

Vaccination recommendations for healthcare workers

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Healthcare workers (HCWs), because of their occupation, are particular role players in nosocomial transmission and are at an increased risk of contracting diseases, including vaccine-preventable diseases.^{1,2}

Appropriate measures should be adopted at all times in order to prevent the risk of contracting diseases or spreading diseases to other patients and family members.¹ In addition to following strict hygiene protocols to minimise this risk, HCWs should ensure that they are up to date with all recommended immunisations.¹

Choice of vaccination for HCWs is dependent on the epidemiology of the disease, as well as an assessment of the risks versus the benefits of individual vaccines.²

Vaccine recommendations: summary³

Influenza	1 dose of flu vaccine recommended annually
Hepatitis B	3 doses of hepatitis B vaccine and serologic testing for anti-HBs 1–2 months after final dose to confirm response*
MMR	2 doses of MMR vaccine a minimum of 4 weeks apart*
Varicella (chickenpox)	2 doses of varicella vaccine a minimum of 4 weeks apart*
Tetanus, diphtheria, pertussis	A single dose of Tdap/IPV to HCWs who have not received this vaccine previously, with a Td vaccine every 10 years thereafter

MMR – mumps, measles, rubella

*For HCWs who do not have serologic proof of immunity or documented proof of prior vaccination

Influenza (flu) vaccine

It is recommended that all HCWs have an influenza vaccine annually.⁴ During nosocomial outbreaks, HCWs have been shown to play a part in flu transmission.² Through increased influenza vaccination of HCWs, studies have shown a marked decrease in the incidence of nosocomial respiratory illnesses.²

Influenza is caused by a virus that mutates rapidly and, as a consequence, seasonal outbreaks occur annually, particularly during the winter.² For this reason, flu vaccines are adapted every year to best match the flu strains that are predicted to be circulating during that particular winter season.²

In addition to protecting themselves, HCWs need to be vaccinated in order to protect their patients, especially those who are at an increased risk of severe complications associated with influenza including⁵:

- Pregnant women
- HIV-infected individuals
- Elderly patients (65 years and older)
- People with chronic illnesses, such as diabetes, renal disease, heart disease and lung disease
- Children under five years of age
- Obese people

In South Africa, an inactivated flu vaccine is available that contains three (trivalent) strains of the virus that is formulated to resemble the strains of flu that are currently circulating amongst humans.⁵

HCWs (and the general population) should receive the flu vaccine as soon as possible after the start of the flu season, as the flu vaccine takes about two weeks to mount a proper antibody response.⁵ Influenza has a short incubation period (one to three days), and it is still possible to contract flu, if exposed within the two-week period after flu vaccination.^{2,5}

Hepatitis B vaccine

All HCWs that may be exposed to blood or blood products as a result of their occupation are at risk of hepatitis B infection if they have not received previous complete vaccination, or a blood test to confirm immunity to hepatitis B.^{6,7}

The hepatitis B virus attacks the liver, causing a potentially fatal disease. Persons who have had acute hepatitis B may go on to develop chronic hepatitis B (becoming chronic 'carriers'). Such individuals are often asymptomatic, unknowingly transmitting the disease to others.⁶ They are also more likely to die due to the resultant cirrhosis of the liver, liver failure and hepatocellular carcinoma.⁷

The hepatitis B vaccine is 95% effective in preventing acute and chronic infection, thereby preventing the associated development of disease-related cirrhosis and liver failure.⁶

Since 1995, children in South Africa have been immunised against hepatitis B as part of the Expanded Programme of Immunisation (EPI).⁸ A three-dose hepatitis B vaccine series, given according to manufacturer's recommendations, is required for protection.³

There are three single-antigen hepatitis B vaccines currently available in South Africa:

- Enderix B[®]: Administered on a 0, 1 and 6 month schedule⁹
- Euvax B[®]: Administered on 0, 1 and 6 month schedule¹⁰
- Heberbio[®]: Administered on a 0, 1 and 2 month schedule¹¹

HCWs, particularly those who are frequently exposed to blood or blood products, are recommended to obtain anti-HBs (hepatitis B surface antigen) serologic testing one to two months after the third dose of hepatitis B vaccine in order to have documented evidence of immunity.³

- If anti-HBs are at least 10 mIU/ml, the HCW will be immune and no further testing or vaccination is recommended.³
- If anti-HBs are below 10 mIU/ml, the HCW is not protected from the hepatitis B virus.³

Previously vaccinated HCWs

HCWs who received their hepatitis B vaccine series as infants, or if a long period of time has elapsed since the last (third) hepatitis B vaccine was given, may have a negative anti-HBs response.⁷ This does not necessarily mean response failure, or lack of protection, as although hepatitis B antibody levels wane over time, the hepatitis B vaccine has an anamnestic (memory) response where antibody levels rise in response to exposure to the virus.⁷

It is recommended that these HCWs receive a "challenge dose" of hepatitis B vaccine. Anti-HBs levels should be measured one to two months after this challenge dose.⁷

- If anti-HBs are at least 10 mIU/ml when measured one to two months after the challenge dose, the HCW will be immune and no further testing or vaccination is recommended.³
- If anti-HBs are less than 10 mIU/ml, it is recommended that the HCW receive another three-dose series of hepatitis B vaccines as per schedule.³ Anti-HBs levels are measured again one to two months after the third dose.³ If levels are still below 10 mIU/ml, the HCW is considered to be a "non-responder."³

Previously unvaccinated HCWs

HCWs who have no documented history of hepatitis B vaccination, or who have never received hepatitis B vaccination in the past, should receive three doses of hepatitis B vaccine as per manufacturer's recommendations.³

Anti-HBs levels should be measured one to two months after the third dose of hepatitis B vaccine.

- If anti-HBs are at least 10 mIU/ml when measured one to two months after the third dose, the HCW will be immune and no further testing or vaccination is recommended.³
- If anti-HBs are less than 10 mIU/ml, it is recommended that the HCW receive another three-dose series of hepatitis B vaccines as per schedule.³ Anti-HBs levels are measured again one to two months after the third dose.³ If levels are still below 10 mIU/ml, the HCW is considered to be a "non-responder."³

Approximately 5 to 21% of HCWs are likely to show a non-response to hepatitis B vaccine.¹ Non-response may be attributed to certain factors, such as¹:

- Older age
- Immunosuppression
- Smoking
- Higher body mass index (BMI)

Non-responders may be hepatitis B surface antigen (HBsAg) positive themselves, and HBsAg testing is recommended.¹ Non-responders to hepatitis B vaccine remain susceptible to hepatitis B, if exposed.³ Hepatitis B immunoglobulin (HBIG) will need to be administered as prophylaxis with any actual or probable parenteral exposure to blood or body fluids from known positive HBsAg sources or unknown HBsAg sources.³

Measles, mumps and rubella (MMR) vaccine

Measles is caused by a virus and is one of the most highly transmissible diseases known to humankind.² It is also one of the most deadly vaccine-preventable diseases.² In order for herd immunity to be achieved, 92–95% vaccination coverage is required.² Outbreaks of measles occur worldwide, mainly due to vaccine hesitancy.² This leaves high-risk individuals, who are unable to be vaccinated for various reasons, at risk of developing the disease.²

HCWs are at a much greater risk of being exposed to measles than the general population. This not only puts unvaccinated HCWs at risk of the disease, but also their vulnerable patients.²

Rubella, although a mild viral disease in children, is teratogenic, causing severe complications to the foetus if contracted by a pregnant woman, especially in the first trimester.¹²

Mumps is not considered to be a disease for which HCWs are considered to be particularly vulnerable.⁶ Many countries, however, have established vaccination programmes where mumps vaccination is given in combination with a measles and rubella vaccination (MMR).⁶

South Africa currently has two combination vaccines available in the private sector containing measles, mumps and rubella: Priorix® and Omzyla.^{®13}

All HCWs working in medical facilities should be immune to measles and rubella.^{3,6}

Proof of immunity should be documented through serologic testing or documented proof of two doses of MMR vaccine.³

HCWs without proof of immunity, or who have not been vaccinated, or have proof thereof, should receive two doses of MMR vaccine a minimum of four weeks apart.³

Varicella vaccine

Varicella is a highly contagious viral disease.¹ HCWs may be exposed to the disease through caring for patients with primary varicella (chickenpox) or herpes zoster (shingles).¹ However, nosocomial outbreaks and transmission have occurred even when the source patients did not have signs and symptoms of the disease at the time.¹ Adults are at risk of developing serious complications from varicella, as are pregnant women and the immunosuppressed.¹

All HCWs should be immune to varicella.³ Unvaccinated HCWs who have never had chickenpox should receive two doses of varicella vaccine a minimum of four weeks apart.⁴ Evidence of immunity includes³:

- Documentation of two doses of varicella vaccine at least four weeks apart
- Laboratory evidence of immunity
- Laboratory confirmation or healthcare provider confirmation of a history of chickenpox disease or herpes zoster (shingles)

South Africa's private sector currently has two varicella vaccines available: Varilrix® and Onvara^{®13}

Tetanus, diphtheria, pertussis vaccine

Pertussis (whooping cough) is a highly transmissible bacterial disease and is life-threatening to infants.² Although vaccination programmes throughout the world have decreased the morbidity and mortality in children under five years of age, outbreaks still occur even in countries with high vaccine coverage.^{2,14} Waning levels of immunity to pertussis in adolescents and adults have led to an increased prevalence of pertussis in the older population and subsequent transmission of pertussis to unimmunised and partially immunised infants.¹⁵

All HCWs are recommended to receive a single pertussis-containing booster vaccine if they have not received one, or are not sure if they have received one. In South Africa, two vaccines are currently available in the private sector as a booster combination vaccine containing tetanus, diphtheria, pertussis and injectable polio (Tdap/IPV).¹³

These vaccines include: Adacel Quadra® or Boostrix Tetra^{®.13}

It is recommended that a tetanus and diphtheria containing booster dose (Td) is received every 10 years thereafter.³

Vaccines recommended for certain HCWs

Meningococcal vaccine

Nosocomial transmission of *Neisseria meningitides* is rare, and, as such, HCWs are not routinely recommended to receive a meningococcal vaccine.¹

HCWs, such as microbiologists, routinely exposed to *Neisseria meningitides* isolates, however, should be vaccinated.³ Also, HCWs who are at personal risk due to certain factors, such as complement component deficiency, asplenia, or who travel to countries where meningococcal meningitis is endemic, should receive the vaccine.¹

There are a few different strains of bacteria that can cause meningococcal meningitis, and South Africa has a vaccine that protects against *Neisseria meningitides* strains A, C, W and Y, called Menactra^{®.13}

It is recommended that these at-risk HCWs receive a single dose of Menactra[®], with a booster dose every five years if they remain at risk.¹⁶

Pneumococcal vaccine

Only HCWs who are at personal risk of developing pneumococcal disease as a result of their age or certain underlying health conditions are recommended to have a pneumococcal vaccine.¹

Other vaccines, such as rabies vaccine, typhoid vaccine, polio vaccine and hepatitis A vaccine, should be administered to specific HCWs as a result of their occupation, e.g. veterinarians who are exposed to the rabies virus, and laboratory workers who handle various specimens.^{1,17}

Conclusion

Vaccines play an important role in preventing the nosocomial transmission of vaccine-preventable diseases.² HCWs are responsible for ensuring that they have protection and are up to date with all necessary vaccine-preventable diseases in order to protect themselves, their family members, and their patients.⁴

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