# OCCUPATIONAL HEALTH FOR HCP: UPDATE

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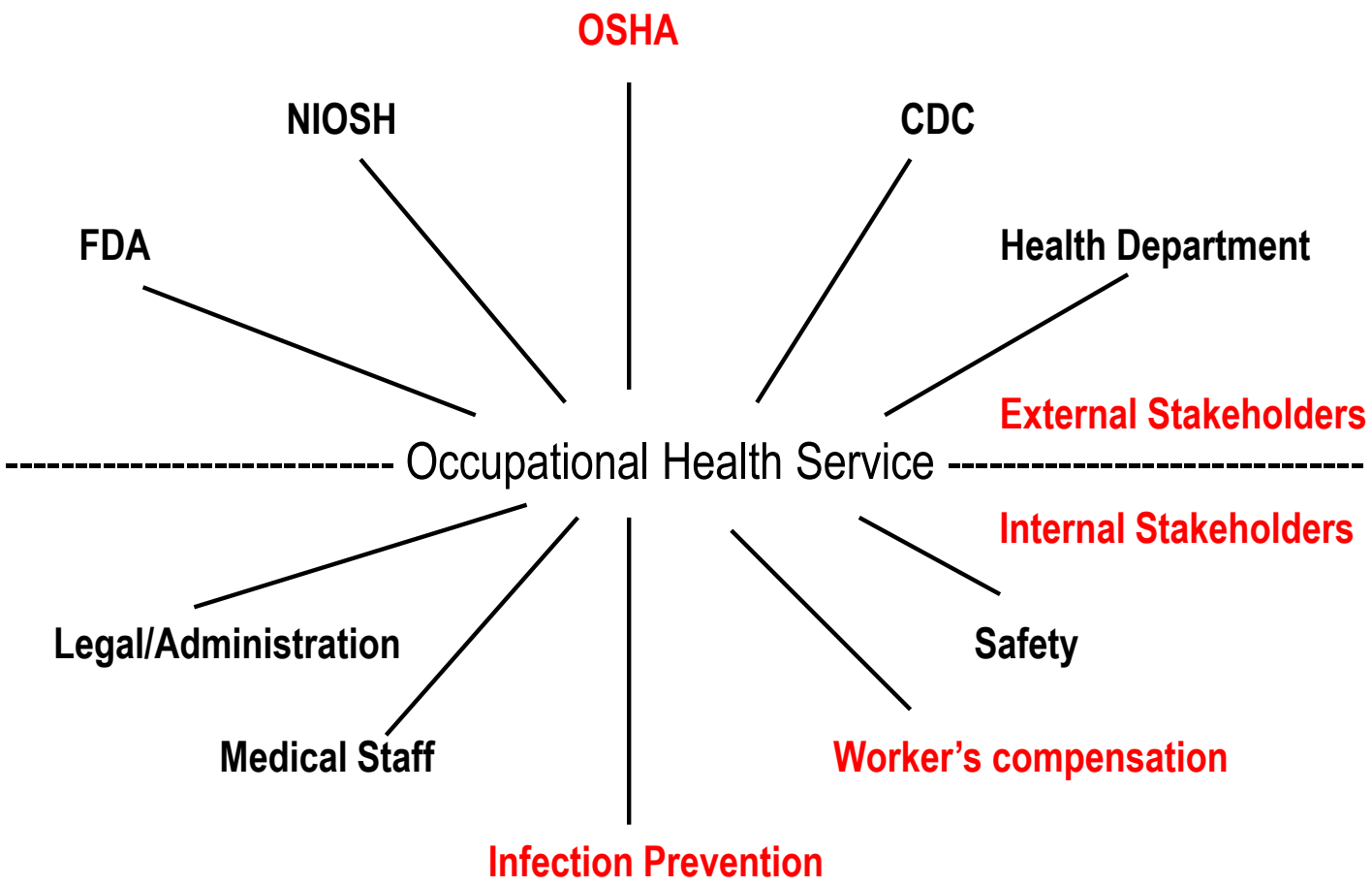
All drugs/vaccines issues discussed consistent with FDA approvals or authorizations

# PREVENTING HCP INFECTIONS & INJURIES

It is the responsibility of the facility, to the extent possible, to provide a safe working environment. This includes minimizing the risk of infectious disease exposures and injuries. An organized program should be in place to identify and evaluate both infectious disease exposures and injuries, and to provide care of the exposed or injured healthcare provider.

- A casual attitude towards personnel health entails a high cost
  - Increased patient morbidity
  - Increased staff morbidity
  - Significant financial cost and legal risk
- Prevention is superior to treatment
- The tools used to reduce the risk of acquiring infection can be used to reduce the risk of injuries


OSHA
NIOSH
CDC
FDA
Health Department
External Stakeholders
Occupational Health Service
Internal Stakeholders
Legal/Administration
Safety
Medical Staff
Worker's compensation
Infection Prevention

# OCCUPATIONAL HEALTH SERVICE (OSH): DEFINITIONS

- "OHS" is used synonymously with "Employee Health," "Employee Health Services," "Employee Health and Safety," "Occupational Health," and other such programs. OHS refers to the group, department, or program that addresses many aspects of health and safety in the workplace for HCP, including the provision of clinical services for work-related injuries, exposures, and illnesses. In healthcare settings, OHS addresses workplace hazards including communicable diseases; slips, trips, and falls; patient handling injuries; chemical exposures; HCP burnout; and workplace violence.
- The term "HCP" refers to all paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or infectious materials, including body substances; contaminated medical supplies, devices, and equipment; contaminated environmental surfaces; or contaminated air. For this document, HCP does not include dental healthcare personnel, autopsy personnel, and clinical laboratory personnel, as recommendations to address occupational IPC for these personnel are available elsewhere.
- The term "healthcare settings" refers to places where healthcare is delivered and includes, but is not limited to, acute care facilities, long-term acute care facilities, inpatient rehabilitation facilities, nursing homes and assisted living facilities, home healthcare, vehicles where healthcare is delivered (e.g., mobile clinics), and outpatient facilities, such as dialysis centers, physician offices, and others.

https://www.cdc.gov/infectioncontrol/pdf/guidelines/infection-control-HCP-H.pdf

# HCP: RISKS

- Healthcare is the fastest-growing sector of the U.S. financial system. It employs over 18 million workers. Women represent nearly 80% of the healthcare work force. Healthcare workers face a wide range of hazards on the job including:
  - Sharps injuries (bloodborne pathogens)
  - Chemical and drug exposure (aerosolized medications {ribavirin, amikacin, colistin, tobramycin), anesthetic gases, antineoplastic drugs, chemical sterilants and high –level disinfectants, nitrous oxide, surgical smoke, and other related resources)
  - Back injuries
  - Latex allergies
  - Violence
  - Stress
- Although it's possible to prevent or reduce these hazards, healthcare workers continue to experience injuries and illnesses at work. Cases of nonfatal work injury and illness with HCP are among the highest of any industry sector.
- HCP are routinely exposed to infectious organisms in their workplaces. These include: Bacteria, Fungi, Viruses & Parasites
  - Respiratory (influenza, RSV, SARS-CoV-2, TB, pertussis), Bloodborne (HIV, HBV, HCV), contact (norovirus, rotavirus, MRSA)
- HCP, emergency response and public safety personnel, and other workers can be exposed to blood through: Needlestick and other sharps injuries, mucous membrane, and skin exposures

https://www.cdc.gov/niosh/topics/healthcare/default.html

# Infection Prevention and Control Objectives for an Occupational Health Service

**OHS objectives for IPC generally include:**

- supporting an HCO safety culture;
- adhering to federal, state, and local requirements for occupational health and reporting;
- collaborating with others (e.g., facility IPC services) to monitor and investigate potentially infectious exposures, illnesses, and outbreaks involving HCP;
- identifying work-related infection risks and collaborating to institute appropriate risk reduction and preventive measures;
- providing HCP preventive measures (e.g., immunizations) and care for occupational exposures or illnesses;
- educating and training HCP about the principles of exposure (e.g., sharps injuries) and infection prevention;
- reducing absenteeism, illness, and disability among HCP; and
- ensuring confidentiality of HCP information consistent with federal, state, and local requirements.

**OHS program responsibilities include:**

- Leadership and management
- Communication and collaboration
- Assessment and reduction of risks for infection among populations of HCP
- Medical evaluations
- Occupational IPC education and training
- Immunization programs
- Management of potentially infectious exposures and illnesses
- Management of HCP health records

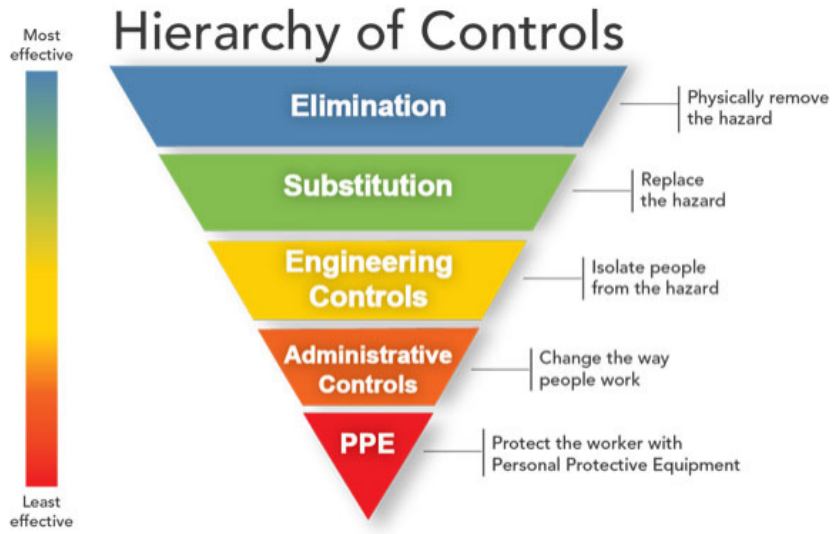
https://www.cdc.gov/infectioncontrol/pdf/guidelines/infection-control-HCP-H.pdf

**Box 3. Examples of Hazard Identification, Risk Assessment, and Risk Reduction Activities in which Occupational Health Services Might Participate**

| Possible Hazard(s) Identified | Example Assessment Method | Risk Reduction Plan Example (Control Addressed)[a] |
|---|---|---|
| Sharps injuries among surgeons when suturing fascia with sharp suture needles | Review of logs of sharps injuries (e.g., OSHA 300 forms) | Revise HCO policies (e.g., HCO equipment purchasing, operating room procedures) to use blunt-tipped suture needles for suturing fascia (elimination/substitution) |
| Sharps injuries on a single unit/floor linked to inconvenient sharps container placement | Review of logs of sharps injuries (e.g., OSHA 300 forms) | Move sharps containers to accessible locations (engineering control) |
| Sharps injuries among HCP using a newly introduced syringe with a sharps safety feature; HCP reported no training on using the new device | Review of logs of sharps injuries (e.g., OSHA 300 forms) | Develop procedures for HCP training on new products prior to use (administrative control) |
| Lowest influenza immunization coverage among HCP in an outpatient, free-standing facility; immunizations were not offered on-site | Review of HCP immunization records and interviews with HCP | Offer on-site immunization of HCP at outpatient sites during work hours (administrative control) |
| HCP TB infections over the past 6 months on one hospital unit | Review of HCP health records and interviews with HCP | Repair of malfunctioning negative pressure in an airborne infection isolation room (engineering control) |
| HCP who presented to OHS over the past 6 months had come to work when already ill; reasons included fear of consequences for missing work and lack of paid sick leave | Review of HCP health records and interviews with HCP | Revise sick leave policies to ensure they are non-punitive and inform HCP of the changes (administrative control) |

a See **Figure 1. Hierarchy of Controls**

**Figure 1. Hierarchy of Controls**




**Source:** Centers for Disease Control and Prevention (https://www.cdc.gov/niosh/topics/hierarchy/)

https://www.cdc.gov/infectioncontrol/pdf/guidelines/infection-control-HCP-H.pdf

**Box 4. Examples of Federal Regulations Requiring Education and Training for Employees**

| Selected Federal Regulations | Selected Education and Training Elements |
|---|---|
| Bloodborne Pathogens standard 29 CFR 1910.1030(g)(2) (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=standards&p_id=10051) | • Bloodborne pathogens epidemiology, modes of transmission<br>• Methods for recognizing activities that may involve exposure to potentially infectious materials<br>• Hepatitis B immunization<br>• Postexposure management<br>• Sharps device safety |
| Respiratory Protection standard 29 CFR 1910.134(k) (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=12716) | • Respiratory hazards to which HCP might be exposed<br>• Use of respirators |
| Personal Protective Equipment standard 29 CFR 1910.132 (https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=9777&p_table=STANDARDS) | • When PPE is necessary<br>• What PPE is necessary<br>• How to properly don, doff, adjust, and wear PPE<br>• Limitations of PPE<br>• Proper care, maintenance, useful life, and disposal of PPE |

**Abbreviations:** ACIP, Advisory Committee on Immunization Practices; HCO, Healthcare Organization; HCP, Healthcare Personnel; IPC, Infection Prevention and Control; PPE, Personal Protective Equipment

https://www.cdc.gov/infectioncontrol/pdf/guidelines/infection-control-HCP-H.pdf

# OCCUPATIONAL HEALTH ACTIVITIES

**Pre-employment screening**

- Employment physical (selected; DOT, FAA, police)
- Drug/alcohol screening should be considered
- Screen for latent TB (TST or IGRA blood test)
- Screen for active TB (symptoms; if positive CxR, sputums?)
- Immunization review
- Fit test clearance (questionnaire, medical exam?); fit testing
- Hearing evaluation/audiogram (if indicated by noise exposure)
- Counseling: pregnant women, immunocompromised

**Annual screening**

- Immunization review
- Screening for TB disease should be considered (symptoms; if positive CxR, sputums?)

**Evaluation of injured personnel**

- First aid
- Long-term care
- Communication with Worker's Compensation

**Return to work evaluation (non-occupational diseases and/or injuries, communicable disease – if indicated)**

Other activities: 1) work site evaluations (e.g., ergonomics); 2) for cause drug/alcohol testing; 3) education (fire, chemical & radiation safety; infection prevention; ergonomics); 4) smoking cessation

# EVALUATION OF HCP FOR LATENT TB AND TB DISEASE

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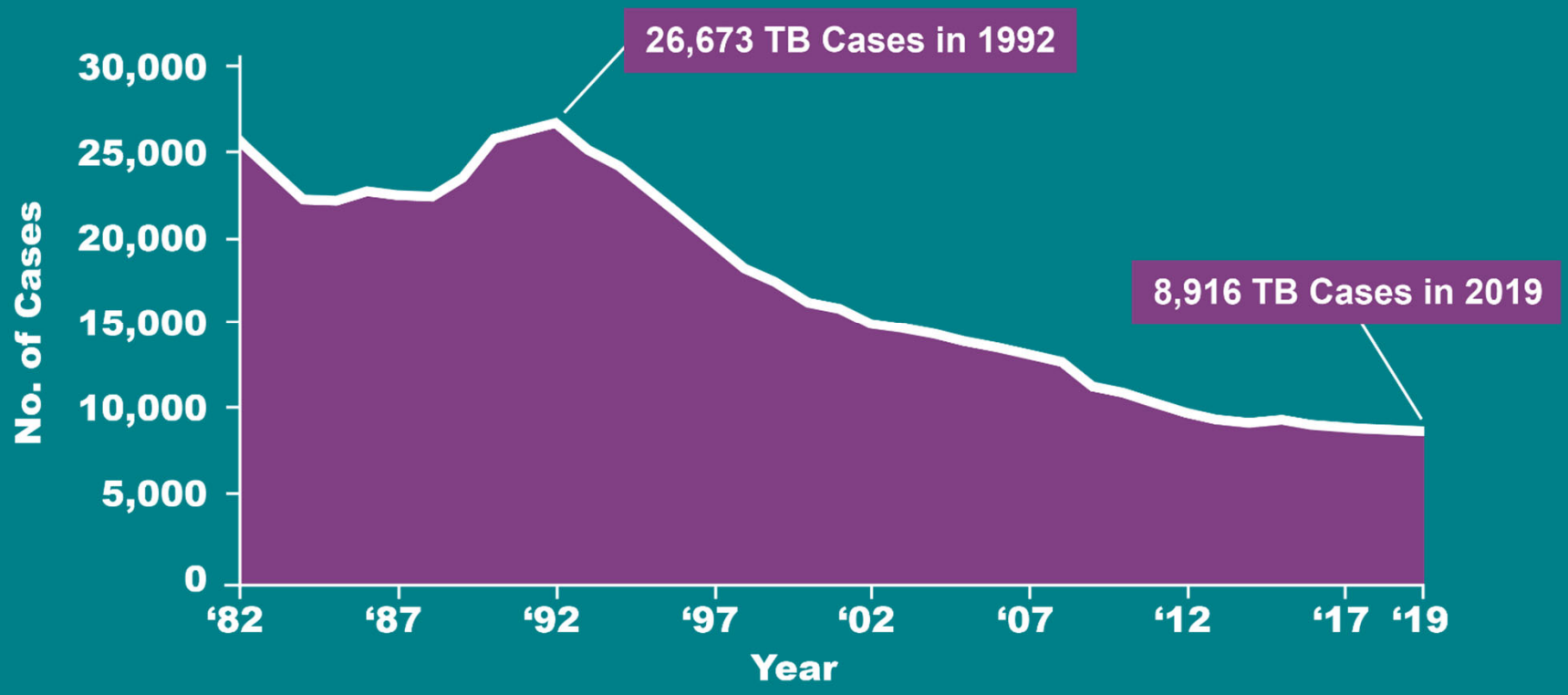
# Progress Toward TB Elimination, CDC,
## United States, 1982-2019



# TB: LATENT TB VERSUS TB DISEASE, CDC

| Person with Latent TB Infection (LTBI) | Person with TB Disease (in the lungs) |
|---|---|
| Has a small number of TB bacteria in his or her body that are alive, but under control | Has a large number of **active** TB bacteria in his or her body |
| **Cannot** spread TB bacteria to others | May spread TB bacteria to others |
| Does **not** feel sick, but may become sick if the bacteria become active in his or her body | May feel sick and may have symptoms such as a cough, fever, or weight loss |
| Tuberculin skin test or interferon-gamma release assay results usually positive | Tuberculin skin test or interferon-gamma release assay results usually positive |
| Chest x-ray usually **normal** | Chest x-ray usually **abnormal** |
| Sputum smears and cultures **negative** | Sputum smears and cultures may be **positive** |
| Should consider treatment for LTBI to prevent TB disease | Needs treatment for TB disease |
| **Does not** require respiratory isolation | May require respiratory isolation |
| **Not a case** of TB | **A case** of TB |

**Risk Factors for TB Disease**

- Infection with HIV
- History of untreated or inadequately treated TB disease
- Recent TB infection (within the past 2 years)
- Abusing drugs or alcohol or smoking cigarettes
- Receiving immunosuppressive therapy such as tumor necrosis factor-alpha (TNF) antagonists, systemic corticosteroids equivalent to/greater than 15 mg of prednisone per day, or immunosuppressive drug therapy following organ transplantation
- Silicosis
- Diabetes mellitus
- Chronic renal failure
- Certain types of cancer (e.g., leukemia, cancer of the head, neck, or lung)
- Certain intestinal conditions
- Low body weigh

# EVALUATION FOR TB, CDC

- All HCP should be tested for latent TB on hire and assessed for TB disease (by symptom screen, chest x-ray if diagnostic test positive) unless demonstrated active TB disease in the past (if s/p TB disease, should be screened for TB disease)
- HCP exposed to patients with TB pulmonary disease (i.e., not wearing appropriate PPE and appropriate duration of exposure should be evaluated for development of latent TB) – test at baseline and 6-8 weeks later.
- Diagnostic methods: TB blood test or TB skin test (TST)
  - TB blood test (also known as interferon gamma release assay or IGRA): 1) Preferred methods in adults; 2) Positive test = Person infected with *M. tuberculosis*; further testing needed to distinguish latent TB from TB disease; Negative test = Unlikely to be infected with *M. tb* or unable to react to test; 3) Prior BCG vaccine does NOT cause test to be positive
  - TB skin test (also known at Mantoux tuberculin skin test): 1) requires two visits: #1 to administer ID TB skin test preparation; #2 (48-72) hours later to read test (record horizontal induration in mm); 2)
- Diagnosing TB disease
  - Symptoms present (fever, chills, night sweats, weight loss, cough >3 weeks, weakness or fatigue, chest pain, decreased appetite, hemoptysis) and/or abnormal chest x-ray consistent with TB disease
- All HCP with latent TB should be offered therapy to prevent development of TB disease (furlough not required); treatment 90% effective in reducing risk of developing TB disease
- All HCP with TB pulmonary disease, should be furloughed till non-infectious and treated per CDC recommendations
- Persons with TB disease including HCP should be reported to the local public health department; in consultation with the health department an exposure evaluation of potentially exposed patients and HCP may need to be done

# INTERPRETING AN IGRA OR TST

| IGRA Result | Interpretation |
|---|---|
| Positive | *M. tuberculosis* infection likely |
| Negative | *M. tuberculosis* infection unlikely, but cannot be excluded especially if<br>1. Patient has signs and symptoms of TB<br>2. Patient has a high risk for developing TB disease once infected with *M. tuberculosis* |
| Indeterminate (QFT-Plus only) | The test did not provide useful information about the likelihood of *M. tuberculosis* infection. Repeating an IGRA or performing a TST may be useful. |
| Invalid or Borderline (T-Spot only) | The test did not provide useful information about the likelihood of *M. tuberculosis* infection. Repeating an IGRA or performing a TST might be useful. |

If the IGRA result is positive, then it is likely that the patient has *M. tuberculosis* infection. TB disease should be ruled out by medical evaluation before LTBI is diagnosed.

| 5 or more millimeters | 10 or more millimeters | 15 or more millimeters |
|---|---|---|
| An induration of **5 or more millimeters** is considered **positive** for<br>• People living with HIV<br>• Recent contacts of people with infectious TB<br>• People with chest x-ray findings suggestive of previous TB disease<br>• People with organ transplants<br>• Other immunosuppressed patients (for example, patients on prolonged therapy with corticosteroids equivalent to/ greater than 15 mg per day of prednisone or those taking TNF-alpha antagonists) | An induration of **10 or more millimeters** is considered **positive** for<br>• People born in countries where TB disease is common, including Mexico, the Philippines, Vietnam, India, China, Haiti, and Guatemala, or other countries with high rates of TB<br>• People who abuse drugs<br>• Mycobacteriology laboratory workers<br>• People who live or work in high-risk congregate settings (for example, nursing homes, homeless shelters, or correctional facilities)<br>• People with certain medical conditions that place them at high risk for TB (for example, silicosis, diabetes mellitus, severe kidney disease, certain types of cancer, and certain intestinal conditions)<br>• Children younger than 5 years of age<br>• Infants, children, and adolescents exposed to adults in high-risk categories | An induration of **15 or more millimeters** is considered **positive** for<br>• People with no known risk factors for TB |

# VACCINES FOR HCP

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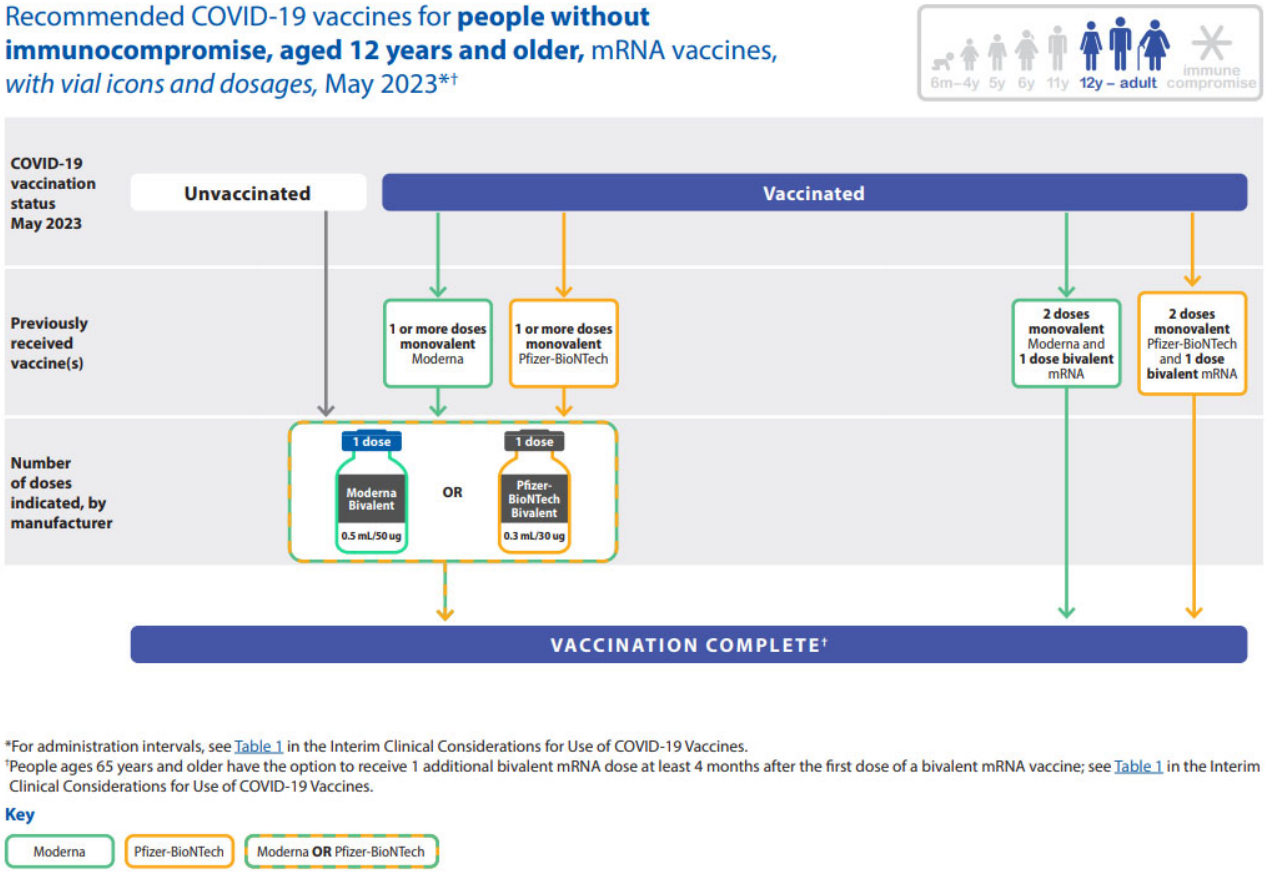
**Table 3**
**Immunizations recommended for nonimmune health care personnel**

| Vaccine | Health Care Personnel | Comments |
|---|---|---|
| Mumps | All (2 doses) | Provide as MMR |
| Measles | All (2 doses) | Provide as MMR |
| Rubella | All (1 dose) | Provide as MMR |
| Varicella | All (2 doses) | — |
| Hepatitis B | HCP with potential exposure to blood or contaminated body fluids (2 or 3 doses depending on vaccine) | — |
| Meningococcal (serogroups A, C, Y, W) | Clinical microbiologists (1 dose; booster every 5 y) | All vaccines available are now conjugate products |
| Meningococcal (serogroup B) | Clinical microbiologists (2 or 3 doses, depending on manufacturer); booster every 2–3 y | MenB-FHbp and MenB-4C are not interchangeable |
| Influenza | All (1 dose each year) | HCP who care for severely immunocompromised persons who require care in a protected environment should receive IIV or RIV; HCP who receive LAIV should avoid providing care for severely immunocompromised persons (ie, persons receiving care in protected hospital unit such as BMTU) for 7 d after immunization |
| SARS-CoV-2 | All (frequency of immunization not yet established) | |

*Abbreviations:* BMTU, bone marrow transplant unit; IIV, inactivated influenza vaccine; LAIV, live, attenuated influenza vaccine; RIV, recombinant influenza vaccine.

*Data from* Refs[31,35] and ACIP.

Tdap now recommended for all persons every 10 year; not specifically recommended for HCP; Shenoy ES, Weber DJ. ID Clin N Am 2021;35:717




**7 June, 2023**

- Everyone aged 6 years and older should get **1 updated Pfizer-BioNTech or Moderna COVID-19 vaccine** to be up to date.
- People aged 65 years and older may get a 2nd dose of updated Pfizer-BioNTech or Moderna COVID-19 vaccine.
- People who are moderately or severely immunocompromised may get additional doses of updated Pfizer-BioNTech or Moderna COVID-19 vaccine.

https://www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html

# Methods of Showing Proof of Immunity of HCP

| Vaccine | Birth Before 1957 | Physician Diagnosis | Positive Serology | Self-Report | Documented Appropriate Vaccine Series[a] |
|---|---|---|---|---|---|
| Mumps (MMR) | Yes[b] | Yes[d] | Yes | No | Yes |
| Measles (MMR) | Yes[b] | Yes[c] | Yes | No | Yes |
| Rubella (MMR) | Yes[b,c] | No | Yes | No | Yes |
| Varicella | No | Yes | Yes | Yes[e] | Yes |
| Hepatitis B | No | — | >10 mIU/mL[f] | No | Yes |
| Influenza | No | No | No | No | Yes |
| SARS-CoV-2 | No | No | No | No | Yes |

Shenoy ES, Weber DJ. ID Clin N Am 2021;35:717

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# VACCINE PREVENTABLE DISEASES

- Anthrax (PEP)
- Cervical, vulvar, vaginal cancer (HPV)
- Coronavirus-19
- Diphtheria (outbreak)
- Genital warts (HPV)
- Hepatitis A (PEP, outbreak)
- Hepatitis B (PEP)
- Hepatitis D
- *H. influenza* type b
- Human papillomavirus
- Influenza A and B
- Japanese encephalitis
- Liver cancer (hepatitis B)
- Measles (PEP, outbreak)
- Meningococcal A,C,Y,W135 (outbreak)
- Meningococcal B (outbreak)
- Monkeypox (PEP, outbreak)
- Mumps (outbreak)
- Pertussis (outbreak)
- Pneumococcal disease
- Poliomyelitis (outbreak)
- Rabies (PEP)
- Rectal cancer (HPV)
- Rotavirus
- RSV
- Rubella (outbreak)
- Smallpox (PEP, outbreak)
- Tetanus (PEP)
- Tuberculosis
- Typhoid fever
- Varicella (PEP)
- Yellow fever
- Zoster (Shingles)

PEP = post-exposure prophylaxis

**Table 1** COVID-19 vaccination recommendations have changed. Find the latest recommendations at www.cdc.gov/covidschedule

## Recommended Adult Immunization Schedule for ages 19 years or older, United States, 2023

| Vaccine | 19–26 years | 27–49 years | 50–64 years | ≥65 years |
|---|---|---|---|---|
| **COVID-19** | 2- or 3- dose primary series and booster (See Notes) | | | |
| **Influenza inactivated** (IIV4) or **Influenza recombinant** (RIV4) | 1 dose annually | | | |
| or | or | | | |
| **Influenza live, attenuated** (LAIV4) | 1 dose annually | | | |
| **Tetanus, diphtheria, pertussis** (Tdap or Td) | 1 dose Tdap each pregnancy; 1 dose Td/Tdap for wound management (see notes) | | | |
| | 1 dose Tdap, then Td or Tdap booster every 10 years | | | |
| **Measles, mumps, rubella** (MMR) | 1 or 2 doses depending on indication (if born in 1957 or later) | | | For healthcare personnel, see notes |
| **Varicella** (VAR) | 2 doses (if born in 1980 or later) | 2 doses | | |
| **Zoster recombinant** (RZV) | 2 doses for immunocompromising conditions (see notes) | | 2 doses | |
| **Human papillomavirus** (HPV) | 2 or 3 doses depending on age at initial vaccination or condition | 27 through 45 years | | |
| **Pneumococcal** (PCV15, PCV20, PPSV23) | 1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes) | | | See Notes |
| | | | | See Notes |
| **Hepatitis A** (HepA) | 2, 3, or 4 doses depending on vaccine | | | |
| **Hepatitis B** (HepB) | 2, 3, or 4 doses depending on vaccine or condition | | | |
| **Meningococcal A, C, W, Y** (MenACWY) | 1 or 2 doses depending on indication, see notes for booster recommendations | | | |
| **Meningococcal B** (MenB) | 2 or 3 doses depending on vaccine and indication, see notes for booster recommendations | | | |
| | 19 through 23 years | | | |
| ***Haemophilus influenzae* type b** (Hib) | 1 or 3 doses depending on indication | | | |

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

Recommended vaccination for adults with an additional risk factor or another indication

Recommended vaccination based on shared clinical decision-making

No recommendation/ Not applicable

https://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf

## Table 2 Recommended Adult Immunization Schedule by Medical Condition or Other Indication, United States, 2023

| Vaccine | Pregnancy | Immuno-compromised (excluding HIV infection) | HIV infection CD4 percentage and count | | Asplenia, complement deficiencies | End-stage renal disease, or on hemodialysis | Heart or lung disease; alcoholism[a] | Chronic liver disease | Diabetes | Health care personnel[b] | Men who have sex with men |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | <15% or <200 mm³ | ≥15% and ≥200 mm³ | | | | | | | |
| COVID-19 | | See Notes | | | | | | | | | |
| IIV4 or RIV4 | 1 dose annually | | | | | | | | | | |
| or | | | | | | | | | | or | |
| LAIV4 | Contraindicated | | | | | Precaution | | | | 1 dose annually | |
| Tdap or Td | 1 dose Tdap each pregnancy | 1 dose Tdap, then Td or Tdap booster every 10 years | | | | | | | | | |
| MMR | Contraindicated* | Contraindicated | 1 or 2 doses depending on indication | | | | | | | | |
| VAR | Contraindicated* | Contraindicated | | | 2 doses | | | | | | |
| RZV | | 2 doses at age ≥19 years | | | 2 doses at age ≥50 years | | | | | | |
| HPV | Not Recommended* | 3 doses through age 26 years | | | 2 or 3 doses through age 26 years depending on age at initial vaccination or condition | | | | | | |
| Pneumococcal (PCV15, PCV20, PPSV23) | | 1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (see notes) | | | | | | | | | |
| HepA | | | | | 2, 3, or 4 doses depending on vaccine | | | | | | |
| HepB | 3 doses (see notes) | 2, 3, or 4 doses depending on vaccine or condition | | | | | | | | | |
| MenACWY | 1 or 2 doses depending on indication, see notes for booster recommendations | | | | | | | | | | |
| MenB | Precaution | 2 or 3 doses depending on vaccine and indication, see notes for booster recommendations | | | | | | | | | |
| Hib | | 3 doses HSCT[c] recipients only | | | 1 dose | | | | | | |

- Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection
- Recommended vaccination for adults with an additional risk factor or another indication
- Recommended vaccination based on shared clinical decision-making
- Precaution–vaccination might be indicated if benefit of protection outweighs risk of adverse reaction
- Contraindicated or not recommended–vaccine should not be administered.
  *Vaccinate after pregnancy.
- No recommendation/ Not applicable

**a.** Precaution for LAIV4 does not apply to alcoholism. **b.** See notes for influenza; hepatitis B; measles, mumps, and rubella; and varicella vaccinations. **c.** Hematopoietic stem cell transplant.

# Appendix Recommended Adult Immunization Schedule, United States, 2023

| Vaccine | Contraindicated or Not Recommended[1] | Precautions[2] |
|---|---|---|
| *Haemophilus influenzae* type b (Hib) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3]<br>• For Hiberix, ActHib, and PedvaxHIB only: History of severe allergic reaction to dry natural latex | • Moderate or severe acute illness with or without fever |
| Hepatitis A (HepA) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3] including neomycin | • Moderate or severe acute illness with or without fever |
| Hepatitis B (HepB) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3] including yeast<br>• *Pregnancy: Heplisav-B and PreHevbrio are not recommended due to lack of safety data in pregnant persons. Use other hepatitis B vaccines if HepB is indicated*[4] | • Moderate or severe acute illness with or without fever |
| Hepatitis A- Hepatitis B vaccine [HepA-HepB, (Twinrix®)] | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3] including neomycin and yeast | • Moderate or severe acute illness with or without fever |
| Human papillomavirus (HPV) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3]<br>• *Pregnancy: HPV vaccination not recommended* | • Moderate or severe acute illness with or without fever |
| Measles, mumps, rubella (MMR) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3]<br>• Severe immunodeficiency (e.g., hematologic and solid tumors, receipt of chemotherapy, congenital immunodeficiency, long-term immunosuppressive therapy or patients with HIV infection who are severely immunocompromised)<br>• Pregnancy<br>• Family history of altered immunocompetence, unless verified clinically or by laboratory testing as immunocompetent | • Recent (≤11 months) receipt of antibody-containing blood product (specific interval depends on product)<br>• History of thrombocytopenia or thrombocytopenic purpura<br>• Need for tuberculin skin testing or interferon-gamma release assay (IGRA) testing<br>• Moderate or severe acute illness with or without fever |
| Meningococcal ACWY (MenACWY) [MenACWY-CRM (Menveo®); MenACWY-D (Menactra®); MenACWY-TT (MenQuadfi®)] | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3]<br>• For MenACWY-D and MenACWY-CRM only: severe allergic reaction to any diphtheria toxoid–or CRM197–containing vaccine<br>• For MenACWY-TT only: severe allergic reaction to a tetanus toxoid-containing vaccine | • Moderate or severe acute illness with or without fever |
| Meningococcal B (MenB) [MenB-4C (Bexsero); MenB-FHbp (Trumenba)] | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3] | • Pregnancy<br>• For MenB-4C only: Latex sensitivity<br>• Moderate or severe acute illness with or without fever |
| Pneumococcal conjugate (PCV15, PCV20) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3]<br>• Severe allergic reaction (e.g., anaphylaxis) to any diphtheria-toxoid–containing vaccine or to its vaccine component[3] | • Moderate or severe acute illness with or without fever |
| Pneumococcal polysaccharide (PPSV23) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3] | • Moderate or severe acute illness with or without fever |
| Tetanus, diphtheria, and acellular pertussis (Tdap)<br>Tetanus, diphtheria (Td) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3]<br>• For Tdap only: Encephalopathy (e.g., coma, decreased level of consciousness, prolonged seizures), not attributable to another identifiable cause, within 7 days of administration of previous dose of DTP, DTaP, or Tdap | • Guillain-Barré syndrome (GBS) within 6 weeks after a previous dose of tetanus-toxoid–containing vaccine<br>• History of Arthus-type hypersensitivity reactions after a previous dose of diphtheria-toxoid–containing or tetanus-toxoid–containing vaccine; defer vaccination until at least 10 years have elapsed since the last tetanus-toxoid–containing vaccine<br>• Moderate or severe acute illness with or without fever<br>• For Tdap only: Progressive or unstable neurological disorder, uncontrolled seizures, or progressive encephalopathy until a treatment regimen has been established and the condition has stabilized |
| Varicella (VAR) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3]<br>• Severe immunodeficiency (e.g., hematologic and solid tumors, receipt of chemotherapy, congenital immunodeficiency, long-term immunosuppressive therapy or patients with HIV infection who are severely immunocompromised)<br>• Pregnancy<br>• Family history of altered immunocompetence, unless verified clinically or by laboratory testing as immunocompetent | • Recent (≤11 months) receipt of antibody-containing blood product (specific interval depends on product)<br>• Receipt of specific antiviral drugs (acyclovir, famciclovir, or valacyclovir) 24 hours before vaccination (avoid use of these antiviral drugs for 14 days after vaccination)<br>• Use of aspirin or aspirin-containing products<br>• Moderate or severe acute illness with or without fever |
| Zoster recombinant vaccine (RZV) | • Severe allergic reaction (e.g., anaphylaxis) after a previous dose or to a vaccine component[3] | • Moderate or severe acute illness with or without fever<br>• Current herpes zoster infection |

1. When a contraindication is present, a vaccine should NOT be administered. Kroger A, Bahta L, Hunter P. ACIP General Best Practice Guidelines for Immunization. www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html
2. When a precaution is present, vaccination should generally be deferred but might be indicated if the benefit of protection from the vaccine outweighs the risk for an adverse reaction. Kroger A, Bahta L, Hunter P. ACIP General Best Practice Guidelines for Immunization. www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html
3. Vaccination providers should check FDA-approved prescribing information for the most complete and updated information, including contraindications, warnings, and precautions. Package inserts for U.S.-licensed vaccines are available at www.fda.gov/vaccines-blood-biologics/approved-products/vaccines-licensed-use-united-states.
4. For information on the pregnancy exposure registries for persons who were inadvertently vaccinated with Heplisav-B or PreHevbrio while pregnant, please visit heplisavbpregnancyregistry.com/ or www.prehevbrio.com/#safety.

# SPECIAL USE VACCINES IN HCP

- Anthrax: Post-exposure
- BCG: Pre-exposure (high risk)
- Hepatitis A: Post-exposure, outbreak, research, travel
- Japanese encephalitis: Research, travel
- Meningococcal: Outbreak, laboratory (spinning CSF), travel
- Polio: Research, travel
- Rabies: Post-exposure, research, travel
- Typhoid: Research, travel
- JYNNEOS (mpox): Pre-exposure, post-exposure, research
- Yellow fever: Research, travel

# Immunization Programs For HCP

## Features of an Effective Program

- prevent vaccine-preventable diseases among HCP;
- prevent illness among patients and others, such as HCP family and household members, by reducing their risk of encountering infectious HCP;
- adhere to ACIP immunization recommendations for HCP and federal, state, and local requirements;
- reduce the need for, and costs related to, reactive measures, including postexposure prophylaxis, use of sick leave, and work restrictions; and
- increase the efficiency of reporting HCP immunization information internally, as for performance measurement and quality improvement initiatives, and to external groups, such as payors and public health agencies.

## Strategies for improving HCP immunization coverage

- Using organizational leaders as role models (e.g., visibly vaccinating institutional leaders to improve coverage among HCP under their leadership).
- Conducting education or organizational campaigns to promote awareness and knowledge about vaccines.
- Providing free access (i.e., no out-of-pocket expense to HCP) to vaccine.
- Providing incentives to encourage immunization, such as coupons for the hospital cafeteria, gift certificates, etc.
- Offering flexible worksite vaccine delivery (e.g., at multiple locations and times, via mobile carts).
- Obtaining signed declinations for vaccine from HCP with non-medical reasons to decline vaccination.
- Monitoring and reporting vaccination rates (e.g., monitoring vaccine coverage by facility ward to identify areas with low coverage for targeted interventions to increase vaccination rates).

https://www.cdc.gov/infectioncontrol/pdf/guidelines/infection-control-HCP-H.pdf

# COVID-19: OCCUPATIONAL HEALTH ISSUES

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# Estimates of SARS-CoV-2 Seroprevalence and Incidence of Primary SARS-CoV-2 Infections Among Blood Donors, by COVID-19 Vaccination Status, US, 4/21–9/22


**Summary**

What is already known about this topic?

SARS-CoV-2 hybrid immunity (immunity derived from both previous infection and vaccination) has been reported to provide better protection than that from infection or vaccination alone.

What is added by this report?

By the third quarter of 2022, an estimated 96.4% of persons aged ≥16 years in a longitudinal blood donor cohort had SARS-CoV-2 antibodies from previous infection or vaccination, including 22.6% from infection alone and 26.1% from vaccination alone; 47.7% had hybrid immunity. Hybrid immunity prevalence was lowest among adults aged ≥65 years.

What are the implications for public health practice?

Low prevalence of infection-induced and hybrid immunity among older adults, who are at increased risk for severe disease if infected, reflects the success of public health infection prevention efforts while also highlighting the importance of this group staying up to date with recommended COVID-19 vaccination, including at least 1 bivalent dose.


Jones JM, et al MMWR 2023;72:601

**FIGURE 1. Prevalences of vaccine-induced, infection-induced, and hybrid* immunity† against SARS-CoV-2 among blood donors aged ≥16 years — United States, April 2021–September 2022**

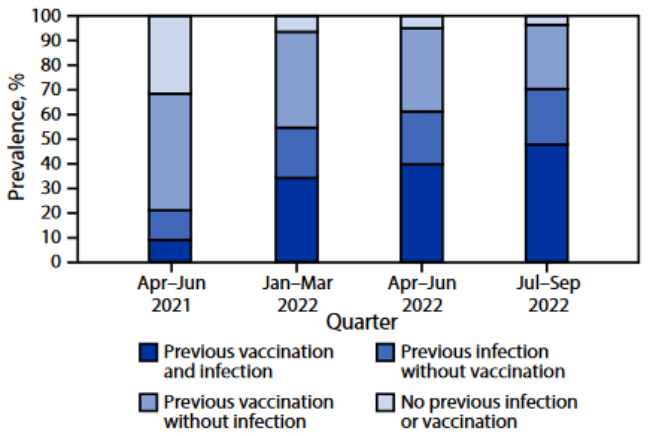
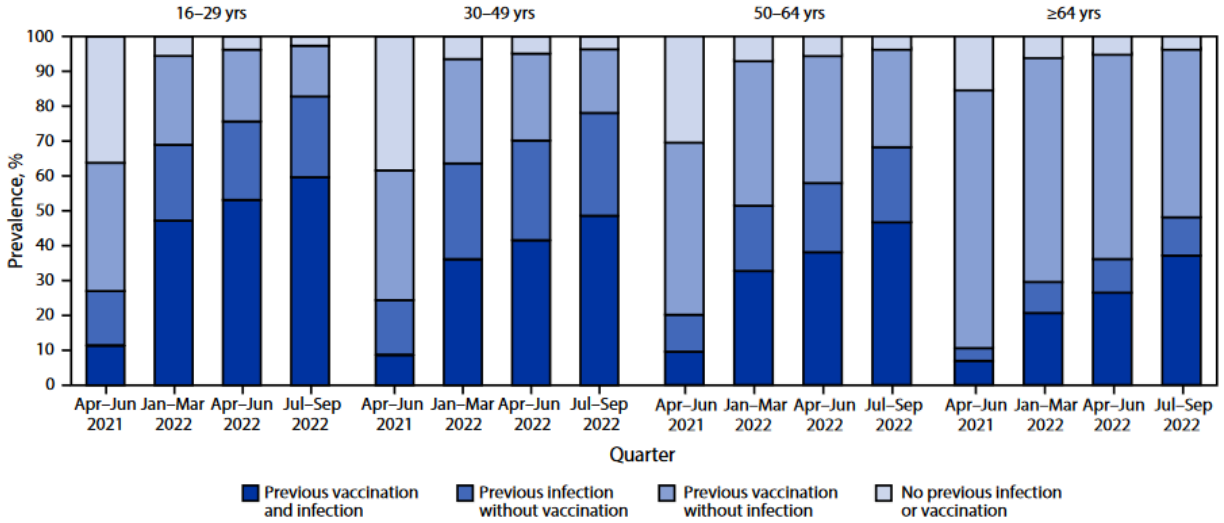


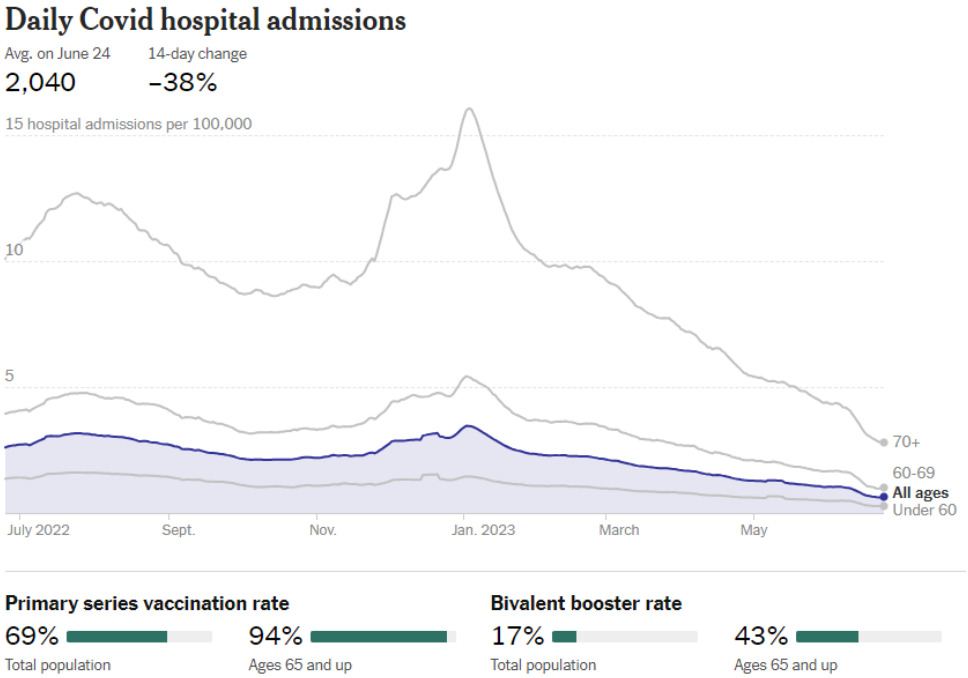

**FIGURE 2. Prevalences of vaccine-induced, infection-induced, and hybrid* immunity† against SARS-CoV-2 among blood donors aged ≥16 years, by age group — United States, April 2021–September 2022**



# COVID-19: UPDATE, 7/4/23

**About the data**

- Data is from the Centers for Disease Control and Prevention.
- Since the end of the public health emergency on May 11, 2023, data that has been crucial to understanding the spread and impact of Covid is reported by government sources less frequently, or is no longer reported at all. Figures displayed on this page are some of the best remaining indicators for tracking the virus.
- The number of **daily hospital admissions** shows how many patients tested positive for Covid in hospitals and is one of the most reliably reported indicators of Covid's impact on a community. Age data can show how much of the vulnerable senior population is being affected by the virus.

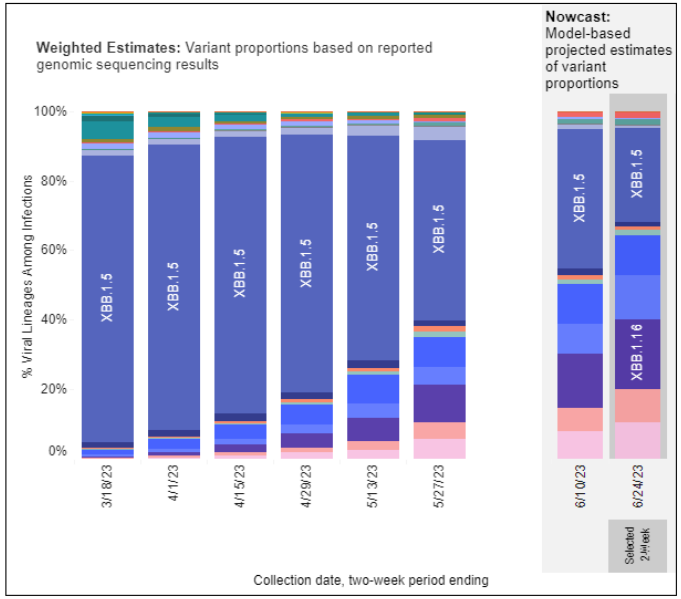



https://www.nytimes.com/interactive/2023/us/covid-cases.html

# CURRENT SARS-CoV-2 VARIANTS, US

**Weighted and Nowcast Estimates in United States for 2-Week Periods in 3/5/2023 – 6/24/2023**

Hover over (or tap in mobile) any lineage of interest to see the amount of uncertainty in that lineage's estimate.

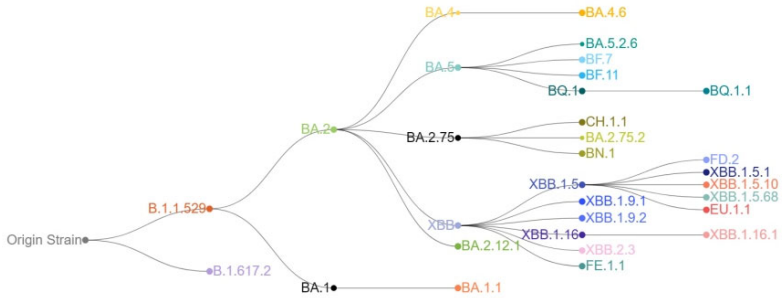



**Nowcast Estimates in United States for 6/11/2023 – 6/24/2023**

USA

| WHO label | Lineage # | %Total | 95%PI |
|---|---|---|---|
| Omicron | XBB.1.5 | 27.0% | 23.8-30.5% |
| | XBB.1.16 | 19.9% | 17.1-23.0% |
| | XBB.1.9.2 | 13.0% | 7.9-20.4% |
| | XBB.1.9.1 | 11.4% | 10.0-13.0% |
| | XBB.2.3 | 10.6% | 7.7-14.4% |
| | XBB.1.16.1 | 9.5% | 7.7-11.8% |
| | EU.1.1 | 1.7% | 1.0-2.7% |
| | FE.1.1 | 1.6% | 0.8-2.8% |
| | XBB.1.5.68 | 1.4% | 0.8-2.3% |
| | XBB.1.5.1 | 1.2% | 0.8-1.6% |
| | XBB.1.5.10 | 1.2% | 0.7-1.9% |
| | XBB | 0.9% | 0.6-1.4% |
| | FD.2 | 0.4% | 0.1-1.0% |
| | CH.1.1 | 0.2% | 0.1-0.2% |
| | BA.2.12.1 | 0.1% | 0.0-0.4% |
| | BQ.1.1 | 0.0% | 0.0-0.1% |
| | BA.2 | 0.0% | 0.0-0.0% |
| | BQ.1 | 0.0% | 0.0-0.0% |
| | BN.1 | 0.0% | 0.0-0.0% |
| | BA.2.75 | 0.0% | 0.0-0.0% |
| | BA.5 | 0.0% | 0.0-0.0% |
| | BF.7 | 0.0% | 0.0-0.0% |
| Other | Other* | 0.0% | 0.0-0.1% |

* Enumerated lineages are US VOC and lineages circulating above 1% nationally in at least one 2-week period. "Other" represents the aggregation of lineages which are circulating <1% nationally during all 2-week periods displayed.
# BA.1, BA.3 and their sublineages (except BA.1.1 and its sublineages) are aggregated with B.1.1.529. Except BA.2.12.1, BA.2.75, XBB and their sublineages, BA.2 sublineages are aggregated with BA.2. Except BA.2.75.2, CH.1.1 and BN.1, BA.2.75 sublineages are aggregated with BA.2.75. Except BA.4.6, sublineages of BA.4 are aggregated to BA.4. Except BF.7, BF.11, BA.5.2.6, BQ.1 and BQ.1.1, sublineages of BA.5 are aggregated to BA.5. Except the lineages shown and their sublineages, sublineages of XBB are aggregated to XBB. Except XBB.1.5.1,XBB.1.5.10,FD.2,EU.1.1 and XBB.1.5.68 sublineages of XBB.1.5 are aggregated to XBB.1.5. Except XBB.1.16.1, sublineages of XBB.1.16 are aggregated to XBB.1.16. Except FE.1.1, sublineages of XBB.1.18.1 are aggregated to XBB. For all the other lineages listed, their sublineages are aggregated to the listed parental lineages respectively. Previously, EU.1.1 and XBB.1.5.68 was aggregated to XBB.1.5 and FE.1.1 was aggregated to XBB. Lineages BA.2.75.2, XBB.1.5 , XBB.1.5.1,XBB.1.5.10, FD.2, XBB.1.9.1, XBB.1.9.2, XBB.1.16, XBB.1.16.1, XBB.2.3, BN.1, BA.4.6, BF.7, BF.11, BA.5.2.6 ,BQ.1.1, EU.1.1, XBB.1.5.68 and FE.1.1 contain the spike substitution R346T.




https://covid.cdc.gov/covid-data-tracker/#variant-proportions

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# SARS-CoV-2 VARIANTS: TRANSMISSIBILITY AND VIRULENCE

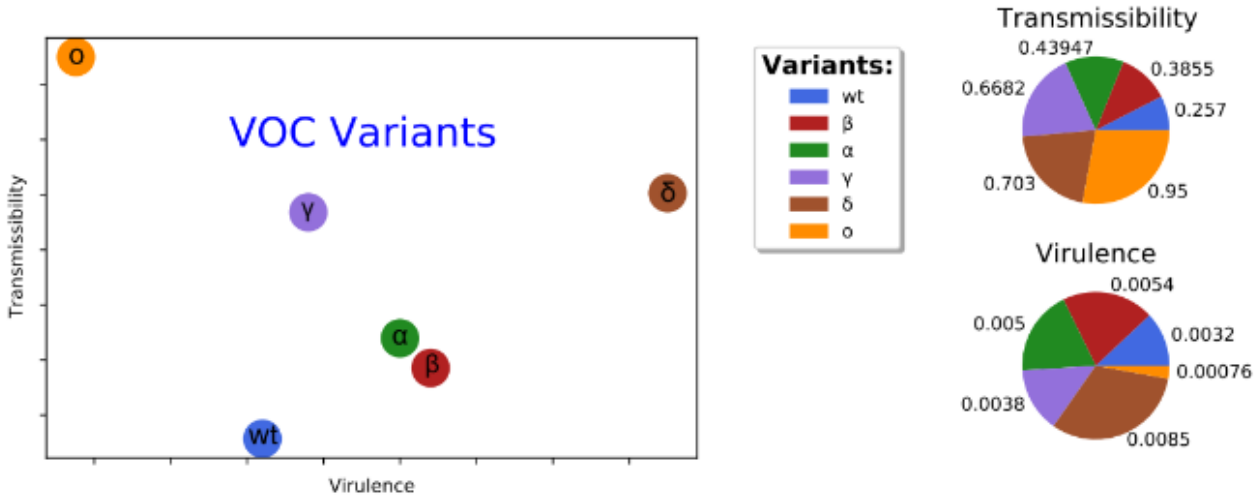


**Fig 1. Qualitative plot of different VOC variants of the disease of Covid-19**

Jabraeilian H, Jamali Y. https://doi.org/10.1101/2023.06.13.23291332

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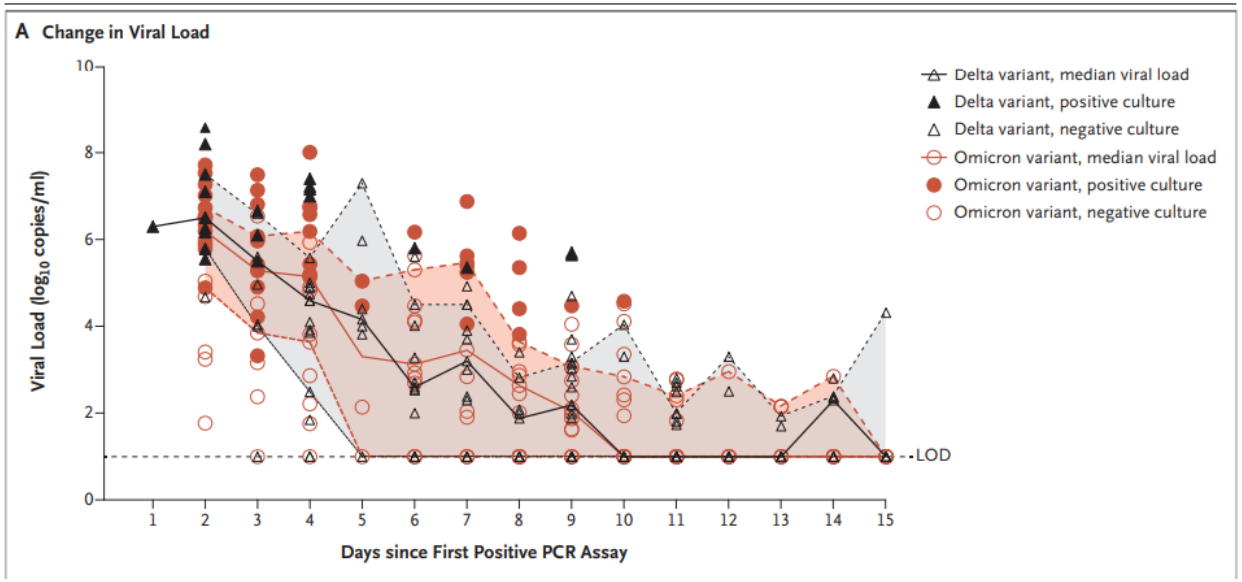
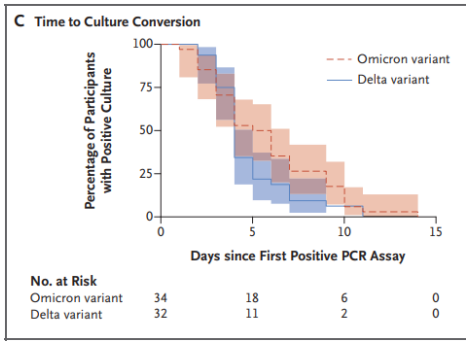
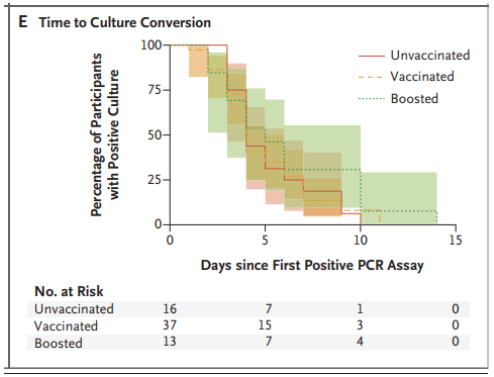
# CDC RATIONALE FOR MANAGEMENT OF HCP WITH COVID-19

In this longitudinal cohort of participants, most of whom had symptomatic, non-severe Covid-19 infection, the viral decay kinetics were similar with omicron infection and delta infection. Although vaccination has been shown to reduce the incidence of infection and the severity of disease, we did not find large differences in the median duration of viral shedding among participants who were unvaccinated, those who were vaccinated but not boosted, and those who were vaccinated and boosted.

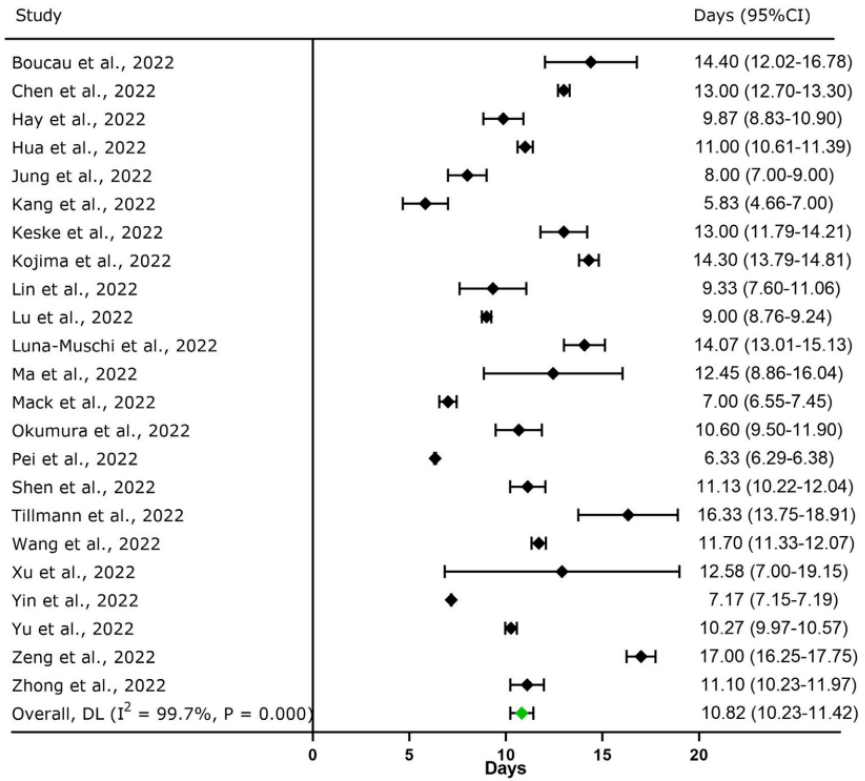
Boucau J, et al
NEJM 2022;387:275



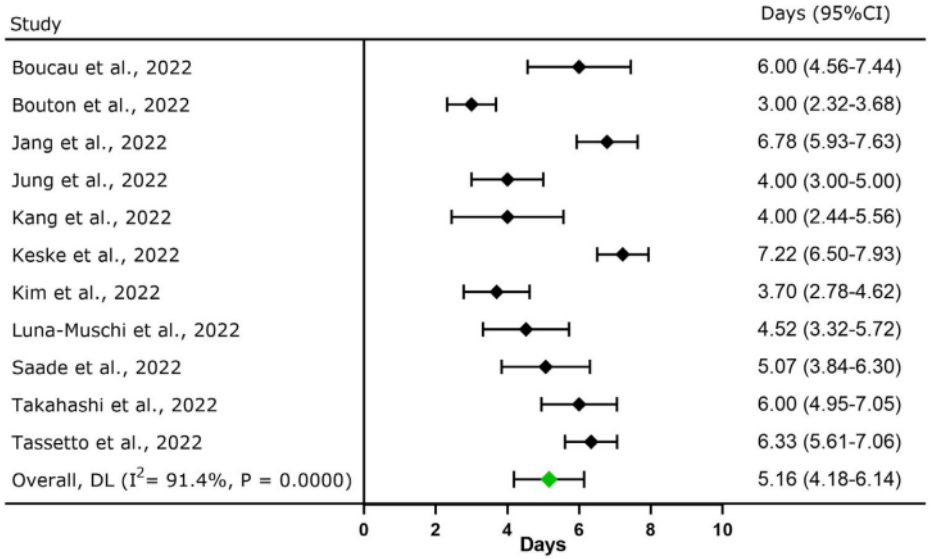



# Duration of viable virus shedding and PCR positivity of the SARS-CoV-2 Omicron variant in the upper respiratory tract: a systematic review and meta-analysis



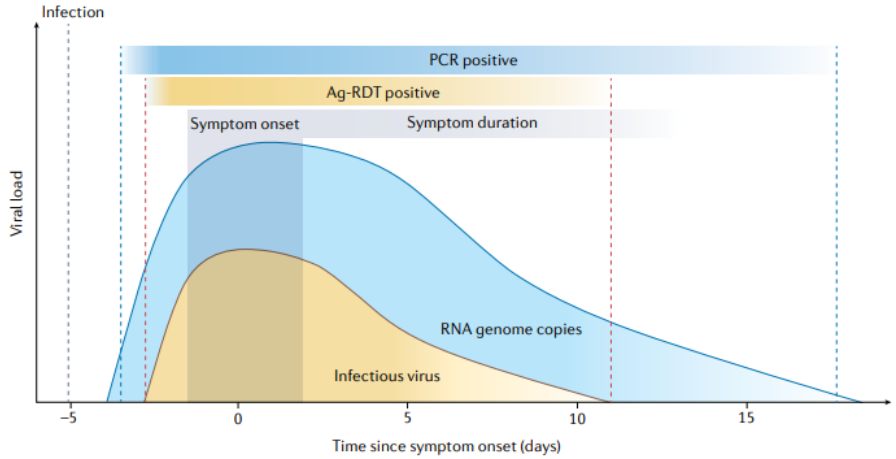

PCR positivity duration of the SARS-CoV-2 Omicron variant in upper respiratory tract.




Viable virus shedding duration of the SARS-CoV-2 Omicron variant in upper respiratory tract

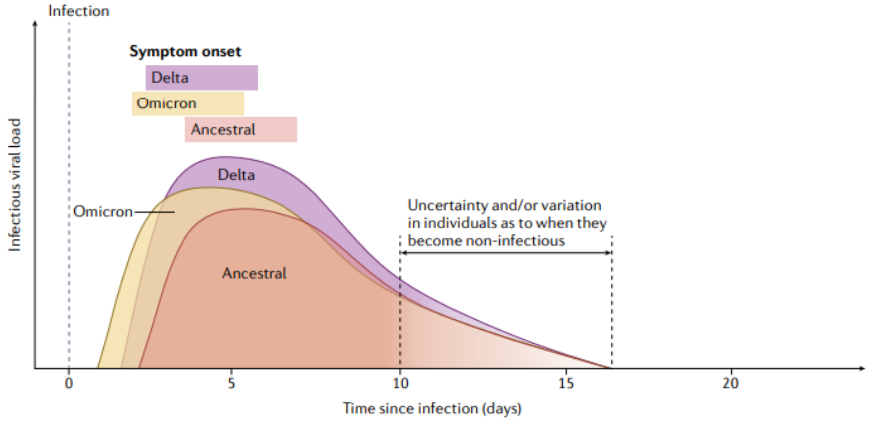
Wu Y, et al. Int J Infect Dis 2023;129:228

# SARS-CoV-2 Viral Load and Shedding Kinetics

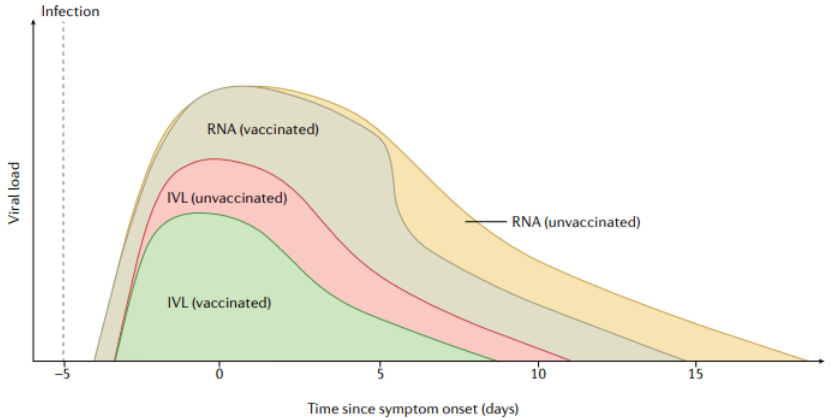



Kinetics of RNA viral loads and infectious virus for ancestral SARS-CoV-2 in patients with mild-to-moderate disease.

Puhach O, et al. Nature Rev Microbiol 202321:147




Infectious viral load and symptom onset in SARS-CoV-2 Delta and Omicron BA.1 variants of concern




**Influence of vaccination on viral load**. Similar RNA viral loads were detected in vaccinated and unvaccinated patients infected with the Delta variant of concern during the first 5 days post-onset of symptoms. However, faster clearance of viral RNA was shown in vaccinated patients. Infectious viral loads (IVLs) were significantly lower in vaccinated individuals and declined faster.

# Interim Guidance for Managing HCP with SARS-CoV-2 Infection or Exposure to SARS-CoV-2, CDC, 9/23/22

- In general, asymptomatic HCP who have had a higher-risk exposure do not require work restriction, regardless of vaccination status, if they do not develop symptoms or test positive for SARS-CoV-2.
- Evaluating Healthcare Personnel with Symptoms of SARS-CoV-2 Infection
  - When testing a person with symptoms of COVID-19, negative results from at least one viral test indicate that the person most likely does not have an active SARS-CoV-2 infection at the time the sample was collected.
    - If using NAAT (molecular), a single negative test is sufficient in most circumstances. If a higher level of clinical suspicion for SARS-CoV-2 infection exists, consider maintaining work restrictions and confirming with a second negative NAAT.
    - If using an antigen test, a negative result should be confirmed by either a negative NAAT (molecular) or second negative antigen test taken 48 hours after the first negative test.
  - For HCP who were initially suspected of having COVID-19 but, following evaluation, another diagnosis is suspected or confirmed, return-to-work decisions should be based on their other suspected or confirmed diagnoses.

https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html

# Interim Guidance for Managing HCP with SARS-CoV-2 Infection or Exposure to SARS-CoV-2, CDC, 9/23/22

## Return to Work Criteria for HCP with SARS-CoV-2 Infection

- The following are criteria to determine when HCP with SARS-CoV-2 infection could return to work and are influenced by severity of symptoms and presence of immunocompromising conditions. After returning to work, HCP should self-monitor for symptoms and seek re-evaluation from occupational health if symptoms recur or worsen. If symptoms recur (e.g., rebound) these HCP should be restricted from work and follow recommended practices to prevent transmission to others (e.g., use of well-fitting source control) until they again meet the healthcare criteria below to return to work unless an alternative diagnosis is identified.
- HCP who were asymptomatic throughout their infection and are not moderately to severely immunocompromised could return to work after the following criteria have been met: At least 7 days have passed since the date of their first positive viral test if a negative viral test* is obtained within 48 hours prior to returning to work (or 10 days if testing is not performed or if a positive test at day 5-7).
- HCP with mild to moderate illness who are not moderately to severely immunocompromised could return to work after the following criteria have been met: (1) At least 7 days have passed since symptoms first appeared if a negative viral test* is obtained within 48 hours prior to returning to work (or 10 days if testing is not performed or if a positive test at day 5-7), and (2) At least 24 hours have passed since last fever without the use of fever-reducing medications, and (3) Symptoms (e.g., cough, shortness of breath) have improved.
- HCP with severe to critical illness who are *not* moderately to severely immunocompromised could return to work after the following criteria have been met: (1) At least 10 days and up to 20 days have passed *since symptoms first appeared,* and (2) At least 24 hours have passed *since last fever* without the use of fever-reducing medications, and (3) Symptoms (e.g., cough, shortness of breath) have improved.
- See CDC guidance for HCP with are moderately to severely immunocompromised. Use of a test-based strategy and consultation with an infectious disease specialist or other expert and an occupational health specialist is recommended to determine when these HCP may return to work.

*Either a NAAT (molecular) or antigen test may be used. If using an antigen test, HCP should have a negative test obtained on day 5 and again 48 hours later
https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html

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# Interim Guidance for Managing HCP with SARS-CoV-2 Infection or Exposure to SARS-CoV-2, CDC, 9/23/22

**Return to Work Criteria for HCP Who Were Exposed to Individuals with Confirmed SARS-CoV-2 Infection**

- For the purposes of this guidance, higher-risk exposures are classified as HCP who had prolonged1 close contact2 with a patient, visitor, or HCP with confirmed SARS-CoV-2 infection and: (1) HCP was not wearing a respirator (or if wearing a facemask, the person with SARS-CoV-2 infection was not wearing a cloth mask or facemask); (2) HCP was not wearing eye protection if the person with SARS-CoV-2 infection was not wearing a cloth mask or facemask; (3) HCP was not wearing all recommended PPE (i.e., gown, gloves, eye protection, respirator) while present in the room for an aerosol-generating procedure
- Following a higher-risk exposure, HCP should: Have a series of three viral tests for SARS-CoV-2 infection. (1) Testing is recommended immediately (but not earlier than 24 hours after the exposure) and, if negative, again 48 hours after the first negative test and, if negative, again 48 hours after the second negative test. This will typically be at day 1 (where day of exposure is day 0), day 3, and day 5. (2) Due to challenges in interpreting the result, testing is generally not recommended for asymptomatic people who have recovered from SARS-CoV-2 infection in the prior 30 days. Testing should be considered for those who have recovered in the prior 31-90 days; however, an antigen test instead of NAAT is recommended. This is because some people may remain NAAT positive but not be infectious during this period. In addition HCP should: (1) Follow all recommended infection prevention and control practices, including wearing well-fitting source control, monitoring themselves for fever or symptoms consistent with COVID-19, and not reporting to work when ill or if testing positive for SARS-CoV-2 infection. (2) Any HCP who develop fever or symptoms consistent with COVID-19 should immediately self-isolate and contact their established point of contact (e.g., occupational health program) to arrange for medical evaluation and testing.

https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-risk-assesment-hcp.html

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# BLOODBORNE PATHOGENS

HIV

HBV

HCV

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# PREVENTING BLOODBORNE PATHOGEN EXPOSURES

**Methods of reducing percutaneous, mucous membrane, or nonintact skin exposure to blood or potentially infectious body fluids**

1. Strict adherence to standard precautions, including appropriate hand hygiene and use of PPE as indicated by the task (eg, gloves, gowns, masks, eye protection)
2. Use of safety-engineered devices (eg, needles, syringes, scalpels)
3. Use of double gloves during surgical procedures with an increased risk of glove puncture
4. Use of blunted surgical needles, when possible
5. Work practice controls to reduce risk of injuries, such as elimination of capping needles, using tray to pass sharp devices, immediate and appropriately discarding used sharp instruments
6. Puncture-resistant sharp disposal units
7. Precautions should be taken to prevent sharps injuries during procedures and during cleaning and disinfection of instruments
8. Mouthpieces, resuscitation bags, or other ventilation devices should be available whenever their need can be anticipated
9. HCP who have exudative lesions or weeping dermatitis on exposed body areas (hands/wrist, face/neck) must be excused from providing direct patient care or working patient equipment (Occupational Safety and Health Administration regulation)
10. HCP unable to perform hand hygiene (eg, cast or nonremovable splint) should be prohibited from providing patient care until able to perform hand hygiene
11. Enhanced education on the proper use of safety-engineered devices

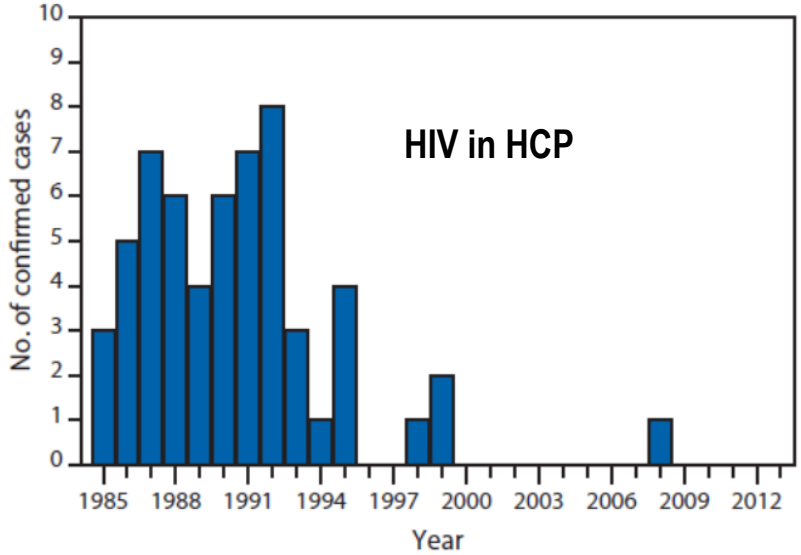
Shenoy ES, Weber DJ. ID Clin N Am 2021
https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1030

## OSHA Bloodborne Pathogen Standard

- Employers must establish a written exposure control plan and provide annual training
- Mandates use of universal precautions (all body fluids assumed contaminated except sweat)
- Employers must utilize engineering and work practice controls to minimize/eliminate exposure
- Requires offering hepatitis B vaccine to persons with the potential for exposure
- Testing of exposed employees for Hepatitis B and HIV
- Post-exposure prophylaxis must be immediately available as per CDC guidelines
- All work-related needle stick injuries and cuts from sharp objects that are contaminated with another person's blood or other potentially infectious material are OSHA-reportable regardless of the source patient disease status.

# BLOODBORNE PATHOGENS: RISKS TO HCP

- Approximately 385,000 needle sticks and other sharps-related injuries to hospital-based healthcare personnel each year.
- 58 total known occupationally acquired HIV cases in HCPs; all but 1 were prior to 1999.
- 88% (50/57) of the documented cases of occupational HIV transmission from 1985-2004 involved a percutaneous exposure. Of those, 45/57 involved a hollow-borne needle.
- 41% of sharp injuries occur during use; 40% after use/before disposal; 15% during/after disposal




**Abbreviation:** HIV = human immunodeficiency virus.

**Risk (percutaneous exposure)**

HBV
- 22.0 – 30.0% (HBeAG+)
- 1.0 – 6.0% (HBeAG-)

HCV
- 1.8%

HIV
- 0.3% (1 in 300)

**Risk (mucous membrane)**

HBV
- Yes (rate unknown)

HCV
- Yes (rate unknown but very small)

HIV
- 0.1% (1 in 1000)
- < 0.1% (non-intact skin)

RISK

- Test source for hepatitis B (HBsAg), hepatitis C (HCV PCR), HIV (4th gen, HIV antibodies and p24 antigen)
- Provide hepatitis B prophylaxis, if indicated
- Provide follow-up for hepatitis C, if indicated
- If source HIV+ or at "high risk" for HIV, offer employee HIV prophylaxis per CDC protocol

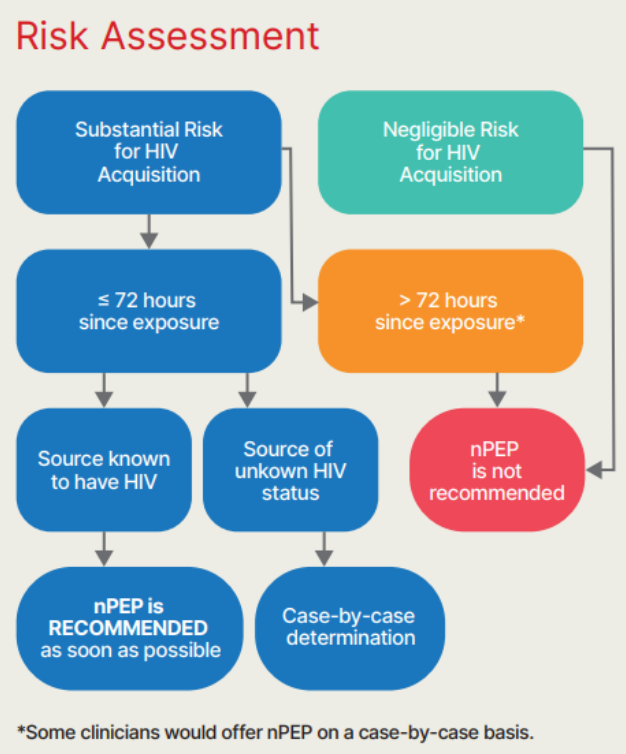
CDC, 2003

MMWR 2015;63:1245

# BBP POST-EXP0SURE PATHWAY

| Infection Status of Source Patient ↓ | Baseline Labs | 2 Weeks | 4 Weeks | 6 Weeks | 4 Months | 6 Months |
|---|---|---|---|---|---|---|
| **DATE: →** | __/__/____ | __/__/___ | __/__/___ | __/__/___ | __/__/___ | __/__/__ |
| **HIV positive** | HIV test – 4th generation | Lab - only if baseline abnormal or clinical indication | | HIV test - 4th generation | HIV test - 4th generation | |
| **HBsAg positive** | • If source positive and HCP unknown, need HBsAb.<br>• If HBsAb ≥12 mIU/mL - testing complete.<br>• If HBsAb <12 mIU/mL, need anti-HBc & HBsAg at baseline | | | | | • Anti-HBc<br>• HBsAg |
| **Hepatitis C RNA PCR positive** | Anti-HCV (Hepatitis C antibody) | Lab - only if baseline abnormal or clinical indication | | HCV RNA PCR | Anti-HCV (Hepatitis C antibody) | |
| **Unknown source** | • HIV test – 4th generation<br>• If source unknown and HCP HBsAb unknown, need HBsAb.<br>• If HBsAb ≥12 mIU/mL - testing complete.<br>• If HBsAb <12 mIU/mL, need anti-HBc & HbsAg at baseline<br>• HCV antibody | Lab - only if baseline abnormal or clinical indication | | • HIV test – 4th generation<br>• HCV RNA PCR | • HIV test – 4th generation<br>• Anti-HCV (Hepatitis C antibody) | • Anti-HBc<br>• HBsAg |

# HIV PEP




High Risk for HIV

- Exposure of mucous membrane, non-intact skin, percutaneous
- Source known to be HIV+

HIV PEP Regimens

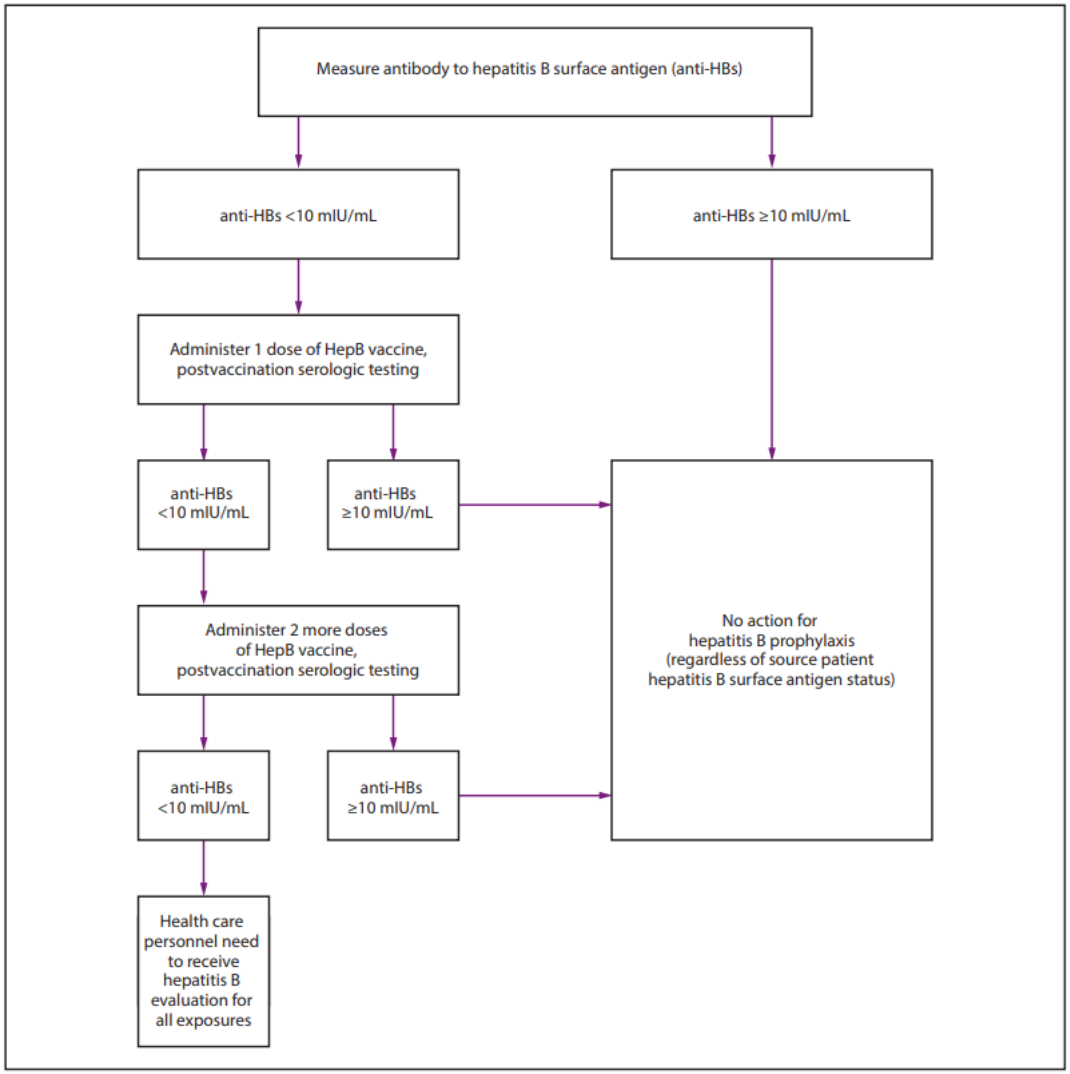
- Tenofovir disoproxil fumarate (TDF)/emtricitabine (FTC) (Truvada) 300/200 mg + dolutegravir (Tivicay) 50 mg – 1 tablet of each PO daily x 28 days
- Many providers prescribe tenofovir alafenamide (TAF)/FTC (Descovy) in place of TDF/FTC, and bictegravir in place of dolutegravir. Bictegravir is available as a coformulation with TAF/FTC (bictegravir/TAF/FTC, Biktarvy)
- Other regiments are available for known HIV-source patients with specific drug resistance but these cases are rare.
- Start within 72 hours
- Baseline HIV, 6 weeks, 12 weeks, 6 months (4$^{th}$ generation test

Inform HCP when prescribing PEP

- possible drug toxicities
- possible drug interactions, and
- the need for adherence to PEP regimens

https://aidsetc.org/sites/default/files/AETC-nPEP-guide-111721_0.pdf
file:///C:/Users/dweber/Downloads/cdc_20711_DS1.pdf

**FIGURE 3. Pre-exposure evaluation for health care personnel previously vaccinated with complete, ≥3-dose HepB vaccine series who have not had postvaccination serologic testing***




MMWR Recommendations and Reports 2018l;67(#1):1-31

**TABLE 5. Postexposure management of health care personnel after occupational percutaneous or mucosal exposure to blood or body fluids, by health care personnel HepB vaccination and response status**

| HCP status | Postexposure testing | | Postexposure prophylaxis | | Postvaccination serologic testing |
|---|---|---|---|---|---|
| | Source patient (HBsAg) | HCP testing (anti-HBs) | HBIG | Vaccination | |
| Documented responder after complete series | | | No action needed | | |
| Documented nonresponder after two complete series | Positive/unknown | —* | HBIG x2 separated by 1 month | — | N/A |
| | Negative | | No action needed | | |
| Response unknown after complete series | Positive/unknown | <10 mIU/mL | HBIG x1 | Initiate revaccination | Yes |
| | Negative | <10 mIU/mL | None | Initiate revaccination | Yes |
| | Any result | ≥10 mIU/mL | No action needed | | |
| Unvaccinated/incompletely vaccinated or vaccine refusers | Positive/unknown | — | HBIG x1 | Complete vaccination | Yes |
| | Negative | — | None | Complete vaccination | Yes |

**Abbreviations**: anti HBs = antibody to hepatitis B surface antigen; HBIG = hepatitis B immune globulin; HBsAg = hepatitis B surface antigen; HCP = health care personnel; N/A = not applicable.
* Not indicated.

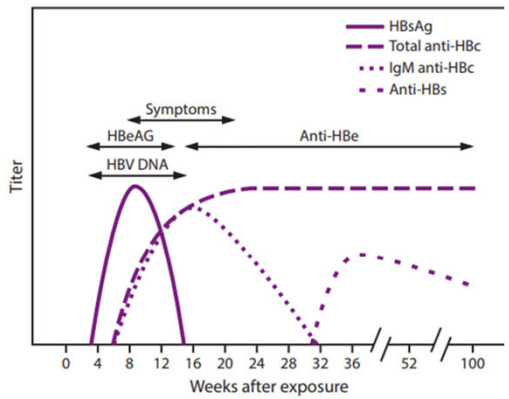
# INTERPRETING HBV TEST RESULTS

**TABLE 1. Typical interpretation of test results for hepatitis B virus infection**

| HBsAg | Total anti-HBc | IgM anti-HBc | Anti-HBs | HBV DNA | Interpretation |
|---|---|---|---|---|---|
| - | - | - | - | - | Never infected |
| + | - | - | - | + or - | Early acute infection; transient (up to 18 days) after vaccination |
| + | + | + | - | + | Acute infection |
| - | + | + | + or - | + or - | Acute resolving infection |
| - | + | - | + | - | Recovered from past infection and immune |
| + | + | - | - | + | Chronic infection |
| - | + | - | - | + or - | False-positive (i.e., susceptible); past infection; "low-level" chronic infection; or passive transfer of anti-HBc to infant born to HBsAg-positive mother |
| - | - | - | + | - | Immune if anti-HBs concentration is ≥10 mIU/mL after vaccine series completion; passive transfer after hepatitis B immune globulin administration |

**Abbreviations:** - = negative; + = positive; anti-HBc = antibody to hepatitis B core antigen; anti-HBs = antibody to hepatitis B surface antigen; HBsAg = hepatitis B surface antigen; HBV DNA = hepatitis B virus deoxyribonucleic acid; IgM = immunoglobulin class M.

**FIGURE 2. Acute hepatitis B virus infection with recovery**




MMWR Recommendations and Reports 2018l;67(#1):1-31

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# HCV EXPOSURE EVALUATION OF HCP

FIGURE 1. Testing of source patients after potential exposure of health care personnel to hepatitis C virus — CDC guidance, United States, 2020*

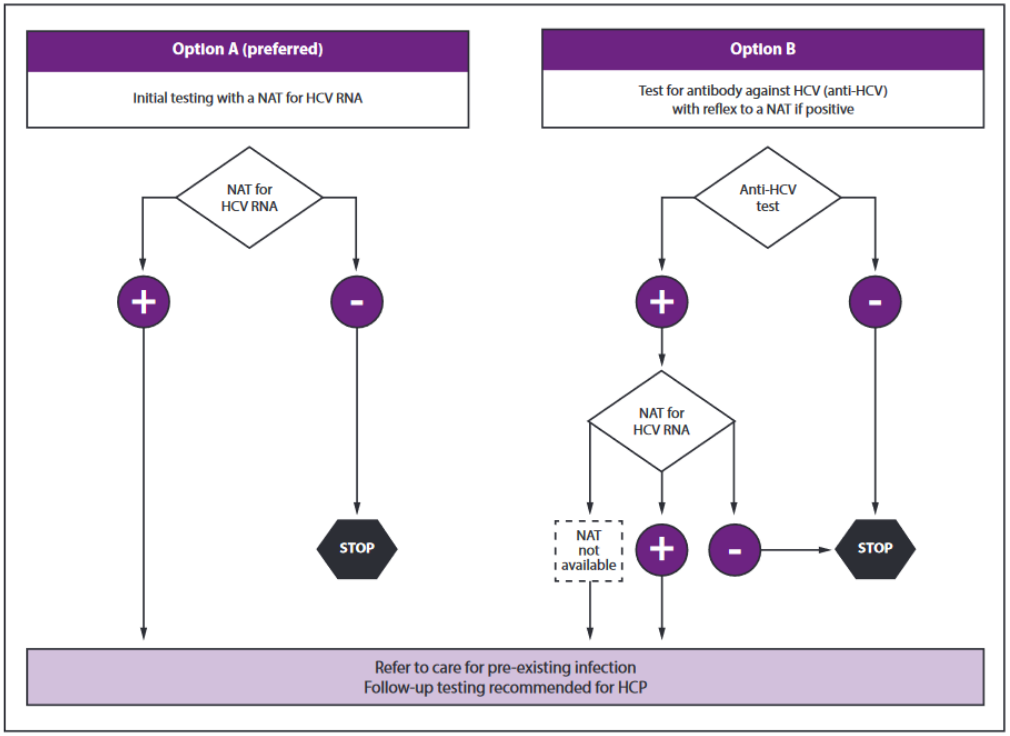
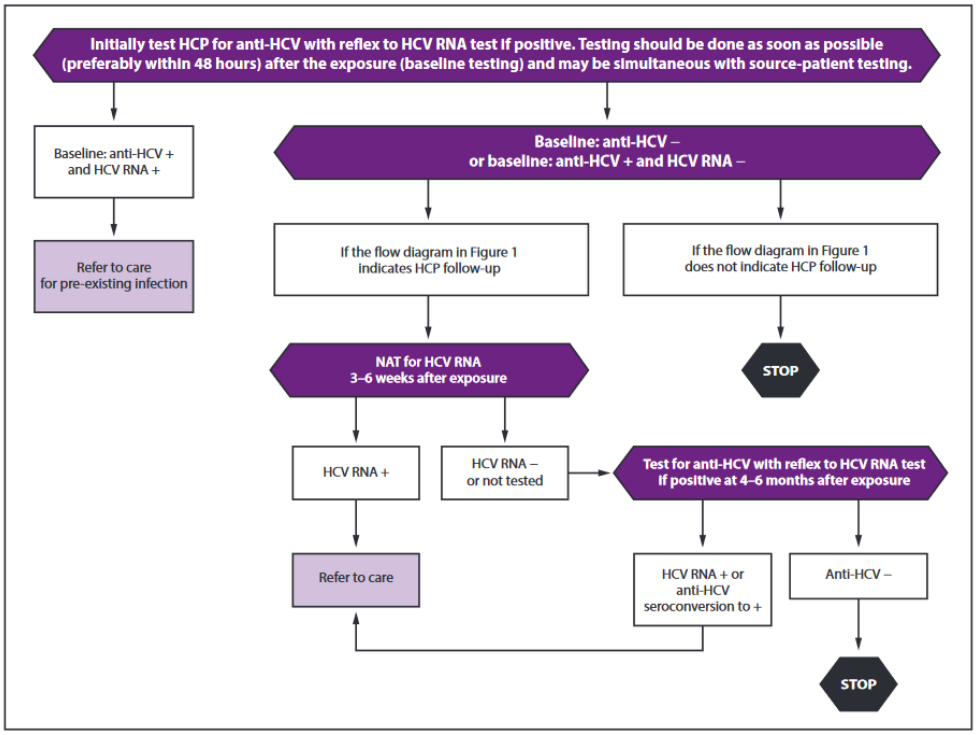



FIGURE 2. Testing of health care personnel after potential exposure to hepatitis C virus — CDC guidance, United States, 2020*




Antiviral PEP for HCV is NOT available – early therapy for HCV conversion is recommended
MMWR 2020 (#6);69:1-7

# EVALUATION OF INFECTIOUS DISEASE EXPOSURES AND INFECTIONS IN HCP

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# OHS HCP EXPOSURE MANAGEMENT

Data Recorded on Exposures

- Employee Data
- Name, unit number, job description
- Date, incident form completed
- Employer, supervisor
- Source Data
- Name, unit number, location, infection(s)
- Exposure Data
- Location, date, type & circumstances of exposure

Exposure Evaluation

- Determine if source case has infection and is infectious
- Determine transmission possible (i.e., appropriate exposure without protection)
- Determine if employee is susceptible (may require labs)
- Determine if prophylaxis available & indicated
- Consider alternative prophylaxis (if available) if employee has contraindications to prophylaxis of first choice
- Arrange follow-up

Employee Counseling

- Information to be provided to HCP who are exposed to an infectious agent: Recommended follow-up; Risk (if known) of transmitting the infection to patients, other personnel, or other contacts; Methods of preventing the transmission of infection to other persons
- Information to be provided to HCP who are offered prophylaxis: Alternative means of prophylaxis; Risk (if known) of infection if treatment not accepted; Degree of protection provided by therapy; Potential side effects of therapy

# POST-EXPOSURE PROPHYLAXIS

- Anthrax
- Diphtheria
- Hepatitis A
- Hepatitis B
- HIV
- Human bite wound
- Influenza A (novel, H5N1)
- Influenza B
- Measles
- Meningococcal infection
- Monkey bite
- Mpox
- Pertussis (whooping cough)
- Plague
- Rabies
- Rat bite (rodent bite)
- Smallpox
- Syphilis
- Tuberculosis (TB)
- Tularemia
- Varicella (chickenpox)
- Zoster (shingles)

# DIPHTHERIA, CDC, 10/3/22

- **Background**: Healthcare-associated transmission of diphtheria has been reported, although diphtheria is uncommon in the United States. Diphtheria remains endemic in many parts of the developing world, and ongoing circulation of toxigenic *Corynebacterium diphtheriae* (*C. diphtheriae*) strains has been reported in North America. HCP are not at substantially higher risk than the general adult population for acquiring diphtheria; however, there is the potential for sporadic or imported cases to require medical care in the US. Some cases in the US have been related to importation
- **Occupational exposures**: Transmission of diphtheria occurs through the deposition of respiratory, oral, or nasal secretions, discharge from skin lesions, or, rarely, fomites from an infected source person on the mucus membranes of a susceptible host. Unprotected (e.g., not wearing a facemask), close, face-to-face contact with an infectious source person or their secretions may be considered an exposure to diphtheria. Close contact may include, but is not limited to, performing a physical examination on, feeding, or bathing a patient; bronchoscopy; intubation; or administration of bronchodilators. Exposure to cutaneous diphtheria lesions may include unprotected contact with the lesions or their drainage, such as when changing lesion dressings or handling potentially infectious secretions without wearing recommended personal protective equipment (PPE) (i.e., gown and gloves).
- **Clinical features**: Diphtheria is an acute, toxin-mediated disease caused by *C. diphtheriae*. Initial symptoms of respiratory diphtheria include sore throat, difficulty in swallowing, malaise, and low-grade fever. The hallmark of respiratory diphtheria is the presence of an exudate that organizes into a tough, grayish-white pseudomembrane over the tonsils, the pharynx, or larynx. The pseudomembrane is firmly adherent to the tissue, and forcible attempts to remove it causes bleeding. Cutaneous diphtheria may be characterized by a scaling rash or by ulcers with clearly demarcated edges.
- Treatment for diphtheria is begun at the first sign(s) of clinical illness.
- **Prep** (Yes; Tdap); **PEP** (Yes; IM benzathine penicillin G x 1 OR 7-10 days of PO erythromycin – see CDC guidelines)

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

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# DIPHTHERIA: RECOMMENDATIONS, CDC, 10/3/22

- For healthcare personnel who have an exposure to diphtheria, regardless of vaccination status: 1) Administer postexposure prophylaxis in accordance with CDC recommendations. 2) Exclude from work and obtain nasal and pharyngeal swabs for diphtheria culture.
  - If nasal AND pharyngeal cultures are negative for toxin-producing *C. diphtheriae*, HCP may return to work while completing postexposure antibiotic therapy.
  - If nasal OR pharyngeal cultures are positive for toxin-producing *C. diphtheriae*: 1) Complete postexposure antibiotic therapy. 2) HCP may return to work when: (a) Postexposure antibiotic therapy is completed AND (b) At least 24hrs after completion of postexposure antibiotic therapy, 2 consecutive pairs of nasal AND pharyngeal cultures, obtained at least 24hrs apart, are negative for toxin-producing *C. diphtheriae*.
  - Implement daily monitoring for the development of signs and symptoms of diphtheria for 7 days after the last exposure.
- For healthcare personnel with respiratory diphtheria infection, exclude from work until: 1) Antibiotic and antitoxin (if needed) therapy are completed AND 2) At least 24 hours after completion of antibiotic therapy, two consecutive pairs of nasal AND pharyngeal cultures, obtained at least 24 hours apart, are negative for toxin-producing *C. diphtheriae*.
- For healthcare personnel with cutaneous diphtheria infection or other diphtheria infection manifestations, determine the duration of exclusion from work in consultation with federal, state, and local public health authorities.

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

# GROUP A STREPTOCCUS (GAS), CDC, 10/3/22

- **Background**: GAS is a bacterium that can cause many different infections, including strep throat, scarlet fever, impetigo, and others. A common cause of pharyngeal, skin, and other soft tissue infections, GAS can also cause severe, life-threatening invasive disease, including pneumonia, streptococcal toxic-shock syndrome (STSS) and necrotizing fasciitis. Healthcare-associated transmission of GAS has been documented from patients-to-HCP and from HCP-to-patients.
- **Occupational exposures**: HCP who were GAS carriers have been linked to outbreaks of surgical site, postpartum, and burn wound infections. In these outbreaks, GAS carriage was documented in the pharynx, the skin, the rectum, and the female genital tract of the colonized personnel. Transmission from patients to HCP has been described, with potential contributing factors including gross contamination of surgical attire during extensive wound debridement, presence of dermatitis, not using gloves when providing wound care, and sharps injury. Although rare, spread of GAS infections may also occur via food. Foodborne outbreaks of pharyngitis have occurred due to improper food handling, and HCP have been linked to foodborne transmission of GAS, causing pharyngitis
- **Clinical features**: GAS infections can have a wide variety of clinical presentations including pharyngitis; superficial (e.g., impetigo) and invasive (e.g., cellulitis, abscesses) skin and soft tissue infection; and invasive infections (e.g., pneumonia, meningitis, fasciitis).
- **Prep** (None); **PEP** (may be indicated). Although PEP is not routinely administered after HCP exposure to GAS, if clinical symptoms compatible with GAS infection develop, GAS infection may be the underlying etiology and testing and treatment may be indicated.
- **Outbreaks**: Even one case of postpartum or postsurgical GAS infection typically prompts an epidemiological investigation because of the potential for prevention of additional cases (see CDC for details)

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

# GROUP A STREPTOCCUS: RECOMMENDATIONS, CDC, 10/3/22

- Postexposure prophylaxis and work restrictions are not necessary for HCP who have an exposure to group A *Streptococcus.*
- For HCP with known or suspected group A *Streptococcus* infection, obtain a sample from the infected site, if possible, for group A *Streptococcus* and exclude from work until group A *Streptococcus* infection is ruled out, or until 24 hours after the start of effective antimicrobial therapy, provided that any draining skin lesions can be adequately contained and covered.
    - For draining skin lesions that cannot be adequately contained or covered (e.g., on the face, neck, hands, wrists), exclude from work until the lesions are no longer draining.
- Work restrictions are not necessary for healthcare personnel with known or suspected group A Streptococcus colonization, unless they are epidemiologically linked to transmission of the organism in the healthcare setting.
- For healthcare personnel with group A *Streptococcus* colonization who are epidemiologically linked to transmission of the organism in the healthcare setting:
    - Administer chemoprophylaxis in accordance with CDC recommendations AND
    - Exclude from work until 24 hours after the start of effective antimicrobial therapy AND
    - Obtain a sample from the affected site for group A *Streptococcus* testing 7 to 10 days after completion of chemoprophylaxis; if positive, repeat administration of chemoprophylaxis and again exclude from work until 24 hours after the start of effective antimicrobial therapy.

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

# MENIGOCOCCAL DISEASE, CDC, 10/3/22

- **Background**: Healthcare-associated transmission of *Neisseria meningitidis* is uncommon. In rare instances, *N. meningitidis* has been transmitted from patients-to-HCP through contact with the respiratory secretions of patients with meningococcal disease and handling isolates of *N. meningitidis*
- **Occupational health exposures**: *N. meningitidis* can be transmitted person-to-person through unprotected direct contact with the respiratory secretions or saliva of a person with clinical disease, such as meningitis or bacteremia. Exposures in healthcare may include mucous membrane contact with infectious secretions from close, face-to-face contact during activities such as mouth-to-mouth resuscitation, endotracheal tube placement or management, or open airway suctioning while not wearing or correctly using recommended personal protective equipment (PPE). Brief, non-face-to-face contact, such as standing in the doorway of a patient's room, cleaning a patient's room, delivering a medication or food tray, starting an IV, or performing a routine physical exam, is generally not considered an exposure.
- **Clinical features**: Meningococcal disease is a serious and potentially life-threatening infection. Common signs and symptoms ofmeningococcal disease include sudden onset of high fever, neck stiffness, confusion, nausea, vomiting, lethargy,and petechial or purpuric rash.
- **Prep** (certain lab workers); **PEP** (Yes). Chemoprophylaxis is administered as soon as possible after exposure, ideally less than 24 hours after identification of an index patient. Chemoprophylaxis administered more than 14 days after onset of illness in an index patient is probably of limited or no value. Rifampin, ciprofloxacin, and ceftriaxone are 90%-95% effective in reducing nasopharyngeal carriage of *N. meningitidis* and are all acceptable antimicrobial agents for chemoprophylaxis (See CDC for details of PEP).

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

# MENIGOCOCCAL DISEASE: RECOMMENDATIONS, CDC, 10/3/22

- Administer antimicrobial prophylaxis to healthcare personnel, regardless of vaccination status, who have an exposure to *N. meningitidis.*
- Exclude healthcare personnel with invasive *N. meningitidis* disease from work until 24 hours after the start of effective antimicrobial therapy.
- Work restrictions are not necessary for HCP who only have nasopharyngeal carriage of *N. meningitidis*.

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

# PERTUSSIS, CDC, 10/3/22

- **Background**: Healthcare-associated transmission of *Bordetella pertussis* has involved both patients and HCP; nonimmunized infants and children are at greatest risk for severe morbidity and mortality. Serologic studies of HCP suggest that they may be infected with pertussis much more frequently than indicated by attack rates of clinical disease.
- **Occupational exposures**: During pertussis outbreaks in healthcare settings, the risk for HCP contracting pertussis is often difficult to quantify because exposure is not well-defined. Transmission of *B. pertussis* occurs through deposition of respiratory, oral, or nasal secretions from an infected source person on the mucous membranes of a susceptible host. Unprotected (e.g., not wearing a facemask), close, face-to-face contact with an infectious source person or contact with their secretions may be considered an exposure to pertussis. Close contact may include, but is not limited to, performing a physical examination on, feeding, or bathing a patient; bronchoscopy; intubation; or administration of bronchodilators.
- **Clinical Features**: Pertussis is highly contagious; secondary attack rates exceed 80% in susceptible household contacts. The incubation period is usually 5 to 10 days, but symptoms may develop up to 3 weeks after exposure. The clinical course of pertussis infection has 3 stages: catarrhal (1-2 weeks), paroxysmal (next 1-6 weeks), and convalescent (~2-3 weeks). HCP at increased risk for complications include: 1) Persons in their third trimester of pregnancy; 2) persons with pre-existing health conditions that may be exacerbated by a pertussis infection (e.g., immunocompromised persons, persons with moderate to severe asthma).
- **Prep** (Yes, Tdap); **PEP** (Yes, antibiotics even if up to date with immunizations). The preferred agents for PEP are azithromycin, erythromycin, and clarithromycin. Trimethoprim-sulfamethoxazole (TMP-SMZ) may also be used as an alternative agent. See CDC for additional details regarding PEP or therapy.

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

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# PERTUSSIS RECEMMENDATIONS, CDC, 10/3/22

- For asymptomatic HCP, regardless of vaccination status, who have an exposure to pertussis and are likely to interact with persons at increased risk for severe pertussis:
  - Administer postexposure prophylaxis.
  - If not receiving postexposure prophylaxis, restrict from contact (e.g., furlough, duty restriction, or reassignment) with patients and other persons at increased risk for severe pertussis for 21 days after the last exposure.
- For asymptomatic HCP, regardless of vaccination status, who have an exposure to pertussis and are not likely to interact with persons at increased risk for severe pertussis:
  - Administer postexposure prophylaxis, OR
  - Implement daily monitoring for 21 days after the last exposure for development of signs and symptoms of pertussis.
- For asymptomatic HCP, regardless of vaccination status, who have an exposure to pertussis and who have preexisting health conditions that may be exacerbated by a pertussis infection:
  - Administer postexposure prophylaxis.
- Exclude symptomatic healthcare personnel with known or suspected pertussis from work for 21 days from the onset of cough, or until 5 days after the start of effective antimicrobial therapy.
- Work restrictions are not necessary for asymptomatic healthcare personnel who have an exposure to pertussis and receive postexposure prophylaxis, regardless of their risk for interaction with persons at increased risk for severe pertussis.

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

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# RABIES, CDC, 10/3/22

- **Background**: Healthcare-associated transmission of rabies virus has been documented between patients, although occupational transmission to HCP has not been confirmed.1 Person to person transmission of rabies is rare and has been reported almost exclusively via cornea, tissue, and organ transplantation.
- **Occupational exposures**: Rabies virus is transmitted through direct contact (e.g., through broken skin or mucous membranes in the eyes, nose, or mouth) with saliva, tears and lacrimal secretions, or brain/nervous system tissue from an infected animal or person. An exposure to rabies virus in a healthcare setting could include being bitten by a potentially infectious patient, or having a patient's saliva come into contact with a person's eyes, mouth, or an open cut on the skin. Casual contact, such as touching a person with rabies or contact with non-infectious fluid or tissue (e.g., urine, blood, feces), is not associated with a risk for infection. Rabies virus is not transmitted through contaminated objects or materials such as clothes or bedding.
- **Clinical features**: Rabies onset is characterized by a non-specific prodrome that could be mistaken for other diseases. As the disease progresses, the person may experience delirium, abnormal behavior, hallucinations, hydrophobia (fear of water), dysphagia, and insomnia. Occasionally, rabies may present as a paralytic syndrome. The acute period of disease typically ends after 2 to 10 days. Once clinical signs of rabies appear, the disease is nearly always fatal, and treatment is typically supportive. In humans, the incubation period averages 1 to 3 months but ranges from days to years.
- **Prep** (Yes; lab workers with potential exposure to rabies virus); **PEP** (Yes; vaccine plus RIG)
- **Prevention**: Use Standard Precautions, that may include a gown, gloves, eye protection and a facemask, for patients with suspected or confirmed clinical infection, to prevent contact with potentially infectious body fluids and secretions

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

# RABIES RECOMMENDATIONS, CDC, 10/3/22

- For HCP who have an exposure to rabies virus, administer postexposure prophylaxis in accordance with CDC and ACIP recommendations and in consultation with federal, state, and local public health authorities.
- Work restrictions are not necessary for asymptomatic HCP who have an exposure to rabies virus.
- For HCP who have a suspected or confirmed rabies virus infection, exclude from work in consultation with federal, state, and local public health authorities.

https://www.cdc.gov/infectioncontrol/pdf/guidelines/IC-Guidelines-HCP-H.pdf

# MEASLES, CDC, 2008 & 2011*

- **Background**: Measles is a highly contagious rash illness that is transmitted by respiratory droplets and airborne spread. Severe complications, which might result in death, include pneumonia and encephalitis. Measles vaccine coverage has decreased in recent years, thus outbreaks are increasingly likely.
- **Occupational exposures**: Medical settings have played a prominent role in perpetuating outbreaks of measles transmission. Because of the greater opportunity for exposure, HCP are at higher risk than the general population for becoming infected with measles. Measles may persist in the air and remain infective for up to 2 hours after an infected patient has left the room.
- **Clinical features**: Measles is an acute viral respiratory illness. It is characterized by a prodrome of fever (as high as 105°F) and malaise, cough, coryza, and conjunctivitis -the three "C"s -, a pathognomonic enanthema (Koplik spots) followed by a maculopapular rash. The rash usually appears about 14 days after a person is exposed. The rash spreads from the head to the trunk to the lower extremities.
- Prep (Yes; MMR); PEP (Yes, MMR and/or Ig)

Bolyard EA, IP for HCP, 1998 – file:///C:/Users/dweber/Downloads/cdc_11563_DS1-1.pdf; Vaccines for HCP, MMWR https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm https://www.cdc.gov/measles/hcp/index.html

*Revised recommendations expected in 2023 or 2024

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# MEASLES RECOMMENDATIONS, CDC, 2008 & 2011*

- MMR vaccine is highly effective in preventing measles with a 1-dose vaccine effectiveness of 95% when administered on or after age 12 months and a 2-dose vaccine effectiveness of 99%.
- Active infection: Exclude from duty; until 7 days after the rash appears
- Postexposure (susceptible HCP): Exclude from duty; from 5th day after 1st exposure personnel) through 21st day after last exposure and/or 4 days after rash appears. Provide 1st dose of MMR.
- Postexposure (HCP who received 1 dose of MMR): Those with documentation of 1 vaccine dose may remain at work and should receive the 2nd dose.
- Presumptive evidence of immunity: 1) written documentation of vaccination with 2 doses of live measles or MMR vaccine administered at least 28 days apart,†; 2) laboratory evidence of immunity,§; laboratory confirmation of disease, or birth before 1957.¶ For HCP with documented immunization, serological testing to demonstrate immunity is not recommended.
- Because of the possibility, albeit low (~1%), of measles vaccine failure in HCP exposed to infected patients, all HCP should observe airborne precautions in caring for patients with measles.

† The first dose of measles-containing vaccine should be administered on or after the first birthday; the second dose should be administered no earlier than 28 days after the first dose. § Measles immunoglobulin (IgG) in the serum; equivocal results should be considered negative. ¶ The majority of persons born before 1957 are likely to have been infected naturally and may be presumed immune, depending on current state or local requirements. HCP should be assessed serologically for immunity or considered for 2 dose of MMR (provide 2 doses of MMR in outbreak setting).

Bolyard EA, IP for HCP, 1998 – file:///C:/Users/dweber/Downloads/cdc_11563_DS1-1.pdf; Vaccines for HCP, MMWR https://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm

*Revised recommendations expected in 2023 or 2024

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# MUMPS, CDC, 2008 & 2011*

- **Background**: The spectrum of illness ranges from subclinical infection (20%--40%) to nonspecific respiratory illness, sialadenitis including classic parotitis, deafness, orchitis, and meningoencephalitis; severity increases with age.
- **Occupational exposures**: Although health-care--associated transmission of mumps is infrequent, it might be underreported because of the high percentage (~20%--40%) of infected persons who might be asymptomatic
- **Clinical features**: Nonspecific prodromal symptoms may precede parotitis by several days, including low-grade fever which may last 3 to 4 days, myalgia, anorexia, malaise, and headache. Mumps usually involves pain, tenderness, and swelling in one or both parotid salivary glands (cheek and jaw area). Swelling usually peaks in 1 to 3 days and then subsides during the next week. The swollen tissue pushes the angle of the ear up and out. As swelling worsens, the angle of the jawbone below the ear is no longer visible. Often, the jawbone cannot be felt because of swelling of the parotid. One parotid may swell before the other, and in 25% of patients, only one side swells. Other salivary glands (submandibular and sublingual) under the floor of the mouth also may swell but do so less frequently (10%).
- **Prep** (Yes, MMR); **PEP** (No)

Bolyard EA, IP for HCP, 1998 – file:///C:/Users/dweber/Downloads/cdc_11563_DS1-1.pdf; Vaccines for HCP, MMWR; ttps://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm.
https://www.cdc.gov/mumps/hcp.html#clinical

*Revised recommendations expected in 2023 or 2024

# MUMPS RECOMMENDATIONS, CDC, 2008 & 2011*

- MMR vaccine has a 1-dose vaccine effectiveness in preventing mumps of 80%--85% (range: 75%--91%) (175,196--199) and a 2-dose vaccine effectiveness of 79%--95%. However, immunity wanes with times (a 3rd dose may be indicated during outbreaks)
- Active infection: Exclude from duty; until 9 days after onset of parotitis
- Postexposure (susceptible HCP): Exclude from duty from 12th day after 1st exposure through 26th day after last exposure or until 9 days after onset of parotitis. Provide 1st dose of MMR.
- Postexposure (HCP who received 1 dose of MMR): HCP with documentation of 1 vaccine dose may remain at work and should receive the second dose. HCP with mumps should be excluded from work for 5 days from the onset of parotitis.
- Consider a 3rd dose of MMR in a mumps outbreak after consultation with local public health.
- Presumptive evidence of immunity: 1) written documentation of vaccination with 2 doses of live mumps or MMR vaccine administered at least 28 days apart,**; 2) laboratory evidence of immunity, ††; laboratory confirmation of disease, or birth before 1957. §§ For HCP with documented immunization, serological testing to demonstrate immunity is not recommended.

** The first dose of mumps-containing vaccine should be administered on or after the first birthday; the second dose should be administered no earlier than 28 days after the first dose; †† Mumps immunoglobulin (IgG) in the serum; equivocal results should be considered negative; §§ The majority of persons born before 1957 are likely to have been infected naturally between birth and 1977, the year that mumps vaccination was recommended for routine use, and may be presumed immune, even if they have not had clinically recognizable mumps disease. For HCP born before 1957 who lack laboratory evidence of mumps immunity or laboratory confirmation of disease, health-care facilities should consider vaccinating personnel with 2 doses of MMR; for unvaccinated personnel born before 1957 who lack lab evidence of mumps immunity or laboratory confirmation of disease, health-care facilities should recommend 2 doses of MMR vaccine during an outbreak of mumps.

Bolyard EA, IP for HCP, 1998 – file:///C:/Users/dweber/Downloads/cdc_11563_DS1-1.pdf; Vaccines for HCP, MMWR; ttps://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm. *Revised recommendations expected in 2023 or 2024

# RUBELLA, CDC, 2008 & 2011*

- **Background**: Rubella (German measles) is a viral disease characterized by rash, low-grade fever, lymphadenopathy, and malaise. Although rubella is considered a benign disease, transient arthralgia and arthritis are observed commonly in infected adults, particularly among postpubertal females. Chronic arthritis has been reported after rubella infection, but such reports are rare. Of primary concern are the effects that rubella can have when a pregnant woman becomes infected, especially during the first trimester, which can result in miscarriages, stillbirths, therapeutic abortions, and congenital rubella syndrome (CRS)
- **Occupational exposures**: No documented transmission of rubella to HCP or other hospital staff or patients in U.S. health-care facilities has occurred since elimination was declared. However, in the decades before elimination, rubella transmission was documented in at least 10 U.S. medical settings
- **Clinical features**: Rubella is a viral illness that can lead to complications and death. It is characterized by a mild, maculopapular rash along with lymphadenopathy, and a slight fever. The rash usually starts on the face, becomes generalized within 24 hours, and lasts a median of 3 days; it occurs in 50% to 80% of infected people, Lymphadenopathy, which may precede rash, often involves posterior auricular or suboccipital lymph nodes, can be generalized, and lasts between 5 and 8 days. About 25% to 50% of infections are asymptomatic. Clinical diagnosis of rubella virus is unreliable and should not be considered in assessing immune status. Up to half of all infections may be subclinical or unapparent. Many rubella infections are not recognized because the rash resembles many other rash illnesses.
- **Prep** (Yes, MMR); **PEP** (No)

Bolyard EA, IP for HCP, 1998 – file:///C:/Users/dweber/Downloads/cdc_11563_DS1-1.pdf; Vaccines for HCP, MMWR; ttps://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm. *Revised recommendations expected in 2023 or 2024
https://www.cdc.gov/rubella/

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# RUBELLA RECOMMENDATIONS, CDC, 2008 & 2011*

- Antibody responses to rubella as part of MMR vaccine are equal (i.e., >99%) to those seen after the single-antigen RA 27/3 rubella vaccine.
- Active infection: Exclude from duty; until 5 days after rash appears
- Postexposure (susceptible HCP): Exclude from duty from 7th day after 1st exposure through 21st day after last exposure
- For HCP who have 1 documented dose of MMR vaccine or other acceptable evidence of immunity to rubella, serologic testing for immunity is not recommended. In the event that a health-care provider who has at least 1 documented dose of rubella-containing vaccine is tested serologically and determined to have negative or equivocal rubella titer results, receipt of an additional dose of MMR vaccine for prevention of rubella is not recommended. Such persons should be considered immune to rubella
- Presumptive evidence of immunity to rubella for persons who work in health-care facilities includes any of the following: 1) written documentation of vaccination with 1 dose of live rubella or MMR vaccine; lab evidence of immunity¶¶; 2) lab confirmation of rubella infection or disease, or; 3) birth before 1957*** (except women of childbearing potential who could become pregnant, although pregnancy in this age group would be exceedingly rare†††).

Rubella immunoglobulin (IgG) in the serum; equivocal results should be considered negative. *** Depending on current state or local requirements, for unvaccinated personnel born before 1957 who lack laboratory evidence of rubella immunity or laboratory confirmation of infection or disease, health-care facilities should consider vaccinating personnel with one dose of MMR vaccine; for unvaccinated personnel born before 1957 who lack laboratory evidence of rubella immunity or laboratory confirmation of infection or disease, health-care facilities should recommend 1 dose of MMR vaccine during an outbreak of rubella. ††† Because rubella can occur in some persons born before 1957 and because congenital rubella and congenital rubella syndrome can occur in the offspring of women infected with rubella virus during pregnancy, birth before 1957 is not acceptable evidence of rubella immunity for women who could become pregnant

Bolyard EA, IP for HCP, 1998 – file:///C:/Users/dweber/Downloads/cdc_11563_DS1-1.pdf; Vaccines for HCP, MMWR; ttps://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm.

*Revised recommendations expected in 2023 or 2024

# VARICELLA/ZOSTER, CDC, 2008 & 2011*

- **Background**: Varicella is a highly infectious disease caused by primary infection with varicella-zoster virus (VZV). VZV is transmitted from person to person by direct contact, inhalation of aerosols from vesicular fluid of skin lesions of varicella or herpes zoster (HZ), a localized, generally painful vesicular rash commonly called shingles, or infected respiratory tract secretions that also might be aerosolized. Infected persons are contagious an estimated 1--2 days before rash onset until all lesions are crusted, typically 4--7 days after rash onset. Varicella secondary attack rates can reach 90% among susceptible contacts. Typically, primary infection with VZV results in lifetime immunity. VZV remains dormant in sensory-nerve ganglia and can reactivate at a later time, causing HZ.
- **Occupational exposures**: Although relatively rare in the United States since introduction of varicella vaccine, nosocomial transmission of VZV is well recognized and can be life-threatening to certain patients. Sources of nosocomial exposure that have resulted in transmission include patients, HCP, and visitors with either varicella or HZ. Both localized and disseminated HZ in immunocompetent as well as immunocompromised patients have been identified as sources of nosocomial transmission of VZV. Localized HZ has been demonstrated to be much less infectious than varicella; disseminated HZ is considered to be as infectious as varicella
- **Clinical features**: The average incubation period for varicella is 14 to 16 days after exposure to a varicella or a herpes zoster rash, with a range of 10 to 21 days. A mild prodrome of fever and malaise may occur 1 to 2 days before rash onset, particularly in adults. In children, the rash is often the first sign of disease. Breakthrough varicella is usually mild. Patients typically are afebrile or have low fever and develop fewer than 50 skin lesions. They usually have a shorter illness compared to unvaccinated people who get varicella. The rash is more likely to be predominantly maculopapular rather than vesicular.

Vaccines for HCP, MMWR; ttps://www.cdc.gov/mmwr/preview/mmwrhtml/rr6007a1.htm. *Revised recommendations expected in 2023 or 2024

# VARICELLA/ZOSTER RECOMMENDATIONS, CDC, 2008 & 2011*

**Varicella**

- Active infection: Exclude from duty until lesions dried and crusted.
- Postexposure (susceptible HCP): Exclude from duty from 10th day after 1st exposure through 21st day (28th day if VZIG given) after last exposure.
- **Prep** (Yes, varicella vaccine); **PEP** (for high-risk HCP – VZIG; antiviral therapy may also be used, not FDA approved, see Red Book)

**Zoster**

- Active infection (localized, in healthy HCP): Cover lesions; restrict from care of high-risk patients until lesions are dried and crusted.
- Active infection (generalized or localized in immunocompromised HCP): Restrict from patient contact until all lesions dry and crusted.
- Postexposure (susceptible HCP): Exclude from duty from 10th day after 1st exposure through 21st day (28th day if VZIG given) after last exposure.

**Presumptive immunity**: Written documentation of vaccination with 2 doses of varicella vaccine; lab evidence of immunity§§§ or lab confirmation of disease; diagnosis or verification of a history of varicella disease by HCP,¶¶¶ or diagnosis or verification of a history of HZ by HCP.

§§§ Commercial assays can be used to assess disease-induced immunity, but they often lack sensitivity to detect vaccine-induced immunity (i.e., they might yield false-negative results); ¶¶¶ Verification of history or diagnosis of typical disease can be provided by any health-care provider
Bolyard EA, IP for HCP, 1998 – file:///C:/Users/dweber/Downloads/cdc_11563_DS1-1.pdf; *Revised recommendations expected in 2023 or 2024

# ZOSTER RECOMMENDATIONS, CDC, 2008*

- Active infection (localized, in healthy HCP): Cover lesions; restrict from care of high-risk patients until lesions are dried and crusted.
- Active infection (generalized or localized in immunocompromised HCP): Restrict from patient contact until all lesions dry and crusted.
- Postexposure (susceptible HCP): Exclude from duty from 10th day after 1st exposure through 21st day (28th day if VZIG given) after last exposure.

Bolyard EA, IP for HCP, 1998 – file:///C:/Users/dweber/Downloads/cdc_11563_DS1-1.pdf;
*Revised recommendations expected in 2023 or 2024

# MISCELLANEOUS DISEASES, CDC, 2008*

- Conjunctivitis: Restrict from patient contact and contact with the patient's environment until discharge ceases
- Diarrheal diseases:
  - Active stage (diarrhea with other symptoms): Restrict from patient contact, contact with the patient's environment, or food handling until symptoms resolved
  - Convalescent stage (Salmonella spp.): Restrict from care of high-risk patients until symptoms resolve; consult with local and state health authorities regarding need for negative stool cultures
- Enteroviral infections: Restrict from care of infants, neonates, and immunocompromised patients and their environments until symptoms resolved
- Hepatitis A: Restrict from patient contact, contact with patient's environment, and food handling until 7 days after onset of jaundice
- *Herpes simplex*: Hands (herpetic whitlow): Restrict from patient contact and contact with the patient's environment until lesions heal - orofacial: Evaluate for need to restrict from care of high-risk patients
- Pediculosis: Restrict from patient contact until treated and observed to be free of adult and immature lice
- Scabies: Restrict from patient contact until cleared by medical evaluation
- *Staphylococcus aureus* infection (active draining skin lesions): Restrict from contact with patients and patient's environment or food handling until lesions have resolved
- No restrictions: CMV, genital Herpes simplex, *S. aureus* carrier state (unless linked to transmission)

Bolyard EA, IP for HCP, 1998 – file:///C:/Users/dweber/Downloads/cdc_11563_DS1-1.pdf; *Revised recommendations expected in 2023 or 2024

# MANAGEMENT OF THE HBV, HCV OR HIV INFECTED HEALTHCARE PROVIDER

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SHEA

**SHEA White Paper**

## Management of healthcare personnel living with hepatitis B, hepatitis C, or human immunodeficiency virus in US healthcare institutions

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# CONCLUSIONS

- A robust occupational health program is critical to the safety and well being of HCP.
- Key activities of OHS include:
  - Initial evaluation of new HCP (vaccine preventable disease evaluation for immunizations, evaluation for latent or active TB, fit test if appropriate, counseling if desired for pregnancy or immune compromise)
  - Evaluation of HCP following a communicable disease exposure: Assessment of need for furlough and post-exposure prophylaxis.
  - Evaluation of HCP with a communicable disease: Assessment of need for furlough and therapy
  - Return to work assessments for selected patient following a communicable disease
- Communication and cooperation between OHS and Infection Prevention important to protect HCP, patients and visitors