Infectious Diseases Policy for Health Professional Students

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Responsible Officer	*Manager, Health Sciences Admissions*
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Purpose

The information contained in this policy document concerns important issues, which affect students in health care professions and patients with whom they come in contact. The document sets out in detail the reason for the steps students are required to take in order to comply with Divisional requirements for students who are infected with a blood-borne virus. Students are encouraged to discuss this policy with the Faculty/School's Infectious Diseases Officer or the Dean or his/her representative if there are any matters requiring clarification. All enquiries will be welcomed and treated on a confidential basis.

Students are required to read, understand and comply with this policy because of its importance in relation to certain procedures in circumstances where a student carries a blood-borne virus. Compliance with the policy is of the utmost importance.

Scope

This policy applies to the following courses offered by the Division: Bachelor of Dental Surgery, Bachelor of Dental Surgery (Hons), Bachelor of Dental Technology, Bachelor of Dental Technology (Hons), Bachelor of Physiotherapy, Bachelor of Physiotherapy (Hons), Bachelor of Medicine and Bachelor of Surgery, Bachelor of Pharmacy, Bachelor of Medical Laboratory Science, Bachelor of Radiation Therapy, Bachelor of Oral Health, Master of Nursing Science and any other Health Sciences course to which this policy may apply.

See Appendix A: Requirements for programme specific information.

Definitions

For full information refer to Appendix A

Community Viral Infections

- *Measles*
- *Mumps*
- *Rubella*
- *Polio*
- *Varicella-Zoster*
- *Human papilloma virus*

Community Bacterial Infections

- *Diphtheria*
- *Tetanus*
- *Pertussis*
- *Mycobacterium tuberculosis*
- *Methicillin-resistant Staphylococcus aureus (MRSA)*
- *Encapsulated Bacteria*

Blood-borne Viral Infections

Included in this group are a number of viruses which circulate in the blood of an infected person, in some cases for many years, and which can be transmitted to other people when they come into contact with this infected blood. The main viruses of importance in this group HBV, HCV and HIV. HCW are potentially at risk of acquiring these infections as they are in frequent contact with blood and other body fluids, which may contain the viruses.

- *Human Immunodeficiency Virus*
- *Hepatitis B Virus*
- *Hepatitis C Virus*

Content

All students enrolled in professional health courses in the Division of Health Sciences at the University of Otago, and who will have patient contact during their course, are expected to comply with specific requirements set out in the Infectious Diseases Policy. This policy applies to undergraduate and graduate-entry health professional students and to students enrolled in some postgraduate health professional courses. The University is required to comply with national regulations and is committed to providing a safe teaching and learning environment for patients, students and staff.

Students should understand the risks of infection that may occur between health care workers (HCW) and their patients or contacts. These risks cannot be totally eliminated, but it is essential that procedures known to be safe are consistently followed to minimise them. The Division's Infectious Diseases Policy has direct relevance to the participation of students in the professional programmes. Consequently, it is important that students consider these important issues before considering a course as they may have an impact on their future career pathways. Students who are not able to demonstrate freedom from specified blood-borne viral infections are warned that their university education or career options may be narrower than they expect.

Certain blood-borne viruses such as hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are of particular significance in health care settings. Following infection with these viruses, individuals may carry virus in their blood and remain infectious for many years, even life-long. Many people infected with these viruses feel completely well and are unaware of their infection. HCW may be involved in the transmission of these viruses. Infectious diseases affect HCW and students during their training and in their professional lives in three ways:

1. HCW may transfer infectious agents (bacteria, viruses, parasites) from patient to patient.
2. HCW may become infected with infectious agents acquired from patients.
3. HCW who are incubating, ill or carrying infectious agents, may infect patients or other HCW.

In the absence of any clear exposure to blood or body substances, patients are at an extremely low risk of acquiring blood-borne infections. Appropriate infection control practices will, except in exceptional circumstances, protect patients (and HCW).

One of the major advances in control of infectious diseases has been the availability of vaccines. In New Zealand routine childhood immunisations have been provided as part of the New Zealand National Immunisation Schedule for many years for diphtheria, tetanus, pertussis (whooping cough), poliomyelitis, measles, mumps, and rubella (German measles). In more recent years, immunisations for HBV, Haemophilus influenza type b, pneumococcal infections, and human papillomavirus (HPV) for girls have been added. Information on the National Immunisation Schedule, and regular update information, is available at: http://www.moh.govt.nz/moh.nsf/indexmh/immunisation-schedule

Health professional students enrolled in professional health courses in the Division of Health Sciences are expected to be fully immunised as per table 1 and 2, to lower their risk of acquiring and hence possibly transmitting vaccine preventable diseases during their study and work. The Division of Health Sciences will appoint a specialist physician, who is a specialist medical practitioner experienced in the management of blood-borne viral infections and other infectious disease who will be known as the Divisional Infectious Diseases Physician, to advise on these matters. The Divisional Infectious Diseases Physician will be Dunedin-based, but will liaise with nominated colleagues in Wellington and Christchurch for students based in these campuses.

Student Requirements and Responsibilities

1. Throughout their course of study students must learn and practise standard infection control precautions that are relevant to their professional training.

2. Students have a responsibility to ensure that they are protected from infection with the vaccine-preventable diseases associated with health care. Those with personal health issues that might preclude vaccination should discuss this with the Divisional Infectious Diseases Physician.

3. Students have a responsibility to take measures to prevent transmission of acute infectious diseases from themselves to others and between patients.

4. Students have a responsibility to know their immune/infectious status for HBV, HCV, HIV, measles, mumps, rubella, varicella and pertussis. All students undertaking the Bachelor of Dental Surgery, Bachelor of Dental

Technology, Bachelor of Physiotherapy, Bachelor of Medicine and Bachelor of Surgery, Bachelor of Pharmacy, Bachelor of Medical Laboratory Science, Bachelor of Radiation Therapy and Bachelor of Oral Health degrees (or any other Health Sciences programmes to which this policy may apply) must be tested for these infectious diseases before commencing studies, and undertake ongoing periodic testing as considered appropriate in relation to ongoing risk through occupational or other activities. All students have the responsibility to seek advice after a risk event whether it be an occupational issue or a personal event.

5. Each Faculty/Clinical School/School or Programme will appoint an Infectious Diseases Officer who will liaise with the Dean/Associate Dean/ Programme Director, the Divisional Infectious Diseases Physician and the Health Sciences Admissions Manager on these matters.

6. Any student at the Dunedin campus who is found to be chronically infected with a blood-borne virus or with TB will be advised of this by Student Health who will arrange an appointment for the student with the Divisional Infectious Diseases physician. The student is required to consult with, and follow any advice provided by, the Infectious Diseases physician or his/her nominee regarding the nature of the virus, extent of infection, likelihood of transmission and the student's ability to undertake particular clinical and coursework activities within accepted professional standards. In addition, the student must make an appointment to discuss these issues with their Dean or his/her representative on a confidential basis within two weeks of consulting the Infectious Diseases physician. Wellington and Christchurch based students will be required to discuss these issues with a local physician nominated by the Divisional Infectious Diseases physician prior to meeting with the Head of School. As appropriate (e.g. for medical and physiotherapy students) information relating to these issues will be passed on to the Dean or leader of a subsequent school/programme.

    a. Students with chronic HBV infection (manifest as circulating hepatitis B surface antigen) will require medical assessment and advice as above, and may not be able to perform exposure-prone procedures. The degree of infectiousness of hepatitis B carriers depends on their hepatitis Be antigen and antibody status, and their circulating concentration of hepatitis B viral DNA and possibly other investigations.
    b. Students with a positive test for antibody to HCV may not be able to perform exposure-prone procedures while such infection persists. Curative treatment is now available for some people with some types of HCV infection.
    c. Students with confirmed HIV infection may not be able to perform certain exposure-prone procedures.
    d. Students with positive QuantiFERON Gold (TB) blood tests will be required to have a chest x-ray and be clinically reviewed. Further screening may be required during the clinical years of the course. BCG vaccine is not recommended. Timing of return to clinical duties is at the discretion of the Infectious Diseases Physician.
    e. Further clinical assessment and specialist assessment may be advised for students identified with any of these conditions.

7. All students in the Division of Health Sciences are expected to have knowledge of the immunisations they have received and ideally a copy of their personal immunisation record at the time of entry to professional classes. Serological assessment to determine the presence of protective antibodies will be required.

8. Students are required to be available for collection of blood samples at the beginning of the first semester of the commencement of their professional programme, before classes commence. The blood samples are taken by Student Health personnel for students on the Dunedin campus. Wellington and Christchurch based students will be advised where their screening will be undertaken.

9. Students are required to comply with any additional screening requirements of institutions in which they do clinical attachments or work e.g. MRSA testing

10. Students will provide the Division with a signed declaration by the prescribed date for the particular course of study indicating that they:

    a. have provided to Student Health staff a statement of previous immunisations, where available, to the diseases listed in the standard of the New Zealand National Immunisation Schedule (http://www.moh.govt.nz/moh.nsf/indexmh/immunisation-schedule)

b. if not immunised to the standard of New Zealand National Immunisation Schedule, will undertake to complete any outstanding immunisations and testing as per the recommendations in Tables 1 & 2 by the relevant date prescribed by the Division
c. will be tested for chronic infection with HBV, HCV and HIV
d. if found to be infected with a blood-borne virus, will obtain advice from the Divisional Infectious Diseases physician or nominee regarding the nature of the virus, extent of the infection, likelihood of transmission and ability to undertake particular clinical and coursework activities within accepted professional standards and advised their Dean or his or her representative on a confidential basis of this advice, within two weeks of receiving the advice.
e. will provide their consent to the Division to liaise with the Infectious Diseases physician and any other relevant medical personnel regarding the matters outlined in (d) above, and
f. generally understand the importance of infection control precautions and of the need for ongoing periodic testing with agreement to undertake ongoing periodic testing.

Related Policies, Procedures and Forms

See Appendix B for additional information including strategies to minimise infectious disease risks, programme requirements, standard and additional precautions.

Consultation

Policy developed by the Working Group on Infectious Diseases Screening and Immunisation Policy, Division of Health Sciences comprising: Professor Alison Rich (Chair), Professor Steve Chambers, Associate Professor Nigel Dickson, Dr Jim Faed, Dr Trish Priest, Mrs Beth Stephenson, Ms Nicola Williams (administrative support). Additional consultation undertaken with Health Sciences Divisional Executive, Health Sciences Professional Programmes Admissions Deans/Programme Directors, Student Health Services and International Office.

Contact for further information about this Procedure or Guidelines

If you have any queries regarding the content of this document or need further clarification, contact Manager, Health Sciences Admissions.

Appendix A:

Community Viral Infections

- *Measles*

Measles is a virus which infects primarily the respiratory tract. It is not common because of widespread vaccination but cases are still seen in those without immunity who come into contact with a case, usually introduced from outside the community. It is highly infectious. The infection consists of fever, red eyes, runny nose, cough and a widespread red blotchy rash. Pneumonia may develop and middle ear infection is a common complication. Mortality is significant in those under 5 years.

Incubation period: 7-18 days, typically 10. Period of infectivity: from 4 days before rash onset, to 4 days after rash onset.

- *Mumps*

Mumps is a viral infection causing painful enlargement of the salivary glands (parotid, sublingual, submandibular). It may also affect the testes, ovaries and mammary glands and uncommonly may result in sterility.

Incubation period: 14-25 days . Period of infectivity: from up to 7 days before parotitis onset to 9 days after onset.

- *Rubella*

It is a very common viral infection in childhood and in this age group it usually causes no problems. Symptoms of the illness include fever, tiredness, loss of appetite, swollen glands in the head and neck and a rash. When the infection occurs in adults it may produce a more significant illness and complications like arthritis and encephalitis (inflammation of the brain, a rare complication) are more common than in children. The infection is most serious when it occurs in pregnant women because it can be transmitted to the developing foetus with disastrous effects. If the affected baby is born alive it may suffer from the congenital rubella syndrome, a collection of birth defects including microcephaly (abnormally small head), mental retardation, abnormally small eyes, blindness, deafness, bleeding disorders and abnormal heart valves. For this reason, a pregnant woman who is not immune to rubella must avoid contact with the virus at all costs. Even a woman who is immune should avoid contact as reinfections can sometimes occur. Rubella is spread in the form of droplets from the respiratory tract. The incubation period (time between first contact and first symptoms) ranges from 14 to 23 days. Infection may be asymptomatic. It is important to realise that a person infected with the virus may be infectious to others even before the onset of symptoms. An infected person is infectious for about a week before the onset of symptoms until at least 4 days after the onset of the rash. Infection with rubella produces immunity to further infections. In addition, immunity may be achieved by vaccination. Reinfection with rubella has been described but is uncommon and is more likely to occur in someone who has achieved immunity through vaccination rather than by natural infection.

Incubation period: 4-23 days. Period of infectivity: from 1 week before to 4 days after onset of rash.

- *Polio*

Polio is a paralytic disease caused by a member of the enterovirus group. The infection is spread by the faecal-oral route and is common in developing countries where poor social conditions and low standards of hygiene are prevalent. A generation ago the infection was common in Western communities but it has essentially been eradicated in such populations by vaccination. In its most common form the illness consists of symptoms of meningitis, which are then followed by the onset of muscle pain and paralysis. This may range from weakness of a single muscle to complete quadriplegia. Disability is common after symptomatic infection, but the bulbar form of the disease results in high mortality due to respiratory and circulatory collapse. Maintenance of immunity in HCW is important, particularly those contemplating working in developing countries.

Incubation period: 3 - 35 days, commonly 7-14. Period of infectivity: difficult to assess but most infectious for several days before and after onset of symptoms; virus may be found in faeces for 3-6 weeks after infection.

- *Varicella-Zoster*

This virus causes chickenpox and it may be reactivated as shingles. Chickenpox is a common infection of children and usually produces only tiredness, low-grade fever, loss of appetite and a very itchy rash consisting of small blisters. Adults who become infected with this virus may suffer from more severe symptoms and are more likely to get complications of pneumonitis or encephalitis. Once a person has been infected with this virus it stays in their body forever remaining hidden in the dorsal root ganglia, small structures of the nervous system close to the spine. In some

people, later in life, the virus can become reactivated and travel down the nerve to the skin where it produces a red and blistery skin rash called shingles or zoster. This very painful condition affects only that segment of the skin supplied by the nerve involved. Two main groups of people should avoid contact with varicella-zoster virus (VZV) if they are not immune to it. These are the immunocompromised (people whose immune systems are impaired by things such as cancer or drugs or HIV infection) and pregnant women. Immunocompromised people if infected by VZV can get an overwhelming and fatal infection. Pregnant women if infected by the virus may experience a number of problems. Firstly, they may get a more serious infection than nonpregnant people would, sometimes resulting in a severe and potentially fatal pneumonitis. Secondly, the developing foetus may be infected and suffer from the foetal varicella syndrome, a collection of birth defects including scarring of the skin, abnormally small limbs, abnormal eyes and mental retardation. Thirdly, if a pregnant woman comes down with chickenpox within several days before or after birth, her baby may suffer from a severe chickenpox infection after birth with a high mortality. VZV is spread by respiratory droplets or by contact with virus from the skin rash. It is highly infectious. The incubation period ranges from 2-3 weeks. The period of infectivity is from two days before the onset of the rash until 5 days after the appearance of the last lot of vesicles. It should be noted that a non-immune person can get chickenpox from another case of chickenpox or from someone with shingles. A person can only get shingles from reactivation of their own latent VZ virus. Immunity is gained from either natural infection or from vaccination.

Incubation period: 2-3 weeks, commonly 14-16 days. Period of infectivity: from up to 5 days before onset of rash until all lesions are crusted.

- *Human papilloma virus*

Human papilloma virus (HPV) is a common virus that infects keratinocytes of the skin and mucous membranes. It is transmitted through skin-skin contact. Most members of the papillomavirus family do not cause significant disease but females infected with particular types of HPV are at significant risk for cervical cancer. These high-risk HPVs are also associated with oropharyngeal cancer in males and females. HPV vaccines prevent infection with HPV 16 and 18 that cause most HPV-associated neoplasms. Once an HPV enters a keratinocyte there is active infection and the virus can be transmitted. Several months to years may elapse before an HPV-associated lesion becomes clinically apparent.

Community Bacterial Infections

- *Diphtheria*

This infection, caused by the bacterium Corynebacterium diphtheriae, is rarely seen in New Zealand because of vaccination. The bacterium infects the superficial tissue of the nasopharynx and sometimes further down the airways. It results in production of a very thick exudate or membrane; this, and associated inflammatory swelling, may result in death by asphyxiation. It may uncommonly produce skin ulceration. The bacterium also produces a toxin which is absorbed into the body to produce effects in the heart, (myocarditis leading to heart failure) and peripheral nerves (difficulty breathing, swallowing; muscle weakness).

Incubation period: 2-5 days. Period of infectivity: 2 weeks, sometimes 4.

- *Tetanus*

This infection occurs when hardy spores of the bacterium Clostridium tetani are introduced into a wound contaminated by soil, faeces or other organic matter. Deep puncture type wounds provide the type of anaerobic environment which favours the growth of the bacteria in the soft tissues. The bacteria produce a powerful neurotoxin which blocks inhibitory nerve impulses to skeletal muscle. This results in unopposed muscle contraction manifesting as muscle spasms. Affected patients develop lockjaw (spasms of the jaw muscles), facial spasms, neck stiffness, difficulty swallowing, trunk and leg spasms and convulsions. Muscular spasm can result in the inability to breathe, one of the causes of death in those with the infection. The spasms can continue for months requiring prolonged intensive care management. Mortality is significant, particularly in those parts of the world where intensive hospital care is not available. The disease can be actively vaccinated against using tetanus toxoid. In addition, tetanus immunoglobulin (TIG) can be used prophylactically in individuals who have not been vaccinated and who sustain a tetanus prone wound.

Incubation period: 3-21 days, average 10. Period of infectivity: Not transmitted from person to person.

- *Pertussis*

Pertussis, or whooping cough, is a respiratory infection caused by the bacterium Bordetella pertussis. Bacterial toxins damage the ciliated cells of the trachea, resulting in a severe coughing illness, which may persist for months. Classical whooping cough is described in young children as having three stages: the catarrhal stage in which increased upper respiratory tract secretions are present, the paroxysmal stage, in which severe bouts of coughing may lead to respiratory arrest, and the convalescent phase, in which coughing episodes persist for months before gradually

diminishing. The mortality of whooping cough is significant, particularly in infants less than 1 year of age. In recent years, whooping cough has become increasingly recognised as an adult infection. Routine vaccination of children between 2 months and 4 years of age has shifted the peak incidence of the infection into the adolescent years but with the majority of cases spread across adulthood. This results from a waning of vaccine-induced immunity. It is prudent for adolescents who have missed childhood pertussis vaccinations to have catch-up vaccinations. Whooping cough in adults does not usually manifest in the classical manner described in infected children and may thus be unrecognised. Maintenance of adult immunity is important, as infected adults are source of life threatening infection to infants who have not yet been vaccinated.

Incubation period: 7-20 days. Period of infectivity: highest during catarrhal stage (up to a week before coughing paroxysms) and during the following 3 weeks; for 5 days after commencement of effective antibiotics.

- *Mycobacterium tuberculosis*

Mycobacterium. tuberculosis is the cause of tuberculosis (TB), a bacterial infection usually involving the lungs but which may spread to many other tissues of the body. This bacterium is spread from actively infected patients in respiratory droplets, produced by coughing, sneezing or talking. The bacterium is highly infectious and may float in the air in the vicinity of an infected patient for a period of time even if the patient has left the area. It is estimated that a third of the world's population is currently infected with M. tuberculosis, most cases occurring in the developing world where spread is enhanced by crowded living conditions and disease results from poor resistance. In nineteenth century Europe tuberculosis was responsible for 30% of all adult deaths but the prevalence of disease has been steadily decreasing in developed countries in this century. In 1985 however epidemiologists were surprised to find that this trend was reversed and that tuberculosis was on the rise. This was attributed largely to the AIDS epidemic and to an increasing population of homeless poor in some developed countries. For these reasons, tuberculosis is still of concern to HCW in this community. Another reason for concern is the increasing resistance of M. tuberculosis to the drugs used to treat it.

Tuberculosis is a chronic disease and may exist in the host for many years without causing symptoms. This can make infection difficult to diagnose unless the disease has reached a fairly advanced state. One of the tests which is used to help detect previous infection with M. tuberculosis is the Mantoux or tuberculin test. In this test a small dose of purified protein derived from M. tuberculosis is injected superficially under the skin. In those who have been previously infected by the bacterium the immune system will produce a reaction at the injection site consisting of redness and swelling. The diameter of the area of swelling is measured 48 hours after the injection and if it is above a certain value then this indicates past infection, which may still be active. False positive reactions may be seen in people infected with nontuberculous species of mycobacteria. Previous administration of BCG (Bacillus Calmette-Guerin) vaccination may also result in a reaction at the site of a Mantoux test. Because of the potential difficulties with interpretation of the results of a Mantoux test many clinicians now recommend the use of an alternative test, interferon-gamma release assays (IGSA) such as QuantiFERON gold. This is a blood test which indicates an immune response to M. tuberculosis. It does not distinguish between latent and active TB. BCG is a vaccine consisting of live Calmette-Guerin bacilli which are attenuated Mycobacterium bovis bacteria. The vaccine is mainly useful in infants and children in parts of the world where the risk of infection is high. It does not prevent infection with M. tuberculosis but in these children it is effective in preventing clinically apparent disease and particularly deaths from tuberculous meningitis. Its usefulness in other populations is debated, particularly as the overall efficacy of the vaccine has been estimated to be only 50 per cent. Additionally, administration of the vaccine makes interpretation of a subsequent Mantoux test difficult, as the test will usually become positive and thus not useful in those suspected of being infected with TB.

Incubation period: To first demonstrable lung lesion or Mantoux seroconversion, +ve QuantiFERON gold assay 2-10 weeks. Period of infectivity: As long as viable bacteria are present in sputum, potentially for years. Infectivity ceases within several weeks of effective antimicrobial therapy commencing.

- *Methicillin-resistant Staphylococcus aureus (MRSA)*

Staphylococcus aureus is a common bacterium which lives harmlessly on the bodies of many healthy people. It is often referred to by the press as the 'Golden Staph'. S. aureus is also a virulent and dangerous pathogen and commonly causes infections such as boils and other skin infections, abscesses in many soft tissues, bone and joint infections, and infections of the blood. Most strains of S. aureus are resistant to penicillin because they can produce an enzyme called beta-lactamase which can destroy this antibiotic. Antibiotics such as methicillin, flucloxacillin and cephalexin have been produced which are resistant to this bacterial enzyme, making treatment of the above infections possible. However, there are strains of S. aureus which are resistant to even these special antibiotics and sometimes to a range of other antibiotics too. When they cause infection they may be very difficult to treat.

There are a number of types of MRSA named according to the range of antibiotics to which they are resistant and their epidemic potential within a hospital. Some strains of MRSA have a tendency to spread if introduced into a hospital environment. The introduction of one of these strains into a hospital proves very costly. Contacts and carriers need to be traced and treated where necessary to eradicate carriage of the organisms and, in the case of staff, carriage may result in many weeks off work. It has been necessary in the past to close wards until the organism can be removed from the environment using labour intensive and expensive cleaning techniques. Not only does the spread of MRSA generate large costs but it creates the risk of hospitalised patients developing S. aureus infections which may be very difficult to treat. For these reasons, students may need to have swabs taken to check for the presence of MRSA before they can go on a clinical placement or start work in a hospital.

- *Encapsulated Bacteria*

Certain bacteria are surrounded by capsules which help them to evade the host's immune defences, making these bacteria more able to produce serious infections. Two major organisms of concern are Neisseria meningitidis and Haemophilus influenzae type b. Serious disease with the latter is rarely encountered in this community now as it is vaccinated against in childhood. Neisseria meningitidis is a cause of life threatening septicaemia and meningitis which may occur in outbreaks. Invasive infection by these organisms is usually preceded by a period of asymptomatic nasopharyngeal carriage, although carriage does not mean that invasive disease will always follow. Carriers are responsible for passing the infection to others, who may develop invasive disease. The infections they produce may be severe and life threatening, particularly in debilitated people those with impaired immune systems and those who have had their spleens removed following trauma or for medical reasons. HCW may come into contact with patients suffering from infections with these bacteria and run the risk of being colonised themselves and becoming carriers. They may then pass the organism on to others or may themselves suffer from invasive infection. In the case of N. meningitidis and H. influenzae type b, HCW and others who have had significant contact with a case of invasive disease may be given a short course of antibiotics in order to eradicate the carrier state if it has been established. People who are considered to be significant contacts are:

– kissing contacts within the preceding 10 days
– household contacts within the preceding 10 days
– those who have had vomit or respiratory secretions from an active case splashed onto their faces

Incubation period (N. meningitides): 2-10 days, commonly 3-4 days . N. meningitidis period of infectivity: As long as bacteria are present in nasopharyngeal secretions; ceases within 24 hrs of commencing appropriate antibiotic therapy.

Blood-borne Viral Infections

Included in this group are a number of viruses which circulate in the blood of an infected person, in some cases for many years, and which can be transmitted to other people when they come into contact with this infected blood. The main viruses of importance in this group HBV, HCV and HIV. HCW are potentially at risk of acquiring these infections as they are in frequent contact with blood and other body fluids, which may contain the viruses.

- *Human Immunodeficiency Virus*

This virus is found in the blood of an infected person and in the following bodily fluids: breast milk, semen, cervical and vaginal fluids, saliva, tears, cerebrospinal fluid, urine, alveolar fluid and joint fluid, However, not all of these fluids have been implicated in the transmission of the virus. Most cases of transmission have been associated with blood (contaminated blood transfusions, blood products, contaminated needles in IV drug users) and with sexual intercourse. In developing countries, mother to infant transmission is a significant mode of transmission. In the occupational setting, HCW have become infected with HIV primarily from contact with blood or blood-containing bodily fluids. This is most likely to occur following penetration of the skin by a needle ("needle stick injury") or by another sharp instrument which is contaminated with blood from an infected patient, or by contact of such infected blood with mucous membranes (eyes, mouth) or nonintact skin. The estimated risk of acquiring HIV infection from a needlestick injury from an infected patient is 0.3%. Following mucous membrane contact with infected blood the estimated risk of infection is 0.09%. Following HIV infection the virus may enter a number of different cells in the body, but those most susceptible are lymphocytes, a type of white blood cell important in the immune response. Following entry of the virus into these cells, the genetic material of the virus inserts itself into the genetic material of the cell. After 3 to 6 months antibodies against HIV are produced by the infected human host and these may be measured by laboratory tests. The period following infection and the point in time when these antibodies can be detected is called the "window period". At the time of the appearance of these antibodies the host may experience a nonspecific flu-like illness called the seroconversion illness. The effect of HIV infection on the host is that the cells of the immune system are gradually destroyed, leaving the host less able to fight off infections and particular types of cancer. For a period averaging ten years, the latent period, the untreated patient may remain outwardly well while the virus continues to replicate and

destroy the immune system. When the immune system is damaged beyond a particular point the host begins to experience infections, often caused by microorganisms which do not usually cause problems in people with healthy immune systems. In addition, unusual types of cancers may be seen when these events begin to take place, the patient is said to have AIDS, the Acquired Immunodeficiency Syndrome.

To date there is no vaccine effective against HIV. A number of antiviral drugs have been shown to slow the replication of the virus and to improve the health of those infected. Following a risk exposure such as a needle stick injury from an infected patient, the use of these drugs alone or in combination for a period of several weeks can reduce the odds of infection in the recipient by 80 per cent. This is more likely to be effective if the drugs are given early after the exposure rather than later, so it is important to seek advice as soon as possible after such an injury.

Incubation period: Variable; to seroconversion illness, 5-70 days, typically 22 days; to onset of AIDS, typically 10 years.
Period of infectivity: Variable: from shortly after infection and for duration of life; influenced by viral load and effectiveness of treatment.

- *Hepatitis B Virus*

This blood borne virus is more likely to be encountered by HCW than is HIV, and it is also many more times infectious than is HIV. Fortunately however, infection with HBV can be prevented by vaccination. HBV is a virus which infects the cells of the liver. Most infections do not cause symptoms, and in those who become ill with hepatitis most recover within 6 months. Symptoms of hepatitis may be severe or mild and include headache, malaise, fever, nausea, vomiting, jaundice and abdominal pain. About 1% of cases may be fulminant, that is severe liver failure and seizures, often leading to death. A small number of cases, perhaps 10%, will become chronically infected and of this group some will develop cirrhosis (a serious form of liver damage) and some will develop cancer of the liver. Those with chronic infection are the major source of transmission to others. As the virus replicates in the liver it spills out into the bloodstream and it can be detected here and in a number of body fluids. These are semen, cervicovaginal secretions, breast milk, salvia, urine, bile, sweat, tears, cerebrospinal fluid and joint fluid. HBV is transmitted by similar routes to HIV although is much more infectious. The most common routes of transmission are sexual intercourse, sharing of contaminated needles by intravenous drug users and from mother to infant. The virus may be transmitted on objects such as toothbrushes, eating utensils, razors, baby bottles and toys. Transmission in the hospital setting may occur from patient to HCW and vice versa, and from patient to patient on contaminated equipment. The risk of transmission following a needlestick injury from an infected patient is estimated to be from 27-40% if the patient is HBeAg positive (refer to information below).

A number of tests are used to diagnose hepatitis B or to show immunity to it. During active infection, two components of the virus are usually looked for in the blood, surface antigen (HBsAg) and 'e' antigen (HBeAg). Both of these indicate that the patient is actively infected and infectious to others. The presence of HBeAg indicates high infectivity. As disease resolves these components disappear from the blood and antibodies to them appear, namely HBsAb and HBeAb. Another antibody, HBcAb, is directed against the 'core' antigen which is found in the liver during active infection but not in the blood. Those who become chronically infected do not clear the surface antigen (HBsAg) from their blood and do not develop antibody to surface antigen (HBsAb). They may also have HBeAg in the blood. Infection with HBV can be effectively prevented by the use of a vaccine The material used in the vaccine is in fact HBsAg, made in the laboratory by a harmless yeast which has been genetically engineered to produce this viral protein. The vaccine gives rise to HBsAb in those vaccinated. The course of vaccination consists of 3 injections, the second 1 month after the first and the third one at 6 months. Although the vaccine produces protective levels of HBsAb in over 90% of individuals, failure to respond to the vaccine occurs in some and is related to increasing age, obesity, smoking and injection in the buttock rather than the upper arm. For those who do not have immunity to hepatitis B and who receive a needlestick injury or other risk exposure, protection from infection is available by other means. If a risk is thought to exist, then the person receiving the needlestick can be injected with hepatitis B immune globulin (HBIG). This is HBsAb derived from the serum of people who already have high levels of HBsAb, and the process is known as passive immunisation. Administration of HBIG must be carried out within 72 hours of the exposure to be fully effective, and it is followed by a course of the vaccine. The aim of this Policy is to ensure that all students will be immune to hepatitis B in advance of any such injury occurring, so that the process of passive immunisation is not necessary.

Incubation period: 45-180 days, average 60-90 days. Period of infectivity: As long as HBsAg is present in blood; from many weeks before onset of symptoms and during the period of the acute illness; for the duration of viral carriage in those chronically infected.

- *Hepatitis C Virus*

HCV is transmitted mainly by contaminated blood or blood products, and many cases in the community were acquired from blood transfusions in the days before specific tests were available to screen blood donations for this virus. Another group at risk of acquiring hepatitis C infection is intravenous drug users sharing contaminated needles. Many people with the infection have no history of blood transfusion or IV drug use. Sexual transmission is not thought to be responsible for many cases. The infection may be transmitted from mother to baby but the rate of transmission is not high. The illness caused by HCV is very similar to that caused by HBV. However, HCV is of major concern because 50-70% of infections will become chronic infections, unlike the 10 per cent chronic infection rate with HBV. As in the case of chronic HBV infection, chronic HCV infection may lead to cirrhosis and hepatocellular carcinoma. Laboratory tests for HCV are relatively limited in their scope. Following infection there is a window period before antibodies to HCV can be detected in the blood, and this averages 6-8 weeks. The presence of HCV antibodies in a blood test gives no indication as to when the infection occurred or whether the infection is active or inactive. Another test is available to detect HCV genetic material in the blood using the polymerase chain reaction, and the presence of this indicates active viral replication in the liver. There is no vaccine against HCV, nor any form of passive immunisation although curative treatment is now available for some people with some types of HCV infection.

Incubation period: 2 weeks to 6 months, commonly 6 - 9 weeks. Period of infectivity: for several weeks before onset of symptoms and for duration of infection in chronic carriers.

Appendix B: Additional Information

Strategies to Minimise Infectious Disease Risks

Infection Control Strategies

Early in their studies students will be taught infection control strategies known as "standard and additional precautions". These include assessing the risk posed by persons with particular infections and clinical syndromes, hand washing, aseptic technique, disposal of sharps and clinical waste, use of single-use only equipment, aspects of sterilisation and disinfection of re-useable equipment, the use of personal protective equipment (such as gloves, gowns, masks and eye protection), and managing patients in various forms of isolation. Competent performance of these precautions is a key professional skill.

Transmission of Blood-borne Viruses

The risk of transmitting a blood-borne virus from an infectious HCW to a patient (or an infectious patient to a HCW) depends on several factors, including the particular virus, and the infectiousness of the infected person (the concentration of virus in the blood). The procedure being performed by the HCW is the other very important consideration. An exposure-prone procedure is any situation where there is a potentially high risk of transmitting a blood-borne virus between a HCW and a patient. In particular, exposure-prone medical or dental procedures pose a risk for direct contact between the skin (usually finger or thumb) of the HCW and sharp surgical instruments, needles, or sharp tissues (broken bone or teeth) in poorly seen or confined body sites (including the mouth) of the patient. There is evidence to suggest that incidents are more likely to occur when the procedure is being undertaken by an inexperienced clinician.

Vaccination

Vaccination provides protection against many of the infectious hazards of health care settings. Vaccines are usually highly effective but occasionally individuals may not respond. The required and recommended vaccinations for students in the Division of Health Sciences is shown in Tables 1 & 2.

Programme Requirements

Student Immunisation

The Division requires all health professional students to take the tests, immunisations and services as per Tables 1 & 2.

The Division requires all students who have a positive TB or blood-borne virus result to consult with and take the advice of the Divisional Infectious Diseases physician or his/her nominee and with the Dean or his/her representative no more than two weeks later to discuss this result and any relevant considerations on a confidential basis.

Medical Students

Medical students who test positive for a blood-borne virus or TB must make an appointment to discuss this with the Infectious Diseases physician and the Dean as above. Medical students may not be able to participate in exposure-prone procedures but adjustments may be made which will nonetheless enable them to complete the course. Students should however note that some specialist medical professions are not able to accept clinicians who test positive for blood borne viruses. Students may want to approach the Medical Council of New Zealand for further information in this regard.

Dental and Oral Health Students

Dental and oral health students who test positive for a blood-borne virus or TB must make an appointment to discuss this with the Infectious Diseases physician and the Dean as above. Where it has been determined that dental or oral health students are not able to participate in exposure-prone procedures because of their blood-borne virus status they may not be able to complete their course. Students may want to approach the Dental Council for information on the implications for registration with positive results for a blood-borne virus.

Dental Technology Students

Dental Technology students who test positive for a blood-borne virus or TB must make an appointment to discuss this with the Infectious Diseases physician and the Dean as above. Adjustments may be made to the programme which will enable them to complete the course.

Medical Laboratory Science Students

Medical Laboratory students who test positive for a blood-borne virus or TB must make an appointment to discuss this with the Infectious Diseases physician and the Head of the Programme as above. Adjustments may be made to the programme which will enable them to complete the course.

Radiation Therapy Students

Radiation Therapy students who test positive for a blood-borne virus or TB must make an appointment to discuss this with the Wellington–based nominee of the Infectious Diseases physician and the Dean/Head of Department as above. Radiation Therapy students may not be able to participate in exposure-prone procedures but adjustments may be made which will nonetheless enable them to complete the course. Students may want to approach the Medical Radiation Technologists Board for information regarding the implications for registration and subsequent practice.

Pharmacy Students

Pharmacy students who test positive for a blood-borne virus or TB must make an appointment to discuss this with the Infectious Diseases physician and the Dean as above. Pharmacy students may not be able to participate in exposure-prone procedures but adjustments may be made which will nonetheless enable them to complete the course. Students may want to approach the Pharmacy Council for information regarding the implications for registration and subsequent practice.

Physiotherapy Students

Physiotherapy students who test positive for a blood-borne virus or TB must make an appointment to discuss this with the Infectious Diseases physician and the Dean as above. Physiotherapy students may not be able to participate in exposure-prone procedures but adjustments may be made which will nonetheless enable them to complete the course. Students may want to approach the Physiotherapy Board of New Zealand for information regarding the implications for registration and subsequent practice.

Table 1: Required Immunity Assessment

Which Students	Testing for	Results held with Student Health	Further Action	Comment
Required for Year 2 BDS **Year 1 BOH** **Year 1 BDentTech** **Year 2 MB ChB** **Year 2 BPhty** **Year 2 BPharm** **Year 2 BMLSc** **Year 1 BRT**	Varicella zoster virus antibody	+ve	none	
		-ve	Vaccinations as per Ministry of Health guidelines	
	Measles/Mumps/ Rubella antibodies	+ve	none	
		-ve	MMR vaccination(s)	
	Pertussis		Boostrix (tetanus/diphtheria/ pertussis vaccine)	All students will be vaccinated not tested
	Hepatitis B antibody	+ve	none	
		-ve	In the absence of infection, vaccination & follow up as per Ministry of Health Guidelines	
	Hepatitis B surface antigen	-ve	none	
		+ve	Refer to Infectious Diseases physician for discussion re management	Refer to Infectious Diseases physician and Dean
	Hepatitis C antibody	-ve	none	
		+ve	Refer to Infectious Diseases physician for discussion re management	If further testing (HCV RNA) confirms HCV infection refer to Infectious Diseases physician and Dean
	HIV antibody	-ve	none	
		+ve	Refer to Infectious Diseases physician for discussion re management	Refer to Infectious Diseases physician and Dean
	TB testing (Quantiferon TB Gold test)	-ve	none	
		+ve	Refer to Respiratory Physician and Infectious Diseases physician for discussion re management – may suggest follow up with chest x-ray	Follow Public Health guidelines

Table 2: Other Immunisations to be considered

Which Students?	Vaccination	Further Action	Comment
All students annually	Seasonal influenza	Vaccination highly recommended	Recommended annually to protect themselves, patients and reduce community spread
All Students	Diphtheria Polio Tetanus	Vaccination required	Most students will have completed vaccination in childhood. If incomplete, catch up vaccinations or full primary course will be required
All Students	Meningococcal (relevant strains)	Vaccination recommended (currently Student Health offers options protecting against single strain C and strains ACW&Y)	Particularly recommended for those living in residential colleges or shared flats
All Students	Hepatitis A	Vaccination recommended	Recommended for health care workers exposed to faeces
Overseas electives			Other vaccinations may be recommended in particular circumstances e.g. on electives. Students undertaking overseas electives, particularly clinical electives, need to be aware of potential risks and of ways to minimise risks. This should be discussed with the Elective Co-ordinator and a specialist travel clinic at least 2-3 months prior to travel (this service is provided by Student Health Service).
Females	HPV	Highly recommended for young women	Many students will have completed vaccination

Standard Precautions & Additional Precautions

Standard Precautions are work practices required for a basic level of infection control. They include good hygiene practices, particularly washing and drying hands before and after patient contact, may include the use of protective barriers such as gloves, gowns, plastic aprons, masks, eye shields or goggles, appropriate handling and disposal of sharps and other contaminated or infectious waste, and use of aseptic techniques. Standard Precautions also apply to dried blood and other body fluids.

Standard Precautions are recommended for the treatment and care of all patients, regardless of their perceived infectious status, and in the handling of: blood, all other body fluids, secretions and excretions (excluding sweat) regardless of whether they contain visible blood

- non-intact skin
- mucous membranes

The main goal of following Standard Precautions is to minimise the risk of acquiring blood borne viruses from contact with patients. In order to make such work practices effective, it must be assumed that all patients are potentially infected with such viruses. To only follow these precautions with those patients who are known to be infected gives a false sense of security and engenders risky work practices.

Additional Precautions are used for patients known or suspected to be infected or colonised with epidemiologically important or highly transmissible pathogens that can cause infection:

- by airborne transmission (eg. Mycobacterium tuberculosis, measles virus, chickenpox virus)
- by droplet transmission (eg. mumps, rubella, pertussis, influenza)
- by direct or indirect contact with dry skin (eg. colonisation with MRSA), or with contaminated surfaces
- by any combination of these routes

Additional Precautions are designed to interrupt transmission of infection by these routes and should be used in addition to Standard Precautions when transmission of infection might not be contained by using Standard Precautions alone. Additional Precautions may be specific to the situation for which they are required or may be combined where microorganisms have multiple routes of transmission. Additional Precautions implies a two tiered approach to infection control, and assumes that in cases where transmission of infection may not be contained by Standard Precautions alone Additional Precautions will be applied in addition to Standard Precautions.

Approved by Divisional Executive: 28 November 2013