

# Health care workers

**Presented by: Dr.Izadi**

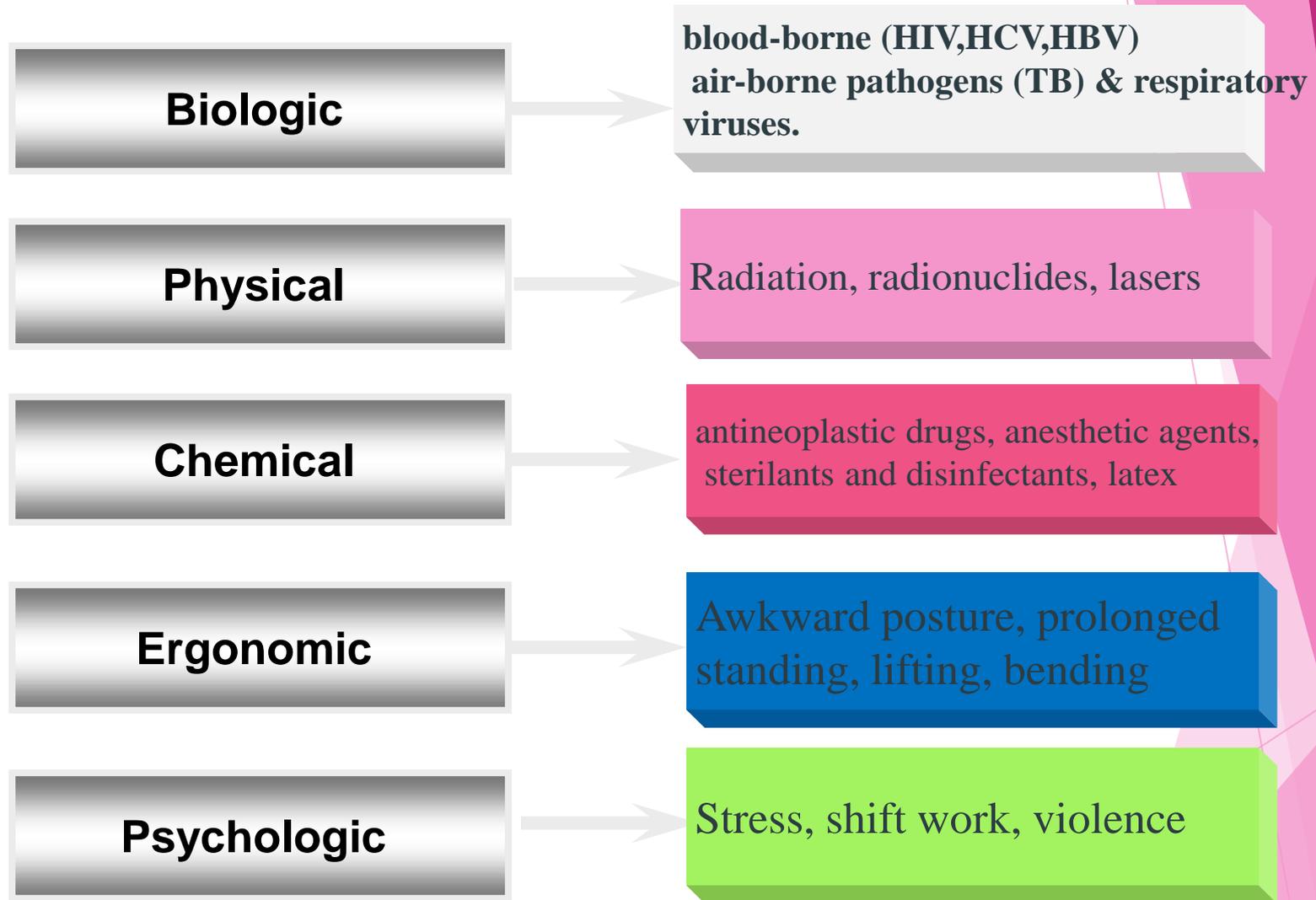
**Associate Professor of Tehran University & Medical Sciences**

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.

# Categories of healthcare workers

Clinical	Physicians Dentists Physician assistants Podiatrists Physical and occupational therapists
Nursing	Nurse practitioners Medical/surgical/pediatric nurses Nurses' aides
Clinical support	Pharmacists Laboratory technicians Diagnostic imaging technicians Operating room technicians
Facility support	Police/security personnel Engineering personnel Building maintenance staff Housekeeping staff Food services staff
Office based	Administrators Clerical support personnel

# Types of Hazard



# Biologic hazards

# Definition

Human diseases caused by work associated exposure to microbial agents:

- ▶ Bacteria
- ▶ Viruses
- ▶ Fungi

# Definition

The **etiology, pathogenesis, clinical findings, diagnosis & treatment** of occupational & non-occupational infections are the same.

- ▶ practical differences:
  - Identification of source of exposure
  - Epidemiologic controls
  - Prevention

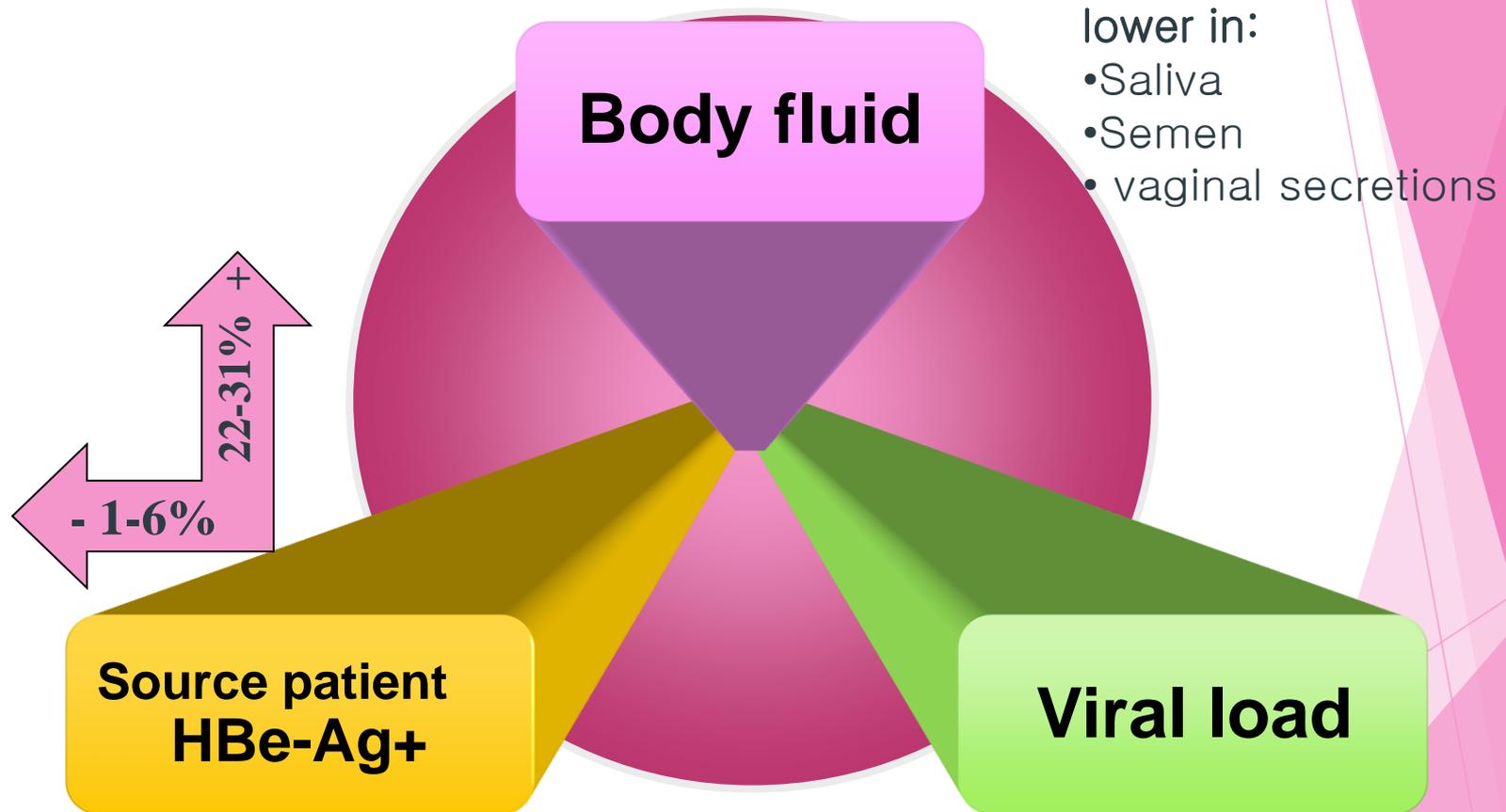
# Blood born pathogens

# Hepatitis B

- ▶ Incubation period: 45 to 60 days
- ▶ The onset of acute hepatitis B is generally insidious, with anorexia, malaise, nausea, vomiting, abdominal pain, jaundice, skin rash, arthralgia, and arthritis.
- ▶ HBsAg serum: 30-60 days after exposure.

Tests	Interpretation	Vaccinate
HBsAg, anti-HBc, anti-HBs	susceptible	vaccinate if indicated
HBsAg, anti-HBc <b>anti-HBs</b>	immune due to vaccination (passive transfer of HBIG)	no vaccination
HBsAg <b>anti-HBc, anti-HBs</b>	immune due to natural infection	no vaccination
<b>HBsAg, anti-HBc, IgM anti-HBc</b> anti-HBs	acutely infected	no vaccination
<b>HBsAg, anti-HBc</b> IgM anti-HBc, anti-HBs	chronically infected	no vaccination (may need treatment)
HBsAg, anti-HBs <b>anti-HBc</b>	Resolved infection False-positive chronic infection	use clinical judgment

# Risk of HBV infection following exposure



In contrast to HIV, and HCV

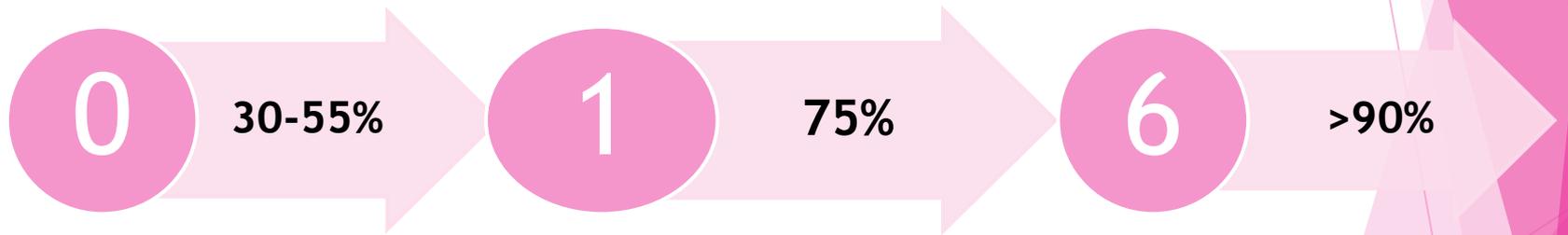
HBV is resistant to drying, ambient temperatures, simple detergents, and alcohol, and may survive on environmental surfaces for up to **one week**.

So, contaminated sharp objects may pose a threat to HCWs for several days following last contact with a source patient.

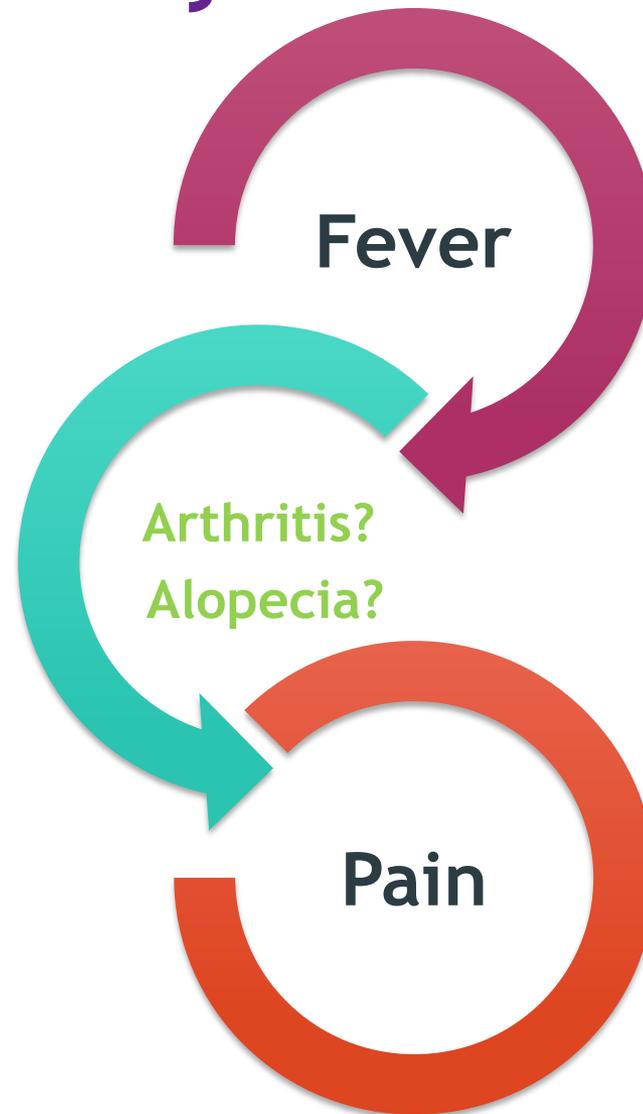
# Hepatitis B vaccine

- ▶ The 3-dose vaccine series at 0, 1,6 months.

Protective antibody response  $\geq 10$  mIU/mL



# Vaccine safety



**Revaccination is not associated with an increase in adverse events**

# HBS-Ab

- ▶ Check for surface antibodies **4 wk-6 months** following the primary series.

What is the appropriate administration site for hepatitis B vaccine and what needle size should be used?

- ▶ A **deep intramuscular** (IM) injection into the deltoid muscle is recommended for adult hepatitis B vaccination.
- ▶ A 22-25 gauge, ” needle should be used, but a **longer needle** may be needed to reach deep into the muscle of **obese persons**.

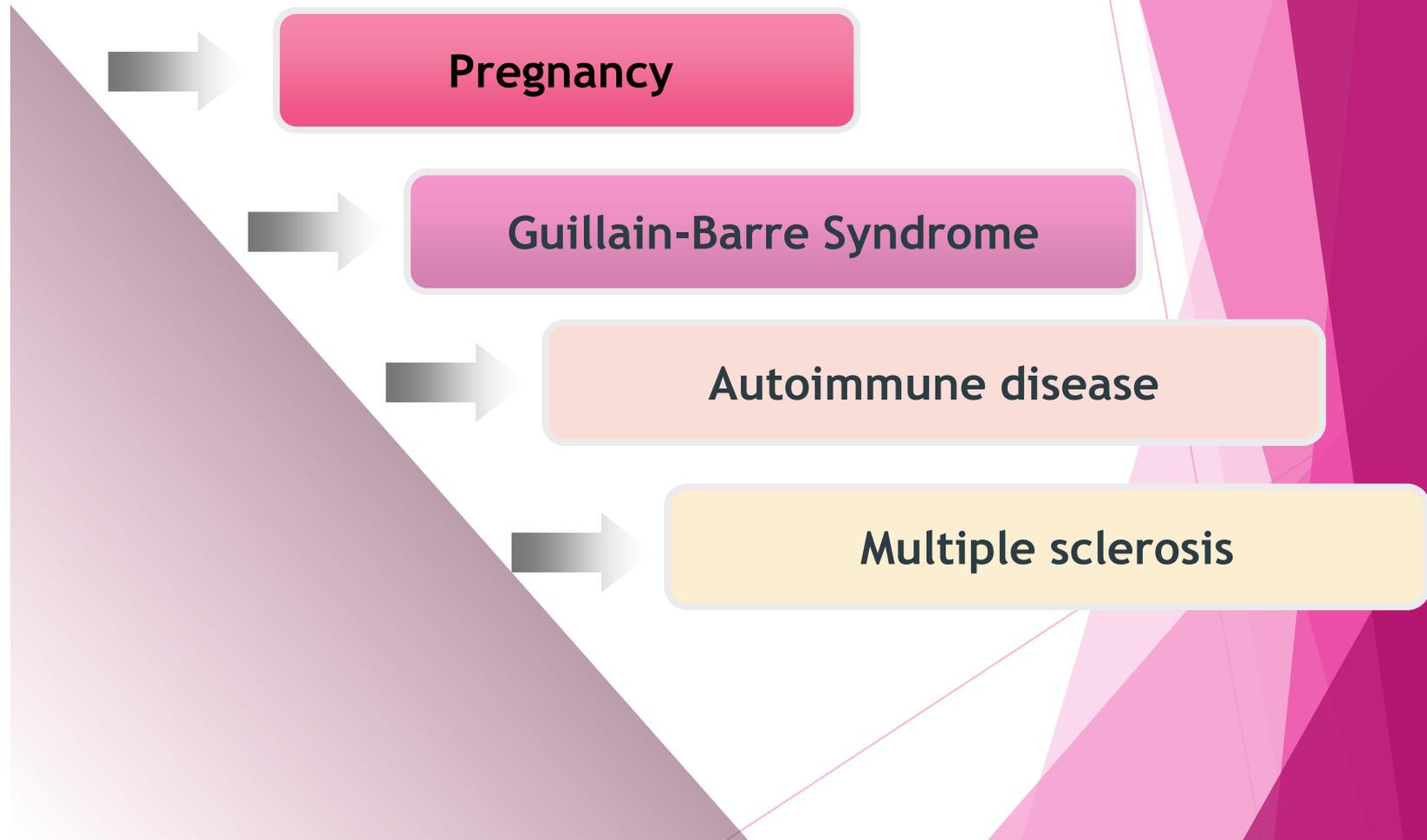
If a HCW's only dose of hepatitis B vaccine was four months ago, should the series be restarted?

- ▶ **No.** The hepatitis B vaccine series **should not be restarted** when doses are delayed.
- ▶ The series should be continued from where it left off.

Is it safe for HCWs to be vaccinated during pregnancy?

- ▶ **YES.** Pregnant women in occupations with a high risk of hepatitis B virus (HBV) infection (e.g., HCWs) should be vaccinated.
- ▶ Hepatitis B vaccine contains no components that have been shown to pose a risk to the fetus at any time during gestation.

# Vaccination is not contraindicated in



# How long is hepatitis B vaccine protective

- ▶ Studies indicate that immunologic memory remains intact for **at least 30 years** and confers protection against clinical illness and chronic HBV infection, even though anti-HBs levels that once measured adequate might become low or decline below detectable levels.
- ▶ Studies are on-going to assess whether booster doses of HepB will be needed in the future.

# Booster And Periodic Check

Only immunocompromised persons

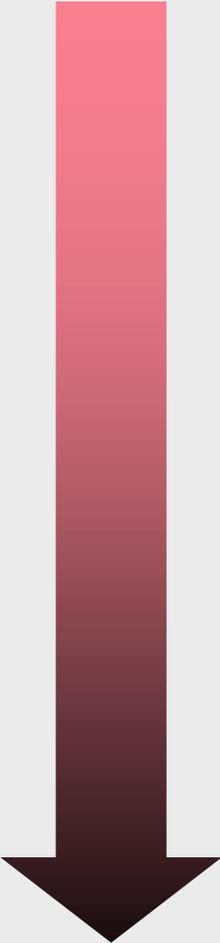
- ▶ hemodialysis patients
- ▶ HIV-positive persons
- ▶ need to have anti-HBs testing and booster doses of vaccine

# Documentation

- ▶ Unfortunately, inadequate documentation of vaccination is common.
- ▶ Even if physicians think they may have been fully vaccinated, but it is not documented, the three-dose vaccination series should be administered.
- ▶ There is no harm in receiving extra doses of vaccine.

A nurse who received the hepatitis B vaccine series over 10 years ago and had a positive follow-up titer. At present, the titer is negative. What should she do now?

- ▶ She doesn't need to do anything further.
- ▶ For health care workers with normal immune status who have demonstrated an anti-HBs response following vaccination, booster doses of vaccine are not recommended nor is periodic anti-HBs testing.



**Anti-HBs < 10mIU/mL**  
after initial series

**3 dose revaccination**

**Non responder**  
Or  
**Infected with HBV**  
**(HBs-Ag & anti-HBc)**

**CDC does not recommend more than two vaccine series in non responders .**

A person who is a known non-responder to hepatitis B vaccine has a percutaneous exposure to HBsAg-positive blood.  
what is the action?

- ▶ The two-dose HBIG regimen would be the better choice.
- ▶ The first dose of HBIG (0.06mL/kg) should be given as soon as possible after exposure and the second dose (same dosage) given one month later.

**If an employee does not respond to hepatitis B vaccination, does he need to be removed from activities that expose him to blood-borne pathogens? Does the employer have a responsibility in this area beyond providing the vaccine?**

- ▶ **No regulations demand removal from the job situations described.**
- ▶ **It is up to each organization to develop a policy concerning non-responders.**

# How long after exposure to HBV can HBsAg be detected in an infected patient's blood?

- ▶ HBsAg will be detected in an infected person's blood an average of 4 weeks (range: 1–9 weeks) after exposure to the virus.

Does being chronically infected with HBV preclude one from becoming a health professional?

- ▶ **No.** All health professionals should practice standard precautions.

Those who are HBsAg-positive and HBeAg-positive should not perform exposure-prone invasive procedures (e.g., gynecologic, cardiothoracic surgery) unless they have been counseled by an expert review panel and been advised under what circumstances, if any, they may perform these procedures.

- ▶ Such circumstances might include notifying prospective patients of the health professional's seropositivity before they undergo exposure-prone invasive procedures.

# HIV/AIDS in the Workplace

## ▶ How is HIV transmitted:

- ▶ from an infected person by body fluids such as blood or other blood- containing secretions

## ▶ Preventive measures:

- ▶ wearing protective clothing, gowns, gloves, masks and goggles

# HIV

US: 5% of individuals with AIDS have been employed in healthcare setting.

<0.3% of HCW were documented to have become HIV positive following occupational exposure most are nurses and laboratory workers.

- Deep injury
- Visible contamination of the device with blood
- needle placement directly into an artery or vein
- exposure to an individual with elevated viral titers

# Post-Exposure Management

## If exposure occurs:

- Skin
  - Wash with soapy water
  - Do not use caustic agent or bleach
- Eye, nose, mouth
  - Rinse with water for 10 minutes
- Needle stick or cut
  - Wash with soapy water
  - Allow to bleed freely
  - Apply first aid

# Post-Exposure Management

Test healthcare worker for HIV after exposure  
at baseline.

Treatment, if started, should be initiated  
immediately after exposure, within 1-2 hours.

Continue treatment for 4 weeks.

# Post exposure prophylaxis

Treatment should begin until 48 or 72 hours  
Following exposure.

Side effect, drug resistance

Several seroconversions have occurred despite prophylaxis :

- Viral resistance
- late initiation of therapy
- inadequate length of therapy
- overwhelming inoculums of virus

# *Follow-up Testing and Appointments*

## Follow-up testing

HIV testing at **baseline, 6 wk., 12 wk., and 6 months** post-exposure

- **4<sup>th</sup> generation combination p24 antigen- antibody HIV test :**
- HIV testing :at **baseline, 6 wk. ,** and at **4 months** post exposure.
- CBC, Renal and Hepatic Function Tests
- (at baseline and 2 weeks post exposure)



# ویژه متخصصین و پزشکان درمانگر ایدز



مجموعه دستورالعمل های مراقبت و درمان  
HIV/AIDS

۶. دستورالعمل مدیریت مواجهه شغلی  
با HIV/AIDS

ویرایش پنجم - تیر ۱۳۹۹

مرکز مدیریت بیماری‌های واگیر، وزارت بهداشت درمان و آموزش پزشکی

مجموعه دستورالعمل و استاندارد فعالیت های مرتبط با  
چهارمین برنامه استراتژیک ملی کنترل عفونت اچ آی وی جمهوری اسلامی  
ایران



زیر کمیته تخصصی مراقبت و  
درمان



Ag/Ab

نسل ۴

Rapid test

HCV +

آزمایش	پایه	۶ هفته پس از تماس	۳ ماه پس از تماس	۶ ماه پس از تماس
HIV Ag/Ab testing	●	●	●	●
HBs Ag, HBs Ab, HBc Ab	●	—	—	●
HCV Ab	●	—	—	●
CBC <sup>v</sup>	●	—	—	—
Serum Cr	●	—	—	—
ALT & AST	●	●	—	—

# HCV

Risk factors in the general population:  
Intravenous drug abuse & contaminated blood transfusions.  
Among healthcare = general population.

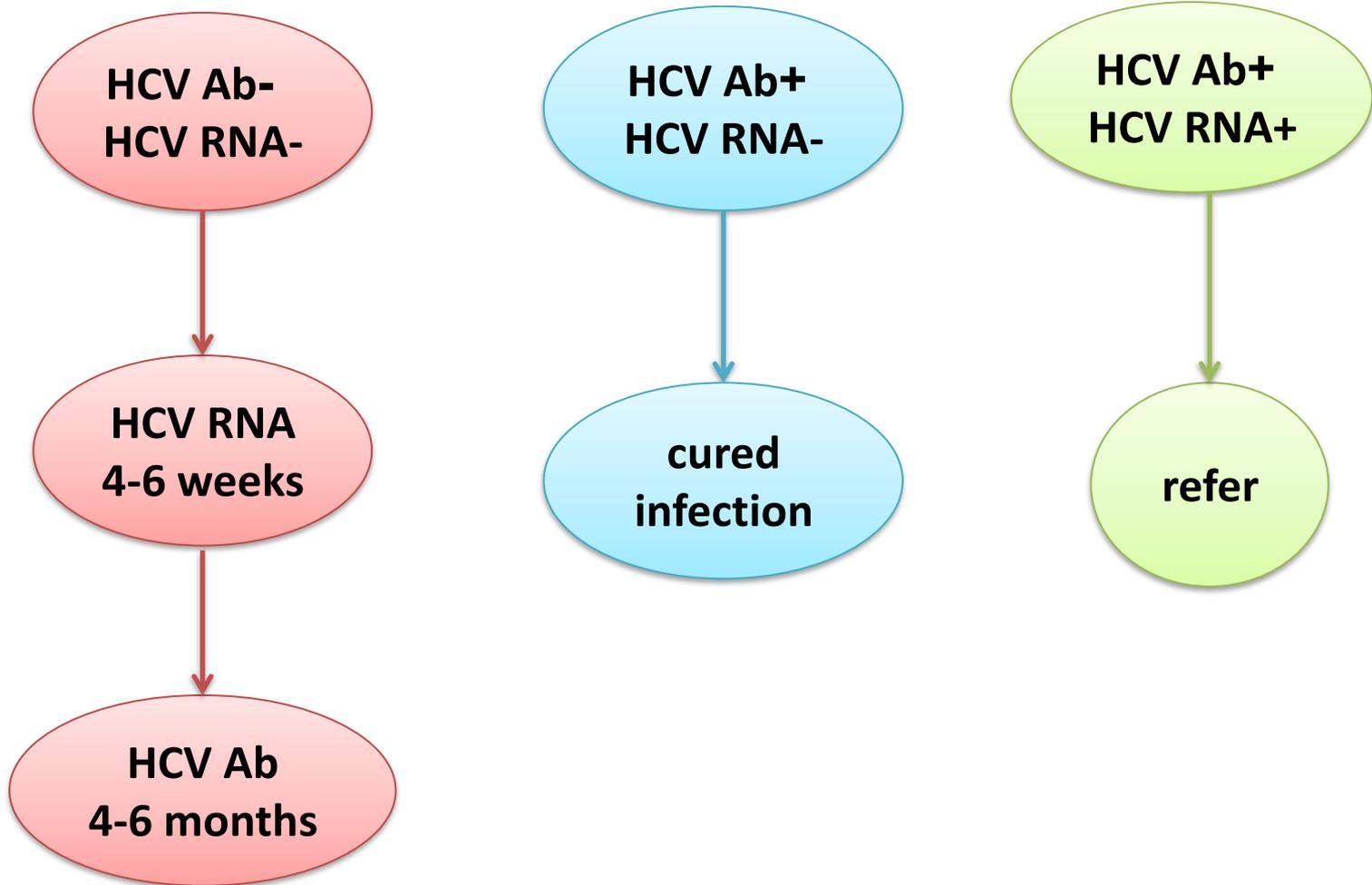
HCV viral titers are low compared to HBV, and virus is generally not detected in urine, feces, or vaginal fluids.

Incubation period: 2-24 wk

Most of infected have no acute symptoms  
chronic hepatitis C : 85%

Exposed HCW: HCV\_Ab at baseline, 6, 12, 24 wk  
PCR & referred to a liver specialist

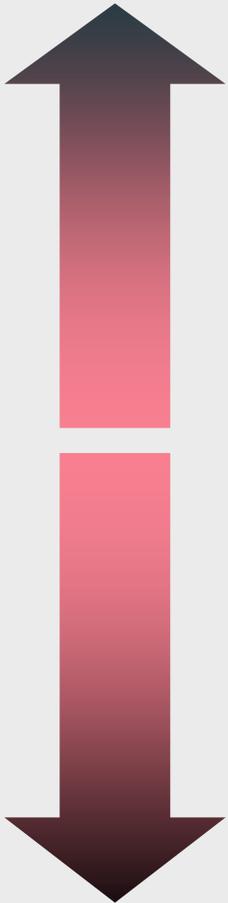
Test HCP within the 48 hr for HCV-Ab and HCV-RNA



# Patient test



More



Less

**30%:HBV**

**0-10%(1.8%): HCV**

**0.09%–0.3% :HIV**

# Air born pathogenes

# Tuberculosis

- ▶ LTBI(Latent tuberculosis infection)
- ▶ Tuberculosis Disease
  
- ▶ Incubation Period :4-12W

The risk of development of clinical disease:

- ▶ Infancy, 16-21 yr
- ▶ Under nutrition
- ▶ Immunopathologic states
- ▶ persons with some coexisting diseases
- ▶ (silicosis, ESRD, leukemia, upper GI carcinoma, DM)

# Primary infection

Usually is asymptomatic in adults.

young adults are at higher risk for rapid progression to active disease,  
usually characterized by apical cavity disease.

- ▶ Once infection occurs, the organism may disseminate from the lungs to other sites: GI, GU & bone.
- ▶ The risk for reactivation is highest in the **first** year after exposure.

# Tuberculin Skin Testing

- ▶ Prior exposure to TB
- ▶ Delayed hypersensitivity
- ▶ Neither 100% sensitive nor specific
- ▶ 0.1 ml of 5IU , intra dermally into the or volar surface of the forearm(48-72hr)
  
- ▶ Positive TST :
  - ▶ exposed to TB in the past and is at risk for reactivation
  
- ▶ New TST (+):CXR, smear &culture sputum

# TST

5 mm of induration:

- ▶ close contacts of infectious patients
- ▶ Immuno suppressed patients
- ▶ organ recipients
- ▶ persons with known or suspected HIV infection

# TST

- ▶  $\geq 10$  mm is considered positive in:
- ▶ High-risk occupational groups
- ▶ High-risk groups such as immigrants from high-prevalence areas
- ▶ Alcoholics
- ▶ IV drug users
- ▶ Those with the other disease states

# TST

- ▶ In persons with no risk factors in areas of low prevalence, induration of 15 mm or more is required for a positive reaction

The PPD test may be negative:

- ▶ overwhelming tuberculosis
- ▶ Measles
- ▶ Hodgkin disease
- ▶ Sarcoidosis, or immunosuppressive states

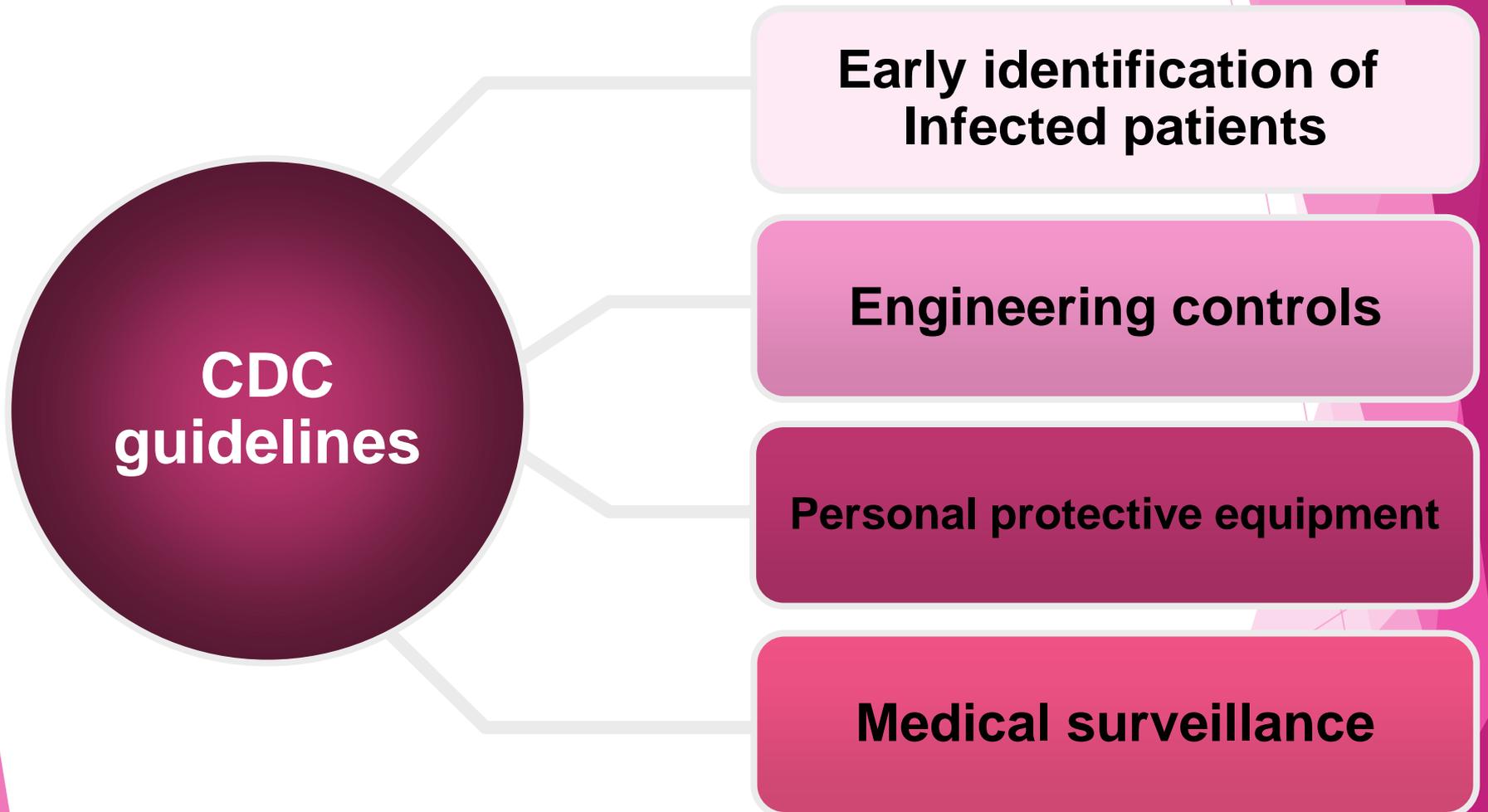
ریسک فعالیت	ریسک برای پرسنل بهداشتی	
	متوسط	پایین
	<p>در یک بیمارستان با بیشتر از ۲۰۰ تخت و بیشتر از ۶ بیمار سالانه با تشخیص TB بستری شوند یا کمتر از ۲۰۰ تخت و بیشتر از ۳ بیمار سالانه با تشخیص TB بستری شوند.</p>	<p>در یک بیمارستان بیشتر از ۲۰۰ تخت و کمتر از ۶ بیمار در یک سال با تشخیص TB بستری شوند یا در یک بیمارستان با کمتر از ۲۰۰ تخت و کمتر از ۳ بیمار سالانه با تشخیص TB بستری شوند.</p>
بالا	سالانه و بعد از مواجهه	سالانه و بعد از مواجهه
متوسط	سالانه و بعد از مواجهه	بعد از مواجهه
کم	بعد از مواجهه	بعد از مواجهه

- ▶ Persons having known contact with an infectious patient for whom PPD status is not previously documented should be:

PPD tested immediately and retested 8-12 wk after the infectious contact.

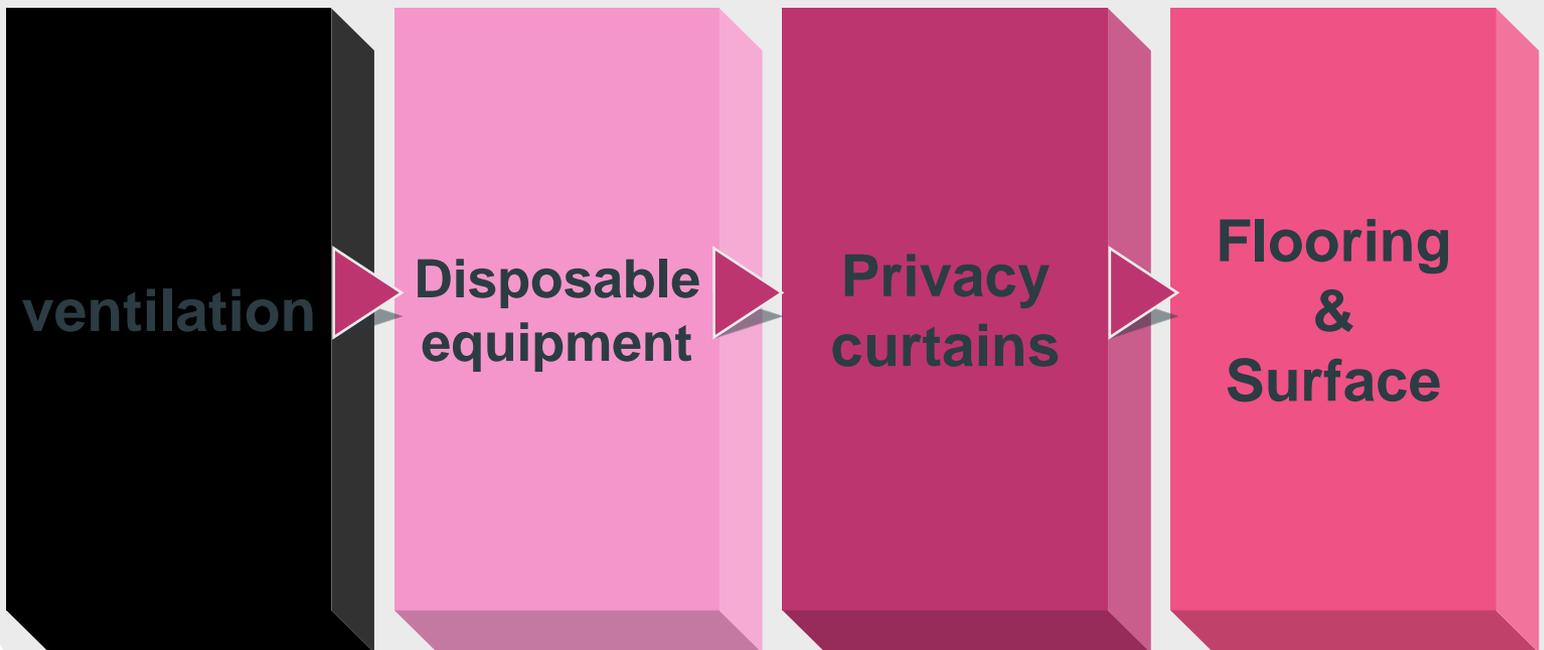
- ▶ If conversion occurs, physical examination and chest radiography should occur to rule out acute clinical infection.

# Programs to prevent occupational exposure to TB

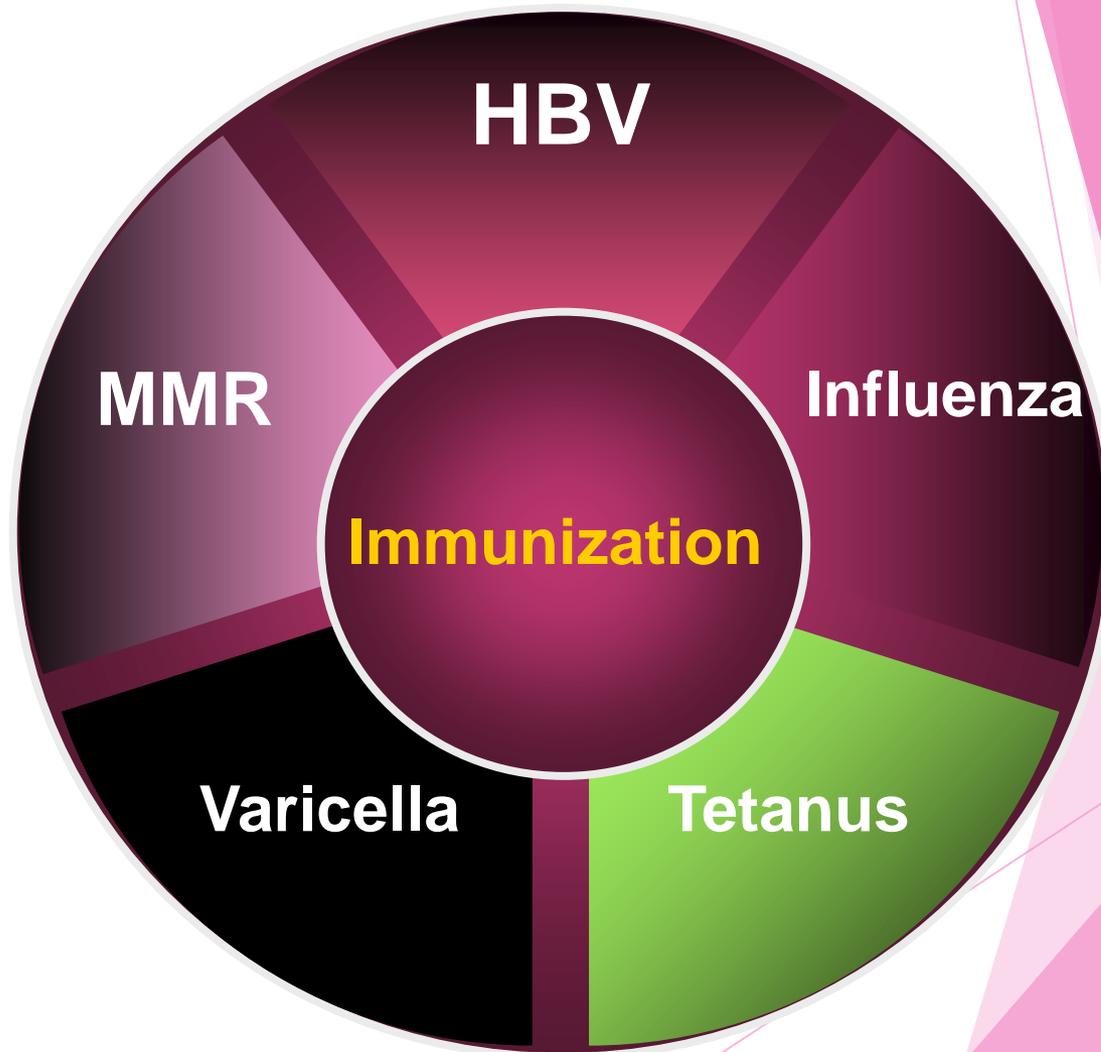


Infectio

## Engineering control for medical center



# Infection control



- HAV vaccine is not currently recommended for HCW.
- Varicella, CMV, rubella :  
teratogen for pregnant employees.
- Immunization for MMR :  
3 months waiting period for pregnancy

# Influenza

# Vaccine types

## LAIN

Live Attenuated  
Influenza Vaccine

- **Healthy, 2-49 yr, Non pregnant**
- **Except for:**
- **HCW who care for severely immunocompromised persons**

## TIV

Trivalent Inactivated  
Influenza Vaccine

- **Age > 6 mo**

## Vaccine effectiveness

Age, Health status of the person(70-90%)

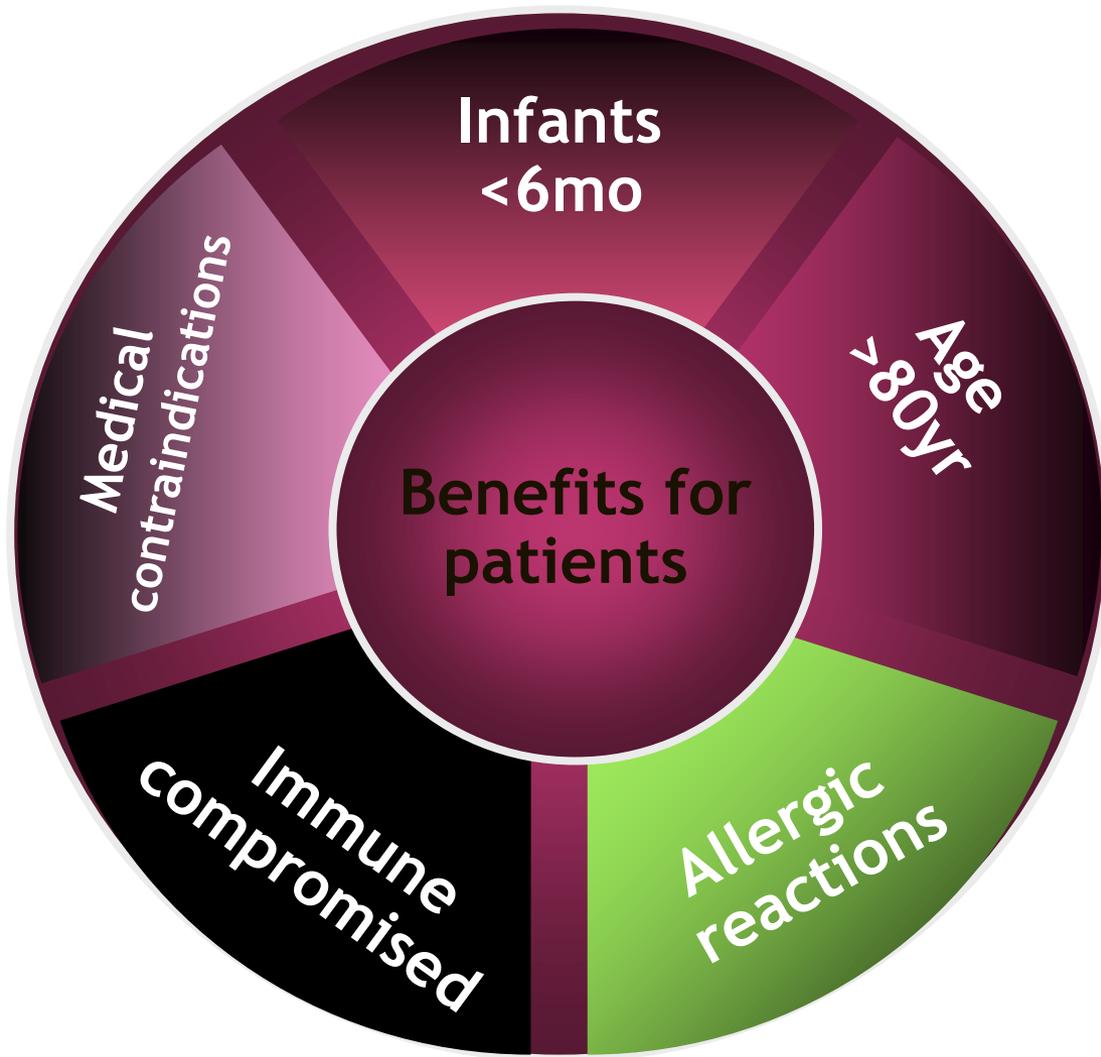
## Vaccine side effects

Soreness at the vaccination site<2days

## Vaccine contraindication

Hx of anaphylactic reaction

Hx of Guillain-Barre syndrome (6wks after 1th dose)



**Benefits for patients**

**Infants  
<6mo**

**Age  
>80yr**

**Allergic  
reactions**

**Immune  
compromised**

**Medical  
contraindications**

# Recommendation

- Vaccination of all HCP who have no contraindications is recommended.
- Antibody titers decline during the year after vaccination.
- Annual vaccination with the current season's formulation is recommended.

Diseases requiring no patient contact	Work restriction
Infectious conjunctivitis Acute diarrhea with symptoms* (i.e. fever, cramps, bloody stools)	Until the discharge ceases Until symptoms resolve and infection with salmonella is ruled out, or if caused by salmonella (non-typhoidal), until stool is free of salmonella on 2 consecutive cultures not less than 24 hours apart
Group A streptococcal disease	Until 24 hours after adequate treatment begun
Hepatitis A*	Until 7 days after onset of jaundice
Herpes simplex infection on the hands	Until lesions heal
Active measles infection	Until 7 days after the rash appears
Post-exposure to measles	Susceptible personnel should remain out of the workplace from days 5–21 after exposure, and/or 7 days after rash appears
Active mumps	Until 9 days after onset of parotitis
Post-exposure to mumps	Susceptible personnel should remain out of the workplace from days 12–26 after exposure, and/or 9 days after onset of parotitis
Active pertussis	From beginning of catarrhal stage through the 3rd week after onset of paroxysms or until 7 days after start of effective therapy
Active rubella	Until 5 days after rash appears
Post-exposure to rubella	Susceptible personnel should remain out of the workplace from days 7–21 after exposure and/or 5 days after rash appears
Scabies	Until treated
<i>Staphylococcus aureus</i> infection of skin	Until lesions have resolved
Group A streptococcal infection*	Until 24 hours after starting adequate therapy
Active tuberculosis	Until proven non-infectious
Active varicella (chicken pox)	Until all lesions dry and crust
Post-exposure to varicella (chicken pox or shingles)	Susceptible personnel should remain out of the workplace for days 10–21 after exposure and/or until all lesions dry and crust

# *References*

CDC Home



Centers for Disease Control and Prevention  
CDC 24/7: Saving Lives, Protecting People™

[Home](#) [Collections](#) [Authors](#) [Recent Additions](#) [Coming Soon](#)

[About CDC Stacks](#) ▼



All Collections ▼

Enter keyword or phrase...

[Search](#)

[Advanced Search](#)

[← Back to Previous Page](#)

[Email](#)

[Print](#)

[Share](#)



[Export Citations](#)

Updated U.S. Public Health Service guidelines for the management of occupational exposures to HIV and recommendations for postexposure prophylaxis.

**Published Date:** 9/25/2013 Update (May 23, 2018)

**Status:** Current

**Language:** English

*Clinical Infectious Diseases*

**IDSA GUIDELINE**



# Official American Thoracic Society/Infectious Diseases Society of America/Centers for Disease Control and Prevention Clinical Practice Guidelines: Diagnosis of Tuberculosis in Adults and Children

**David M. Lewinsohn,<sup>1,a</sup> Michael K. Leonard,<sup>2,a</sup> Philip A. LoBue,<sup>3,a</sup> David L. Cohn,<sup>4</sup> Charles L. Daley,<sup>5</sup> Ed Desmond,<sup>6</sup> Joseph Keane,<sup>7</sup> Deborah A. Lewinsohn,<sup>1</sup> Ann M. Loeffler,<sup>8</sup> Gerald H. Mazurek,<sup>3</sup> Richard J. O'Brien,<sup>9</sup> Madhukar Pai,<sup>10</sup> Luca Richeldi,<sup>11</sup> Max Salfinger,<sup>12</sup> Thomas M. Shinnick,<sup>3</sup> Timothy R. Sterling,<sup>13</sup> David M. Warshauer,<sup>14</sup> and Gail L. Woods<sup>15</sup>**

<sup>1</sup>Oregon Health & Science University, Portland, Oregon, <sup>2</sup>Emory University School of Medicine and <sup>3</sup>Centers for Disease Control and Prevention, Atlanta, Georgia, <sup>4</sup>Denver Public Health Department, Denver, Colorado, <sup>5</sup>National Jewish Health and the University of Colorado Denver, and <sup>6</sup>California Department of Public Health, Richmond, <sup>7</sup>St James's Hospital, Dublin, Ireland; <sup>8</sup>Francis J. Curry International TB Center, San Francisco, California; <sup>9</sup>Foundation for Innovative New Diagnostics, Geneva, Switzerland; <sup>10</sup>McGill University and McGill International TB Centre, Montreal, Canada;

<sup>11</sup>University of Southampton, United Kingdom; <sup>12</sup>National Jewish Health, Denver, Colorado, <sup>13</sup>Vanderbilt University School of Medicine, Vanderbilt Institute for Global Health, Nashville, Tennessee,

<sup>14</sup>Wisconsin State Laboratory of Hygiene, Madison, and <sup>15</sup>University of Arkansas for Medical Sciences, Little Rock

**HEPATOLOGY**



PRACTICE GUIDANCE | HEPATOLOGY, VOL. 67, NO. 4, 2018

# Update on Prevention, Diagnosis, and Treatment of Chronic Hepatitis B: AASLD 2018 Hepatitis B Guidance

Norah A. Terrault,<sup>1</sup> Anna S.F. Lok,<sup>2</sup> Brian J. McMahon,<sup>3</sup> Kyong-Mi Chang,<sup>4</sup> Jessica P. Hwang,<sup>5</sup> Maureen M. Jonas,<sup>6</sup> Robert S. Brown Jr.,<sup>7</sup> Natalie H. Bzowej,<sup>8</sup> and John B. Wong<sup>9</sup>



## Morbidity and Mortality Weekly Report (*MMWR*)

CDC



# Testing and Clinical Management of Health Care Personnel Potentially Exposed to Hepatitis C Virus — CDC Guidance, United States, 2020

*Recommendations and Reports* / July 24, 2020 / 69(6);1–8

Anne C. Moorman, MPH<sup>1</sup>; Marie A. de Perio, MD<sup>2</sup>; Ronald Goldschmidt, MD<sup>3</sup>; Carolyn Chu, MD<sup>3</sup>; David Kuhar, MD<sup>4</sup>; David K. Henderson, MD<sup>5</sup>; Susanna Naggie, MD<sup>6</sup>; Saleem Kamili, PhD<sup>1</sup>; Philip R. Spradling, MD<sup>1</sup>; Stuart C. Gordon, MD<sup>7</sup>; Mark B. Russi, MD<sup>8</sup>; Eyasu H. Teshale, MD<sup>1</sup> ([View author affiliations](#))



## SHEA White Paper

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

David K. Henderson MD<sup>1</sup>, Louise-Marie Dembry MD, MS, MBA<sup>2</sup>, Costi D. Sifri MD<sup>3,4</sup> , Tara N. Palmore MD<sup>5</sup>,  
E. Patchen Dellinger MD, Professor Emeritus<sup>6</sup> , Deborah S. Yokoe MD, MPH<sup>7</sup>, Christine Grady PhD<sup>8</sup> , Theo Heller MD<sup>9</sup>,  
David Weber MD, MPH<sup>10,11,12,13</sup>, Carlos del Rio MD<sup>14,15,16</sup> , Neil O. Fishman MD<sup>17,18</sup>, Valerie M. Deloney MBA<sup>19</sup> ,  
Tammy Lundstrom MD, JD<sup>20</sup> and Hilary M. Babcock MD, MPH<sup>21</sup> 

<sup>1</sup>Clinical Center, National Institutes of Health, Bethesda, Maryland, <sup>2</sup>Veterans Administration of Connecticut Healthcare System Hospital Epidemiology, West Haven, Connecticut, <sup>3</sup>Office of Hospital Epidemiology, University of Virginia Health System, Charlottesville, Virginia, <sup>4</sup>Division of Infectious Diseases and International Health, University of Virginia School of Medicine, Charlottesville, Virginia, <sup>5</sup>Clinical Center, National Institutes of Health, Bethesda, Maryland, <sup>6</sup>University of Washington, Department of Surgery, Seattle, Washington, <sup>7</sup>Division of Infectious Diseases, Department of Medicine, University of California–San Francisco, San Francisco, California, <sup>8</sup>Bioethics Department Clinical Center, National Institutes of Health, Bethesda, Maryland, <sup>9</sup>Translational Hepatology Section, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, Bethesda, Maryland, <sup>10</sup>Division of Infectious Diseases, UNC School of Medicine, Chapel Hill, North Carolina, <sup>11</sup>Gillings School of Global Public Health, Chapel Hill, North Carolina, <sup>12</sup>UNC Hospitals Departments of Hospital Epidemiology, Chapel Hill, North Carolina, <sup>13</sup>UNC Health Care, Chapel Hill, North Carolina, <sup>14</sup>Emory Vaccine Center, Atlanta, Georgia, <sup>15</sup>Hubert Department of Global Health, Rollins School of Public Health, Atlanta, Georgia, <sup>16</sup>Division of Infectious Diseases, Department of Medicine, Emory University School of Medicine, Atlanta, Georgia, <sup>17</sup>University of Pennsylvania Health System, Philadelphia, Pennsylvania, <sup>18</sup>Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania, <sup>19</sup>The Society for Healthcare Epidemiology of America, Arlington, Virginia, <sup>20</sup>Trinity Health, Livonia, Michigan and <sup>21</sup>Washington University School of Medicine, and Medical Director for the Infection Prevention and Epidemiology Consortium of BJC HealthCare, St Louis, Missouri



**Morbidity and Mortality Weekly Report**

---

Recommendations and Reports

December 30, 2005 / Vol. 54 / No. RR-17

---

**Guidelines for Preventing the Transmission  
of *Mycobacterium tuberculosis*  
in Health-Care Settings, 2005**



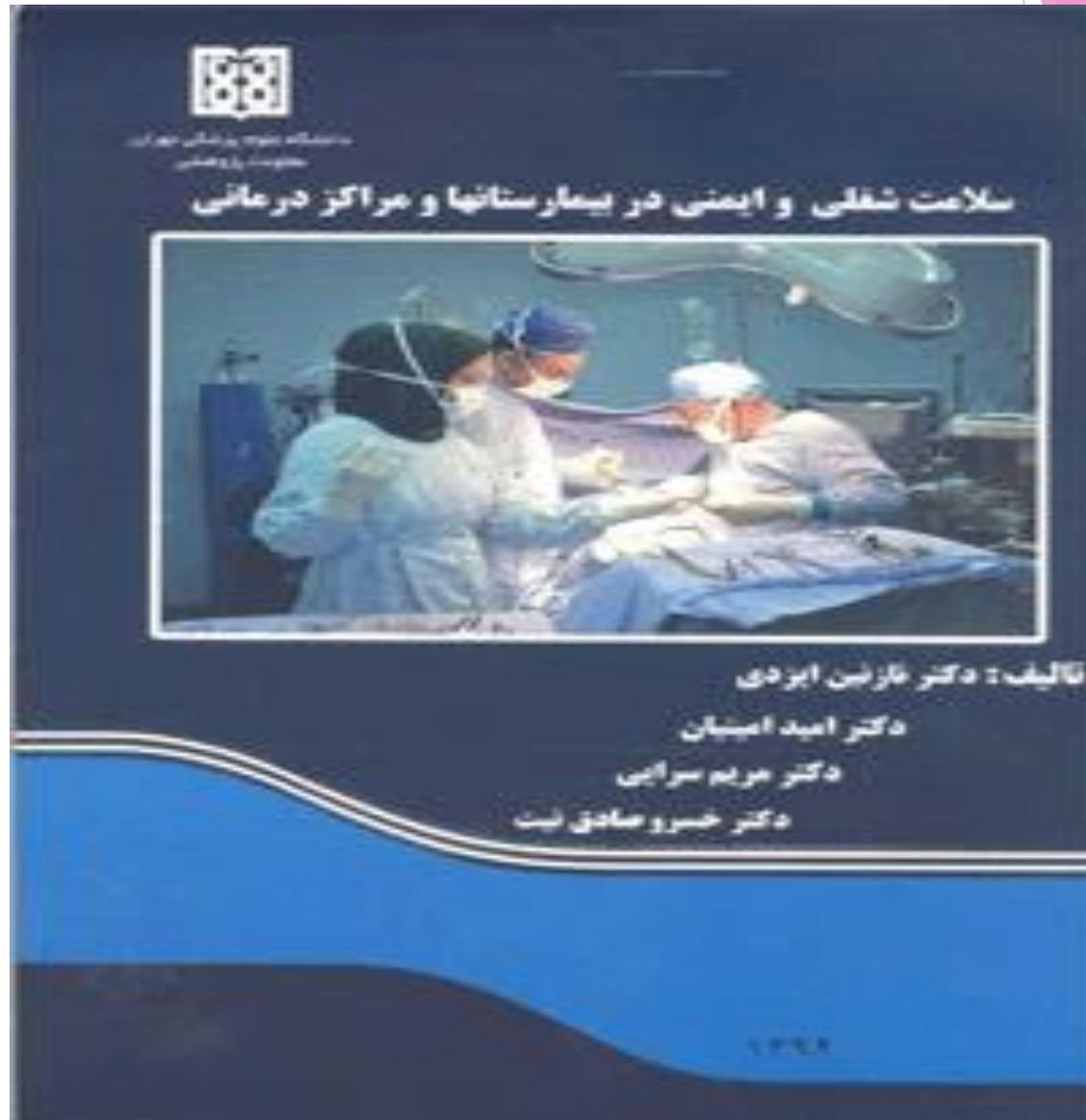
جمهوری اسلامی ایران  
وزارت بهداشت، درمان و آموزش پزشکی  
مرکز سلامت محیط و کار



دانشگاه علوم پزشکی تهران  
پژوهشگاه محیط و سلامت

# راهنمای معاینات سلامت شغلی کارکنان مراکز بهداشتی - درمانی

<http://tumspress.tums.ac.ir/>



**Thank You!**  
Thank You!