



Procedure: Immunisation

Purpose

To specify the minimum requirements and responsibilities for providing occupation related vaccinations and immunisation at the Australian National University (ANU) and to ensure compliance with the *Work Health and Safety Act 2011* (Cth) and the *Work Health and Safety Regulations 2011* (Cth) and the University's Work Health & Safety (WHS) Management System. This procedure is linked to the Australian National University's Work health and safety policy and is one of the Safe Work Procedures within the WHS Management System.

Definitions

Immunisation or vaccination is the processes of introducing a vaccine into the body to produce or enhance immunity.

Immunity is the body's resistance to disease.

Vaccine is an agent that produces specific antibodies when introduced into the body, so conferring immunity against a specific disease.

Procedure

Scope

1. This procedure applies to all staff members, student laboratory workers, and visitors undertaking research at the University.

Introduction

2. The University seeks to minimise the risk of contracting serious infections. Some occupations and activities are acknowledged as having a higher risk of infection than that faced by the general population, including;

- Medical and animal researchers and support staff
- Laboratory workers
- First aid attendants
- Staff conducting fieldwork
- Staff travelling interstate or overseas to areas where certain diseases are prevalent

- Child / adult care staff
- Gardeners, maintenance staff & cleaners

3. Receiving and maintaining the appropriate vaccination before exposure to the disease agent can reduce health risks and is one control mechanism to maintain the health and wellbeing of staff.

Consent for immunisation

4. Valid consent is defined as 'the voluntary agreement by an individual to a proposed procedure, given after sufficient, appropriate and reliable information about the procedure, including the potential risks and benefits, has been conveyed to that individual'¹.

5. As part of the consent procedure for immunisation, staff members to be vaccinated should be given sufficient information (preferably written) on the risks and benefits of each vaccine, including what adverse events are possible, how common they are and what they should do about them.

6. The individual must have sufficient opportunity to seek further details or explanations about the vaccine(s) and/or its administration. The information must be provided in a language or by other means the individual can understand. Where appropriate, an interpreter and/or cultural support person should be involved.

Staff ideologically opposed to immunisation

7. Staff identified in occupations requiring vaccinations who refuse immunisation must take responsibility for their decision and have this appropriately documented. These staff must accept that due to relevant licence conditions or an internal hazard assessment, vaccinations are a requirement in certain research fields and occupations to prevent serious illness. Their actions may restrict the work that they can undertake.

Health management

8. Staff who are immuno-suppressed, immuno-compromised, or otherwise unduly vulnerable to infection, should inform their supervisor or person responsible for microbiological safety of their condition so that appropriate action may be taken. Medical opinion may be required if working with human pathogens. Some microorganisms that are regarded as part of the normal flora of humans or animals may be pathogenic for immuno-compromised persons⁷.

9. Laboratory management shall inform all female employees of the risk to the unborn child or the pregnant woman of occupational exposure to certain microorganisms (e.g. *Toxoplasma gondii*, *Listeria monocytogenes*, cytomegalovirus, parvovirus B19, rubella virus, human immunodeficiency virus (HIV), *Coxiella burnetii* and hepatitis B, C and E

viruses) and some fungi. The precise steps taken for protection will vary, depending on the microorganisms to which the woman may be exposed. Medical opinion may be required⁷.

Responsibilities

10. The University will:

- require immunisations for relevant persons as per occupation-based recommendations in section (16-17);
- withdraw an offer of appointment if a new staff member chooses not to undertake a required vaccination; and
- withdraw a staff member from duty who chooses not to have an immunisation deemed essential for the control of the risk. The staff member will be withdrawn from the specific duty or duties relating to the risk.

11. College Deans, Research School and Service Division Directors, or their representative, will:

- undertake a hazard assessment of occupation groups and consider the need and benefit of immunisation;
- clearly notify the staff member (or potential staff members) of any vaccination requirements in employment documentation (including the [Pre-Employment Work Environment Report form](#));
- communicate jobs and student positions requiring vaccinations. Discussion about vaccination should form part of the pre-employment process. If the person is a Visiting Fellow, discussion of vaccination requirements should take place before a position is offered;
- give serious consideration to not employing a person who is medically contraindicated for a necessary vaccination, or does not wish to receive the vaccination. If the person is a Visiting Fellow, consideration should be given to not offering the position;
- offer immunisations to relevant persons (through the [University Health Service](#), their own GP or specialist medical provider);
- reimburse the cost of the occupation-based recommendations to relevant staff who undertake the required immunisation; and
- some immunisations require a period of time before immunity has been obtained. In areas of moderate or high risk relevant to an immunisation, a person's duties should be restricted until that period has lapsed or serological testing confirms immunity. The Work Environment Group can assist with the hazard assessment in this situation.

Vaccination procedure

12. Life in Australia is associated with a risk of contracting certain serious infections and for some occupations this risk may be higher than for the general population. Vaccinations are also essential for those travelling to [high risk locations](#).

13. Receiving and maintaining the appropriate vaccination before exposure to the disease agent can reduce such risks. However there are always some people who will not become immune even after a full set of vaccinations. For this reason vaccination should not be seen as a substitute for good practice, good hygiene or careful choice of lifestyle.

14. It is important to remember that many vaccinations require more than one dose, often a set period of time apart. For example, hepatitis B immunisation takes six months for the full set of vaccinations to be completed (or 21 days on a special accelerated schedule). This is particularly relevant to overseas travellers who may need a period of several months to complete the vaccinations required for their area of travel. With this in mind, it is wise to seek consultation with a doctor some time before you actually need the vaccination to take effect.

15. Vaccinations are available through consultation with a medical officer at the University Health Service, from your local doctor, or from a University appointed medical provider.

Occupation-based recommendations

16. In addition to the general recommendations, members of certain occupations are strongly advised to maintain immunity to the agents listed below. Additional immunisations may be recommended through a specific internal hazard assessment process.

17. These recommendations may be modified at any time through changes to the Australian Immunisation recommendations.

Table 1 – recommended immunisations for University staff, student laboratory workers and visitors undertaking research¹. For further information refer to the [Australian Immunisation Handbook](#)¹.

Occupation	Immunisation Recommended
Medical / Paramedical / Forensic laboratory worker	Tetanus#, hepatitis A & B*, influenza, Note 1, 2, 3,5,6
Laboratory worker	Tetanus#, Note 1, 2, 3 & 6
First aid officer / Contact sportsperson	Tetanus#, hepatitis A & B*

/ Referee of contact sport	
Animal worker	Tetanus#, influenza, Note 2, 3, 5, 6
Field worker (Australia)	Tetanus#, hepatitis A & B*, Note 3
Field worker (Overseas)	Tetanus#, hepatitis A & B*, Note 4
Work related (overseas) travel	Note 4
Cleaner / Housekeeper / Security officers / Laundry staff	Tetanus#, influenza, hepatitis A & B*
Gardener / Horticulturist	Tetanus#, hepatitis A & B*, Polio
Plumber/Drainer/Building maintenance	Tetanus#, hepatitis A & B*
Child care worker / Teacher of children	Tetanus#, varicella (if non-immune), hepatitis A & B*, influenza, MMR (if non-immune), Pertussis (dTpa)
Medical student	Tetanus#, hepatitis A & B*, influenza, Note 7

Given as ADT (Adult diphtheria and Tetanus) vaccine-Tetanus toxoid vaccine is only to be used if diphtheria toxoid is contraindicated.

* Serological testing following Hepatitis B vaccination (to ensure the worker has a sufficient level of immunity) is required for these occupation groups.

Note 1: Plus other immunisation relevant to the work being undertaken (e.g. rubella, tuberculosis, smallpox, influenza, varicella) as recommended by your medical officer or as according to AS/NZS 2243.3 2010, internal hazard assessment or imposed licence condition. Follow-up of immunisation via serological testing to ensure immunity may be necessary in some cases. Consult your health care provider for details.

Note 2: Plus Q-fever vaccination if working with sheep, cattle, goats or kangaroos. Also recommended for laboratory personnel handling specimens from these animals, and veterinary workers. Plus any other vaccinations relevant to the work being undertaken,

such as hepatitis A & B if the work involves human blood or body fluids. Follow-up of immunisation via serological testing to ensure immunity may be necessary in some cases (in particular hepatitis B, and Q-fever). Consult your health care provider for details.

Note 3: A rabies vaccination (for protection against Australian Bat Lyssavirus) is recommended for any animal, laboratory, or field worker likely to come into contact with bats.

Note 4: Plus other immunisation relevant to the location of travel or the work being undertaken (e.g. tuberculosis, cholera, typhoid, meningitis, yellow fever, Japanese encephalitis, rabies, malaria prophylaxis) as recommended by your doctor. An alternative source of information for travellers is a traveller's health clinic that provides vaccination and advice specific to your region of travel. For example: <http://www.travelclinic.com.au/>

18. The University travel advice page is available at: <https://services.anu.edu.au/human-resources/business-travel>

19. It is also useful to check the Department of Foreign Affairs and Trade website: <http://www.dfat.gov.au/> or <http://www.smartraveller.gov.au/> for specific information for the country to which you are travelling.

Note 5: Animal workers and researchers who come into contact with non-human primates should be immunised against tetanus, diphtheria, polio, hepatitis A & B and tuberculosis.

Note 6: Any laboratory or animal workers who are involved with research on vaccinia virus shall consult the sections 38 - 68 of this procedure.

Note 7: It is recommended that students in the medical school be considered medical workers under this policy. Students from the medical school seeking clinical placement should also consult: https://policies.anu.edu.au/ppl/document/ANUP_000420.

Occupational Vaccination Considerations

20. The vaccination process for new staff may be commenced as soon as practical after the employment contract is signed/accepted.

21. There will be some situations in which staff are unwilling or unable to be vaccinated for one of a variety of reasons. For staff ideologically opposed to vaccinations, information is presented above. For current staff who are medically advised against a specific vaccine:

- Consideration should be given to restricting those staff from duties relevant to the vaccination.
- Consideration should be given to not accepting any person as a first aid officer who is medically contraindicated, or who does not wish to receive the recommended immunisations.

General immunisation recommendations

22. All adults in the Australian community are advised to maintain their immunity to tetanus, diphtheria, pertussis (whooping cough), polio, measles and mumps.
23. Adult Diphtheria and Tetanus (ADT) vaccination is recommended at age 15 to 16 years and then not again until 50 years of age unless travelling or injured with a tetanus prone wound i.e. compound fractures, deep penetrating wounds, wounds containing foreign bodies (especially wood splinters), contusions (bruises), abrasions (grazes), burns, superficial wound obviously contaminated with soil, dust or horse manure-especially if washing and cleaning of the skin is delayed more than four hours).
24. Influenza vaccination and pneumococcal vaccination is recommended, and free, to all adults over 65 years of age, Indigenous people over 15 years of age, pregnant women and any person ≥ 6 months of age with specific underlying medical conditions that put them at increased risk of severe influenza.
25. Rubella is more common in males than females therefore adolescent and young adult males as well as females should receive MMR vaccine both for their own protection and to prevent transmission of the disease in the community.

Common Diseases Controlled by Vaccination

26. Diphtheria: An acute, infectious disease caused by toxigenic *Corynebacterium diphtheriae*, which primarily affects the upper respiratory tract. The death rate following infection is about 10%. A completed course of vaccination provides total protection for many years.
27. Hepatitis A: An acute liver infection, which does not result in chronic liver damage. Hepatitis A Virus (HAV) is quite persistent in the environment and can survive on hands and food for relatively long periods. In young children it is usually a mild or asymptomatic illness, symptoms become more severe in older adolescents and adults. HAV is the leading vaccine-preventable disease among travellers to endemic areas. The disease is endemic in some indigenous communities in Australia. It is also the leading vaccine-preventable disease among childcare and preschool staff and vaccination of these staff should be mandatory. Any staff such as plumbers or maintenance staff who may come into contact with sewerage are at increased risk and should be vaccinated. Hepatitis A vaccine can be administered in conjunction with hepatitis B vaccine where necessary.
28. Hepatitis B: The hepatitis-B virus is endemic worldwide. The infection has a long incubation time (up to 5 months) and exerts chronic and serious effects on the liver, with death rates up to 20%. Hepatitis-B requires direct transmission from contaminated blood or body fluid to the blood or body fluid of the recipient (e.g. by transfusion of contaminated blood, by use of contaminated syringes, by sexual transmission, or by contact of blood with broken skin).

29. Influenza: An acute respiratory disease with other associated symptoms. Secondary complications of pneumonia can occur. The elderly and people with chronic disease are at particular risk of mortality associated with influenza. The vaccine should be given routinely to those aged 65 and over, and to those aged 50 and over of Aboriginal or Torres Strait Island descent. The vaccine is available for all groups of people who wish to have it, and other groups such as carers should also receive the vaccination.
30. Measles: An acute illness due to a morbilli virus invasion via the respiratory tract. Measles is highly infectious with an incubation period of about 10 days. Measles is often a severe disease with complications of bronchopneumonia (4% of cases), otitis media (2.5%), and encephalitis (0.05%). The last complication often produces permanent brain damage.
31. Mumps: An acute illness caused by infection by a paramyxovirus. Orchitis occurs in 20% of clinical mumps cases in post-pubertal males, but it is usually unilateral and sterility is rare. Another rare complication is nerve deafness.
32. Polio: An acute illness resulting from the invasion of the gastro-intestinal tract by poliovirus. The infection may lead to paralysis. Polio remains endemic in many developing countries. In Australia the last case of wild polio was in 1978, since then there have been two vaccine-associated cases. The small risk of vaccine-associated polio does not outweigh the benefits of vaccination.
33. Q fever: An acute illness lasting 1 to 3 weeks, possibly including symptoms of hepatitis and pneumonia, and potentially resulting in substantial weight loss. There may be chronic effects of the infection including a prolonged fatigue syndrome. Up to 600 infections are reported in Australia each year. Infection may be transmitted through infected (apparently healthy) animals - both domestic and wild. Exposure occurs through inhalation of infected aerosols, often dust, and the organism can be found in the milk, excreta and placenta of infected animals. According to the Australian Immunisation Handbook veterinarians, laboratory workers and others exposed to cattle, sheep, goats and kangaroos and their products or specimens should be vaccinated.
34. Rubella: The rubella virus generally produces only a mild disease in the adult or child, often only causing a transient skin rash. However, the disease during pregnancy may produce serious congenital defects in the unborn baby. Infection during the first trimester is the period of greatest risk for the foetus but there is also a small risk of hearing defects and delayed development following maternal infection up to the 20th week. Rubella is spread by droplet infection and the incubation period is 14-21 days.
35. Tetanus: An acute disease (10% fatality rate in Australia) caused by the toxin produced by *Clostridium tetani*, which grows anaerobically at an injury site. Penetrating wounds containing foreign bodies, wounds associated with soil, dirt or manure, and burns are the greatest risk, but tetanus can follow trivial, even unnoticed wounds. Active

immunisation is the best protection against tetanus. Only 52% of adults aged over 50 in Australia are immune, and the majority of cases result from people aged over 55. A completed course of vaccinations provides total protection for many years; consult your doctor for the recommended course of vaccination.

36. Tuberculosis: Usually manifests in the form of a lung disease. About 1000 cases a year occur in Australia, however most of these are from migrants. The vaccine is rarely used in Australia, although it may be necessary for some travellers or health care workers. Consult your doctor or travellers health clinic for detailed information on individual situations.

37. Varicella (Chickenpox): A highly contagious illness which is usually mild and of short duration in healthy children. Severity and mortality are increased in adults and immunocompromised people. Mortality rate in children is 0.1-0.4%, however in the immunocompromised this rises to 7-10%. Most people are exposed during childhood (75%) however some adults and adolescents remain susceptible. The vaccine is highly recommended for non-immune people who work with children, are health care workers, women prior to pregnancy and parents.

Vaccinia

38. When indicated by research licence conditions or an internal hazard assessment, vaccination against vaccinia virus is a requirement. The document '[Vaccination of Laboratory Staff Working with Vaccinia](#)' must be consulted.

39. Staff at ANU who come into contact with vaccinia virus through their work are advised to be vaccinated against the virus, as per current Australian recommendations and legislative requirements^[1, 7, and 12].

40. Staff are currently advised to receive revaccination every 10 years.

Vaccinia Vaccine and Side Effects

41. The current vaccinia vaccine used in Australia is a live virus that is capable of replicating in human cells and causing a usually mild illness. The vaccine confers immunity to other viruses in the genus Orthopoxvirus (eg monkeypox, cowpox, smallpox)^[1]. Side effects and adverse reactions to the vaccine are wide ranging in type and severity.

42. Some of the more common and less severe reactions may be^[1]:

- Most frequently, inadvertent inoculation at other sites of the body can occur. This happens when the person touches the vaccination site and then touches, for example, their eye.
- A fever – this is less common among adults than children.

43. Some of the moderate and severe adverse reactions may be:

- Eczema vaccinatum – a localised or systemic dissemination of vaccinia, occurring most commonly in people with a history of eczema or some other skin conditions.
- Generalised vaccinia – a generalised rash that can vary in extent and is generally self-limiting except in those who may have underlying immunodeficiency.
- Progressive vaccinia – progressive necrosis in the vaccination area, which may spread to other areas of the body. Very serious, however occurs almost exclusively among those with an underlying immunodeficiency.
- Further basic information on side effects from the vaccination is available in the information sheet: [‘Smallpox vaccine, what you need to know’](#) ^[13]

Strains of Vaccinia

44. Various strains of vaccinia virus are used in the laboratory for experimental purposes.

45. Standard and recombinant vaccinia strains are capable of replicating in human cells, and thus can cause illness in humans. Examples of these strains include: Copenhagen, Lister, NYCBOH, Wyeth and WR ^[1]. Laboratory-acquired infections with standard and recombinant vaccinia strains have been reported in the literature ^[3-7].

46. Some strains of poxviruses have been developed that are highly attenuated, host restricted and replicate either not at all or poorly in human cells. Examples of these strains include: MVA, NYVAC, ALVAC and TROVAC ^[1]. These highly attenuated strains of poxvirus do not result in productive infection in humans.

47. Australian information and recommendations on vaccinia virus vaccination can be found in the Australian Immunisation Handbook ^[1], and AS/NZS 2243.3. The Immunisation Handbook recommends that the only current indication for vaccination with vaccinia/smallpox vaccine in Australia is for laboratory workers using live vaccinia virus. AS/NZS 2243.3 reinforces this by also recommending vaccination in these circumstances. The Australian recommendations do not differentiate between the more virulent and the highly attenuated strains of vaccinia.

48. In America, the Advisory Committee on Immunisation Practices (ACIP) has written a document ^[2] on the use of vaccinia vaccine. This document includes information on use of the vaccine to protect laboratory workers who handle vaccinia virus. It is much more comprehensive than any Australian information available on the subject.

49. The ACIP recommends vaccinia vaccine for ‘laboratory workers who directly handle a) cultures or b) animals contaminated or infected with, non-highly attenuated vaccinia virus or other Orthopoxviruses that infect humans’ ^[2]. Laboratory workers who handle only highly attenuated strains of vaccinia virus, or who handle the Avipoxvirus strains ALVAC and TROVAC do not require routine vaccination.

50. International opinion is divided as to the necessity and usefulness of vaccination of laboratory workers using vaccinia. There has been speculation that even in a vaccinated worker an exposure through, for example, a splash to the eye or a needlestick injury, may still result in a local infection ^[3,8]. In the documented cases of laboratory acquired vaccinia infection ^[3-7] no deaths have been recorded.

51. In the case of the University it is felt that the decision to be vaccinated should be made by the individual involved, after detailed advice and counselling.

52. The advice to revaccinate workers every 10 years has also been closely questioned, and there is much international discussion on the usefulness of revaccination. Recent papers ^[9,10] have questioned the necessity of revaccination, citing older examples that indicate that smallpox immunity after a single vaccination is long lasting, possibly for decades. The 10-year revaccination recommendation appears to be somewhat arbitrary and does not seem to be based on any concrete epidemiological or immunological data (personal communication, A/Prof Mark Slifka, 5/8/04). There are some indications that repeated vaccination has very little additional effect on top of the initial vaccination ^[9], and even several vaccinations did not achieve much higher levels of antibodies in the long term compared to just one or two vaccinations. A booster vaccination may be of some assistance however if the initial vaccination is suboptimal ^[10]. Most adverse effects from vaccination occur during the primary vaccination; booster vaccinations have a much lower rate of side effects ^[2].

53. Another recent paper ^[11] presents evidence that smallpox vaccination does not increase risk of heart related complications. However it recommends continuing to exclude anyone with pre-existing heart problems from vaccination unless there are compelling reasons for vaccination.

Vaccinia vaccination recommendations

54. Considerations involving staff who will work with vaccinia virus should begin before employment with the pre-employment questionnaire and medical screening.

55. Jobs and student positions requiring dealing with vaccinia virus and potential vaccination should be advertised as such, and;

56. Discussion about vaccinia and the vaccination should form part of pre-employment medical screening. Consideration should be given to not employing a person who is medically contraindicated for vaccination, or does not wish to receive the vaccination, in a position that handles standard or recombinant live vaccinia virus, or animals infected with the virus.

57. For those current staff who are medically advised against being vaccinated strong consideration should be given to restricting those staff from duties involving handling of standard and recombinant live vaccinia virus, or animals infected with the virus. The

implications of a laboratory-acquired infection with vaccinia virus, in a person who is medically contraindicated from vaccination could be severe. This group of people could be at risk for the most serious complications of infection.

58. Staff working directly with standard and recombinant strains of vaccinia virus cultures and vaccinia virus infected animals must receive mandatory counselling by a doctor approved by the local budget unit, and; then if appropriate must be offered the vaccinia vaccine.

59. Staff who work with highly attenuated strains of vaccinia virus are not required to receive vaccination with vaccinia vaccine, however they should still receive counselling and information if requested. 52. Prior to staff being sent for counselling and potentially vaccination, they should be provided with the following documents from the CDC for their information: Smallpox vaccine – What you need to know ^[12]

60. New staff members should read this procedure before their appointment for counselling so that they are prepared to raise any questions or concerns.

61. It is desirable for the local ANU business unit to record;

- Which of those staff who handle vaccinia have received counselling for the vaccination and;
- Whether or not they were subsequently vaccinated.

62. Feedback in writing should be requested from the treating doctor as to which staff were or were not vaccinated. No reasons for staff not being vaccinated should be requested, as this would breach patient confidentiality.

63. A formalised agreement between the ANU and the doctor who administers the vaccination needs to be implemented. This agreement should set out the details of the procedure for counselling and vaccination, along with follow-up procedures.

64. Booster vaccination should still be offered to staff after 10 years given the lack of current knowledge on this subject. This recommendation should be reviewed at regular intervals and kept in line with current knowledge.

65. Regardless of vaccination status, all staff who handle vaccinia virus must wear protective eyewear with side shields whenever handling viable virus or animals infected with the virus.

66. One of the most serious potential incidents involving laboratory staff and vaccinia virus is contamination of the eye leading to an eye infection and potentially blindness. It is possible that even vaccinated individuals may still become infected in this situation, so eye protection is mandatory for all staff handling the live virus, or handling animals infected with the virus.

67. Regardless of vaccination status, all staff who handle vaccinia virus must cover any breaks in skin integrity with a waterproof dressing in addition to wearing gloves.

68. If an incident involving a laboratory worker being exposed to vaccinia were to occur, the first point of contact for treatment should be the University Medical School, who will be able to provide guidance in identifying the appropriate medical practitioner for assistance.

Regulatory obligations

69. The Gene Technology Act and associated Regulations may impose licence conditions upon researchers, including the need for certain vaccinations (as recommended by the AS/NZS2243.3⁷). In this situation, staff are required to be immunised or be restricted from duties relevant to the vaccination.

70. In the specific case of vaccination against vaccinia virus, the document 'Vaccination of Laboratory Staff Working with Vaccinia' must be consulted.

Record keeping

71. Records of staff vaccinations should be maintained on personnel files.

72. [A form](#) outlining vaccination history, is available and may be used to record/document immunisation. A copy of vaccinations certificates or a letter from a medical officer may be satisfactory.

Sources

Legal and other requirements
<i>Work Health and Safety Act 2011 (Cth)</i>
<i>Work Health and Safety Regulations 2011 (Cth)</i>
<i>Safety, Rehabilitation and Compensation Act 1988 (Cth)</i>
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