Employee Health Shared Responsibility

"EMPLOYERS AND HCP HAVE A SHARED RESPONSIBILITY TO PREVENT OCCUPATIONALLY ACQUIRED INFECTIONS AND AVOID CAUSING HARM TO PATIENTS BY TAKING REASONABLE PRECAUTIONS TO PREVENT TRANSMISSION OF VACCINE-PREVENTABLE DISEASES."

IMMUNIZATION OF HEALTH-CARE PERSONNEL, RECOMMENDATIONS OF ACIP, MMWR, NOVEMBER 25, 2011/60(RR07);1-45

Health screening and Immunizations Recommended for Health-care Personnel

- immunizations recommended for health-care personnel (HCP)
- work restrictions for HCP following exposure to communicable diseases of significance in the health-care setting
- tuberculosis screening of health-care personnel
- bloodborne pathogen exposure

Diseases for which vaccination of HCP is recommended

- Hepatitis B
- Influenza
- Measles
- Mumps
- Rubella
- Pertussis
- Varicella

Hepatitis B

- Transmitted through exposure to blood and body fluids
- Highly infectious (transmission to non immune persons is 100 times more likely following exposure to Hepatitis B e Antigen positive blood than HIV infected blood)
- Virus environmentally stable, remains viable on surfaces for at least 7 days
- Infection can lead to chronic infection resulting in cirrhosis, liver failure, liver cancer and death
- Between 800,000-1.4 million persons in the U.S. are living with Hepatitis B virus (HBV) infection, represents the U.S. reservoir of continued HBV transmission

Hepatitis B

- 1981 hepatitis B vaccine available in U.S.
- 1982 hepatitis B vaccine recommended for HCP
- 1991 OSHA mandated employers offer hepatitis B vaccine to all HCP who have occupational exposure to blood or other potentially infectious materials within 10 days of hire
- 1991 routine vaccination of children against hepatitis B
- Hepatitis B infections in HCP decreased from around 10,000 in 1982 to 304 in 2004 largely thought to be due to pre-exposure vaccination and improved IC measures

Hepatitis B Vaccine

- Post vaccination hepatitis B antibody titers should be obtained on all HCP at risk for occupational BBP exposures, done 1 - 2 months after last dose of vaccine. Hepatitis BS Ab titer ≥10mIU/mL considered to be protective

- Immunocompetent persons with a documented positive hepatitis B antibody titer following completion of ≥3 doses of vaccine are considered to have long term protection and do not need further periodic antibody testing or boosters.

- Incomplete series (<3 doses) is not considered protective (even if a positive hepatitis B Ab titer is obtained in interim) and the vaccination series (3 doses) should be completed.

Influenza

- ≥200,000 hospitalizations and 3,000-39,000 deaths annually in U.S.
- annual vaccination recommended for all HCP who have no contraindication to influenza vaccine
- appropriate and safe to begin vaccinating HCP as early in the season as vaccine is available
- health-care administrators should include influenza vaccination coverage among HCP as a measure of quality of care
- January, 2013 - acute care hospitals required to report influenza vaccination summary data of HCP to Centers for Medicaid and Medicare Services (CMS) via the CDC's National Healthcare Safety Network (NHSN).
- CMS will use HCP influenza vaccination measures to determine payments in 2015vaccinntireCM

Influenza vaccine

Licensed influenza vaccines available in U.S. for 2013-2014

http://www.cdc.gov/flu/protect/vaccine/vaccines.htm

Measles

- highly contagious
- droplet and airborne spread
- severe complications including death, pneumonia and encephalitis
- < 1963 almost all persons in U.S. acquired measles before adulthood with 500,000 cases annually of which there were 500 deaths, 48,000 hospitalizations, 1,000 permanent brain damage from measles encephalitis
- 1963 measles vaccination implemented in U.S.

Measles

- HCP are considered to be 19 times more likely to develop measles than other adults because of greater opportunity for exposure

Measles

- Measles vaccine administered in combination with mumps and rubella components as the MMR vaccine in the U.S.
- 2 dose live vaccine (given 28 days apart) provides long lasting immunity.
- excellent safety profile
- 2000 endemic measles declared eliminated in US through successful vaccination program
- most cases in US are imported cases with local outbreaks

Presumptive Immunity to Measles

All HCP should have presumptive evidence of immunity to measles which includes any of the following:

- written documentation of vaccination with 2 doses of MMR administered at least 28 days apart
- laboratory evidence of immunity (positive antibody titers)
- birth before 1957

Mumps

- common childhood illness in pre-vaccination era
  - spectrum of illness ranged from subclinical in 20-40%, nonspecific respiratory illness, sialadenitis including classic parotitis, deafness, orchitis and meningoencephalitis

- Droplet transmission
- 1967 mumps vaccine introduced
- 1977 single dose mumps vaccine policy of children
- 1989 2nd dose of MMR recommended for better measles control resulting in a decrease in mumps from 2000-2005
- resurgence in 2006 and periodic outbreaks thereafter, in vaccinated and unvaccinated persons, occurring mostly in children, adolescents and adults living in crowded environments

Mumps

- Health-care associated transmission is infrequent but has been documented in post vaccine era.
- may be underreported because 20-40% of infected persons may be asymptomatic
- Exposures in health-care settings can result in economic costs because of furlough of HCP

Mumps vaccine

- Live vaccine
- 2 doses separated by a minimum of 28 days
- Administered in combination with measles and rubella components of MMR
- Monovalent mumps vaccine not available in U.S.
- Excellent safety profile after decades of use

Presumptive Immunity to Mumps

All persons who work in health-care should have presumptive evidence of immunity to mumps which includes any of the following:

- documentation of vaccination with 2 doses of live mumps or MMR vaccine administered at least 28 days apart
- laboratory evidence of immunity
- birth before 1957

Rubella (German measles)

- Benign disease characterized by rash, low-grade fever, lymphadenopathy, with transient arthralgia and arthritis observed in adults, most commonly post pubertal females.
  - Rare complications include thrombocytopenia and encephalitis
  - 25-50% cases asymptomatic
- Infection in pregnant women during first trimester can result in miscarriages, stillbirths, therapeutic abortions and congenital rubella syndrome
- Less contagious than measles
- Symptoms can be similar to other diseases and a **clinical diagnosis of rubella is unreliable and cannot be used to assess immunity.**
- Positive IgG titer is only reliable evidence of immunity

Rubella

- 1969 live rubella vaccine licensed in U.S
- Decline in incidence of rubella in all age groups over the following years
- 1989 – 2nd dose of MMR recommended in response to national measles outbreak
- 2004 rubella declared eliminated in the U.S.
  - sporadic cases still occur, many thought to be imported
- September 2011 3 states (NY, Oklahoma, Rhode Island) require that HCP have proof of immunity to rubella and do not allow for religious or philosophical exemptions.

Rubella

- Because of the potential for contact with pregnant women in any type of health-care facility, all HCP should have documented presumptive evidence of immunity to rubella

- History of disease is not considered adequate evidence of immunity.

Rubella

- Vaccine administered in combination with measles and mumps components as MMR
- Monovalent vaccine no longer available in the U.S.
- Adequate rubella vaccination for HCP consists of 1 dose of MMR.
  - Because of the 2 dose MMR requirement for measles and mumps, most HCP will have received 2 doses of rubella containing vaccine, providing a safeguard against primary rubella vaccine failure.
- HCP receiving MMR do not require any restriction in work activities.

Presumptive evidence of immunity to rubella

- Written documentation of vaccination with 1 dose of live rubella or MMR vaccine
- Laboratory evidence of immunity (positive rubella antibody titer)
- Birth before 1957 (except women of childbearing potential who could become pregnant, although pregnancy in this age group becoming exceedingly rare)

Pertussis

- Highly contagious bacterial infection (secondary attack rates for susceptible household contacts is >80%)
- Transmission via direct contact with respiratory secretions or large aerosolized droplets
- Incubation 7-10 days but can be as long as 21 days
- Communicability from start of catarrhal stage into paroxysmal stage
- Symptoms of early disease similar to those of URI

Pertussis

- Immunity from childhood vaccination wanes 5-10 years after the most recent dose (usually administered from 4-6 years of age)
- adolescents and adults are important sources of pertussis infection to susceptible infants
- Infants too young to be vaccinated are at greatest risk for severe pertussis including hospitalization and death
- Disease can be transmitted from adults to close contacts, especially unvaccinated children

Tdap

- 2005 single dose of Tdap (tetanus toxoid, reduced diphtheria toxoid and acellular pertussis vaccine) recommended for HCP who have not previously had it
- Tdap should be given regardless of age or the time since their most recent Td vaccination
- Not licensed for multiple administrations
- After receipt of single Tdap, Td given for future booster vaccinations against tetanus and diphtheria
- Hospitals should develop approaches to maximize Tdap vaccination rates in HCP

Management of vaccinated HCP exposed to pertussis

- Tdap vaccination does not change the approach to evaluate the need for post exposure prophylaxis (PEP) for exposed HCP
- PEP is recommended for HCP in contact with persons at risk for severe disease (very young children, etc.)
- Other HCP should either receive PEP or be monitored for symptoms for 21 days after exposure and treated at the onset of signs and symptoms of pertussis.
- PEP for pertussis exposure includes azithromycin, clarithromycin or erythromycin.
- HCP aren't at greater risk for pertussis than the general population

Varicella (chickenpox)

- Highly infectious
- Transmission via direct contact , inhalation of aerosols from vesicular fluid of skin lesions of varicella or herpes zoster (HZ).
- Average incubation 14-16 days after exposure to rash
- Infected persons are infectious 1-2 days before onset or rash until all lesions crusted typically 4-7 days after onset or rash
- Secondary attack rate of 90% among susceptible contacts
- Primary infection results in lifetime immunity

Varicella

- Varicella Zoster Virus (VZV) remains dormant in sensory-nerve ganglia following primary infection and can reactivate at a later time causing herpes zoster (HZ)
- Prior to 1995 approximately 90% of varicella disease occurred among children <15 years of age
- 1995 childhood vaccination began in U.S. leading to dramatic declines (>85%) in varicella incidence, hospitalizations and deaths

Varicella

- With the declining likelihood of VZV exposure, children and adults who did not receive 2 doses of varicella vaccine could remain susceptible as they age into adulthood
- Presentation of disease has changed with the advent of vaccination
- "Breakthrough varicella" has a milder rash (<50 lesions) can occur in vaccinated individuals.
  - rash milder (<50 lesions), predominantly maculopapular rather than vesicular.
  - fever is less common
  - duration of illness shorter
  - still infectious, but less so in persons with <50 lesions

Varicella

- The epidemiology of varicella in tropical and subtropical regions differs from that in the U.S.
- In these regions, a higher proportion of VZV infections are acquired later in life.
- **Persons immigrating from these regions (i.e. Caribbean) might be more likely to be susceptible to varicella compared to U.S.-born persons and therefore are at higher risk for developing varicella if unvaccinated and exposed**

Varicella

- Health-care institutions should ensure that HCP have evidence of immunity to varicella.
- HCP without evidence of immunity to varicella should receive 2 doses of varicella vaccine administered 4-8 weeks apart.
- If >8 weeks elapses after the first dose, the 2nd dose can be administered without restarting the schedule
- Work restrictions not needed for vaccinated HCP unless they develop a vaccine-related rash. If this occurs, HCP should avoid contact with susceptible individuals at risk for severe disease until
  - all lesions are crusted over
  - if rash is macular and papular, until no lesions appear within a 24 hour period

Evidence of immunity to varicella

- Written documentation of vaccination with 2 doses of varicella vaccine
- Laboratory evidence of immunity (positive VZV Ab titer) or laboratory confirmation of disease
- Diagnosis or verification of a history of varicella disease by a health-care provider or
- Diagnosis or verification of a history of herpes zoster (HZ) by a health-care provider
- Birth in U.S. < 1980 for immunocompetent and non-pregnant persons (MMWR 11/25/2011/60 (RR07); 1-45)

Management of HCP exposed to varicella

- Exposure - close contact with an infectious person such as close indoor contact (in the same room) or face-to-face contact
  - Disagreement as to duration of contact: some say 5 minutes, others up to 1 hour.
- Check VZV immune status of exposed HCP
- Furlough non immune HCP from work day 8-21 after exposure (period of infectivity)
- Vaccinate susceptible HCP as soon as possible; vaccination within 3 - 5 days of exposure might modify the disease if infection occurred
- Vaccination of susceptible HCP 5 days after exposure still indicated to provide protection against future exposures

Management of HCP exposed to varicella

- Provide varicella zoster immune globulin (VZIG) to exposed HCP at risk for severe disease for whom vaccination is contraindicated i.e. immunocompromised or pregnant persons.
- Extend furlough of HCP who receive VZIG from 21 to 28 days after last contact with infected person as this treatment may extend incubation period
- PEP with vaccination or VZIG, depending on immune status, of exposed HCP and patients without evidence of immunity is recommended

Management of vaccinated HCP exposed to VZV

- HCP who received 2 doses of varicella vaccine must be monitored by OM or IC personnel daily from day 8-21 after exposure for symptoms of varicella or instruct HCP to promptly report these symptoms

- HCP who develop symptoms consistent with varicella (fever, rash, headache, or systemic symptoms) are to be immediately excluded from work

- HCP who received one dose of varicella vaccine should receive a 2nd dose of within 3-5 days of exposure (provided 4 weeks have elapsed since the previous dose). Management following receipt of 2nd dose of vaccine is similar to that of 2-dose vaccine recipients

- **HCP who only received 1 dose of varicella vaccine or a second dose >5 days after exposure should be excluded from work for 8-21 days after exposure**

Management of HCP exposed to herpes zoster (HZ) or "shingles"

- Exposed to HZ with covered lesions - no work restrictions for HCP who received 1 dose of varicella vaccine 3 - 5 days prior to exposure
  - administer 2nd dose at the appropriate interval
  - monitor HCP daily from day 8-21 for symptoms suggestive of varicella and excluded from work if symptoms appear
- If at least 1 dose of vaccine wasn't received, restrict from patient contact

Diseases for Which Vaccination might Be Indicated for HCP in Certain Circumstances

Meningococcal Vaccine

- laboratory workers who might be exposed routinely to isolates of N. meningitides (single dose of MCV4 every 5 years) if remains at continued risk

Meningococcal Disease Post Exposure Prophylaxis (PEP)

- PEP advised for all individuals (including vaccinated persons) who have had intensive, unprotected contact without wearing a mask to infected persons
- PEP with rifampin, ciprofloxacin and ceftriaxone is effective in eradication of nasopharyngeal carriage of N. meningitides. If resistance to ciprofloxacin exists in area, use azithromycin instead.
- Start PEP within 24 hours of exposure if possible
- Ceftriaxone can be used during pregnancy
- Offer vaccine to HCP in setting of community or institutional outbreaks caused by a serogroup in the vaccine

Typhoid Fever

- Consider for workers in microbiology laboratories who may have routine exposure to isolates

Poliomyelitis

- 1994 Americas certified as free of indigenous wild poliovirus
- Globally poliomyelitis not eradicated, reintroduction of to U.S. still possible.
- Majority of US born persons are immune; vaccination is not routinely recommended for persons > 18 years of age
- Single lifetime booster recommended for HCP who completed primary polio series with risk of exposure i.e. work in polio endemic areas or with travelers returning from such areas or laboratory workers who may work with with specimens containing polio virus.

Hepatitis A vaccine

- HCP not demonstrated to be at increased risk for infection with Hepatitis A due to occupational exposure , including persons exposed to sewage

- Recommended for persons with chronic liver disease, international travelers, and certain other groups at risk for exposure to hepatitis A

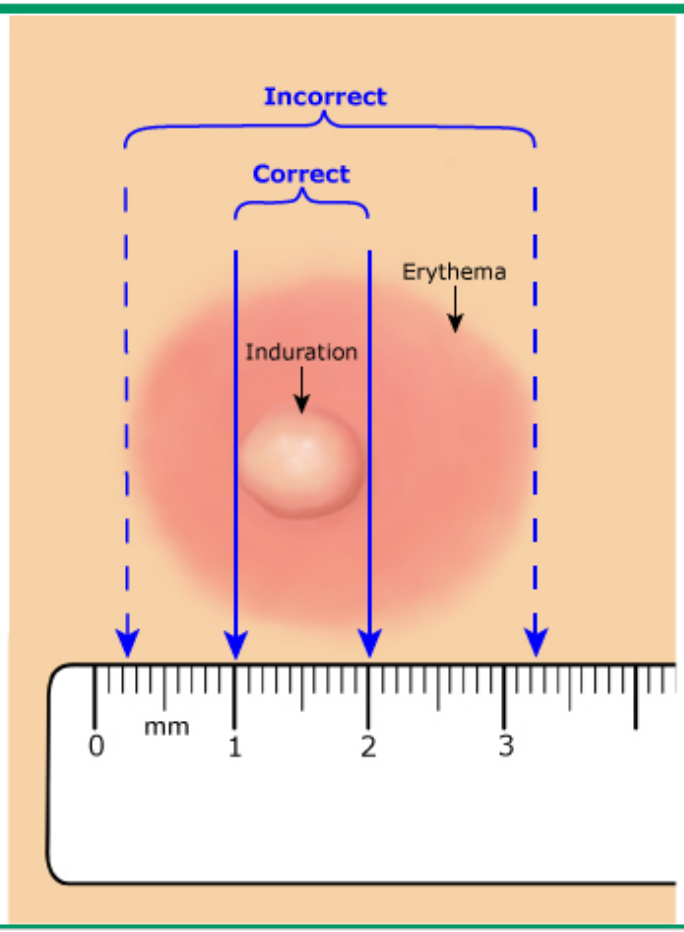
TB Surveillance of HCP

Frequency of TB surveillance of HCP depends on health-care facility risk assessment

(ref: Figure 1. Protocol for conducting a tuberculosis (TB) risk assessment in a health-care facility, MMWR, 10/28/1994/Vo. 43/No. RR-13)

- **TB skin testing with intracutaneous or Mantoux test (PPD)**
  - 2 step PPD (two sequential PPDs separated by a minimum of 7 days given within a 3 week period) recommended for HCP who haven't had a PPD within 12 months of hire to rule "boost effect" (amnestic response)
- **Interferon Gamma Release Assay (IGRA)- blood test**
  - alternate method of screening for LTBI
  - equivalent to and not confirmatory of TB skin testing
  - may be preferred in individuals who recently (i.e. within last 5 years or so) have had a BCG or have been treated with treatment with BCG i.e. bladder cancer
- **Switching back and forth between PPDs and IGRAs <u>not</u> recommended**
  - Approximately 15 % discordance between TST's and IGRA, usually with TST positive and IGRA negative.
  - Best not to mix tests, but if done, better to go from TST to IGRA than visa versa
  - If discordant results, base likelihood of true positive result on pre-test probability of LTBI infection i.e. risk factors including coming from high incidence country, past exposure, occupational risk factors, etc.

Measuring a reaction to the tuberculin skin test



This figure shows the correct method for measuring a reaction to the tuberculin skin test. The size of the reaction is measured by the width of induration, not erythema. In the example shown, the reaction measures 10 mm.

Redrawn from: Testing for Tuberculosis Infection and Disease. In: Core Curriculum on Tuberculosis: What the Clinician Should Know, Sixth Edition, Centers for Disease Control and Prevention, 2013. Available at: http://www.cdc.gov/tb/education/corecurr/default.htm.

Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Facilities, 1994, MMWR, October 28, 1994/Vol. 43/No. RR-13

TABLE S2-1. Summary of interpretation of purified protein derivative (PPD)-tuberculin skin-test results

1. An induration of ≥5 mm is classified as positive in:
   - persons who have human immunodeficiency virus (HIV) infection or risk factors for HIV infection but unknown HIV status;
   - persons who have had recent close contact* with persons who have active tuberculosis (TB);
   - persons who have fibrotic chest radiographs (consistent with healed TB).
2. An induration of ≥10 mm is classified as positive in all persons who do not meet any of the criteria above but who have other risk factors for TB, including:

   High-risk groups —
   - injecting-drug users known to be HIV seronegative;
   - persons who have other medical conditions that reportedly increase the risk for progressing from latent TB infection to active TB (e.g., silicosis; gastrectomy or jejuno-ileal bypass; being ≥10% below ideal body weight; chronic renal failure with renal dialysis; diabetes mellitus; high-dose corticosteroid or other immunosuppressive therapy; some hematologic disorders, including malignancies such as leukemias and lymphomas; and other malignancies);
   - children <4 years of age.

   High-prevalence groups —
   - persons born in countries in Asia, Africa, the Caribbean, and Latin America that have high prevalence of TB;
   - persons from medically underserved, low-income populations;
   - residents of long-term–care facilities (e.g., correctional institutions and nursing homes);
   - persons from high-risk populations in their communities, as determined by local public health authorities.
3. An induration of ≥15 mm is classified as positive in persons who do not meet any of the above criteria.
4. Recent converters are defined on the basis of both size of induration and age of the person being tested:
   - ≥10 mm increase within a 2-year period is classified as a recent conversion for persons <35 years of age;
   - ≥15 mm increase within a 2-year period is classified as a recent conversion for persons ≥35 years of age.
5. PPD skin-test results in health-care workers (HCWs)
   - In general, the recommendations in sections 1, 2, and 3 of this table should be followed when interpreting skin-test results in HCWs.

     However, the prevalence of TB in the facility should be considered when choosing the appropriate cut-point for defining a positive PPD reaction. In facilities where there is essentially no risk for exposure to *Mycobacterium tuberculosis* (i.e., minimal- or very low-risk facilities [Section II.B]), an induration ≥15 mm may be a

*Recent close contact implies either household or social contact or unprotected occupational exposure similar in intensity and duration to household contact.

A comparison of tuberculin skin tests and interferon-gamma release assays

	TST	IGRAs
Advantages	TST does not require equipment and can be done without a laboratory. It is less expensive than for IGRAs (but greater personnel time is required) Longitudinal studies have demonstrated the predictive value of TST, and randomized trials show that LTBI therapy is highly effective in those who are TST-positive	IGRA does not require follow up visit to complete the testing process (but follow up visits may be needed for LTBI therapy) IGRA test results can be available within 24 to 48 hours IGRA does not give false positive results because of prior BCG vaccination or sensitization to nontuberculous mycobacteria
Disadvantages	TST requires an intra-dermal injection and a subsequent follow up visit with trained staff to interpret results in 48 to 72 hours TST may give false positive results because of prior BCG vaccination, sensitization to nontuberculous mycobacteria, or remote TB infection TST may give false negative results because of immunosuppression, natural waning of immunity, and technical limitations (including reader variability) Serial TST interpretation is complicated by boosting, conversions, and reversions TST can cause adverse reactions (skin blistering and ulceration); these are rare	IGRA requires a blood draw, laboratory equipment, and technical expertise for specimen collection, processing, and assay. Reagent costs are substantially higher than costs of TST IGRA sensitivity is diminished by HIV infection and active TB Interpretation of serial IGRA is complicated by frequent conversions and reversions, and lack of consensus on optimum thresholds for conversions and reversions

TST: tuberculin skin test; IGRA: interferon-gamma release assay; HIV: human immunodeficiency virus; LTBI: latent tuberculosis infection; BCG: Bacillus Calmette-Guerin.

http://www.cdc.gov/tb/publications/factsheets/testing/IGRA.pdf

Management of Bloodborne Pathogen Exposure

- HCP should wash wound or skin with soap and water (expressing blood from wound of no proven benefit and may traumatize tissue)
- rinse eyes, nose, mouth with water several minutes
- BBP exposures should be managed by clinicians with experience in management of these exposures
- Immediate efforts should be made to ascertain HIV Ab status of source patient (consent required for HIV Ab testing)
- If source's HIV Ab status is unknown immediately obtain a rapid HIV Ab on source patient whenever possible (rapid HIV Ab results are generally available in most labs within 1-2 hours of exposure)
- When warranted, HIV PEP should be started in exposed HCP within 2 hours of exposure

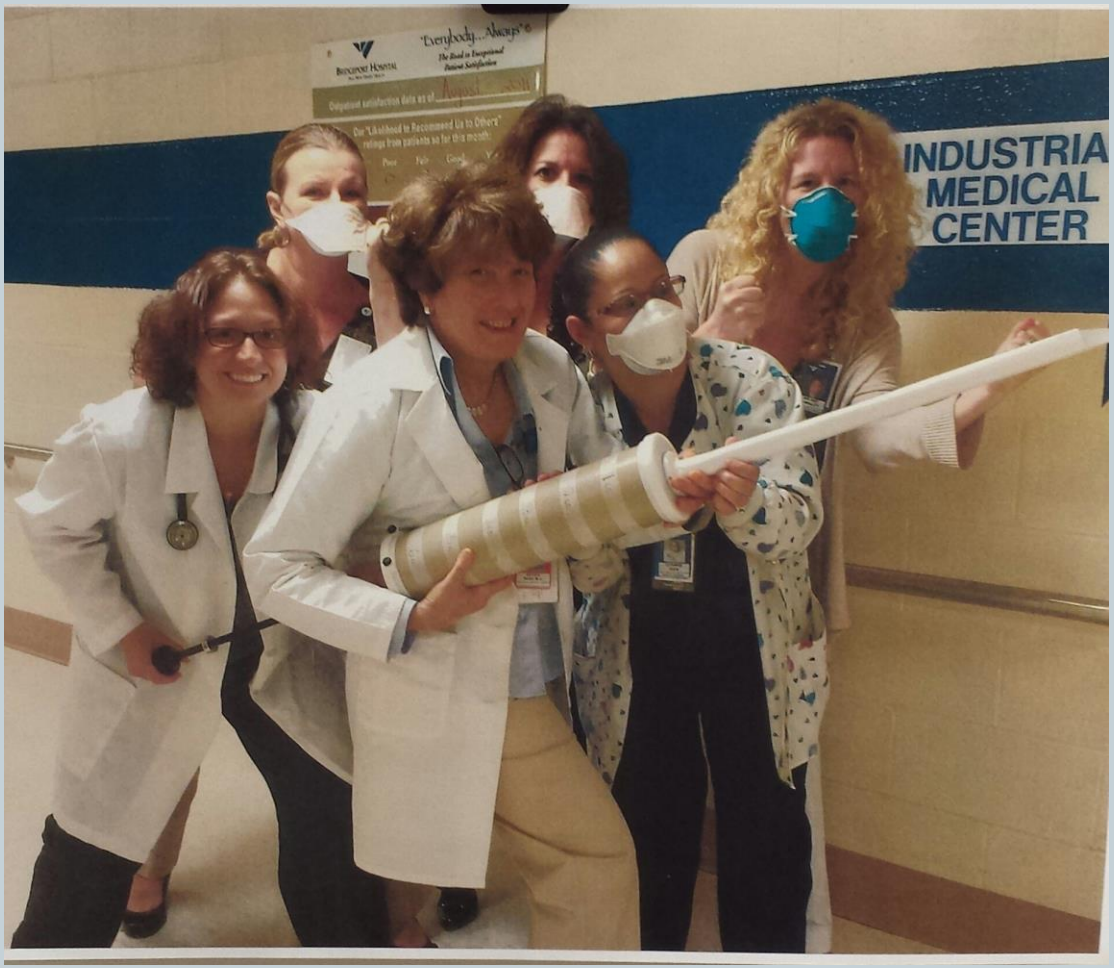
Management of BBP Exposure

- HCP's Hepatitis B immune status should be assessed and a determination made regarding the need for hepatitis B PEP for the exposed health-care work (see recommendations for Hepatitis B PEP in handout)

- Baseline labs should be done on the HCW i.e. HIV Ab, Hepatitis BS Ag, Hepatitis BS Ab (if not already known), Hepatitis C Ab and source patient i.e. HIV Ab, Hepatitis BS Ag, Hepatitis C Ab)

- Laboratory follow up is required for HCP exposed to source patients positive for HIV, Hepatitis B or Hepatitis C.

“Disease Busters”
Bridgeport Hospital
Industrial Medical Center/Employee Health Unit



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