date

____

Print Name

SCHOOL OF HEALTH SCIENCES AND PROFESSIONAL PROGRAMS

CHANGE OF PERSONAL INFORMATION FORM

Program: Occupational Therapy Program

Name: ____
Student Name - Print Clearly

EMPL ID: _______________________

Please be advised that as of _______________the following information has changed:

Check all that apply:

□ Name: ____

□ Address ____

□ Home Phone Number: ____

□ Cell Phone Number: ____

□ E-Mail: ____

□ Emergency Contact Person: _______________________________________

□ Other:

____

____

____

____

Please submit to **ot@york.cuny.edu**

It is the student's responsibility to notify Registrar, Bursar, and any other departments of any changes.

SCHOOL OF HEALTH SCIENCES AND PROFESSIONAL PROGRAMS

OCCUPATIONAL THERAPY DEPARTMENT
STUDENT PROFESSIONAL DEVELOPMENT FORM

Student Name: ______________________________ **Semester: Fall [ ] Spring [ ]**

Advisor: ______________________________ **Year:** ____________________

STUDENT TO COMPLETE

Current copy of York College transcript: □ Yes □ No

OT GPA from last semester completed listed on transcript: __________

Current Academic Progress:

Midterm Status:

As of date: ____/____/_____ my work has been: □ Satisfactory □ Unsatisfactory

Have you ever been on probation? □ Yes □ No

(If yes, which year/semester?): ______________________________

Indicate courses in which you've have/had difficulty:

____

____

When completing this form think about your strengths and areas of needed growth related to becoming a professional and competent in OT technical skills.

MY STRENGTHS:

AREAS NEEDING FURTHER DEVELOPMENT:

PLANS AND GOALS: Professional Skill Development: (Cooperation, Organization, etc.) (Students who are on academic probation are to attach a detailed plan to support their academic success to achieve the required GPA and academic success their course.)

Technical Skill Development (growth in a content area, completing readings etc.):

Strategies for achievement of above goals (ideas you have to achieve your goals):

Student Signature: ____
Date:______________________

STUDENT EVALUATION SUMMARY

Student Name: ______________________________________ **Semester:** **Fall [ ]** **Spring [ ]**

Advisor: ____ **Year:** ________________________

FACTULTY TO COMPLETE

Review of Student Professional Plan:

Progress toward Professional Goal(s):

Progress toward Technical Skill Competence Goal(s):

Additional Comments: (From faculty or student)

I have read and discussed all of the above with a faculty member of the Department of Occupational Therapy at York College- CUNY.

Student Signature: ____
Date:____________________

Faculty Signature: ____ **Date:**
____

***IMPORTANT**: Attach student's transcript to this form

adapted from the USD handbook

YORK College

School of Health Sciences and Professional Programs

CUNY The City University of New York

STUDENT PROGRESSION AND RETENTION COMMITTEE APPEALS COVER SHEET

Student's Last Name: ______________________________ First Name: ______________________________

CUNYfirst ID Number: __________________________Major: ______________________________________

Email: ____

Mailing Address: ____

City: _____________________________ State: ___________________________ Zip: ___________________

Home Phone: _____________________ Work Phone: ___________________ Cell Phone: _____________________

All requests are made in writing (formally typed, double spaced, dated and signed and include CUNYfirst ID number) and attach any supporting documents. Attach this cover sheet to appeal letter and supporting documentation.

Student Signature:____ Date:_____________________________

Supporting Documents- Check (√) all that apply:

[ ] Personal Statement **[ ] Documentation of Extenuating Circumstances** **[ ] Transcript**

[ ] Other: ____

[ ] I am NOT submitting Supporting Documentation

STUDENT HANDBOOK APPENDICES

Appendix A:

Course of Study

OCCUPATIONAL THERAPY PLAN OF STUDY

*Lecture and guided laboratory class   Revised as of 8/21/2024

FALL	THIRD YEAR	SPRING	
OT 313 Fundamentals of Occupational Therapy	3	*OT 318 Clinical Kinesiology	4
*OT 315 Functional Human Anatomy	4	OT 319 Common Medical Conditions WI	3
*OT 316 Functional Human Physiology	4	OT 423 Collaboration in Occupational Therapy	4
*OT 321 Occupational Analysis	3	OT 424 Professional Development I	1
OT 322 Occupation Through the Life Span WI	3	OT 432 Neuroscience	3.5
Total Credits:	17	Total Credits:	15.5

FALL	FOURTH YEAR	SPRING	
*OT 403 Advanced Occupational Analysis WI	3	*OT 505 Occupational Therapy Process I: Physical Intervention	4
*OT 404 Advanced Neuroscience & Cognitive Rehabilitation	4	*OT 508 Occupational TherapyProcess I: Psychosocial Intervention	4
*OT 411 Occupational Therapy Process I: Pediatric Intervention	4	OT 517 Research Design	3
*OT 417 Research Methods	3.5	OT 518 Research Seminar I	1
		*OT 647 Assistive Technology	2
Total Credits:	14.5	Total Credits:	14

FALL	FIFTH YEAR	SPRING	
*OT 506 Occupational TherapyProcess II: Physical Intervention	4	OT 641 Fieldwork II: (Full-time Internship Experience) OT Practice I	5
OT 507 Professional Development II	1	OT 642 Fieldwork II: (Full-time Internship Experience)OT Practice II	5
*OT 509 Occupational TherapyProcess II: Psychosocial Intervention	4		
OT 513 Systems Management	3		
OT 519 Research Seminar II	1		
OT 523 Use of Orthotics in Occupational Therapy Practice	1		
OT 524 Use of Physical Agent: Modalities in Occupational Therapy Practice	1		
Total Credits:	15	Total Credits:	10

FALL	SIXTH YEAR	
OT 522 Research Seminar IV	2	Total Credits in OT Major: 98
OT 643 Capstone Community Experience	4	
OT 644 Advanced OT Theory & Practice	3	
*OT 645A Occupational Therapy Practice or *OT 645B Occupational Therapy Practice	3	
Total Credits:	12	

Appendix B:

CDC Universal Precautions Guidelines

This is a link for the CDC Guidelines and information regarding Covid 19 virus. Please be aware that you are expected to follow these guidelines as a healthcare practitioner.

https://www.cdc.gov/coronavirus/2019-ncov/hcp/non-us-settings/overview/index.html

https://www.cdc.gov/vaccines/covid-19/index.html

COVID-19 Vaccine Effectiveness Research | CDC (research that reports to vaccine effectiveness)

CDC Guidelines for Universal Precautions:

https://www.cdc.gov/oralhealth/infectioncontrol/summary-infection-prevention-practices/standard-precautions.html

Accessable version: https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

Last update: July 2019

Jane D. Siegel, MD; Emily Rhinehart, RN MPH CIC; Marguerite Jackson, PhD; Linda Chiarello, RN MS; the Healthcare Infection Control Practices Advisory Committee

Acknowledgement: The authors and HICPAC gratefully acknowledge Dr. Larry Strausbaugh for his many contributions and valued guidance in the preparation of this guideline.

Suggested citation: Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee, 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html

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TABLE OF CONTENTS

Updates

Ebola Virus Disease Update [August 2014]: The recommendations in this guideline for Ebola has been superseded by these CDC documents:

- Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Virus Disease in U.S. Hospitals (https://www.cdc.gov/vhf/ebola/clinicians/evd/infection-control.html accessed September 2018)
- Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus (https://www.cdc.gov/vhf/ebola/clinicians/cleaning/hospitals.html accessed September 2018)

See CDC's Ebola Virus Disease website (https://www.cdc.gov/vhf/ebola/ accessed September 2018) for current information on how Ebola virus is transmitted.

⚠ **Ebola Virus Disease for Healthcare Workers [2014]:** Updated recommendations for healthcare workers can be found at Ebola: for Clinicians (https://www.cdc.gov/vhf/ebola/clinicians/index.html accessed September 2018).

⚠ **Mumps Update [October 2017]:** The Healthcare Infection Control Practices Advisory Committee (HICPAC) voted to change the recommendation of isolation for persons with mumps from 9 days to 5 days based on a 2008 MMWR report: Updated Recommendations for Isolation of Persons with Mumps (https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5740a3.htm accessed September 2018)

⚠ **Tdap Vaccine Recommendations Update [2018]:** Current recommendations can be found at Tdap / Td ACIP Vaccine Recommendations (https://www.cdc.gov/vaccines/hcp/aciprecs/vacc-specific/dtap.html accessed September 2018).

⚠ **Environmental Control Recommendation Correction [April 2019]:** For recommendation VI.C.1.c., the pressure differential changed from ≥ 12.5 to ≥ 2.5.

⚠ **Varicella Post-exposure Prophylaxis Update [May 2019]:** This update aligns with and clarifies the 2013 Updated Recommendations for use of varicella zoster immune globulin. For susceptible exposed persons for whom vaccine is contraindicated, provide varicella zoster immune globulin as soon as possible after exposure and within 10 days. See Updated Recommendations for Use of VariZIG — United States, 2013 (https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6228a4.htm accessed September 2018).

⚠ **Gastroenteritis, Noroviruses Precaution Update [May 2019]:** The Type of Precaution for Gastroenteritis, Noroviruses, in Appendix A: Type and Duration of Precautions Recommended for Selected Infections and Conditions was updated from “Standard” to “Contact + Standard” to align with Guideline for the Prevention and Control of Norovirus Gastroenteritis Outbreaks in Healthcare Settings (2011) (https://www.cdc.gov/infectioncontrol/guidelines/norovirus/ accessed May 2019).

⚠ **Interim Measles Infection Control [July 2019]**
See Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings (https://wwwdev.cdc.gov/infectioncontrol/guidelines/measles/ accessed July 2019)

Executive Summary

The *Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007* updates and expands the *1996 Guideline for Isolation Precautions in Hospitals*. The following developments led to revision of the 1996 guideline:

1. The transition of healthcare delivery from primarily acute care hospitals to other healthcare settings (e.g., home care, ambulatory care, free-standing specialty care sites, long-term care) created a need for recommendations that can be applied in all healthcare settings using common principles of infection control practice, yet can be modified to reflect setting-specific needs. Accordingly, the revised guideline addresses the spectrum of healthcare delivery settings. Furthermore, the term “nosocomial infections” is replaced by “healthcare-associated infections” (HAIs) to reflect the changing patterns in healthcare delivery and difficulty in determining the geographic site of exposure to an infectious agent and/or acquisition of infection.
2. The emergence of new pathogens (e.g., SARS-CoV associated with the severe acute respiratory syndrome [SARS], Avian influenza in humans), renewed concern for evolving known pathogens (e.g., C. difficile, noroviruses, community-associated MRSA [CA-MRSA]), development of new therapies (e.g., gene therapy), and increasing concern for the threat of bioweapons attacks, established a need to address a broader scope of issues than in previous isolation guidelines.
3. The successful experience with Standard Precautions, first recommended in the 1996 guideline, has led to a reaffirmation of this approach as the foundation for preventing transmission of infectious

agents in all healthcare settings. New additions to the recommendations for Standard Precautions are Respiratory Hygiene/Cough Etiquette and safe injection practices, including the use of a mask when performing certain high-risk, prolonged procedures involving spinal canal punctures (e.g., myelography, epidural anesthesia). The need for a recommendation for Respiratory Hygiene/Cough Etiquette grew out of observations during the SARS outbreaks where failure to implement simple source control measures with patients, visitors, and healthcare personnel with respiratory symptoms may have contributed to SARS coronavirus (SARS-CoV) transmission. The recommended practices have a strong evidence base. The continued occurrence of outbreaks of hepatitis B and hepatitis C viruses in ambulatory settings indicated a need to reiterate safe injection practice recommendations as part of Standard Precautions. The addition of a mask for certain spinal injections grew from recent evidence of an associated risk for developing meningitis caused by respiratory flora.

4. The accumulated evidence that environmental controls decrease the risk of lifethreatening fungal infections in the most severely immunocompromised patients (allogeneic hematopoietic stem-cell transplant patients) led to the update on the components of the Protective Environment (PE).
5. Evidence that organizational characteristics (e.g., nurse staffing levels and composition, establishment of a safety culture) influence healthcare personnel adherence to recommended infection control practices and therefore are important factors in preventing transmission of infectious agents, led to a new emphasis and recommendations for administrative involvement in the development and support of infection control programs.
6. Continued increase in the incidence of HAIs caused by multidrug-resistant organisms (MDROs) in all healthcare settings and the expanded body of knowledge concerning prevention of transmission of MDROs created a need for more specific recommendations for surveillance and control of these pathogens that would be practical and effective in various types of healthcare settings.

This document is intended for use by infection control staff, healthcare epidemiologists, healthcare administrators, nurses, other healthcare providers, and persons responsible for developing, implementing, and evaluating infection control programs for healthcare settings across the continuum of care. The reader is referred to other guidelines and websites for more detailed information and for recommendations concerning specialized infection control problems.

Parts I - III: Review of the Scientific Data Regarding Transmission of Infectious Agents in Healthcare Settings

Part I reviews the relevant scientific literature that supports the recommended prevention and control practices. As with the 1996 guideline, the modes and factors that influence transmission risks are described in detail. New to the section on transmission are discussions of bioaerosols and of how droplet and airborne transmission may contribute to infection transmission. This became a concern during the SARS outbreaks of 2003, when transmission associated with aerosol-generating procedures was observed. Also new is a definition of “epidemiologically important organisms” that was developed to assist in the identification of clusters of infections that require investigation (i.e. multidrug-resistant organisms, *C. difficile)*. Several other pathogens that hold special infection control interest (i.e., norovirus, SARS, Category A bioterrorist agents, prions, monkeypox, and the hemorrhagic fever viruses) also are discussed to present new information and infection control lessons learned from experience with these agents. This section of the guideline also presents information on infection risks associated with specific healthcare settings and patient populations.

Part II updates information on the basic principles of hand hygiene, barrier precautions, safe work practices and isolation practices that were included in previous guidelines. However, new to this guideline, information on healthcare system components is important that influence transmission risks, including those under the influence of healthcare administrators. An important administrative priority that is described is the need for appropriate infection control staffing to meet the ever-expanding role of infection control professionals in the modern, complex healthcare system. Evidence presented also demonstrates another administrative concern, the importance of nurse staffing levels, including numbers of appropriately trained nurses in ICUs for preventing HAIs. The role of the clinical microbiology

laboratory in supporting infection control is described to emphasize the need for this service in healthcare facilites. Other factors that influence transmission risks are discussed i.e., healthcare worker adherence to recommended infection control practices, organizational safety culture or climate, education and training.
Discussed for the first time in an isolation guideline is surveillance of healthcare associated infections. The information presented will be useful to new infection control professionals as well as persons involved in designing or responding to state programs for public reporting of HAI rates.

Part III describes each of the categories of precautions developed by the Healthcare Infection Control Practices Advisory Committee (HICPAC) and the Centers for Disease Control and Prevention (CDC) and provides guidance for their application in various healthcare settings. The categories of Transmission-Based Precautions are unchanged from those in the 1996 guideline: Contact, Droplet, and Airborne. One important change is the recommendation to don the indicated personal protective equipment (gowns, gloves, mask) *upon entry into the patient's room* for patients who are on Contact and/or Droplet Precautions since the nature of the interaction with the patient cannot be predicted with certainty and contaminated environmental surfaces are important sources for transmission of pathogens.

In addition, the Protective Environment (PE) for allogeneic hematopoietic stem cell transplant patients, described in previous guidelines, has been updated.

Tables, Appendices, and Other Information

There are several tables that summarize important information:

1. a summary of the evolution of this document;
2. guidance on using empiric isolation precautions according to a clinical syndrome;
3. a summary of infection control recommendations for category A agents of bioterrorism;
4. components of Standard Precautions and recommendations for their application; 5. components of the Protective Environment; and

6. a glossary of definitions used in this guideline.

New in this guideline is a figure that shows a recommended sequence for donning and removing personal protective equipment used for isolation precautions to optimize safety and prevent self-contamination during removal.

Appendix A: Type and Duration of Precautions Recommended for Selected Infections and Conditions

Appendix A consists of an updated alphabetical list of most infectious agents and clinical conditions for which isolation precautions are recommended. A preamble to the Appendix provides a rationale for recommending the use of one or more Transmission Based Precautions, in addition to Standard Precautions, based on a review of the literature and evidence demonstrating a real or potential risk for person-to-person transmission in healthcare settings. The type and duration of recommended precautions are presented with additional comments concerning the use of adjunctive measures or other relevant considerations to prevent transmission of the specific agent. Relevant citations are included.

Pre- Publication of the Guideline on Preventing Transmission of MDROs

New to this guideline is a comprehensive review and detailed recommendations for prevention of transmission of MDROs. This portion of the guideline was published electronically in October 2006 and updated in November, 2006 (Siegel JD, Rhinehart E, Jackson M, Chiarello L and HICPAC. Management of Multidrug-Resistant Organisms in Healthcare Settings (2006) (https://www.cdc.gov/infectioncontrol/guidelines/mdro/ accessed May 2016)), and is considered a part of the Guideline for Isolation Precautions. This section provides a detailed review of the complex topic of MDRO control in healthcare settings and is intended to provide a context for evaluation of MDRO at individual healthcare settings. A rationale and institutional requirements for developing an effective MDRO control program are summarized. Although the focus of this guideline is on measures to prevent *transmission* of MDROs in healthcare settings, information concerning the judicious use of antimicrobial agents is presented since such practices are intricately related to the size of the reservoir of MDROs which in turn influences transmission (e.g., colonization pressure). There are two tables that summarize recommended prevention and control practices using the following seven categories of interventions to control MDROs: administrative measures, education of healthcare personnel, judicious antimicrobial use, surveillance, infection control precautions, environmental measures, and decolonization. Recommendations for each category apply to and are adapted for the various healthcare settings. With the increasing incidence and prevalence of MDROs, all healthcare facilities must prioritize effective control of MDRO transmission. Facilities should identify prevalent MDROs at the facility, implement control measures, assess the effectiveness of control programs, and demonstrate decreasing MDRO rates. A set of intensified MDRO prevention interventions is presented to be added

1. if the incidence of transmission of a target MDRO is NOT decreasing despite implementation of basic MDRO infection control measures, and
2. when the *first* case(s) of an epidemiologically important MDRO is identified within a healthcare facility.

Summary

This updated guideline responds to changes in healthcare delivery and addresses new concerns about transmission of infectious agents to patients and healthcare workers in the United States and infection control. The primary objective of the guideline is to improve the safety of the nation's healthcare delivery system by reducing the rates of HAIs.

Abbreviations Used in the Guideline

Acronym	Definition
AIIR	Airborne infection isolation room
CDC	Centers for Disease Control and Prevention
CF	Cystic fibrosis
CJD	Creutzfeld-Jakob Disease
CLSI	Clinical Laboratory Standards Institute
ESBL	Extended spectrum beta-lactamases
FDA	Food and Drug Administration
HAI	Healthcare-associated infections
HBV	Hepatitis B virus
HCV	Hepatitis C virus
HEPA	High efficiency particulate air [filtration]
HICPAC	Healthcare Infection Control Practices Advisory Committee
HIV	Human immunodeficiency virus
HCW	Healthcare worker
HSCT	Hematopoetic stem-cell transplant
ICU	Intensive care unit
LTCF	Long-term care facility
MDRO	Multidrug-resistant organism
MDR-GNB	Multidrug-resistant gram-negative bacilli
MRSA	Methicillin-resistant *Staphylococcus aureus*
NCCLS	National Committee for Clinical Laboratory Standards

NICU	Neonatal intensive care unit
NIOSH	National Institute for Occupational Safety and Health, CDC
NNIS	National Nosocomial Infection Surveillance
NSSP	Nonsusceptible *Streptococcus pneumoniae*
OSHA	Occupational Safety and Health Administration
PICU	Pediatric intensive care unit
PPE	Personal protective equipment
RSV	Respiratory syncytial virus
SARS	Severe acquired respiratory syndrome
vCJD	variant Creutzfeld-Jakob Disease
VRE	Vancomycin-resistant enterococci
WHO	World Health Organization

Part I: Review of Scientific Data Regarding Transmission of Infectious Agents in Healthcare Settings

I.A. Evolution of the 2007 Document

The *Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007* builds upon a series of isolation and infection prevention documents promulgated since 1970. These previous documents are summarized and referenced in Table 1 and in Part I of the *1996 Guideline for Isolation Precautions in Hospitals* [1].

Objectives and methods The objectives of this guideline are to

1. provide infection control recommendations for all components of the healthcare delivery system, including hospitals, long-term care facilities, ambulatory care, home care and hospice;
2. reaffirm Standard Precautions as the foundation for preventing transmission during patient care in all healthcare settings;
3. reaffirm the importance of implementing Transmission-Based Precautions based on the clinical presentation or syndrome and likely pathogens until the infectious etiology has been determined (Table 2); and
4. provide epidemiologically sound and, whenever possible, evidence-based recommendations.

This guideline is designed for use by individuals who are charged with administering infection control programs in hospitals and other healthcare settings. The information also will be useful for other healthcare personnel, healthcare administrators, and anyone needing information about infection control measures to prevent transmission of infectious agents. Commonly used abbreviations are provided on page 11 and terms used in the guideline are defined in the Glossary (page 126).

Med-line and Pub Med were used to search for relevant studies published in English, focusing on those published since 1996. Much of the evidence cited for preventing transmission of infectious agents in healthcare settings is derived from studies that used "quasi-experimental designs", also referred to as nonrandomized, pre- post-intervention study designs [2]. Although these types of studies can provide valuable information regarding the effectiveness of various interventions, several factors decrease the certainty of attributing improved outcome to a specific intervention. These include: difficulties in controlling for important confounding variables; the use of multiple interventions during an outbreak; and results that are explained by the statistical principle of regression to the mean, (e.g., improvement over time without any intervention)[3]. Observational studies remain relevant and have been used to evaluate infection control interventions[4, 5]. The quality of studies, consistency of results and correlation with results from randomized, controlled trials when available were considered during the literature review and assignment of evidence-based categories (See Part IV: Recommendations) to the recommendations in this guideline. Several authors have summarized properties to consider when evaluating studies for the purpose of determining if the results should change practice or in designing new studies[2, 6, 7].

Changes or clarifications in terminology. This guideline contains four changes in terminology from the 1996 guideline:

- The term *nosocomial infection* is retained to refer only to infections acquired in hospitals. The term *healthcare-associated infection* (HAI) is used to refer to infections associated with healthcare delivery in any setting (e.g., hospitals, longterm care facilities, ambulatory settings, home care). This term reflects the inability to determine with certainty where the pathogen is acquired since patients may be colonized with or exposed to potential pathogens outside of the healthcare setting, before receiving health care, or may develop infections caused by those pathogens when exposed to the conditions associated with delivery of healthcare. Additionally, patients frequently move among the various settings within a healthcare system[8]. A new addition to the practice recommendations for Standard Precautions is *Respiratory Hygiene/Cough Etiquette*. While Standard Precautions generally apply to the recommended practices of healthcare personnel during patient care, Respiratory Hygiene/Cough Etiquette applies broadly to all persons who enter a healthcare setting, including healthcare personnel, patients and visitors. These recommendations evolved from observations during the SARS epidemic that failure to implement basic source control measures with patients, visitors, and healthcare personnel with signs and symptoms of respiratory tract infection may have contributed to SARS coronavirus (SARS-CoV) transmission. This concept has been incorporated into CDC planning documents for SARS and pandemic influenza[9, 10].
- The term *"Airborne Precautions"* has been supplemented with the term "*Airborne Infection Isolation Room (AIIR)*" for consistency with the *Guidelines for Environmental Infection Control in Healthcare Facilities*[11], the *Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings 2005*[12] and the American Institute of Architects (AIA) guidelines for design and construction of hospitals, 2006[13]
- A set of prevention measures termed *Protective Environment* has been added to the precautions used to prevent HAIs. These measures, which have been defined in other guidelines , consist of engineering and design interventions that decrease the risk of exposure to environmental fungi for severely immunocompromised allogeneic hematiopoietic stem cell transplant (HSCT) patients during their highest risk phase, usually the first 100 days post transplant, or longer in the presence of graft-versushost disease[11, 13-15]. Recommendations for a Protective Environment apply only to acute care hospitals that provide care to HSCT patients.

Scope. This guideline, like its predecessors, focuses primarily on interactions between patients and healthcare providers. The Guidelines for the Prevention of MDRO Infection were published separately in November 2006, and are available online at Management of Multidrug-Resistant Organisms in Healthcare Settings (https://www.cdc.gov/infectioncontrol/guidelines/mdro/ accessed May 2016). Several other HICPAC guidelines to prevent transmission of infectious agents associated with healthcare delivery are cited; e.g., Guideline for Hand Hygiene, Guideline for Environmental Infection Control, Guideline for Prevention of Healthcare-Associated Pneumonia, and Guideline for Infection Control in Healthcare Personnel[11, 14, 16, 17]. In combination, these provide comprehensive guidance on the primary infection control measures for ensuring a safe environment for patients and healthcare personnel.

This guideline does not discuss in detail specialized infection control issues in defined populations that are addressed elsewhere, (e.g., *Recommendations for Preventing Transmission of Infections among Chronic Hemodialysis Patients* , *Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Facilities 2005*, *Guidelines for Infection Control in Dental Health-Care Settings and Infection Control Recommendations for Patients with Cystic Fibrosis*[12, 18-20]. An exception has been made by including abbreviated guidance for a Protective Environment used for allogeneic HSCT recipients because components of the Protective Environment have been more completely defined since publication of the *Guidelines for Preventing Opportunistic Infections Among HSCT Recipients in 2000* and the *Guideline for Environmental Infection Control in Healthcare Facilities*[11, 15].

I.B. Rationale for Standard and Transmission-Based Precautions in healthcare settings

Transmission of infectious agents within a healthcare setting requires three elements: a source (or reservoir) of infectious agents, a susceptible host with a portal of entry receptive to the agent, and a mode of transmission for the agent. This section describes the interrelationship of these elements in the epidemiology of HAIs.

I.B.1. Sources of infectious agents. Infectious agents transmitted during healthcare derive primarily from human sources but inanimate environmental sources also are implicated in transmission. Human reservoirs include patients[20-28], healthcare personnel[29-35 17, 36-39], and household members and other visitors[40-45]. Such source individuals may have active infections, may be in the asymptomatic and/or incubation period of an infectious disease, or may be transiently or chronically colonized with pathogenic microorganisms, particularly in the respiratory and gastrointestinal tracts. The endogenous flora of patients (e.g., bacteria residing in the respiratory or gastrointestinal tract) also are the source of HAIs[46-54].

I.B.2. Susceptible hosts. Infection is the result of a complex interrelationship between a potential host and an infectious agent. Most of the factors that influence infection and the occurrence and severity of disease are related to the host. However, characteristics of the host-agent interaction as it relates to pathogenicity, virulence and antigenicity are also important, as are the infectious dose, mechanisms of disease production and route of exposure[55]. There is a spectrum of possible outcomes following exposure to an infectious agent. Some persons exposed to pathogenic microorganisms never develop symptomatic disease while others become severely ill and even die. Some individuals are prone to becoming transiently or permanently colonized but remain asymptomatic. Still others progress from colonization to symptomatic disease either immediately following exposure, or after a period of asymptomatic colonization. The immune state at the time of exposure to an infectious agent, interaction between pathogens, and virulence factors intrinsic to the agent are important predictors of an individuals' outcome. Host factors such as extremes of age and underlying disease (e.g., diabetes[56, 57]), human immunodeficiency virus/acquired immune deficiency syndrome [HIV/AIDS][58, 59], malignancy, and transplants[18, 60, 61] can increase susceptibility to infection as do a variety of medications that alter the normal flora (e.g., antimicrobial agents, gastric acid suppressants, corticosteroids, antirejection drugs, antineoplastic agents, and immunosuppressive drugs). Surgical procedures and radiation therapy impair defenses of the skin and other involved organ systems. Indwelling devices such as urinary catheters, endotracheal tubes, central venous and arterial catheters[62-64] and synthetic implants facilitate development of HAIs by allowing potential pathogens to bypass local defenses that would ordinarily impede their invasion and by providing surfaces for development of bioflms that may facilitate adherence of microorganisms and protect from antimicrobial activity[65]. Some infections associated with invasive procedures result from transmission within the healthcare facility; others arise from the patient's endogenous flora[46-50]. High-risk patient populations with noteworthy risk factors for infection are discussed further in Sections I.D, I.E., and I.F.

I.B.3. Modes of transmission. Several classes of pathogens can cause infection, including bacteria, viruses, fungi, parasites, and prions. The modes of transmission vary by type of organism and some infectious agents may be transmitted by more than one route: some are transmitted primarily by direct or indirect contact, (e.g., Herpes simplex virus [HSV], respiratory syncytial virus, Staphylococcus aureus), others by the droplet, (e.g., influenza virus, B. pertussis) or airborne routes (e.g., M. tuberculosis). Other infectious agents, such as bloodborne viruses (e.g., hepatitis B and C viruses [HBV, HCV] and HIV are transmitted rarely in healthcare settings, via percutaneous or mucous membrane exposure. Importantly, not all infectious agents are transmitted from person to person. These are distinguished in Appendix A. The three principal routes of transmission are summarized below.

I.B.3.a. Contact transmission. The most common mode of transmission, contact transmission is divided into two subgroups: direct contact and indirect contact.

I.B.3.a.i. Direct contact transmission. Direct transmission occurs when microorganisms are transferred from one infected person to another person without a contaminated intermediate object or person. Opportunities for direct contact transmission between patients and healthcare personnel have been summarized in the Guideline for Infection Control in Healthcare Personnel, 1998 [17] and include:

- blood or other blood-containing body fluids from a patient directly enters a caregiver's body through contact with a mucous membrane[66] or breaks (i.e., cuts, abrasions) in the skin[67].
- mites from a scabies-infested patient are transferred to the skin of a caregiver while he/she is having direct ungloved contact with the patient's skin[68, 69].
- a healthcare provider develops herpetic whitlow on a finger after contact with HSV when providing oral care to a patient without using gloves or HSV is transmitted to a patient from a herpetic whitlow on an ungloved hand of a healthcare worker (HCW)[70, 71].

I.B.3.a.ii. Indirect contact transmission. Indirect transmission involves the transfer of an infectious agent through a contaminated intermediate object or person. In the absence of a point-source outbreak, it is difficult to determine how indirect transmission occurs. However, extensive evidence cited in the Guideline for Hand Hygiene in HealthCare Settings suggests that the contaminated hands of healthcare personnel are important contributors to indirect contact transmission[16]. Examples of opportunities for indirect contact transmission include:

- Hands of healthcare personnel may transmit pathogens after touching an infected or colonized body site on one patient or a contaminated inanimate object, if hand hygiene is not performed before touching another patient.[72, 73].
- Patient-care devices (e.g., electronic thermometers, glucose monitoring devices) may transmit pathogens if devices contaminated with blood or body fluids are shared between patients without cleaning and disinfecting between patients[74 75-77].
- Shared toys may become a vehicle for transmitting respiratory viruses (e.g., respiratory syncytial virus[24, 78, 79] or pathogenic bacteria (e.g., *Pseudomonas aeruginosa*[80]) among pediatric patients.
- Instruments that are inadequately cleaned between patients before disinfection or sterilization (e.g., endoscopes or surgical instruments)[81-85] or that have manufacturing defects that interfere with the effectiveness of reprocessing [86, 87] may transmit bacterial and viral pathogens.

Clothing, uniforms, laboratory coats, or isolation gowns used as personal protective equipment (PPE), may become contaminated with potential pathogens after care of a patient colonized or infected with an infectious agent, (e.g., MRSA[88], VRE[89], and *C. difficile*[90]. Although contaminated clothing has not been implicated directly in transmission, the potential exists for soiled garments to transfer infectious agents to successive patients.

I.B.3.b. Droplet transmission. Droplet transmission is, technically, a form of contact transmission, and some infectious agents transmitted by the droplet route also may be transmitted by the direct and indirect contact routes. However, in contrast to contact transmission, respiratory droplets carrying infectious pathogens transmit infection when they travel directly from the respiratory tract of the infectious individual to susceptible mucosal surfaces of the recipient, generally over short distances, necessitating facial protection. Respiratory droplets are generated when an infected person coughs, sneezes, or talks[91, 92] or during procedures such as suctioning, endotracheal intubation[9396], cough induction by chest physiotherapy[97] and cardiopulmonary resuscitation[98, 99]. Evidence for droplet transmission comes from epidemiological studies of disease outbreaks[100-103], experimental studies[104] and from information on aerosol dynamics[91, 105]. Studies have shown that the nasal mucosa, conjunctivae and less frequently the mouth, are susceptible portals of entry for respiratory viruses[106]. The maximum distance for droplet transmission is currently unresolved, although pathogens transmitted by the droplet route have not been transmitted through the air over long distances, in contrast to the airborne pathogens discussed below. Historically, the area of defined risk has been a distance of ≤3 feet around the patient and is based on epidemiologic and simulated studies of selected infections[103, 104]. Using this distance for donning masks has been effective in preventing transmission of infectious agents via the droplet route. However, experimental studies with smallpox[107, 108] and investigations during the global SARS outbreaks of 2003[101] suggest that droplets from patients with these two infections could reach persons located 6 feet or more from their source. It is likely that the distance droplets travel depends on the velocity and mechanism by which respiratory droplets are propelled from the source, the density of respiratory secretions, environmental factors such as temperature and humidity, and the ability of the pathogen to maintain infectivity over that distance[105]. Thus, a distance of ≤3 feet around the patient is best viewed as an *example* of what is meant by "a short distance from a patient" and should not be used as the sole *criterion* for deciding when a mask should be donned to protect from droplet exposure. Based on these considerations, it may be prudent to don a mask when within 6 to 10 feet of the patient or upon entry into the patient's room, especially when exposure to emerging or highly virulent pathogens is likely. More studies are needed to improve understanding of droplet transmission under various circumstances.

Droplet size is another variable under discussion. Droplets traditionally have been defined as being >5 µm in size. Droplet nuclei, particles arising from desiccation of suspended droplets, have been associated with airborne transmission and defined as ≤5 µm in size[105] , a reflection of the pathogenesis of pulmonary tuberculosis which is not generalizable to other organisms. Observations of particle dynamics have demonstrated that a range of droplet sizes, including those with diameters of 30µm or greater, can remain suspended in the air[109]. The behavior of droplets and droplet nuclei affects recommendations for preventing transmission. Whereas fine airborne particles containing pathogens that can remain infective may transmit infections over long distances, requiring AIIR to prevent its dissemination within a facility; organisms transmitted by the droplet route do not remain infective over long distances, and therefore do not require special air handling and ventilation. Examples of infectious agents that are transmitted via the droplet route include *Bordetella pertussis*[110]*,* influenza virus[23], adenovirus[111] , rhinovirus[104], *Mycoplasma pneumoniae*[112], SARSassociated coronavirus (SARS-CoV)[21, 96, 113], group A streptococcus[114], and *Neisseria meningitidis*[95, 103, 115]. Although respiratory syncytial virus may be transmitted by the droplet route, direct contact with infected respiratory secretions is the most important determinant of transmission and consistent adherence to Standard plus Contact Precautions prevents transmission in healthcare settings[24, 116, 117].

Rarely, pathogens that are not transmitted routinely by the droplet route are dispersed into the air over short distances. For example, although *S. aureus* is transmitted most frequently by the contact route, viral upper respiratory tract infection has been associated with increased dispersal of *S. aureus* from the nose into the air for a distance of 4 feet under both outbreak and experimental conditions and is known as the "cloud baby" and "cloud adult" phenomenon[118-120].

I.B.3.c. Airborne transmission. Airborne transmission occurs by dissemination of either airborne droplet nuclei or small particles in the respirable size range containing infectious agents that remain infective over time and distance (e.g., spores of Aspergillus spp, and Mycobacterium tuberculosis). Microorganisms carried in this manner may be dispersed over long distances by air currents and may be inhaled by susceptible individuals who have not had face-to-face contact with (or been in the same room with) the infectious individual[121-124]. Preventing the spread of pathogens that are transmitted by the airborne route requires the use of special air handling and ventilation systems (e.g., AIIRs) to contain and then safely remove the infectious agent[11, 12]. Infectious agents to which this applies include Mycobacterium tuberculosis[124-127], rubeola virus (measles)[122], and varicella-zoster virus (chickenpox)[123].

In addition, published data suggest the possibility that variola virus (smallpox) may be transmitted over long distances through the air under unusual circumstances and AIIRs are recommended for this agent as well; however, droplet and contact routes are the more frequent routes of transmission for smallpox[108, 128, 129]. In addition to AIIRs, respiratory protection with NIOSH certified N95 or higher level respirator is recommended for healthcare personnel entering the AIIR to prevent acquisition of airborne infectious agents such as M. tuberculosis[12].

For certain other respiratory infectious agents, such as influenza[130, 131] and rhinovirus[104], and even some gastrointestinal viruses (e.g., norovirus[132] and rotavirus[133]) there is some evidence that the pathogen may be transmitted via small-particle aerosols, under natural and experimental conditions. Such transmission has occurred over distances longer than 3 feet but within a defined airspace (e.g., patient room), suggesting that it is unlikely that these agents remain viable on air currents that travel long distances. AIIRs are not required routinely to prevent transmission of these agents. Additional issues concerning examples of small particle aerosol transmission of agents that are most frequently transmitted by the droplet route are discussed below.

I.B.3.d. Emerging issues concerning airborne transmission of infectious agents.

I.B.3.d.i. Transmission from patients. The emergence of SARS in 2002, the importation of monkeypox into the United States in 2003, and the emergence of avian influenza present challenges to the assignment of isolation categories because of conflicting information and uncertainty about possible routes of transmission. Although SARS-CoV is transmitted primarily by contact and/or droplet routes, airborne transmission over a limited distance (e.g., within a room), has been suggested, though not proven[134-141]. This is true of other infectious agents such as influenza virus[130] and noroviruses[132, 142, 143]. Influenza viruses are transmitted primarily by close contact with respiratory droplets[23, 102] and acquisition by healthcare personnel has been prevented by Droplet Precautions, even when positive pressure rooms were used in one center[144] However, inhalational transmission could not be excluded in an outbreak of influenza in the passengers and crew of a single aircraft[130]. Observations of a protective effect of UV lights in preventing influenza among patients with tuberculosis during the influenza pandemic of 1957-'58 have been used to suggest airborne transmission[145, 146].

In contrast to the strict interpretation of an airborne route for transmission (i.e., long distances beyond the patient room environment), short distance transmission by small particle aerosols generated under specific circumstances (e.g., during endotracheal intubation) to persons in the immediate area near the patient has been demonstrated. Also, aerosolized particles <100 µm can remain suspended in air when room air current velocities exceed the terminal settling velocities of the particles[109]. SARS-CoV transmission has been associated with endotracheal intubation, noninvasive positive pressure ventilation, and cardio-pulmonary resuscitation[93, 94, 96, 98, 141]. Although the most frequent routes of transmission of noroviruses are contact and food and waterborne routes, several reports suggest that noroviruses may be transmitted through aerosolization of infectious particles from vomitus or fecal material[142, 143, 147, 148]. It is hypothesized that the aerosolized particles are inhaled and subsequently swallowed.

Roy and Milton proposed a new classification for aerosol transmission when evaluating routes of SARS transmission:

1. *obligate*: under natural conditions, disease occurs following transmission of the agent only through inhalation of small particle aerosols (e.g., tuberculosis);
2. *preferential*: natural infection results from transmission through multiple routes, but small particle aerosols are the predominant route (e.g., measles, varicella); and
3. *opportunistic*: agents that naturally cause disease through other routes, but under special circumstances may be transmitted via fine particle aerosols[149].

This conceptual framework can explain rare occurrences of airborne transmission of agents that are transmitted most frequently by other routes (e.g., smallpox, SARS, influenza, noroviruses). Concerns about unknown or possible routes of transmission of agents associated with severe disease and no known treatment often result in more extreme prevention strategies than may be necessary; therefore, recommended precautions could change as the epidemiology of an emerging infection is defined and controversial issues are resolved.

I.B.3.d.ii. Transmission from the environment. Some airborne infectious agents are derived from the environment and do not usually involve person-to-person transmission. For example, anthrax spores present in a finely milled powdered preparation can be aerosolized from contaminated environmental surfaces and inhaled into the respiratory tract[150, 151]. Spores of environmental fungi (e.g., *Aspergillus spp*.) are ubiquitous in the environment and may cause disease in immunocompromised patients who inhale aerosolized (e.g., via construction dust) spores[152, 153]. As a rule, neither of these organisms is subsequently transmitted from infected patients. However, there is one well-documented report of person-to-person transmission of *Aspergillus* sp. in the ICU setting that was most likey due to the aerosolization of spores during wound debridement[154]. A Protective Environment refers to isolation practices designed to decrease the risk of exposure to environmental fungal agents in allogeneic HSCT patients[11, 14, 15, 155-158].

Environmental sources of respiratory pathogens (eg. Legionella) transmitted to humans through a common aerosol source is distinct from direct patient-to-patient transmission.

I.B.3.e. Other sources of infection. Transmission of infection from sources other than infectious individuals include those associated with common environmental sources or vehicles (e.g., contaminated food, water, or medications (e.g., intravenous fluids). Although Aspergillus spp. have been recovered from hospital water systems[159], the role of water as a reservoir for immunosuppressed patients remains uncertain. Vectorborne transmission of infectious agents from mosquitoes, flies, rats, and other vermin also can occur in healthcare settings. Prevention of vector borne transmission is not addressed in this document.

I.C. Infectious Agents of Special Infection Control Interest for Healthcare Settings

Several infectious agents with important infection control implications that either were not discussed extensively in previous isolation guidelines or have emerged recently are discussed below. These are epidemiologically important organisms (e.g., *C. difficile*), agents of bioterrorism, prions, SARS-CoV, monkeypox, noroviruses, and the hemorrhagic fever viruses. Experience with these agents has broadened the understanding of modes of transmission and effective preventive measures. These agents are included for purposes of information and, for some (i.e., SARS-CoV, monkeypox), because of the lessons that have been learned about preparedness planning and responding effectively to new infectious agents.
I.C.1. Epidemiologically important organisms. Any infectious agents transmitted in healthcare settings may, under defined conditions, become targeted for control because they are epidemiologically important. C. difficile is specifically discussed below because of wide recognition of its current importance in U.S. healthcare facilities. In determining what constitutes an "epidemiologically important organism", the following characteristics apply:

- A propensity for transmission within healthcare facilities based on published reports and the occurrence of temporal or geographic clusters of > 2 patients, (e.g., *C..difficile*, norovirus, respiratory syncytial virus (RSV), influenza, rotavirus, *Enterobacter* spp; *Serratia* spp., group A streptococcus). A single case of healthcare-associated invasive disease caused by certain pathogens (e.g., group A streptococcus post-operatively[160], in burn units[161], or in a LTCF[162]; *Legionella* sp. [14, 163], *Aspergillus* sp.[164]) is generally considered a trigger for investigation and enhanced control measures because of the risk of additional cases and severity of illness associated with these infections. Antimicrobial resistance
- Resistance to first-line therapies (e.g., MRSA, VISA, VRSA, VRE, ESBL-producing organisms).
- Common and uncommon microorganisms with unusual patterns of resistance within a facility (e.g., the first isolate of *Burkholderia cepacia* complex or *Ralstonia* spp. in non-CF patients or a quinolone-resistant strain of *Pseudomonas aeruginosa* in a facility).
- Difficult to treat because of innate or acquired resistance to multiple classes of antimicrobial agents (e.g., *Stenotrophomonas maltophilia, Acinetobacter spp.*).
- Association with serious clinical disease, increased morbidity and mortality (e.g., MRSA and MSSA, group A streptococcus)
- A newly discovered or reemerging pathogen

I.C.1.a. C. difficile. *C. difficile* is a spore-forming gram positive anaerobic bacillus that was first isolated from stools of neonates in 1935 [165] and identified as the most commonly identified causative agent of antibiotic-associated diarrhea and pseudomembranous colitis in 1977 [166]. This pathogen is a major cause of healthcareassociated diarrhea and has been responsible for many large outbreaks in healthcare settings that were extremely difficult to control. Important factors that contribute to healthcare-associated outbreaks include environmental contamination, persistence of spores for prolonged periods of time, resistance of spores to routinely used disinfectants and antiseptics, hand carriage by healthcare personnel to other patients, and exposure of patients to frequent courses of antimicrobial agents[167] . Antimicrobials most frequently associated with increased risk of *C. difficile* include third generation cephalosporins, clindamycin, vancomycin, and fluoroquinolones.

Since 2001, outbreaks and sporadic cases of *C. difficile* with increased morbidity and mortality have been observed in several U.S. states, Canada, England and the Netherlands[168-172]. The same strain of *C. difficile* has been implicated in these outbreaks[173]. This strain, toxinotype III, North American PFGE type 1, and PCR-ribotype
027 (NAP1/027) has been found to hyperproduce toxin A (16 fold increase) and toxin B
(23 fold increase) compared with isolates from 12 different pulsed-field gel electrophoresisPFGE types. A recent survey of U.S. infectious disease physicians found that 40% perceived recent increases in the incidence and severity of *C. difficile* disease[174]. Standardization of testing methodology and surveillance definitions is needed for accurate comparisons of trends in rates among hospitals[175]. It is hypothesized that the incidence of disease and apparent heightened transmissibility of this new strain may be due, at least in part, to the greater production of toxins A and B, increasing the severity of diarrhea and resulting in more environmental contamination. Considering the greater morbidity, mortality, length of stay, and costs associated with *C. difficile* disease in both acute care and long term care facilities, control of this pathogen is now even more important than previously. Prevention of transmission focuses on syndromic application of Contact Precautions for patients with diarrhea, accurate identification of patients, environmental measures (e.g., rigorous cleaning of patient rooms) and consistent hand hygiene. Use of soap and water, rather than alcohol based handrubs, for mechanical removal of spores from hands, and a bleach-containing disinfectant (5000 ppm) for environmental disinfection, may be valuable when there is transmission in a healthcare facility. See Appendix A for specific recommendations.

I.C.1. b. Multidrug-resistant organisms (MDROs). In general, MDROs are defined as microorganisms – predominantly bacteria – that are resistant to one or more classes of antimicrobial agents[176]. Although the names of certain MDROs suggest resistance to only one agent (e.g., methicillin-resistant *Staphylococcus aureus* [MRSA], vancomycin resistant enterococcus [VRE]), these pathogens are usually resistant to all but a few commercially available antimicrobial agents. This latter feature defines MDROs that are considered to be epidemiologically important and deserve special attention in healthcare facilities[177]. Other MDROs of current concern include multidrug-resistant *Streptococcus pneumoniae* (MDRSP) which is resistant to penicillin and other broadspectrum agents such as macrolides and fluroquinolones, multidrug-resistant gramnegative bacilli (MDR- GNB), especially those producing extended spectrum betalactamases (ESBLs); and strains of *S. aureus* that are intermediate or resistant to vancomycin (i.e., VISA and VRSA)[178-197] [198].

MDROs are transmitted by the same routes as antimicrobial susceptible infectious agents. Patient-to-patient transmission in healthcare settings, usually via hands of HCWs, has been a major factor accounting for the increase in MDRO incidence and prevalence, especially for MRSA and VRE in acute care facilities[199-201]. Preventing the emergence and transmission of these pathogens requires a comprehensive approach that includes administrative involvement and measures (e.g., nurse staffing, communication systems, performance improvement processes to ensure adherence to recommended infection control measures), education and training of medical and other healthcare personnel, judicious antibiotic use, comprehensive surveillance for targeted MDROs, application of infection control precautions during patient care, environmental measures (e.g., cleaning and disinfection of the patient care environment and equipment, dedicated single-patient-use of non-critical equipment), and decolonization therapy when appropriate.

The prevention and control of MDROs is a national priority - one that requires that all healthcare facilities and agencies assume responsibility and participate in communitywide control programs[176, 177]. A detailed discussion of this topic and recommendations for prevention was published in 2006 may be found at Management of Multidrug-Resistant Organisms in Healthcare Settings (2006) (https://www.cdc.gov/infectioncontrol/guidelines/mdro/ accessed May 2016).

I.C.2. Agents of bioterrorism. CDC has designated the agents that cause anthrax, smallpox, plague, tularemia, viral hemorrhagic fevers, and botulism as Category A (high priority) because these agents can be easily disseminated environmentally and/or transmitted from person to person; can cause high mortality and have the potential for major public health impact; might cause public panic and social disruption; and require special action for public health preparedness[202]. General information relevant to infection control in healthcare settings for Category A agents of bioterrorism is summarized in Table 3. Consult [This link is no longer active: www.bt.cdc.gov. Similar information may be found at CDC Bioterrorism Agents/Diseases (https://emergency.cdc.gov/agent/agentlist.asp accessed May 2016.)] for additional, updated Category A agent information as well as information concerning Category B and C agents of bioterrorism and updates. Category B and C agents are important but are not as readily disseminated and cause less morbidity and mortality than Category A agents.

Healthcare facilities confront a different set of issues when dealing with a suspected bioterrorism event as compared with other communicable diseases. An understanding of the epidemiology, modes of transmission, and clinical course of each disease, as well as carefully drafted plans that provide an approach and relevant websites and other resources for disease-specific guidance to healthcare, administrative, and support personnel, are essential for responding to and managing a bioterrorism event. Infection control issues to be addressed include:

1. identifying persons who may be exposed or infected;
2. preventing transmission among patients, healthcare personnel, and visitors;
3. providing treatment, chemoprophylaxis or vaccine to potentially large numbers of people;
4. protecting the environment including the logistical aspects of securing sufficient numbers of AIIRs or designating areas for patient cohorts when there are an insufficient number of AIIRs available;
5. providing adequate quantities of appropriate personal protective equipment; and
6. identifying appropriate staff to care for potentially infectious patients (e.g., vaccinated healthcare personnel for care of patients with smallpox).

The response is likely to differ for exposures resulting from an intentional release compared with naturally occurring disease because of the large number persons that can be exposed at the same time and possible differences in pathogenicity.

A variety of sources offer guidance for the management of persons exposed to the most likely agents of bioterrorism. Federal agency websites (e.g., [This link is no longer active: www.usamriid.army.mil/publications/index.html. Similar information may be found at USAMRIID: Biodefense Solutions to Protect our Nation (http://www.usamriid.army.mil/ accessed May 2016).], [This link is no longer active: www.bt.cdc.gov. Similar information may be found at CDC Bioterrorism Agents/Diseases (https://emergency.cdc.gov/agent/agentlist.asp accessed May 2016.)] and state and county health department web sites should be consulted for the most upto-date information. Sources of information on specific agents include: anthrax[203]; smallpox[204-206]; plague[207, 208]; botulinum toxin[209]; tularemia[210]; and hemorrhagic fever viruses.[211, 212].

I.C.2.a. Pre-event administration of smallpox (vaccinia) vaccine to healthcare personnel. Vaccination of personnel in preparation for a possible smallpox exposure has important infection control implications[213-215]. These include the need for meticulous screening for vaccine contraindications in persons who are at increased risk for adverse vaccinia events; containment and monitoring of the vaccination site to prevent transmission in the healthcare setting and at home; and the management of patients with vaccinia-related adverse events[216, 217]. The pre-event U.S. smallpox vaccination program of 2003 is an example of the effectiveness of carefully developed recommendations for both screening potential vaccinees for contraindications and vaccination site care and monitoring. Approximately 760,000 individuals were vaccinated in the Department of Defense and 40,000 in the civilian or public health populations from December 2002 to February 2005, including approximately 70,000 who worked in healthcare settings. There were no cases of eczema vaccinatum, progressive vaccinia, fetal vaccinia, or contact transfer of vaccinia in healthcare settings or in military workplaces[218, 219]. Outside the healthcare setting, there were 53 cases of contact transfer from military vaccinees to close personal contacts (e.g., bed partners or contacts during participation in sports such as wrestling[220]). All contact transfers were from individuals who were not following recommendations to cover their vaccination sites. Vaccinia virus was confirmed by culture or PCR in 30 cases, and two of the confirmed cases resulted from tertiary transfer. All recipients, including one breast-fed infant, recovered without complication. Subsequent studies using viral culture and PCR techniques have confirmed the effectiveness of semipermeable dressings to contain vaccinia[221-224]. This experience emphasizes the importance of ensuring that newly vaccinated healthcare personnel adhere to recommended vaccination-site care, especially if they are to care for high-risk patients. Recommendations for pre-event smallpox vaccination of healthcare personnel and vaccinia-related infection control recommendations are published in the MMWR[216, 225] with updates posted on the CDC bioterrorism web site[205].

I.C.3. Prions. Creutzfeldt-Jakob disease (CJD) is a rapidly progressive, degenerative, neurologic disorder of humans with an incidence in the United States of approximately 1 person/million population/year[226, 227] (Creutzfeldt-Jakob Disease, Classic (CJD) (https://www.cdc.gov/prions/cjd/index.html accessed May 2016) [Current version of this document may differ from original.]). CJD is believed to be caused by a transmissible proteinaceous infectious agent termed a prion. Infectious prions are isoforms of a hostencoded glycoprotein known as the prion protein. The incubation period (i.e., time between exposure and and onset of symptoms) varies from two years to many decades. However, death typically occurs within 1 year of the onset of symptoms.
Approximately 85% of CJD cases occur sporadically with no known environmental source of infection and 10% are familial. Iatrogenic transmission has occurred with most resulting from treatment with human cadaveric pituitary-derived growth hormone or gonadotropin[228, 229], from implantation of contaminated human dura mater grafts[230] or from corneal transplants[231]). Transmission has been linked to the use of contaminated neurosurgical instruments or stereotactic electroencephalogram electrodes[232, 233, 234, 235].

Prion diseases in animals include scrapie in sheep and goats, bovine spongiform encephalopathy (BSE, or “mad cow disease”) in cattle, and chronic wasting disease in deer and elk[236]. BSE, first recognized in the United Kingdom (UK) in 1986, was associated with a major epidemic among cattle that had consumed contaminated meat and bone meal.

The possible transmission of BSE to humans causing variant CJD (vCJD) was first described in 1996 and subsequently found to be associated with consumption of BSEcontaminated cattle products primarily in the United Kingdom. There is strong epidemiologic and laboratory evidence for a causal association between the causative agent of BSE and vCJD[237]. Although most cases of vCJD have been reported from the UK, a few cases also have been reported from Europe, Japan, Canada, and the United States. Most vCJD cases worldwide lived in or visited the UK during the years of a large outbreak of BSE (1980-96) and may have consumed contaminated cattle products during that time (Creutzfeldt-Jakob Disease, Classic (CJD) (https://www.cdc.gov/prions/cjd/index.html accessed May 2016) [Current version of this document may differ from original.]). Although there has been no indigenously acquired vCJD in the United States, the sporadic occurrence of BSE in cattle in North America has heightened awareness of the possibility that such infections could occur and have led to increased surveillance activities. Updated information may be found on the following website: Creutzfeldt-Jakob Disease, Classic (CJD) (https://www.cdc.gov/prions/cjd/index.html accessed May 2016) [Current version of this document may differ from original.]. The public health impact of prion diseases has been reviewed [238].

vCJD in humans has different clinical and pathologic characteristics from sporadic or classic CJD[239], including the following:

1. younger median age at death: 28 (range 16-48) vs. 68 years;
2. longer duration of illness: median 14 months vs. 4-6 months;
3. increased frequency of sensory symptoms and early psychiatric symptoms with delayed onset of frank neurologic signs; and
4. detection of prions in tonsillar and other lymphoid tissues from vCJD patients but not from sporadic CJD patients[240].

Similar to sporadic CJD, there have been no reported cases of direct human-to-human transmission of vCJD by casual or environmental contact, droplet, or airborne routes. Ongoing blood safety surveillance in the U.S. has not detected sporadic CJD transmission through blood transfusion[241-243]. However, bloodborne transmission of vCJD is believed to have occurred in two UK patients[244, 245]. The following FDA websites provide information on steps that are being taken in the US to protect the blood supply from CJD and vCJD: [This link is no longer active: http://www.fda.gov/cber/gdlns/cjdvcjd.htm. Similar information may be found at Guidance for Industry: Revised Preventive Measures (http://www.fda.gov/BiologicsBloodVaccines/GuidanceComplianceRegulatoryInformation/Guidances/Blood/ucm074089.htm accessed May 2016).]; [This link is no longer active: http://www.fda.gov/cber/gdlns/cjdvcjdq&a.htm. Similar information may be found at Questions and Answers on Guidance for Industry: Revised Preventive Measures (http://www.fda.gov/BiologicsBloodVaccines/GuidanceComplianceRegulatoryInformation/Guidances/Blood/ucm074100.htm accessed May 2016.)].

Standard Precautions are used when caring for patients with suspected or confirmed CJD or vCJD. However, special precautions are recommended for tissue handling in the histology laboratory and for conducting an autopsy, embalming, and for contact with a body that has undergone autopsy[246]. Recommendations for reprocessing surgical instruments to prevent transmission of CJD in healthcare settings have been published by the World Health Organization (WHO) and are currently under review at CDC.

Questions concerning notification of patients potentially exposed to CJD or vCJD through contaminated instruments and blood products from patients with CJD or vCJD or at risk of having vCJD may arise. The risk of transmission associated with such exposures is believed to be extremely low but may vary based on the specific circumstance. Therefore consultation on appropriate options is advised. The United Kingdom has developed several documents that clinicians and patients in the US may find useful ([This link is no longer active: http://www.hpa.org.uk/infections/topics_az/cjd/information_documents.htm. Similar information may be found at Health Protection Agency: Creutzfeldt-Jakob Disease (CJD) (http://webarchive.nationalarchives.gov.uk/20100121072521/hpa.org.uk/hpa/topics/infectiousdiseases/infectionsaz/1191942152861/), accessed May 2016.]).

I.C.4. Severe Acute Respiratory Syndrome (SARS). SARS is a newly discovered respiratory disease that emerged in China late in 2002 and spread to several countries[135, 140]; Mainland China, Hong Kong, Hanoi, Singapore, and Toronto were affected significantly. SARS is caused by SARS CoV, a previously unrecognized member of the coronavirus family[247, 248]. The incubation period from exposure to the onset of symptoms is 2 to 7 days but can be as long as 10 days and uncommonly even longer[249]. The illness is initially difficult to distinguish from other common respiratory infections. Signs and symptoms usually include fever >38.0°C and chills and rigors, sometimes accompanied by headache, myalgia, and mild to severe respiratory symptoms. Radiographic finding of atypical pneumonia is an important clinical indicator of possible SARS. Compared with adults, children have been affected less frequently, have milder disease, and are less likely to transmit SARS-CoV[135, 249-251]. The overall case fatality rate is approximately 6.0%;

underlying disease and advanced age increase the risk of mortality (WHO Update 49 - SARS case fatality ratio, incubation period (http://www.who.int/csr/sarsarchive/2003_05_07a/en/ accessed May 2016)).

Outbreaks in healthcare settings, with transmission to large numbers of healthcare personnel and patients have been a striking feature of SARS; undiagnosed, infectious patients and visitors were important initiators of these outbreaks[21, 252-254]. The relative contribution of potential modes of transmission is not precisely known. There is ample evidence for droplet and contact transmission[96, 101, 113]; however, opportunistic airborne transmission cannot be excluded[101, 135-139, 149, 255]. For example, exposure to aerosolgenerating procedures (e.g., endotracheal intubation, suctioning) was associated with transmission of infection to large numbers of healthcare personnel outside of the United States[93, 94, 96, 98, 253].Therefore, aerosolization of small infectious particles generated during these and other similar procedures could be a risk factor for transmission to others within a multi-bed room or shared airspace. A review of the infection control literature generated from the SARS outbreaks of 2003 concluded that the greatest risk of transmission is to those who have close contact, are not properly trained in use of protective infection control procedures, do not consistently use PPE; and that N95 or higher respirators may offer additional protection to those exposed to aerosol- generating procedures and high risk activities[256, 257]. Organizational and individual factors that affected adherence to infection control practices for SARS also were identified[257].

Control of SARS requires a coordinated, dynamic response by multiple disciplines in a healthcare setting[9]. Early detection of cases is accomplished by screening persons with symptoms of a respiratory infection for history of travel to areas experiencing community transmission or contact with SARS patients, followed by implementation of Respiratory Hygiene/Cough Etiquette (i.e., placing a mask over the patient's nose and mouth) and physical separation from other patients in common waiting areas.The precise combination of precautions to protect healthcare personnel has not been determined. At the time of this publication, CDC recommends Standard Precautions, with emphasis on the use of hand hygiene, Contact Precautions with emphasis on environmental cleaning due to the detection of SARS CoV RNA by PCR on surfaces in rooms occupied by SARS patients[138, 254, 258], Airborne Precautions, including use of fit-tested NIOSHapproved N95 or higher level respirators, and eye protection[259]. In Hong Kong, the use of Droplet and Contact Precautions, which included use of a mask but not a respirator, was effective in protecting healthcare personnel[113]. However, in Toronto, consistent use of an N95 respirator was slightly more protective than a mask[93]. It is noteworthy that there was no transmission of SARS-CoV to public hospital workers in Vietnam despite inconsistent use of infection control measures, including use of PPE, which suggests other factors (e.g., severity of disease, frequency of high risk procedures or events, environmental features) may influence opportunities for transmission[260].

SARS-CoV also has been transmitted in the laboratory setting through breaches in recommended laboratory practices. Research laboratories where SARS-CoV was under investigation were the source of most cases reported after the first series of outbreaks in the winter and spring of 2003[261, 262]. Studies of the SARS outbreaks of 2003 and transmissions that occurred in the laboratory re-affirm the effectiveness of recommended infection control precautions and highlight the importance of consistent adherence to these measures.

Lessons from the SARS outbreaks are useful for planning to respond to future public health crises, such as pandemic influenza and bioterrorism events. Surveillance for cases among patients and healthcare personnel, ensuring availability of adequate supplies and staffing, and limiting access to healthcare facilities were important factors in the response to SARS that have been summarized[9]. Guidance for infection control precautions in various settings is available at [This link is no longer active: www.cdc.gov/ncidod/sars. Similar information may be found at CDC Severe Acute Respiratory Syndrome (SARS), (https://www.cdc.gov/sars/index.html accessed September 2018.)].

I.C.5. Monkeypox. Monkeypox is a rare viral disease found mostly in the rain forest countries of Central and West Africa. The disease is caused by an orthopoxvirus that is similar in appearance to smallpox but causes a milder disease. The only recognized outbreak of human monkeypox in the United States was detected in June 2003 after several people became ill following contact with sick pet prairie dogs. Infection in the prairie dogs was subsequently traced to their contact with a shipment of animals from Africa, including giant Gambian rats[263]. This outbreak demonstrates the importance of recognition and prompt reporting of unusual disease presentations by clinicians to enable prompt identification of the etiology; and the potential of epizootic diseases to spread from animal reservoirs to humans through personal and occupational exposure[264].

Limited data on transmission of monkeypox are available. Transmission from infected animals and humans is believed to occur primarily through direct contact with lesions and respiratory secretions; airborne transmission from animals to humans is unlikely but cannot be excluded, and may have occurred in veterinary practices (e.g., during administration of nebulized medications to ill prairie dogs[265]). Among humans, four instances of monkeypox transmission within hospitals have been reported in Africa among children, usually related to sharing the same ward or bed[266, 267]. Additional recent literature documents transmission of Congo Basin monkeypox in a hospital compound for an extended number of generations[268].

There has been no evidence of airborne or any other person-to-person transmission of monkeypox in the United States, and no new cases of monkeypox have been identified since the outbreak in June 2003 [269]. The outbreak strain is a clade of monkeypox distinct from the Congo Basin clade and may have different epidemiologic properties (including human-to-human transmission potential) from monkeypox strains of the Congo Basin[270]; this awaits further study. Smallpox vaccine is 85% protective against Congo Basin monkeypox[271]. Since there is an associated case fatality rate of ≤10%, administration of smallpox vaccine within 4 days to individuals who have had direct exposure to patients or animals with monkeypox is a reasonable consideration[272]. For the most current information, see CDC Monkeypox (https://www.cdc.gov/poxvirus/monkeypox/index.html accessed September 2018). [Current version of this document may differ from original.].

I.C.6. Noroviruses. Noroviruses, formerly referred to as Norwalk-like viruses, are members of the Caliciviridae family. These agents are transmitted via contaminated food or water and from person-to-person, causing explosive outbreaks of gastrointestinal disease[273]. Environmental contamination also has been documented as a contributing factor in ongoing transmission during outbreaks[274, 275]. Although noroviruses cannot be propagated in cell culture, DNA detection by molecular diagnostic techniques has facilitated a greater appreciation of their role in outbreaks of gastrointestinal disease[276]. Reported outbreaks in hospitals[132, 142, 277], nursing homes[275, 278-283], cruise ships[284, 285], hotels[143, 147], schools[148], and large crowded shelters established for hurricane evacuees[286], demonstrate their highly contagious nature, the disruptive impact they have in healthcare facilities and the community, and the difficulty of controlling outbreaks in settings where people share common facilites and space. Of note, there is nearly a 5 fold increase in the risk to patients in outbreaks where a patient is the index case compared with exposure of patients during outbreaks where a staff member is the index case[287].

The average incubation period for gastroenteritis caused by noroviruses is 12-48 hours and the clinical course lasts 12-60 hours[273]. Illness is characterized by acute onset of nausea, vomiting, abdominal cramps, and/or diarrhea. The disease is largely selflimited; rarely, death caused by severe dehydration can occur, particularly among the elderly with debilitating health conditions.

The epidemiology of norovirus outbreaks shows that even though primary cases may result from exposure to a fecally-contaminated food or water, secondary and tertiary cases often result from person-to-person transmission that is facilitated by contamination of fomites[273, 288] and dissemination of infectious particles, especially during the process of vomiting[132, 142, 143, 147, 148, 273, 279, 280]. Widespread, persistent and inapparent contamination of the environment and fomites can make outbreaks extremely difficult to control[147, 275, 284].These clinical observations and the detection of norovirus DNA on horizontal surfaces 5 feet above the level that might be touched normally suggest that, under certain circumstances, aerosolized particles may travel distances beyond 3 feet[147]. It is hypothesized that infectious particles may be aerosolized from vomitus, inhaled, and swallowed. In addition, individuals who are responsible for cleaning the environment may be at increased risk of infection. Development of disease and transmission may be facilitated by the low infectious dose (i.e., <100 viral particles)[289] and the resistance of these viruses to the usual cleaning and disinfection agents (i.e., may survive ≤10 ppm chlorine)[290-292]. An alternate phenolic agent that was shown to be effective against feline calicivirus was used for environmental cleaning in one outbreak[275, 293]. There are insufficient data to determine the efficacy of alcohol-based hand rubs against noroviruses when the hands are not visibly soiled[294]. Absence of disease in certain individuals during an outbreak may be explained by protection from infection conferred by the B histo-blood group antigen[295]. Consultation on outbreaks of gastroenteritis is available through CDC's Division of Viral and Rickettsial Diseases[296].

I.C.7. Hemorrhagic fever viruses (HFV). The hemorrhagic fever viruses are a mixed group of viruses that cause serious disease with high fever, skin rash, bleeding diathesis, and in some cases, high mortality; the disease caused is referred to as viral hemorrhagic fever (VHF). Among the more commonly known HFVs are Ebola and Marburg viruses (Filoviridae), Lassa virus (Arenaviridae), Crimean-Congo hemorrhagic fever and Rift Valley Fever virus (Bunyaviridae), and Dengue and Yellow fever viruses (Flaviviridae)[212, 297]. These viruses are transmitted to humans via contact with infected animals or via arthropod vectors. While none of these viruses is endemic in the United States, outbreaks in affected countries provide potential opportunities for importation by infected humans and animals. Furthermore, there are concerns that some of these agents could be used as bioweapons[212]. Person-to-person transmission is documented for Ebola, Marburg, Lassa and Crimean-Congo hemorrhagic fever viruses. In resourcelimited healthcare settings, transmission of these agents to healthcare personnel, patients and visitors has been described and in some outbreaks has accounted for a large proportion of cases[298-300]. Transmissions within households also have occurred among individuals who had direct contact with ill persons or their body fluids, but not to those who did not have such contact[301].

Evidence concerning the transmission of HFVs has been summarized[212, 302]. Person-toperson transmission is associated primarily with direct blood and body fluid contact. Percutaneous exposure to contaminated blood carries a particularly high risk for transmission and increased mortality[303, 304]. The finding of large numbers of Ebola viral particles in the skin and the lumina of sweat glands has raised concern that transmission could occur from direct contact with intact skin though epidemiologic evidence to support this is lacking[305]. Postmortem handling of infected bodies is an important risk for transmission[301, 306, 307]. In rare situations, cases in which the mode of transmission was unexplained among individuals with no known direct contact , have led to speculation that airborne transmission could have occurred [298]. However, airborne transmission of naturally occurring HFVs in humans has not been seen. In one study of airplane passengers exposed to an in-flight index case of Lassa fever, there was no transmission to any passengers[308].

In the laboratory setting, animals have been infected experimentally with Marburg or Ebola viruses via direct inoculation of the nose, mouth and/or conjunctiva[309, 310] and by using mechanically generated virus-containing aerosols[311, 312]. Transmission of Ebola virus among laboratory primates in an animal facility has been described[313]. Secondarily infected animals were in individual cages and separated by approximately 3 meters. Although the possibility of airborne transmission was suggested, the authors were not able to exclude droplet or indirect contact transmission in this incidental observation. Guidance on infection control precautions for HVFs that are transmitted person-toperson have been published by CDC[1, 211] and by the Johns Hopkins Center for Civilian Biodefense Strategies[212]. The most recent recommendations at the time of publication of this document were posted on the CDC website on 5/19/05 [314]. Inconsistencies among the various recommendations have raised questions about the appropriate precautions to use in U.S. hospitals. In less developed countries, outbreaks of HFVs have been controlled with basic hygiene, barrier precautions, safe injection practices, and safe burial practices[299, 306]. The preponderance of evidence on HFV transmission indicates that Standard, Contact and Droplet Precautions with eye protection are effective in protecting healthcare personnel and visitors who may attend an infected patient. Single gloves are adequate for routine patient care; double-gloving is advised during invasive procedures (e.g., surgery) that pose an increased risk for blood exposure. Routine eye protection (i.e. goggles or face shield) is particularly important. Fluid-resistant gowns should be worn for all patient contact. Airborne Precautions are not required for routine patient care; however, use of AIIRs is prudent when procedures that could generate infectious aerosols are performed (e.g., endotracheal intubation, bronchoscopy, suctioning, autopsy procedures involving oscillating saws). N95 or higher level respirators may provide added protection for individuals in a room during aerosolgenerating procedures (Table 3, Appendix A). When a patient with a syndrome consistent with hemorrhagic fever also has a history of travel to an endemic area, precautions are initiated upon presentation and then modified as more information is obtained (Table 2). Patients with hemorrhagic fever syndrome in the setting of a suspected bioweapon attack should be managed using Airborne Precautions, including AIIRs, since the epidemiology of a potentially weaponized hemorrhagic fever virus is unpredictable.

I.D. Transmission Risks Associated with Specific Types of Healthcare Settings

Numerous factors influence differences in transmission risks among the various healthcare settings. These include the population characteristics (e.g., increased susceptibility to infections, type and prevalence of indwelling devices), intensity of care, exposure to environmental sources, length of stay, and frequency of interaction between patients/residents with each other and with HCWs. These factors, as well as organizational priorities, goals, and resources, influence how different healthcare settings adapt transmission prevention guidelines to meet their specific needs[315, 316].
Infection control management decisions are informed by data regarding institutional experience/epidemiology, trends in community and institutional HAIs, local, regional, and national epidemiology, and emerging infectious disease threats.

I.D.1. Hospitals. Infection transmission risks are present in all hospital settings. However, certain hospital settings and patient populations have unique conditions that predispose patients to infection and merit special mention. These are often sentinel sites for the emergence of new transmission risks that may be unique to that setting or present opportunities for transmission to other settings in the hospital.

I.D.1.a. Intensive care units. Intensive care units (ICUs) serve patients who are immunocompromised by disease state and/or by treatment modalities, as well as patients with major trauma, respiratory failure and other life-threatening conditions (e.g., myocardial infarction, congestive heart failure, overdoses, strokes, gastrointestinal bleeding, renal failure, hepatic failure, multi-organ system failure, and the extremes of age). Although ICUs account for a relatively small proportion of hospitalized patients, infections acquired in these units accounted for >20% of all HAIs[317]. In the National Nosocomial Infection Surveillance (NNIS) system, 26.6% of HAIs were reported from ICU and high risk nursery (NICU) patients in 2002 (NNIS, unpublished data). This patient population has increased susceptibility to colonization and infection, especially with MDROs and Candida sp.[318, 319], because of underlying diseases and conditions, the invasive medical devices and technology used in their care (e.g., central venous catheters and other intravascular devices, mechanical ventilators, extracorporeal membrane oxygenation (ECMO), hemodialysis/-filtration, pacemakers, implantable left ventricular assist devices), the frequency of contact with healthcare personnel, prolonged length of stay, and prolonged exposure to antimicrobial agents[320-331]. Furthermore, adverse patient outcomes in this setting are more severe and are associated with a higher mortality[332]. Outbreaks associated with a variety of bacterial, fungal and viral pathogens due to common-source and person-to-person transmissions are frequent in adult and pediatric ICUs[31, 333-336, 337, 338].

I.D.1.b. Burn units. Burn wounds can provide optimal conditions for colonization, infection, and transmission of pathogens; infection acquired by burn patients is a frequent cause of morbidity and mortality[320, 339, 340]. In patients with a burn injury
involving ≥30% of the total body surface area (TBSA), the risk of invasive burn wound infection is particularly high[341, 342]. Infections that occur in patients with burn injury involving <30% TBSA are usually associated with the use of invasive devices. Methicillin-susceptible *Staphylococcus aureus*, MRSA, enterococci, including VRE, gram-negative bacteria, and candida are prevalent pathogens in burn infections[53, 340, 343-350] and outbreaks of these organisms have been reported[351-354]. Shifts over time in the predominance of pathogens causing infections among burn patients often lead to changes in burn care

practices[343, 355-358]. Burn wound infections caused by *Aspergillus* sp. or other environmental molds may result from exposure to supplies contaminated during construction[359] or to dust generated during construction or other environmental disruption[360].

Hydrotherapy equipment is an important environmental reservoir of gram-negative organisms. Its use for burn care is discouraged based on demonstrated associations between use of contaminated hydrotherapy equipment and infections. Burn wound infections and colonization, as well as bloodstream infections, caused by multidrugresistant *P. aeruginosa*[361], *A. baumannii*[362], and MRSA[352] have been associated with hydrotherapy; excision of burn wounds in operating rooms is preferred.

Advances in burn care, specifically early excision and grafting of the burn wound, use of topical antimicrobial agents, and institution of early enteral feeding, have led to decreased infectious complications. Other advances have included prophylactic antimicrobial usage, selective digestive decontamination (SDD), and use of antimicrobial-coated catheters (ACC), but few epidemiologic studies and no efficacy studies have been performed to show the relative benefit of these measures [357].

There is no consensus on the most effective infection control practices to prevent transmission of infections to and from patients with serious burns (e.g., single-bed rooms[358], laminar flow[363] and high efficiency particulate air filtration [HEPA][360] or maintaining burn patients in a separate unit without exposure to patients or equipment from other units[364]). There also is controversy regarding the need for and type of barrier precautions for routine care of burn patients. One retrospective study demonstrated efficacy and cost effectiveness of a simplified barrier isolation protocol for wound colonization, emphasizing handwashing and use of gloves, caps, masks and plastic impermeable aprons (rather than isolation gowns) for direct patient contact[365]. However, there have been no studies that define the most effective combination of infection control precautions for use in burn settings. Prospective studies in this area are needed. ***I.D.1.c. Pediatrics.*** Studies of the epidemiology of HAIs in children have identified unique infection control issues in this population[63, 64, 366-370]. Pediatric intensive care unit (PICU) patients and the lowest birthweight babies in the high-risk nursery (HRN) monitored in the NNIS system have had high rates of central venous catheter-associated bloodstream infections[64, 320, 369-372]. Additionally, there is a high prevalence of communityacquired infections among hospitalized infants and young children who have not yet become immune either by vaccination or by natural infection. The result is more patients and their sibling visitors with transmissible infections present in pediatric healthcare settings, especially during seasonal epidemics (e.g., pertussis[36, 40, 41], respiratory viral infections including those caused by RSV[24], influenza viruses[373], parainfluenza virus[374], human metapneumovirus[375], and adenoviruses[376]; rubeola [measles][34], varicella [chickenpox][377], and rotavirus[38, 378]).

Close physical contact between healthcare personnel and infants and young children (eg. cuddling, feeding, playing, changing soiled diapers, and cleaning copious uncontrolled respiratory secretions) provides abundant opportunities for transmission of infectious material. Practices and behaviors such as congregation of children in play areas where toys and bodily secretions are easily shared and family members roomingin with pediatric patients can further increase the risk of transmission. Pathogenic bacteria have been recovered from toys used by hospitalized patients[379]; contaminated bath toys were implicated in an outbreak of multidrug-resistant *P. aeruginosa* on a pediatric oncology unit[80]. In addition, several patient factors increase the likelihood that infection will result from exposure to pathogens in healthcare settings (e.g., immaturity of the neonatal immune system, lack of previous natural infection and resulting immunity, prevalence of patients with congenital or acquired immune deficiencies, congenital anatomic anomalies, and use of life-saving invasive devices in neontal and pediatric intensive care units)[63]. There are theoretical concerns that infection risk will increase in association with innovative practices used in the NICU for the purpose of improving developmental outcomes, Such factors include co-bedding[380] and kangaroo care[381] that may increase opportunity for skin-to-skin exposure of multiple gestation infants to each other and to their mothers, respectively; although infection risk smay actually be reduced among infants receiving kangaroo care[382]. Children who attend child care centers[383, 384] and pediatric rehabilitation units[385] may increase the overall burden of antimicrobial resistance (eg. by contributing to the reservoir of communityassociated MRSA [CA-MRSA])[386-391]. Patients in chronic care facilities may have increased rates of colonization with resistant GNBs and may be sources of introduction of resistant organisms to acute care settings[50].

I.D.2. Non-acute healthcare settings. Healthcare is provided in various settings outside of hospitals including facilities, such as long-term care facilities (LTCF) (e.g., nursing homes), homes for the developmentally disabled, settings where behavioral health services are provided, rehabilitation centers and hospices[392]. In addition, healthcare may be provided in nonhealthcare settings such as workplaces with occupational health clinics, adult day care centers, assisted living facilities, homeless shelters, jails and prisons, school clinics and infirmaries. Each of these settings has unique circumstances and population risks to consider when designing and implementing an infection control program. Several of the most common settings and their particular challenges are discussed below. While this Guideline does not address each setting, the principles and strategies provided may be adapted and applied as appropriate.

I.D.2.a. Long-term care. The designation LTCF applies to a diverse group of residential settings, ranging from institutions for the developmentally disabled to nursing homes for the elderly and pediatric chronic-care facilities[393-395]. Nursing homes for the elderly predominate numerically and frequently represent long-term care as a group of facilities. Approximately 1.8 million Americans reside in the nation's 16,500 nursing homes.[396] Estimates of HAI rates of 1.8 to 13.5 per 1000 resident-care days have been reported with a range of 3 to 7 per 1000 resident-care days in the more rigorous studies[397-401].
The infrastructure described in the Department of Veterans Affairs nursing home care units is a promising example for the development of a nationwide HAI surveillance system for LTCFs[402].

LCTFs are different from other healthcare settings in that elderly patients at increased risk for infection are brought together in one setting and remain in the facility for extended periods of time; for most residents, it is their home. An atmosphere of community is fostered and residents share common eating and living areas, and participate in various facility-sponsored activities[403, 404]. Since able residents interact freely with each other, controlling transmission of infection in this setting is challenging[405]. Residents who are colonized or infected with certain microorganisms are, in some cases, restricted to their room. However, because of the psychosocial risks associated with such restriction, it has been recommended that psychosocial needs be balanced with infection control needs in the LTCF setting[406-409]. Documented LTCF outbreaks have been caused by various viruses (e.g., influenza virus[35, 410-412], rhinovirus[413], adenovirus [conjunctivitis][414], norovirus[278, 279 275, 281]) and bacteria (e.g., group A streptococcus[162], *B. pertussis*[415], non-susceptible *S. pneumoniae*[197, 198], other MDROs, and *Clostridium difficile*[416]) These pathogens can lead to substantial morbidity and mortality, and increased medical costs; prompt detection and implementation of effective control measures are required.

Risk factors for infection are prevalent among LTCF residents[395, 417, 418]. Age-related declines in immunity may affect responses to immunizations for influenza and other infectious agents, and increase susceptibility to tuberculosis. Immobility, incontinence, dysphagia, underlying chronic diseases, poor functional status, and age-related skin changes increase susceptibility to urinary, respiratory and cutaneous and soft tissue infections, while malnutrition can impair wound healing[419-423]. Medications (e.g., drugs that affect level of consciousness, immune function, gastric acid secretions, and normal flora, including antimicrobial therapy) and invasive devices (e.g., urinary catheters and feeding tubes) heighten susceptibility to infection and colonization in LTCF residents[424426]. Finally, limited functional status and total dependence on healthcare personnel for activities of daily living have been identified as independent risk factors for infection[401, 417, 427] and for colonization with MRSA[428, 429] and ESBL-producing *K. pneumoniae*[430]. Several position papers and review articles have been published that provide guidance on various aspects of infection control and antimicrobial resistance in LTCFs[406-408, 431436]. The Centers for Medicare and Medicaid Services (CMS) have established regulations for the prevention of infection in LTCFs[437].

Because residents of LTCFs are hospitalized frequently, they can transfer pathogens between LTCFs and healthcare facilities in which they receive care[8, 438-441]. This is also true for pediatric long-term care populations. Pediatric chronic care facilities have been associated with importing extended-spectrum cephalosporin-resistant, gram-negative bacilli into one PICU[50]. Children from pediatric rehabilitation units may contribute to the reservoir of community-associated MRSA[385, 389-391].

I.D.2.b. Ambulatory care. In the past decade, healthcare delivery in the United States has shifted from the acute, inpatient hospital to a variety of ambulatory and communitybased settings, including the home. Ambulatory care is provided in hospital-based outpatient clinics, nonhospital-based clinics and physician offices, public health clinics, free-standing dialysis centers, ambulatory surgical centers, urgent care centers, and many others. In 2000, there were 83 million visits to hospital outpatient clinics and more than 823 million visits to physician offices[442]; ambulatory care now accounts for most patient encounters with the health care system[443]. In these settings, adapting transmission prevention guidelines is challenging because patients remain in common areas for prolonged periods waiting to be seen by a healthcare provider or awaiting admission to the hospital, examination or treatment rooms are turned around quickly with limited cleaning, and infectious patients may not be recognized immediately. Furthermore, immunocompromised patients often receive chemotherapy in infusion rooms where they stay for extended periods of time along with other types of patients. There are few data on the risk of HAIs in ambulatory care settings, with the exception of hemodialysis centers[18, 444, 445]. Transmission of infections in outpatient settings has been reviewed in three publications[446-448]. Goodman and Solomon summarized 53 clusters of infections associated with the outpatient setting from 1961-1990 [446]. Overall, 29 clusters were associated with common source transmission from contaminated solutions or equipment, 14 with person-to-person transmission from or involving healthcare personnel and ten associated with airborne or droplet transmission among patients and healthcare workers. Transmission of bloodborne pathogens (i.e., hepatitis B and C viruses and, rarely, HIV) in outbreaks, sometimes involving hundreds of patients, continues to occur in ambulatory settings. These outbreaks often are related to common source exposures, usually a contaminated medical device, multi-dose vial, or intravenous solution[82, 449-453]. In all cases, transmission has been attributed to failure to adhere to fundamental infection control principles, including safe injection practices and aseptic technique.This subject has been reviewed and recommended infection control and safe injection practices summarized[454].

Airborne transmission of *M.tuberculosis* and measles in ambulatory settings, most frequently emergency departments, has been reported[34, 127, 446, 448, 455-457]. Measles virus was transmitted in physician offices and other outpatient settings during an era when immunization rates were low and measles outbreaks in the community were occurring regularly[34, 122, 458]. Rubella has been transmitted in the outpatient obstetric setting[33]; there are no published reports of varicella transmission in the outpatient setting. In the ophthalmology setting, adenovirus type 8 epidemic keratoconjunctivitis has been transmitted via incompletely disinfected ophthalmology equipment and/or from healthcare workers to patients, presumably by contaminated hands[17, 446, 448, 459-462].
If transmission in outpatient settings is to be prevented, screening for potentially infectious symptomatic and asymptomatic individuals, especially those who may be at risk for transmitting airborne infectious agents (e.g., M. tuberculosis, varicella-zoster virus, rubeola [measles]), is necessary at the start of the initial patient encounter.

Interim Measles Infection Control [July 2019]

See Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings (https://www.cdc.gov/infectioncontrol/guidelines/measles)

Upon identification of a potentially infectious patient, implementation of prevention measures, including prompt separation of potentially infectious patients and implementation of appropriate control measures (e.g., Respiratory Hygiene/Cough Etiquette and Transmission-Based Precautions) can decrease transmission risks[9, 12]. Transmission of MRSA and VRE in outpatient settings has not been reported, but the association of CA-MRSA in healthcare personnel working in an outpatient HIV clinic with environmental CA-MRSA contamination in that clinic, suggests the possibility of transmission in that setting[463]. Patient-to-patient transmission of *Burkholderia species* and *Pseudomonas aeruginosa* in outpatient clinics for adults and children with cystic fibrosis has been confirmed[464, 465].

I.D.2.c. Home care. Home care in the United States is delivered by over 20,000 provider agencies that include home health agencies, hospices, durable medical equipment providers, home infusion therapy services, and personal care and support services providers. Home care is provided to patients of all ages with both acute and chronic conditions. The scope of services ranges from assistance with activities of daily living and physical and occupational therapy to the care of wounds, infusion therapy, and chronic ambulatory peritoneal dialysis (CAPD).

The incidence of infection in home care patients, other than those associated with infusion therapy is not well studied[466-471]. However, data collection and calculation of infection rates have been accomplished for central venous catheter-associated bloodstream infections in patients receiving home infusion therapy [470-474] and for the risk of blood contact through percutaneous or mucosal exposures, demonstrating that surveillance can be performed in this setting[475]. Draft definitions for home care associated infections have been developed[476].

Transmission risks during home care are presumed to be minimal. The main transmission risks to home care patients are from an infectious healthcare provider or contaminated equipment; providers also can be exposed to an infectious patient during home visits. Since home care involves patient care by a limited number of personnel in settings without multiple patients or shared equipment, the potential reservoir of pathogens is reduced. Infections of home care providers, that could pose a risk to home care patients include infections transmitted by the airborne or droplet routes (e.g., chickenpox, tuberculosis, influenza), and skin infestations (e.g., scabies[69] and lice) and infections (e.g.,impetigo) transmitted by direct or indirect contact. There are no published data on indirect transmission of MDROs from one home care patient to another, although this is theoretically possible if contaminated equipment is transported from an infected or colonized patient and used on another patient. Of note, investigation of the first case of VISA in homecare[186] and the first 2 reported cases of VRSA[178, 180, 181, 183] found no evidence of transmission of VISA or VRSA to other home care recipients. Home health care also may contribute to antimicrobial resistance; a review of outpatient vancomycin use found 39% of recipients did not receive the antibiotic according to recommended guidelines[477].

Although most home care agencies implement policies and procedures to prevent transmission of organisms, the current approach is based on the adaptation of the 1996 Guideline for Isolation Precautions in Hospitals 1 as well as other professional guidance[478, 479]. This issue has been very challenging in the home care industry and practice has been inconsistent and frequently not evidence-based. For example, many home health agencies continue to observe "nursing bag technique," a practice that prescribes the use of barriers between the nursing bag and environmental surfaces in the home[480.] While the home environment may not always appear clean, the use of barriers between two non-critical surfaces has been questioned[481, 482]. Opportunites exist to conduct research in home care related to infection transmission risks[483].

I.D.2.d. Other sites of healthcare delivery. Facilities that are not primarily healthcare settings but in which healthcare is delivered include clinics in correctional facilities and shelters. Both settings can have suboptimal features, such as crowded conditions and poor ventilation. Economically disadvantaged individuals who may have chronic illnesses and healthcare problems related to alcoholism, injection drug use, poor nutrition, and/or inadequate shelter often receive their primary healthcare at sites such as these[484]. Infectious diseases of special concern for transmission include tuberculosis, scabies, respiratory infections (e.g., N. meningitides, S. pneumoniae), sexually transmitted and bloodborne diseases (e.g.,HIV, HBV, HCV, syphilis, gonorrhea), hepatitis A virus (HAV), diarrheal agents such as norovirus, and foodborne diseases[286, 485-488]. A high index of suspicion for tuberculosis and CA-MRSA in these populations is needed as outbreaks in these settings or among the populations they serve have been reported[489-497].

Patient encounters in these types of facilities provide an opportunity to deliver recommended immunizations and screen for *M. tuberculosis* infection in addition to diagnosing and treating acute illnesses[498]. Recommended infection control measures in these non-traditional areas designated for healthcare delivery are the same as for other ambulatory care settings. Therefore, these settings must be equipped to observe Standard Precautions and, when indicated, Transmission-based Precautions.

I.E. Transmission Risks Associated with Special Patient Populations

As new treatments emerge for complex diseases, unique infection control challenges associated with special patient populations need to be addressed.

I.E.1. Immunocompromised patients. Patients who have congenital primary immune deficiencies or acquired disease (eg. treatment-induced immune deficiencies) are at increased risk for numerous types of infections while receiving healthcare and may be located throughout the healthcare facility. The specific defects of the immune system determine the types of infections that are most likely to be acquired (e.g., viral infections are associated with T-cell defects and fungal and bacterial infections occur in patients who are neutropenic). As a general group, immunocompromised patients can be cared for in the same environment as other patients; however, it is always advisable to minimize exposure to other patients with transmissible infections such as influenza and other respiratory viruses[499, 500]. The use of more intense chemotherapy regimens for treatment of childhood leukemia may be associated with prolonged periods of neutropenia and suppression of other components of the immune system, extending the period of infection risk and raising the concern that additional precautions may be indicated for select groups[501, 502]. With the application of newer and more intense immunosuppressive therapies for a variety of medical conditions (e.g., rheumatologic disease[503, 504], inflammatory bowel disease[505]), immunosuppressed patients are likely to be more widely distributed throughout a healthcare facility rather than localized to single patient units (e.g., hematology-oncology). Guidelines for preventing infections in certain groups of immunocompromised patients have been published[15, 506, 507].

Published data provide evidence to support placing allogeneic HSCT patients in a Protective Environment[15, 157, 158]. Also, three guidelines have been developed that address the special requirements of these immunocompromised patients, including use of antimicrobial prophylaxis and engineering controls to create a Protective Environment for the prevention of infections caused by *Aspergillus* spp. and other environmental fungi[11, 14, 15]. As more intense chemotherapy regimens associated with prolonged periods of neutropenia or graft-versus-host disease are implemented, the period of risk and duration of environmental protection may need to be prolonged beyond the traditional 100 days[508].

I.E.2. Cystic fibrosis patients. Patients with cystic fibrosis (CF) require special consideration when developing infection control guidelines. Compared to other patients, CF patients require additional protection to prevent transmission from contaminated respiratory therapy equipment[509-513]. Infectious agents such as *Burkholderia cepacia* complex and *P. aeruginosa*[464, 465, 514, 515] have unique clinical and prognostic significance. In CF patients, *B. cepacia* infection has been associated with increased morbidity and mortality [516-518], while delayed acquisition of chronic *P.aeruginosa* infection may be associated with an improved long-term clinical outcome[519, 520]. Person-to-person transmission of *B. cepacia* complex has been demonstrated among children[517] and adults[521] with CF in healthcare settings[464, 522], during various social contacts[523], most notably attendance at camps for patients with CF[524], and among siblings with CF[525]. Successful infection control measures used to prevent transmission of respiratory secretions include segregation of CF patients from each other in ambulatory and hospital settings (including use of private rooms with separate showers), environmental decontamination of surfaces and equipment contaminated with respiratory secretions, elimination of group chest physiotherapy sessions, and disbanding of CF camps[97, 526]. The Cystic Fibrosis Foundation published a consensus document with evidence-based recommendations for infection control practices for CF patients[20].

I.F. New Therapies Associated with Potentially Transmissible Infectious Agents

I.F.1. Gene therapy. Gene therapy has has been attempted using a number of different viral vectors, including nonreplicating retroviruses, adenoviruses, adeno-associated viruses, and replication-competent strains of poxviruses. Unexpected adverse events have restricted the prevalence of gene therapy protocols.

The infectious hazards of gene therapy are theoretical at this time, but require meticulous surveillance due to the possible occurrence of in vivo recombination and the subsequent emergence of a transmissible genetically altered pathogen. Greatest concern attends the use of replication-competent viruses, especially vaccinia. As of the time of publication, no reports have described transmission of a vector virus from a gene therapy recipient to another individual, but surveillance is ongoing. Recommendations for monitoring infection control issues throughout the course of gene therapy trials have been published[527-529].

I.F.2. Infections transmitted through blood, organs and other tissues. The potential hazard of transmitting infectious pathogens through biologic products is a small but ever present risk, despite donor screening. Reported infections transmitted by transfusion or transplantation include West Nile Virus infection[530] cytomegalovirus infection[531], Creutzfeldt-Jacob disease[230], hepatitis C [532], infections with Clostridium spp. [533] and group A streptococcus[534], malaria[535], babesiosis[536], Chagas disease[537], lymphocytic choriomeningitis[538], and rabies[539, 540]. Therefore, it is important to consider receipt of biologic products when evaluating patients for potential sources of infection.

I.F.3. Xenotransplantation. The transplantation of nonhuman cells, tissues, and organs into humans potentially exposes patients to zoonotic pathogens. Transmission of known zoonotic infections (e.g., trichinosis from porcine tissue), constitutes one concern, but also of concern is the possibility that transplantation of nonhuman cells, tissues, or organs may transmit previously unknown zoonotic infections (xenozoonoses) to immunosuppressed human recipients. Potential infections that might accompany transplantation of porcine organs have been described[541]. Guidelines from the U.S. Public Health Service address many infectious diseases and infection control issues that surround the developing field of xenotransplantation,[542] work in this area is ongoing.

Part II: Fundamental Elements Needed to Prevent Transmission of Infectious Agents in Healthcare Settings

II.A. Healthcare System Components that Influence the Effectiveness of Precautions to Prevent Transmission

II.A.1. Administrative measures. Healthcare organizations can demonstrate a commitment to preventing transmission of infectious agents by incorporating infection control into the objectives of the organization's patient and occupational safety programs[543-547]. An infrastructure to guide, support, and monitor adherence to Standard and Transmission-Based Precautions[434, 548, 549] will facilitate fulfillment of the organization's mission and achievement of the Joint Commission on Accreditation of Healthcare Organization's patient safety goal to decrease HAIs[550]. Policies and procedures that explain how Standard and Transmission-Based Precautions are applied, including systems used to identify and communicate information about patients with potentially transmissible infectious agents, are essential to ensure the success of these measures and may vary according to the characteristics of the organization.

A key administrative measure is provision of fiscal and human resources for maintaining infection control and occupational health programs that are responsive to emerging needs. Specific components include bedside nurse[551] and infection prevention and control professional (ICP) staffing levels[552], inclusion of ICPs in facility construction and design decisions[11], clinical microbiology laboratory support[553, 554], adequate supplies and equipment including facility ventilation systems[11], adherence monitoring[555], assessment and correction of system failures that contribute to transmission[556, 557], and provision of feedback to healthcare personnel and senior administrators[434, 548, 549, 558]. The positive influence of institutional leadership has been demonstrated repeatedly in studies of HCW adherence to recommended hand hygiene practices[176, 177, 434, 548, 549, 559-564]. Healthcare administrator involvement in infection control processes can improve administrators' awareness of the rationale and resource requirements for following recommended infection control practices.

Several administrative factors may affect the transmission of infectious agents in healthcare settings: institutional culture, individual worker behavior, and the work environment. Each of these areas is suitable for performance improvement monitoring and incorporation into the organization's patient safety goals[543, 544, 546, 565].

II.A.1.a. Scope of work and staffing needs for infection control professionals. The effectiveness of infection surveillance and control programs in preventing nosocomial infections in United States hospitals was assessed by the CDC through the Study on the Efficacy of Nosocomial Infection Control (SENIC Project) conducted 1970-76 [566]. In a representative sample of US general hospitals, those with a trained infection control physician or microbiologist involved in an infection control program, and at least one infection control nurse per 250 beds, were associated with a 32% lower rate of four infections studied (CVC-associated bloodstream infections, ventilator-associated pneumonias, catheter-related urinary tract infections, and surgical site infections).
Since that landmark study was published, responsibilities of ICPs have expanded commensurate with the growing complexity of the healthcare system, the patient populations served, and the increasing numbers of medical procedures and devices used in all types of healthcare settings. The scope of work of ICPs was first assessed in 1982[567-569] by the Certification Board of Infection Control (CBIC), and has been reassessed every five years since that time[558, 570-572]. The findings of these task analyses have been used to develop and update the Infection Control Certification Examination, offered for the first time in 1983. With each survey, it is apparent that the role of the ICP is growing in complexity and scope, beyond traditional infection control activities in acute care hospitals. Activities currently assigned to ICPs in response to emerging challenges include:

1. surveillance and infection prevention at facilities other than acute care hospitals e.g., ambulatory clinics, day surgery centers, long term care facilities, rehabilitation centers, home care;
2. oversight of employee health services related to infection prevention, e.g., assessment of risk and administration of recommended treatment following exposure to infectious agents, tuberculosis

screening, influenza vaccination, respiratory protection fit testing, and administration of other vaccines as indicated, such as smallpox vaccine in 2003;
3. preparedness planning for annual influenza outbreaks, pandemic influenza, SARS, bioweapons attacks;
4. adherence monitoring for selected infection control practices;
5. oversight of risk assessment and implementation of prevention measures associated with construction and renovation;
6. prevention of transmission of MDROs;
7. evaluation of new medical products that could be associated with increased infection risk. e.g.,intravenous infusion materials;
8. communication with the public, facility staff, and state and local health departments concerning infection control-related issues; and
9. participation in local and multi-center research projects[434, 549, 552, 558, 573, 574].

None of the CBIC job analyses addressed specific staffing requirements for the identified tasks, although the surveys did include information about hours worked; the 2001 survey included the number of ICPs assigned to the responding facilities [558]. There is agreement in the literature that 1 ICP per 250 acute care beds is no longer adequate to meet current infection control needs; a Delphi project that assessed staffing needs of infection control programs in the 21st century concluded that a ratio of 0.8 to 1.0 ICP per 100 occupied acute care beds is an appropriate level of staffing [552]. A survey of participants in the National Nosocomial Infections Surveillance (NNIS) system found the average daily census per ICP was 115 [316]. Results of other studies have been similar: 3 per 500 beds for large acute care hospitals, 1 per 150-250 beds in long term care facilities, and 1.56 per 250 in small rural hospitals[573, 575]. The foregoing demonstrates that infection control staffing can no longer be based on patient census alone, but rather must be determined by the scope of the program, characteristics of the patient population, complexity of the healthcare system, tools available to assist personnel to perform essential tasks (e.g., electronic tracking and laboratory support for surveillance), and unique or urgent needs of the institution and community[552]. Furthermore, appropriate training is required to optimize the quality of work performed[558, 572, 576].

II.A.1.a.i. Infection control nurse liaison. Designating a bedside nurse on a patient care unit as an infection control liaison or "link nurse" is reported to be an effective adjunct to enhance infection control at the unit level[577-58]2. Such individuals receive training in basic infection control and have frequent communication with the ICPs, but maintain their primary role as bedside caregiver on their units. The infection control nurse liaison increases the awareness of infection control at the unit level. He or she is especially effective in implementation of new policies or control interventions because of the rapport with individuals on the unit, an understanding of unit-specific challenges, and ability to promote strategies that are most likely to be successful in that unit. This position is an adjunct to, not a replacement for, fully trained ICPs. Furthermore, the infection control liaison nurses should not be counted when considering ICP staffing.

II.A.1.b. Bedside nurse staffing. There is increasing evidence that the level of bedside nurse-staffing influences the quality of patient care[583, 584]. If there are adequate nursing staff, it is more likely that infection control practices, including hand hygiene and Standard and Transmission-Based Precautions, will be given appropriate attention and applied correctly and consistently[552]. A national multicenter study reported strong and consistent inverse relationships between nurse staffing and five adverse outcomes in medical patients, two of which were HAIs: urinary tract infections and pneumonia[583]. The association of nursing staff shortages with increased rates of HAIs has been demonstrated in several outbreaks in hospitals and long term care settings, and with increased transmission of hepatitis C virus in dialysis units[22, 418, 551, 585-597]. In most cases, when staffing improved as part of a comprehensive control intervention, the outbreak ended or the HAI rate declined. In two studies[590, 596], the composition of the nursing staff ("pool" or "float" vs. regular staff nurses) influenced the rate of primary bloodstream infections, with an increased infection rate occurring when the proportion of regular nurses decreased and pool nurses increased.

II.A.1.c. Clinical microbiology laboratory support. The critical role of the clinical microbiology laboratory in infection control and healthcare epidemiology is described well[553, 554, 598-600] and is supported by the Infectious Disease Society of America policy statement on consolidation of clinical microbiology laboratories published in 2001 [553]. The clinical microbiology laboratory contributes to preventing transmission of infectious diseases in healthcare settings by promptly detecting and reporting epidemiologically important organisms, identifying emerging patterns of antimicrobial resistance, and assisting in assessment of the effectiveness of recommended precautions to limit transmission during outbreaks[598]. Outbreaks of infections may be recognized first by laboratorians[162]. Healthcare organizations need to ensure the availability of the recommended scope and quality of laboratory services, a sufficient number of appropriately trained laboratory staff members, and systems to promptly communicate epidemiologically important results to those who will take action (e.g., providers of clinical care, infection control staff, healthcare epidemiologists, and infectious disease consultants)[601]. As concerns about emerging pathogens and bioterrorism grow, the role of the clinical microbiology laboratory takes on even greater importance. For healthcare organizations that outsource microbiology laboratory services (e.g., ambulatory care, home care, LTCFs, smaller acute care hospitals), it is important to specify by contract the types of services (e.g., periodic institution-specific aggregate susceptibility reports) required to support infection control.

Several key functions of the clinical microbiology laboratory are relevant to this guideline:

- Antimicrobial susceptibility by testing and interpretation in accordance with current guidelines developed by the National Committee for Clinical Laboratory Standards (NCCLS), known as the Clinical and Laboratory Standards Institute (CLSI) since 2005 [602], for the detection of emerging resistance patterns[603, 604], and for the preparation, analysis, and distribution of periodic cumulative antimicrobial susceptibility summary reports[605-607]. While not required, clinical laboratories ideally should have access to rapid genotypic identification of bacteria and their antibiotic resistance genes[608].
- Performance of surveillance cultures when appropriate (including retention of isolates for analysis) to assess patterns of infection transmission and effectiveness of infection control interventions at the facility or organization. Microbiologists assist in decisions concerning the indications for initiating and discontinuing active surveillance programs and optimize the use of laboratory resources.
- Molecular typing, on-site or outsourced, in order to investigate and control healthcare-associated outbreaks[609].
- Application of rapid diagnostic tests to support clinical decisions involving patient treatment, room selection, and implementation of control measures including barrier precautions and use of vaccine or chemoprophylaxis agents (e.g., influenza[610-612], B. pertussis[613], RSV[614, 615], and enteroviruses[616]). The microbiologist provides guidance to limit rapid testing to clinical situations in which rapid results influence patient management decisions, as well as providing oversight of point-of-care testing performed by non-laboratory healthcare workers[617].
- Detection and rapid reporting of epidemiologically important organisms, including those that are reportable to public health agencies.
- Implementation of a quality control program that ensures testing services are appropriate for the population served, and stringently evaluated for sensitivity, specificity, applicability, and feasibility.
- Participation in a multidisciplinary team to develop and maintain an effective institutional program for the judicious use of antimicrobial agents[618, 619].

II.A.2. Institutional safety culture and organizational characteristics. Safety culture (or safety climate) refers to a work environment where a shared commitment to safety on the part of management and the workforce is understood and followed[557, 620, 621]. The authors of the Institute of Medicine Report, To Err is Human[543], acknowledge that causes of medical error are multifaceted but emphasize repeatedly the pivotal role of system failures and the benefits of a safety culture. A safety culture is created through

1. the actions management takes to improve patient and worker safety;
2. worker participation in safety planning;
3. the availability of appropriate protective equipment;
4. influence of group norms regarding acceptable safety practices; and

5. the organization's socialization process for new personnel.

Safety and patient outcomes can be enhanced by improving or creating organizational characteristics within patient care units as demonstrated by studies of surgical ICUs[622, 623]. Each of these factors has a direct bearing on adherence to transmission prevention recommendations[257]. Measurement of an institutional culture of safety is useful for designing improvements in healthcare[624, 625]. Several hospital-based studies have linked measures of safety culture with both employee adherence to safe practices and reduced exposures to blood and body fluids[626-632]. One study of hand hygiene practices concluded that improved adherence requires integration of infection control into the organization's safety culture[561]. Several hospitals that are part of the Veterans Administration Healthcare System have taken specific steps toward improving the safety culture, including error reporting mechanisms, performing root cause analysis on problems identified, providing safety incentives, and employee education.[633-635].

II.A.3. Adherence of healthcare personnel to recommended guidelines. Adherence to recommended infection control practices decreases transmission of infectious agents in healthcare settings[116, 562, 636-640]. However, several observational studies have shown limited adherence to recommended practices by healthcare personnel[559, 640-657]. Observed adherence to universal precautions ranged from 43% to 89% [641, 642, 649, 651, 652]. However, the degree of adherence depended frequently on the practice that was assessed and, for glove use, the circumstance in which they were used. Appropriate glove use has ranged from a low of 15% [645] to a high of 82% [650]. However, 92% and 98% adherence with glove use have been reported during arterial blood gas collection and resuscitation, respectively, procedures where there may be considerable blood contact[643, 656]. Differences in observed adherence have been reported among occupational groups in the same healthcare facility[641] and between experienced and nonexperienced professionals[645]. In surveys of healthcare personnel, self-reported adherence was generally higher than that reported in observational studies. Furthermore, where an observational component was included with a self-reported survey, self-perceived adherence was often greater than observed adherence[657]. Among nurses and physicians, increasing years of experience is a negative predictor of adherence[645, 651]. Education to improve adherence is the primary intervention that has been studied. While positive changes in knowledge and attitude have been demonstrated[640, 658], there often has been limited or no accompanying change in behavior[642, 644]. Self-reported adherence is higher in groups that have received an educational intervention[630, 659]. Educational interventions that incorporated videotaping and performance feedback were successful in improving adherence during the period of study; the long-term effect of these interventions is not known[654].The use of videotape also served to identify system problems (e.g., communication and access to personal protective equipment) that otherwise may not have been recognized.

Use of engineering controls and facility design concepts for improving adherence is gaining interest. While introduction of automated sinks had a negative impact on consistent adherence to hand washing[660], use of electronic monitoring and voice prompts to remind healthcare workers to perform hand hygiene, and improving accessibility to hand hygiene products, increased adherence and contributed to a decrease in HAIs in one study[661]. More information is needed regarding how technology might improve adherence.

Improving adherence to infection control practices requires a multifaceted approach that incorporates continuous assessment of both the individual and the work environment[559, 561]. Using several behavioral theories, Kretzer and Larson concluded that a single intervention (e.g., a handwashing campaign or putting up new posters about transmission precautions) would likely be ineffective in improving healthcare personnel adherence[662]. Improvement requires that the organizational leadership make prevention an institutional priority and integrate infection control practices into the organization's safety culture[561]. A recent review of the literature concluded that variations in organizational factors (e.g., safety climate, policies and procedures, education and training) and individual factors (e.g., knowledge, perceptions of risk, past experience) were determinants of adherence to infection control guidelines for protection against SARS and other respiratory pathogens[257].

II.B. Surveillance for Healthcare-Associated Infections (HAIs)

Surveillance is an essential tool for case-finding of single patients or clusters of patients who are infected or colonized with epidemiologically important organisms (e.g., susceptible bacteria such as *S. aureus*, *S. pyogenes* [Group A streptococcus] or Enterobacter-Klebsiella spp; MRSA, VRE, and other MDROs; *C.*

difficile; RSV; influenza virus) for which transmission-based precautions may be required. Surveillance is defined as the ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding a health-related event for use in public health action to reduce morbidity and mortality and to improve health[663]. The work of Ignaz Semmelweis that described the role of person-to-person transmission in puerperal sepsis is the earliest example of the use of surveillance data to reduce transmission of infectious agents[664]. Surveillance of both process measures and the infection rates to which they are linked are important for evaluating the effectiveness of infection prevention efforts and identifying indications for change[555, 665-668].

The Study on the Efficacy of Nosocomial Infection Control (SENIC) found that different combinations of infection control practices resulted in reduced rates of nosocomial surgical site infections, pneumonia, urinary tract infections, and bacteremia in acute care hospitals[566]; however, surveillance was the only component essential for reducing all four types of HAIs. Although a similar study has not been conducted in other healthcare settings, a role for surveillance and the need for novel strategies have been described in LTCFs[398, 434, 669, 670] and in home care[470-473]. The essential elements of a surveillance system are: 1. standardized definitions;

2. identification of patient populations at risk for infection;
3. statistical analysis (e.g., risk-adjustment, calculation of rates using appropriate denominators, trend analysis using methods such as statistical process control charts); and
4. feedback of results to the primary caregivers[671-676].

Data gathered through surveillance of high-risk populations, device use, procedures, and/or facility locations (e.g., ICUs) are useful for detecting transmission trends[671-673]. Identification of clusters of infections should be followed by a systematic epidemiologic investigation to determine commonalities in persons, places, and time; and guide implementation of interventions and evaluation of the effectiveness of those interventions.

Targeted surveillance based on the highest risk areas or patients has been preferred over facility-wide surveillance for the most effective use of resources [673, 676]. However, surveillance for certain epidemiologically important organisms may need to be facilitywide. Surveillance methods will continue to evolve as healthcare delivery systems change[392, 677] and user-friendly electronic tools become more widely available for electronic tracking and trend analysis[674, 678, 679]. Individuals with experience in healthcare epidemiology and infection control should be involved in selecting software packages for data aggregation and analysis to assure that the need for efficient and accurate HAI surveillance will be met. Effective surveillance is increasingly important as legislation requiring public reporting of HAI rates is passed and states work to develop effective systems to support such legislation[680].

II.C. Education of HCWs, Patients, and Families

Education and training of healthcare personnel are a prerequisite for ensuring that policies and procedures for Standard and Transmission-Based Precautions are understood and practiced. Understanding the scientific rationale for the precautions will allow HCWs to apply procedures correctly, as well as safely modify precautions based on changing requirements, resources, or healthcare settings[14, 655, 681-688]. In one study, the likelihood of HCWs developing SARS was strongly associated with less than 2 hours of infection control training and lack of understanding of infection control procedures689. Education about the important role of vaccines (e.g., influenza, measles, varicella, pertussis, pneumococcal) in protecting healthcare personnel, their patients, and family members can help improve vaccination rates [690-693].

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See Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings (https://www.cdc.gov/infectioncontrol/guidelines/measles)

Education on the principles and practices for preventing transmission of infectious agents should begin during training in the health professions and be provided to anyone who has an opportunity for contact with patients or medical equipment (e.g., nursing and medical staff; therapists and technicians, including respiratory, physical, occupational, radiology, and cardiology personnel; phlebotomists; housekeeping and maintenance staff; and students). In healthcare facilities, education and training on Standard and Transmission-Based Precautions are typically provided at the time of orientation and should be repeated as necessary to maintain competency; updated education and training are necessary when policies and procedures are revised or when there is a special circumstance, such as an outbreak that requires modification of current practice or adoption of new recommendations. Education and training materials and methods appropriate to the HCW's level of responsibility, individual learning habits, and language needs, can improve the learning experience[658, 694-702].

Education programs for healthcare personnel have been associated with sustained improvement in adherence to best practices and a related decrease in deviceassociated HAIs in teaching and non-teaching settings[639, 703] and in medical and surgical ICUs {Coopersmith, 2002 #2149; Babcock, 2004 #2126; Berenholtz, 2004 #2289; [This link is no longer active: www.ihi.org/IHI/Programs/Campaign], #2563} Several studies have shown that, in addition to targeted education to improve specific practices, periodic assessment and feedback of the HCWs knowledge,and adherence to recommended practices are necessary to achieve the desired changes and to identify continuing education needs[562, 704-708]. Effectiveness of this approach for isolation practices has been demonstrated for control of RSV[116, 684].

Patients, family members, and visitors can be partners in preventing transmission of infections in healthcare settings[9, 42, 709-711]. Information about Standard Precautions, especially hand hygiene, Respiratory Hygiene/Cough Etiquette, vaccination (especially against influenza) and other routine infection prevention strategies may be incorporated into patient information materials that are provided upon admission to the healthcare facility. Additional information about Transmission-Based Precautions is best provided at the time they are initiated. Fact sheets, pamphlets, and other printed material may include information on the rationale for the additional precautions, risks to household members, room assignment for Transmission-Based Precautions purposes, explanation about the use of personal protective equipment by HCWs, and directions for use of such equipment by family members and visitors. Such information may be particularly helpful in the home environment where household members often have primary responsibility for adherence to recommended infection control practices. Healthcare personnel must be available and prepared to explain this material and answer questions as needed.

II.D. Hand Hygiene

Hand hygiene has been cited frequently as the single most important practice to reduce the transmission of infectious agents in healthcare settings[559, 712, 713] and is an essential element of Standard Precautions. The term "hand hygiene" includes both handwashing with either plain or antiseptic-containing soap and water, and use of alcohol-based products (gels, rinses, foams) that do not require the use of water. In the absence of visible soiling of hands, approved alcohol-based products for hand disinfection are preferred over antimicrobial or plain soap and water because of their superior microbiocidal activity, reduced drying of the skin, and convenience[559]. Improved hand hygiene practices have been associated with a sustained decrease in the incidence of MRSA and VRE infections primarily in the ICU[561, 562, 714-717]. The scientific rationale, indications, methods, and products for hand hygiene are summarized in other publications559, 717.

The effectiveness of hand hygiene can be reduced by the type and length of fingernails[559, 718, 719]. Individuals wearing artifical nails have been shown to harbor more pathogenic organisms, especially gram negative bacilli and yeasts, on the nails and in the subungual area than those with native nails[720, 721]. In 2002, CDC/HICPAC recommended (Category IA) that artificial fingernails and extenders not be worn by healthcare personnel who have contact with high-risk patients (e.g., those in ICUs, ORs) due to the association with outbreaks of gram-negative bacillus and candidal infections as confirmed by molecular typing of isolates[30, 31, 559, 722-725].The need to restrict the wearing of artificial fingernails by all healthcare personnel who provide direct patient care or by healthcare personnel who have contact with other high risk groups (e.g., oncology, cystic fibrosis patients), has not been studied, but has been recommended by some experts[20]. At this time such decisions are at the discretion of an individual facility's infection control program. There is less evidence that jewelry affects the quality of hand hygiene. Although hand contamination with potential pathogens is increased with ringwearing[559, 726], no studies have related this practice to HCW-to-patient transmission of pathogens.

II.E. Personal Protective Equipment (PPE) for Healthcare Personnel

PPE refers to a variety of barriers and respirators used alone or in combination to protect mucous membranes, airways, skin, and clothing from contact with infectious agents. The selection of PPE is based on the nature of the patient interaction and/or the likely mode(s) of transmission. Guidance on the use of PPE is discussed in Part III. A suggested procedure for donning and removing PPE that will prevent skin or clothing contamination is presented in the Figure. Designated containers for used disposable or reusable PPE should be placed in a location that is convenient to the site of removal to facilitate disposal and containment of contaminated materials. Hand hygiene is always the final step after removing and disposing of PPE. The following sections highlight the primary uses and methods for selecting this equipment.

II.E.1. Gloves. Gloves are used to prevent contamination of healthcare personnel hands when

1. anticipating direct contact with blood or body fluids, mucous membranes, nonintact skin and other potentially infectious material;
2. having direct contact with patients who are colonized or infected with pathogens transmitted by the contact route e.g., VRE, MRSA, RSV[559, 727, 728]; or
3. handling or touching visibly or potentially contaminated patient care equipment and environmental surfaces[72, 73, 559].

Gloves can protect both patients and healthcare personnel from exposure to infectious material that may be carried on hands[73]. The extent to which gloves will protect healthcare personnel from transmission of bloodborne pathogens (e.g., HIV, HBV, HCV) following a needlestick or other pucture that penetrates the glove barrier has not been determined. Although gloves may reduce the volume of blood on the external surface of a sharp by 46-86% [729], the residual blood in the lumen of a hollowbore needle would not be affected; therefore, the effect on transmission risk is unknown.

Gloves manufactured for healthcare purposes are subject to FDA evaluation and clearance[730]. Nonsterile disposable medical gloves made of a variety of materials (e.g., latex, vinyl, nitrile) are available for routine patient care[731]. The selection of glove type for non-surgical use is based on a number of factors, including the task that is to be performed, anticipated contact with chemicals and chemotherapeutic agents, latex sensitivity, sizing, and facility policies for creating a latex-free environment[17, 732-734]. For contact with blood and body fluids during non-surgical patient care, a single pair of gloves generally provides adequate barrier protection[734]. However, there is considerable variability among gloves; both the quality of the manufacturing process and type of material influence their barrier effectiveness[735]. While there is little difference in the barrier properties of unused intact gloves[736], studies have shown repeatedly that vinyl gloves have higher failure rates than latex or nitrile gloves when tested under simulated and actual clinical conditions[731, 735-738]. For this reason either latex or nitrile gloves are preferable for clinical procedures that require manual dexterity and/or will involve more than brief patient contact. It may be necessary to stock gloves in several sizes. Heavier, reusable utility gloves are indicated for non-patient care activities, such as handling or cleaning contaminated equipment or surfaces[11, 14, 739].

During patient care, transmission of infectious organisms can be reduced by adhering to the principles of working from “clean” to “dirty”, and confining or limiting contamination to surfaces that are directly needed for patient care. It may be necessary to change gloves during the care of a single patient to prevent cross-contamination of body sites[559, 740]. It also may be necessary to change gloves if the patient interaction also involves touching portable computer keyboards or other mobile equipment that is transported from room to room. Discarding gloves between patients is necessary to prevent transmission of infectious material. Gloves must not be washed for subsequent reuse because microorganisms cannot be removed reliably from glove surfaces and continued glove integrity cannot be ensured. Furthermore, glove reuse has been associated with transmission of MRSA and gram-negative bacilli[741-743].

When gloves are worn in combination with other PPE, they are put on last. Gloves that fit snugly around the wrist are preferred for use with an isolation gown because they will cover the gown cuff and provide a more reliable continuous barrier for the arms, wrists, and hands. Gloves that are removed properly will prevent hand contamination (Figure). Hand hygiene following glove removal further ensures that the hands will not carry potentially infectious material that might have penetrated through unrecognized tears or that could contaminate the hands during glove removal[559, 728, 741].

II.E.2. Isolation gowns. Isolation gowns are used as specified by Standard and Transmission-Based Precautions, to protect the HCW's arms and exposed body areas and prevent contamination of clothing with blood, body fluids, and other potentially infectious material[24, 88, 262, 744-746]. The need for and type of isolation gown selected is based on the nature of the patient interaction, including the anticipated degree of contact with infectious material and potential for blood and body fluid penetration of the barrier. The wearing of isolation gowns and other protective apparel is mandated by the OSHA Bloodborne Pathogens Standard[739]. Clinical and laboratory coats or jackets worn over personal clothing for comfort and/or purposes of identity are not considered PPE.

When applying Standard Precautions, an isolation gown is worn only if contact with blood or body fluid is anticipated. However, when Contact Precautions are used (i.e., to prevent transmission of an infectious agent that is not interrupted by Standard Precautions alone and that is associated with environmental contamination), donning of both gown and gloves upon room entry is indicated to address unintentional contact with contaminated environmental surfaces[54, 72, 73, 88]. The routine donning of isolation gowns upon entry into an intensive care unit or other high-risk area does not prevent or influence potential colonization or infection of patients in those areas[365, 747-750].

Isolation gowns are always worn in combination with gloves, and with other PPE when indicated. Gowns are usually the first piece of PPE to be donned. Full coverage of the arms and body front, from neck to the mid-thigh or below will ensure that clothing and exposed upper body areas are protected. Several gown sizes should be available in a healthcare facility to ensure appropriate coverage for staff members. Isolation gowns should be removed before leaving the patient care area to prevent possible contamination of the environment outside the patient's room. Isolation gowns should be removed in a manner that prevents contamination of clothing or skin (Figure). The outer, “contaminated”, side of the gown is turned inward and rolled into a bundle, and then discarded into a designated container for waste or linen to contain contamination.

II.E.3. Face protection: masks, goggles, face shields.

II.E.3.a. Masks. Masks are used for three primary purposes in healthcare settings:

1. placed on healthcare personnel to protect them from contact with infectious material from patients e.g., respiratory secretions and sprays of blood or body fluids, consistent with Standard Precautions and Droplet Precautions;
2. placed on healthcare personnel when engaged in procedures requiring sterile technique to protect patients from exposure to infectious agents carried in a healthcare worker's mouth or nose, and
3. placed on coughing patients to limit potential dissemination of infectious respiratory secretions from the patient to others (i.e., Respiratory Hygiene/Cough Etiquette).

Masks may be used in combination with goggles to protect the mouth, nose and eyes, or a face shield may be used instead of a mask and goggles, to provide more complete protection for the face, as discussed below. **Masks should not be confused with particulate respirators that are used to prevent inhalation of small particles that may contain infectious agents transmitted via the airborne route as described below.**
The mucous membranes of the mouth, nose, and eyes are susceptible portals of entry for infectious agents, as can be other skin surfaces if skin integrity is compromised (e.g., by acne, dermatitis)[66, 751-754]. Therefore, use of PPE to protect these body sites is an important component of Standard Precautions. The protective effect of masks for exposed healthcare personnel has been demonstrated[93, 113, 755, 756]. Procedures that generate splashes or sprays of blood, body fluids, secretions, or excretions (e.g., endotracheal suctioning, bronchoscopy, invasive vascular procedures) require either a face shield (disposable or reusable) or mask and goggles[93-95, 96, 113, 115, 262, 739, 757].The wearing of masks, eye protection, and face shields in specified circumstances when blood or body fluid exposures are likely to

occur is mandated by the OSHA Bloodborne Pathogens Standard[739]. Appropriate PPE should be selected based on the anticipated level of exposure.

Two mask types are available for use in healthcare settings: surgical masks that are cleared by the FDA and required to have fluid-resistant properties, and procedure or isolation masks[758 #2688]. No studies have been published that compare mask types to determine whether one mask type provides better protection than another. Since procedure/isolation masks are not regulated by the FDA, there may be more variability in quality and performance than with surgical masks. Masks come in various shapes (e.g., molded and non-molded), sizes, filtration efficiency, and method of attachment (e.g., ties, elastic, ear loops). Healthcare facilities may find that different types of masks are needed to meet individual healthcare personnel needs.

II.E.3.b. Goggles, face shields. Guidance on eye protection for infection control has been published[759]. The eye protection chosen for specific work situations (e.g., goggles or face shield) depends upon the circumstances of exposure, other PPE used, and personal vision needs. Personal eyeglasses and contact lenses are NOT considered adequate eye protection (NIOSH Eye Protection for Infection Control (https://www.cdc.gov/niosh/topics/eye/eye-infectious.html accessed May 2016) [Current version of this document may differ from original.]). NIOSH states that, eye protection must be comfortable, allow for sufficient peripheral vision, and must be adjustable to ensure a secure fit. It may be necessary to provide several different types, styles, and sizes of protective equipment. Indirectly-vented goggles with a manufacturer's anti-fog coating may provide the most reliable practical eye protection from splashes, sprays, and respiratory droplets from multiple angles. Newer styles of goggles may provide better indirect airflow properties to reduce fogging, as well as better peripheral vision and more size options for fitting goggles to different workers. Many styles of goggles fit adequately over prescription glasses with minimal gaps. While effective as eye protection, goggles do not provide splash or spray protection to other parts of the face.

The role of goggles, in addition to a mask, in preventing exposure to infectious agents transmitted via respiratory droplets has been studied only for RSV. Reports published in the mid-1980s demonstrated that eye protection reduced occupational transmission of RSV[760, 761]. Whether this was due to preventing hand-eye contact or respiratory dropleteye contact has not been determined. However, subsequent studies demonstrated that
RSV transmission is effectively prevented by adherence to Standard plus Contact Precations and that for this virus routine use of goggles is not necessary[24, 116, 117, 684, 762]. It is important to remind healthcare personnel that even if Droplet Precautions are not recommended for a specific respiratory tract pathogen, protection for the eyes, nose and mouth by using a mask and goggles, or face shield alone, is necessary when it is likely that there will be a splash or spray of any respiratory secretions or other body fluids as defined in Standard Precautions.

Disposable or non-disposable face shields may be used as an alternative to goggles[759]. As compared with goggles, a face shield can provide protection to other facial areas in addition to the eyes. Face shields extending from chin to crown provide better face and eye protection from splashes and sprays; face shields that wrap around the sides may reduce splashes around the edge of the shield.

Removal of a face shield, goggles and mask can be performed safely after gloves have been removed, and hand hygiene performed. The ties, ear pieces and/or headband used to secure the equipment to the head are considered "clean" and therefore safe to touch with bare hands. The front of a mask, goggles and face shield are considered contaminated (Figure).

II.E.4. Respiratory protection. The subject of respiratory protection as it applies to preventing transmission of airborne infectious agents, including the need for and frequency of fit-testing is under scientific review and was the subject of a CDC workshop in 2004[763]. Respiratory protection currently requires the use of a respirator with N95 or higher filtration to prevent inhalation of infectious particles. Information about respirators and respiratory protection programs is summarized in the *Guideline for Preventing Transmission of Mycobacterium tuberculosis in Health-care Settings, 2005* (CDC.MMWR 2005; 54: RR-17[12]).

Respiratory protection is broadly regulated by OSHA under the general industry standard for respiratory protection (29CFR1910.134)[764] which requires that U.S. employers in all employment settings implement a program to protect employees from inhalation of toxic materials. OSHA program components include medical clearance to wear a respirator; provision and use of appropriate respirators, including fit-tested NIOSH-certified N95 and higher particulate filtering respirators; education on respirator use and periodic re-evaluation of the respiratory protection program. When selecting particulate respirators, models with inherently good fit characteristics (i.e., those expected to provide protection factors of 10 or more to 95% of wearers) are preferred and could theoretically relieve the need for fit testing[765, 766]. Issues pertaining to respiratory protection remain the subject of ongoing debate. Information on various types of respirators may be found at [This link is no longer active: www.cdc.gov/niosh/npptl/respirators/disp_part/particlist.html. Similar information may be found at NIOSH Respirators (https://www.cdc.gov/niosh/topics/respirators accessed May 2016).] and in published studies[765, 767, 768]. A user-seal check (formerly called a "fit check") should be performed by the wearer of a respirator each time a respirator is donned to minimize air leakage around the facepiece[769]. The optimal frequency of fittestng has not been determined; re-testing may be indicated if there is a change in facial features of the wearer, onset of a medical condition that would affect respiratory function in the wearer, or a change in the model or size of the initially assigned respirator[12].

Respiratory protection was first recommended for protection of preventing U.S. healthcare personnel from exposure to *M. tuberculosis* in 1989. That recommendation has been maintained in two successive revisions of the Guidelines for Prevention of Transmission of Tuberculosis in Hospitals and other Healthcare Settings[12, 126]. The incremental benefit from respirator use, in addition to administrative and engineering controls (i.e., AIIRs, early recognition of patients likely to have tuberculosis and prompt placement in an AIIR, and maintenance of a patient with suspected tuberculosis in an AIIR until no longer infectious), for preventing transmission of airborne infectious agents (e.g., *M. tuberculosis)* is undetermined. Although some studies have demonstrated effective prevention of *M. tuberculosis* transmission in hospitals where surgical masks, instead of respirators, were used in conjunction with other administrative and engineering controls[637, 770, 771], CDC currently recommends N95 or higher level respirators for personnel exposed to patients with suspected or confirmed tuberculosis. Currently this is also true for other diseases that could be transmitted through the airborne route, including SARS[262] and smallpox[108, 129, 772], until inhalational transmission is better defined or healthcare-specific protective equipment more suitable for for preventing infection are developed. Respirators are also currently recommended to be worn during the performance of aerosol-generating procedures (e.g., intubation, bronchoscopy, suctioning) on patients withSARS Co-V infection, avian influenza and pandemic influenza (See Appendix A).

Although Airborne Precautions are recommended for preventing airborne transmission of measles and varicella-zoster viruses, there are no data upon which to base a recommendation for respiratory protection to protect susceptible personnel against these two infections; transmission of varicella-zoster virus has been prevented among pediatric patients using negative pressure isolation alone[773]. Whether respiratory protection (i.e., wearing a particulate respirator) would enhance protection from these viruses has not been studied. Since the majority of healthcare personnel have natural or acquired immunity to these viruses, only immune personnel generally care for patients with these infections[774-777]. Although there is no evidence to suggest that masks are not adequate to protect healthcare personnel in these settings, for purposes of consistency and simplicity, or because of difficulties in ascertaining immunity, some facilities may require the use of respirators for entry into all AIIRs, regardless of the specific infectious agent.

Procedures for safe removal of respirators are provided (Figure). In some healthcare settings, particulate respirators used to provide care for patients *with M. tuberculosis* are reused by the same HCW. This is an acceptable practice providing the respirator is not damaged or soiled, the fit is not compromised by change in shape, and the respirator has not been contaminated with blood or body fluids. There are no data on which to base a recommendation for the length of time a respirator may be reused.

II.F. Safe Work Practices to Prevent HCW Exposure to Bloodborne Pathogens

II.F.1. Prevention of needlesticks and other sharps-related injuries. Injuries due to needles and other sharps have been associated with transmission of HBV, HCV and HIV to healthcare personnel[778, 779]. The prevention of sharps injuries has always been an essential element of Universal and now Standard Precautions[1, 780]. These include measures to handle needles and other sharp devices in a manner that will prevent injury to the user and to others who may encounter the device during or after a procedure. These measures apply to routine patient care and do not address the prevention of sharps injuries and other blood exposures during surgical and other invasive procedures that are addressed elsewhere[781-785].

Since 1991, when OSHA first issued its Bloodborne Pathogens Standard to protect healthcare personnel from blood exposure, the focus of regulatory and legislative activity has been on implementing a hierarchy of control measures. This has included focusing attention on removing sharps hazards through the development and use of engineering controls. The federal Needlestick Safety and Prevention Act signed into law in November, 2000 authorized OSHA's revision of its Bloodborne Pathogens Standard to more explicitly require the use of safety-engineered sharp devices[786]. CDC has provided guidance on sharps injury prevention[787, 788], including for the design, implementation and evaluation of a comprehensive sharps injury prevention program[789].

II.F.2. Prevention of mucous membrane contact. Exposure of mucous membranes of the eyes, nose and mouth to blood and body fluids has been associated with the transmission of bloodborne viruses and other infectious agents to healthcare personnel[66, 752, 754, 779]. The prevention of mucous membrane exposures has always been an element of Universal and now Standard Precautions for routine patient care[1, 753] and is subject to OSHA bloodborne pathogen regulations. Safe work practices, in addition to wearing PPE, are used to protect mucous membranes and non-intact skin from contact with potentially infectious material. These include keeping gloved and ungloved hands that are contaminated from touching the mouth, nose, eyes, or face; and positioning patients to direct sprays and splatter away from the face of the caregiver. Careful placement of PPE before patient contact will help avoid the need to make PPE adjustments and possible face or mucous membrane contamination during use.

In areas where the need for resuscitation is unpredictable, mouthpieces, pocket resuscitation masks with one-way valves, and other ventilation devices provide an alternative to mouth-to-mouth resuscitation, preventing exposure of the caregiver's nose and mouth to oral and respiratory fluids during the procedure.

II.F.2.a. Precautions during aerosol-generating procedures. The performance of procedures that can generate small particle aerosols (aerosol-generating procedures), such as bronchoscopy, endotracheal intubation, and open suctioning of the respiratory tract, have been associated with transmission of infectious agents to healthcare personnel, including M. tuberculosis[790], SARS-CoV[93, 94, 98] and N. meningitidis[95]. Protection of the eyes, nose and mouth, in addition to gown and gloves, is recommended during performance of these procedures in accordance with Standard Precautions. Use of a particulate respirator is recommended during aerosol-generating procedures when the aerosol is likely to contain M. tuberculosis, SARS-CoV, or avian or pandemic influenza viruses.

II.G. Patient Placement

II.G.1. Hospitals and long-term care settings. Options for patient placement include single patient rooms, two patient rooms, and multi-bed wards. Of these, single patient rooms are prefered when there is a concern about transmission of an infectious agent. Although some studies have failed to demonstrate the efficacy of single patient rooms to prevent HAIs[791], other published studies, including one commissioned by the American Institute of Architects and the Facility Guidelines Institute, have documented a beneficial relationship between private rooms and reduction in infectious and noninfectious adverse patient outcomes[792, 793]. The AIA notes that private rooms are the trend in hospital planning and design. However, most hospitals and long-term care facilities have multi-bed rooms and must consider many competing priorities when determining the appropriate room placement for patients (e.g., reason for admission; patient characteristics, such as age, gender, mental status; staffing needs; family requests; psychosocial factors; reimbursement concerns). In the absence of obvious infectious diseases that require specified airborne infection isolation rooms (e.g., tuberculosis, SARS, chickenpox), the risk of transmission of infectious agents is not always considered when making placement decisions.

When there are only a limited number of single-patient rooms, it is prudent to prioritize them for those patients who have conditions that facilitate transmission of infectious material to other patients (e.g., draining wounds, stool incontinence, uncontained secretions) and for those who are at increased risk of acquisition and adverse outcomes resulting from HAI (e.g., immunosuppression, open wounds, indwelling catheters, anticipated prolonged length of stay, total dependence on HCWs for activities of daily living)[15, 24, 43, 430, 794, 795].

Single-patient rooms are always indicated for patients placed on Airborne Precautions and in a Protective Environment and are preferred for patients who require Contact or Droplet Precautions[23, 24, 410, 435, 796, 797]. During a suspected or proven outbreak caused by a pathogen whose reservoir is the gastrointestinal tract, use of single patient rooms with private bathrooms limits opportunities for transmission, especially when the colonized or infected patient has poor personal hygiene habits, fecal incontinence, or cannot be expected to assist in maintaining procedures that prevent transmission of microorganisms (e.g., infants, children, and patients with altered mental status or developmental delay). In the absence of continued transmission, it is not necessary to provide a private bathroom for patients colonized or infected with enteric pathogens as long as personal hygiene practices and Standard Precautions, especially hand hygiene and appropriate environmental cleaning, are maintained. Assignment of a dedicated commode to a patient,and cleaning and disinfecting fixtures and equipment that may have fecal contamination (e.g., bathrooms, commodes[798], scales used for weighing diapers) and the adjacent surfaces with appropriate agents may be especially important when a single-patient room can not be used since environmental contamination with intestinal tract pathogens is likely from both continent and incontinent patients[54, 799]. Results of several studies to determine the benefit of a single-patient room to prevent transmission of *Clostridium difficile* are inconclusive [167, 800-802]. Some studies have shown that being in the same room with a colonized or infected patient is not necessarily a risk factor for transmission[791, 803-805]. However, for children, the risk of healthcare-associated diarrhea is increased with the increased number of patients per room[806]. Thus, patient factors are important determinants of infection transmission risks, and the need for a single-patient room and/or private bathroom for any patient is best determined on a case-by-case basis.

Cohorting is the practice of grouping together patients who are colonized or infected with the same organism to confine their care to one area and prevent contact with other patients. Cohorts are created based on clinical diagnosis, microbiologic confirmation when available, epidemiology, and mode of transmission of the infectious agent. It is generally preferred not to place severely immunosuppressed patients in rooms with other patients. Cohorting has been used extensively for managing outbreaks of MDROs including MRSA[22, 807], VRE[638, 808, 809], MDR-ESBLs[810]; *Pseudomonas aeruginosa*[29]; methicillin-susceptible *Staphylococcus aureus*[811]; RSV[812, 813]; adenovirus keratoconjunctivitis[814]; rotavirus[815]; and SARS[816]. Modeling studies provide additional support for cohorting patients to control outbreaks Talon[817-819]. However, cohorting often is implemented only after routine infection control measures have failed to control an outbreak.

Assigning or cohorting healthcare personnel to care only for patients infected or colonized with a single target pathogen limits further transmission of the target pathogen to uninfected patients[740, 819] but is difficult to achieve in the face of current staffing shortages in hospitals[583] and residential healthcare sites[820-822]. However, when continued transmission is occurring after implementing routine infection control measures and creating patient cohorts, cohorting of healthcare personnel may be beneficial.

During the seasons when RSV, human metapneumovirus[823], parainfluenza, influenza, other respiratory viruses[824], and rotavirus are circulating in the community, cohorting based on the presenting clinical syndrome is often a priority in facilities that care for infants and young children[825]. For example, during the respiratory virus season, infants may be cohorted based soley on the clinical diagnosis of bronchiolitis due to the logistical difficulties and costs associated with requiring microbiologic confirmation prior to room placement, and the predominance of RSV during most of the season. However, when available, single patient rooms are always preferred since a common clinical presentation (e.g., bronchiolitis), can be caused by more than one infectious agent[823, 824, 826]. Furthermore, the inability of infants and children to contain body fluids, and the close physical contact that occurs during their care, increases infection transmission risks for patients and personnel in this setting[24, 795].

II.G.2. Ambulatory settings. Patients actively infected with or incubating transmissible infectious diseases are seen frequently in ambulatory settings (e.g., outpatient clinics, physicians' offices, emergency departments) and potentially expose healthcare personnel and other patients, family members and visitors[21, 34, 127, 135, 142, 827]. In response to the global outbreak of SARS in 2003 and in preparation for pandemic influenza, healthcare providers working in outpatient settings are urged to implement source containment measures (e.g., asking couging patients to wear a surgical mask or cover their coughs with tissues) to prevent transmission of respiratory infections, beginning at the point of initial patient encounter[9, 262, 828] as described below in section III.A.1.a. Signs can be posted at the entrance to facilities or at the reception or registration desk requesting that the patient or individuals accompanying the patient promptly inform the receptionist if there are symptoms of a respiratory infection (e.g., cough, flu-like illness, increased production of respiratory secretions). The presence of diarrhea, skin rash, or known or suspected exposure to a transmissible disease (e.g., measles, pertussis, chickenpox, tuberculosis) also could be added. Placement of potentially infectious patients without delay in an examination room limits the number of exposed individuals, e.g., in the common waiting area.

Interim Measles Infection Control [July 2019]

See [Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings](https://www.cdc.gov/infectioncontrol/guidelines/measles) (https://www.cdc.gov/infectioncontrol/guidelines/measles)

In waiting areas, maintaining a distance between symptomatic and non-symptomatic patients (e.g., >3 feet), in addition to source control measures, may limit exposures. However, infections transmitted via the airborne route (e.g., *M tuberculosis*, measles, chickenpox) require additional precautions[12, 125, 829]. Patients suspected of having such an infection can wear a surgical mask for source containment, if tolerated, and should be placed in an examination room, preferably an AIIR, as soon as possible. If this is not possible, having the patient wear a mask and segregate him/herself from other patients in the waiting area will reduce opportunities to expose others. Since the person(s) accompanying the patient also may be infectious, application of the same infection control precautions may need to be extended to these persons if they are symptomatic[21, 252, 830]. For example, family members accompanying children admitted with suspected *M. tuberculosis* have been found to have unsuspected pulmonary tuberculosis with cavitary lesions, even when asymptomatic[42, 831].

Patients with underlying conditions that increase their susceptibility to infection (e.g., those who are immunocompromised[43, 44] or have cystic fibrosis[20]) require special efforts to protect them from exposures to infected patients in common waiting areas. By informing the receptionist of their infection risk upon arrival, appropriate steps may be taken to further protect them from infection. In some cystic fibrosis clinics, in order to avoid exposure to other patients who could be colonized with *B. cepacia*, patients have been given beepers upon registration so that they may leave the area and receive notification to return when an examination room becomes available[832].

II.G.3. Home care. In home care, the patient placement concerns focus on protecting others in the home from exposure to an infectious household member. For individuals who are especially vulnerable to adverse outcomes associated with certain infections, it may be beneficial to either remove them from the home or segregate them within the home. Persons who are not part of the household may need to be prohibited from visiting during the period of infectivity. For example, if a patient with pulmonary tuberculosis is contagious and being cared for at home, very young children (<4 years of age)[833] and immunocompromised persons who have not yet been infected should be removed or excluded from the household. During the SARS outbreak of 2003, segregation of infected persons during the communicable phase of the illness was beneficial in preventing household transmission[249, 834].

II.H. Transport of Patients

Several principles are used to guide transport of patients requiring Transmission-Based Precautions. In the inpatient and residential settings these include

1. limiting transport of such patients to essential purposes, such as diagnostic and therapeutic procedures that cannot be performed in the patient's room;

2. when transport is necessary, using appropriate barriers on the patient (e.g., mask, gown, wrapping in sheets or use of impervious dressings to cover the affected area(s) when infectious skin lesions or drainage are present, consistent with the route and risk of transmission;
3. notifying healthcare personnel in the receiving area of the impending arrival of the patient and of the precautions necessary to prevent transmission; and
4. for patients being transported outside the facility, informing the receiving facility and the medi-van or emergency vehicle personnel in advance about the type of Transmission-Based Precautions being used.

For tuberculosis, additional precautions may be needed in a small shared air space such as in an ambulance[12].

II.I. Environmental Measures

Cleaning and disinfecting non-critical surfaces in patient-care areas are part of Standard Precautions. In general, these procedures do not need to be changed for patients on Transmission-Based Precautions. The cleaning and disinfection of all patient-care areas is important for frequently touched surfaces, especially those closest to the patient, that are most likely to be contaminated (e.g., bedrails, bedside tables, commodes, doorknobs, sinks, surfaces and equipment in close proximity to the patient) [11, 72, 73, 835]. The frequency or intensity of cleaning may need to change based on the patient's level of hygiene and the degree of environmental contamination and for certain for infectious agents whose reservoir is the intestinal tract [54]. This may be especially true in LTCFs and pediatric facilities where patients with stool and urine incontinence are encountered more frequently. Also, increased frequency of cleaning may be needed in a Protective Environment to minimize dust accumulation [11]. Special recommendations for cleaning and disinfecting environmental surfaces in dialysis centers have been published [18]. In all healthcare settings, administrative, staffing and scheduling activities should prioritize the proper cleaning and disinfection of surfaces that could be implicated in transmission. During a suspected or proven outbreak where an environmental reservoir is suspected, routine cleaning procedures should be reviewed, and the need for additional trained cleaning staff should be assessed. Adherence should be monitored and reinforced to promote consistent and correct cleaning is performed.

EPA-registered disinfectants or detergents/disinfectants that best meet the overall needs of the healthcare facility for routine cleaning and disinfection should be selected[11, 836]. In general, use of the existing facility detergent/disinfectant according to the manufacturer's recommendations for amount, dilution, and contact time is sufficient to remove pathogens from surfaces of rooms where colonized or infected individuals were housed. This includes those pathogens that are resistant to multiple classes of antimicrobial agents (e.g., *C. difficile*, VRE, MRSA, MDR-GNB[11, 24, 88, 435, 746, 796, 837]). Most often, environmental reservoirs of pathogens during outbreaks are related to a failure to follow recommended procedures for cleaning and disinfection rather than the specific cleaning and disinfectant agents used[838-841].

Certain pathogens (e.g., rotavirus, noroviruses, *C. difficile*) may be resistant to some routinely used hospital disinfectants[275, 292, 842-847].The role of specific disinfectants in limiting transmission of rotavirus has been demonstrated experimentally[842]. Also, since *C. difficile* may display increased levels of spore production when exposed to nonchlorine-based cleaning agents, and the spores are more resistant than vegetative cells to commonly used surface disinfectants, some investigators have recommended the use of a 1:10 dilution of 5.25% sodium hypochlorite (household bleach) and water for routine environmental disinfection of rooms of patients with *C. difficile* when there is continued transmission[844, 848]. In one study, the use of a hypochlorite solution was associated with a decrease in rates of *C. difficile* infections[847]. The need to change disinfectants based on the presence of these organisms can be determined in consultation with the infection control committee[11, 847, 848].

Detailed recommendations for disinfection and sterilization of surfaces and medical equipment that have been in contact with prion-containing tissue or high risk body fluids, and for cleaning of blood and body substance spills, are available in the Guidelines for Environmental Infection Control in Health-Care Facilities[11] and in the Guideline for Disinfection and Sterilization[848].

II.J. Patient Care Equipment and Instruments/Devices

Medical equipment and instruments/devices must be cleaned and maintained according to the manufacturers' instructions to prevent patient-to-patient transmission of infectious agents[86, 87, 325, 849]. Cleaning to remove organic material must always precede high level disinfection and sterilization of critical and semi-critical instruments and devices because residual proteinacous material reduces the effectiveness of the disinfection and sterilization processes[836, 848]. Noncritical equipment, such as commodes, intravenous pumps, and ventilators, must be thoroughly cleaned and disinfected before use on another patient. All such equipment and devices should be handled in a manner that will prevent HCW and environmental contact with potentially infectious material. It is important to include computers and personal digital assistants (PDAs) used in patient care in policies for cleaning and disinfection of non-critical items. The literature on contamination of computers with pathogens has been summarized[850] and two reports have linked computer contamination to colonization and infections in patients[851, 852]. Although keyboard covers and washable keyboards that can be easily disinfected are in use, the infection control benefit of those items and optimal management have not been determined.

In all healthcare settings, providing patients who are on Transmission-Based Precautions with dedicated noncritical medical equipment (e.g., stethoscope, blood pressure cuff, electronic thermometer) has been beneficial for preventing transmission[74, 89, 740, 853, 854]. When this is not possible, disinfection after use is recommended. Consult other guidelines for detailed guidance in developing specific protocols for cleaning and reprocessing medical equipment and patient care items in both routine and special circumstances[11, 14, 18, 20, 740, 836, 848].

In home care, it is preferable to remove visible blood or body fluids from durable medical equipment before it leaves the home. Equipment can be cleaned on-site using a detergent/disinfectant and, when possible, should be placed in a single plastic bag for transport to the reprocessing location[20, 739].

II.K. Textiles and Laundry

Soiled textiles, including bedding, towels, and patient or resident clothing may be contaminated with pathogenic microorganisms. However, the risk of disease transmission is negligible if they are handled, transported, and laundered in a safe manner[11, 855, 856]. Key principles for handling soiled laundry are

1. not shaking the items or handling them in any way that may aerosolize infectious agents;
2. avoiding contact of one's body and personal clothing with the soiled items being handled; and
3. containing soiled items in a laundry bag or designated bin. When laundry chutes are used, they must be maintained to minimize dispersion of aerosols from contaminated items[11].

The methods for handling, transporting, and laundering soiled textiles are determined by organizational policy and any applicable regulations[739]; guidance is provided in the Guidelines for Environmental Infection Control[11]. Rather than rigid rules and regulations, hygienic and common sense storage and processing of clean textiles is recommended[11, 857]. When laundering occurs outside of a healthcare facility, the clean items must be packaged or completely covered and placed in an enclosed space during transport to prevent contamination with outside air or construction dust that could contain infectious fungal spores that are a risk for immunocompromised patients[11].

Institutions are required to launder garments used as personal protective equipment and uniforms visibly soiled with blood or infective material[739]. There are few data to determine the safety of home laundering of HCW uniforms, but no increase in infection rates was observed in the one published study[858] and no pathogens were recovered from home- or hospital-laundered scrubs in another study[859]. In the home, textiles and laundry from patients with potentially transmissible infectious pathogens do not require special handling or separate laundering, and may be washed with warm water and detergent[11, 858, 859].

II.L. Solid Waste

The management of solid waste emanating from the healthcare environment is subject to federal and state regulations for medical and non-medical waste[860, 861]. No additional precautions are needed for non-medical solid waste that is being removed from rooms of patients on Transmission-Based Precautions. Solid waste may be contained in a single bag (as compared to using two bags) of sufficient strength[862].

II.M. Dishware and Eating Utensils

The combination of hot water and detergents used in dishwashers is sufficient to decontaminate dishware and eating utensils. Therefore, no special precautions are needed for dishware (e.g., dishes, glasses, cups) or eating utensils; reusable dishware and utensils may be used for patients requiring Transmission- Based Precautions. In the home and other communal settings, eating utensils and drinking vessels that are being used should not be shared, consistent with principles of good personal hygiene and for the purpose of preventing transmission of respiratory viruses, *Herpes simplex* virus, and infectious agents that infect the gastrointestinal tract and are transmitted by the fecal/oral route (e.g., hepatitis A virus, noroviruses). If adequate resources for cleaning utensils and dishes are not available, disposable products may be used.

II.N. Adjunctive Measures

Important adjunctive measures that are not considered primary components of programs to prevent transmission of infectious agents, but improve the effectiveness of such programs, include

1. antimicrobial management programs;
2. postexposure chemoprophylaxis with antiviral or antibacterial agents;
3. vaccines used both for pre and postexposure prevention; and
4. screening and restricting visitors with signs of transmissible infections.

Detailed discussion of judicious use of antimicrobial agents is beyond the scope of this document; however the topic is addressed in the Management of Multidrug- Resistant Organisms in Healthcare Settings 2006 (https://www.cdc.gov/infectioncontrol/guidelines/mdro/ accessed May 2016).

II.N.1. Chemoprophylaxis. Antimicrobial agents and topical antiseptics may be used to prevent infection and potential outbreaks of selected agents. Infections for which postexposure chemoprophylaxis is recommended under defined conditions include *B. pertussis*[17, 863]*, N. meningitidi* [864]*, B. anthracis* after environmental exposure to aeosolizable material[865], influenza virus[611], HIV[866], and group A streptococcus[160]. Orally administered antimicrobials may also be used under defined circumstances for MRSA decolonization of patients or healthcare personnel[867].

Another form of chemoprophylaxis is the use of topical antiseptic agents. For example, triple dye is used routinely on the umbilical cords of term newborns to reduce the risk of colonization, skin infections, and omphalitis caused by *S. aureus*, including MRSA, and group A streptococcus[868, 869]. Extension of the use of triple dye to low birth weight infants in the NICU was one component of a program that controlled one longstanding MRSA outbreak[22]. Topical antiseptics are also used for decolonization of healthcare personnel or selected patients colonized with MRSA, using mupirocin as discussed in the MDRO guideline870 867, 871-873.

II.N.2. Immunoprophylaxis. Certain immunizations recommended for susceptible healthcare personnel have decreased the risk of infection and the potential for transmission in healthcare facilities[17, 874]. The OSHA mandate that requires employers to offer hepatitis B vaccination to HCWs played a substantial role in the sharp decline in incidence of occupational HBV infection[778, 875]. The use of varicella vaccine in healthcare personnel has decreased the need to place susceptible HCWs on administrative leave following exposure to patients with varicella[775]. Also, reports of healthcare-associated transmission of rubella in obstetrical clinics[33, 876] and measles in acute care settings[34] demonstrate the importance of immunization of susceptible healthcare personnel against childhood diseases. Many states have requirements for HCW vaccination for measles and rubella in the absence of evidence of immunity.

Annual influenza vaccine campaigns targeted to patients and healthcare personnel in LTCFs and acute-care settings have been instrumental in preventing or limiting institutional outbreaks and increasing attention is being directed toward improving influenza vaccination rates in healthcare personnel[35, 611, 690, 877, 878, 879].

Transmission of *B. pertussis* in healthcare facilities has been associated with large and costly outbreaks that include both healthcare personnel and patients[17, 36, 41, 100, 683, 827, 880, 881]. HCWs who have close contact with infants with pertussis are at particularly high risk because of waning immunity and, until 2005, the absence of a vaccine that could be used in adults. However, two acellular pertussis vaccines were licensed in the United States in 2005, one for use in individuals aged 11-18 and one for use in ages 10-64 years[882]. Provisional ACIP recommendations at the time of publication of this document include adolescents and adults, especially those with contact with infants < 12 months of age and healthcare personnel with direct patient contact[883 884].

Immunization of children and adults will help prevent the introduction of vaccinepreventable diseases into healthcare settings. The recommended immunization schedule for children is published annually in the January issues of the *Morbidity Mortality Weekly Report* with interim updates as needed[885, 886]. An adult immunization schedule also is available for healthy adults and those with special immunization needs due to high risk medical conditions[887].

Some vaccines are also used for postexposure prophylaxis of susceptible individuals, including varicella[888], influenza[611], hepatitis B[778], and smallpox[225] vaccines[17, 874]. In the future, administration of a newly developed *S. aureus* conjugate vaccine (still under investigation) to selected patients may provide a novel method of preventing healthcareassociated *S. aureus,* including MRSA*,* infections in high-risk groups (e.g., hemodialysis patients and candidates for selected surgical procedures)[889, 890].

Varicella Post-exposure Prophylaxis Update [May 2019]: Immune globulin preparations also are used for postexposure prophylaxis of certain infectious agents under specified circumstances (e.g., varicella-zoster virus [varicella zoster immune globulin], hepatitis B virus [HBIG], rabies [RIG], measles and hepatitis A virus [IG][17, 833, 874]). The RSV monoclonal antibody preparation, Palivizumab, may have contributed to controlling a nosocomial outbreak of RSV in one NICU , but there is insufficient evidence to support a routine recommendation for its use in this setting[891].

II.N. 3. Management of visitors.

II.N.3.a. Visitors as sources of infection. Visitors have been identified as the source of several types of HAIs (e.g., pertussis[40, 41], *M. tuberculosis*[42, 892], influenza, and other respiratory viruses[24, 43, 44, 373] and SARS [21, 252-254]). However, effective methods for visitor screening in healthcare settings have not been studied. Visitor screening is especially important during community outbreaks of infectious diseases and for high risk patient units. Sibling visits are often encouraged in birthing centers, post partum rooms and in pediatric inpatient units, ICUs, and in residential settings for children; in hospital settings, a child visitor should visit only his or her own sibling. Screening of visiting siblings and other children before they are allowed into clinical areas is necessary to prevent the introduction of childhood illnesses and common respiratory infections. Screening may be passive through the use of signs to alert family members and visitors with signs and symptoms of communicable diseases not to enter clinical areas. More active screening may include the completion of a screening tool or questionnaire which elicits information related to recent exposures or current symptoms. That information is reviewed by the facility staff and the visitor is either permitted to visit or is excluded[833].

Family and household members visiting pediatric patients with pertussis and tuberculosis may need to be screened for a history of exposure as well as signs and symptoms of current infection. Potentially infectious visitors are excluded until they receive appropriate medical screening, diagnosis, or treatment. If exclusion is not considered to be in the best interest of the patient or family (i.e., primary family members of critically or terminally ill patients), then the symptomatic visitor must wear a mask while in the healthcare facility and remain in the patient's room, avoiding exposure to others, especially in public waiting areas and the cafeteria.

Visitor screening is used consistently on HSCT units[15, 43]. However, considering the experience during the 2003 SARS outbreaks and the potential for pandemic influenza, developing effective visitor screening systems will be beneficial[9]. Education concerning Respiratory Hygiene/Cough Etiquette is a useful adjunct to visitor screening.

II.N.3.b. Use of barrier precautions by visitors. The use of gowns, gloves, or masks by visitors in healthcare settings has not been addressed specifically in the scientific literature. Some studies included the use of gowns and gloves by visitors in the control of MDRO's, but did not perform a separate analysis to determine whether their use by visitors had a measurable impact[893-895]. Family members or visitors who are providing care or having very close patient contact (e.g., feeding, holding) may have contact with other patients and could contribute to transmission if barrier precautions are not used correctly. Specific recommendations may vary by facility or by unit and should be determined by the level of interaction.

Part III: Precautions to Prevent Transmission of Infectious Agents

There are two tiers of HICPAC/CDC precautions to prevent transmission of infectious agents, Standard Precautions and Transmission-Based Precautions. Standard Precautions are intended to be applied to the care of all patients in all healthcare settings, regardless of the suspected or confirmed presence of an infectious agent. **Implementation of *Standard Precautions* constitutes the primary strategy for the prevention of healthcare-associated transmission of infectious agents among patients and healthcare personnel**. Transmission-Based Precautions are for patients who are known or suspected to be infected or colonized with infectious agents, including certain epidemiologically important pathogens, which require additional control measures to effectively prevent transmission. Since the infecting agent often is not known at the time of admission to a healthcare facility, Transmission-Based Precautions are used empirically, according to the clinical syndrome and the likely etiologic agents at the time, and then modified when the pathogen is identified or a transmissible infectious etiology is ruled out. Examples of this syndromic approach are presented in Table 2. The HICPAC/CDC Guidelines also include recommendations for creating a Protective Environment for allogeneic HSCT patients.

The specific elements of Standard and Transmission-Based Precautions are discussed in Part II of this guideline. In Part III, the circumstances in which Standard Precautions, Transmission-Based Precautions, and a Protective Environment are applied are discussed. See Tables 4 and 5 for summaries of the key elements of these sets of precautions.

III.A. Standard Precautions

Standard Precautions combine the major features of Universal Precautions (UP)[780, 896] and Body Substance Isolation (BSI)[640] and are based on the principle that all blood, body fluids, secretions, excretions except sweat, nonintact skin, and mucous membranes may contain transmissible infectious agents. Standard Precautions include a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status, in any setting in which healthcare is delivered (Table 4). These include: hand hygiene; use of gloves, gown, mask, eye protection, or face shield, depending on the anticipated exposure; and safe injection practices. Also, equipment or items in the patient environment likely to have been contaminated with infectious body fluids must be handled in a manner to prevent transmission of infectious agents (e.g., wear gloves for direct contact, contain heavily soiled equipment, properly clean and disinfect or sterilize reusable equipment before use on another patient).

The application of Standard Precautions during patient care is determined by the nature of the HCW-patient interaction and the extent of anticipated blood, body fluid, or pathogen exposure. For some interactions (e.g., performing venipuncture), only gloves may be needed; during other interactions (e.g., intubation), use of gloves, gown, and face shield or mask and goggles is necessary. Education and training on the principles and rationale for recommended practices are critical elements of Standard Precautions because they facilitate appropriate decision-making and promote adherence when HCWs are faced with new circumstances[655, 681-686]. An example of the importance of the use of Standard Precautions is intubation, especially under emergency circumstances when infectious agents may not be suspected, but later are identified (e.g., SARS-CoV, *N. meningitides*). The application of Standard Precautions is described below and summarized in Table 4. Guidance on donning and removing gloves, gowns and other PPE is presented in the Figure.

Standard Precautions are also intended to protect patients by ensuring that healthcare personnel do not carry infectious agents to patients on their hands or via equipment used during patient care.

III.A.1. New elements of standard precautions. Infection control problems that are identified in the course of outbreak investigations often indicate the need for new recommendations or reinforcement of existing infection control recommendations to protect patients. Because such recommendations are considered a standard of care and may not be included in other guidelines, they are added here to Standard Precautions. Three such areas of practice that have been added are: Respiratory Hygiene/Cough Etiquette, safe injection practices, and use of masks for insertion of catheters or injection of material into spinal or epidural spaces via lumbar puncture procedures (e.g., myelogram, spinal or epidural anesthesia). While most elements of Standard Precautions evolved from Universal Precautions that were developed for protection of healthcare personnel, these new elements of Standard Precautions focus on protection of patients.

III.A.1.a. Respiratory hygiene/cough etiquette. The transmission of SARS-CoV in emergency departments by patients and their family members during the widespread SARS outbreaks in 2003 highlighted the need for vigilance and prompt implementation of infection control measures at the first point of encounter within a healthcare setting (e.g., reception and triage areas in emergency departments, outpatient clinics, and physician offices)[21, 254, 897]. The strategy proposed has been termed Respiratory Hygiene/Cough Etiquette[9, 828] and is intended to be incorporated into infection control practices as a new component of Standard Precautions. The strategy is targeted at patients and accompanying family members and friends with undiagnosed transmissible respiratory infections, and applies to any person with signs of illness including cough, congestion, rhinorrhea, or increased production of respiratory secretions when entering a healthcare facility[40, 41, 43]. The term *cough etiquette* is derived from recommended source control measures for *M. tuberculosis*[12, 126].

The elements of Respiratory Hygiene/Cough Etiquette include

1. education of healthcare facility staff, patients, and visitors;
2. posted signs, in language(s) appropriate to the population served, with instructions to patients and accompanying family members or friends;
3. source control measures (e.g., covering the mouth/nose with a tissue when coughing and prompt disposal of used tissues, using surgical masks on the coughing person when tolerated and appropriate);
4. hand hygiene after contact with respiratory secretions; and
5. spatial separation, ideally >3 feet, of persons with respiratory infections in common waiting areas when possible.

Covering sneezes and coughs and placing masks on coughing patients are proven means of source containment that prevent infected persons from dispersing respiratory secretions into the air[107, 145, 898, 899]. Masking may be difficult in some settings, (e.g., pediatrics, in which case, the emphasis by necessity may be on cough etiquette[900]. Physical proximity of <3 feet has been associated with an increased risk for transmission of infections via the droplet route (e.g., *N. meningitidis*[103] and group A streptococcus[114] and therefore supports the practice of distancing infected persons from others who are not infected. The effectiveness of good hygiene practices, especially hand hygiene, in preventing transmission of viruses and reducing the incidence of respiratory infections both within and outside[901-903] healthcare settings is summarized in several reviews[559, 717, 904].

These measures should be effective in decreasing the risk of transmission of pathogens contained in large respiratory droplets (e.g., influenza virus[23], adenovirus[111], *B. pertussis*[827] and *Mycoplasma pneumoniae*[112]. Although fever will be present in many respiratory infections, patients with pertussis and mild upper respiratory tract infections are often afebrile. Therefore, the absence of fever does not always exclude a respiratory infection. Patients who have asthma, allergic rhinitis, or chronic obstructive lung disease also may be coughing and sneezing. While these patients often are not infectious, cough etiquette measures are prudent.

Healthcare personnel are advised to observe Droplet Precautions (i.e., wear a mask) and hand hygiene when examining and caring for patients with signs and symptoms of a respiratory infection. Healthcare personnel who have a respiratory infection are advised to avoid direct patient contact, especially with high risk patients. If this is not possible, then a mask should be worn while providing patient care.

III.A.1.b. Safe injection practices. The investigation of four large outbreaks of HBV and HCV among patients in ambulatory care facilities in the United States identified a need to define and reinforce safe injection practices[453]. The four outbreaks occurred in a private medical practice, a pain clinic, an endoscopy clinic, and a hematology/oncology clinic. The primary breaches in infection control practice that contributed to these outbreaks were

1. reinsertion of used needles into a multiple-dose vial or solution container (e.g., saline bag) and
2. use of a single needle/syringe to administer intravenous medication to multiple patients.

In one of these outbreaks, preparation of medications in the same workspace where used needle/syringes were dismantled also may have been a contributing factor. These and other outbreaks of viral hepatitis could have been prevented by adherence to basic principles of aseptic technique for the preparation and administration of parenteral medications [453, 454]. These include the use of a sterile, single-use, disposable needle and syringe for each injection given and prevention of contamination of injection equipment and medication. Whenever possible, use of single-dose vials is preferred over multiple-dose vials, especially when medications will be administered to multiple patients.

Outbreaks related to unsafe injection practices indicate that some healthcare personnel are unaware of, do not understand, or do not adhere to basic principles of infection control and aseptic technique. A survey of US healthcare workers who provide medication through injection found that 1% to 3% reused the same needle and/or syringe on multiple patients[905]. Among the deficiencies identified in recent outbreaks were a lack of oversight of personnel and failure to follow-up on reported breaches in infection control practices in ambulatory settings. Therefore, to ensure that all healthcare workers understand and adhere to recommended practices, principles of infection control and aseptic technique need to be reinforced in training programs and incorporated into institutional polices that are monitored for adherence[454].

III.A.1.c. Infection Control Practices for Special Lumbar Puncture Procedures. In 2004, CDC investigated eight cases of post-myelography meningitis that either were reported to CDC or identified through a survey of the Emerging Infections Network of the Infectious Disease Society of America. Blood and/or cerebrospinal fluid of all eight cases yielded streptococcal species consistent with oropharyngeal flora and there were changes in the CSF indices and clinical status indicative of bacterial meningitis. Equipment and products used during these procedures (e.g., contrast media) were excluded as probable sources of contamination. Procedural details available for seven cases determined that antiseptic skin preparations and sterile gloves had been used. However, none of the clinicians wore a face mask, giving rise to the speculation that droplet transmission of oralpharyngeal flora was the most likely explanation for these infections. Bacterial meningitis following myelogram and other spinal procedures (e.g., lumbar puncture, spinal and epidural anesthesia, intrathecal chemotherapy) has been reported previously[906-915]. As a result, the question of whether face masks should be worn to prevent droplet spread of oral flora during spinal procedures (e.g., myelogram, lumbar puncture, spinal anesthesia) has been debated[916, 917]. Face masks are effective in limiting the dispersal of oropharyngeal droplets[918] and are recommended for the placement of central venous catheters[919]. In October 2005, the Healthcare Infection Control Practices Advisory Committee (HICPAC) reviewed the evidence and concluded that there is sufficient experience to warrant the additional protection of a face mask for the individual placing a catheter or injecting material into the spinal or epidural space.

III.B. Transmission-Based Precautions

There are three categories of Transmission-Based Precautions: Contact Precautions, Droplet Precautions, and Airborne Precautions. Transmission-Based Precautions are used when the route(s) of transmission is (are) not completely interrupted using Standard Precautions alone. For some diseases that have multiple routes of transmission (e.g., SARS), more than one Transmission-Based Precautions category may be used. When used either singly or in combination, they are always used in addition to Standard Precautions. See Appendix A for recommended precautions for specific infections. When Transmission-Based Precautions are indicated, efforts must be made to counteract possible adverse effects on patients (i.e., anxiety, depression and other mood disturbances[920-922], perceptions of stigma[923], reduced contact with clinical staff[924-926], and increases in preventable adverse events[565] in order to improve acceptance by the patients and adherence by HCWs.

III.B.1. Contact precautions. Contact Precautions are intended to prevent transmission of infectious agents, including epidemiologically important microorganisms, which are spread by direct or indirect contact with the patient or the patient's environment as described in I.B.3.a. The specific agents and circumstance for which Contact Precautions are indicated are found in Appendix A. The application of Contact Precautions for patients infected or colonized with MDROs is described in the 2006 HICPAC/CDC MDRO guideline[927]. Contact Precautions also apply where the presence of excessive wound drainage, fecal incontinence, or other discharges from the body suggest an increased potential for extensive environmental contamination and risk of transmission. A single-patient room is preferred for patients who require Contact Precautions. When a single-patient room is not available, consultation with infection control personnel is recommended to assess the various risks associated with other patient placement options (e.g., cohorting, keeping the patient with an existing roommate). In multi-patient rooms, ≥3 feet spatial separation between beds is advised to reduce the opportunities for inadvertent sharing of items between the infected/colonized patient and other patients. Healthcare personnel caring for patients on Contact Precautions wear a gown and gloves for all interactions that may involve contact with the patient or potentially contaminated areas in the patient's environment. Donning PPE upon room entry and discarding before exiting the patient room is done to contain pathogens, especially those that have been implicated in transmission through environmental contamination (e.g., VRE, C. difficile, noroviruses and other intestinal tract pathogens; RSV)[54, 72, 73, 78, 274, 275, 740].

III.B.2. Droplet precautions. Droplet Precautions are intended to prevent transmission of pathogens spread through close respiratory or mucous membrane contact with respiratory secretions as described in I.B.3.b. Because these pathogens do not remain infectious over long distances in a healthcare facility, special air handling and ventilation are not required to prevent droplet transmission. Infectious agents for which Droplet Precautions are indicated are found in Appendix A and include B. pertussis, influenza virus, adenovirus, rhinovirus, N. meningitides, and group A streptococcus (for the first 24 hours of antimicrobial therapy). A single patient room is preferred for patients who require Droplet Precautions. When a single-patient room is not available, consultation with infection control personnel is recommended to assess the various risks associated with other patient placement options (e.g., cohorting, keeping the patient with an existing roommate). Spatial separation of ≥3 feet and drawing the curtain between patient beds is especially important for patients in multi-bed rooms with infections transmitted by the droplet route. Healthcare personnel wear a mask (a respirator is not necessary) for close contact with infectious patient; the mask is generally donned upon room entry. Patients on Droplet Precautions who must be transported outside of the room should wear a mask if tolerated and follow Respiratory Hygiene/Cough Etiquette.

III.B.3. Airborne precautions. Airborne Precautions prevent transmission of infectious agents that remain infectious over long distances when suspended in the air (e.g., rubeola virus [measles], varicella virus [chickenpox], M. tuberculosis, and possibly SARS-CoV) as described in I.B.3.c and Appendix A.

Interim Measles Infection Control [July 2019]

See Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings (https://www.cdc.gov/infectioncontrol/guidelines/measles)

The preferred placement for patients who require Airborne Precautions is in an airborne infection isolation room (AIIR). An AIIR is a single-patient room that is equipped with special air handling and ventilation capacity that meet the American Institute of Architects/Facility Guidelines Institute (AIA/FGI) standards for AIIRs (i.e., monitored negative pressure relative to the surrounding area, 12 air exchanges per hour for new construction and renovation and 6 air exchanges per hour for existing facilities, air exhausted directly to the outside or recirculated through HEPA filtration before return)[12, 13]. Some states require the availability of such rooms in hospitals, emergency departments, and nursing homes that care for patients with M. tuberculosis. A respiratory protection program that includes education about use of respirators, fittesting, and user seal checks is required in any facility with AIIRs. In settings where Airborne Precautions cannot be implemented due to limited engineering resources (e.g., physician offices), masking the patient, placing the patient in a private room (e.g., office examination room) with the door closed, and providing N95 or higher level respirators or masks if respirators are not available for healthcare personnel will reduce the likelihood of airborne transmission until the patient is either transferred to a facility with an AIIR or returned to the home environment, as deemed medically appropriate. Healthcare personnel caring for patients on Airborne Precautions wear a mask or respirator, depending on the disease-specific recommendations (Respiratory Protection II.E.4, Table 2, and Appendix A), that is donned prior to room entry. Whenever possible, nonimmune HCWs should not care for patients with vaccine-preventable airborne diseases (e.g., measles, chickenpox, and smallpox).

III.C. Syndromic and Empiric Applications of Transmission-Based Precautions

Diagnosis of many infections requires laboratory confirmation. Since laboratory tests, especially those that depend on culture techniques, often require two or more days for completion, Transmission-Based Precautions must be implemented while test results are pending based on the clinical presentation and likely pathogens. Use of appropriate Transmission-Based Precautions at the time a patient develops symptoms or signs of transmissible infection, or arrives at a healthcare facility for care, reduces transmission opportunities. While it is not possible to identify prospectively all patients needing Transmission-Based Precautions, certain clinical syndromes and conditions carry a sufficiently high risk to warrant their use empirically while confirmatory tests are pending (Table 2). Infection control professionals are encouraged to modify or adapt this table according to local conditions.

III.D. Discontinuation of Transmission-Based Precautions Transmission-Based Precautions remain in effect for limited periods of time (i.e., while the risk for transmission of the infectious agent persists or for the duration of the illness (Appendix A). For most infectious diseases, this duration reflects known patterns of persistence and shedding of infectious agents associated with the natural history of the infectious process and its treatment. For some diseases (e.g., pharyngeal or cutaneous diphtheria, RSV), Transmission-Based Precautions remain in effect until culture or antigen-detection test results document eradication of the pathogen and, for RSV, symptomatic disease is resolved. For other diseases, (e.g., *M. tuberculosis*) state laws and regulations, and healthcare facility policies, may dictate the duration of precautions[12]). In immunocompromised patients, viral shedding can persist for prolonged periods of time (many weeks to months) and transmission to others may occur during that time; therefore, the duration of contact and/or droplet precautions may be prolonged for many weeks[500, 928-933].

The duration of Contact Precautions for patients who are colonized or infected with MDROs remains undefined. MRSA is the only MDRO for which effective decolonization regimens are available[867]. However, carriers of MRSA who have negative nasal cultures after a course of systemic or topical therapy may resume shedding MRSA in the weeks that follow therapy[934, 935]. Although early guidelines for VRE suggested discontinuation of Contact Precautions after three stool cultures obtained at weekly intervals proved negative[740], subsequent experiences have indicated that such screening may fail to detect colonization that can persist for >1 year[27, 936-938]. Likewise, available data indicate that colonization with VRE, MRSA[939], and possibly MDR-GNB, can persist for many months, especially in the presence of severe underlying disease, invasive devices, and recurrent courses of antimicrobial agents.

It may be prudent to assume that MDRO carriers are colonized permanently and manage them accordingly. Alternatively, an interval free of hospitalizations, antimicrobial therapy, and invasive devices (e.g., 6 or 12 months) before reculturing patients to document clearance of carriage may be used. Determination of the best strategy awaits the results of additional studies. See the 2006 HICPAC/CDC MDRO guideline [927] for discussion of possible criteria to discontinue Contact Precautions for patients colonized or infected with MDROs.

III.E. Application of Transmission-Based Precautions in Ambulatory and Home Care Settings
Although Transmission-Based Precautions generally apply in all healthcare settings, exceptions exist. For example, in home care, AIIRs are not available. Furthermore, family members already exposed to diseases such as varicella and tuberculosis would not use masks or respiratory protection, but visiting HCWs would need to use such protection. Similarly, management of patients colonized or infected with MDROs may necessitate Contact Precautions in acute care hospitals and in some LTCFs when there is continued transmission, but the risk of transmission in ambulatory care and home care, has not been defined. Consistent use of Standard Precautions may suffice in these settings, but more information is needed.

III.F. Protective Environment A Protective Environment is designed for allogeneic HSCT patients to minimize fungal spore counts in the air and reduce the risk of invasive environmental fungal infections (see Table 5 for specifications)[11, 13-15]. The need for such controls has been demonstrated in studies of aspergillus outbreaks associated with construction[11, 14, 15, 157, 158]. As defined by the American Insitute of Architecture[13] and presented in detail in the Guideline for Environmental Infection Control 2003[11, 861], air quality for HSCT patients is improved through a combination of environmental controls that include

1. HEPA filtration of incoming air;
2. directed room air flow;
3. positive room air pressure relative to the corridor;
4. well-sealed rooms (including sealed walls, floors, ceilings, windows, electrical outlets) to prevent flow of air from the outside;
5. ventilation to provide $\geq$12 air changes per hour;
6. strategies to minimize dust (e.g., scrubbable surfaces rather than upholstery[940] and carpet[941], and routinely cleaning crevices and sprinkler heads); and
7. prohibiting dried and fresh flowers and potted plants in the rooms of HSCT patients.

The latter is based on molecular typing studies that have found indistinguishable strains of *Aspergillus terreus* in patients with hematologic malignancies and in potted plants in the vicinity of the patients[942-944]. The desired quality of air may be achieved without incurring the inconvenience or expense of laminar airflow[15, 157]. To prevent inhalation of fungal spores during periods when construction, renovation, or other dust-generating activities that may be ongoing in and around the health-care facility, it has been advised that severely immunocompromised patients wear a high-efficiency respiratory-protection device (e.g., an N95 respirator) when they leave the Protective Environment[11, 14, 945]). The use of masks or respirators by HSCT patients when they are outside of the Protective Environment for prevention of environmental fungal infections in the absence of construction has not been evaluated. A Protective Environment does not include the use of barrier precautions beyond those indicated for Standard and TransmissionBased Precautions. No published reports support the benefit of placing solid organ transplants or other immunocompromised patients in a Protective Environment.

Part IV: Recommendations

These recommendations are designed to prevent transmission of infectious agents among patients and healthcare personnel in all settings where healthcare is delivered. As in other CDC/HICPAC guidelines, each recommendation is categorized on the basis of existing scientific data, theoretical rationale, applicability, and when possible, economic impact. The CDC/HICPAC system for categorizing recommendations is as follows:

Category IA Strongly recommended for implementation and strongly supported by welldesigned experimental, clinical, or epidemiologic studies.

Category IB Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale.

Category IC Required for implementation, as mandated by federal and/or state regulation or standard.

Category II Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.

No recommendation; unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists.

I. Administrative Responsibilities

Healthcare organization administrators should ensure the implementation of recommendations in this section.

I.A. Incorporate preventing transmission of infectious agents into the objectives of the organization's patient and occupational safety programs[543-546, 561, 620, 626, 946]. *Category IB/IC*

I.B. Make preventing transmission of infectious agents a priority for the healthcare organization. Provide administrative support, including fiscal and human resources for maintaining infection control programs[434, 548, 549, 559, 561, 566, 662, 552, 562-564, 946]. *Category IB/IC*

I.B.1. Assure that individuals with training in infection control are employed by or are available by contract to all healthcare facilities so that the infection control program is managed by one or more qualified individuals[552, 566 316, 575, 947 573, 576, 946]. *Category IB/IC*

I.B.1.a. Determine the specific infection control full-time equivalents (FTEs) according to the scope of the infection control program, the complexity of the healthcare facility or system, the characteristics of the patient population, the unique or urgent needs of the facility and community, and proposed staffing levels based on survey results and recommendations from professional organizations [434, 549, 552, 566 316, 569, 573, 575, 948, 949]. *Category IB*

I.B.2. Include prevention of healthcare-associated infections (HAI) as one determinant of bedside nurse staffing levels and composition, especially in high-risk units[585-589, 590, 592, 593, 551, 594, 595, 418, 596, 597, 583]. *Category IB*

I.B.3. Delegate authority to infection control personnel or their designees (e.g., patient care unit charge nurses) for making infection control decisions concerning patient placement and assignment of Transmission-Based Precautions[549, 434, 857, 946]. *Category IC*

I.B.4. Involve infection control personnel in decisions on facility construction and design, determination of AIIR and Protective Environment capacity needs and environmental assessments[11, 13, 950, 951, 12]. *Category IB/IC*

I.B.4.a. Provide ventilation systems required for a sufficient number of AIIRs (as determined by a risk assessment) and Protective Environments in healthcare facilities that provide care to patients for whom such rooms are indicated, according to published recommendations[11-13, 15]. *Category IB/IC*

I.B.5. Involve infection control personnel in the selection and post-implementation evaluation of medical equipment and supplies and changes in practice that could affect the risk of HAI[952, 953]. *Category IC*

I.B.6. Ensure availability of human and fiscal resources to provide clinical microbiology laboratory support, including a sufficient number of medical technologists trained in microbiology, appropriate to the healthcare setting, for monitoring transmission of microorganisms, planning and conducting epidemiologic investigations, and detecting emerging pathogens. Identify resources for performing surveillance cultures, rapid diagnostic testing for viral and other selected pathogens, preparation of antimicrobial susceptibility summary reports, trend analysis, and molecular typing of clustered isolates (performed either on-site or in a reference laboratory) and use these resources according to facility-specific epidemiologic needs, in consultation with clinical microbiologists [553, 609, 610, 612, 617, 954 614 603, 615, 616 605 599 554 598, 606, 607]. *Category IB*

I.B.7. Provide human and fiscal resources to meet occupational health needs related to infection control (e.g., healthcare personnel immunization, postexposure evaluation and care, evaluation and management of healthcare personnel with communicable infections[739 12, 17, 879-881, 955, 134, 690]. *Category IB/IC*

I.B.8. In all areas where healthcare is delivered, provide supplies and equipment necessary for the consistent observance of Standard Precautions, including hand hygiene products and personal protective equipment (e.g., gloves, gowns, face and eye protection)[739, 559, 946]. *Category IB/IC*

I.B.9. Develop and implement policies and procedures to ensure that reusable patient care equipment is cleaned and reprocessed appropriately before use on another patient[11, 956, 957, 958, 959, 836, 87, 11, 960, 961]. *Category IA/IC*

I.C. Develop and implement processes to ensure oversight of infection control activities appropriate to the healthcare setting and assign responsibility for oversight of infection control activities to an individual or group within the healthcare organization that is knowledgeable about infection control [434, 549, 566]. *Category II*

I.D. Develop and implement systems for early detection and management (e.g., use of appropriate infection control measures, including isolation precautions, PPE) of potentially infectious persons at initial points of patient encounter in outpatient settings (e.g., triage areas, emergency departments, outpatient clinics, physician offices) and at the time of admission to hospitals and long-term care facilities (LTCF)[9, 122, 134, 253, 827]. *Category IB*

I.E. Develop and implement policies and procedures to limit patient visitation by persons with signs or symptoms of a communicable infection. Screen visitors to high-risk patient care areas (e.g., oncology units, hematopoietic stem cell transplant [HSCT] units, intensive care units, other severely immunocompromised patients) for possible infection[43 24, 41, 962, 963]. *Category IB*

I.F. Identify performance indicators of the effectiveness of organization-specific measures to prevent transmission of infectious agents (Standard and Transmission-Based Precautions), establish processes to monitor adherence to those performance measures and provide feedback to staff members[704 739 705 708 666, 964 667 668 555]. *Category IB*

II. Education and Training

II.A. Provide job- or task-specific education and training on preventing transmission of infectious agents associated with healthcare during orientation to the healthcare facility; update information periodically during ongoing education programs. Target all healthcare personnel for education and training, including but not limited to medical, nursing, clinical technicians, laboratory staff; property service (housekeeping), laundry, maintenance and dietary workers; students, contract staff and volunteers. Document competency initially and repeatedly, as appropriate, for the specific staff positions. Develop a system to ensure that healthcare personnel employed by outside agencies meet these education and training requirements through programs offered by the agencies or by participation in the healthcare facility's program designed for full-time personnel[126, 559, 561, 562, 655, 681-684, 686, 688, 689, 702, 893, 919, 965]. *Category IB*

II.A.1. Include in education and training programs, information concerning use of vaccines as an adjunctive infection control measure [17, 611, 690, 874]. *Category IB*

II.A.2. Enhance education and training by applying principles of adult learning, using reading level and language appropriate material for the target audience, and using online educational tools available to the institution[658, 694, 695, 697, 698, 700, 966]. *Category IB*

II.B. Provide instructional materials for patients and visitors on recommended hand hygiene and Respiratory Hygiene/Cough Etiquette practices and the application of Transmission-Based Precautions[9, 709, 710, 963]. *Category II*

III. Surveillance

III.A. Monitor the incidence of epidemiologically-important organisms and targeted HAIs that have substantial impact on outcome and for which effective preventive interventions are available; use information collected through surveillance of high-risk populations, procedures, devices and highly transmissible infectious agents to detect transmission of infectious agents in the healthcare facility[566, 671, 672, 675, 687, 919, 967, 968 673 969 970]. *Category IA*

III.B. Apply the following epidemiologic principles of infection surveillance[671, 967 673 969 663 664]. *Category IB*

- Use standardized definitions of infection
- Use laboratory-based data (when available)
- Collect epidemiologically-important variables (e.g., patient locations and/or clinical service in hospitals and other large multi-unit facilities, populationspecific risk factors [e.g., low birth-weight neonates], underlying conditions that predispose to serious adverse outcomes)
- Analyze data to identify trends that may indicated increased rates of transmission
- Feedback information on trends in the incidence and prevalence of HAIs, probable risk factors, and prevention strategies and their impact to the appropriate healthcare providers, organization administrators, and as required by local and state health authorities

III.C. Develop and implement strategies to reduce risks for transmission and evaluate effectiveness[566, 673, 684, 970 963 971]. *Category IB*

III.D. When transmission of epidemiologically-important organisms continues despite implementation and documented adherence to infection prevention and control strategies, obtain consultation from persons knowledgeable in infection control and healthcare epidemiology to review the situation and recommend additional measures for control[566 247 687]. *Category IB*

III.E. Review periodically information on community or regional trends in the incidence and prevalence of epidemiologically-important organisms (e.g., influenza, RSV, pertussis, invasive group A streptococcal disease, MRSA, VRE) (including in other healthcare facilities) that may impact transmission of organisms within the facility[398, 687, 972, 973 974]. *Category II*

IV. Standard Precautions

Assume that every person is potentially infected or colonized with an organism that could be transmitted in the healthcare setting and apply the following infection control practices during the delivery of health care.

IV.A. **Hand Hygiene**

IV.A.1. During the delivery of healthcare, avoid unnecessary touching of surfaces in close proximity to the patient to prevent both contamination of clean hands from environmental surfaces and transmission of pathogens from contaminated hands to surfaces72, 73 739, 800, 975{CDC, 2001 #970. *Category IB/IC*

IV.A.2. When hands are visibly dirty, contaminated with proteinaceous material, or visibly soiled with blood or body fluids, wash hands with either a nonantimicrobial soap and water or an antimicrobial soap and water [559]. *Category IA*

IV.A.3. If hands are not visibly soiled, or after removing visible material with nonantimicrobial soap and water, decontaminate hands in the clinical situations described in IV.A.3.a-f. The preferred method of hand decontamination is with an alcohol-based hand rub[562, 978]. Alternatively, hands may be washed with an antimicrobial soap and water. Frequent use of alcoholbased hand rub immediately following handwashing with nonantimicrobial soap may increase the frequency of dermatitis[559]. *Category IB*

Edits [February 2017]: An § indicates text that was edited for clarity. The edit does not constitute change to the intent of the recommendations.

Perform hand hygiene § in the following clinical situations: IV.A.3.a. Before having direct contact with patients [664, 979]. *Category IB* IV.A.3.b. After contact with blood, body fluids or excretions, mucous membranes, nonintact skin, or wound dressings [664]. *Category IA*

IV.A.3.c. After contact with a patient’s intact skin (e.g., when taking a pulse or blood pressure or lifting a patient) [167, 976, 979, 980]. *Category IB*

IV.A.3.d. If hands will be moving from a contaminated-body site to a cleanbody site during patient care. *Category II*

IV.A.3.e. After contact with inanimate objects (including medical equipment) in the immediate vicinity of the patient [72, 73, 88, 800, 981 982]. *Category II* IV.A.3.f. After removing gloves [728, 741, 742]. *Category IB*

IV.A.4. Wash hands with non-antimicrobial soap and water or with antimicrobial soap and water if contact with spores (e.g., *C. difficile* or *Bacillus anthracis*) is likely to have occurred. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores [559, 956, 983]. *Category II*

IV.A.5. Do not wear artificial fingernails or extenders if duties include direct contact with patients at high risk for infection and associated adverse outcomes (e.g., those in ICUs or operating rooms) [30, 31, 559, 722-724]. *Category IA*

IV.A.5.a. Develop an organizational policy on the wearing of non-natural nails by healthcare personnel who have direct contact with patients outside of the groups specified above [984]. *Category II*

IV.B. **Personal protective equipment (PPE) (see Figure)** IV.B.1. **Observe the following principles of use:**

IV.B.1.a. Wear PPE, as described in IV.B.2-4,when the nature of the anticipated patient interaction indicates that contact with blood or body fluids may occur [739, 780, 896]. *Category IB/IC*

IV.B.1.b. Prevent contamination of clothing and skin during the process of removing PPE (see Figure). *Category II*

IV.B.1.c. Before leaving the patient's room or cubicle, remove and discard PPE [18, 739]. *Category IB/IC*

IV.B.2. **Gloves**

IV.B.2.a. Wear gloves when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, nonintact skin, or potentially contaminated intact skin
(e.g., of a patient incontinent of stool or urine) could occur [18, 728, 739, 741, 780, 985]. *Category IB/IC*

IV.B.1.a. Wear gloves with fit and durability appropriate to the task [559, 731, 732, 739, 986, 987]. *Category IB*

IV.B.1.a.i. Wear disposable medical examination gloves for providing direct patient care.

IV.B.1.a.ii. Wear disposable medical examination gloves or reusable utility gloves for cleaning the environment or medical equipment.

IV.B.1.b. Remove gloves after contact with a patient and/or the surrounding environment (including medical equipment) using proper technique to prevent hand contamination (see Figure). Do not wear the same pair of gloves for the care of more than one patient. Do not wash gloves for the purpose of reuse since this practice has been associated with transmission of pathogens [559, 728, 741-743, 988]. *Category IB*

IV.B.1.c. Change gloves during patient care if the hands will move from a contaminated body-site (e.g., perineal area) to a clean body-site (e.g., face). *Category II*

IV.B.3. **Gowns**

IV.B.3.a. Wear a gown, that is appropriate to the task, to protect skin and prevent soiling or contamination of clothing during procedures and patient-care activities when contact with blood, body fluids, secretions, or excretions is anticipated [739, 780, 896]. *Category IB/IC* IV.B.3.a.i. Wear a gown for direct patient contact if the patient has uncontained secretions or excretions 24, 88, 89, 739, 744 *Category IB/IC*

IV.B.3.a.ii. Remove gown and perform hand hygiene before leaving the patient's environment 24, 88, 89, 739, 744 *Category IB/IC*

IV.B.3.b. Do not reuse gowns, even for repeated contacts with the same patient. *Category II*

IV.B.3.c. Routine donning of gowns upon entrance into a high risk unit (e.g., ICU, NICU, HSCT unit) is not indicated [365, 747-750]. *Category IB*

IV.B.4. **Mouth, nose, eye protection**

IV.B.4.a. Use PPE to protect the mucous membranes of the eyes, nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood, body fluids, secretions and
excretions. Select masks, goggles, face shields, and combinations of each according to the need anticipated by the task performed [113, 739, 780, 896]. *Category IB/IC*

IV.B.5. During aerosol-generating procedures (e.g., bronchoscopy, suctioning of the respiratory tract [if not using in-line suction catheters], endotracheal intubation) in patients who are not suspected of being infected with an agent for which respiratory protection is otherwise recommended (e.g., *M. tuberculosis,* SARS or hemorrhagic fever viruses), wear one of the following: a face shield that fully covers the front and sides of the face, a mask with attached shield, or a mask and goggles (in addition to gloves and gown) [95, 96,]

113, 126 93 94, 134. *Category IB*

⚠ **Ebola Virus Disease for Healthcare Workers [2014]:** Updated recommendations for healthcare workers can be found at Ebola: for Clinicians (https://www.cdc.gov/vhf/ebola/clinicians/index.html accessed September 2018).

IV.C. **Respiratory Hygiene/Cough Etiquette**

IV.C.1. Educate healthcare personnel on the importance of source control measures to contain respiratory secretions to prevent droplet and fomite transmission of respiratory pathogens, especially during seasonal outbreaks of viral respiratory tract infections (e.g., influenza, RSV, adenovirus, parainfluenza virus) in communities [14, 24, 684 10, 262]. *Category IB*

IV.C.2. Implement the following measures to contain respiratory secretions in patients and accompanying individuals who have signs and symptoms of a respiratory infection, beginning at the point of initial encounter in a healthcare setting (e.g., triage, reception and waiting areas in emergency departments, outpatient clinics and physician offices) [20, 24, 145, 902, 989].

IV.C.2.a. Post signs at entrances and in strategic places (e.g., elevators, cafeterias) within ambulatory and inpatient settings with instructions to patients and other persons with symptoms of a respiratory infection to cover their mouths/noses when coughing or sneezing, use and dispose of tissues, and perform hand hygiene after hands have been in contact with respiratory secretions. *Category II*

IV.C.2.b. Provide tissues and no-touch receptacles (e.g.,foot-pedal-operated lid or open, plastic-lined waste basket) for disposal of tissues [20]. *Category II*

IV.C.2.c. Provide resources and instructions for performing hand hygiene in or near waiting areas in ambulatory and inpatient settings; provide conveniently-located dispensers of alcohol-based hand rubs and, where sinks are available, supplies for handwashing [559, 903]. *Category IB*

IV.C.2.d. During periods of increased prevalence of respiratory infections in the community (e.g., as indicated by increased school absenteeism, increased number of patients seeking care for a respiratory infection), offer masks to coughing patients and other symptomatic persons (e.g., persons who accompany ill patients) upon entry into the facility or medical office [126, 899 898] and encourage them to maintain special separation, ideally a distance of at least 3 feet, from others in common waiting areas [23, 103, 111, 114]

[20, 134]. *Category IB*

IV.C.2.d.i. Some facilities may find it logistically easier to institute this recommendation year-round as a standard of practice. *Category II*

IV.D. **Patient Placement**

IV.D.1. Include the potential for transmission of infectious agents in patientplacement decisions. Place patients who pose a risk for transmission to others (e.g., uncontained secretions, excretions or wound drainage; infants with suspected viral respiratory or gastrointestinal infections) in a singlepatient room when available 24, 430, 435, 796, 797, 806, 990 410, 793. *Category IB* IV.D.2. Determine patient placement based on the following principles:

- Route(s) of transmission of the known or suspected infectious agent
- Risk factors for transmission in the infected patient

- Risk factors for adverse outcomes resulting from an HAI in other patients in the area or room being considered for patient-placement
- Availability of single-patient rooms
- Patient options for room-sharing (e.g., cohorting patients with the same infection) *Category II*

IV.E. **Patient-care Equipment and Instruments/devices[956]**

IV.E.1. Establish policies and procedures for containing, transporting, and handling patient-care equipment and instruments/devices that may be contaminated with blood or body fluids[18, 739, 975]. *Category IB/IC*

IV.E.2. Remove organic material from critical and semi-critical instrument/devices, using recommended cleaning agents before high level disinfection and sterilization to enable effective disinfection and sterilization processes[836 991, 992]. *Category IA*

IV.E.3. Wear PPE (e.g., gloves, gown), according to the level of anticipated contamination, when handling patient-care equipment and instruments/devices that is visibly soiled or may have been in contact with blood or body fluids[18, 739, 975]. *Category IB/IC*

IV.F. **Care of the Environment[11]**

Edit [February 2017]: An * indicates recommendations that were renumbered for clarity. The renumbering does not constitute change to the intent of the recommendations.

IV.F.1. Establish policies and procedures for routine and targeted cleaning of environmental surfaces as indicated by the level of patient contact and degree of soiling[11]. *Category II*

IV.F.2. Clean and disinfect surfaces that are likely to be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients' rooms) on a more frequent schedule compared to that for other surfaces (e.g., horizontal surfaces in waiting rooms)[11 73, 740, 746, 993, 994 72, 800, 835 995]. *Category IB*

IV.F.3. Use EPA-registered disinfectants that have microbiocidal (i.e., killing) activity against the pathogens most likely to contaminate the patient-care environment. Use in accordance with manufacturer's instructions[842-844, 956, 996]. *Category IB/IC*

IV.F.3.a. Review the efficacy of in-use disinfectants when evidence of continuing transmission of an infectious agent (e.g., rotavirus, *C. difficile,* norovirus) may indicate resistance to the in-use product and change to a more effective disinfectant as indicated[275, 842, 847]. *Category II*

Edit [February 2017]: An * indicates recommendations that were renumbered for clarity. The renumbering does not constitute change to the intent of the recommendations.

IV.F.4. In facilities that provide health care to pediatric patients or have waiting areas with child play toys (e.g., obstetric/gynecology offices and clinics), establish policies and procedures for cleaning and disinfecting toys at regular intervals[379, 80]. *Category IB*

IV.F.4.a. * Use the following principles in developing this policy and procedures: *Category II*

- Select play toys that can be easily cleaned and disinfected
- Do not permit use of stuffed furry toys if they will be shared
- Clean and disinfect large stationary toys (e.g., climbing quipment) at least weekly and whenever visibly soiled
- If toys are likely to be mouthed, rinse with water after disinfection; alternatively wash in a dishwasher
- When a toy requires cleaning and disinfection, do so immediately or store in a designated labeled container separate from toys that are clean and ready for use

IV.F.5. Include multi-use electronic equipment in policies and procedures for preventing contamination and for cleaning and disinfection, especially those items that are used by patients, those used during delivery of patient care, and mobile devices that are moved in and out of patient rooms frequently (e.g., daily)[850 851, 852, 997]. *Category IB*

IV.F.5.a. No recommendation for use of removable protective covers or washable keyboards. *Unresolved issue*

IV.G. **Textiles and Laundry**

IV.G.1. Handle used textiles and fabrics with minimum agitation to avoid contamination of air, surfaces and persons[739, 998, 999]. *Category IB/IC* IV.G.2. If laundry chutes are used, ensure that they are properly designed, maintained, and used in a manner to minimize dispersion of aerosols from contaminated laundry[11, 13, 1000, 1001]. *Category IB/IC*

IV.H. **Safe Injection Practices**

The following recommendations apply to the use of needles, cannulas that replace needles, and, where applicable, intravenous delivery systems [454]

IV.H.1. Use aseptic technique to avoid contamination of sterile injection equipment[1002, 1003]. *Category IA*

IV.H.2. Do not administer medications from a syringe to multiple patients, even if the needle or cannula on the syringe is changed. Needles, cannulae and syringes are sterile, single-use items; they should not be reused for another patient nor to access a medication or solution that might be used for a subsequent patient[453, 919, 1004, 1005]. *Category IA*

IV.H.3. Use fluid infusion and administration sets (i.e., intravenous bags, tubing and connectors) for one patient only and dispose appropriately after use. Consider a syringe or needle/cannula contaminated once it has been used to enter or connect to a patient's intravenous infusion bag or administration set[453]. *Category IB*

IV.H.4. Use single-dose vials for parenteral medications whenever possible[453]. *Category IA*

IV.H.5. Do not administer medications from single-dose vials or ampules to multiple patients or combine leftover contents for later use[369 453, 1005]. *Category IA*

IV.H.6. If multidose vials must be used, both the needle or cannula and syringe used to access the multidose vial must be sterile[453, 1002]. *Category IA*

IV.H.7. Do not keep multidose vials in the immediate patient treatment area and store in accordance with the manufacturer's recommendations; discard if sterility is compromised or questionable[453, 1003]. *Category IA*

IV.H.8. Do not use bags or bottles of intravenous solution as a common source of supply for multiple patients[453, 1006]. *Category IB*

IV.I. Infection control practices for special lumbar puncture procedures

Wear a surgical mask when placing a catheter or injecting material into the spinal canal or subdural space (i.e., during myelograms, lumbar puncture and spinal or epidural anesthesia).[906 907-909 910, 911 912-914, 918 1007] *Category IB*

IV.J. Worker safety

Adhere to federal and state requirements for protection of healthcare personnel from exposure to bloodborne pathogens[739]. *Category IC*

V. Transmission-Based Precautions

V.A. General Principles

V.A.1. In addition to Standard Precautions, use Transmission-Based Precautions for patients with documented or suspected infection or colonization with highly transmissible or epidemiologically-important pathogens for which additional precautions are needed to prevent transmission (see Appendix A)[24, 93, 126, 141, 306, 806, 1008]. *Category IA*

V.A.2. Extend duration of Transmission-Based Precautions, (e.g., Droplet, Contact) for immunosuppressed patients with viral infections due to prolonged shedding of viral agents that may be transmitted to others [928, 931-933, 1009-1011]. *Category IA*

V.B. Contact Precautions

V.B.1. Use Contact Precautions as recommended in Appendix A for patients with known or suspected infections or evidence of syndromes that represent an increased risk for contact transmission. For specific recommendations for use of Contact Precautions for colonization or infection with MDROs, go to Management of Multidrug- Resistant Organisms in Healthcare Settings 2006 (https://www.cdc.gov/infectioncontrol/guidelines/mdro/ accessed May 2016)[870].

Edit [February 2017]: An * indicates recommendations that were renumbered for clarity. The renumbering does not constitute change to the intent of the recommendations.

V.B.2. **Patient placement** V.B.2.a. In ***acute care hospitals***, place patients who require Contact Precautions in a single-patient room when available[24, 687, 793, 796, 797, 806, 837, 893, 1012, 1013] *Category IB*

When single-patient rooms are in short supply, apply the following principles for making decisions on patient placement:

- * V.B.2.a.i. Prioritize patients with conditions that may facilitate transmission (e.g., uncontained drainage, stool incontinence) for single-patient room placement. *Category II*
- * V.B.2.a.ii.Place together in the same room (cohort) patients who are infected or colonized with the same pathogen and are suitable roommates[29, 638, 808, 811-813, 815, 818, 819] *Category IB*

If it becomes necessary to place a patient who requires Contact Precautions in a room with a patient who is not infected or colonized with the same infectious agent:

- * V.B.2.a.iii. Avoid placing patients on Contact Precautions in the same room with patients who have conditions that may increase the risk of adverse

outcome from infection or that may facilitate transmission (e.g., those who are
immunocompromised, have open wounds, or have anticipated prolonged lengths of stay). *Category II*

- * V.B.2.a.iv. Ensure that patients are physically separated (i.e., >3 feet apart) from each other. Draw the privacy curtain between beds to minimize opportunities for direct contact.) *Category II*
- * V.B.2.a.v. Change protective attire and perform hand hygiene between contact with patients in the same room, regardless of whether one or both patients are on Contact Precautions[728, 741, 742, 988, 1014, 1015]. *Category IB*

V.B.2.b. In *long-term care and other residential settings*, make decisions regarding patient placement on a case-by-case basis, balancing infection risks to other patients in the room, the presence of risk factors that increase the likelihood of transmission, and the potential adverse psychological impact on the infected or colonized patient[920, 921]. *Category II*

V.B.2.c. In *ambulatory settings*, place patients who require Contact Precautions in an examination room or cubicle as soon as possible[20]. *Category II*

V.B.3. **Use of personal protective equipment** V.B.3.a. **Gloves**

Wear gloves whenever touching the patient's intact skin[24, 89, 134, 559, 746, 837] or surfaces and articles in close proximity to the patient (e.g., medical equipment, bed rails)[72, 73, 88, 837]. Don gloves upon entry into the room or cubicle. *Category IB* V.B.3.b. **Gowns**

V.B.3.b.i. Wear a gown whenever anticipating that clothing will have direct contact with the patient or potentially contaminated environmental surfaces or equipment in close proximity to the patient. Don gown upon entry into the room or cubicle. Remove gown and observe hand hygiene before leaving the patient-care environment[24, 88, 134, 745, 837]. *Category IB*

V.B.3.b.ii. After gown removal, ensure that clothing and skin do not contact potentially contaminated environmental surfaces that could result in possible transfer of microorganism to other patients or environmental surfaces[72, 73]. *Category II*

V.B.4. **Patient transport**

V.B.4.a. In *acute care hospitals and long-term care and other residential settings*, limit transport and movement of patients outside of the room to medically-necessary purposes. *Category II*

V.B.4.b. When transport or movement in any healthcare setting is necessary, ensure that infected or colonized areas of the patient's body are contained and covered. *Category II*

V.B.4.c. Remove and dispose of contaminated PPE and perform hand hygiene prior to transporting patients on Contact Precautions. *Category II*

V.B.4.d. Don clean PPE to handle the patient at the transport destination. *Category II*

V.B.5. **Patient-care equipment and instruments/devices**

V.B.5.a. Handle patient-care equipment and instruments/devices according to Standard Precautions[739, 836]. *Category IB/IC*

V.B.5.b. In *acute care hospitals and long-term care and other residential settings*, use disposable noncritical patient-care equipment (e.g., blood pressure cuffs) or implement patient-dedicated use of such equipment. If common use of equipment for multiple patients is unavoidable, clean and disinfect such equipment before use on another patient 24, 88, 796, 836, 837, 854, 1016. *Category IB*

V.B.5.c. **In home care settings**

V.B.5.c.i. Limit the amount of non-disposable patient-care equipment brought into the home of patients on Contact Precautions. Whenever possible, leave patient-care equipment in the home until discharge from home care services. *Category II*

V.B.5.c.ii. If noncritical patient-care equipment (e.g., stethoscope) cannot remain in the home, clean and disinfect items before taking them from the home using a low- to intermediate-level disinfectant. Alternatively, place contaminated reusable items in a plastic bag for transport and subsequent cleaning and disinfection. *Category II*

V.B.5.d. In ***ambulatory settings***, place contaminated reusable noncritical patient-care equipment in a plastic bag for transport to a soiled utility area for reprocessing. *Category II*

V.B.6. **Environmental measures**

Ensure that rooms of patients on Contact Precautions are prioritized for frequent cleaning and disinfection (e.g., at least daily) with a focus on frequently-touched surfaces (e.g., bed rails, overbed table, bedside commode, lavatory surfaces in patient bathrooms, doorknobs) and equipment in the immediate vicinity of the patient[11, 24, 88, 746, 837]. *Category IB* V.B.7. Discontinue Contact Precautions after signs and symptoms of the infection have resolved or according to pathogen-specific recommendations in Appendix A. *Category IB*

V.C. **Droplet Precautions**

Use Droplet Precautions as recommended in Appendix A for patients known or suspected to be infected with pathogens transmitted by respiratory droplets (i.e., large-particle droplets >5μ in size) that are generated by a patient who is coughing, sneezing or talking[14,]
23, Steinberg, 1969 #1708, 41, 95, 103, 111, 112, 755, 756, 989, 1017. *Category IB*

Edit [February 2017]: An * indicates recommendations that were renumbered for clarity. The renumbering does not constitute change to the intent of the recommendations.

V.C.1. **Patient placement**

V.C.1.a. In acute care hospitals, place patients who require Droplet Precautions in a single-patient room when available *Category II*

When single-patient rooms are in short supply, apply the following principles for making decisions on patient placement:

- * V.C.2.a.i. Prioritize patients who have excessive cough and sputum production for single-patient room placement *Category II*
- * V.C.2.a.ii. Place together in the same room (cohort) patients who are infected the same pathogen and are suitable roommates[814,816]. *Category IB*

If it becomes necessary to place patients who require Droplet Precautions in a room with a patient who does not have the same infection:

- * V.C.2.a.iii. Avoid placing patients on Droplet Precautions in the same room with patients who have conditions that may increase the risk of adverse outcome from infection or that may facilitate transmission (e.g., those who are immunocompromised, have or have anticipated prolonged lengths of stay). *Category II*

- * V.C.2.a.iv. Ensure that patients are physically separated (i.e., >3 feet apart) from each other. Draw the privacy curtain between beds to minimize opportunities for close contact[103, 104 410]. *Category IB*
- * V.C.2.a.v. Change protective attire and perform hand hygiene between contact with patients in the same room, regardless of whether one patient or both patients are on Droplet Precautions[741-743, 988, 1014, 1015]. *Category IB*

V.C.1.b. In *long-term care and other residential settings*, make decisions regarding patient placement on a case-by-case basis after considering infection risks to other patients in the room and available alternatives[410]. *Category II*

V.C.1.c. In *ambulatory settings*, place patients who require Droplet Precautions in an examination room or cubicle as soon as possible. Instruct patients to follow recommendations for Respiratory Hygiene/Cough Etiquette[447, 448 9, 828]. *Category II*

V.C.2. **Use of personal protective equipment**

V.C.2.a. Don a mask upon entry into the patient room or cubicle[14, 23, 41, 103, 111, 113, 115, 827]. *Category IB*

V.C.2.b. No recommendation for routinely wearing eye protection (e.g., goggle or face shield), in addition to a mask, for close contact with patients who require Droplet Precautions. *Unresolved issue*

V.C.2.c. For patients with suspected or proven SARS, avian influenza or pandemic influenza, refer to the following websites for the most recommendations ([This link is no longer active: www.cdc.gov/ncidod/sars. Similar information may be found at CDC Severe Acute Respiratory Syndrome (SARS) (https://www.cdc.gov/sars/index.html accessed September 2018); CDC Information on Avian Influenza (https://www.cdc.gov/flu/avianflu/ accessed May 2016) Current version of this document may differ from original; Flu.gov Pandemic Awareness (https://www.cdc.gov/flu/ accessed May 2016) Current version of this document may differ from original.])[134, 1018, 1019]

V.C.3. **Patient transport**

V.C.3.a. In *acute care hospitals and long-term care and other residential settings*, limit transport and movement of patients outside of the room to medically-necessary purposes. *Category II*

V.C.3.b. If transport or movement in any healthcare setting is necessary, instruct patient to wear a mask and follow CDC's Respiratory Hygiene/Cough Etiquette in Healthcare Settings (https://www.cdc.gov/flu/professionals/infectioncontrol/resphygiene. htm accessed May 2016) [Current version of this document may differ from original.]. *Category IB*

V.C.3.c. No mask is required for persons transporting patients on Droplet Precautions. *Category II*

V.C.3.d. Discontinue Droplet Precautions after signs and symptoms have resolved or according to pathogen-specific recommendations in Appendix A. *Category IB*

V.D. **Airborne Precautions**

V.D.1. Use Airborne Precautions as recommended in Appendix A for patients known or suspected to be infected with infectious agents transmitted personto-person by the airborne route (e.g., *M tuberculosis* [12], measles [34, 122, 1020], chickenpox [123, 773, 1021], disseminated herpes zoster [1022]. *Category IA/IC*

V.D.2. **Patient placement**

V.D.2.a. In *acute care hospitals and long-term care settings*, place patients who require Airborne Precautions in an AIIR that has been constructed in accordance with current guidelines[11-13]. *Category IA/IC*

V.D.2.a.i. Provide at least six (existing facility) or 12 (new construction/renovation) air changes per hour.

V.D.2.a.ii. Direct exhaust of air to the outside. If it is not possible to exhaust air from an AIIR directly to the outside, the air may be returned to the air-handling system or adjacent spaces if all air is directed through HEPA filters.

V.D.2.a.iii. Whenever an AIIR is in use for a patient on Airborne Precautions, monitor air pressure daily with visual indicators (e.g., smoke tubes, flutter strips), regardless of the presence of differential pressure sensing devices (e.g., manometers)[11, 12, 1023, 1024].

V.D.2.a.iv. Keep the AIIR door closed when not required for entry and exit.

V.D.2.b. When an AIIR is not available, transfer the patient to a facility that has an available AIIR[12]. *Category II*

V.D.2.c. In the event of an outbreak or exposure involving large numbers of patients who require Airborne Precautions:

- Consult infection control professionals before patient placement to determine the safety of alternative room that do not meet engineering requirements for an AIIR.
- Place together (cohort) patients who are presumed to have the same infection(based on clinical presentation and diagnosis when known) in areas of the facility that are away from other patients, especially patients who are at increased risk for infection (e.g., immunocompromised patients).
- Use temporary portable solutions (e.g., exhaust fan) to create a negative pressure environment in the converted area of the facility. Discharge air directly to the outside,away from people and air intakes, or direct all the air through HEPA filters before it is introduced to other air spaces[12] *Category II*

V.D.2.d. **In ambulatory settings:**

V.D.2.d.i. Develop systems (e.g., triage, signage) to identify patients with known or suspected infections that require Airborne Precautions upon entry into ambulatory settings[9, 12, 34, 127, 134]. *Category IA*

V.D.2.d.ii. Place the patient in an AIIR as soon as possible. If an AIIR is not available, place a surgical mask on the patient and place him/her in an examination room. Once the patient leaves, the room should remain vacant for the appropriate time, generally one hour, to allow for a full exchange of air[11, 12, 122]. *Category IB/IC*

V.D.2.d.iii. Instruct patients with a known or suspected airborne infection to wear a surgical mask and observe Respiratory Hygiene/Cough Etiquette. Once in an AIIR, the mask may be removed; the mask should remain on if the patient is not in an AIIR[12, 107, 145, 899]. *Category IB/IC*

V.D.3. **Personnel restrictions**

Restrict susceptible healthcare personnel from entering the rooms of patients known or suspected to have measles (rubeola), varicella (chickenpox), disseminated zoster, or smallpox if other immune healthcare personnel are available[17, 775]. *Category IB*

V.D.4. **Use of PPE**

Edit [February 2017]: These recommendations contain minor edits in order to clarify the meaning. The edits do not constitute any change to the intent of the recommendations.
* Indicates a change to the numbering system.
§ Indicates a text change.

V.D.4.a. Wear a fit-tested NIOSH-approved N95 or higher level respirator for respiratory protection when entering the room or home of a patient when the following diseases are suspected or confirmed:

- * V.D.4.a.i. Infectious pulmonary or laryngeal tuberculosis or when infectious tuberculosis skin lesions are present and procedures that would aerosolize viable organisms (e.g., irrigation, incision and drainage, whirlpool treatments) are performed[12, 1025, 1026]. *Category IB*
- * V.D.4.a.ii. Smallpox (vaccinated and unvaccinated). Respiratory protection is recommended for all healthcare personnel, including those with a documented "take" after smallpox vaccination due to the risk of a genetically engineered virus against which the vaccine may not provide protection, or of exposure to a very large viral load (e.g., from high-risk aerosol-generating procedures, immunocompromised patients, hemorrhagic or flat smallpox[108, 129]. *Category II*

V.D.4.b. § Suspected measles, chickenpox or disseminated zoster.

Interim Measles Infection Control [July 2019]

For current recommendations on face protection for measles, see [Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings](https://www.cdc.gov/infectioncontrol/guidelines/measles/)
(https://www.cdc.gov/infectioncontrol/guidelines/measles/)

No recommendation is made regarding the use of PPE by healthcare personnel who are presumed to be immune to measles (rubeola) or varicella-zoster based on history of disease, vaccine, or serologic testing when caring for an individual with known or suspected measles, chickenpox or disseminated zoster, due to difficulties in establishing definite immunity[1027, 1028]. *Unresolved issue*

V.D.4.c. § Suspected measles, chickenpox or disseminated zoster.

Interim Measles Infection Control [July 2019]

For current recommendations on face protection for measles, see [Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings](https://www.cdc.gov/infectioncontrol/guidelines/measles/)
(https://www.cdc.gov/infectioncontrol/guidelines/measles/)

No recommendation is made regarding the type of personal protective equipment (i.e., surgical mask or respiratory protection with a N95 or higher respirator) to be worn by susceptible healthcare personnel who must have contact with patients with known or suspected measles, chickenpox or disseminated herpes zoster. *Unresolved issue*

V.D.5. **Patient transport**

V.D.5.a. In *acute care hospitals and long-term care and other residential settings*, limit transport and movement of patients outside of the room to medically-necessary purposes. *Category II*

V.D.5.b. If transport or movement outside an AIIR is necessary, instruct patients to wear a surgical mask, if possible, and observe Respiratory Hygiene/Cough Etiquette[12]. *Category II*

V.D.5.c. For patients with skin lesions associated with varicella or smallpox or draining skin lesions caused by *M. tuberculosis*, cover the affected areas to prevent aerosolization or contact with the infectious agent in skin lesions[108, 1025, 1026, 1029-1031]. *Category IB*

V.D.5.d. Healthcare personnel transporting patients who are on Airborne Precautions do not need to wear a mask or respirator during transport if the patient is wearing a mask and infectious skin lesions are covered. *Category II*

V.D.6. **Exposure management**

⚠ For current recommendations on face protection for measles, see the **Interim Measles Infection Control [July 2019]**

See [Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings](https://www.cdc.gov/infectioncontrol/guidelines/measles/) (https://www.cdc.gov/infectioncontrol/guidelines/measles/)

Immunize or provide the appropriate immune globulin to susceptible persons as soon as possible following unprotected contact (i.e., exposed) to a patient with measles, varicella or smallpox: *Category IA*

- Administer measles vaccine to exposed susceptible persons within 72 hours after the exposure or administer immune globulin within six days of the exposure event for high-risk persons in whom vaccine is contraindicated[17, 1032-1035].

⚠ **Varicella Exposure Management Update [May 2019]:** Administer varicella vaccine to exposed susceptible persons within 120 hours after the exposure or administer varicella immune globulin (varicella zoster immune globulin or alternative product), when available, within 96 hours for high-risk persons in whom vaccine is contraindicated (e.g., immunocompromised patients, pregnant women, newborns whose mother's varicella onset was <5 days before or within 48 hours after delivery[888, 1035-1037]).

- Administer smallpox vaccine to exposed susceptible persons within 4 days after exposure[108, 1038-1040].

V.D.7. Discontinue Airborne Precautions according to pathogen-specific recommendations in Appendix A. *Category IB*

V.D.8. Consult CDC's "Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Settings, 2005" (https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm accessed September 2018)[12] and the "Guideline for Environmental Infection Control in Health-Care Facilities" (https://www.cdc.gov/infectioncontrol/guidelines/environmental/index.html accessed May 2016)[11] for additional guidance on environment strategies for preventing transmission of tuberculosis in healthcare settings. The environmental recommendations in these guidelines may be applied to patients with other infections that require Airborne Precautions.

VI. Protective Environment (Table 4)

VI.A. Place allogeneic hematopoietic stem cell transplant (HSCT) patients in a Protective Environment as described in the "Guideline to Prevent Opportunistic Infections in HSCT Patients" (https://www.cdc.gov/mmwr/preview/mmwrhtml/rr4910a1.htm accessed May 2016)[15], the "Guideline for Environmental Infection Control in Health-Care Facilities" (https://www.cdc.gov/infectioncontrol/guidelines/environmental/index.html accessed May 2016)[11] and the "Guidelines for Preventing Health-Care-Associated Pneumonia, 2003" (https://www.cdc.gov/infectioncontrol/guidelines/pneumonia/index.html accessed May 2016)[14] to reduce exposure to environmental fungi (e.g., *Aspergillus* sp)[157, 158]. *Category IB*

VI.B. No recommendation for placing patients with other medical conditions that are associated with increased risk for environmental fungal infections (e.g., aspergillosis) in a Protective Environment[11]. *Unresolved issue*

VI.C. For patients who require a Protective Environment, implement the following (see Table 5)[11, 15]

⚠ **Edit [February 2017]:** An § indicates text that was edited for clarity. The edit does not constitute change to the intent of the recommendations.

VI.E.1. **Environmental controls**

VI.E.1.a. § Filter incoming air using central or point-of-use high efficiency particulate (HEPA) filters capable of removing 99.97% of particles ≥0.3 µm in diameter[13]. *Category IB*

VI.E.1.b. § Direct room airflow with the air supply on one side of the room that moves air across the patient bed and out through an exhaust on the opposite side of the room[13]. *Category IB*

VI.E.1.c. § Ensure positive air pressure in room relative to the corridor (pressure differential of ≥ 2.5 Pa [0.01-in water gauge])[13]. *Category IB*

⚠ **Correction [April 2019**] Pressure differential changed from ≥ 12.5 to ≥ 2.5.

VI.C.1.c.i. Monitor air pressure daily with visual indicators (e.g., smoke tubes, flutter strips)[11, 1024]. *Category IA*

VI.E.1.d. § Ensure well-sealed rooms that prevent infiltration of outside air[13]. *Category IB*

VI.E.1.e. § Ensure at least 12 air changes per hour[13]. *Category IB*

VI.E.2. Lower dust levels by using smooth, nonporous surfaces and finishes that can be scrubbed, rather than textured material (e.g., upholstery). Wet dust horizontal surfaces whenever dust detected and routinely clean crevices and sprinkler heads where dust may accumulate[940, 941]. *Category II*

VI.E.3. Avoid carpeting in hallways and patient rooms in areas[941]. *Category IB*

VI.E.4. Prohibit dried and fresh flowers and potted plants[942-944]. *Category II* VI.D. Minimize the length of time that patients who require a Protective Environment are outside their rooms for diagnostic procedures and other activities[11, 158, 945]. *Category IB*

VI.F. During periods of construction, to prevent inhalation of respirable particles that could contain infectious spores, provide respiratory protection (e.g., N95 respirator) to patients who are medically fit to tolerate a respirator when they are required to leave the Protective Environment[945, 158]. *Category II*

VI.E.1.a. No recommendation for fit-testing of patients who are using respirators. *Unresolved issue*

VI.E.1.b. No recommendation for use of particulate respirators when leaving the Protective Environment in the absence of construction. *Unresolved issue*

VI.G. **Use of Standard and Transmission-Based Precautions in a Protective Environment.**

VI.G.1. Use Standard Precautions as recommended for all patient interactions. *Category IA*

VI.G.2. Implement Droplet and Contact Precautions as recommended for diseases listed in Appendix A. Transmission-Based precautions for viral infections may need to be prolonged because of the patient's immunocompromised state and prolonged shedding of viruses930, 1010, 928, 932, 1011. *Category IB*

VI.G.3. Barrier precautions, (e.g., masks, gowns, gloves) are not required for healthcare personnel in the absence of suspected or confirmed infection in the patient or if they are not indicated according to Standard Precautions [15]. *Category II*

VI.G.4. Implement Airborne Precautions for patients who require a Protective Environment room and who also have an airborne infectious disease (e.g., pulmonary or laryngeal tuberculosis, acute varicella-zoster). *Category IA*

VI.G.4.a. Ensure that the Protective Environment is designed to maintain positive pressure[13]. *Category IB*

VI.G.4.b. Use an anteroom to further support the appropriate air-balance relative to the corridor and the Protective Environment; provide independent exhaust of contaminated air to the outside or place a HEPA filter in the exhaust duct if the return air must be recirculated[13, 1041]. *Category IB*

VI.G.4.c. If an anteroom is not available, place the patient in an AIIR and use portable, industrial-grade HEPA filters in the room to enhance filtration of spores[1042]. *Category II*

Appendix A:

Available from: https://www.cdc.gov/infectioncontrol/guidelines/isolation/

Preamble The mode(s) and risk of transmission for each specific disease agent included in Appendix A were reviewed. Principle sources consulted for the development of disease-specific recommendations for Appendix A included infectious disease manuals and textbooks [833, 1043, 1044]. The published literature was searched for evidence of person-to-person transmission in healthcare and non-healthcare settings with a focus on reported outbreaks that would assist in developing recommendations for all settings where healthcare is delivered. Criteria used to assign Transmission-Based Precautions categories follow:

- A Transmission-Based Precautions category was assigned if there was strong evidence for person-to-person transmission via droplet, contact, or airborne routes in healthcare or nonhealthcare settings and/or if patient factors (e.g., diapered infants, diarrhea, draining wounds) increased the risk of transmission
- Transmission-Based Precautions category assignments reflect the predominant mode(s) of transmission
- If there was no evidence for person-to-person transmission by droplet, contact or airborne routes, Standard Precautions were assigned
- If there was a low risk for person-to-person transmission and no evidence of healthcareassociated transmission, Standard Precautions were assigned
- Standard Precautions were assigned for bloodborne pathogens (e.g., hepatitis B and C viruses, human immunodeficiency virus) as per CDC recommendations for Universal Precautions issued in 1988 [780]. Subsequent experience has confirmed the efficacy of Standard Precautions to prevent exposure to infected blood and body fluid [778, 779, 866].

Additional information relevant to use of precautions was added in the comments column to assist the caregiver in decision-making. Citations were added as needed to support a change in or provide additional evidence for recommendations for a specific disease and for new infectious agents (e.g., SARS-CoV, avian influenza) that have been added to Appendix A. The reader may refer to more detailed discussion concerning modes of transmission and emerging pathogens in the background text and for MDRO control in Appendix B (Management of Multidrug-Resistant Organisms in Healthcare Settings (https://www.cdc.gov/infectioncontrol/guidelines/mdro/ accessed May 2016).

Type and Duration of Precautions Recommended for Selected Infections and Conditions[1]

⚠ **Appendix A Updates [September 2018]**

Changes: Updates and clarifications made to the table in Appendix A: Type and Duration of Precautions Recommended for Selected Infections and Conditions.

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Abscess Draining, major	Contact + Standard	Duration of illness	Until drainage stops or can be contained by dressing
Abscess Draining, minor or limited	Standard		If dressing covers and contains drainage
Acquired human immunodeficiency syndrome (HIV)	Standard		Postexposure chemoprophylaxis for some blood exposures [866].

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Actinomycosis	Standard		Not transmitted from person to person.
Adenovirus infection (see agent-specific guidance under Gastroenteritis, Conjunctivitis, Pneumonia)			

Amebiasis	Standard		Person-to-person transmission is rare. Transmission in settings for the mentally challenged and in a family group has been reported [1045]. Use care when handling diapered infants and mentally challenged persons [1046].
Anthrax	Standard		Infected patients do not generally pose a transmission risk.
Anthrax Cutaneous	Standard		Transmission through non-intact skin contact with draining lesions possible, therefore use Contact Precautions if large amount of uncontained drainage. Handwashing with soap and water preferable to use of waterless alcohol-based antiseptics since alcohol does not have sporicidal activity [983].
Anthrax Pulmonary	Standard		Not transmitted from person to person.
Anthrax Environmental: aerosolizable sporecontaining powder or other substance		Until environment completely decontaminated	Until decontamination of environment complete [203]. Wear respirator (N95 mask or PAPRs), protective clothing; decontaminate persons with powder on them (Notice to Readers: Occupational Health Guidelines for Remediation Workers at Bacillus anthracis-Contaminated Sites — United States, 2001–2002 (https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5135a3.htm accessed September 2018).) Hand hygiene: Handwashing for 30-60 seconds with soap and water or 2% chlorhexidine gluconate after spore contact (alcohol handrubs inactive against spores [983].) Postexposure prophylaxis following environmental exposure: 60 days of antimicrobials (either doxycycline, ciprofloxacin, or levofloxacin) and Postexposure vaccine under IND.
Antibiotic-associated colitis (see *Clostridium difficile*)			
Arthropod-borne • viral encephalitides (eastern, western, Venezuelan equine encephalomyelitis; St Louis, California encephalitis; West Nile Virus) and • viral fevers (dengue, yellow fever, Colorado tick fever)	Standard		Not transmitted from person to person except rarely by transfusion, and for West Nile virus by organ transplant, breastmilk or transplacentally [530, 1047]. Install screens in windows and doors in endemic areas. Use DEET-containing mosquito repellants and clothing to cover extremities.
Ascariasis	Standard		Not transmitted from person to person.
Aspergillosis	Standard		Contact Precautions and Airborne if massive soft tissue infection with copious drainage and repeated irrigations required [154].
Avian influenza (see Influenza, Avian below)			

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Babesiosis	Standard		Not transmitted from person to person, except rarely by transfusion.
Blastomycosis, North American, cutaneous or pulmonary	Standard		Not transmitted from person to person.

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Botulism	Standard		Not transmitted from person to person.
Bronchiolitis (see Respiratory Infections in infants and young children)	Contact + Standard	Duration of illness	Use mask according to Standard Precautions.
Brucellosis (undulant, Malta, Mediterranean fever)	Standard		Not transmitted from person to person, except rarely via banked spermatozoa and sexual contact [1048, 1049]. Provide antimicrobial prophylaxis following laboratory exposure [1050].
Campylobacter gastroenteritis (see Gastroenteritis)			
Candidiasis, all forms including mucocutaneous	Standard		
Cat-scratch fever (benign inoculation lymphoreticulosis)	Standard		Not transmitted from person to person.
Cellulitis	Standard		
Chancroid (soft chancre) (*H. ducreyi*)	Standard		Transmitted sexually from person to person.
Chickenpox (see Varicella)			
Chlamydia trachomatis Conjunctivitis	Standard		
Chlamydia trachomatis Genital (lymphogranuloma venereum)	Standard		
Chlamydia trachomatis Pneumonia (infants ≤3 mos. of age)	Standard		
Chlamydia pneumoniae	Standard		Outbreaks in institutionalized populations reported, rarely [1051, 1052].
Cholera (see Gastroenteritis)			
Closed-cavity infection Open drain in place; limited or minor drainage	Standard		Contact Precautions if there is copious uncontained drainage.
Closed-cavity infection No drain or closed drainage system in place	Standard		
Clostridium botulinum	Standard		Not transmitted from person to person.
Clostridium difficile (see Gastroenteritis, *C. difficile*)	Contact + Standard	Duration of illness	
Clostridium perfringens Food poisoning	Standard		Not transmitted from person to person.
Clostridium perfringens Gas gangrene	Standard		Transmission from person to person rare; 1 outbreak in a surgical setting reported [1053]. Use Contact Precautions if wound drainage is extensive.

Coccidioidomycosis (valley fever) Draining lesions	Standard		Not transmitted from person to person except under extraordinary circumstances, because the infectious arthroconidial form of *Coccidioides immitis* is not produced in humans [1054].
Coccidioidomycosis (valley fever) Pneumonia	Standard		Not transmitted from person to person except under extraordinary circumstances, (e.g., inhalation of aerosolized tissue phase endospores during necropsy, transplantation of infected lung) because the infectious arthroconidial form of *Coccidioides immitis* is not produced in humans [1054, 1055].
Colorado tick fever	Standard		Not transmitted from person to person.
Congenital rubella	Contact + Standard	Until 1 yr of age	Standard Precautions if nasopharyngeal and urine cultures repeatedly negative after 3 mos. of age.
Conjunctivitis Acute bacterial	Standard		
Conjunctivitis Acute bacterial *Chlamydia*	Standard		
Conjunctivitis Acute bacterial Gonococcal	Standard		
Conjunctivitis Acute viral (acute hemorrhagic)	Contact + Standard	Duration of illness	Adenovirus most common; enterovirus 70 [1056], Coxsackie virus A24 [1057] also associated with community outbreaks. Highly contagious; outbreaks in eye clinics, pediatric and neonatal settings, institutional settings reported. Eye clinics should follow Standard Precautions when handling patients with conjunctivitis. Routine use of infection control measures in the handling of instruments and equipment will prevent the occurrence of outbreaks in this and other settings. [460, 461, 814, 1058-1060].
Corona virus associated with SARS (SARS-CoV) (see Severe Acute Respiratory Syndrome)			
Coxsackie virus disease (see enteroviral infection)			
Creutzfeldt-Jakob disease (CJD, vCJD)	Standard		Use disposable instruments or special sterilization/disinfection for surfaces, objects contaminated with neural tissue if CJD or vCJD suspected and has not been R/O; No special burial procedures. [1061]
Croup (see Respiratory Infections in infants and young children)			
Crimean-Congo Fever (see Viral Hemorrhagic Fever)	Standard		
Cryptococcosis	Standard		Not transmitted from person to person, except rarely via tissue and corneal transplant. [1062, 1063]
Cryptosporidiosis (see Gastroenteritis)			
Cysticercosis	Standard		Not transmitted from person to person.

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Cytomegalovirus infection, including in neonates and immunosuppressed patients	Standard		No additional precautions for pregnant HCWs.
Decubitus ulcer (see Pressure Ulcer)			
Dengue fever	Standard		Not transmitted from person to person.
Diarrhea, acute-infective etiology suspected (see Gastroenteritis)			
Diphtheria Cutaneous	Contact + Standard	Until off antimicrobial treatment and culture-negative	Until 2 cultures taken 24 hours apart negative.
Diphtheria Pharyngeal	Droplet + Standard	Until off antimicrobial treatment and culture-negative	Until 2 cultures taken 24 hours apart negative.
Ebola virus (see Viral Hemorrhagic Fevers)			**Ebola Virus Disease for Healthcare Workers [2014]:** Updated recommendations for healthcare workers can be found at [Ebola: for Clinicians](https://www.cdc.gov/vhf/ebola/clinicians/index.html) (https://www.cdc.gov/vhf/ebola/clinicians/index.html accessed September 2018).
Echinococcosis (hydatidosis)	Standard		Not transmitted from person to person.
Echovirus (see Enteroviral Infection)			
Encephalitis or encephalomyelitis (see specific etiologic agents)			
Endometritis (endomyometritis)	Standard		
Enterobiasis (pinworm disease, oxyuriasis)	Standard		
Enterococcus species (see Multidrug-Resistant Organisms if epidemiologically significant or vancomycin-resistant)			
Enterocolitis, *C. difficile* (see Gastroenteritis, *C. difficile*)			
Enteroviral infections (i.e., Group A and B Coxsackie viruses and Echo viruses) (excludes polio virus)	Standard		Use Contact Precautions for diapered or incontinent children for duration of illness and to control institutional outbreaks.
Epiglottitis, due to *Haemophilus influenzae* type b	Droplet + Standard	Until 24 hours after initiation of effective therapy	See specific disease agents for epiglottitis due to other etiologies.
Epstein-Barr virus infection, including infectious mononucleosis	Standard		
Erythema infectiosum (also see Parvovirus B19)			

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Escherichia coli gastroenteritis (see gastroenteritis)			
Food poisoning Botulism	Standard		Not transmitted from person to person.
Food poisoning *C. perfringens* or *welchii*	Standard		Not transmitted from person to person.
Food poisoning Staphylococcal	Standard		Not transmitted from person to person.
Furunculosis, staphylococcal	Standard		Contact if drainage not controlled. Follow institutional policies if MRSA.
Furunculosis, staphylococcal Infants and young children	Contact + Standard	Duration of illness (with wound lesions, until wounds stop draining)	
Gangrene (gas gangrene)	Standard		Not transmitted from person to person.
Gastroenteritis	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks for gastroenteritis caused by all of the agents below.
Gastroenteritis Adenovirus	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
Gastroenteritis *Campylobacter* species	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
Gastroenteritis Cholera (*Vibrio cholerae*)	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
Gastroenteritis *C. difficile*	Contact + Standard	Duration of illness	Discontinue antibiotics if appropriate. Do not share electronic thermometers; [853, 854] ensure consistent environmental cleaning and disinfection. Hypochlorite solutions may be required for cleaning if transmission continues [847]. Handwashing with soap and water preferred because of the absence of sporicidal activity of alcohol in waterless antiseptic handrubs [983].
Gastroenteritis *Cryptosporidium* species	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
Gastroenteritis *E. coli* Enteropathogenic O157:H7 and other Shiga toxin-producing strains	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
Gastroenteritis *E. coli* Other species	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.

Gastroenteritis *Giardia lamblia*	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Gastroenteritis Noroviruses	**Update** Contact + Standard		Use Contact Precautions for a minimum of 48 hours after the resolution of symptoms or to control institutional outbreaks. Persons who clean areas heavily contaminated with feces or vomitus may benefit from wearing masks since virus can be aerosolized from these body substances [142, 147 148]; ensure consistent environmental cleaning and disinfection with focus on restrooms even when apparently unsoiled [273, 1064]. Hypochlorite solutions may be required when there is continued transmission [290-292]. Alcohol is less active, but there is no evidence that alcohol antiseptic handrubs are not effective for hand decontamination [294]. Cohorting of affected patients to separate airspaces and toilet facilities may help interrupt transmission during outbreaks. **Gastroenteritis, Noroviruses Precaution Update [May 2019]:** The Type of Precaution was updated from "Standard" to "Contact + Standard" to align with Guideline for the Prevention and Control of Norovirus Gastroenteritis Outbreaks in Healthcare Settings (2011)
Gastroenteritis Rotavirus	Contact + Standard	Duration of illness	Ensure consistent environmental cleaning and disinfection and frequent removal of soiled diapers. Prolonged shedding may occur in both immunocompetent and immunocompromised children and the elderly [932, 933].
Gastroenteritis *Salmonella* species (including *S. typhi*)	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
Gastroenteritis *Shigella* species (Bacillary dysentery)	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
Gastroenteritis *Vibrio parahaemolyticus*	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
Gastroenteritis Viral (if not covered elsewhere)	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
Gastroenteritis *Yersinia enterocolitica*	Standard		Use Contact Precautions for diapered or incontinent persons for the duration of illness or to control institutional outbreaks.
German measles (see Rubella; see Congenital Rubella)			
Giardiasis (see Gastroenteritis)			
Gonococcal ophthalmia neonatorum (gonorrheal ophthalmia, acute conjunctivitis of newborn)	Standard		
Gonorrhea	Standard		
Granuloma inguinale (Donovanosis, granuloma venereum)	Standard		

Guillain-Barré syndrome	Standard		Not an infectious condition.
Haemophilus influenzae (see disease-specific recommendations)			

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Hand, foot, and mouth disease (see Enteroviral Infection)			
Hansen's Disease (see Leprosy)			
Hantavirus pulmonary syndrome	Standard		Not transmitted from person to person.
Helicobacter pylori	Standard		
Hepatitis, viral Type A	Standard		Provide hepatitis A vaccine postexposure as recommended. [1065]
Hepatitis, viral Type A- Diapered or incontinent patients	Contact + Standard		Maintain Contact Precautions in infants and children <3 years of age for duration of hospitalization; for children 3-14 yrs. of age for 2 weeks after onset of symptoms; >14 yrs. of age for 1 week after onset of symptoms [833, 1066, 1067].
Hepatitis, viral Type B- HBsAg positive; acute or chronic	Standard		See specific recommendations for care of patients in hemodialysis centers. [778]
Hepatitis, viral Type C and other unspecified non-A, non-B	Standard		See specific recommendations for care of patients in hemodialysis centers. [778]
Hepatitis, viral Type D (seen only with hepatitis B)	Standard		
Hepatitis, viral Type E	Standard		Use Contact Precautions for diapered or incontinent individuals for the duration of illness. [1068]
Hepatitis, viral Type G	Standard		
Herpangina (see Enteroviral Infection)			
Hookworm	Standard		
Herpes simplex (*Herpesvirus hominis*) Encephalitis	Standard		
Herpes simplex (*Herpesvirus hominis*) Mucocutaneous, disseminated or primary, severe	Contact + Standard	Until lesions dry and crusted	
Herpes simplex (*Herpesvirus hominis*) Mucocutaneous, recurrent (skin, oral, genital)	Standard		

Herpes simplex (*Herpesvirus hominis*) Neonatal	Contact + Standard	Until lesions dry and crusted	Also, for asymptomatic, exposed infants delivered vaginally or by C-section and if mother has active infection and membranes have been ruptured for more than 4 to 6 hours until infant surface cultures obtained at 24-36 hours of age negative after 48 hours incubation. [1069, 1070]

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Herpes zoster (varicella-zoster) (shingles) Disseminated disease in any patient Localized disease in immunocompromised patient until disseminated infection ruled out	Airborne + Contact + Standard	Duration of illness	Susceptible HCWs should not enter room if immune caregivers are available; no recommendation for protection of immune HCWs; no recommendation for type of protection (i.e. surgical mask or respirator) for susceptible HCWs.
Herpes zoster (varicella-zoster) (shingles) Localized in patient with intact immune system with lesions that can be contained/covered	Standard	Until lesions dry and crusted	Susceptible HCWs should not provide direct patient care when other immune caregivers are available.
Histoplasmosis	Standard		Not transmitted from person to person.
Human immunodeficiency virus (HIV)	Standard		Postexposure chemoprophylaxis for some blood exposures [866].
Human metapneumovirus	Contact + Standard	Duration of illness	HAI reported [1071], but route of transmission not established [823]. Assumed to be Contact transmission as for RSV since the viruses are closely related and have similar clinical manifestations and epidemiology. Wear masks according to Standard Precautions.
Impetigo	Contact + Standard	Until 24 hours after initiation of effective therapy	
Infectious mononucleosis	Standard		
Influenza Human (seasonal influenza)			See Prevention Strategies for Seasonal Influenza in Healthcare Settings (https://www.cdc.gov/flu/professionals/infectioncontrol/healthcaresettings.htm accessed September 2018). [Current version of this document may differ from original.] for current seasonal influenza guidance.
Influenza Avian (e.g., H5N1, H7, H9 strains)			See [This link is no longer active: www.cdc.gov/flu/avian/professional/infect-control.htm. Similar information may be found at Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation for Infection with Novel Influenza A Viruses Associated with Severe Disease (https://www.cdc.gov/flu/avianflu/novel-flu-infectioncontrol.htm accessed September 2018)] for current avian influenza guidance.

Influenza Pandemic Influenza (also a human influenza virus)	Droplet + Standard		See [This link is no longer active: http://www.pandemicflu.gov. Similar information may be found at Interim Guidance for Infection Control Within Healthcare Settings When Caring for Confirmed Cases, Probable Cases, and Cases Under Investigation for Infection with Novel Influenza A Viruses Associated with Severe Disease (https://www.cdc.gov/flu/avianflu/novel-flu-infectioncontrol.htm accessed September 2018)] for current pandemic influenza guidance.
Kawasaki syndrome	Standard		Not an infectious condition.
Lassa fever (see Viral Hemorrhagic Fevers)			

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Legionnaires' disease	Standard		Not transmitted from person to person.
Leprosy	Standard		
Leptospirosis	Standard		Not transmitted from person to person.
Lice Head (pediculosis)	Contact + Standard	Until 24 hours after initiation of effective therapy	See [This link is no longer active: https://www.cdc.gov/ncidod/dpd/parasites/lice/default.htm. Similar information may be found at CDC's Parasites – Lice (https://www.cdc.gov/parasites/lice/index.html accessed September 2018).]
Lice Body	Standard		Transmitted person-to-person through infested clothing. Wear gown and gloves when removing clothing; bag and wash clothes according to CDC guidance Parasites – Lice (https://www.cdc.gov/parasites/lice/index.html accessed September 2018).
Lice Pubic	Standard		Transmitted person-to-person through sexual contact. See CDC's Parasites – Lice (https://www.cdc.gov/parasites/lice/index.html accessed September 2018).
Listeriosis (*Listeria monocytogenes*)	Standard		Person-to-person transmission rare; cross-transmission in neonatal settings reported. [1072-1075]
Lyme disease	Standard		Not transmitted from person to person.
Lymphocytic choriomeningitis	Standard		Not transmitted from person to person.
Lymphogranuloma venereum	Standard		
Malaria	Standard		Not transmitted from person to person, except through transfusion rarely and through a failure to follow Standard Precautions during patient care. [1076-1079] Install screens in windows and doors in endemic areas. Use DEET-containing mosquito repellants and clothing to cover extremities.
Marburg virus disease (see Viral Hemorrhagic Fevers)			

Measles (rubeola)	Airborne + Standard	4 days after onset of rash; duration of illness in immune compromised	**Interim Measles Infection Control [July 2019]** See Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings (https://www.cdc.gov/infectioncontrol/guidelines/measles) Susceptible healthcare personnel (HCP) should not enter room if immune care providers are available; regardless of presumptive evidence of immunity, HCP should use respiratory protection that is at least as protective as a fittested, NIOSH-certified N95 respirator upon entry into the patient's room or care area. For exposed susceptibles, postexposure vaccine within 72 hours or immune globulin within 6 days when available [17, 1032, 1034]. Place exposed susceptible patients on Airborne Precautions and exclude susceptible healthcare personnel.
Melioidosis, all forms	Standard		Not transmitted from person to person.
Meningitis Aseptic (nonbacterial or viral; also see enteroviral infections)	Standard		Contact for infants and young children.

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Meningitis Bacterial, gram-negative enteric, in neonates	Standard		
Meningitis Fungal	Standard		
Meningitis *Haemophilus influenzae,* type b known or suspected	Droplet + Standard	Until 24 hours after initiation of effective therapy	
Meningitis *Listeria monocytogenes* (See Listeriosis)	Standard		
Meningitis *Neisseria meningitidis* (meningococcal) known or suspected	Droplet + Standard	Until 24 hours after initiation of effective therapy	See Meningococcal Disease below.
Meningitis *Streptococcus pneumoniae*	Standard		
Meningitis *M. tuberculosis*	Standard		Concurrent, active pulmonary disease or draining cutaneous lesions may necessitate addition of Contact and/or Airborne. For children, Airborne Precautions until active tuberculosis ruled out in visiting family members (see Tuberculosis below). [42]
Meningitis Other diagnosed bacterial	Standard		

Meningococcal disease: sepsis, pneumonia, Meningitis	Droplet + Standard	Until 24 hours after initiation of effective therapy	Postexposure chemoprophylaxis for household contacts, HCWs exposed to respiratory secretions; postexposure vaccine only to control outbreaks. [15, 17]
Molluscum contagiosum	Standard		
Monkeypox	Airborne + Contact + Standard	Airborne - Until monkeypox confirmed and smallpox excluded Contact - Until lesions crusted	See CDC's Monkeypox website (https://www.cdc.gov/poxvirus/monkeypox/ accessed September 2018). [Current version of this document may differ from original.] for most current recommendations. Transmission in hospital settings unlikely [269]. Pre- and postexposure smallpox vaccine recommended for exposed HCWs.
Mucormycosis	Standard		
Multidrug-resistant organisms (MDROs), infection or colonization (e.g., MRSA, VRE, VISA/VRSA, ESBLs, resistant *S. pneumoniae*)	Contact + Standard		MDROs judged by the infection control program, based on local, state, regional, or national recommendations, to be of clinical and epidemiologic significance. Contact Precautions recommended in settings with evidence of ongoing transmission, acute care settings with increased risk for transmission or wounds that cannot be contained by dressings. See recommendations for management options in Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006 [870]. Contact state health department for guidance regarding new or emerging MDRO.

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Mumps (infectious parotitis)	Droplet + Standard	Until 5 days after the onset of swelling	**Mumps Update [October 2017]:** The Healthcare Infection Control Practices Advisory Committee (HICPAC) voted to change the recommendation of isolation for persons with mumps from 9 days to 5 days based on a 2008 MMWR report**:** Updated Recommendations for Isolation of Persons with Mumps. (https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5740a3.htm accessed September 2018). After onset of swelling; susceptible HCWs should not provide care if immune caregivers are available. The below note has been superseded by the above recommendation update Note: (Recent assessment of outbreaks in healthy 18-24 year olds has indicated that salivary viral shedding occurred early in the course of illness and that 5 days of isolation after onset of parotitis may be appropriate in community settings; however the implications for healthcare personnel and highrisk patient populations remain to be clarified.)
Mycobacteria, nontuberculosis (atypical)			Not transmitted person-to-person.
Mycobacteria, nontuberculosis (atypical) Pulmonary	Standard		
Mycobacteria, nontuberculosis (atypical) Wound	Standard		

Mycoplasma pneumonia	Droplet + Standard	Duration of Illness	
Necrotizing enterocolitis	Standard		Contact Precautions when cases clustered temporally [10801083].
Nocardiosis, draining lesions, or other presentations	Standard		Not transmitted person-to-person.
Norovirus (see Gastroenteritis)			
Norwalk agent Gastroenteritis (see Gastroenteritis)			
Orf	Standard		
Parainfluenza virus infection, respiratory in infants and young children	Contact + Standard	Duration of illness	Viral shedding may be prolonged in immunosuppressed patients [1009, 1010]. Reliability of antigen testing to determine when to remove patients with prolonged hospitalizations from Contact Precautions uncertain.
Parvovirus B19 (Erythema infectiosum)	Droplet + Standard		Maintain precautions for duration of hospitalization when chronic disease occurs in an immunocompromised patient. For patients with transient aplastic crisis or red-cell crisis, maintain precautions for 7 days. Duration of precautions for immunosuppressed patients with persistently positive PCR not defined, but transmission has occurred [929].
Pediculosis (lice)	Contact + Standard	Until 24 hours after initiation of effective therapy after treatment	

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Pertussis (whooping cough)	Droplet + Standard	Until 5 days after initiation of effective antibiotic therapy	Single patient room preferred. Cohorting an option. Postexposure chemoprophylaxis for household contacts and HCWs with prolonged exposure to respiratory secretions [863]. Recommendations for Tdap vaccine in adults under development. **Tdap Vaccine Recommendations Update [2018]:** Current recommendations can be found at Tdap / Td ACIP Vaccine Recommendations (https://www.cdc.gov/vaccines/hcp/acip-recs/vaccspecific/dtap.html accessed September 2018).
Pinworm infection (Enterobiasis)	Standard		
Plague (*Yersinia pestis)* Bubonic	Standard		
Plague (*Yersinia pestis)* Pneumonic	Droplet + Standard	Until 48 hours after initiation of effective antibiotic therapy	Antimicrobial prophylaxis for exposed HCW [207].
Pneumonia Adenovirus	Droplet + Contact + Standard	Duration of illness	Outbreaks in pediatric and institutional settings reported [376, 1084 -1086]. In immunocompromised hosts, extend duration of Droplet and Contact Precautions due to prolonged shedding of virus. [931]

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Pneumonia Bacterial not listed elsewhere (including gramnegative bacterial)	Standard		
Pneumonia *B. cepacia* in patients with CF, including respiratory tract colonization	Contact + Standard	Unknown	Avoid exposure to other persons with CF; private room preferred. Criteria for D/C precautions not established. See CF Foundation guideline. [20]
Pneumonia *B. cepacia* in patients without CF (see MultidrugResistant Organisms)			
Pneumonia *Chlamydia*	Standard		
Pneumonia Fungal	Standard		
Pneumonia *Haemophilus influenzae,* type b Adults	Standard		
Pneumonia *Haemophilus influenzae,* type b Infants and children	Droplet + Standard	Until 24 hours after initiation of effective therapy	
Pneumonia *Legionella spp.*	Standard		
Pneumonia Meningococcal	Droplet + Standard	Until 24 hours after initiation of effective therapy	See Meningococcal Disease above.
Pneumonia Multidrug-resistant bacterial (see Multidrug-Resistant Organisms)			
Pneumonia *Mycoplasma* (primary atypical Pneumonia)	Droplet + Standard	Duration of illness	
Pneumonia Pneumococcal pneumonia	Standard		Use Droplet Precautions if evidence of transmission within a patient care unit or facility. [196-198, 1087]
Pneumonia *Pneumocystis jiroveci* (*Pneumocystis carinii*)	Standard		Avoid placement in the same room with an immunocompromised patient.
Pneumonia *Staphylococcus aureus*	Standard		For MRSA, see MDROs.
Pneumonia *Streptococcus*, group A Adults	Droplet + Standard	Until 24 hours after initiation of effective therapy	See Streptococcal Disease (group A *Streptococcus*) below Contact Precautions if skin lesions present.

Pneumonia *Streptococcus*, group A Infants and young children	Droplet + Standard	Until 24 hours after initiation of effective therapy	Contact Precautions if skin lesions present.
Pneumonia Varicella-Zoster (See Varicella-Zoster)			
Pneumonia Viral Adults	Standard		
Pneumonia Viral Infants and young children (see Respiratory Infectious Disease, acute, or specific viral agent)			
Poliomyelitis	Contact + Standard	Duration of illness	
Pressure ulcer (decubitus ulcer, pressure sore) infected Major	Contact + Standard	Duration of illness	Until drainage stops or can be contained by dressing.
Pressure ulcer (decubitus ulcer, pressure sore) infected Minor or limited	Standard		If dressing covers and contains drainage.
Prion disease (See CreutzfeldJacob Disease)			
Psittacosis (ornithosis) (*Chlamydia psittaci*)	Standard		Not transmitted from person to person.
Q fever	Standard		
Rabies	Standard		Person to person transmission rare; transmission via corneal, tissue and organ transplants has been reported [539, 1088]. If patient has bitten another individual or saliva has contaminated an open wound or mucous membrane, wash exposed area thoroughly and administer postexposure prophylaxis. [1089]

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Rat-bite fever (*Streptobacillus moniliformis* disease, *Spirillum minus* disease)	Standard		Not transmitted from person to person.
Relapsing fever	Standard		Not transmitted from person to person.
Resistant bacterial infection or colonization (see MultidrugResistant Organisms)			
Respiratory infectious disease, acute (if not covered elsewhere) Adults	Standard		
Respiratory infectious disease, acute (if not covered elsewhere) Infants and young children	Contact + Standard	Duration of illness	Also see syndromes or conditions listed in Table 2.

Respiratory syncytial virus infection, in infants, young children and immunocompromised adults	Contact + Standard	Duration of illness	Wear mask according to Standard Precautions [24] CB [116, 117]. In immunocompromised patients, extend the duration of Contact Precautions due to prolonged shedding [928]. Reliability of antigen testing to determine when to remove patients with prolonged hospitalizations from Contact Precautions uncertain.
Reye's syndrome	Standard		Not an infectious condition.
Rheumatic fever	Standard		Not an infectious condition.
Rhinovirus	Droplet + Standard	Duration of illness	Droplet most important route of transmission [104 1090]. Outbreaks have occurred in NICUs and LTCFs [413, 1091, 1092]. Add Contact Precautions if copious moist secretions and close contact likely to occur (e.g., young infants) [111, 833].
Rickettsial fevers, tickborne (Rocky Mountain spotted fever, tickborne Typhus fever)	Standard		Not transmitted from person to person except through transfusion, rarely.
Rickettsialpox (vesicular rickettsiosis)	Standard		Not transmitted from person to person.
Ringworm (dermatophytosis, dermatomycosis, tinea)	Standard		Rarely, outbreaks have occurred in healthcare settings, (e.g., NICU [1093], rehabilitation hospital [1094]. Use Contact Precautions for outbreak.
Rocky Mountain spotted fever	Standard		Not transmitted from person to person except through transfusion, rarely.
Roseola infantum (exanthem subitum; caused by HHV-6)	Standard		
Rotavirus infection (see Gastroenteritis)			
Rubella (German measles) (also see Congenital Rubella)	Droplet + Standard	Until 7 days after onset of rash	Susceptible HCWs should not enter room if immune caregivers are available. No recommendation for wearing face protection (e.g., a surgical mask) if immune. Pregnant women who are not immune should not care for these patients [17, 33]. Administer vaccine within 3 days of exposure to non-pregnant susceptible individuals. Place exposed susceptible patients on Droplet Precautions; exclude susceptible healthcare personnel from duty from day 5 after first exposure to day 21 after last exposure, regardless of postexposure vaccine.
Rubeola (see Measles)			

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Salmonellosis (see Gastroenteritis)			
Scabies	Contact + Standard	Until 24	
Scalded skin syndrome, staphylococcal	Contact + Standard	Duration of illness	See Staphylococcal Disease, scalded skin syndrome below.
Schistosomiasis (bilharziasis)	Standard		

Severe acute respiratory syndrome (SARS)	Airborne + Droplet + Contact + Standard	Duration of illness plus 10 days after resolution of fever, provided respiratory symptoms are absent or improving	Airborne preferred; Droplet if AIIR unavailable. N95 or higher respiratory protection; surgical mask if N95 unavailable; eye protection (goggles, face shield); aerosol-generating procedures and "supershedders" highest risk for transmission via small droplet nuclei and large droplets [93, 94, 96]. Vigilant environmental disinfection (see [This link is no longer active: www.cdc.gov/ncidod/sars]. Similar information may be found at CDC Severe Acute Respiratory Syndrome (SARS) (https://www.cdc.gov/sars/index.html accessed September 2018).)
Shigellosis (see Gastroenteritis)			
Smallpox (variola; see Vaccinia for management of vaccinated persons)	Airborne + Contact + Standard	Duration of illness	Until all scabs have crusted and separated (3-4 weeks). Nonvaccinated HCWs should not provide care when immune HCWs are available; N95 or higher respiratory protection for susceptible and successfully vaccinated individuals; postexposure vaccine within 4 days of exposure protective [108, 129, 1038-1040].
Sporotrichosis	Standard		
Spirillum minor disease (rat-bite fever)	Standard		Not transmitted from person to person.
Staphylococcal disease (*S. aureus*) Skin, wound, or burn Major	Contact + Standard	Duration of illness	Until drainage stops or can be contained by dressing.
Staphylococcal disease (*S. aureus*) Skin, wound, or burn Minor or limited	Standard		If dressing covers and contains drainage adequately.
Staphylococcal disease (*S. aureus*) Enterocolitis	Standard		Use Contact Precautions for diapered or incontinent children for duration of illness.
Staphylococcal disease (*S. aureus*) Multidrug-resistant (see Multidrug-Resistant Organisms)			
Staphylococcal disease (*S. aureus*) Pneumonia	Standard		
Staphylococcal disease (*S. aureus*) Scalded skin syndrome	Contact + Standard	Duration of illness	Consider healthcare personnel as potential source of nursery, NICU outbreak [1095].
Staphylococcal disease (*S. aureus*) Toxic shock syndrome	Standard		

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Streptobacillus moniliformis disease (rat-bite fever)	Standard		Not transmitted from person to person.
Streptococcal disease (group A *Streptococcus*) Skin, wound, or burn Major	Contact + Droplet + Standard	Until 24 hours after initiation of effective therapy	Until drainage stops or can be contained by dressing.

Streptococcal disease (group A *Streptococcus*) Skin, wound, or burn Minor or limited	Standard		If dressing covers and contains drainage.
Streptococcal disease (group A *Streptococcus*) Endometritis (puerperal sepsis)	Standard		
Streptococcal disease (group A *Streptococcus*) Pharyngitis in infants and young children	Droplet + Standard	Until 24 hours after initiation of effective therapy	
Streptococcal disease (group A *Streptococcus*) Pneumonia	Droplet + Standard	Until 24 hours after initiation of effective therapy	
Streptococcal disease (group A *Streptococcus*) Scarlet fever in infants and young children	Droplet + Standard	Until 24 hours after initiation of effective therapy	
Streptococcal disease (group A *Streptococcus*) Serious invasive disease	Droplet + Standard	Until 24 hours after initiation of effective therapy	Outbreaks of serious invasive disease have occurred secondary to transmission among patients and healthcare personnel [162, 972, 1096-1098]. Contact Precautions for draining wound as above; follow recommendations for antimicrobial prophylaxis in selected conditions [160].
Streptococcal disease (group B *Streptococcus*), neonatal	Standard		
Streptococcal disease (not group A or B) unless covered elsewhere Multidrug-resistant (see Multidrug-Resistant Organisms)			
Strongyloidiasis	Standard		
Syphilis Latent (tertiary) and seropositivity without lesions	Standard		
Syphilis Skin and mucous membrane, including congenital, primary, Secondary	Standard		
Tapeworm disease *Hymenolepis nana*	Standard		Not transmitted from person to person.
Tapeworm disease *Taenia solium* (pork)	Standard		
Infection/Condition	**Type of Precaution**	**Duration of Precaution**	**Precautions/Comments**

Tapeworm disease Other	Standard		
Tetanus	Standard		Not transmitted from person to person.
Tinea (e.g., dermatophytosis, dermatomycosis, ringworm)	Standard		Rare episodes of person-to-person transmission.
Toxoplasmosis	Standard		Transmission from person to person is rare; vertical transmission from mother to child, transmission through organs and blood transfusion rare.
Toxic shock syndrome (staphylococcal disease, streptococcal disease)	Standard		Droplet Precautions for the first 24 hours after implementation of antibiotic therapy if Group A *Streptococcus* is a likely etiology.
Trachoma, acute	Standard		
Transmissible spongiform encephalopathy (see Creutzfeld-Jacob disease, CJD, vCJD)			
Trench mouth (Vincent's angina)	Standard		
Trichinosis	Standard		
Trichomoniasis	Standard		
Trichuriasis (whipworm disease)	Standard		
Tuberculosis (*M. tuberculosis*) Extrapulmonary, draining lesion	Airborne + Contact + Standard		Discontinue precautions only when patient is improving clinically, and drainage has ceased or there are 3 consecutive negative cultures of continued drainage [1025, 1026]. Examine for evidence of active pulmonary tuberculosis.
Tuberculosis (*M. tuberculosis*) Extrapulmonary, no draining lesion, Meningitis	Standard		Examine for evidence of pulmonary tuberculosis. For infants and children, use Airborne until active pulmonary tuberculosis in visiting family members ruled out. [42]
Tuberculosis (*M. tuberculosis*) Pulmonary or laryngeal disease, confirmed	Airborne + Standard		Discontinue precautions only when patient on effective therapy is improving clinically and has 3 consecutive sputum smears negative for acid-fast bacilli collected on separate days (MMWR 2005; 54: RR-17 Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings, 2005 (https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5417a1.htm accessed September 2018) [12].
Tuberculosis (*M. tuberculosis*) Pulmonary or laryngeal disease, suspected	Airborne + Standard		Discontinue precautions only when the likelihood of infectious TB disease is deemed negligible, and either 1. there is another diagnosis that explains the clinical syndrome, or 2. the results of 3 sputum smears for AFB are negative. Each of the 3 sputum specimens should be collected 8-24 hours apart, and at least 1 should be an early morning specimen.
Tuberculosis (*M. tuberculosis*) Skin-test positive with no evidence of current active disease	Standard		

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Tularemia Draining lesion	Standard		Not transmitted from person to person.
Tularemia Pulmonary	Standard		Not transmitted from person to person.
Typhoid (*Salmonella typhi*) fever (see Gastroenteritis)			
Typhus Rickettsia prowazekii (Epidemic or Louse-borne Typhus)	Standard		Transmitted from person to person through close personal or clothing contact.
Typhus *Rickettsia typhi*	Standard		Not transmitted from person to person.
Urinary tract infection (including pyelonephritis), with or without urinary catheter	Standard		
Vaccinia			Only vaccinated HCWs have contact with active vaccination sites and care for persons with adverse vaccinia events; if unvaccinated, only HCWs without contraindications to vaccine may provide care.
Vaccinia Vaccination site care (including autoinoculated areas)	Standard		Vaccination recommended for vaccinators; for newly vaccinated HCWs: semi-permeable dressing over gauze until scab separates, with dressing change as fluid accumulates, ~3-5 days; gloves, hand hygiene for dressing change; vaccinated HCW or HCW without contraindication to vaccine for dressing changes. [205, 221, 225].
Vaccinia (adverse events following vaccination) Eczema vaccinatum	Contact + Standard	Until lesions dry and crusted, scabs separated	For contact with virus-containing lesions and exudative material.
Vaccinia (adverse events following vaccination) Fetal vaccinia	Contact + Standard	Until lesions dry and crusted, scabs separated	For contact with virus-containing lesions and exudative material.
Vaccinia (adverse events following vaccination) Generalized vaccinia	Contact + Standard	Until lesions dry and crusted, scabs separated	For contact with virus-containing lesions and exudative material.
Vaccinia (adverse events following vaccination) Progressive vaccinia	Contact + Standard	Until lesions dry and crusted, scabs separated	For contact with virus-containing lesions and exudative material.
Vaccinia (adverse events following vaccination) Postvaccinia encephalitis	Standard		
Vaccinia (adverse events following vaccination) Blepharitis or conjunctivitis	Contact + Standard		Use Contact Precautions if there is copious drainage.
Vaccinia (adverse events following vaccination) Iritis or keratitis	Standard		

Vaccinia (adverse events following vaccination) Vaccinia-associated erythema multiforme (Stevens Johnson Syndrome)	Standard		Not an infectious condition.

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Vaccinia (adverse events following vaccination) Secondary bacterial infection (e.g., *S. aureus*, group A beta hemolytic *Streptococcus*)	Standard + Contact		Follow organism-specific (strep, staph most frequent) recommendations and consider magnitude of drainage.
Varicella Zoster	Airborne + Contact + Standard	Until lesions dry and crusted	Susceptible HCWs should not enter room if immune caregivers are available; no recommendation for face protection of immune HCWs; no recommendation for type of protection (i.e., surgical mask or respirator) for susceptible HCWs. In immunocompromised host with varicella pneumonia, prolong duration of precautions for duration of illness. **Varicella Post-exposure Prophylaxis Update [May 2019]** Postexposure prophylaxis: provide postexposure vaccine ASAP but within 120 hours; for susceptible exposed persons for whom vaccine is contraindicated (immunocompromised persons, pregnant women, newborns whose mother's varicella onset is <5 days before delivery or within 48 hours after delivery) provide varicella zoster immune globulin as soon as possible after exposure and within 10 days. Use Airborne for exposed susceptible persons and exclude exposed susceptible healthcare workers beginning 8 days after first exposure until 21 days after last exposure or 28 if received varicella zoster immune globulin, regardless of postexposure vaccination. [1036]
Variola (see smallpox)			
Vibrio parahaemolyticus (see Gastroenteritis)			
Vincent's angina (trench mouth)	Standard		
Infection/Condition	**Type of Precaution**	**Duration of Precaution**	**Precautions/Comments**

Viral hemorrhagic fevers due to Lassa, Ebola, Marburg, Crimean-Congo fever viruses	Droplet + Contact + Standard	Duration of illness	⚠ **Ebola Virus Disease for Healthcare Workers [2014]:** Updated recommendations for healthcare workers can be found at Ebola: for Clinicians (https://www.cdc.gov/vhf/ebola/clinicians/index.html accessed September 2018). Single-patient room preferred. Emphasize: 1. use of sharps safety devices and safe work practices, 2. hand hygiene; 3. barrier protection against blood and body fluids upon entry into room (single gloves and fluid-resistant or impermeable gown, face/eye protection with masks, goggles or face shields); and 4. appropriate waste handling. Use N95 or higher respirators when performing aerosolgenerating procedures. Largest viral load in final stages of illness when hemorrhage may occur; additional PPE, including double gloves, leg and shoe coverings may be used, especially in resource-limited settings where options for cleaning and laundry are limited. Notify public health officials immediately if Ebola is suspected [212, 314, 740, 772]. Also see Table 3C for Ebola as a bioterrorism agent.
Viral respiratory diseases (not covered elsewhere) Adults	Standard		
Viral respiratory diseases (not covered elsewhere) Infants and young children (see Respiratory infectious disease, acute)			
Whooping cough (see Pertussis)			
Wound infections Major	Contact + Standard	Duration of illness	Until drainage stops or can be contained by dressing.
Wound infections Minor or limited	Standard		If dressing covers and contains drainage
Yersinia enterocolitica Gastroenteritis (see Gastroenteritis)			
Zoster (varicella-zoster) (see Herpes Zoster)			
Zygomycosis (phycomycosis, mucormycosis)	Standard		Not transmitted person-to-person.

*Table 1. History of Guidelines for Isolation Precautions in Hospitals**

Year (Ref)	Document Issued	Comment

1970 [1099]	Isolation Techniques for Use in Hospitals, 1st ed.	• Introduced seven isolation precaution categories with color-coded cards: Strict, Respiratory, Protective, Enteric, Wound and Skin, Discharge, and Blood • No user decision-making required • Simplicity a strength; over isolation prescribed for some infections
1975 [1100]	Isolation Techniques for Use in Hospitals, 2nd ed.	• Same conceptual framework as 1st edition
1983 [1101]	CDC Guideline for Isolation Precautions in Hospitals	• Provided two systems for isolation: category-specific and disease-specific • Protective Isolation eliminated; Blood Precautions expanded to include Body Fluids • Categories included Strict, Contact, Respiratory, AFB, Enteric, Drainage/Secretion, Blood and Body Fluids • Emphasized decision-making by users
1985-88 [780, 896]	Universal Precautions	• Developed in response to HIV/AIDS epidemic • Dictated application of Blood and Body Fluid precautions to all patients, regardless of infection status • Did not apply to feces, nasal secretions, sputum, sweat, tears, urine, or vomitus unless contaminated by visible blood • Added personal protective equipment to protect HCWs from mucous membrane exposures • Handwashing recommended immediately after glove removal • Added specific recommendations for handling needles and other sharp devices; concept became integral to OSHA's 1991 rule on occupational exposure to blood-borne pathogens in healthcare settings
1987 [1102]	Body Substance Isolation	• Emphasized avoiding contact with all moist and potentially infectious body substances except sweat even if blood not present • Shared some features with Universal Precautions • Weak on infections transmitted by large droplets or by contact with dry surfaces • Did not emphasize need for special ventilation to contain airborne infections • Handwashing after glove removal not specified in the absence of visible soiling
1996 [1]	Guideline for Isolation Precautions in Hospitals	• Prepared by the Healthcare Infection Control Practices Advisory Committee (HICPAC) • Melded major features of Universal Precautions and Body Substance Isolation into Standard Precautions to be used with all patients at all times • Included three transmission-based precaution categories: airborne, droplet, and contact • Listed clinical syndromes that should dictate use of empiric isolation until an etiological diagnosis is established

* Derived from Garner ICHE 1996

Table 2. Clinical Syndromes or Conditions Warranting Empiric TransmissionBased Precautions in Addition to Standard Precautions.

Disease	Clinical Syndrome or Condition†	Potential Pathogens‡	Empiric Precautions (Always Includes Standard Precautions)
Diarrhea	Acute diarrhea with a likely infectious cause in an incontinent or diapered patient	Enteric pathogens§	Contact Precautions (pediatrics and adult)
Meningitis	Meningitis	Neisseria meningitidis	Droplet Precautions for first 24 hours of antimicrobial therapy; mask and face protection for intubation
Meningitis	Meningitis	Enteroviruses	Contact Precautions for infants and children
Meningitis	Meningitis	M. tuberculosis	Airborne Precautions if pulmonary infiltrate Airborne Precautions plus Contact Precautions if potentially infectious draining body fluid present
Rash or Exanthems, Generalized, Etiology Unknown	Petechial/ecchymotic with fever (general)	Neisseria meningitides	Droplet Precautions for first 24 hours of antimicrobial therapy
Rash or Exanthems, Generalized, Etiology Unknown	Petechial/ecchymotic with fever (general) If positive history of travel to an area with an ongoing outbreak of VHF in the 10 days before onset of fever	Ebola, Lassa, Marburg viruses	Droplet Precautions plus Contact Precautions, with face/eye protection, emphasizing safety sharps and barrier precautions when blood exposure likely. Use N95 or higher respiratory protection when aerosolgenerating procedure performed. ⚠ **Ebola Virus Disease Update [2014]:** Updated recommendations for healthcare workers can be found at Ebola: for Clinicians (https://www.cdc.gov/vhf/ebola/clinicians/index.html accessed September 2018).
Rash or Exanthems, Generalized, Etiology Unknown	Vesicular	Varicella-zoster, *herpes simplex,* variola (smallpox), vaccinia viruses	Airborne plus Contact Precautions; Contact Precautions only if Herpes simplex, localized zoster in an immunocompetent host or vaccinia viruses most likely
Rash or Exanthems, Generalized, Etiology Unknown	Maculopapular with cough, coryza and fever	Rubeola (measles) virus	Airborne Precautions
Respiratory Infections	Cough/fever/upper lobe pulmonary infiltrate in an HIV-negative patient or a patient at low risk for human immunodeficiency virus (HIV) infection	M. tuberculosis, Respiratory viruses, S. pneumoniae, S. aureus (MSSA or MRSA)	Airborne Precautions plus Contact precautions
Disease	**Clinical Syndrome or Condition†**	**Potential Pathogens‡**	**Empiric Precautions (Always Includes Standard Precautions)**

Respiratory Infections	Cough/fever/pulmonary infiltrate in any lung location in an HIVinfected patient or a patient at high risk for HIV infection	M. tuberculosis, Respiratory viruses, S. pneumoniae, S. aureus (MSSA or MRSA)	Airborne Precautions plus Contact Precautions Use eye/face protection if aerosol-generating procedure performed or contact with respiratory secretions anticipated. If tuberculosis is unlikely and there are no AIIRs and/or respirators available, use Droplet Precautions instead of Airborne Precautions Tuberculosis more likely in HIV-infected individual than in HIV negative individual
Respiratory Infections	Cough/fever/pulmonary infiltrate in any lung location in a patient with a history of recent travel (10-21 days) to countries with active outbreaks of SARS, avian influenza	*M. tuberculosis,* severe acute respiratory syndrome virus (SARS- CoV), avian influenza	Airborne plus Contact Precautions plus eye protection. If SARS and tuberculosis unlikely, use Droplet Precautions instead of Airborne Precautions.
Respiratory Infections	Respiratory infections, particularly bronchiolitis and pneumonia, in infants and young children	Respiratory syncytial virus, parainfluenza virus, adenovirus, influenza virus, *Human metapneumovirus*	Contact plus Droplet Precautions; Droplet Precautions may be discontinued when adenovirus and influenza have been ruled out
Skin or Wound Infection	Abscess or draining wound that cannot be covered	*Staphylococcus aureus* (MSSA or MRSA), group A streptococcus	Contact Precautions Add Droplet Precautions for the first 24 hours of appropriate antimicrobial therapy if invasive Group A streptococcal disease is suspected

* Infection control professionals should modify or adapt this table according to local conditions. To ensure that appropriate empiric precautions are implemented always, hospitals must have systems in place to evaluate patients routinely according to these criteria as part of their preadmission and admission care.

† Patients with the syndromes or conditions listed below may present with atypical signs or symptoms (e.g.neonates and adults with pertussis may not have paroxysmal or severe cough). The clinician's index of suspicion should be guided by the prevalence of specific conditions in the community, as well as clinical judgment.

‡ The organisms listed under the column "Potential Pathogens" are not intended to represent the complete, or even most likely, diagnoses, but rather possible etiologic agents that require additional precautions beyond Standard Precautions until they can be ruled out.

§ These pathogens include enterohemorrhagic *Escherichia coli* O157:H7, *Shigella spp,* hepatitis A virus, noroviruses, rotavirus, *C. difficile*.

Table 3. Infection Control Considerations for High-Priority (CDC Category A) Diseases that May Result from Bioterrorist Attacks or are Considered to be Bioterrorist Threats

[This link is no longer active: www.bt.cdc.gov. Similar information may be found at CDC Bioterrorism Agents/Diseases (https://emergency.cdc.gov/agent/agentlist.asp accessed May 2016)]

Table 3A. Anthrax

Characteristics	Additional Information

Site(s) of Infection; Transmission Mode Cutaneous and inhalation disease have occurred in past bioterrorist incidents	**Cutaneous** (contact with spores); **Respiratory Tract:** (inhalation of spores); **Gastrointestinal Tract** (ingestion of spores - rare) **Comment:** Spores can be inhaled into the lower respiratory tract. The infectious dose of *B. anthracis* in humans by any route is not precisely known. In primates, the LD50 (i.e., the dose required to kill 50% of animals) for an aerosol challenge with *B. anthracis* is estimated to be 8,000–50,000 spores; the infectious dose may be as low as 1-3 spores
Incubation Period	**Cutaneous**: 1 to12 days; **Respiratory Tract:** Usually 1 to 7 days but up to 43 days reported; **Gastrointestinal Tract:** 15-72 hours
Clinical Features	**Cutaneous:** Painless, reddish papule, which develops a central vesicle or bulla in 1-2 days; over next 3-7 days lesion becomes pustular, and then necrotic, with black eschar; extensive surrounding edema. **Respiratory Tract:** initial flu-like illness for 1-3 days with headache, fever, malaise, cough; by day 4 severe dyspnea and shock, and is usually fatal (85%-90% if untreated; meningitis in 50% of Respiratory Tract cases. **Gastrointestinal Tract**: if intestinal form, necrotic, ulcerated edematous lesions develop in intestines with fever, nausea and vomiting, progression to hematemesis and bloody diarrhea; 25-60% fatal
Diagnosis	**Cutaneous:** Swabs of lesion (under eschar) for immunohistochemistry, polymerase chain reaction and culture; punch biopsy for immunohistochemistry, polymerase chain reaction and culture; vesicular fluid aspirate for Gram stain and culture; blood culture if systemic symptoms; acute and convalescent sera for ELISA serology **Respiratory Tract:** Chest X-ray or CT scan demonstrating wide mediastinal widening and/or pleural effusion, hilar abnormalities; blood for culture and polymerase chain reaction; pleural effusion for culture, polymerase chain reaction and immunohistochemistry; cerebrospinal fluid if meningeal signs present for immunohistochemistry, polymerase chain reaction and culture; acute and convalescent sera for ELISA serology; pleural and/or bronchial biopsies immunohistochemistry. **Gastrointestinal Tract:** blood and ascites fluid, stool samples, rectal swabs, and swabs of oropharyngeal lesions if present for culture, polymerase chain reaction and immunohistochemistry.
Infectivity	**Cutaneous:** Person-to-person transmission from contact with lesion of untreated patient possible, but extremely rare. **Respiratory Tract and Gastrointestinal Tract:** Person-to-person transmission does not occur. **Aerosolized powder, environmental exposures:** Highly infectious if aerosolized
Characteristics	**Additional Information**
Recommended Precautions	Cutaneous: Standard Precautions; Contact Precautions if uncontained copious drainage. Respiratory Tract and Gastrointestinal Tract: Standard Precautions. Aerosolized powder, environmental exposures: Respirator (N95 mask or Powered Air Purifying Respirators), protective clothing; decontamination of persons with powder on them (Notice to Readers: Occupational Health Guidelines for Remediation Workers at Bacillus anthracis-Contaminated Sites --- United States, 2001--2002 (https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5135a3.htm accessed September 2018). Hand hygiene: Handwashing for 30-60 seconds with soap and water or 2% chlorhexidene gluconate after spore contact (alcohol handrubs inactive against spores [Weber DJ JAMA 2003; 289:1274]). Postexposure prophylaxis following environmental exposure: 60 days of antimicrobials (either doxycycline, ciprofloxacin, or levofloxacin) and Postexposure vaccine under IND

Table 3B. Botulism

Characteristics	Additional Information

Site(s) of Infection; Transmission Mode	**Gastrointestinal Tract:** Ingestion of toxin-containing food, **Respiratory Tract:** Inhalation of toxin containing aerosol cause disease. **Comment:** Toxin ingested or potentially delivered by aerosol in bioterrorist incidents. LD50 (lethal dose for 50% of experimental animals) for type A is 0.001 μg/ml/kg.
Incubation Period	1-5 days.
Clinical Features	Ptosis, generalized weakness, dizziness, dry mouth and throat, blurred vision, diplopia, dysarthria, dysphonia, and dysphagia followed by symmetrical descending paralysis and respiratory failure.
Diagnosis	Clinical diagnosis; identification of toxin in stool, serology unless toxin-containing material available for toxin neutralization bioassays.
Infectivity	Not transmitted from person to person. Exposure to toxin necessary for disease.
Recommended Precautions	Standard Precautions.

Ebola Hemorrhagic Fever

Ebola Virus Disease for Healthcare Workers [2014]: Updated recommendations for healthcare workers can be found at Ebola: for Clinicians (https://www.cdc.gov/vhf/ebola/clinicians/index.html accessed September 2018).

Table 3C. Ebola Hemorrhagic Fever

Characteristics	Additional Information
Site(s) of Infection; Transmission Mode	As a rule infection develops after exposure of mucous membranes or respiratory tract, or through broken skin or percutaneous injury.
Incubation Period	2-19 days, usually 5-10 days
Clinical Features	Febrile illnesses with malaise, myalgias, headache, vomiting and diarrhea that are rapidly complicated by hypotension, shock, and hemorrhagic features. Massive hemorrhage in < 50% pts.
Diagnosis	Etiologic diagnosis can be made using respiratory tract-polymerase chain reaction, serologic detection of antibody and antigen, pathologic assessment with immunohistochemistry and viral culture with EM confirmation of morphology,
Infectivity	Person-to-person transmission primarily occurs through unprotected contact with blood and body fluids; percutaneous injuries (e.g., needlestick) associated with a high rate of transmission; transmission in healthcare settings has been reported but is prevented by use of barrier precautions.
Characteristics	**Additional Information**

Recommended Precautions	**Hemorrhagic fever specific barrier precautions:** If disease is believed to be related to intentional release of a bioweapon, epidemiology of transmission is unpredictable pending observation of disease transmission. Until the nature of the pathogen is understood and its transmission pattern confirmed, Standard, Contact and Airborne Precautions should be used. Once the pathogen is characterized, if the epidemiology of transmission is consistent with natural disease, Droplet Precautions can be substituted for Airborne Precautions. Emphasize: 1. use of sharps safety devices and safe work practices, 2. hand hygiene; 3. barrier protection against blood and body fluids upon entry into room (single gloves and fluid- resistant or impermeable gown, face/eye protection with masks, goggles or face shields); and 4. appropriate waste handling. Use N95 or higher respirators when performing aerosol-generating procedures. In settings where AIIRs are unavailable or the large numbers of patients cannot be accommodated by existing AIIRs, observe Droplet Precautions (plus Standard Precautions and Contact Precautions) and segregate patients from those not suspected of VHF infection. Limit blooddraws to those essential to care. See text for discussion and Appendix A for recommendations for naturally occurring VHFs.

Plague

Pneumonic plague is not as contagious as is often thought. Historical accounts and contemporary evidence indicate that persons with plague usually transmit the infection only when the disease is in the end stage. These persons cough copious amounts of bloody sputum that contains many plague bacteria. Patients in the early stage of primary pneumonic plague (approximately the first 20–24 h) apparently pose little risk [1, 2]. Antibiotic medication rapidly clears the sputum of plague bacilli, so that a patient generally is not infective within hours after initiation of effective antibiotic treatment [3]. This means that in modern times many patients will never reach a stage where they pose a significant risk to others. Even in the end stage of disease, transmission only occurs after close contact. Simple protective measures, such as wearing masks, good hygiene, and avoiding close contact, have been effective to interrupt transmission during many pneumonic plague outbreaks [2]. In the United States, the last known cases of person to person transmission of pneumonic plague occurred in 1925 [2].

Table 3D. Plague

Characteristics	Additional Information
Site(s) of Infection; Transmission Mode	**Respiratory Tract:** Inhalation of respiratory droplets. **Comment**: Pneumonic plague most likely to occur if used as a biological weapon, but some cases of bubonic and primary septicemia may also occur. Infective dose 100 to 500 bacteria
Incubation Period	1 to 6, usually 2 to 3 days.
Clinical Features	Pneumonic: fever, chills, headache, cough, dyspnea, rapid progression of weakness, and in a later stage hemoptysis, circulatory collapse, and bleeding diathesis
Diagnosis	Presumptive diagnosis from Gram stain or Wayson stain of sputum, blood, or lymph node aspirate; definitive diagnosis from cultures of same material, or paired acute/convalescent serology.
Infectivity	Person-to-person transmission occurs via respiratory droplets risk of transmission is low during first 20-24 hours of illness and requires close contact. Respiratory secretions probably are not infectious within a few hours after initiation of appropriate therapy.

Recommended Precautions	Standard Precautions, Droplet Precautions until patients have received 48 hours of appropriate therapy. **Chemoprophylaxis:** Consider antibiotic prophylaxis for HCWs with close contact exposure.

1. Wu L-T. A treatise on pneumonic plague. Geneva: League of Nations, 1926. III. Health.
2. Kool JL. Risk of person to person transmission of pneumonic plague. Clinical Infectious Diseases, 2005; 40 (8): 1166-1172
3. Butler TC. Plague and other Yersinia infections. In: Greenough WB, ed. Current topics in infectious disease. New York: Plenum Medical Book Company, 1983.

Table 3E. Smallpox

Characteristics	Additional Information
Site(s) of Infection; Transmission Mode	**Respiratory Tract Inhalation** of droplet or, rarely, aerosols; and skin lesions (contact with virus). **Comment:** If used as a biological weapon, natural disease, which has not occurred since 1977, will likely result.
Incubation Period	7 to 19 days (mean 12 days)
Clinical Features	Fever, malaise, backache, headache, and often vomiting for 2-3 days; then generalized papular or maculopapular rash (more on face and extremities), which becomes vesicular (on day 4 or 5) and then pustular; lesions all in same stage.
Diagnosis	Electron microscopy of vesicular fluid or culture of vesicular fluid by WHO approved laboratory (CDC); detection by polymerase chain reaction available only in select LRN labs, CDC and USAMRID
Infectivity	Secondary attack rates up to 50% in unvaccinated persons; infected persons may transmit disease from time rash appears until all lesions have crusted over (about 3 weeks); greatest infectivity during first 10 days of rash.
Recommended Precautions	Combined use of Standard, Contact, and Airborne Precautions until all scabs have separated (3-4 weeks). Transmission by the airborne route is a rare event; Airborne Precautions is recommended when possible, but in the event of mass exposures, barrier precautions and containment within a designated area are most important. [204, 212] Only immune HCWs to care for pts; Postexposure vaccine within 4 days. **Vaccinia:** HCWs cover vaccination site with gauze and semi-permeable dressing until scab separates (≥21 days). Observe hand hygiene. **Adverse events with virus-containing lesions:** Standard plus Contact Precautions until all lesions crusted. Vaccinia adverse events with lesions containing infectious virus include inadvertent autoinoculation, ocular lesions (blepharitis, conjunctivitis), generalized vaccinia, progressive vaccinia, eczema vaccinatum; bacterial superinfection also requires addition of contact precautions if exudates cannot be contained. [216, 217]

Table 3F. Tularemia

Characteristics	Additional Information

Site(s) of Infection; Transmission Mode	**Respiratory Tract:** Inhalation of aerosolized bacteria. **Gastrointestinal Tract:** Ingestion of food or drink contaminated with aerosolized bacteria. **Comment:** Pneumonic or typhoidal disease likely to occur after bioterrorist event using aerosol delivery. Infective dose 10-50 bacteria
Incubation Period	2 to 10 days, usually 3 to 5 days
Clinical Features	Pneumonic: malaise, cough, sputum production, dyspnea; Typhoidal: fever, prostration, weight loss and frequently an associated pneumonia.
Diagnosis	Diagnosis usually made with serology on acute and convalescent serum specimens; bacterium can be detected by polymerase chain reaction (LRN) or isolated from blood and other body fluids on cysteine-enriched media or mouse inoculation.
Infectivity	Person-to-person spread is rare. Laboratory workers who encounter/handle cultures of this organism are at high risk for disease if exposed.
Recommended Precautions	Standard Precautions

Table 4. Recommendations for Application of Standard Precautions for the Care of All Patients in All Healthcare Settings

Component	Recommendations
Hand hygiene	After touching blood, body fluids, secretions, excretions, contaminated items; immediately after removing gloves; between patient contacts.
Personal protective equipment (PPE) Gloves	For touching blood, body fluids, secretions, excretions, contaminated items; for touching mucous membranes and nonintact skin
Personal protective equipment (PPE) Gown	During procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated.
Personal protective equipment (PPE) Mask, eye protection (goggles), face shield	During procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, secretions, especially suctioning, endotracheal intubation. During aerosol-generating procedures on patients with suspected or proven infections transmitted by respiratory aerosols wear a fit-tested N95 or higher respirator in addition to gloves, gown and face/eye protection.
Soiled patient-care equipment	Handle in a manner that prevents transfer of microorganisms to others and to the environment; wear gloves if visibly contaminated; perform hand hygiene.
Environmental control	Develop procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas.
Textiles and laundry	Handle in a manner that prevents transfer of microorganisms to others and to the environment
Needles and other sharps	Do not recap, bend, break, or hand-manipulate used needles; if recapping is required, use a one-handed scoop technique only; use safety features when available; place used sharps in puncture-resistant container
Patient resuscitation	Use mouthpiece, resuscitation bag, other ventilation devices to prevent contact with mouth and oral secretions
Patient placement	Prioritize for single-patient room if patient is at increased risk of transmission, is likely to contaminate the environment, does not maintain appropriate hygiene, or is at increased risk of acquiring infection or developing adverse outcome following infection.

Respiratory hygiene/cough etiquette (source containment of infectious respiratory secretions in symptomatic patients, beginning at initial point of encounter e.g., triage and reception areas in emergency departments and physician offices)	Instruct symptomatic persons to cover mouth/nose when sneezing/coughing; use tissues and dispose in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation, >3 feet if possible.

(See Sections II.D.-II.J. and III.A.1)

Table 5. Components of a Protective Environment

(Adapted from MMWR 2003; 52 [RR-10])

I. Patients: allogeneic hematopoeitic stem cell transplant (HSCT) only

- Maintain in PE room except for required diagnostic or therapeutic procedures that cannot be performed in the room, e.g., radiology, operating room
- Respiratory protection e.g., N95 respirator, for the patient when leaving PE during periods of construction

II. Standard and Expanded Precautions

- Hand hygiene observed before and after patient contact
- Gown, gloves, mask NOT required for HCWs or visitors for routine entry into the room
- Use of gown, gloves, mask by HCWs and visitors according to Standard Precautions and as indicated for suspected or proven infections for which Transmission-Based Precautions are recommended

III. Engineering

- Central or point-of-use HEPA (99.97% efficiency) filters capable of removing particles 0.3 μm in diameter for supply (incoming) air
- Well-sealed rooms ○ Proper construction of windows, doors, and intake and exhaust ports
  - ○ Ceilings: smooth, free of fissures, open joints, crevices ○ Walls sealed above and below the ceiling
  - ○ If leakage detected, locate source and make necessary repairs
- Ventilation to maintain ≥12 ACH
- Directed air flow: air supply and exhaust grills located so that clean, filtered air enters from one side of the room, flows across the patient's bed, exits on opposite side of the room
- Positive room air pressure in relation to the corridor ○ Pressure differential of >2.5 Pa [0.01" water gauge]
- Monitor and document results of air flow patterns daily using visual methods (e.g., flutter strips, smoke tubes) or a hand held pressure gauge
- Self-closing door on all room exits
- Maintain back-up ventilation equipment (e.g., portable units for fans or filters) for emergency provision of ventilation requirements for PE areas and take immediate steps to restore the fixed ventilation system
- For patients who require both a PE and Airborne Infection Isolation, use an anteroom to ensure proper air balance relationships and provide independent exhaust of contaminated air to the outside or place a HEPA filter in the exhaust duct. If an anteroom is not available, place patient in an AIIR and use portable ventilation units, industrial-grade HEPA filters to enhance filtration of spores.

IV. Surfaces

- Daily wet-dusting of horizontal surfaces using cloths moistened with EPA-registered hospital disinfectant/detergent
- Avoid dusting methods that disperse dust
- No carpeting in patient rooms or hallways
- No upholstered furniture and furnishings

V. Other

- No flowers (fresh or dried) or potted plants in PE rooms or areas
- Use vacuum cleaner equipped with HEPA filters when vacuum cleaning is necessary

Figure. Example of Safe Donning and Removal of Personal Protective Equipment (PPE)

⚠ For updated content see [Sequence for Putting on Personal Protective Equipment and How to Safely Remove Personal Protective Equipment](https://www.cdc.gov/hai/pdfs/ppe/PPE-Sequence.pdf) (https://www.cdc.gov/hai/pdfs/ppe/PPE-Sequence.pdf accessed May 2016).

Donning PPE
GOWN

- Fully cover torso from neck to knees, arms to end of wrist, and wrap around the back
- Fasten in back at neck and waist

MASK OR RESPIRATOR

- Secure ties or elastic band at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

GOGGLES/FACE SHIELD

- Put on face and adjust to fit

GLOVES

- Use non-sterile for isolation
- Select according to hand size
- Extend to cover wrist of isolation gown

Safe Work Practices

- Keep hands away from face
- Work from clean to dirty
- Limit surfaces touched
- Change when torn or heavily contaminated
- Perform hand hygiene

Removing PPE

Remove PPE at doorway before leaving patient room or in anteroom

GLOVES

- Outside of gloves are contaminated!

- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist

GOGGLES/FACE SHIELD

- Outside of goggles or face shield are contaminated!
- To remove, handle by "clean" head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container

GOWN

- Gown front and sleeves are contaminated!
- Unfasten neck, then waist ties
- Remove gown using a peeling motion; pull gown from each shoulder toward the same hand
- Gown will turn inside out
- Hold removed gown away from body, roll into a bundle and discard into waste or linen receptacle

MASK OR RESPIRATOR

- Front of mask/respirator is contaminated – DO NOT TOUCH!
- Grasp ONLY bottom then top ties/elastics and remove
- Discard in waste container

Hand Hygiene
Perform hand hygiene immediately after removing all PPE!

Glossary

Airborne infection isolation room (AIIR). Formerly, negative pressure isolation room, an AIIR is a single-occupancy patient-care room used to isolate persons with a suspected or confirmed airborne infectious disease. Environmental factors are controlled in AIIRs to minimize the transmission of infectious agents that are usually transmitted from person to person by droplet nuclei associated with coughing or aerosolization of contaminated fluids. AIIRs should provide negative pressure in the room (so that air flows under the door gap into the room); **and** an air flow rate of 6-12 ACH (6 ACH for existing structures, 12 ACH for new construction or renovation); **and** direct exhaust of air from the room to the outside of the building or recirculation of air through a HEPA filter before retruning to circulation (MMWR 2003; 52 [RR-10]; MMWR 1994; 43 [RR-13]).

American Institute of Architects (AIA). A professional organization that develops standards for building ventilation, The "2001Guidelines for Design and Construction of Hospital and Health Care Facilities", the development of which was supported by the AIA, Academy of Architecture for Health, Facilities Guideline Institute, with assistance from the U.S. Department of Health and Human Services and the National Institutes of Health, is the primary source of guidance for creating airborne infection isolation rooms (AIIRs) and protective environments (American Institute of Architects – Academy of Architecture for Health (https://network.aia.org/academyofarchitectureforhealth/home accessed May 2016) [Current version of this document may differ from original.])

Ambulatory care settings. Facilities that provide health care to patients who do not remain overnight (e.g., hospital-based outpatient clinics, nonhospital-based clinics and physician offices, urgent care centers, surgicenters, free-standing dialysis centers, public health clinics, imaging centers, ambulatory behavioral health and substance abuse clinics, physical therapy and rehabilitation centers, and dental practices. ***Bioaerosols*****.** An airborne dispersion of particles containing whole or parts of biological entities, such as bacteria, viruses, dust mites, fungal hyphae, or fungal spores. Such aerosols usually consist of a mixture of mono-dispersed and aggregate cells, spores or viruses, carried by other materials, such as respiratory secretions and/or inert particles. Infectious bioaerosols (i.e., those that contain biological agents capable of causing an infectious disease) can be generated from human sources (e.g., expulsion from the respiratory tract during coughing, sneezing, talking or singing; during suctioning or wound irrigation), wet environmental sources (e.g., HVAC and cooling tower water with Legionella) or dry sources (e.g., construction dust with spores produced by *Aspergillus* spp.). Bioaerosols include large respiratory droplets and small droplet nuclei (Cole EC. AJIC 1998;26: 453-64).

Caregivers. All persons who are not employees of an organization, are not paid, and provide or assist in providing healthcare to a patient (e.g., family member, friend) and acquire technical training as needed based on the tasks that must be performed.

Cohorting. In the context of this guideline, this term applies to the practice of grouping patients infected or colonized with the same infectious agent together to confine their care to one area and prevent contact with susceptible patients (cohorting patients). During outbreaks, healthcare personnel may be assigned to a cohort of patients to further limit opportunities for transmission (cohorting staff).

Colonization. Proliferation of microorganisms on or within body sites without detectable host immune response, cellular damage, or clinical expression. The presence of a microorganism within a host may occur with varying duration, but may become a source of potential transmission. In many instances, colonization and carriage are synonymous. ***Droplet nuclei.*** Microscopic particles < 5 µm in size that are the residue of evaporated droplets and are produced when a person coughs, sneezes, shouts, or sings. These particles can remain suspended in the air for prolonged periods of time and can be carried on normal air currents in a room or beyond, to adjacent spaces or areas receiving exhaust air.

Engineering controls. Removal or isolation of a workplace hazard through technology. AIIRs, a Protective Environment, engineered sharps injury prevention devices and sharps containers are examples of engineering controls.

Epidemiologically important pathogens. Infectious agents that have one or more of the following characteristics: 1. are readily transmissible;
2. have a proclivity toward causing
outbreaks; 3. may be associated with a
severe outcome; or 4. are difficult to treat.

Examples include *Acinetobacter sp., Aspergillus* sp., *Burkholderia cepacia*, *Clostridium difficile*, *Klebsiella* or *Enterobacter* sp., Extended spectrum beta lactamase producing gram negative bacilli [ESBLs], methicillin-resistant *Staphylococcus aureus* [MRSA], *Pseudomonas aeruginosa,* vancomycin-resistant enterococci [VRE], methicillin resistant *Staphylococcus aureus* [MRSA], vancomycin resistant *Staphylococcus aureus* [VRSA] influenza virus, respiratory syncytial virus [RSV], rotavirus, SARS-CoV, noroviruses and the hemorrhagic fever viruses).

Hand hygiene. A general term that applies to any one of the following:
1. handwashing with plain (nonantimicrobial) soap and water);
2. antiseptic handwash (soap containing antiseptic agents and water);
3. antiseptic handrub (waterless antiseptic product, most often alcohol-based, rubbed on all surfaces of hands); or

4. surgical hand antisepsis (antiseptic handwash or antiseptic handrub performed preoperatively by surgical personnel to eliminate transient hand flora and reduce resident hand flora) [559].

Healthcare-associated infection (HAI). An infection that develops in a patient who is cared for in any setting where healthcare is delivered (e.g., acute care hospital, chronic care facility, ambulatory clinic, dialysis center, surgicenter, home) and is related to receiving health care (i.e., was not incubating or present at the time healthcare was provided). In ambulatory and home settings, HAI would apply to any infection that is associated with a medical or surgical intervention. Since the geographic location of infection acquisition is often uncertain, the preferred term is considered to be healthcare-*associated* rather than healthcare-*acquired*.
Healthcare epidemiologist. A person whose primary training is medical (M.D., D.O.) and/or masters or doctorate-level epidemiology who has received advanced training in healthcare epidemiology. Typically these professionals direct or provide consultation to an infection control program in a hospital, long term care facility (LTCF), or healthcare delivery system (also see infection control professional).

Healthcare personnel, healthcare worker (HCW). All paid and unpaid persons who work in a healthcare setting (e.g., any person who has professional or technical training in a healthcare-related field and provides patient care in a healthcare setting or any person who provides services that support the delivery of healthcare such as dietary, housekeeping, engineering, maintenance personnel).

Hematopoietic stem cell transplantation (HSCT). Any transplantation of blood- or bone marrow-derived hematopoietic stem cells, regardless of donor type (e.g., allogeneic or autologous) or cell source (e.g., bone marrow, peripheral blood, or placental/umbilical cord blood); associated with periods of severe immunosuppression that vary with the source of the cells, the intensity of chemotherapy required, and the presence of graft versus host disease (MMWR 2000; 49: RR-10).

High-efficiency particulate air (HEPA) filter. *An air filter that removes >99.97% of* particles ≥ 0.3µm (the most penetrating particle size) at a specified flow rate of air. HEPA filters may be integrated into the central air handling systems, installed at the point of use above the ceiling of a room, or used as portable units (MMWR 2003; 52: RR-10).

Home care. A wide-range of medical, nursing, rehabilitation, hospice and social services delivered to patients in their place of residence (e.g., private residence, senior living center, assisted living facility). Home health-care services include care provided by home health aides and skilled nurses, respiratory therapists, dieticians, physicians, chaplains, and volunteers; provision of durable medical equipment; home infusion therapy; and physical, speech, and occupational therapy.

Immunocompromised patients. Those patients whose immune mechanisms are deficient because of congenital or acquired immunologic disorders (e.g., human immunodeficiency virus [HIV] infection, congenital immune deficiency syndromes), chronic diseases such as diabetes mellitus, cancer, emphysema, or cardiac failure, ICU care, malnutrition, and immunosuppressive therapy of another disease process [e.g., radiation, cytotoxic chemotherapy, anti-graft-rejection medication, corticosteroids, monoclonal antibodies directed against a specific component of the immune system]). The type of infections for which an immunocompromised patient has increased susceptibility is determined by the severity of immunosuppression and the specific component(s) of the immune system that is affected. Patients undergoing allogeneic HSCT and those with chronic graft versus host disease are considered the most vulnerable to HAIs. Immunocompromised states also make it more difficult to diagnose certain infections (e.g., tuberculosis) and are associated with more severe clinical disease states than persons with the same infection and a normal immune system.

Infection. The transmission of microorganisms into a host after evading or overcoming defense mechanisms, resulting in the organism's proliferation and invasion within host tissue(s). Host responses to infection may include clinical symptoms or may be subclinical, with manifestations of disease mediated by direct organisms pathogenesis and/or a function of cell-mediated or antibody responses that result in the destruction of host tissues.

Infection control and prevention professional (ICP). A person whose primary training is in either nursing, medical technology, microbiology, or epidemiology and who has acquired specialized training in infection control. Responsibilities may include collection, analysis, and feedback of infection data and trends to healthcare providers; consultation on infection risk assessment, prevention and control strategies; performance of education and training activities; implementation of evidence-based infection control practices or those mandated by regulatory and licensing agencies; application of epidemiologic principles to improve patient outcomes; participation in planning renovation and construction projects (e.g., to ensure appropriate containment of construction dust); evaluation of new products or procedures on patient outcomes; oversight of employee health services related to infection prevention; implementation of preparedness plans; communication within the healthcare setting, with local and state health departments, and with the community at large concerning infection control issues; and participation in research. Certification in infection control (CIC) is available through the Certification Board of Infection Control and Epidemiology.

***Infection control and prevention program*.** A multidisciplinary program that includes a group of activities to ensure that recommended practices for the prevention of healthcare-associated infections are implemented and followed by HCWs, making the healthcare setting safe from infection for patients and healthcare personnel. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) requires the following five components of an infection control program for accreditation:

1. *surveillance*: monitoring patients and healthcare personnel for acquisition of infection and/or colonization;
2. *investigation:* identification and analysis of infection problems or undesirable trends;
3. *prevention*: implementation of measures to prevent transmission of infectious agents and to reduce risks for device- and procedure-related infections; 4) *control*: evaluation and management of outbreaks; and
4. *reporting:* provision of information to external agencies as required by state and federal law and regulation (The Joint Commission (https://www.jointcommission.org/ accessed May 2016) [Current version of this document may differ from original.]). The infection control program staff has the ultimate authority to determine infection control policies for a healthcare organization with the approval of the organization's governing body.

Long-term care facilities (LTCFs). An array of residential and outpatient facilities designed to meet the bio-psychosocial needs of persons with sustained self-care deficits. These include skilled nursing facilities, chronic disease hospitals, nursing homes, foster and group homes, institutions for the developmentally disabled, residential care facilities, assisted living facilities, retirement homes, adult day health care facilities, rehabilitation centers, and long-term psychiatric hospitals.

Mask. A term that applies collectively to items used to cover the nose and mouth and includes both procedure masks and surgical masks ([This link is no longer active: www.fda.gov/cdrh/ode/guidance/094.html#4. Similar information may be found at FDA: Masks and N95 Respirators (http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/GeneralHospitalDevicesandSupplies/PersonalProtectiveEquipment/ucm055977.htm accessed May 2016)]).

Multidrug-resistant organisms (MDROs). In general, bacteria (excluding *M. tuberculosis)* that are resistant to one or more classes of antimicrobial agents and usually are resistant to all but one or two commercially available antimicrobial agents (e.g., MRSA, VRE, extended spectrum beta-lactamase [ESBL]-producing or intrinsically resistant gram-negative bacilli) [176].

Nosocomial infection. Derived from two Greek words “nosos” (disease) and “komeion” (to take care of). Refers to any infection that develops during or as a result of an admission to an acute care facility (hospital) and was not incubating at the time of admission.

Personal protective equipment (PPE). A variety of barriers used alone or in combination to protect mucous membranes, skin, and clothing from contact with infectious agents. PPE includes gloves, masks, respirators, goggles, face shields, and gowns.

Procedure Mask. A covering for the nose and mouth that is intended for use in general patient care situations. These masks generally attach to the face with ear loops rather than ties or elastic. Unlike surgical masks, procedure masks are not regulated by the Food and Drug Administration.

Protective Environment. A specialized patient-care area, usually in a hospital, with a positive air flow relative to the corridor (i.e., air flows from the room to the outside adjacent space). The combination of high-efficiency particulate air (HEPA) filtration, high numbers (≥12) of air changes per hour (ACH), and minimal leakage of air into the room creates an environment that can safely accommodate patients with a severely compromised immune system (e.g., those who have received allogeneic hemopoietic stem-cell transplant [HSCT]) and decrease the risk of exposure to spores produced by environmental fungi. Other components include use of scrubbable surfaces instead of materials such as upholstery or carpeting, cleaning to prevent dust accumulation, and prohibition of fresh flowers or potted plants.

Quasi-experimental studies. Studies to evaluate interventions but do not use randomization as part of the study design. These studies are also referred to as nonrandomized, pre-post-intervention study designs. These studies aim to demonstrate causality between an intervention and an outcome but cannot achieve the level of confidence concerning attributable benefit obtained through a randomized, controlled trial. In hospitals and public health settings, randomized control trials often cannot be implemented due to ethical, practical and urgency reasons; therefore, quasiexperimental design studies are used commonly. However, even if an intervention appears to be effective statistically, the question can be raised as to the possibility of alternative explanations for the result. Such study design is used when it is not logistically feasible or ethically possible to conduct a randomized, controlled trial, (e.g., during outbreaks). Within the classification of quasi-experimental study designs, there is a hierarchy of design features that may contribute to validity of results (Harris et al. CID 2004:38: 1586).

Residential care setting. A facility in which people live, minimal medical care is delivered, and the psychosocial needs of the residents are provided for.

Respirator. A personal protective device worn by healthcare personnel over the nose and mouth to protect them from acquiring airborne infectious diseases due to inhalation of infectious airborne particles that are < 5 μm in size. These include infectious droplet nuclei from patients with *M. tuberculosis,* variola virus [smallpox], SARS-CoV), and dust particles that contain infectious particles, such as spores of environmental fungi (e.g., *Aspergillus* sp.). The CDC's National Institute for Occupational Safety and Health (NIOSH) certifies respirators used in healthcare settings (Personal Protective Equipment for Healthcare Workers (https://www.cdc.gov/NIOSH/docs/2013-138/ accessed May 2016)). [Current version of this document may differ from original.]. The N95 disposable particulate, air purifying, respirator is the type used most commonly by healthcare personnel. Other respirators used include N-99 and N-100 particulate respirators, powered air-purifying respirators (PAPRS) with high efficiency filters; and non-powered full-facepiece elastomeric negative pressure respirators. A listing of NIOSH-approved respirators can be found at [This link is no longer active: www.cdc.gov/niosh/npptl/respirators/disp_part/particlist.html. Similar information may be found at NIOSH Respirator Trusted-Source Information (https://www.cdc.gov/niosh/npptl/topics/respirators/disp_part/respsource.html accessed May 2016).]. Respirators must be used in conjunction with a complete Respiratory Protection Program, as required by the Occupational Safety and Health Administration (OSHA) that includes fit testing, training, proper selection of respirators, medical clearance and respirator maintenance.

Respiratory Hygiene/ Cough Etiquette. A combination of measures designed to minimize the transmission of respiratory pathogens via droplet or airborne routes in healthcare settings. The components of respiratory hygiene/cough etiquette are

1. covering the mouth and nose during coughing and sneezing,
2. using tissues to contain respiratory secretions with prompt disposal into a no-touch receptacle,
3. offering a surgical mask to persons who are coughing to decrease contamination of the surrounding environment, and
4. turning the head away from others and maintaining spatial separation, ideally >3 feet, when coughing.

These measures are targeted to all patients with symptoms of respiratory infection and their accompanying family members or friends beginning at the point of initial encounter with a healthcare setting (e.g., reception/triage in emergency departments, ambulatory clinics, healthcare provider offices)[126] (Srinivasin A ICHE 2004; 25: 1020; Respiratory Hygiene/Cough Etiquette in Healthcare Settings (https://www.cdc.gov/flu/professionals/infectioncontrol/resphygiene.htm accessed May 2016) [Current version of this document may differ from original.])

Safety culture. Shared perceptions of workers and management regarding the level of safety in the work environment. A hospital safety climate includes the following six organizational components:

1. senior management support for safety programs;
2. absence of workplace barriers to safe work practices;
3. cleanliness and orderliness of the worksite;
4. minimal conflict and good communication among staff members; 5. frequent safety-related feedback/training by supervisors; and
6. availability of PPE and engineering controls[620].

Source Control*.* The process of containing an infectious agent either at the portal of exit from the body or within a confined space. The term is applied most frequently to containment of infectious agents transmitted by the respiratory route but could apply to other routes of transmission, (e.g., a draining wound, vesicular or bullous skin lesions).

Respiratory Hygiene/Cough Etiquette that encourages individuals to "cover your cough" and/or wear a mask is a source control measure. The use of enclosing devices for local exhaust ventilation (e.g., booths for sputum induction or administration of aerosolized medication) is another example of source control.

Standard Precautions. A group of infection prevention practices that apply to all patients, regardless of suspected or confirmed diagnosis or presumed infection status. Standard Precautions is a combination and expansion of Universal Precautions[780] and Body Substance Isolation[1102]. Standard Precautions is based on the principle that all blood, body fluids, secretions, excretions except sweat, nonintact skin, and mucous membranes may contain transmissible infectious agents. Standard Precautions includes hand hygiene, and depending on the anticipated exposure, use of gloves, gown, mask, eye protection, or face shield. Also, equipment or items in the patient environment likely to have been contaminated with infectious fluids must be handled in a manner to prevent transmission of infectious agents, (e.g., wear gloves for handling, contain heavily soiled equipment, properly clean and disinfect or sterilize reusable equipment before use on another patient).

Surgical mask. A device worn over the mouth and nose by operating room personnel during surgical procedures to protect both surgical patients and operating room personnel from transfer of microorganisms and body fluids. Surgical masks also are used to protect healthcare personnel from contact with large infectious droplets (>5 μm in size). According to draft guidance issued by the Food and Drug Administration on May 15, 2003, surgical masks are evaluated using standardized testing procedures for fluid resistance, bacterial filtration efficiency, differential pressure (air exchange), and flammability in order to mitigate the risks to health associated with the use of surgical masks. These specifications apply to any masks that are labeled surgical, laser, isolation, or dental or medical procedure ([This link is no longer active: www.fda.gov/cdrh/ode/guidance/094.html#4. Similar information may be found at FDA: Masks and N95 Respirators (http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/GeneralHospitalDevicesandSupplies/PersonalProtectiveEquipment/ucm055977.htm accessed May 2016.]). Surgical masks do not protect against inhalation of small particles or droplet nuclei and should not be confused with particulate respirators that are recommended for protection against selected airborne infectious agents, (e.g., *Mycobacterium tuberculosis)*.

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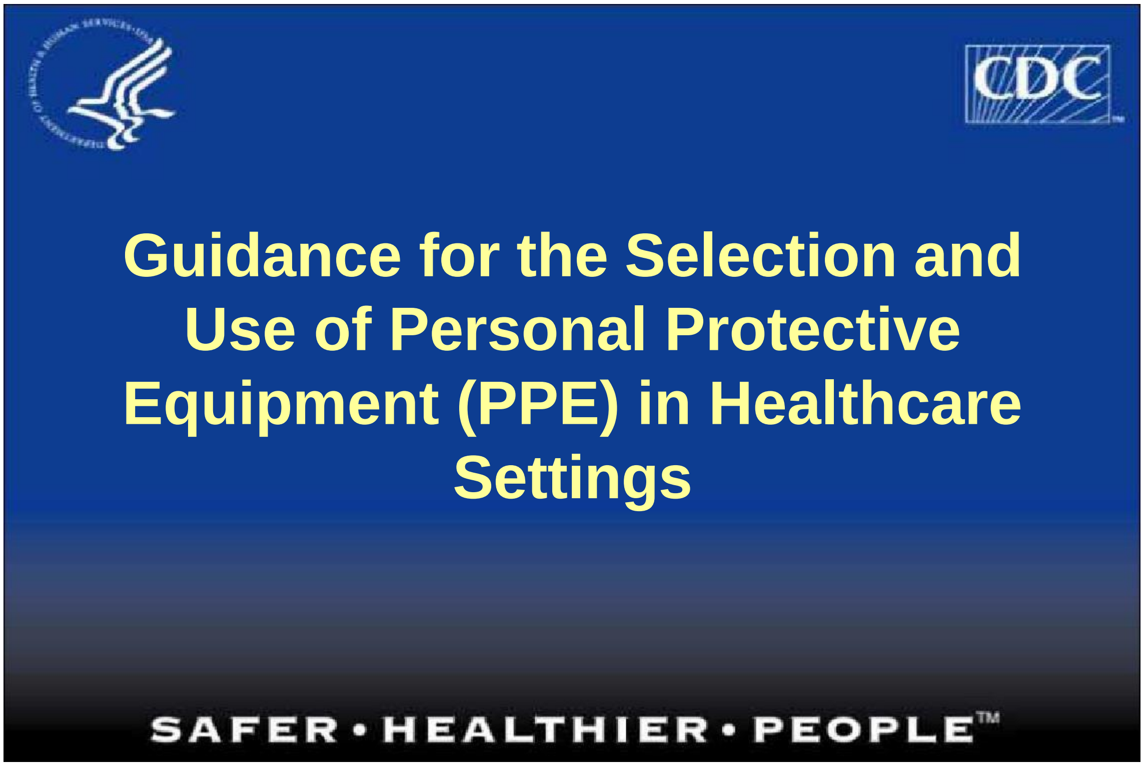
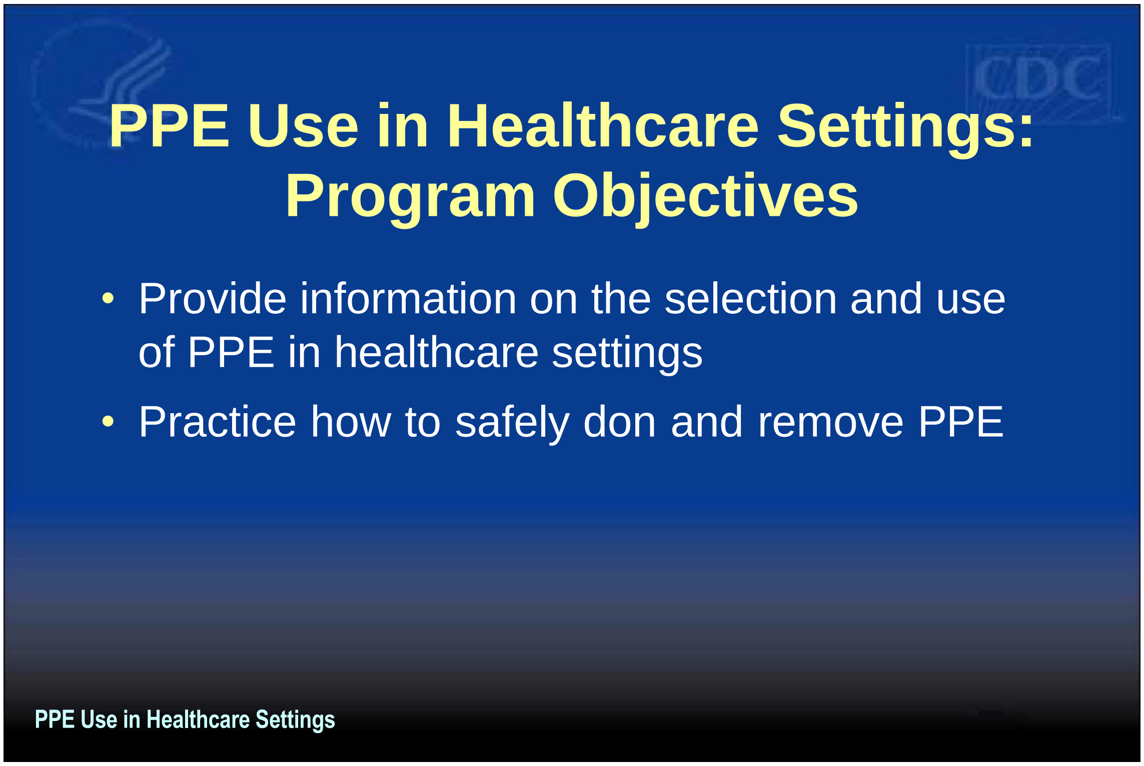
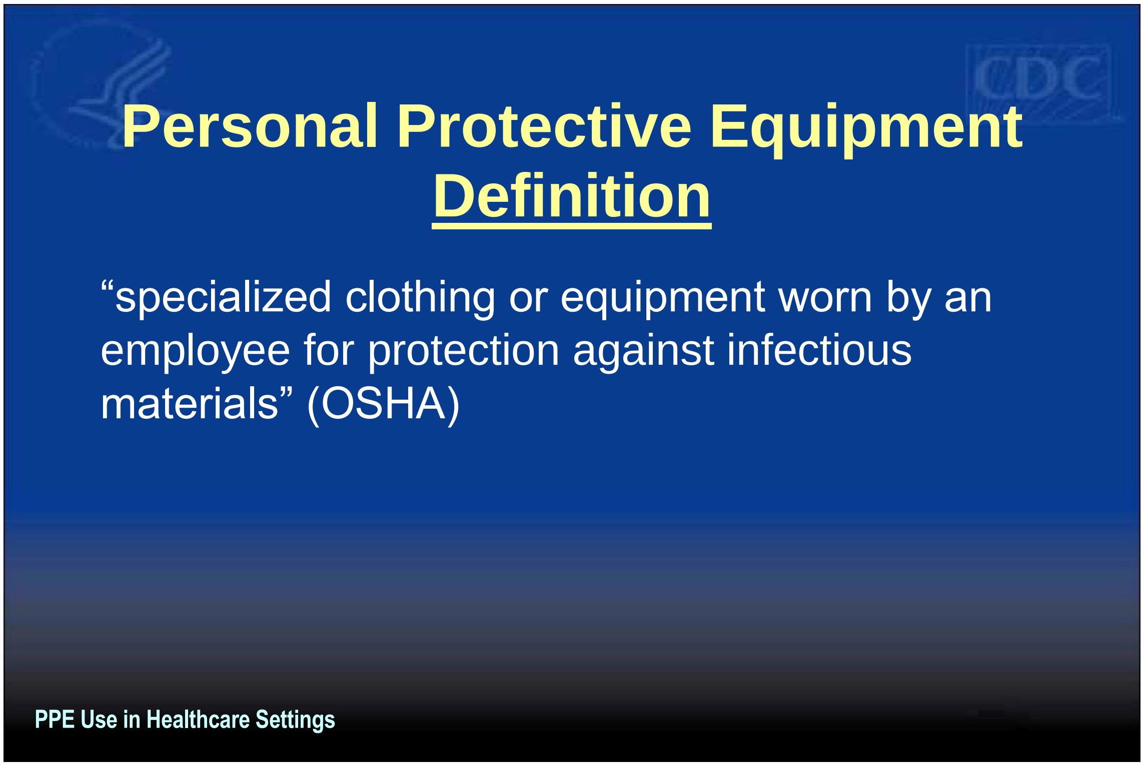

CDC
Guidance for the Selection and Use of Personal Protective Equipment (PPE) in Healthcare Settings
SAFER • HEALTHIER • PEOPLE™

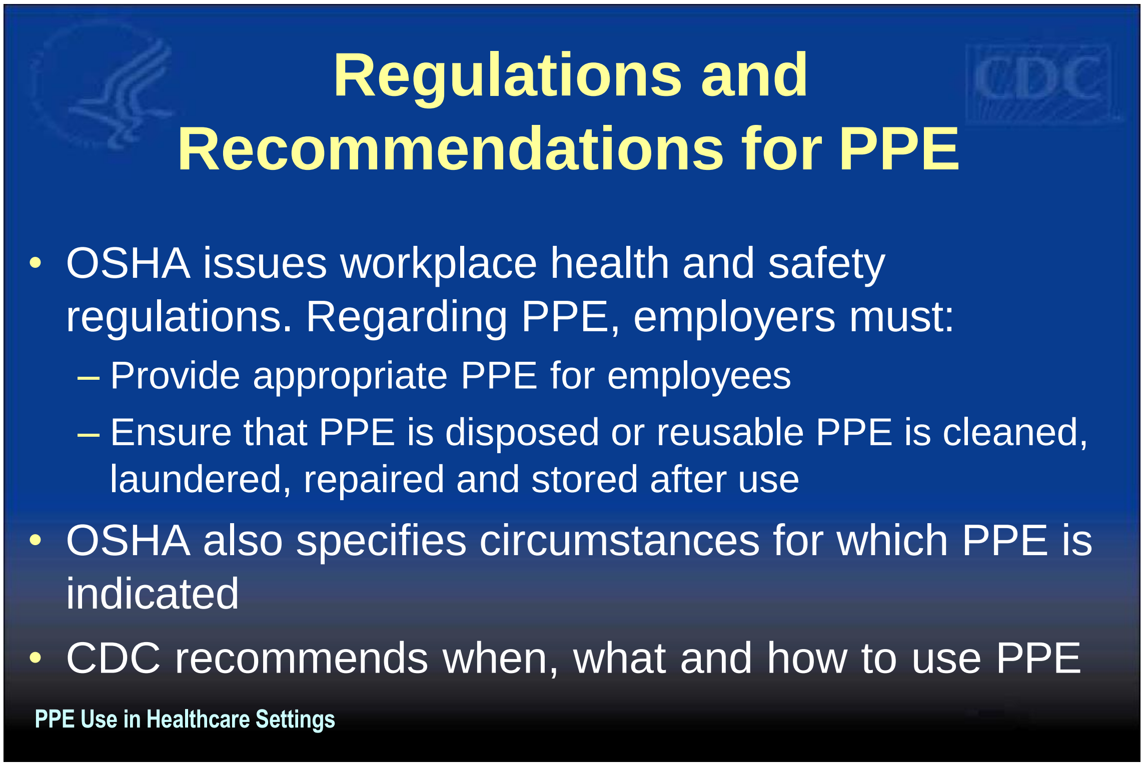
The goal of this program is to improve personnel safety in the healthcare environment through appropriate use of PPE.



The objectives of this program are to provide information on the selection and use of PPE in healthcare settings and to allow time for participants to practice the correct way to don and remove PPE.



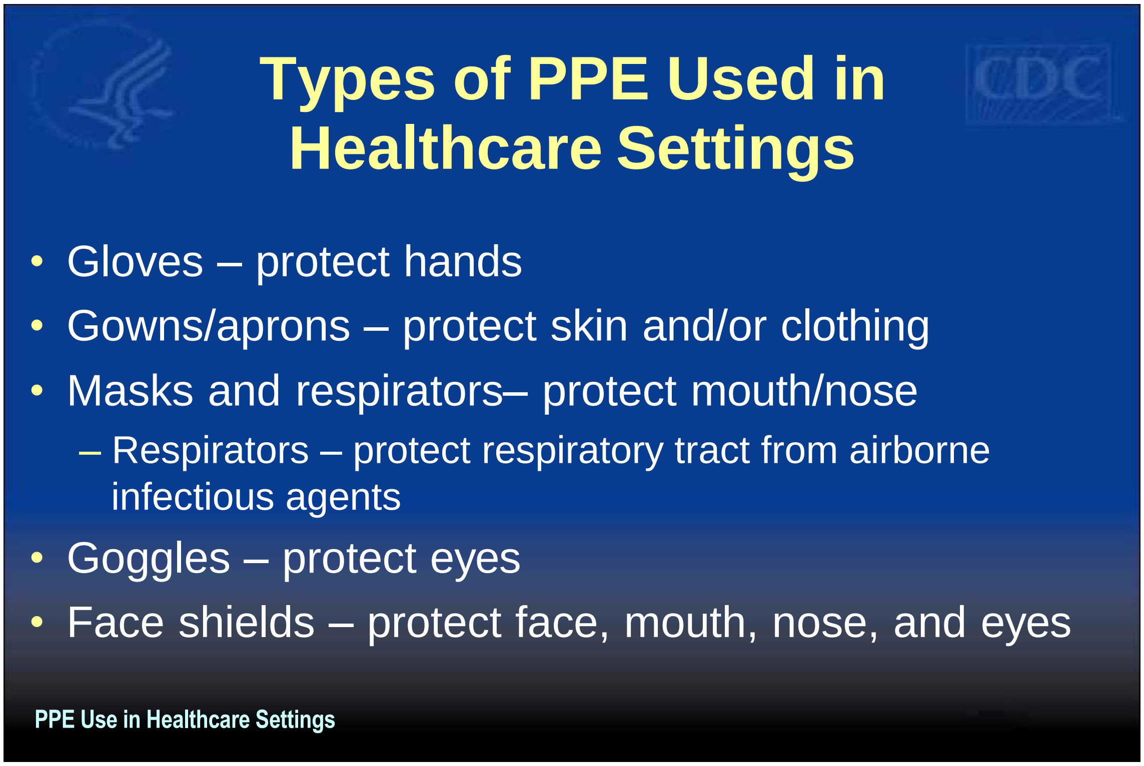
Personal protective equipment, or PPE, as defined by the Occupational Safety and Health Administration, or OSHA, is “specialized clothing or equipment, worn by an employee for protection against infectious materials.”



OSHA issues regulations for workplace health and safety. These regulations requireuse of PPE in healthcare settings to protect healthcare personnel from exposure to bloodborne pathogens and *Mycobacterium tuberculosis.* However, under OSHA's General Duty Clause PPE is required for any potential infectious disease exposure. Employers must provide their employees with appropriate PPE and ensure that PPE is disposed or, if reusable, that it is properly cleaned or laundered, repaired and stored after use.

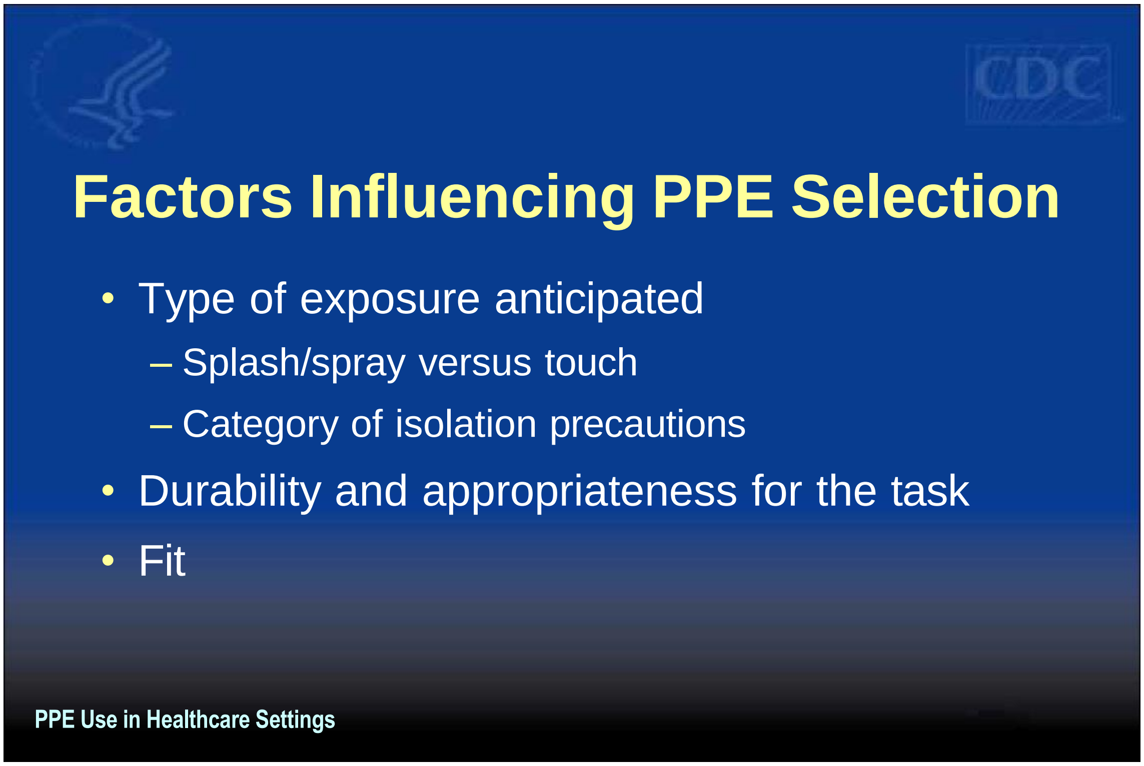
The Centers for Disease Control and Prevention (CDC) issues recommendations forwhen and what PPE should be used to prevent exposure to infectious diseases. Thispresentation will cover those recommendations, beginning with the hierarchy of safety and health controls.

The protection of healthcare personnel from infectious disease exposures in the workplace requires a combination of controls, one of which is the use of PPE. It is important to recognize that your protection as a healthcare worker also involves other prevention strategies. There are four major components to healthcare worker safety programs. First are training, such as you're receiving today, and administrative controls, like isolation policies and procedures, and procedures for recognizing patients with a communicable disease before they expose workers. Second are engineering controls like negative pressure rooms for patients with airborne diseases such as TB; third are work practice controls such as not recappingneedles, and finally personal protective equipment . While PPE is last in the hierarchy of prevention, it is very important for protecting healthcare workers from disease transmission.



All of the PPE listed here prevent contact with the infectious agent, or body fluid that may contain the infectious agent, by creating a barrier between the worker and the infectious material. Gloves, protect the hands, gowns or aprons protect the skinand/or clothing, masks and respirators protect the mouth and nose, goggles protect the eyes, and face shields protect the entire face.

The respirator, has been designed to also protect the respiratory tract from airbornetransmission of infectious agents. We'll discuss this in more detail later.



When you are selecting PPE, consider three key things.

First is the type of anticipated exposure. This is determined by the type of anticipated exposure, such as touch, splashes or sprays, or large volumes of blood orbody fluids that might penetrate the clothing. PPE selection, in particular the combination of PPE, also is determined by the category of isolation precautions a patient is on.

Second, and very much linked to the first, is the **durability and appropriateness ofthe PPE for the task**. This will affect, for example, whether a gown or apron is selected for PPE, or, if a gown is selected, whether it needs to be fluid resistant, fluid proof, or neither.

Third is fit. (optional question) How many of you have seen someone trying to work in PPE that is too small or large? PPE must fit the individual user, and it is up to the employer to ensure that all PPE are available in sizes appropriate for the workforce that must be protected.

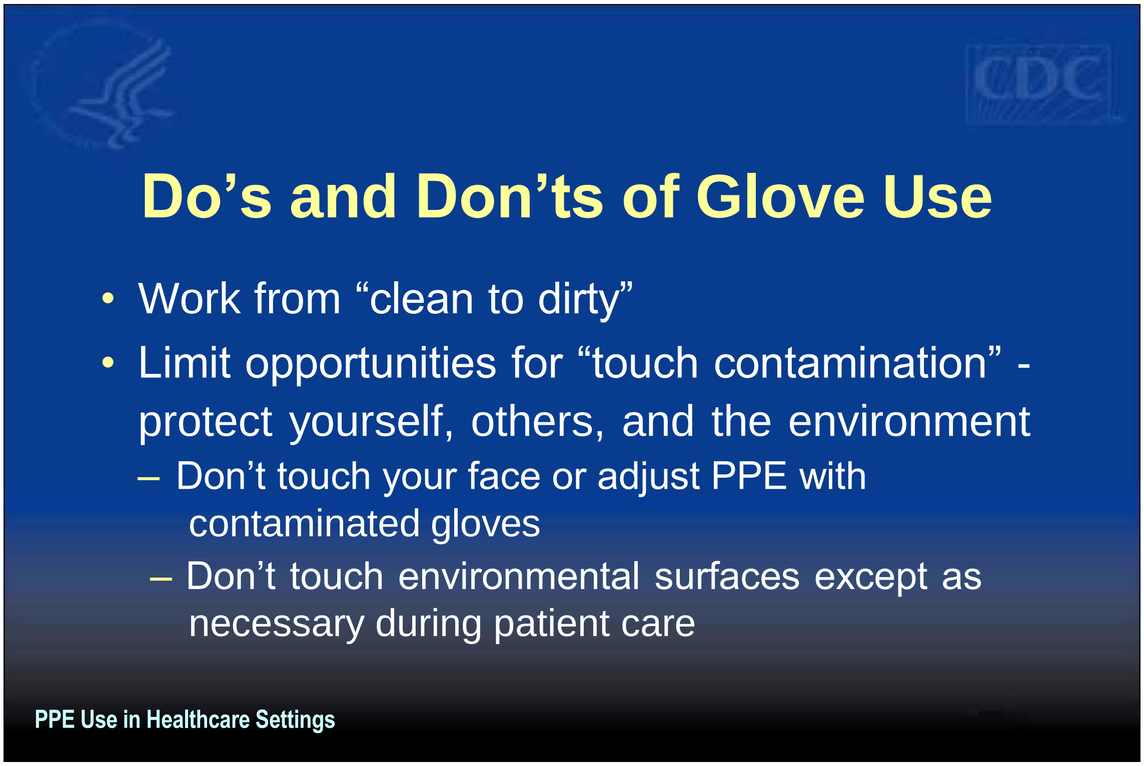
(Segue to next slide) With this as background, let's now discuss how to select and use specific PPE. After that we'll talk about which PPE is recommended for Standard Precautions and the various Isolation Precaution categories.

Gloves are the most common type of PPE used in healthcare settings. As you can see here, there are several things to consider when selecting the right glove for a specified purpose.

Most patient care activities require the use of a single pair of nonsterile gloves madeof either latex, nitrile, or vinyl. However, because of allergy concerns, some facilities have eliminated or limited latex products, including gloves, and now use gloves made of nitrile or other material. Vinyl gloves are also frequently available and work well if there is limited patient contact. However, some gloves do not provide a snug fit on the hand, especially around the wrist, and therefore should not be used if extensive contact is likely.

Gloves should fit the user's hands comfortably – they should not be too loose or tootight. They also should not tear or damage easily. Gloves are sometimes worn for several hours and need to stand up to the task.

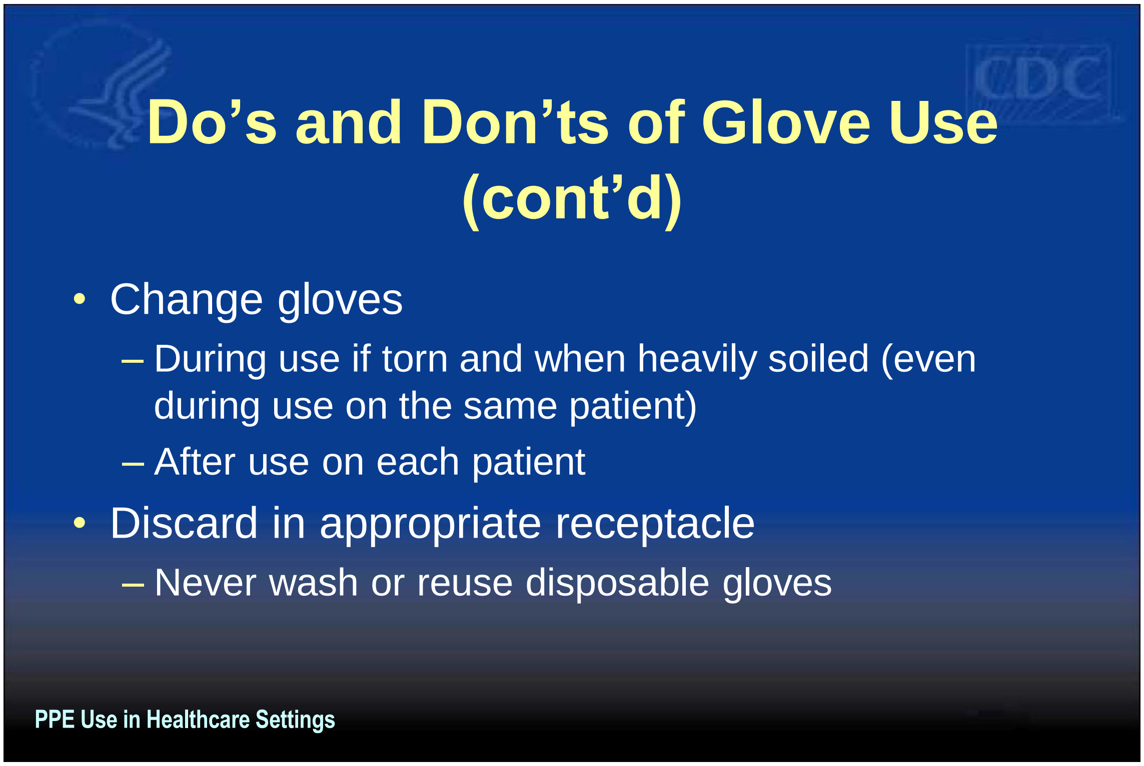
Who uses the other glove options? Sterile surgical gloves are worn by surgeons andother healthcare personnel who perform invasive patient procedures. During some surgical procedures, two pair of gloves may be worn. Environmental services personnel often wear reusable heavy duty gloves made of latex or nitrile to work with caustic disinfectants when cleaning environmental surfaces. However, they sometimes use patient care gloves too.



Gloves protect you against contact with infectious materials. However, once contaminated, gloves can become a means for spreading infectious materials to yourself, other patients or environmental surfaces. Therefore, the way YOU use gloves can influence the risk of disease transmission in your healthcare setting. These are the most important do’s and don'ts of glove use.

Work from clean to dirty. This is a basic principle of infection control. In this instance it refers to touching clean body sites or surfaces before you touch dirty or heavily contaminated areas.

Limit opportunities for “touch contamination” - protect yourself, others and environmental surfaces. How many times have you seen someone adjust their glasses, rub their nose or touch their face with gloves that have been in contact with a patient? This is one example of “touch contamination” that can potentially exposeoneself to infectious agents. Think about environmental surfaces too and avoid unnecessarily touching them with contaminated gloves. Surfaces such as light switches, door and cabinet knobs can become contaminated if touched by soiled gloves.

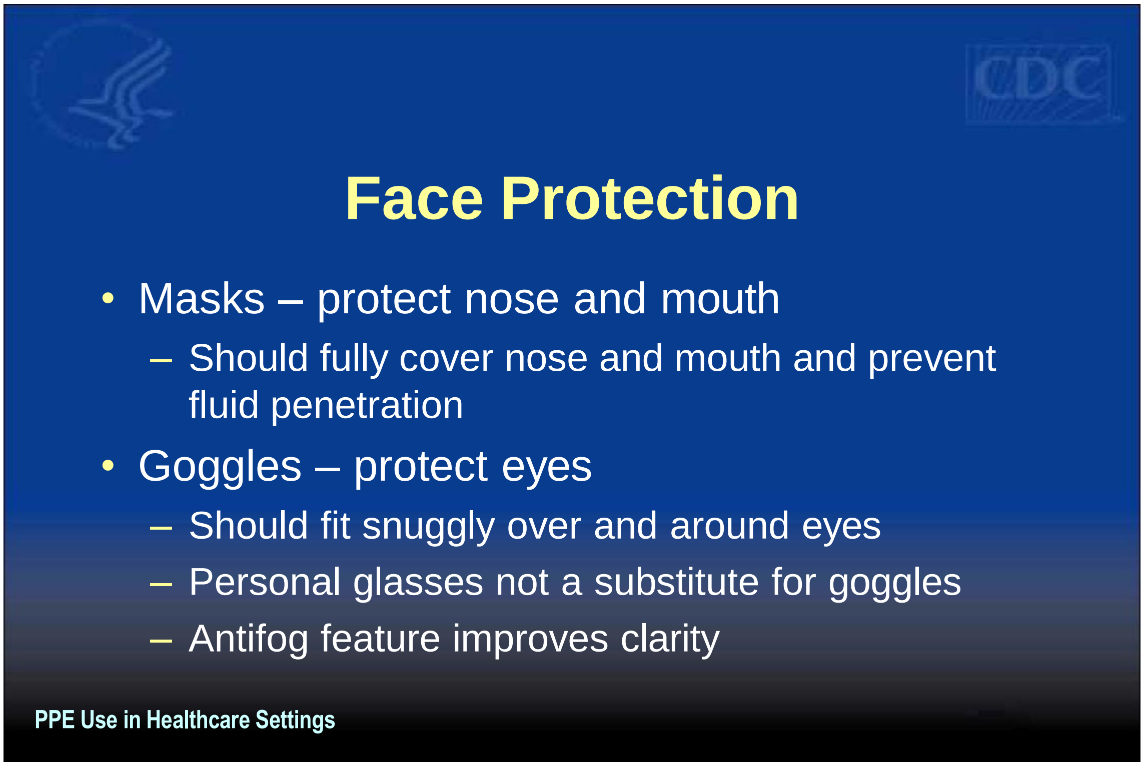


Change gloves as needed. If gloves become torn or heavily soiled and additional patient care tasks must be performed, then change the gloves before starting the nexttask. **Always** change gloves after use on each patient, and discard them in the nearest appropriate receptacle. Patient care gloves should never be washed and used again. Washing gloves does not necessarily make them safe for reuse; it may not be possible to eliminate all microorganisms and washing can make the gloves more prone to tearing or leaking.

There are three factors that influence the selection of a gown or apron as PPE. Firstis the purpose of use. Isolation gowns are generally the preferred PPE for clothing but aprons occasionally are used where limited contamination is anticipated. If contamination of the arms can be anticipated, a gown should be selected. Gowns should fully cover the torso, fit comfortably over the body, and have long sleeves that fit snuggly at the wrist.

Second are the material properties of the gown. Isolation gowns are made either of cotton or a spun synthetic material that dictate whether they can be laundered and reused or must be disposed. Cotton and spun synthetic isolation gowns vary in theirdegree of fluid resistance, another factor that must be considered in the selection of this garb. If fluid penetration is likely, a fluid resistant gown should be used.

The last factor concerns patient risks and whether a clean, rather than sterile gown,can be used. Clean gowns are generally used for isolation. Sterile gowns are only necessary for performing invasive procedures, such as inserting a central line. In this case, a sterile gown would serve purposes of patient and healthcare worker protection.

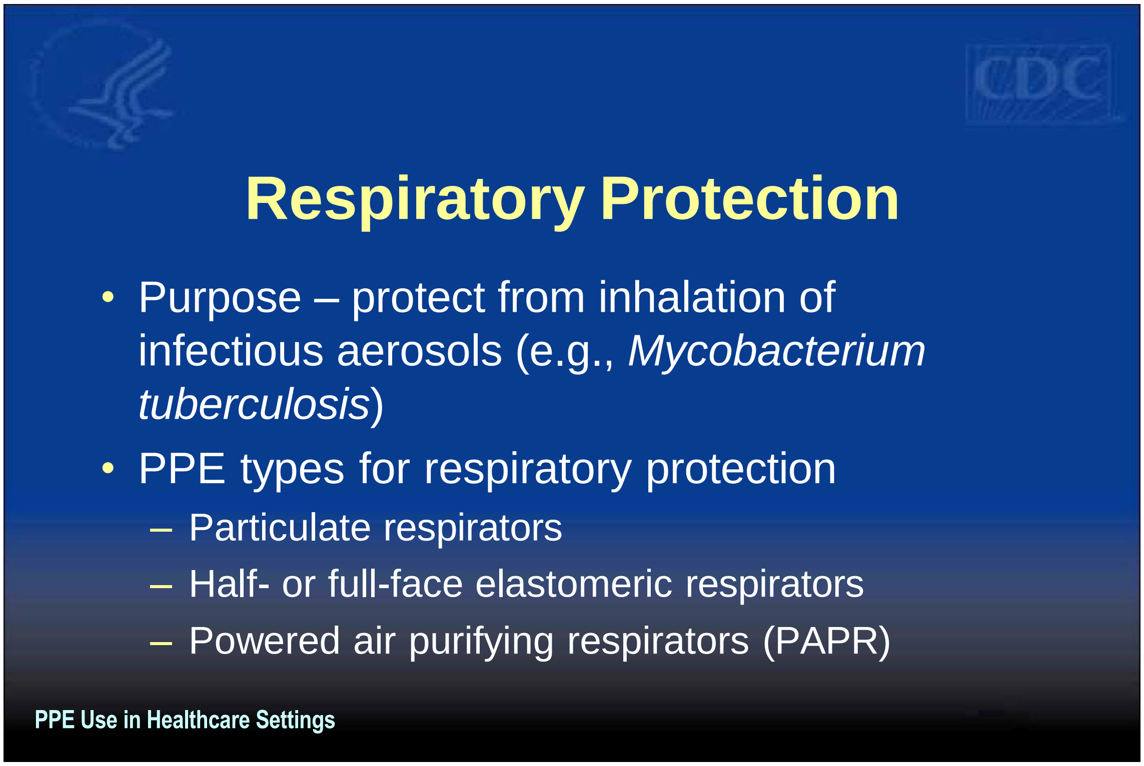


A combination of PPE types is available to protect all or parts of the face from contact with potentially infectious material. The selection of facial PPE is determined by the isolation precautions required for the patient and/or the nature ofthe patient contact. This will be discussed later.

Masks should fully cover the nose and mouth and prevent fluid penetration. Masks should fit snuggly over the nose and mouth. For this reason, masks that have a flexible nose piece and can be secured to the head with string ties or elastic are preferable.

Goggles provide barrier protection for the eyes; personal prescription lenses do not provide optimal eye protection and should not be used as a substitute for goggles. Goggles should fit snuggly over and around the eyes or personal prescription lenses.Goggles with antifog features will help maintain clarity of vision.

When skin protection, in addition to mouth, nose, and eye protection, is needed or desired, for example, when irrigating a wound or suctioning copious secretions, a face shield can be used as a substitute to wearing a mask or goggles. The face shieldshould cover the forehead, extend below the chin, and wrap around the side of the face.

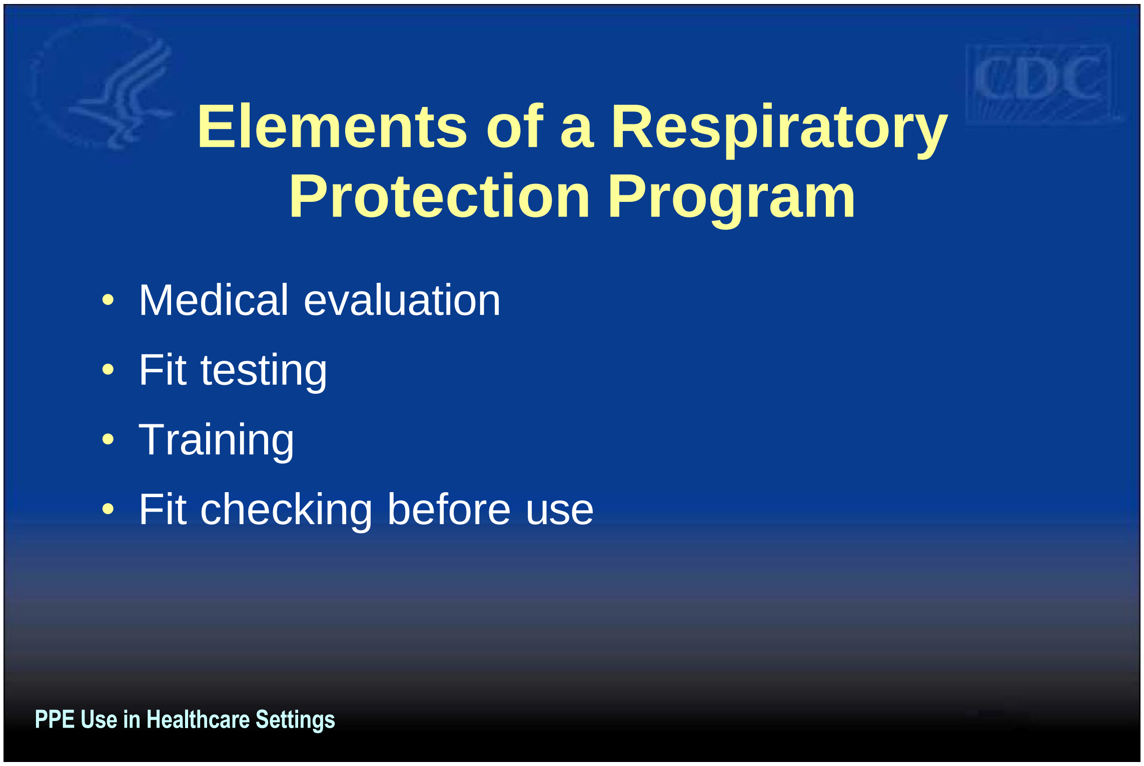


PPE also is used to protect healthcare workers' from hazardous or infectious aerosols, such as *Mycobacterium tuberculosis*. Respirators that filter the air beforeit is inhaled should be used for respiratory protection.

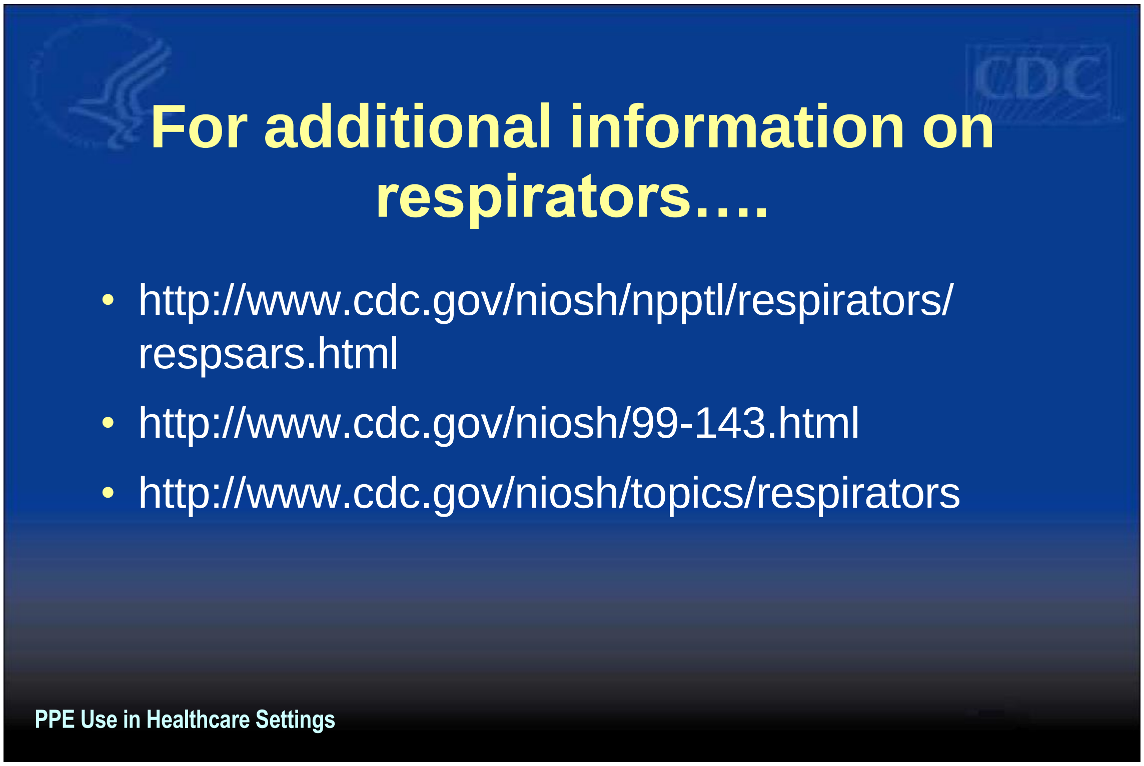
The most commonly used respirators in healthcare settings are the N95, N99, or N100 particulate respirators. The device has a sub-micron filter capable of excluding particles that are less than 5 microns in diameter.

Respirators are approved by the CDC's National Institute for Occupational Safety and Health.

Like other PPE, the selection of a respirator type must consider the nature of the exposure and risk involved. For example, N95 particulate respirators might be worn by personnel entering the room of a patient with infectious tuberculosis. However, if a bronchoscopy is performed on the patient, the healthcare provider might wear a higher level of respiratory protection, such as a powered air-purifying respirator or PAPR.



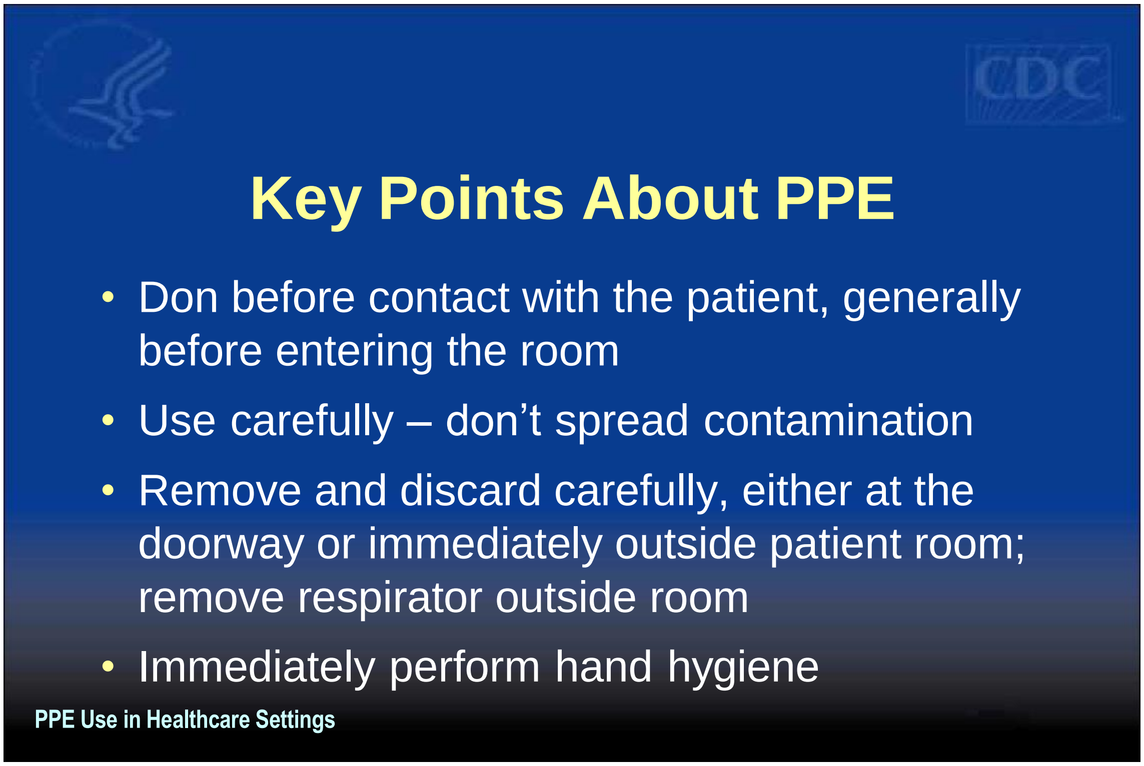
Prior to your using a respirator, your employer is required to have you medically evaluated to determine that it is safe for you to wear a respirator, to fit test you for the appropriate respirator size and type, and to train you on how and when to use a respirator. YOU are responsible for fit checking your respirator before use to makesure it has a proper seal.



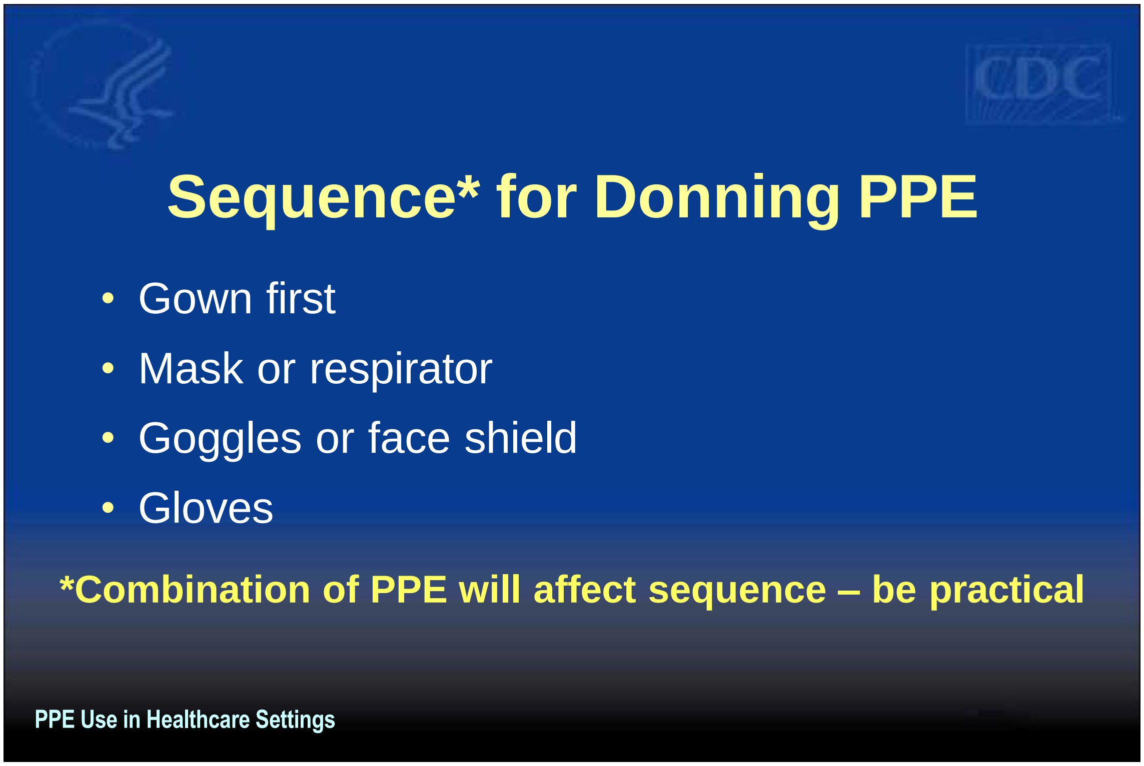
These websites can provide you with the most up-to-date information on respirators.

This next segment will address how to safely don, use, and remove PPE.

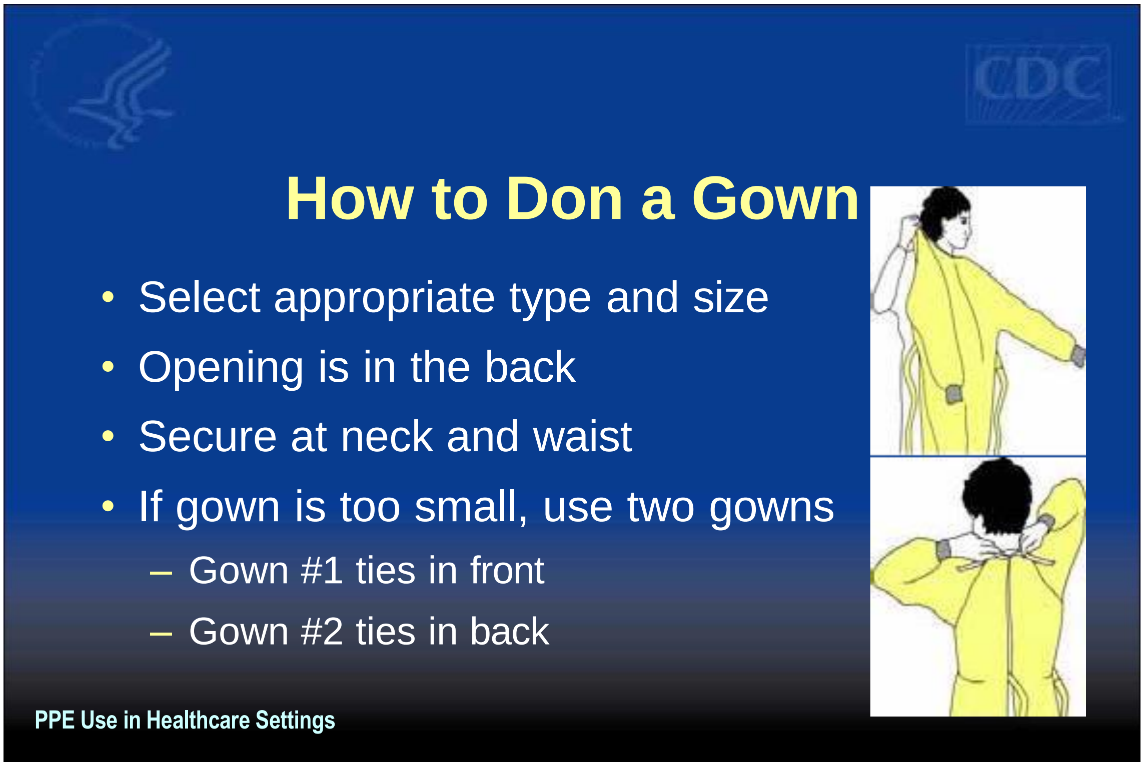
NOTE TO TRAINER: Consider having a participant demonstrate donning and removing PPE as you go through this section.



There are four key points to remember about PPE use. First, don it before you haveany contact with the patient, generally before entering the room. Once you have PPE on, use it carefully to prevent spreading contamination. When you have completed your tasks, remove the PPE carefully and discard it in the receptacles provided. Then immediately perform hand hygiene before going on to the next patient.



The gown should be donned first. The mask or respirator should be put on next andproperly adjusted to fit; remember to fit check the respirator. The goggles or face shield should be donned next and the gloves are donned last. Keep in mind, the combination of PPE used, and therefore the sequence for donning, will be determined by the precautions that need to be taken.

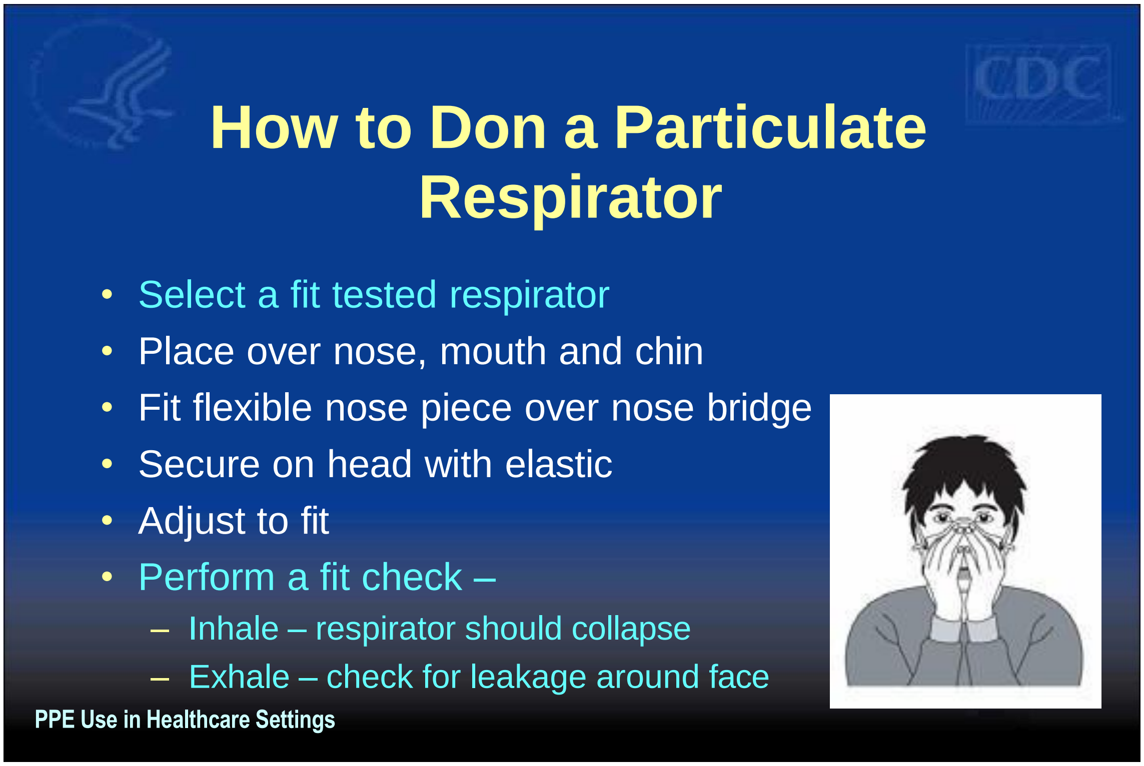


To don a gown, first select the appropriate type for the task and the right size for you. The opening of the gown should be in the back; secure the gown at the neck and waist. If the gown is too small to fully cover your torso, use two gowns. Put on the first gown with the opening in front and the second gown over the first with the opening in the back.

Some masks are fastened with ties, others with elastic. If the mask has ties, place themask over your mouth, nose and chin. Fit the flexible nose piece to the form of your nose bridge; tie the upper set at the back of your head and the lower set at the base of your neck.

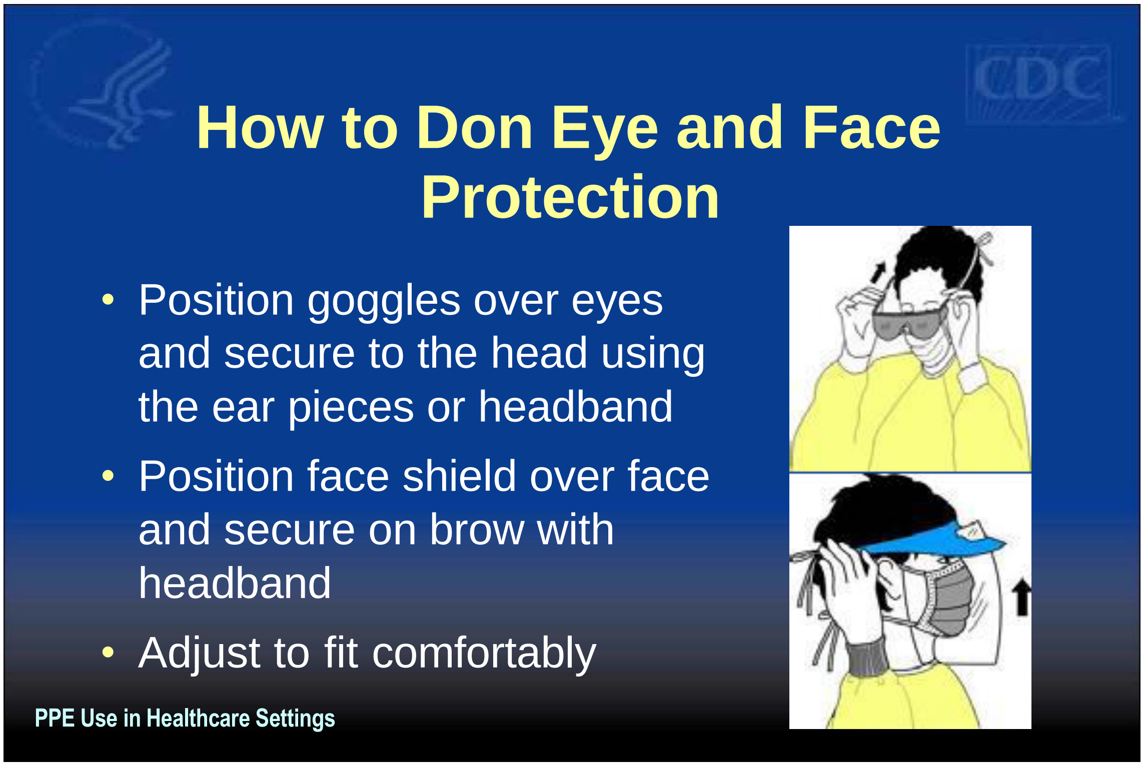
If a mask has elastic head bands, separate the two bands, hold the mask in one handand the bands in the other. Place and hold the mask over your nose, mouth, and chin, then stretch the bands over your head and secure them comfortably as shown; one band on the upper back of your head, the other below the ears at the base of theneck.

Adjust the mask to fit. Remember, you don't want to be touching it during use so take the few seconds needed to make sure it is secure on your head and fits snugglyaround your face so there are no gaps.

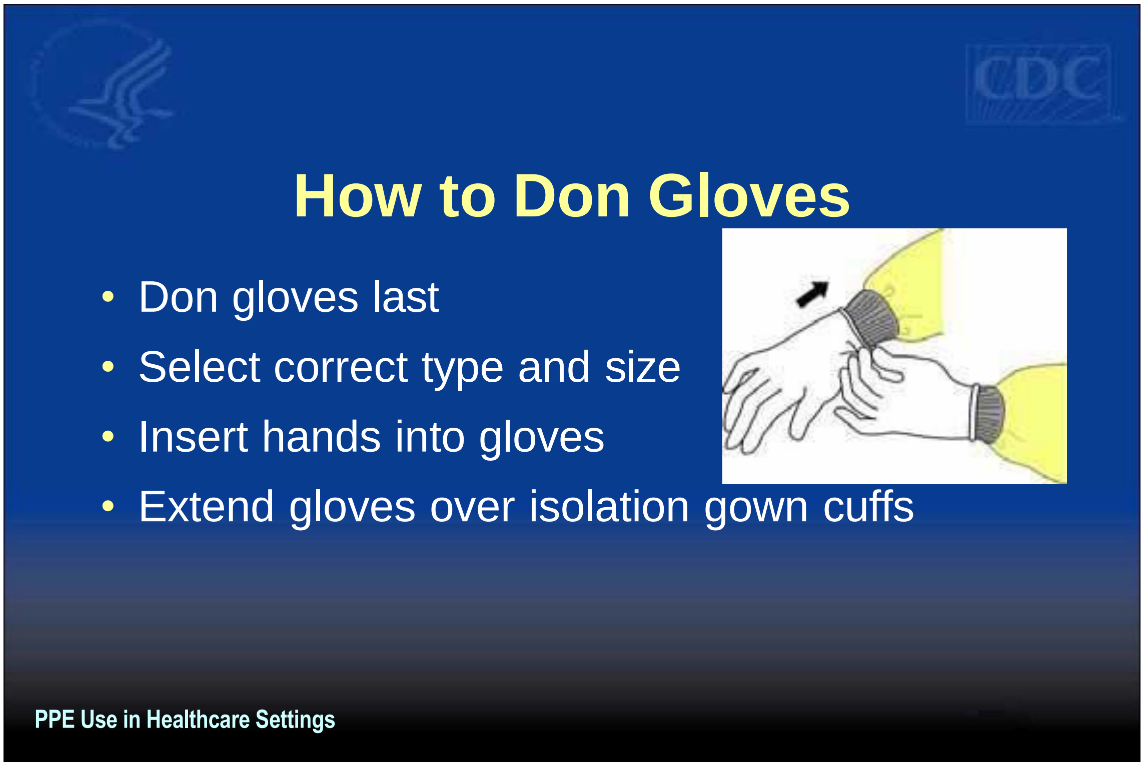


The technique for donning a particulate respirator, such as an N95, N99 or N100, is similar to putting on a pre-formed mask with elastic head bands. Key differences, however, are 1) the need to first select a respirator for which you have been fit tested and 2) fit checking the device, as you have been instructed, before entering anarea where there may be airborne infectious disease. Be sure to follow the manufacturer’s instructions for donning the device. In some instances, the manufacturer’s instructions may differ slightly from this presentation.

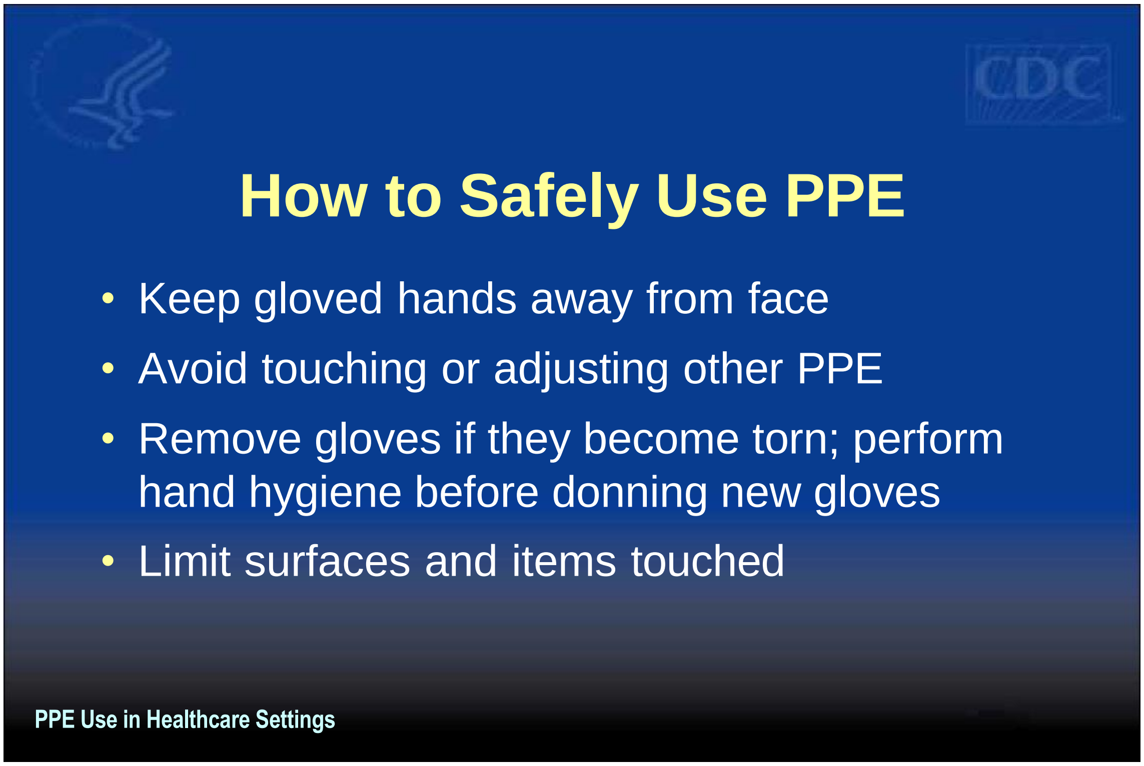
You may also be asked to wear an elastomeric or powered air purifying respirator, or PAPR. Guidance on how to use these devices is not included in this presentation.You will need instruction locally to properly use these devices.



If eye protection is needed, either goggles or a face shield should be worn. Positioneither device over the face and/or eyes and secure to head using the attached ear pieces or head band. Adjust to fit comfortably. Goggles should feel snug but not tight.

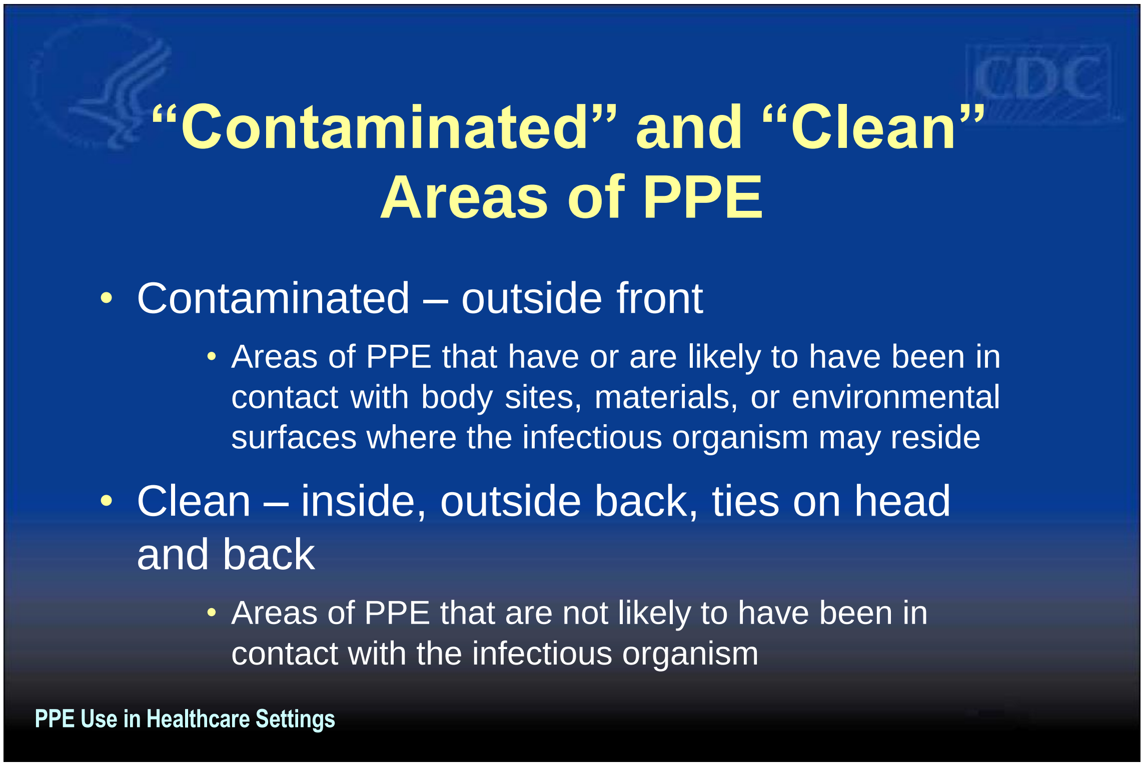


The last item of PPE to be donned is a pair of gloves. Be sure to select the type of glove needed for the task in the size that best fits you. Insert each hand into the appropriate glove and adjust as needed for comfort and dexterity. If you are wearing an isolation gown, tuck the gown cuffs securely under each glove. This provides a continuous barrier protection for your skin.



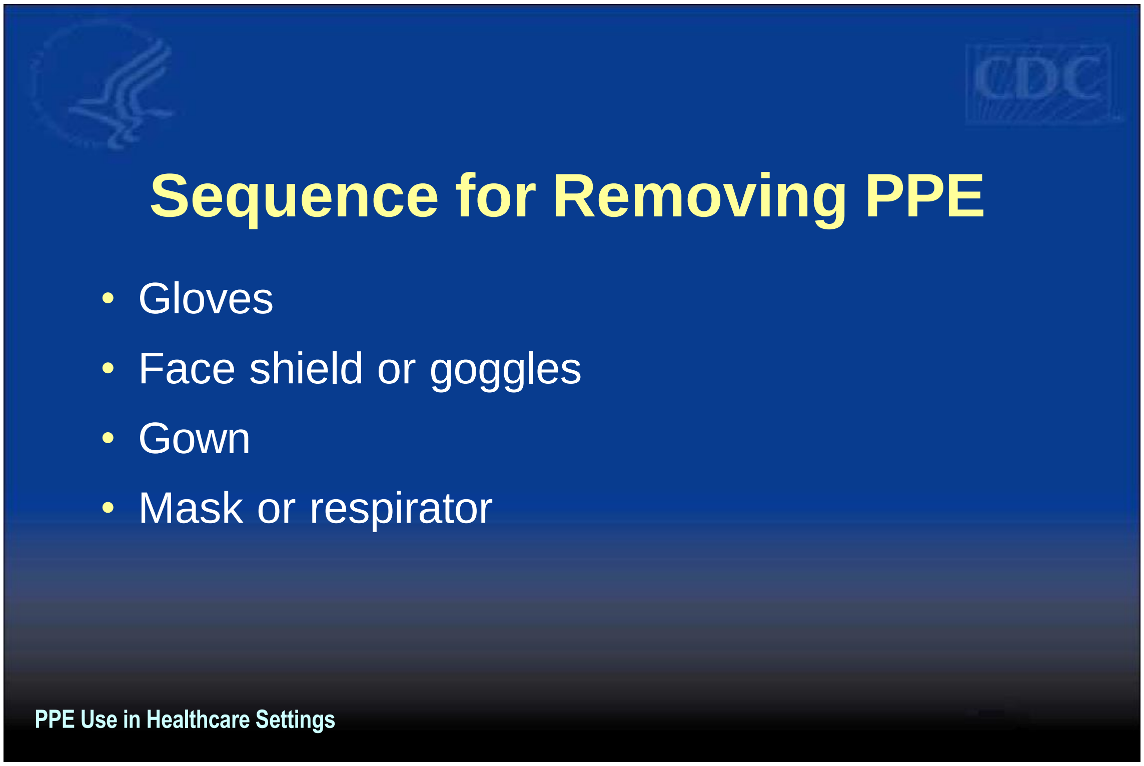
In addition to wearing PPE, you should also use safe work practices. Avoid contaminating yourself by keeping your hands away from your face and not touching or adjusting PPE. Also, remove your gloves if they become torn and perform hand hygiene before putting on a new pair of gloves. You should also avoid spreading contamination by limiting surfaces and items touched with contaminated gloves.

We've talked about donning and using PPE. Now we'll discuss how to safely remove PPE to protect you, your colleagues, and patients from exposure to contaminated materials.

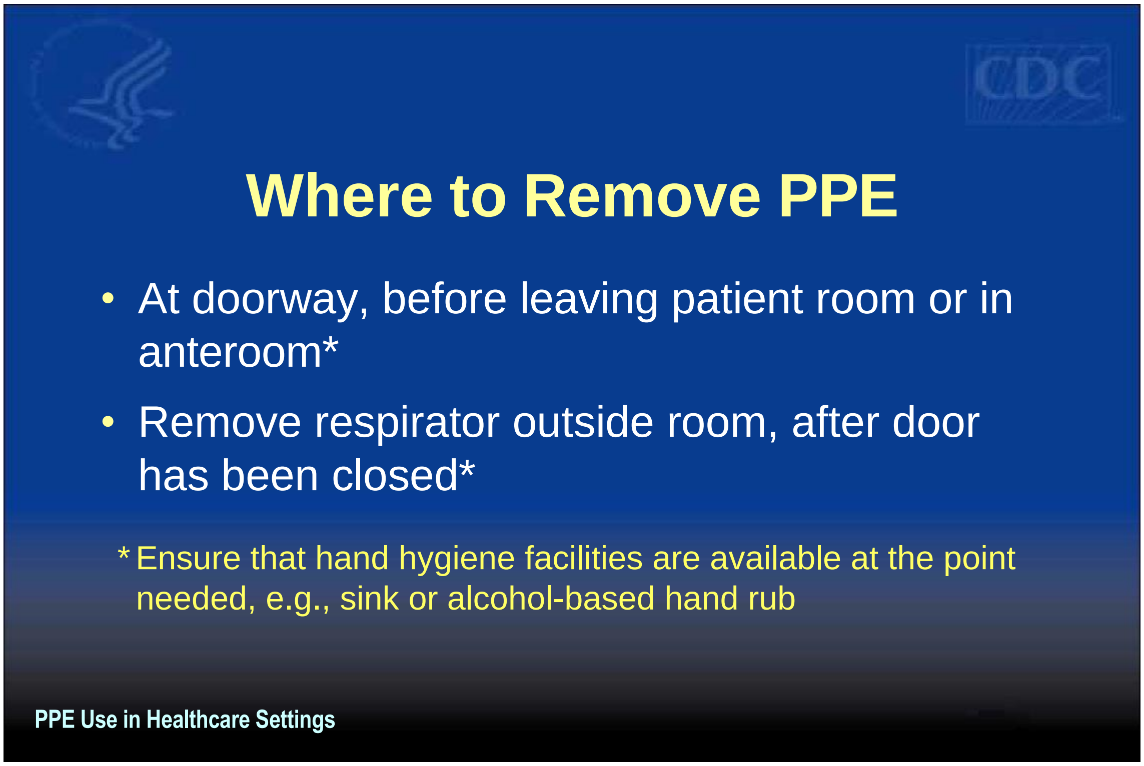


To remove PEP safely, you must first be able to identify what sites are considered "clean" and what are "contaminated." In general, the outside front and sleeves of the isolation gown and outside front of the goggles, mask, respirator and face shieldare considered "contaminated," regardless of whether there is visible soil. Also, the outside of the gloves are contaminated.

The areas that are considered "clean" are the parts that will be touched when removing PPE. These include inside the gloves; inside and back of the gown, including the ties; and the ties, elastic, or ear pieces of the mask, goggles and face shield.

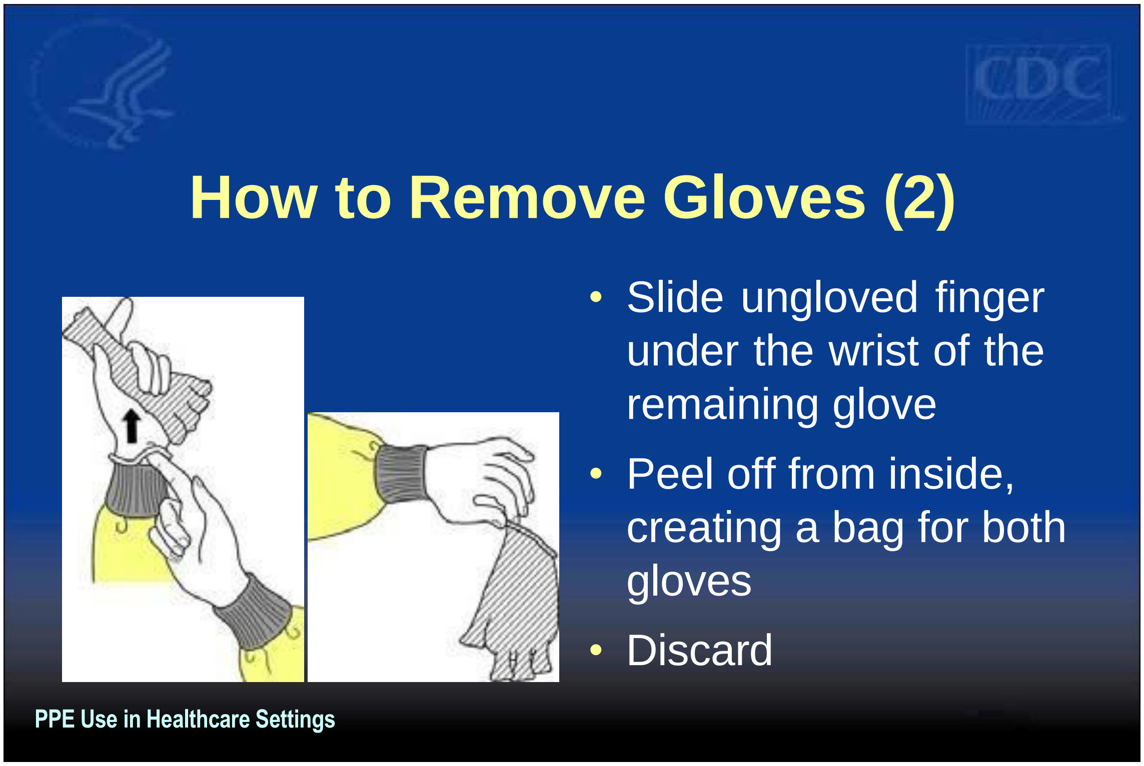


The sequence for removing PPE is intended to limit opportunities for self-contamination. The gloves are considered the most contaminated pieces of PPE andare therefore removed first. The face shield or goggles are next because they are more cumbersome and would interfere with removal of other PPE. The gown is third in the sequence, followed by the mask or respirator.

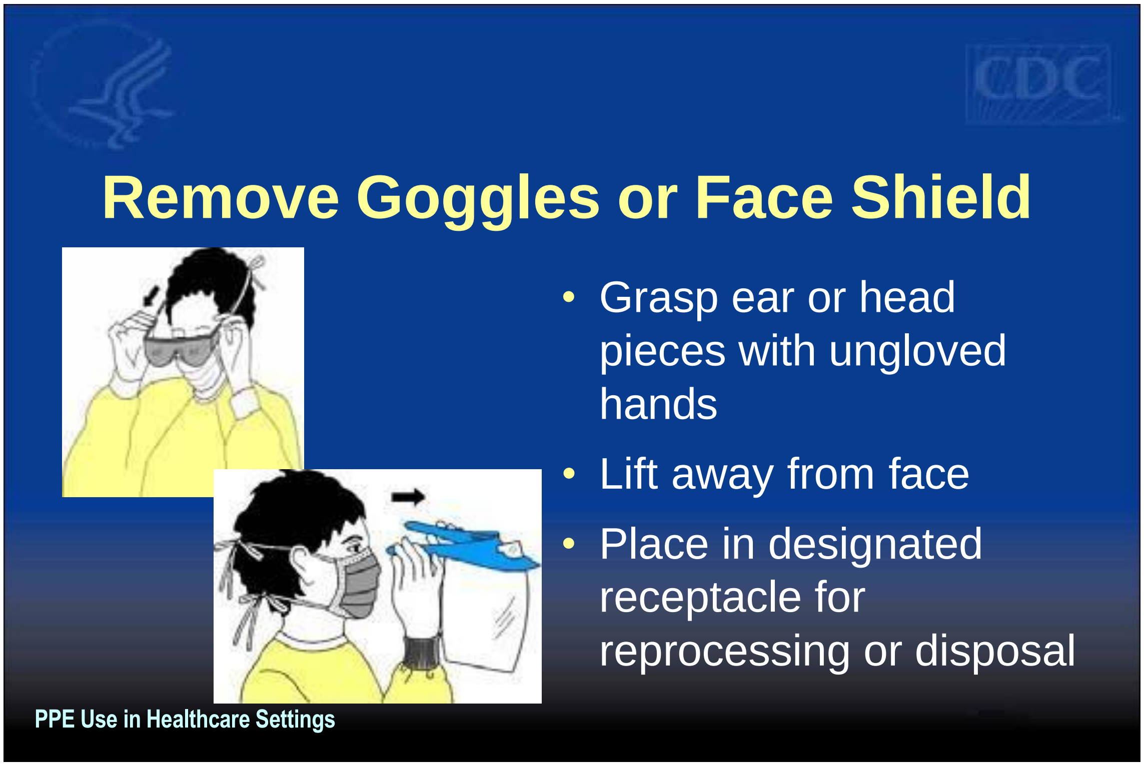


The location for removing PPE will depend on the amount and type of PPE worn and the category of isolation a patient is on, if applicable. If only gloves are worn as PPE, it is safe to remove and discard them in the patient room. When a gown orfull PPE is worn, PPE should be removed at the doorway or in an anteroom. Respirators should always be removed outside the patient room, after the door is closed. Hand hygiene should be performed after all PPE is removed.

Using one gloved hand, grasp the outside of the opposite glove near the wrist. Pull and peel the glove away from the hand. The glove should now be turned inside-out, with the contaminated side now on the inside. Hold the removed glove in the opposite gloved hand.

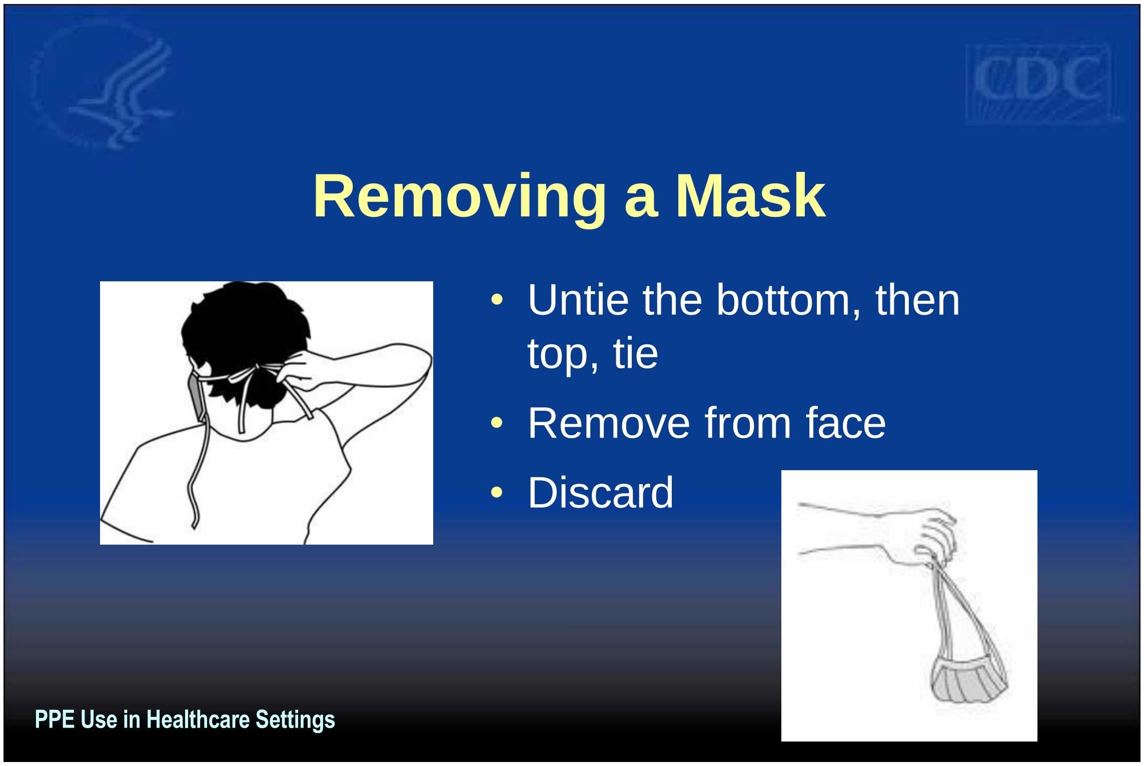


Slide one or two fingers of the ungloved hand under the wrist of the remaining glove. Peel glove off from the inside, creating a bag for both gloves. Discard in waste container.

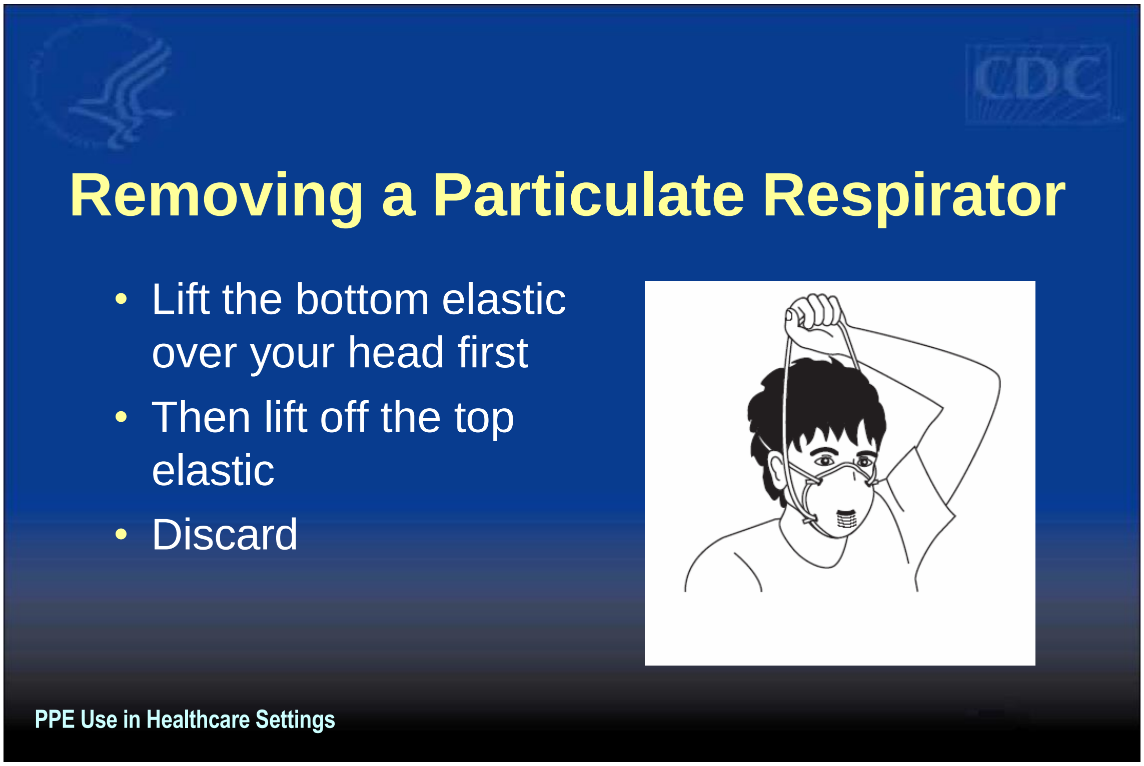


Using ungloved hands, grasp the “clean” ear or head pieces and lift away from face.If goggle or face shield are reusable, place them in a designated receptacle for subsequent reprocessing. Otherwise, discard them in the waste receptacle.

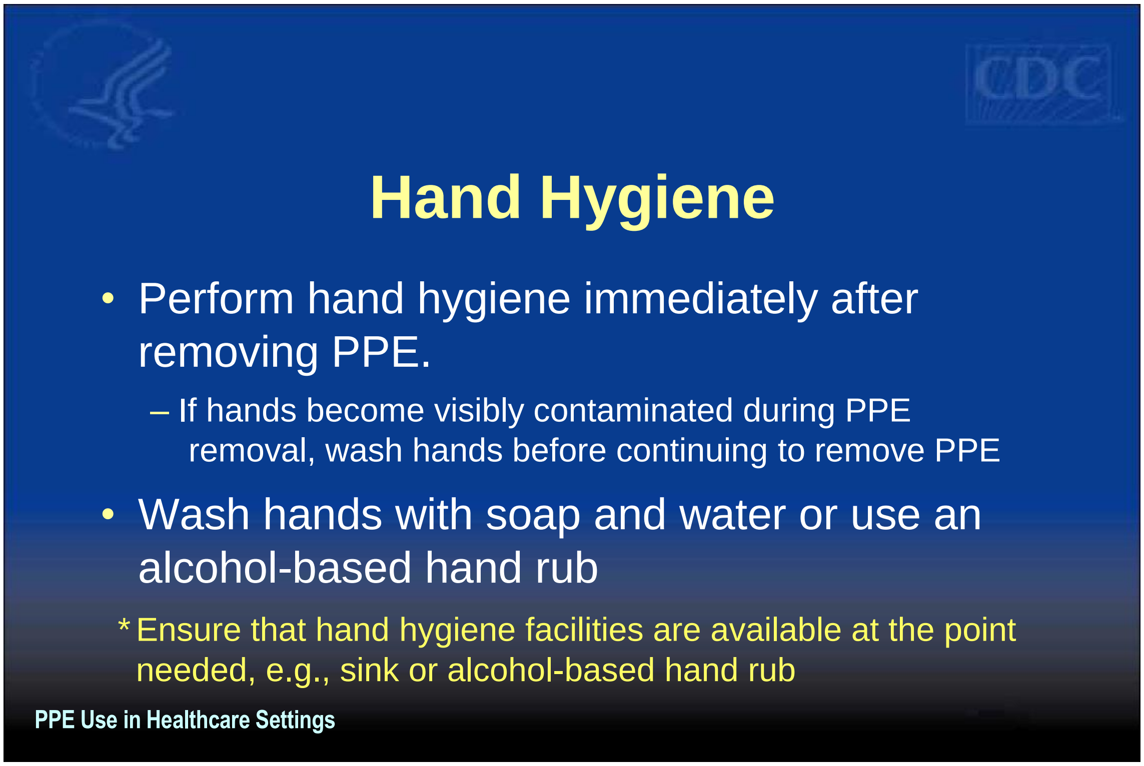
Unfasten the gown ties with the ungloved hands. Slip hands underneath the gown atthe neck and shoulder, peel away from the shoulders. Slip the fingers of one hand under the cuff of the opposite arm. Pull the hand into the sleeve, grasping the gown from inside. Reach across and push the sleeve off the opposite arm. Fold the gown towards the inside and fold or roll into a bundle. (Only the “clean” part of thegown should be visible.) Discard into waste or linen container, as appropriate.



The front of the mask is considered contaminated and should not be touched. Remove by handling only the ties or elastic bands starting with the bottom then top tie or band. Lift the mask or respirator away from the face and discard it into the designated waste receptacle.



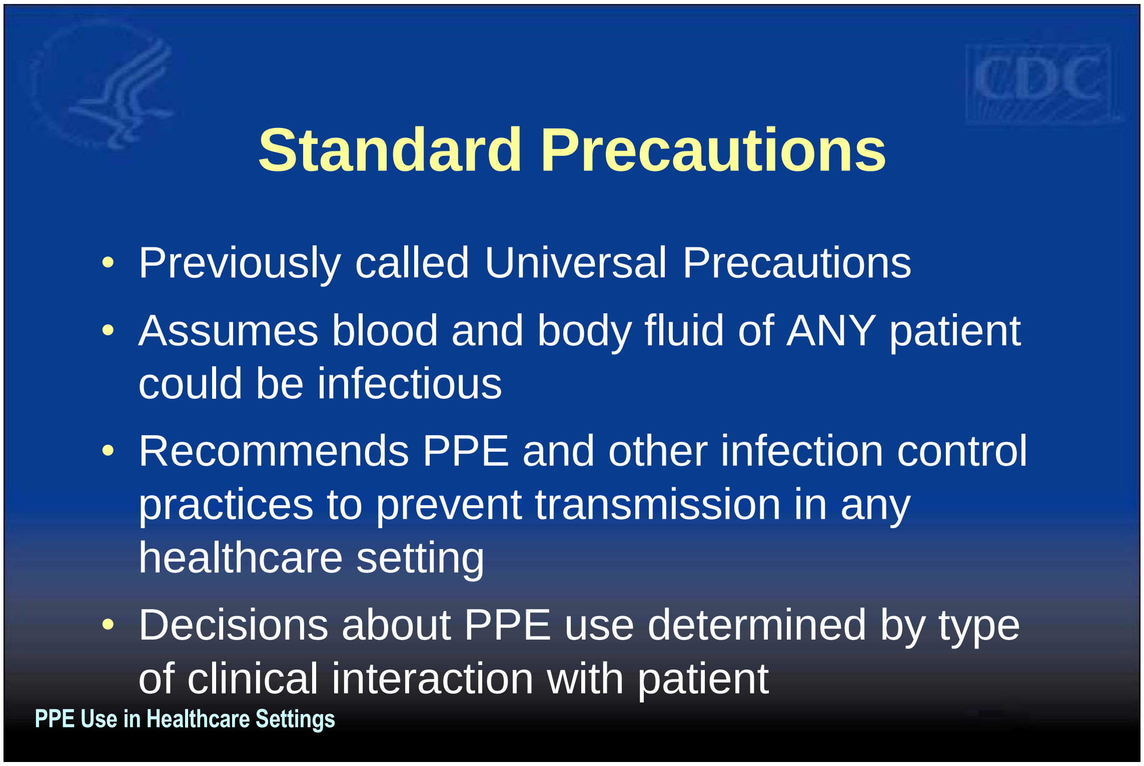
The bottom elastic should be lifted over the head first. Then remove the top elastic. This should be done slowly to prevent the respirator from “snapping” off the face.



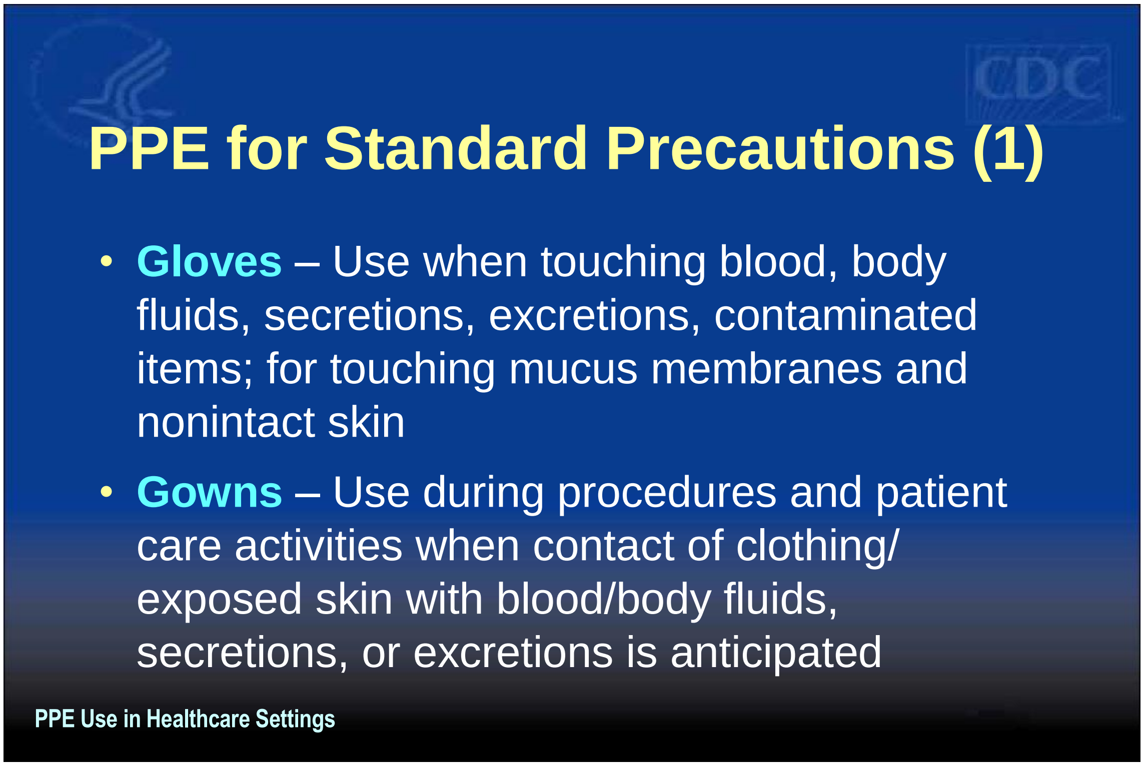
Hand hygiene is the cornerstone of preventing infection transmission. You should perform hand hygiene immediately after removing PPE. If your hands become visibly contaminated during PPE removal, wash hands before continuing to removePPE. Wash your hands thoroughly with soap and warm water or, if hands are not visibly contaminated, use an alcohol-based hand rub.

Thus far we have discussed the various types of PPE, considered various factors thatgo into selecting appropriate PPE, and described how to don, use, and remove PPE safely. This last segment of this presentation will discuss **WHEN** to use which PPE.

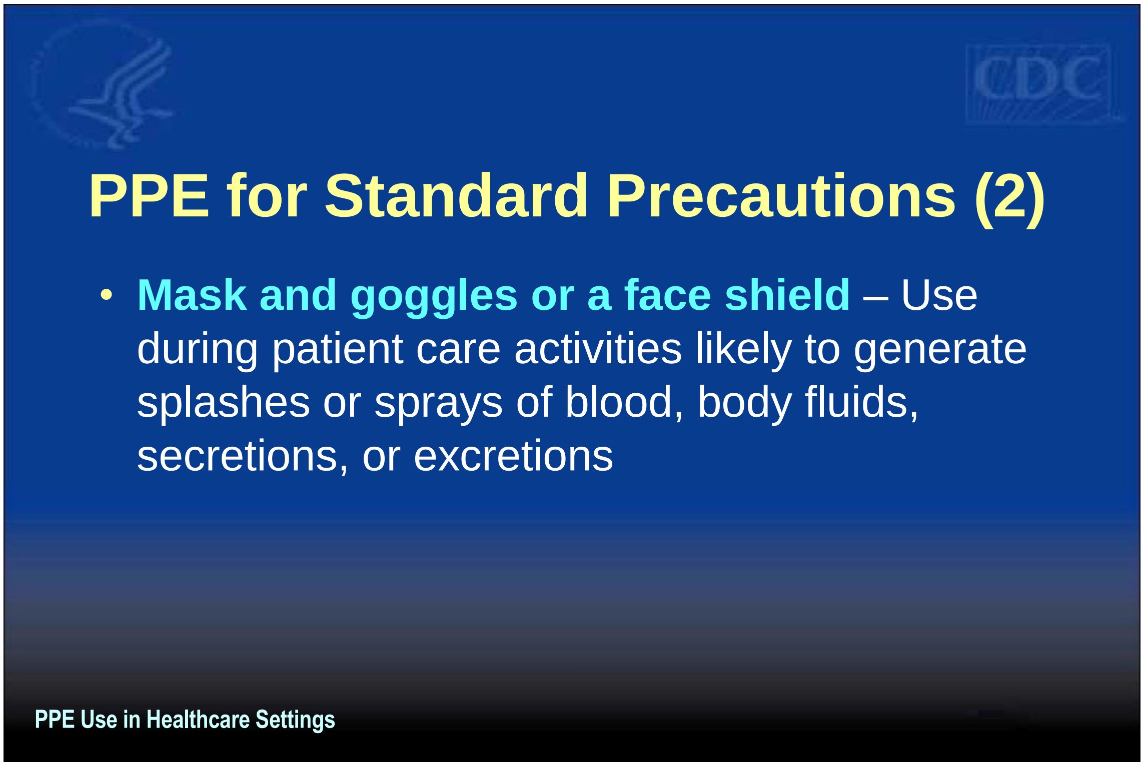
Decisions regarding when and which type of PPE should be worn are determined byCDC recommendations for Standard Precautions and Expanded Isolation Precautions.



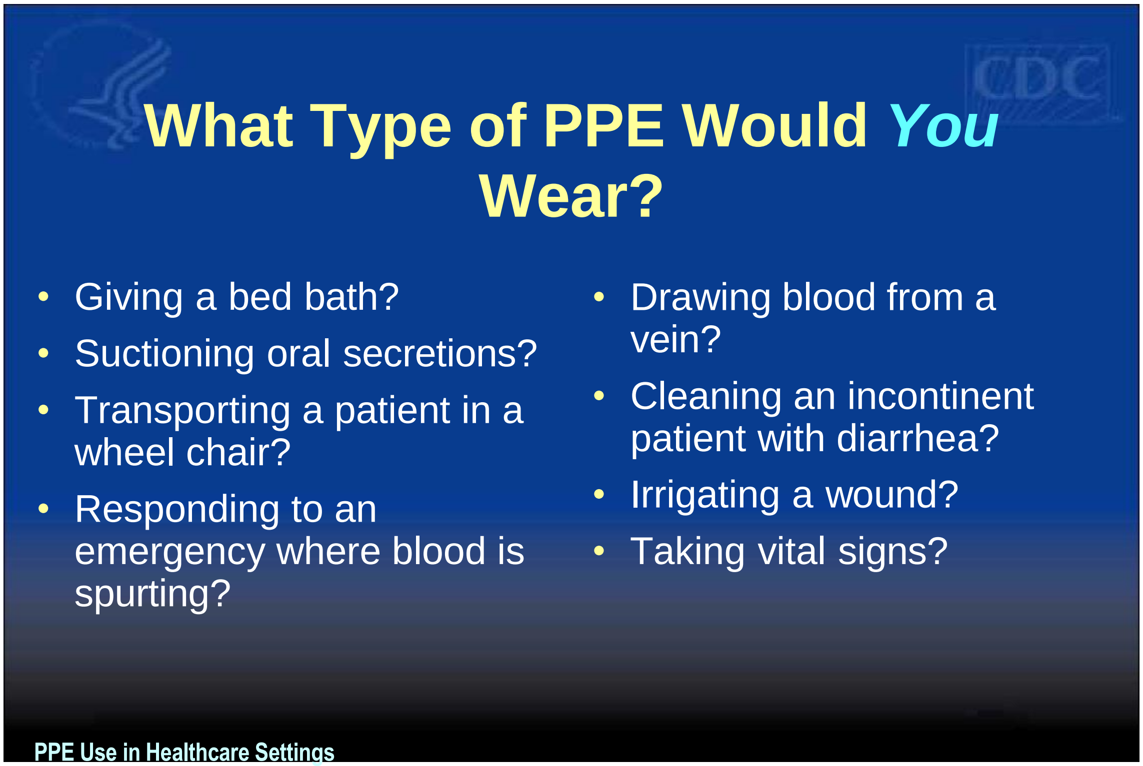
Standard Precautions is an outgrowth of Universal Precautions. Universal Precautions was first recommended in 1987 to prevent the transmission of bloodborne pathogens to healthcare personnel. In 1996, the application of the concept was expanded and renamed “Standard Precautions.” Standard Precautions is intended to prevent the transmission of common infectious agents to healthcare personnel, patients and visitors in any healthcare setting. During care for any patient, one should assume that an infectious agent could be present in the patient’sblood or body fluids, including all secretions and excretions except tears and sweat.Therefore appropriate precautions, including use of PPE, must be taken. Whether PPE is needed, and if so, which type, is determined by the type of clinical interaction with the patient and the degree of blood and body fluid contact that can be reasonably anticipated and by whether the patient has been placed on isolation precautions such as Contact or Droplet Precautions or Airborne Infection Isolation.



Under Standard Precautions, **gloves** should be used when touching blood, body fluids, secretions, excretions, or contaminated items and for touching mucous membranes and nonintact skin. A **gown** should be used during procedures and patient care activities when contact of clothing and/or exposed skin with blood, body fluids, secretions, or excretions is anticipated. Aprons are sometimes used asPPE over scrubs, such as in hemodialysis centers when inserting a needle into a fistula.



Mask and goggles or a face shield should be used during patient care activities that are likely to generate splashes and sprays of blood, body fluids, secretions, orexcretions.



Listed here are several patient care activities that could indicate a need to wear PPE. What PPEwould you wear for the following?

Giving a bed bath? (generally none)

Suctioning oral secretions? (gloves and mask/goggles or a face shield) (Respondents may correctlynote that this may depend on whether open or closed suction is being used)

Transporting a patient in a wheelchair? (generally none)

Responding to an emergency where blood is spurting? (gloves, fluid-resistant gown, mask/goggles ora face shield)

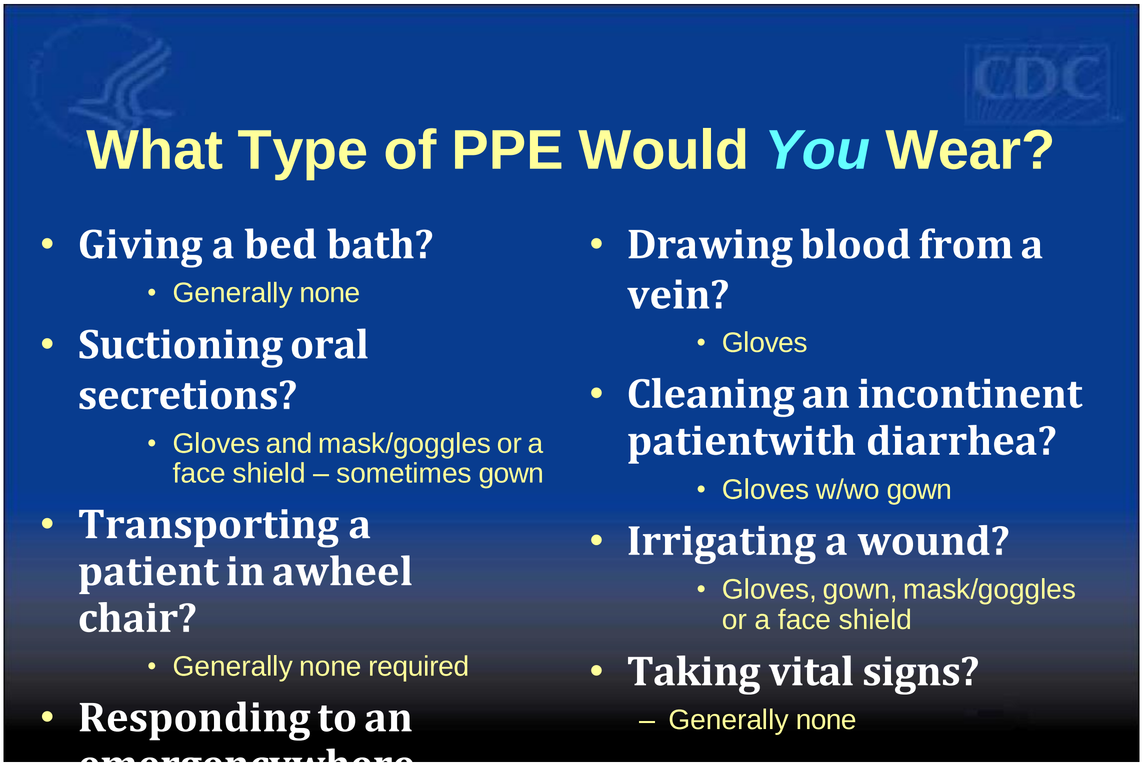
Drawing blood from a vein? (gloves)

Cleaning an incontinent patient with diarrhea? (gloves and generally a

gown)Irrigating a wound? (gloves, gown, and mask/goggles or a face

shield) Taking vital signs? (generally none)

NOTE TO TRAINER: Encourage discussion of how healthcare personnel decide for themselves which PPE will be worn. Do they over- or under-protect themselves? If a question is raised aboutuse of gloves for giving an injection, indicate that this is largely a matter of local or state policy. OSHA does not require use of gloves for giving an injection.



- Gloves, fluid-resistant gown, mask/goggles or a face shield

PPE Use in Healthcare Settings

Listed here are several patient care activities that could indicate a need to wear PPE.What PPE would you wear for the following?

Giving a bed bath? (generally none)

Suctioning oral secretions? (gloves and mask/goggles or a face shield) (Respondents may correctly note that this may depend on whether open or closed suction is being used)

Transporting a patient in a wheelchair? (generally none)

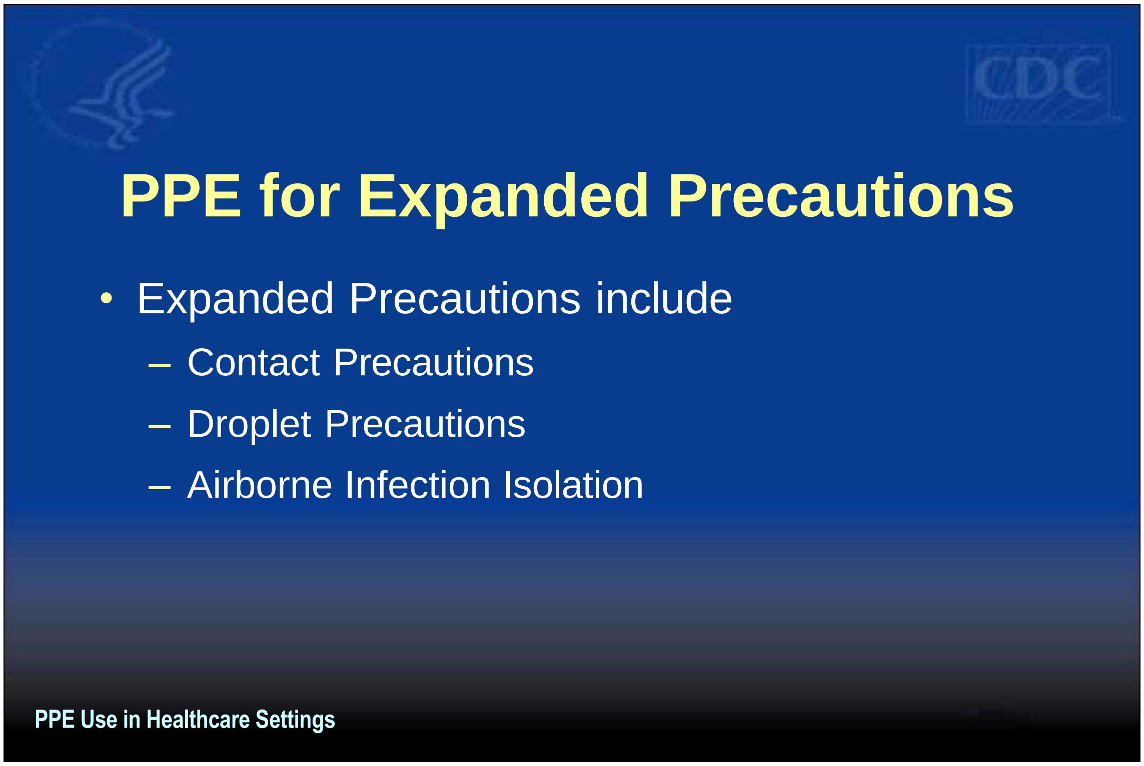
Responding to an emergency where blood is spurting? (gloves, fluid-resistant gown,and mask/goggles or a face shield)

Drawing blood from a vein? (gloves)

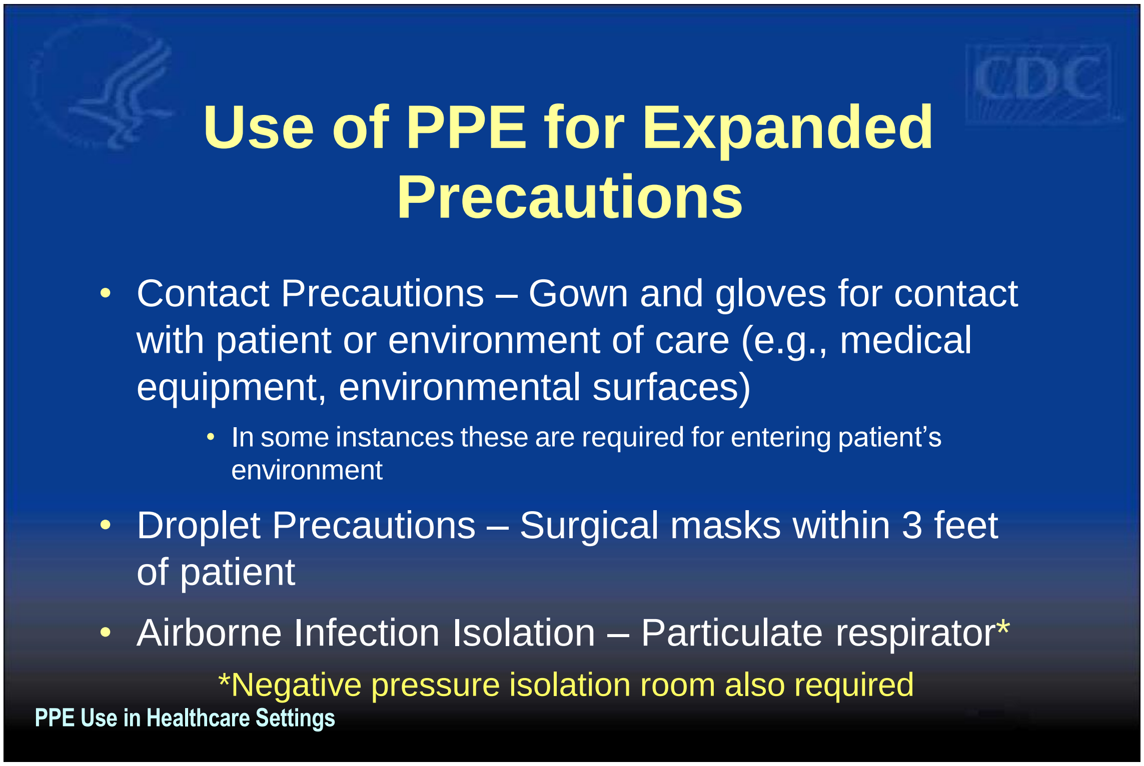
Cleaning an incontinent patient with diarrhea? (gloves and generally a gown)Irrigating a wound? (gloves, gown, and mask/goggles or a face shield)

Taking vital signs? (generally none)

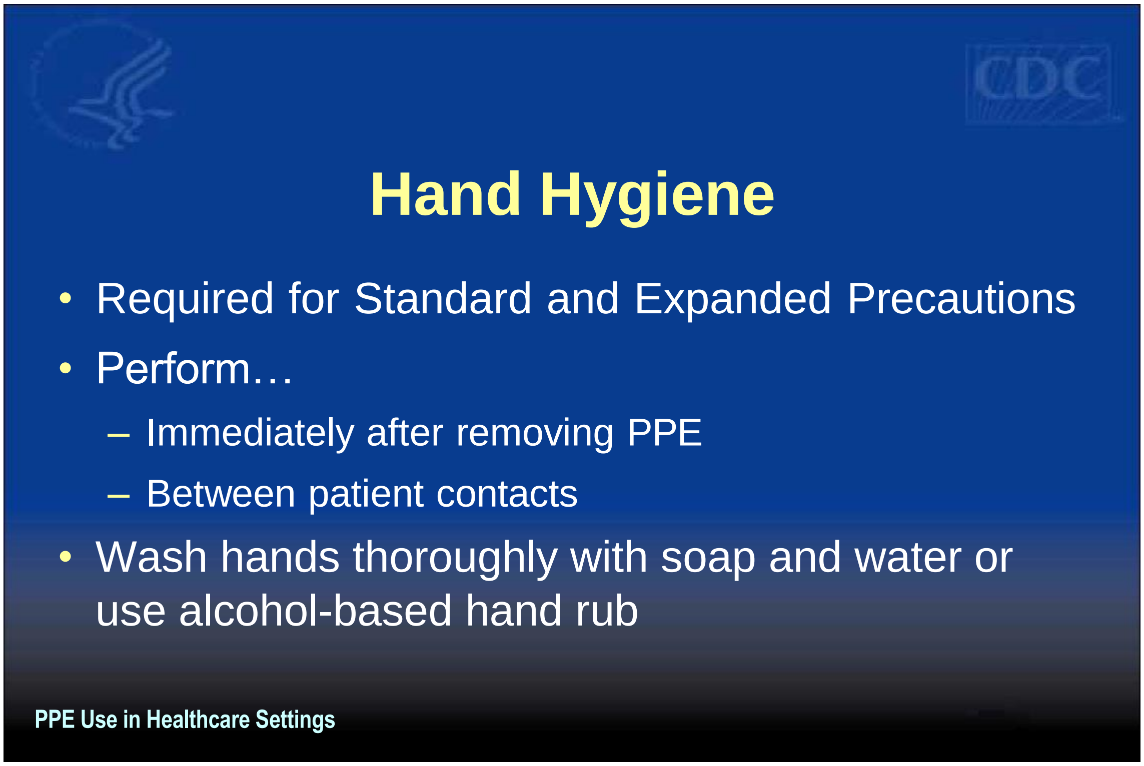
NOTE TO TRAINER: Encourage discussion of how healthcare personnel decide for themselves which PPE will be worn. Do they over- or under-protect themselves?



In some instances, healthcare personnel are required to wear PPE in addition to thatrecommended for Standard Precautions. The three Expanded Precaution categories(formerly called Transmission-Based Precautions) where this applies are Contact and Droplet Precautions and Airborne Infection Isolation.



Contact Precautions requires gloves and gown for contact with the patient and/or theenvironment of care; in some instances, use of this PPE is recommended for even entering the patient's environment. Droplet Precautions requires the use of a surgical mask, and Airborne Infection Isolation requires that only a respirator be worn.

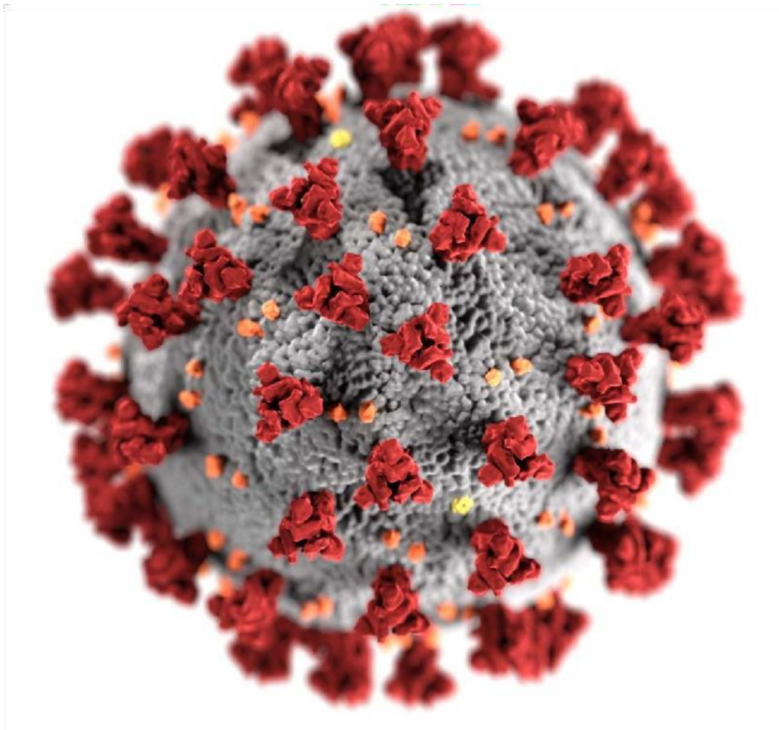


Hand hygiene has been mentioned several time during this presentation. Hand hygiene is an essential infection control practice to protect patients, healthcare personnel and visitors and is required for both Standard and Expanded Precautions. Hand hygiene should be performed immediately after removing PPE, even during PPE changes and removal if necessary, and between patient contacts. Wash your hands thoroughly with soap and warm water or, if hands are not visibly soiled, use aalcohol-based hand rub.

These are a few final thoughts before ending today's presentation. Remember, PPEis available to protect you from exposure to infectious agents during healthcare. It is important that you know what type of PPE is necessary for the procedures you perform AND that you use it correctly.

Thank you for your attention and participation. Are there any questions?

Document can be found at:
https://www.cdc.gov/coronavirus/2019ncov/hcp/non-ussettings/overview/index.html



COVID-19 Overview and Infection Prevention and Control Priorities in non-US Healthcare Settings

cdc.gov/coronaviru
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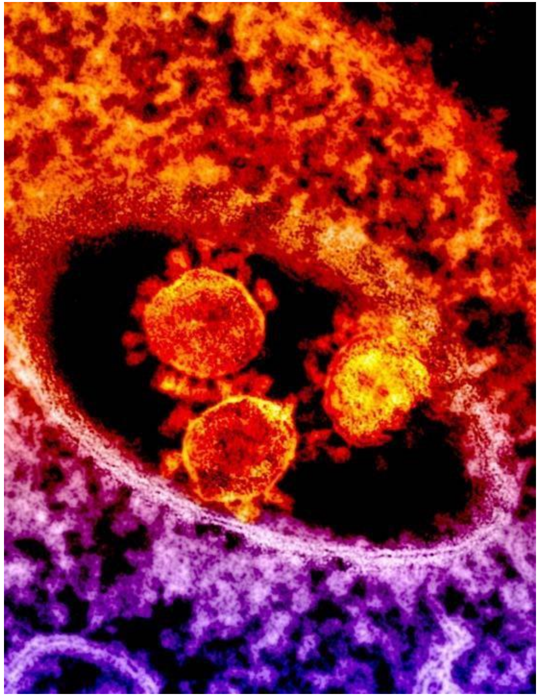
Outline

- Coronavirus Background
- Coronavirus Disease 2019 (COVID-19)
  - Emergence of COVID-19
  - Transmission
  - Symptoms
- COVID-19 Prevention and Treatment
- Infection Prevention and Control (IPC) for COVID-19

Coronavirus Background

Coronaviruses (CoV)

- Coronaviruses are a large family of viruses that can cause illness in animals or humans
- In humans, several known coronaviruses can cause respiratory infections
  - Ranging from the common cold to more severe diseases such as severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS) and coronavirus disease 2019 (COVID-19)



Coronavirus Disease 2019 (COVID-19)

COVID-19: Emergence

- Identified in Wuhan, China in December 2019
- COVID-19 is caused by the virus SARS-CoV-2
- Early in the outbreak, many patients were reported to have a link to a large seafood and live animal market
    - Later, no link to the market indicating person-to-person spread of the disease
- Travel-

related exportation of cases reported

https://www.healthpolicy -watch.org/

COVID-19: Transmission

- The primary transmission of COVID-19 is from person to person through respiratory droplets
  - Droplets are released when someone talks, sneezes, or coughs – Infectious droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs
- COVID-19 may also be spread if you touch contaminated objects and surfaces
- Recent data suggest transmission by people who are not showing symptoms

COVID-19: Transmission

- Current data do not support long range aerosol transmission of SARS-CoV-2 such as with measles and tuberculosis
- As with many respiratory pathogens, short-range inhalation aerosols is a possibility for COVID-19 transmission
  - Particularly in crowded medical wards and inadequately ventilated spaces
- Certain procedures in health facilities can generate fine aerosols and should be avoided whenever possible.

See WHO Guidance: [Modes of transmission of virus causing COVID-19: implications for IPC precaution recommendations]

COVID-19: Symptoms

- Wide range of symptoms reported*
  - Fever or chills
  - Cough
  - Shortness of breath or difficulty breathing
  - Headache
  - Nasal congestion or runny nose
  - Muscle or body aches

Estimated incubation period: 2 to 14 days

– Sore throat
– New loss of smell or taste
– Diarrhea (may be present in some patients)

* https://www.who.int/publications-detail/clinical-management-ofcovid-19

CDC

* 1,023 (49%) deaths among 2,087 critically ill patients

adapted from Zhang 2020,China CDC Weekly Repor t; 2(8):113-122.

COVID-19: People at higher risk for severe illness

- In some cases, people who get COVID-19 can become seriously ill and develop difficulty breathing
  - These severe complications can lead to death
- The risk of severe disease increases steadily as people age
- Those of all ages with underlying medical conditions appear to be at higher risk to develop severe COVID-19 compared to those without these conditions
- As more data become available, additional risk factors for severe COVID-19 may be identified

COVID-19 Prevention and Treatment

COVID-19: Everyday preventative actions

- Avoid touching your eyes, nose, and mouth
- Avoid close contact with people who are sick
  - Remember that people without symptoms can still spread the virus
- Stay at home when you are sick
- Cover your cough or sneeze with a tissue, then dispose of it properly
- Use a face covering when physical distancing is difficult or when going into closed spaces

- Clean and disinfect frequently touched objects and surfaces
- Perform hand hygiene with soap and water or use alcohol-based hand rub

COVID-19: Treatment

- Currently, care for patients is primarily supportive: – Relieve symptoms
  - Manage respiratory, and other organ, failure
- There are no specific antiviral treatments currently licensed for COVID-19
  - Many treatments are under investigation
  - Remdesivir, which is also an investigational drug, received Food and Drug Administration (FDA) emergency use authorization for treatment of hospitalized patients*

- No vaccine is currently available

  * FDA: https://www.fda.gov/media/137564/download

Infection Prevention and Control (IPC) for COVID-19

What is IPC?

- The practice of preventing or stopping the spread of infections during healthcare delivery
  - Hospitals, outpatient clinics, dialysis centers, long-term care facilities, traditional practitioners

- **IPC Goal for COVID-19: To support the maintenance of essential healthcare services by containing and preventing COVID-19 transmission within healthcare facilities to keep patients and healthcare workers healthy and safe**

COVID-19: IPC Priorities

- Rapid identification of suspect cases – Screening/triage at initial healthcare facility encounter and rapid implementation of source control
  - Limiting entry of healthcare workers and/or visitors with suspected or confirmed COVID-19
- Immediate isolation and referral for testing
  - Group patients with suspected or confirmed COVID-19 separately
  - Test all suspected patients for COVID-19
- Safe clinical management
  - Immediate identification of inpatients and healthcare workers with suspected COVID-19

- Adherence to IPC practices
  - Appropriate personal protective equipment (PPE) use

[Strategic Priority IPC Activities for Containment and Prevention](#)

Standard and Transmission-Based Precautions

- Standard Precautions
  - Set of practices that apply to care of all patients in all healthcare settings
- Transmission-Based Precautions
  - Set of practices specific for patients with known or suspected infectious agents that require additional control measures to prevent transmission

– Used in addition to Standard Precautions

Standard Precautions

- Hand hygiene
- Personal protective equipment (PPE)
- Respiratory hygiene and cough etiquette
- Cleaning and disinfection of devices and environmental surfaces
- Safe injection practices
- Medication storage and handling

COVID-19: Transmission-Based Precautions

- Wear PPE for contact and droplet precautions* – Unless an aerosol-generating procedure is performed, in which case airborne precautions are needed
- Use disposable or dedicated patient care equipment (e.g., stethoscopes, blood pressure cuffs)
  - If equipment needs to be shared among patients, clean and disinfect it between use for each patient by using ethyl

alcohol of at least 70%

*WHO recommendations
https://www.who.int/publications/i/item/WHO-2019-nCoV-IPC-2020.4

COVID-19: Transmission-based precautions

- Use adequately ventilated single rooms (preferable) or dedicated COVID-19 ward rooms with dedicated bathrooms
  - Bathrooms should be cleaned and disinfected twice daily
- Avoid transporting COVID-19 patients out of room unless medically necessary

– Place a mask on COVID-19 suspected or confirmed patients if transport out of a room is medically necessary

– Healthcare workers should wear appropriate PPE during transport*

- Designate healthcare workers to care for patients with COVID-19
- Restrict the number of visitors allowed

* https://www.who.int/publications-detail/rational-use-of-personal-protective-equipment-for-coronavirus-disease-(covid-19)-andconsiderations-during-severe-shortages

COVID-19: PPE

- Healthcare workers should:
  - Use a medical mask (i.e., at least a surgical/medical mask)
    - ✓ N95 respirator for aerosol-generating procedure

- Wear eye protection (goggles) or facial protection (face shield)
- Wear a clean, non-sterile, long-sleeved gown
- Use gloves

- Healthcare workers should be trained on correct use of PPE, including putting on and taking off PPE
  - Extended use and re-use of certain PPE items (e.g., mask, gown) can be considered if supply shortage
- Risk of self-contamination is high when removing PPE

Instructions for putting on and removing PPE:
https://www.who.int/csr/resources/publications/ppe_en.pdf?ua=1

Aerosol-Generating Procedures

- Endotracheal intubation
- Bronchoscopy
- Non-invasive ventilation
- Tracheostomy
- Manual ventilation before intubation
- Cardiopulmonary resuscitation
- Sputum induction
- Autopsy procedures

PPE Recommendations for aerosol-generating procedures performed on COVID-19 patients:

- A fitted respirator (N95, FFP2, or equivalent) as opposed to surgical/medical masks
- Gloves
- Gown

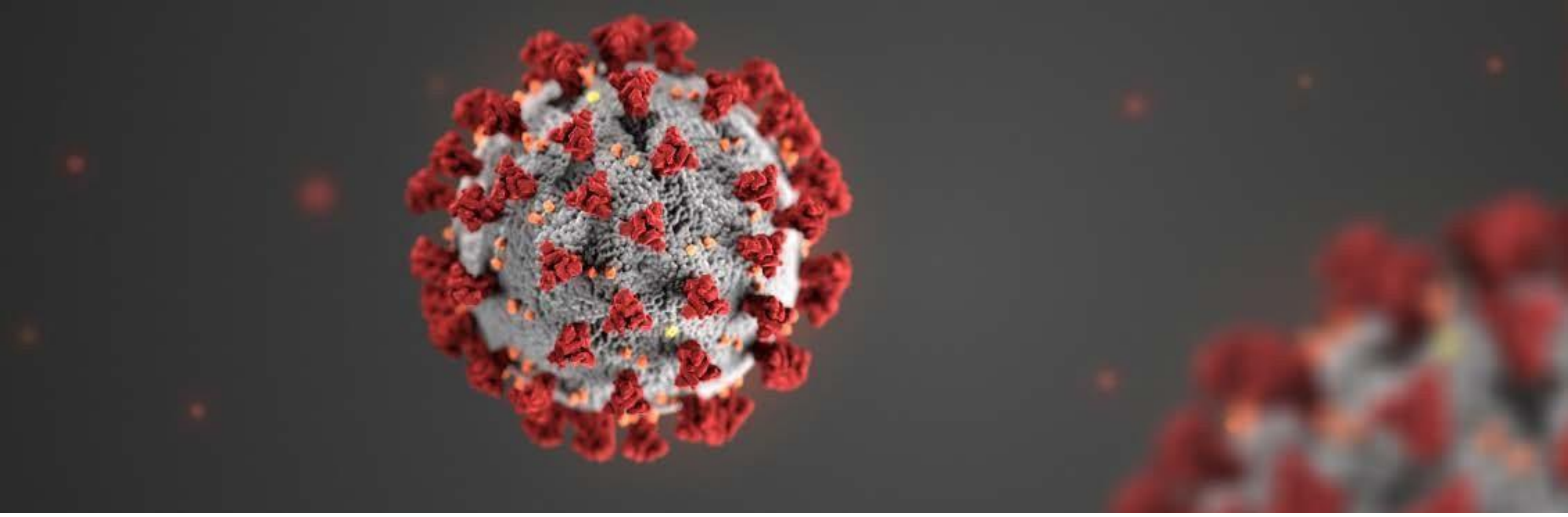
- Eye protection (goggles/face shield)

https://www.who.int/publications/i/item/WHO-2019-nCoV-IPC-2020.4

Infection Prevention and Control Resources for COVID-19 in non-US Healthcare Settings

- Strategic Priority IPC Activities for Containment and Prevention
- Triage SOP
- Identification of Healthcare Workers and Inpatients with Suspected COVID-19
- Management of Visitors to Healthcare Facilities

- Interim Operational Considerations for Public Health Management of Healthcare Workers Exposed to or Infected with COVID-19
- Operational Considerations in Outpatient Facilities



For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov