

**ABSTRACT**

Occupational vaccines are recommended for those whose work predisposes them to potential acquisition of certain infections. Strongly recommended vaccines for Health Care Workers in general are hepatitis B, influenza, measles, mumps, rubella, and varicella. If there are specific occupational risks, immunization against typhoid or meningococcal infection are also recommended.

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**INTRODUCTION**

Occupational vaccines are recommended for those whose work predisposes them to potential acquisition of certain infections. These could range from influenza vaccines for health care workers (HCWs) to typhoid vaccines for food handlers. This article will focus on vaccinations for HCWs.

**HEALTH CARE WORKERS**

Hospital staff, students in health care disciplines, laboratory workers, and other HCWs are at risk of exposure to communicable diseases because of their contact with patients or material from patients with infections, both diagnosed and undiagnosed. It is therefore important for HCWs to maintain immunity against vaccine-preventable diseases.

Strongly recommended vaccines for HCWs in general are hepatitis B, influenza, measles, mumps, rubella, and varicella<sup>1</sup> (Table 1). If there are specific occupational risks, typhoid or meningococcal vaccines may be applicable.

Recommendations for other vaccines follow those for the general public.

**Table 1. Health Care Worker Vaccine Recommendations**

Vaccine	Recommendations
Hepatitis B	Give 3-dose series (dose #1 now, #2 in 1 month, #3 approx 5 months after #2). Give IM. Obtain anti-HBS serologic testing 1-2 months after #3.
Influenza	Give 1 dose of TIV annually. Give IM.
MMR	For persons without serologic evidence of immunity, give 1 dose of MMR. Give SC.
Varicella	For persons who have no serologic proof of immunity, prior vaccination, or history of varicella disease, give 1 dose of varicella vaccine. Give SC.

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**Hepatitis B**

Health-care workers face high risk of hepatitis B virus (HBV) infection because of patients' blood or other biological materials containing HBV. The risk of hepatitis B has diminished considerably since the introduction of standard precautions and a recombinant vaccine<sup>1</sup>.

Healthcare workers (HCWs) who perform tasks that may involve exposure to blood or body fluids should receive a 3-dose series of hepatitis B vaccine at 0-, 1-, and 6-month intervals. Testing for hepatitis B surface antibody (anti-HBs) should be done to document immunity 1–2 months after dose #3. If anti-HBs is at least 10 mIU/mL (positive), the HCW is immune and no further serologic testing or vaccination is recommended. If anti-HBs is less than 10 mIU/mL (negative), the HCW is unprotected from HBV infection and revaccination is recommended with a 3-dose series. Again retest anti-HBs 1–2 months after dose #3. If anti-HBs is positive, the patient is immune and no further testing or vaccination is recommended. About 5% to 12% of persons may have negative anti-HBs following 6 doses of vaccine: non-responders.

**For non-responders:** Persons who are non-responders should be considered susceptible to HBV and should be counseled regarding precautions to prevent HBV infection and the need to obtain HBIG prophylaxis for any high-risk exposure to hepatitis B surface antigen (HBsAg)-positive blood. Non-responders may also be HBsAg positive and testing should be considered.

**Other situations:** Many HCWs were not routinely tested for anti-HBs 1–2 months after their original vaccine series. There is no need to test these previously vaccinated HCWs unless there is an exposure to blood or body fluids. If they are found to be anti-HBs negative, protection is required.

Anti-HBs titres decline with time since first vaccination series to below the putative protective level of 10mIU/ml in up to 50% of vaccines at 10–15 years. However, vaccinated responders can mount a rapid and powerful anamnestic response to a vaccine challenge. This immune memory implies protection to potential high-risk exposure to HBV and hence there is no recommendation for booster doses for immunocompetent persons.

**Influenza**

All HCWs with patient contact and laboratory staff working with the influenza virus should receive an annual influenza vaccine. There are many reports in the international literature of influenza transmission and outbreaks in hospitals and nursing homes<sup>2</sup>. HCWs may acquire influenza from patients or vice-versa. We cannot underestimate the impact of influenza locally.

Recent studies in Singapore show that influenza poses a considerable burden of illness locally and that its annual death rates were comparable to the US<sup>3,4</sup>. There are well-documented benefits of influenza vaccination on patient outcomes, HCW absenteeism, and reducing influenza among staff<sup>2</sup>. There is also the added threat of various respiratory diseases like SARS and avian flu. Vaccinating HCWs may not just reduce 'background noise' but prevent the re-assortment of avian and human influenza strains. Unfortunately the uptake of HCW of influenza remains dismal due to various misconceptions including the fear of vaccine side effects, and the perceived ineffectiveness of the vaccine. Methods to improve the uptake of vaccination include educational campaigns, role models, and improved access like the mobile vaccination cart.

#### Measles, Mumps, and Rubella (MMR)

MMR vaccine should be given to all employees providing patient care who are non-immune (i.e., no previous history of rubella, measles & mumps or MMR immunization).

Prompted by outbreaks of measles and mumps, a single dose of MMR vaccine in childhood was revised to two doses to increase herd immunity. Expectedly, there are many adults who have only received one dose of MMR as children and therefore cases of measles and mumps continue to be seen. It is imperative that all women and adolescent girls of child-bearing age be immune to rubella. Plans for pregnancy should be deferred for four weeks after immunization. MMR immunity is also particularly important for HCWs dealing with immunocompromised patients.

#### Varicella

The varicella immune status of all HCWs should be determined either from a reliable history of varicella disease or vaccination. A study in a local hospital showed that 26% to 55% of HCWs with no history of chicken pox tested negative for antibody against varicella and required vaccination<sup>5</sup>. Routine post-vaccination testing of HCWs for antibodies to varicella is not recommended because commercial tests are often not sensitive enough to measure vaccine-induced immunity. Vaccine should not be administered to susceptible female HCWs during pregnancy. Female HCWs of child-bearing age should avoid

pregnancy for 1 month after immunization. Booster doses of varicella vaccine are not recommended. Varicella vaccine is also recommended for teachers of young children, day care workers, workers in correctional institutions, colleges, long-term care facilities, and military personnel.

#### Other vaccines

Laboratory workers working with hepatitis A virus, or meningococcus should receive hepatitis A or meningococcal vaccination respectively. Food handlers working in any setting should be vaccinated against typhoid at least 3-yearly.

Another vaccine preventable disease is pertussis, which has an emerging impact on morbidity in adults. Waning immunity in adults also results in a reservoir of transmission to young children in whom the disease has its greatest impact. The immunogenicity and reactogenicity of a reduced-antigen-content diphtheria-tetanus-acellular pertussis vaccine as a single-dose booster in Singaporean adults has recently been studied. The Advisory Committee on Immunization Practices (ACIP) of the US is currently in discussion about the use of acellular pertussis vaccination in HCWs.

#### REFERENCES

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#### LEARNING POINTS

- o Strongly recommended vaccines for Health Care Workers in general are hepatitis B, influenza, measles, mumps, rubella (MMR), and varicella.
  - o Health-care workers face high risk of hepatitis B virus (HBV) infection because of patients' blood or other biological materials containing HBV.
  - o All Health Care Workers with patient contact and laboratory staff working with the influenza virus should receive an annual influenza vaccine.
  - o MMR vaccine should be given to all employees providing patient care who are non-immune (i.e., no previous history of rubella, measles & mumps or MMR immunization).
  - o Laboratory workers working with hepatitis A virus, or meningococcus should receive hepatitis A or meningococcal vaccination respectively.
  - o Food handlers working in any setting should be vaccinated against typhoid at least 3-yearly.
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