Appendix 7

Further information about the vaccine preventable diseases

Disease	Healthcare associated transmission and community exposure	Vaccine
Hepatitis B		
Infectious agent: Hepatitis B virus (HBV) **Mode of transmission:** through blood-to-blood contact with an infected person which may include: Percutaneous exposure (IV, IM, SC or intradermal).[1,2] Coming into contact with inadequately sterilized instruments.[1] Sexual contact (hepatitis B is one of the most common sexually transmitted infections in the world).[1,2] Perinatal transmission from mother to child. **Incubation period:** Usually 45–180 days, average 60–90 days.[1] **Infectious period:** Blood from infected persons is infective many weeks before the onset of symptoms and remains infective through the acute clinical course of the disease.[1] **Disease signs and symptoms:** in approximately 30 to 50% of adults infection causes symptomatic acute hepatitis, but in neonates and young children, particularly those <1 year of age, initial infection is usually asymptomatic.[1,2] Symptoms include fever, jaundice, malaise, anorexia, nausea and vomiting, abdominal pain (especially in the right upper quadrant), myalgia, and the passage of dark coloured urine and light-coloured stools.[1,2]	HBV is a vaccine preventable disease, and the incidence of healthcare associated transmission of HBV has declined following the widespread implementation of HBV vaccination of healthcare workers.[5] Since HBV is stable on environmental surfaces for at least seven days, indirect inoculation can occur via inanimate objects.	**Hepatitis B vaccines** Recombinant virus vaccines contain hepatitis B surface antigen. **Side effects of hepatitis B vaccine:** About 1 in 20 will have local swelling, redness or pain at the injection site. 2 in 100 will have fever. Anaphylaxis occurs in about 1 in 1 million.[2] Serious adverse events are very rare.[2] **Contraindications to receiving hepatitis B vaccine:** Anaphylaxis following a previous dose of any hepatitis B vaccine[2] Anaphylaxis following any hepatitis B vaccine component.[2] *In particular, hepatitis B vaccines are contraindicated in persons with a history of anaphylaxis to yeast.*[2] Hepatitis B vaccine is recommended at a population level, and hepatitis B vaccination is part of the National Immunisation Program. Further information about the HBV vaccine, schedule and recommendations can be found in the online Australian Immunisation Handbook.[2]

Disease	Healthcare associated transmission and community exposure	Vaccine
Complications and serious consequences Severity ranges from unapparent cases detectable only by abnormal liver function tests to severe hepatitis with serious complications including fatal cases of acute hepatic necrosis.[1,2] About 1 in 4 chronic HBV carriers will develop cirrhosis or liver cancer.[1] Further information about HBV can be found on the Queensland Health communicable disease control guidance internet page.		

Disease	Healthcare associated transmission and community exposure	Vaccine
Measles		
Infectious agent: Measles virus **Mode of transmission:** Airborne transmission via inhalation of aerosolised respiratory particles and droplets and direct contact with respiratory secretions. Measles is one of the most highly communicable infectious diseases.[1] There is a 90% chance that susceptible close contacts who are exposed to the disease will become infected.[3,4] **Incubation period:** from 7–18 days (average 10).[1] **Infectious period:** from 24 hours prior to onset of symptoms (or 4 days before onset of rash) until 4 days post onset of rash. **Disease signs and symptoms:** Measles is an acute illness characterised by fever, conjunctivitis, coryza (cold-like symptoms) and cough in the initial phase. This is followed by onset of a non-itchy, maculopapular (red, raised) rash beginning on the face or upper neck spreading to become generalised. Other symptoms may include: loss of appetite, diarrhoea, and swollen glands. **Complications and serious consequences** *Common complications*: middle ear infection and chest infection/pneumonia. *Serious complications and consequences*: about 1 in 15 children with measles develops pneumonia and 1 in 1,000 develops encephalitis (brain inflammation). For every 10 children who develop measles encephalitis, one child dies and many have permanent brain damage. About 1 in 100,000 will develop subacute sclerosing panencephalitis (SSPE) (progressive brain degeneration) up to several years after an apparent full recovery from a measles infection; it is always fatal.[2] Further information about measles can be found on the Queensland Health communicable disease control guidance internet page.	Despite the availability of a safe and effective vaccine, there has been an increase in measles outbreaks in countries where there is a high uptake of vaccination and no circulating wild measles virus[4]. These outbreaks are often caused by non-immune travellers importing the disease from countries affected by ongoing outbreaks of measles.[1,4] Healthcare associated transmission of measles has been well documented.[5] Many of the adult cases identified in healthcare associated outbreaks have been unvaccinated healthcare workers who have transmitted the disease to susceptible patients.[5] Work related exposures result in susceptible healthcare workers being 13 to 19 times more likely to contract measles than susceptible members of the general population.[6] Patients exposed to measles are at increased risk for severe disease with high mortality and morbidity.[5,6] The most effective method for eliminating the risk of healthcare associated transmission of measles among healthcare workers is vaccination.[5]	**MMR (measles, mumps, and rubella) vaccine** A live attenuated virus vaccine. A single vaccination is 95% effective in preventing measles and a second vaccination has been found to be 99% effective when given after 12 months of age.[2] **Side effects of MMR vaccine:** Adverse events are generally mild and well tolerated.[2] About 1 in 10 has local swelling, redness or pain at the injection site, or fever. About 1 in 20 develops a rash, which is non-infectious. Low platelet count (causing bruising or bleeding) occurs after the 1st dose of MMR vaccine at a rate of about 1 in 20, 000 to 30,000. About 1 in 100 may develop swelling of the salivary glands. Serious adverse events are very rare. **Contraindications to receiving MMR vaccine** Anaphylaxis following a previous dose of MMR-containing vaccine. Anaphylaxis following any MMR vaccine component. Immunocompromised persons (seek further information from healthcare providers). Pregnant women. Further information about the MMR vaccine, schedule and recommendations can be found in the online Australian Immunisation Handbook

Disease	Healthcare associated transmission and community exposure	Vaccine
Mumps		
Infectious agent: Mumps virus **Mode of transmission**: Airborne transmission via inhalation of aerosolised respiratory particles and droplets and direct contact with respiratory secretions, saliva and possibly urine. **Incubation period**: from 12–25 days (average 16–18).[1] **Infectious period**: maximum communicability occurs between 2 days before and 4 days after onset of illness.[1] **Disease signs and symptoms:** mumps is an acute illness characterised by fever, swelling and tenderness of the parotid and/or other salivary glands.[1] Respiratory symptoms may also be present. **Complications and serious consequences** *Common complications*: Orchitis (inflammation of the testes) occurs in 20–30% of adult and adolescent males[1], meningitis occurs in up to 10% of cases.[1] *Serious complications and consequences*: Occasionally, mumps causes infertility or permanent deafness.[2] Further information about mumps can be found on the Queensland Health communicable disease control guidance internet page.	Since the introduction of the mumps vaccine there has been a dramatic decrease in the incidence of the disease. Sporadic outbreaks do still occur, affecting those with possible waning immunity and populations with lower vaccine uptake. Community outbreaks of mumps have been associated with significant concurrent healthcare associated transmission of the disease.[5] Due to the nature of their occupation, non-immune healthcare workers are at increased risk of exposure to mumps with a greater likelihood of acquiring and transmitting the disease.[5,7,8] The safest and most effective means for preventing healthcare associated transmission of mumps is vaccination of non-immune healthcare workers.	**MMR (measles, mumps, and rubella) vaccine** A live attenuated virus vaccine. A single Mumps vaccine is around 65%–80% effective and 2 doses of vaccine are approximately 88%–95% effective.[2] **Side effects of MMR vaccine:** Adverse events are generally mild and well tolerated. [2] About 1 in 10 has local swelling, redness or pain at the injection site, or fever. About 1 in 20 develops a rash, which is non-infectious. Low platelet count (causing bruising or bleeding) occurs after the 1st dose of MMR vaccine at a rate of about 1 in 20,000 to 30,000. About 1 in 100 may develop swelling of the salivary glands. Serious adverse events are very rare. **Contraindications to receiving MMR vaccine:** Anaphylaxis following a previous dose of MMR-containing vaccine. Anaphylaxis following any MMR vaccine component. Persons who are immunocompromised (seek further information from healthcare providers). Pregnant women. Further information about the MMR vaccine, schedule and recommendations can be found in the online Australian Immunisation Handbook

Disease	Healthcare associated transmission and community exposure	Vaccine
Pertussis (whooping cough)		
Infectious agent: *Bordetella pertussis* (a bacteria) **Mode of transmission**: contact with respiratory secretions and droplet transmission. The disease is highly infectious and approximately 90% of non-immune household contacts develop the disease.[2] Pertussis can be a relatively mild disease, with a subtle onset in adults and older children, who may unwittingly be infectious and transmit the disease to those at serious risk, e.g. infants under 6 months of age. **Incubation period:** from 4–21 days (average 7–10 days). **Infectious period:** from the onset of catarrhal (runny nose, sneezing) symptoms until 3 weeks after onset of cough, or until completing 5 days of a course of an appropriate antibiotic. **Disease signs and symptoms:** Initial catarrhal phase: runny nose, sneezing, absent or low grade fever, mild occasional cough.[1] Paroxysmal phase: paroxysmal cough (violent attacks of uncontrollable coughing) that may result in vomiting, cyanosis (bluish tinge to skin), and a characteristic "whoop" on breathing in.[1] Infants are more likely to have gagging, gasping, cyanosis, seizures, poor feeding, or to stop breathing.[1] **Complications and serious consequences:** The risk of complications and mortality is high in unvaccinated infants. Approximately 1 in 125 babies under the age of 6 months with whooping cough die from pneumonia or brain damage. The most common cause of death associated with pertussis infection is pertussis pneumonia, sometimes complicated by seizures and hypoxic encephalopathy.[2] Further information about pertussis can be found on the Queensland Health communicable disease control guidance internet page.	All healthcare workers should receive dTpa vaccine because of the significant risk of healthcare associated transmission of pertussis to vulnerable patients.[2] Healthcare associated transmission of pertussis has been documented to have occurred from hospital visitors to patients, from healthcare workers to patients, and from patients to healthcare workers.[7] Pertussis vaccination is an effective method for reducing the risk of healthcare associated transmission of pertussis between healthcare workers, patients and other members of the community.[2,5,7]	**Diphtheria-tetanus-pertussis (acellular) DTPa-containing vaccines and dTpa (reduced antigen) vaccines:** Vaccination for pertussis is only available with a combination vaccine. This contains vaccine for diphtheria, tetanus (toxoid) and pertussis (subunit antigen) and is referred to as dTpa/DTPa.[2] A booster dose of dTpa for health care workers is recommended if 10 years have elapsed since a previous dose.[2] **Side effects of dTpa vaccine:** Low-grade temperature (fever)[2] About 1 in 10 has local swelling, redness or pain at the injection site, or fever (DTPa/dTpa vaccine).[2] Booster doses of DTPa may occasionally be associated with extensive swelling of the limb, but this resolves completely within a few days.[2] Occasionally, an injection-site nodule; may last many weeks; no treatment is needed.[2] Serious adverse events are very rare.[2] **Contraindications to acellular pertussis-containing vaccine** Anaphylaxis following a previous dose of any acellular pertussis-containing vaccine.[2] Anaphylaxis following any acellular DTP vaccine component.[2] Further information about the dTpa vaccine, schedule and recommendations can be found in the online Australian Immunisation Handbook

Disease	Healthcare associated transmission and community exposure	Vaccine
Rubella		
Infectious agent: Rubella virus **Mode of transmission:** Direct contact with respiratory secretions, and possibly airborne transmission via inhalation of aerosolised respiratory particles and droplets. **Incubation period:** from 14–21 days (average 14–17). **Infectious period:** From one week before to at least 4 days after the onset of rash.[1] Rubella is highly communicable.[1] **Disease signs and symptoms:** rash, low grade fever, painful swollen glands, malaise and painful joints.[2,5,7.] **Complications and serious consequences** *Serious complications and consequences*: One in 3,000 develop low platelet count (causing bruising or bleeding); 1 in 6,000 develops encephalitis (brain inflammation).[2] Rubella infection during pregnancy can cause congenital infection in the infant and up to 9 in 10 babies infected during the first trimester of pregnancy will have a major congenital abnormality (including deafness, blindness or heart defects).[2] Rubella infection during pregnancy can also cause miscarriage and stillbirth.[2,5,6] Further information about rubella can be found on the Queensland Health communicable disease control guidance internet page.	Prior to the introduction of the vaccine rubella was an endemic disease globally and healthcare associated transmission of the disease was not uncommon. Following the introduction of rubella vaccination there have not been any documented cases of healthcare associated transmission of rubella.[5,7] Vaccination has been demonstrated to be a safe effective method for prevention of healthcare associated rubella infection.	**MMR (measles, mumps, and rubella) vaccine** A live attenuated virus vaccine. A single vaccination is 95% effective in producing an antibody response, with the aim of the second dose being to produce immunity in those who did not produce antibodies in response to the first dose[2]. **Side effects of MMR vaccine:** Adverse events are generally mild and well tolerated.[2] About 1 in 10 has local swelling, redness or pain at the injection site, or fever. About 1 in 20 develops a rash, which is non-infectious. Low platelet count (causing bruising or bleeding) occurs after the 1st dose of MMR vaccine at a rate of about 1 in 20,000 to 30,000. About 1 in 100 may develop swelling of the salivary glands. Serious adverse events are very rare. **Contraindications to receiving MMR vaccine** Anaphylaxis following a previous dose of MMR-containing vaccine. Anaphylaxis following any MMR vaccine component. Immunocompromised persons (seek further information from healthcare providers). Pregnant women. Further information about the MMR vaccine, schedule and recommendations can be found in the online Australian Immunisation Handbook

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