

# Vaccine Preventable Diseases and healthcare workers



# Expected learning outcomes

At the end of this activity, you will:

- understand your responsibility to manage increased risks associated with vaccine preventable diseases (VPDs) in the healthcare environment.
- have an increased knowledge of vaccine preventable diseases.
- be informed of the VPD requirements for your role.

# What are VPDs?

Vaccine preventable diseases (VPDs) are infectious diseases for which an effective vaccine is available.

VPDs may cause:

- serious, life-threatening illness and even death
- chronic (long lasting) impacts with ongoing health problems.
- undesirable pregnancy outcomes, such as miscarriage, stillbirth and birth defects, if a pregnant woman contracts a VPD during pregnancy.

# Why vaccinate?

- There is an increased risk of exposure to certain diseases in a healthcare setting; as a staff member it is important to know about these risks.
- As well as protecting yourself and your family, health professionals have a duty of care to protect their patients.
- You have an increased risk of contracting and transmitting the VPDs to people at risk.
- Vaccination is a valuable tool to help minimise exposure of people to VPDs.

# VPDs in Healthcare

Working in the healthcare setting can increase your risk of exposure to the following VPDs:

- hepatitis B
- varicella (Chicken pox)
- pertussis (Whooping cough)
- influenza
- measles
- mumps
- rubella
- hepatitis A (in some circumstances)
- tuberculosis (in some circumstances).

# Vaccination

- A vaccine is a product often made from extracts of killed viruses or bacteria, or from live weakened strains of viruses or bacteria; the vaccine is capable of stimulating an immune response that protects against natural ('wild') infection<sup>1</sup> .
- Vaccines usually induce an immune response to mimic the host's response to natural infection, but without the harmful consequences of the infection itself<sup>1</sup> .
- Immunity following vaccination or natural infection generally lasts for months to many years depending on the nature of the vaccine and host factors<sup>1</sup> .
- Some vaccine courses require more than one dose.

# Transmission

VPDs can be spread in a variety of ways, such as:

- inhaling droplets expelled from an infected person when they cough, sneeze, laugh or speak.
- inhaling respiratory particles carried on air currents.
- contact with infected blood and body fluids.
- contact with fluid from vesicles.
- touching a surface that someone has contaminated and then touching your own mucous membranes.
- contact with something contaminated with faeces that is transferred to another person's mouth (faecal-oral route).

# New starters to Queensland

## Health - responsibilities

- From 1 July 2016, new conditions of engagement will apply for certain categories of prospective workers to provide evidence that they are not susceptible to specified VPDs.
- It is your responsibility to comply with the specified VPD requirements for any new position you apply for.
- It is important to know your vaccination status prior to commencement of employment.

# Existing staff responsibilities

- It is important to know your vaccination status.
- You may be required to be excluded from contact with patients that have a VPD if you have no history of immunity or vaccination to that VPD.
- Hepatitis B vaccination is an existing condition of employment for roles that:
  - have direct contact with patients, or
  - in the course of their work, may be exposed to blood/body fluids or contaminated sharps.

# Benefits of vaccination

- You increase your protection against VPDs.
- You protect vulnerable patients.
- You protect your co-workers.
- You protect your family and friends.
- You help to reduce sick leave in the work place.
- You contribute to the global vision strategy to eradicate VPDs.

# Hepatitis B

- Hepatitis B virus (HBV) is a blood borne virus that is spread via percutaneous and mucosal exposure to infective body fluids<sup>2</sup>.
- HBV is stable on environmental surfaces for at least 7 days, therefore indirect inoculation can occur via inanimate objects<sup>2</sup>.



# Hepatitis B

- Following acute infection 1-10% of persons infected in adulthood and up to 90% of those infected in early infancy become chronically infected with hepatitis B<sup>2</sup>.
- 15-25% of persons with chronic HBV infection die prematurely of either cirrhosis or hepatocellular carcinoma<sup>2</sup>.
- Approximately 50% of hepatocellular carcinoma globally are attributable to chronic HBV infection<sup>2</sup>.

# Hepatitis B

- Vaccination requires 2-4 doses depending on the individual's age and the timing of the doses.
- Hepatitis B antibody levels can be tested 1-2 months post the last vaccine.
- A hepatitis B antibody level  $\geq 10\text{mIU/mL}$  is accepted as evidence of seroprotection.

# Hepatitis B requirement

- Hepatitis B vaccination or proof that an individual is not susceptible to hepatitis B is a condition of employment for all Queensland Health workers for roles that:
  - have direct contact with patients, or
  - in the course of their work, may be exposed to blood/body fluids or contaminated sharps.

# Varicella

- Varicella is also known as chickenpox.
- It is a virus from the herpes virus family.
- It is a highly contagious infection spread by respiratory secretions, including aerosol transmission, or from the vesicle fluid of the skin lesions of varicella or zoster infection<sup>1</sup>.
- Incubation is 10-21 days, it is communicable 1-2 days prior to the onset of rash.

# Varicella

- Primary infection with Varicella-zoster virus (VZV) causes varicella (chicken pox)<sup>1</sup>.
- Following primary infection VZV establishes latency in the dorsal root ganglia<sup>1</sup>.
- Reactivation of the latent virus manifests as herpes zoster (shingles)<sup>1</sup>.



# Varicella

- The *Australian Immunisation Handbook* recommends vaccination for all non-immune healthcare workers<sup>1</sup>.
- Adults require 2 doses of varicella vaccine at least 4 weeks apart<sup>1</sup>.
- Testing to check for seroconversion after varicella vaccination is not recommended<sup>1</sup>.
- Varicella containing vaccines are contraindicated in pregnant women and pregnancy should be avoided for 28 days after vaccination<sup>1</sup>.

# Pertussis

- Also known as whooping cough.
- Caused by the gram negative bacillus *Bordetella pertussis*.
- It is an acute bacterial infection of the respiratory tract<sup>2</sup>.
- Is classically characterised by paroxysmal cough and inspiratory whoop<sup>2</sup>.

# Pertussis

- Transmission occurs through direct contact with discharges from respiratory mucous membranes of infected persons.
- Incubation ranges from 4-21 days, usually 7-10 days<sup>3</sup>. People with untreated pertussis are infectious for approximately 3 weeks.

# Pertussis

- *The Australian Immunisation Handbook* recommends pertussis vaccination (with diphtheria, tetanus and pertussis containing vaccine) for healthcare workers with particular importance for those working with newborn babies.
- The vaccine is only available in Australia in combination with diphtheria and tetanus<sup>1</sup>.
- A booster dose is recommended if 10 years has elapsed since previous dose<sup>1</sup>.
- It is recommended as a single dose for pregnant women during the third trimester of pregnancy.

# Measles

- Measles is a highly infectious acute viral illness<sup>1</sup>.
- Characterised by fever and malaise, cough and conjunctivitis, maculopapular rash (flat red area on the skin covered with confluent bumps).
- It is often a severe disease and is frequently complicated by otitis media (inflammation of the middle ear), pneumonia and diarrhoea. It can also cause acute encephalitis (inflammation of the brain).

# Measles

- Transmission occurs via respiratory secretions through airborne transmission.
- Incubation average is 14 days with a range of 7-21 days<sup>2</sup>.



# Mumps

- Acute viral illness.
- Symptoms include fever, swelling and tenderness of one or more salivary glands. Prodromal symptoms are non specific, myalgia (muscle pain), anorexia, malaise (body weakness or discomfort), headache<sup>2</sup>.

# Mumps

- Transmission occurs via airborne respiratory secretions and by direct contact with saliva or possibly urine<sup>1</sup>.
- Incubation is 16-18 days with a range of 12-25 days<sup>2</sup>.



# Rubella

- Rubella is generally a mild and self limiting infectious disease, often causes a mild febrile viral disease with a maculopapular rash.
- Rubella during pregnancy can result in fetal infection causing congenital rubella syndrome.
- Up to 90% of infants born to women who had rubella in the first trimester of pregnancy have abnormalities<sup>1</sup>.

# Rubella

- Transmission occurs via contact with nasopharyngeal secretions of infected people either by droplet spread or direct contact.
- Incubation is 14-17 days with a range of 14-21 days<sup>2</sup>.
- Symptoms include mild fever, punctate (studded or denoting dots) and maculopapular rash, headache, malaise and conjunctivitis.

# MMR Vaccine

- *The Australian Immunisation Handbook* recommends Measles, Mumps, Rubella (MMR) vaccination for healthcare workers.
- It is available free for anyone born after 1 January 1966.
- Healthcare workers should ensure that they have received 2 dose of MMR.

# MMR, varicella & pertussis requirement

- Evidence of measles, mumps, rubella, varicella and pertussis vaccination or evidence that the person is not susceptible to measles, mumps, rubella and varicella is required for prospective workers for roles that:
  - have contact that would allow acquisition and/or transmission of measles, mumps, rubella, varicella or pertussis. This applies to roles in which:
    - work requires face to face contact with patients, or
    - normal work location is in a clinical area such as a ward, emergency department or outpatient clinic, or
    - work frequently requires them to attend clinical areas.

*Where pertussis vaccination is a role requirement, the worker is required to provide evidence of booster vaccination when a period of ten years has elapsed since the previous dose.*

# Influenza

- Influenza is an acute viral disease of the respiratory tract characterised by fever, cough, headache, muscle pain, sore throat<sup>2</sup>.
- Influenza is different to the common cold.
- Influenza is transmitted person to person by direct contact with respiratory secretions or by virus containing respiratory droplets.
- These are produced through coughing, sneezing, and talking.

# Influenza

- Incubation period is approximately 2 days (1-4). Virus communicability is greatest during the first 3-5 days.
- Vaccination is required annually.
- Influenza viruses undergo frequent changes in their surface antigens. This results in changes in influenza antigens or 'antigenic shift'. For this reason the influenza vaccination undergoes annual review.
- *The Australian Immunisation Handbook* recommends annual influenza vaccination for healthcare workers.

# Hepatitis A

- Hepatitis A is an acute viral infection of the liver caused by the Hepatitis A virus.
- Transmission occurs person to person via the faecal-oral route.
- Incubation on average is 28-30 days (range: 15-50 days).
- Symptoms include fever, malaise, anorexia, nausea, abdominal discomfort and jaundice<sup>2</sup>.

# Hepatitis A

- *The Australian Immunisation Handbook* recommends hepatitis A vaccination for healthcare workers if they work in remote Indigenous communities, are plumbers or they work with untreated sewage.
- The number of required doses for adults should be administered in accordance with recommendations in *The Australian Immunisation Handbook* as this is dependent on brand/combination with another vaccine.

# Tuberculosis

- Tuberculosis (TB) is caused by Mycobacterium tuberculosis complex which are slow growing, aerobic, acid fast bacilli.
- Symptoms of TB include cough, fever, weight loss, sweats, haemoptysis.



# Tuberculosis

- Due to the limited evidence of benefit of BCG vaccination in adults and interference of vaccination with interpretation of tuberculin skin test (TST) routine BCG vaccination of healthcare workers is not recommended<sup>1</sup>.
- BCG vaccination should be considered for TST-negative healthcare workers who are at risk of exposure to drug-resistant TB, due to the difficulty in treating drug-resistant infection<sup>1</sup>.

# Japanese encephalitis

- Japanese encephalitis (JE) is caused by a mosquito-borne ribonucleic acid (RNA) flavivirus.
- JE is a serious infection of the brain caused by a virus that can be spread by some (but not all) types of mosquitoes.
- JE is a significant public health problem in many parts of Asia, including the Indian subcontinent, Southeast Asia and China<sup>1</sup>.
- The disease has extended and occasional cases are seen in eastern Indonesia, occasional outbreaks in the Torres Strait and one case in north Queensland.
- JE is now considered endemic in the Torres Strait region and Papua New Guinea<sup>1</sup>.

# Japanese encephalitis

- Most JE infections are asymptomatic<sup>1</sup>.
- Symptomatic disease is characterised by headache, fever, convulsions, focal neurological signs and depressed level of consciousness. It has a high case-fatality rate<sup>1</sup>.
- Milder forms include febrile illness with headache, and aseptic meningitis<sup>1</sup>.
- After a person is bitten by an infected mosquito, it usually takes five to 15 days for the first symptoms to appear.

# Japanese encephalitis

- *The Australian Immunisation Handbook* recommends JE vaccination for permanent residents and for those who will be living or working on the outer islands of the Torres Strait for a cumulative total of 30 days or more during the wet season (December to May)
- People travelling in Asia and Papua New Guinea, particularly during the monsoonal wet season, should take care to avoid exposure to mosquitoes during biting hours (eg. dusk until dawn).

# Hepatitis A, TB and JE requirements

- Hospital and Health Services may apply a risk based approach to include a requirement for pre-engagement/pre-commencement screening for prospective workers for these additional VPDs as indicated by geographical or population specific requirements as outlined in *The Australian Immunisation Handbook*, as updated from time to time.
- Please refer to your local human resources team for information.

# Additional information/resources

If you would like further information on vaccinations please contact:

- Your doctor, staff health clinic or vaccine service provider
- 13 HEALTH (13 43 25 84)
- Immunise Australia National Infoline: 1800 671 811

Websites:

- [www.immunise.health.gov.au](http://www.immunise.health.gov.au)
- [www.ncirs.usyd.edu.au](http://www.ncirs.usyd.edu.au)
- <http://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/immunisation/healthcare-workers/recording-vaccinations/default.asp>

# References

1. *The Australian Immunisation Handbook, 10<sup>th</sup> Edition.*(2015 update) Australia: Australian Health and Medical Research Council; 2015.
2. Heymann DL. *Control of Communicable Diseases manual 20<sup>th</sup> Edition.* America: American Public Health Association; 2015.
3. Communicable Diseases Network Australia (CDNA). Australia: *National Guidelines for Public Health Units.*

Acknowledgement and thanks to the Center for Disease Control and Prevention (CDC) Public Health Image Library for the images contained in this presentation. These were obtained from: <http://phil.cdc.gov/phil/home.asp>