Ashford and St. Peter's Hospitals
NHS Foundation Trust

OCCUPATIONAL HEALTH DEPARTMENT MEDICATION & VACCINATION POLICY

Author: Dwayne Gillane – Occupational Health Nurse Consultant

In consultation with: Nadine Williams, Occupational Health Manager
Lisa Jackson, Deputy Chief Pharmacist
Dr Clive Grundy - Consultant Microbiologist
Dr Marian Burling -Occupational Health Physician

Status: Approval date: 24th November 2011

Ratified by: Drugs & Therapeutic Committee

Review date: January 2020

Patients first • Personal responsibility • Passion for excellence • Pride in our team

History

Issue	Date Issued	Brief Summary of Change	Author
1	Nov 2011	New policy	Dwayne Gillane
2	Nov 2013	First review	Nadine Williams
3	Jun 2017	Addition of Boostrix – IPV for post exposure prophylaxis Change of Drug used on HIV PEP Raltegravir Removal of Rifampcin and the addition of Ciprofloxacin for post exposure prohylaxis - meningococcal meningitis Addition of Clarithromycin for post exposure prophylaxis – Pertussis Addition of Permethrin 5% for post exposure prophylaxis - Scabies	Nadine Williams

For more information on the status of this document, please contact:	Nadine Williams, Occupational Health Manager
Policy Author	Dwayne Gillane
Department/Directorate	Occupational Health
Date of issue	June 2017
Review due	January 2020
Ratified by	Drugs & Therapeutics Committee
Audience	All Occupational Health staff administering medicine & vaccines

ASHFORD & ST. PETER'S HOSPITAL NHS FOUNDATION TRUST

OCCUPATIONAL HEALTH MEDICATION / VACCINATION POLICY

See also: **Medicines Management Policy**
Health clearance for Tuberculosis, hepatitis B, Hepatitis C and HIV New healthcare workers (DH 2007)

CONTENTS

1. INTRODUCTION

The Trust is committed to protecting the health, safety and welfare of its employees. We recognise that workplace immunisation programmes are essential to help reduce both the number of susceptible Health Care Workers (HCW) and the attendant risks for transmission of these diseases to other workers and patients.

This policy is based upon guidance from the Association of National Health Occupational Physicians (ANHOPS) Immunisation of Health Care Workers so as to promote a consistent immunisation approach and the Department of Health 'Immunisation against Infectious Disease, The Green Book' (2006). It also aims to comply with NICE and other authoritative guidelines.

1.1 Occupational Health & The Medicines Act

In accordance with the Medicines Act Occupational Health operate an Occupational Health scheme and as a result do not require Patient Group Directive (PGD's) in order to supply or administer medicines to employees. Under the Prescriptions Only Medicines (Human Use) Order 1997 (http://www.legislation.gov.uk/uksi/1997/1830/schedule/5/made) exemptions exist regarding prescription only medicines sold or supplied to a person operating an **occupational health scheme** in response to an order in writing signed by a doctor or a registered nurse.

The following 2 conditions apply;

(1) The supply shall be in the course of an occupational health scheme.

(2) The individual supplying the prescription only medicine, if not a doctor, shall be a registered nurse acting in accordance with the written instructions of a doctor as to the circumstances in which prescription only medicines of the description in question are to be used in the course of the occupational health scheme.

Appendix 1 lists the current medications / vaccinations included in the Occupational Health scheme which will be signed by the Occupational Health Physician.

2. PURPOSE

Due to contact with patients and infective material from patients, HCWs (Doctors, nurses, other medical personnel, students, laboratory technicians, volunteers and administrative staff) are at risk from exposure to and transmission of vaccine preventable disease. Maintaining the immunity/protection forms an important part of preventing infection within an infection control programme for HCWs.

The purpose of immunisation of HCWs is:

a) To protect HCW from any occupational risk of contracting communicable disease that is preventable by vaccination.
b) To protect patients and colleagues from acquiring vaccine preventable diseases from an infected HCW.
c) A corollary of the above policy is to identify and protect HCWs who may not have received immunisations recommended for general use or who may need immunisations for overseas travel in relation to work.

2.1 Definition of a HCW

Employees who work within a Healthcare setting and may be directly or indirectly involved with patient care. For the purposes of occupational risk, following categories of HCWs are defined:

a) HCWs including those in primary care who have regular clinical contact with patients (Doctors, nurses, dentists, physiotherapists, radiographers, porters, occupational therapists and students)
b) Laboratory workers and other staff like mortuary staff, who have direct contact with potentially infections clinical specimens and may be exposed to pathogens in the laboratory.
c) Non-clinical staff who may have administrative contact with patients but not usually or a prolonged or closed nature (e.g. receptionists, ward clerks, maintenance engineers, cleaners, etc)

It is important to remember that employee movement occurs within these groups and different immunisation recommendations may apply. If a job change occurs the immunisation needs would need to be reviewed as part of a new work health assessment process by Occupational Health.

2.2 Definition of 'Immunity/Immune'

For the purpose of this policy these terms do not mean a guarantee from contracting the illness or complete protection. It often means that antibodies are present indicating past natural infection or response to vaccination. The correlation of level of antibodies and protection is not clear. Presence of antibodies does not equate to complete protection or immunity, but for the purpose of this document this term is used to indicate accepted immunity/protection/response to vaccination.

3 DUTIES / RESPONSIBILITIES

3.1 The Trust

The Trust has a specific duty to protect, so far as is reasonable practicable, those at work and others that may be affected by their work such as, contactors, visitors, etc. Within the health and safety legislation there is a requirement for employers to assess the risks to staff and others.

3.2 Trust Employees

All HCWs have a duty of care towards themselves, their patients and colleagues, which includes taking reasonable precautions such as receiving vaccinations to protect themselves from communicable disease. Furthermore health professional bodies including NMC and GMC recognise the need for staff to have immunisations for vaccine preventable disease and consider this to be an ethical duty.

3.3 Occupational Health

To ensure that all staff are up to date with their appropriate vaccination schedules and immunisation programmes are being adhered to. For that reason all staff will be assessed as part of the Occupational Health clearance process for new posts and when changing posts within the Trust.

Where applicable to the role Occupational Health will also inform Human Resources (HR) whether an individual is fit to undertake exposure prone procedures (EPP) or not.

3.4 Pharmacy

To ensure availability of vaccines for staff immunisation programmes as outlined in Appendix 1.

4 SPECIAL CONSIDERATIONS & CONTRAINDICATIONS

Almost all individuals can be safely vaccinated with all vaccines. In very few individuals, vaccination is contraindicated or should be deferred. Where there is doubt, rather than withholding vaccine, advice should be sought from an appropriate Consultant Physician and/or Microbiologist, or Consultant in health protection e.g. Public Health England

All vaccines are contraindicated in those who have had:

- a confirmed anaphylactic reaction to a previous dose of a vaccine containing the same antigens, or
- a confirmed anaphylactic reaction to another component contained in the relevant vaccine, e.g. neomycin, streptomycin or polymyxin B (which may be present in trace amounts in some vaccines).

Administration of live vaccines including MMR, Varicella, Yellow Fever and BCG, may be temporarily contraindicated in individuals who are:

- pregnant
- immunosuppressed

It is essential therefore that these risks are discussed and documented with the HCWs in order to raise the awareness and achieve better compliance.

4.1 Pregnancy

Live vaccines should not be given to pregnant women due to the theoretical concern that vaccinating pregnant women with live vaccines may infect the foetus. Live vaccines should generally be delayed until after delivery. Termination of pregnancy following inadvertent immunisation is not recommended.

Since inactivated vaccines cannot replicate they cannot cause infection in either the mother or the foetus. However, inactivated vaccines should be administered to pregnant women only if protection is required without delay.

If yellow fever vaccination is required due to travel to a high risk area the pregnant women should be advised not to travel to the high-risk area. When travel is unavoidable, the risk from the disease and the theoretical risk from the vaccine have to be assessed on an individual basis. WHO states that the vaccine may be considered after the sixth month of pregnancy and should be administered if the destination risk is high (WHO, 2004). Two studies in which pregnant women have been vaccinated demonstrated no adverse foetal outcomes (Nasidi *et al*., 1993; Tsai *et al*., 1993), but transplacental transmission has occurred in early pregnancy (Tsai *et al*., 1993). A slightly increased risk of spontaneous abortion in women vaccinated in early pregnancy has been suggested (Nishioka *et al*., 1998). Antibody titres following vaccination are lower in pregnant women (Nasidi *et al*., 1993). Women who continue to be at risk once the pregnancy is completed should be revaccinated.
Inadvertent vaccination during early pregnancy is not an indication for termination (Monath, 2004).

When considering if those medications held in Occupational Health are suitable for staff further Specialist advice may need to be sought if the individual is or could be pregnant.

4.2 Breast-feeding

There is no evidence of harm to the baby from vaccination of the breast-feeding mother with inactive vaccines.
Breastfeeding is not a contraindication to administration of live vaccines include BCG, MMR, Varicella, or Yellow fever.

- MMR vaccine can be given to breast-feeding mothers without any risk to their baby. Very occasionally, rubella vaccine virus has been found in breast milk, but this has not caused any symptoms in the baby (Buimovici-Klein *et al.,* 1997; Landes *et al*., 1980; Losonsky *et al*., 1982).
- Varicella vaccine studies have shown that the vaccine virus is not transferred to the infant through breast milk (Bohlke *et al*., 2003) and therefore breast-feeding women can be vaccinated if indicated.
- While there is a theoretical risk that yellow fever vaccine virus is excreted in breast milk, vaccination should be considered in cases where there is a real risk to the mother from yellow fever disease.

When considering if those medications held in Occupational Health are suitable for staff further Specialist advice may need to be sought if the individual is breastfeeding.

4.3 Immunocompromised HCWs

Before they are exposed to medications / vaccinations, an assessment of the severity of immune suppression must be done by their treating physician. Severe immuno-suppression can be the result of many illnesses – HIV, leukaemia, lymphoma, malignancy, congenital immune-deficiency or therapy with anti-malignancy agents, radiation, large doses of steroids. Degree of immuno-suppression will differ depending on the condition afflicting the HCW, the stage of the illness and disease progression.

Immune-compromised HCWs and their physician should consider risks of exposure to vaccine preventable disease together with the risks of vaccination. Liaison with a specialist caring for the specific employee may be beneficial in such times.

4.4 Steroid Therapy

The dose and duration of systematically absorbed corticosteroids needed to suppress the immune system of an otherwise healthy person is not well defined. Steroid therapy usually does not contraindicate administration of live virus vaccine such as MMR and its component vaccines when:

- Therapy is short term (less than 14 days)
- Low to moderate dose administered daily on alternate days
- The long term alternate day treatment with short acting preparations
- Maintenance of physiological replacement therapy
- Topically the skin or eyes by aerosol or intra-articular or bursal injection.

A steroid dose that is equivalent to or greater than a prednisone dose of 20mgs per day is considered sufficiently immune-suppressive to cause concerns about the safety of administrating live virus vaccine.

HCWs who take more than this dose daily or on alternate days for an interval of greater than or equal to 14 days should avoid vaccination with live vaccines for at least one month after cessation of steroid therapy. Prolonged or extensive topical or local steroid therapy that may lead to immune suppression should also be considered for postponing immunisation with live virus for at least one month after cessation of therapy.

Persons who receive steroid doses equivalent or greater than or equal to 20mgs per day or prednisone during an interval of less than 14 days generally can receive live vaccines immediately after cessation of therapy although some may prefer waiting until

two weeks after completion of therapy.

Persons who have had disease that in itself suppresses the immune response and are also receiving steroid therapy should not receive live vaccine.

4.5 HIV Infected HCWs

In general symptomatic HIV infected persons have sub-optimal immunological responses to vaccines. Response to both live and killed antigens may decrease as the disease progresses. Administration of high dose of vaccine or more frequent boosters to HIV infected patients may be considered. However, because neither the initial immune response to a higher dose of vaccine nor the persistence of antibody in HIV infected patients has been systematically evaluated recommendations are difficult to be made. Serology confirmation of immunity should be sought were possible to inform the basis of the risk assessment for the infected HCW.

5 PROGRAMME FOR CATCH UP VACCINATION

When new guidelines are published, implementation to include existing employees will be considered. Rolling/opportunistic programmes for catch-up will ensure optimum immunisation level and will be addressed to the highest risk areas first.

- At Trust Induction employees will be advised that their duty of care requires them to be responsible for their health and avail themselves of immunisation where recommended.
- Risk prioritisation: Immunise HCWs in those groups that are considered at high risk for that disease and then gradually expand to include all other groups as recommended.

6 MANAGING DISEASE OUTBREAKS / CONTACT TRACING

This is discussed in each disease section where appropriate. Recent outbreaks of mumps or varicella have been experienced in certain parts of UK.

- Lists of exposed HCWs to be obtained by manager and sent to OH.
- Relevant recorded immunity to be checked and if needed check serology for immunity in those HCWs with no/doubtful information.
- Offer timely immunisation where appropriate.
- Keep away from work if infected.

6.1 Work restrictions

Incubation periods in HCWs is tabulated at the end of all disease discussions. The decision to be kept off work will come from Occupational Health who may liaise with a Consultant Microbiologist.

7 OCCUPATIONAL HEALTH VACCINES

The following vaccinations are offered by Occupational Health to Trust staff
BCG
Cholera
Diphtheria, Polio & Tetanus (DPT)
Diphtheria, Polio, Pertussis, Tetanus
Hepatitis A
Hepatitis B
Influenza (Pandemic & Seasonal)
Japanese Encephalitis
Measles, Mumps & Rubella (MMR)

Meningococcal ACWY
Rabies
Tick-borne Encephalitis
Typhoid
Varicella (also know as Chicken Pox)
Yellow Fever

This policy will provide a detailed section on each of the above vaccines including vaccination schedule, administration, use, contraindication / cautions, side effects.

8 VACCINATION CONSENT

The OH practitioner will complete the electronic or paper general consent for vaccination form (See Appendix 2) for all workplace vaccines as listed above except the Influenza vaccine.

Where the following vaccines are being given for Travel health related purposes **Cholera, Diphtheria, Polio & Tetanus (DPT), Hepatitis A, Hepatitis B, Japanese Encephalitis, MMR, Meningococcal ACWY, Rabies, Tick-Borne Encephalitis, Typhoid, Yellow Fever** a separate Pre-Travel Health questionnaire and associated vaccination consent form will need to be completed (See Appendix 3).

Occupational Health staff will use either the www.travax.nhs.uk or the www.nathnac.org travel health websites to ensure the vaccine recommended for travel are up to date with current guidance.

OH staff will complete a specific influenza (pandemic or seasonal) vaccination consent form when administering this vaccine. (See Appendix 4).

The vaccine information leaflet will be offered to staff receiving vaccines.

Travel health vaccination information will be provided to staff members on an individual basis depending on the vaccines required and the destination(‘s) involved.

9 VACCINE STORAGE

All vaccines, and where applicable their diluents, will be stored in the original packaging at +2◦C to +8◦C and protected from light.
No vaccines will be frozen and any that are frozen must be disposed of in accordance with Trust guidelines.

Occupational Health will monitor both the minimum and maximum fridge temperature on a daily basis and record this on a temperature chart in line with Trust policy and to ensure adhere NaTHNaC yellow fever vaccine storage requirements.

10 VACCINE ADMINISTRATION

All vaccines given in Occupational Health will be administered by either a Registered Nurse or Doctor.

Occupational Health operates a single nurse vaccine administration procedure with all it’s vaccines.

Vaccines are administered by one of four routes, oral, intra muscular, deep subcutaneous or intradermal injection.

- Oral vaccines include: Cholera
- Intra-muscular injections include; Diphtheria, Polio and Tetanus; Hepatitis A; Hepatitis B; Influenza vaccine (Seasonal & Pandemic); Japanese Encephalitis; Meningoccoal ACWY; MMR; Rabies; Tick-Borne Encephalitis; Typhoid, Pertussis.
- Deep sub cutanous injections include; Varicella and Yellow Fever.
- Intradermal injections include BCG vaccines.

However for individuals with a bleeding disorder, the vaccine should be given by deep subcutaneous injection to reduce the risk of bleeding.

Any new member of staff will be required to complete the Occupational Health Medication /Vaccination Policy competency form (see Appendix 1).

Vaccines should not be administered where a contraindication has been identified, please refer to the individual vaccine contraindication sections below.

Live vaccines such as BCG, MMR, Varicella, Yellow Fever, can be given together ideally in difference limbs but if given in the same limb, they should be given at least 2.5 cm apart. If live vaccines cannot be administered simultaneously a four week interval is recommended.

Where applicable, if there are more specific recommendations made regarding administration of a vaccine these will be highlighted in the individual vaccination section below.

11 VACCINE SIDE EFFECTS / ANAPHYLAXIS

The most commonly reported reactions post vaccinations are pain, redness and rash at the injection site. Generalised symptoms such as fever and rash can also occur.

The Resuscitation Council UK in 2008 highlight that from 1992 – 2001 there were 24 cases of drug induced anaphylaxis none of which are listed as immunisation vaccines.

The DH Green Book – Immunisation against infectious diseases states ‘Anaphylactic reactions to vaccines are extremely rare but have the potential to be fatal. Between 1997 and 2003, there were 130 reports to the Medicines and Healthcare products Regulatory Agency (MHRA) of anaphylaxis or anaphylactic-type reactions following immunisation (excluding the meningitis C campaign), although no deaths as a result of the reaction were reported. In that time, around 117 million doses of all vaccines were supplied to hospitals and GPs. This rate (**approximately one per million vaccine doses**) is similar to that reported from other countries’ (Bohlke *et al*., 2003; Canadian Medical Association, 2002).

Onset of anaphylaxis is rapid, typically within minutes, and its clinical course is unpredictable with variable severity and clinical features. Due to the unpredictable nature of anaphylactic reactions it is not possible to define a particular time period over which all individuals should be observed following immunisation to ensure they do not develop anaphylaxis.

Occupational Health staff should refer to the department Anaphylaxis protocol as set out by the UK Resuscitation Council.

12 VACCINATION / IMMUNISATION PROGRAMME TRAINING

Both existing Occupational Health staff and any new member of staff will be required to complete and pass the NHS Immunisation and Vaccination Programme (developed by the HPA) e-learning modules available at http://www.skillsforhealth.org.uk/core-learning-unit

The Occupational Health Manager will also ensure that

- at least one member of staff attends the ½ day refresher NaTHNaC Yellow Fever vaccination course every 2 years to adhere to Yellow Fever vaccination centre requirements.
- at least one member of staff has attended a recognised vaccination course for example TREC (Travel related Health education and Care) Travel health courses.

13 BCG (Bacillus Calmette-Guèrin) Vaccine

Tuberculosis (TB) is an infection caused by a bacterium from the Mycobacterium tuberculosis complex which may affect any part of the body. The most common form is pulmonary TB with accounts for almost 60% of all cases in the UK.

The symptoms of TB are varied and depend on the site of the infection. General symptoms include:

- Fever
- Loss of appetite
- Weight loss
- Night sweats
- Fatigue/lethargy
- Persistent cough.

Immunisation with BCG is used to protect against tuberculosis (TB), for individuals at increased risk of developing the disease and/or of exposure to TB. The vaccine contains live attenuated strain derived from Mycobacteruim bovis which reacts with the immune system to protect the individual against infection with the bacteria that causes TB.
BCG vaccine cannot completely prevent infections that cause TB.

13.1 Recommended use of BCG vaccine

- BCG vaccination should be offered to all health care workers and Laboratory Staff who will have contact with patients, clinical materials or derived isolates who:
- Are previously unvaccinated. ie unable to supply documented evidence of previous BCG and/or does not have a visible BCG scar
- Have a documented negative (0-5mm) reaction to Mantoux test in the last 3 months, or Negative IGRA blood test result and negative HIV blood serology
- Subjects who give a history of, or have evidence of, previous BCG immunisation should not be re-immunised.

13.2 BCG vaccine Storage

The unreconstituted vaccine and its dilutent should be stored in the original packaging at +2◦C to +8◦C and protected from light.
The vaccine is usable for up to four hours at room temperature after reconstitution.
Rubber stopper does not contain latex.

13.3 BCG Vaccine Dosage and Schedule

- Bacillus Calmette-Guèrin (BCG) Danish strain 1331 vaccine powder and solvent for injection (SSI brand, multidose vial with diluents)

- A single dose vaccine of 0.1 ml for adults administered intradermally
- Revaccination is not recommended

13.4 BCG Vaccine Contraindications

Exclusion Criteria

- No valid consent
- Current acute febrile illness
- Currently receiving TB treatment or past history of TB disease
- Previously vaccinated with BCG
- Individuals with an induration of >6mm following Mantoux (SSI) tuberculin skin testing (Mantoux positive) or positive IGRA blood test result
- Individuals who are immunocompromised by virtue of disease or treatment, e.g. Patients receiving corticosteroid or other immunosuppressive treatment including general radiation. (Inhaled steroid are not a contraindication).Those suffering from a malignant condition such as lymphoma, leukaemia, Hodgkin's disease or other tumour of the reticuloendothelial system.
- General septic skin conditions
- HIV positive individuals
- Pregnancy
- Other live vaccinations given within 4 weeks (ie MMR, Varicella-Zoster, Yellow fever)
- Known to be hypersensitive to any component of the vaccine

The risk to the individual of not being immunised must be taken into account.

13.5 BCG Vaccine Administration

- The vaccine must be suspended with the Diluted Suton SSI solvent only – DO NOT SHAKE the vaccine vial.
- The powder might be difficult to see due to the small amount in the vial.
- Sunlight should be avoided
- The solution is stable for 4 hours at room temperature following reconstitution.

13.6 BCG Vaccine - Intradermal Injection Technique

Skin is stretched between thumb and forefinger and needle (size 25G or 26G) inserted (bevel upwards) for about 3mm into superficial layers of dermis (almost parallel with surface).
Needle should be short with short bevel (can usually be seen through epidermis during insertion). Tense raised blanched bleb showing tips of hair follicles is a sign of correction injection: 7 mm bleb = 0.1 ml
If considerable resistance not felt, needle too deep and should be removed and reinserted before giving more vaccine.
To be injected at insertion of deltoid muscle onto humerus (keloid formation more likely with sites higher on arm) tip of shoulder should be avoided.

No further immunisation should be given in the arm used for BCG immunisation for at least 3 months because of the risk of regional Lymphadenitis (see section below 15.6 Side Effects).

13.7 BCG Vaccine Side Effects

Following intradermal administration of BCG, normally a local reaction develops at the immunisation site within two to six weeks, beginning as a small papule which increases

in size for a few weeks widening into a circular area up to 7mm in diameter with scaling, crusting and occasional bruising. Occasionally a shallow ulcer up to 10mm in diameter develops.
It is not necessary to protect the site from becoming wet during washing and bathing, but should any oozing occur, a temporary dry dressing (not a plaster) may be used until a scab forms.
If essential an impervious dressing may be applied but only for a short period (for example, to permit swimming) as it may delay healing and cause a larger scar. The lesion slowly subsides over several months and eventually heals leaving only a small, pale, flat circular scar.

Severe injection site reactions, large ulcers and abscesses are most commonly caused by faulty injection technique where part or all of the dose is administered too deeply

Keloid formation at the injection site is an uncommon and largely avoidable, complication of BCG immunisation. Most experience has been gained in the use of the upper arm and it is known that the risk of keloid formation is increased many fold when the injection is given at a site higher than the insertion of the deltoid muscle near the middle of the upper arm

Injections made too deeply are not the only cause, but most likely to increase the risk of lymphadenitis with or without suppuration and discharge

Fever, headache, enlarged regional lymph nodes are uncommon.

Rarely anaphylactic reactions and disseminated BCG infection

Refer to current manufacture's SPC for full details and Green Book chapter on Tuberculosis.

All suspected adverse reactions after the administration of the vaccine should be reported to the Commission on Human Medicines (CHM), using the yellow card system, as the drug carries a black triangle ▼ symbol.

13.8 BCG vaccine – Cautions

- The vaccine must be suspended with the Diluted Suton SSI solvent only – DO NOT SHAKE the vaccine vial
- The dilutant must always be measured out as although 1ml is stated on the vial there is a surplus
- The rubber stopper of the vaccine must not be wiped with any antiseptic or detergent. If alcohol is used to swab the rubber stopper of the vial, it must be allowed to evaporate before the stopper is penetrated with syringe needle
- Staff should take great care when handling with vaccine. If spillage occurs i.e. on skin, this should be washed off immediately. If splashed in the eye, wash out with water/saline about 10 times and report incident to Health and Safety Executive (HSE)
- Injections made too deeply increase the risk of lymphadentitis and abscess formation

13.9 BCG Additional Information

- Eczema is not a contraindication to BCG vaccination, however a vaccination site free from lesions should be chosen.
- BCG can be given up to 3 months following a negative tuberculin test (providing

contact has not been made with an infectious case of TB)

- BCG vaccination can be given simultaneously with inactive or live vaccines including combined MMR (although these should not be given in the same arm), otherwise an interval of at least FOUR weeks should normally be allowed between the two.
- It is advisable not to give further vaccinations in the arm used for BCG vaccinations for 3 months because of the risk of regional lymphadenitis
- BCG takes approximately six weeks to build an immune response to TB
- One vial of reconstituted BCG vaccine SSI contains 1ml, corresponding to 10 doses for adults – total number of doses obtained may vary dependant on technique.

13.10 Post BCG Vaccination Advice

- During formation of scab: keep injection site clean and dry. If site actively discharging can apply waterproof dressing before bathing and swimming
- Supply a BCG vaccine after care advice sheet (See Appendix 5).

13.11 BCG Vaccine – Adverse Reactions Referral arrangements

The following reactions from BCG vaccination require immediate referral for medical assessment and management:

i) Severe local reactions (ulceration >10mm, caseous lesions, abscesses or drainage at the injection site), or regional suppurative lymphadenitis with draining sinuses.

ii) Disseminated BCG infection

Refer to current Green Book chapter on tuberculosis for full details on management of adverse reactions

14 CHOLERA

Cholera is an acute diarrhoeal illness caused by the gram-negative bacterium *Vibrio cholerae*. Following colonisation of the small bowel, *V. cholerae* produces an enterotoxin that causes secretion of fluid and electrolytes and leads to painless, watery diarrhoea. Cholera is characterised by the sudden onset of profuse, watery stools with occasional vomiting. In severe disease, dehydration, metabolic acidosis and circulatory collapse may follow rapidly.

Untreated, over 50% of the most severe cases die within a few hours of onset; with prompt, correct treatment, mortality is less than 1%. Mild cases with only moderate diarrhoea also occur and asymptomatic infection is common. The incubation period is usually between two and five days but may be only a few hours.

The disease is mainly water-borne through ingestion of faecally contaminated water or shellfish and other foods. Person-to-person spread may occur through the faecal–oral route. The risk to travellers even in infected areas is very small.

14.1 Cholera Vaccine

Oral, killed cholera vaccine (Dukoral®) is the only licensed cholera vaccine available in the UK. It contains 1mg of recombinant cholera toxin B (rCTB) in a liquid suspension of four strains of killed *V. cholerae* O1, representing subtypes Inaba and Ogawa and biotypes El Tor and classical (25×10^9 bacteria in each batch). This suspension is mixed with buffer and water as indicated below.

The vaccine is thiomersal-free, It is inactivated and does not contain the A subunit of the cholera toxin which is responsible for the pathogenicity of the toxin.

14.2 Cholera Vaccine – Administration

Oral cholera vaccine is supplied as approximately 3ml of a whitish suspension in a glass vial. A sachet of sodium hydrogen carbonate as white granules is also supplied and should be dissolved in approximately 150ml of cool water in a disposable plastic cup. The solution should obtain a colourless, slightly opalescent fluid.
For adults, the whole 150ml of buffer solution should be used. (See Figure 1 below)

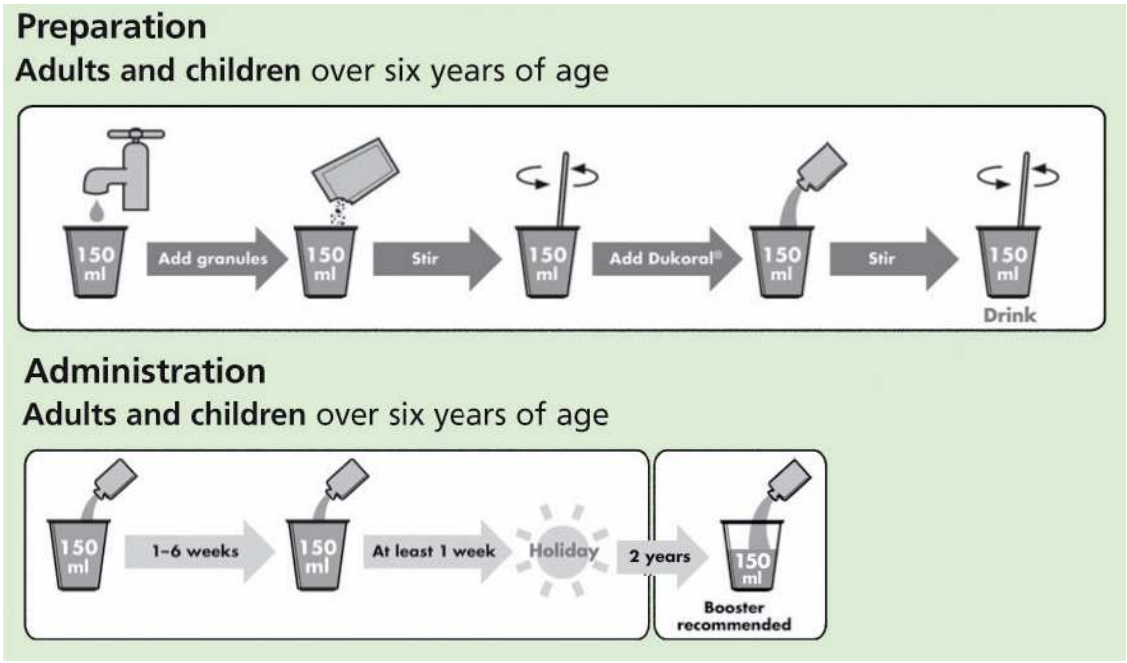


Figure 1 Preparation & Administration of oral cholera vaccine

The vaccine must be drunk within two hours of reconstitution.

Cholera vaccine can be given at the same time as injected vaccines.

14.3 Cholera Vaccine – Schedule

Adults and children over six years of age
The standard primary course of vaccination with this vaccine against cholera consists of two doses with an interval of at least one week but less than six weeks between doses.

Primary Course
First dose of vaccine on day 0.
Second dose between one and six weeks after the first dose.
Each dose of vaccine should be dissolved in 150ml of the prepared buffer solution.

Reinforcing Dose
For continuous protection against cholera, a single booster dose is recommended two years after completing the primary course for adults

The primary course of the immunisation must be restarted if more than six weeks have elapsed between the first and second doses or if more than two years have elapsed since the last vaccination.

The need to repeat a primary course of the immunisation is unique to this vaccine.

No clinical data are available on the protective efficacy of this vaccine against cholera after administration of booster doses.

14.3 Cholera Vaccine Recommended Use

The objective of the cholera immunisation programme is to protect those who are most at risk of serious illness or death from the disease. Cholera vaccine is indicated for active immunisation against disease caused by *V. cholerae* serogroup O1 in adults and child travellers from two years of age who are considered at risk for cholera. General estimates of travellers' risk of cholera based on imported cases into Europe and North America are in the order of two to three per million travellers (Mahon *et al.*, 1996; Morger *et al*., 1983; Wittlinger *et al.*, 1995; Sánchez and Taylor, 1997).

Immunisation against cholera can be considered for the following categories of traveller (JCVI, 2004):

- relief or disaster aid workers
- persons with remote itineraries in areas where cholera epidemics are occurring and there is limited access to medical care.

Individual risk assessment is essential, based on area of travel and any underlying health conditions.

No traveller should be required to demonstrate vaccination against cholera. Officials at a few remote borders may occasionally ask people travelling from infected areas for evidence of immunisation. Travellers who are likely to cross such borders, especially overland, should be advised to carry a signed statement on official paper that cholera vaccine is not required (Lea and Leese, 2001).

Individuals at occupational risk

Vaccine is recommended for laboratory workers who may be regularly exposed to cholera in the course of their work. This would normally only include those working in reference laboratories or in laboratories attached to infectious disease units.

14.4 Cholera Vaccine Contraindications

There are very few individuals who cannot receive oral cholera vaccine when it is recommended.

The vaccine should not be given to those who have had:

- a confirmed anaphylactic reaction to a previous dose of oral cholera vaccine, or
- a confirmed anaphylactic reaction to formaldehyde or any of the components of the vaccine.

14.5 Cholera Vaccine Precautions

Minor illnesses without fever or systemic upset are not valid reasons to postpone immunisation.

If an individual is acutely unwell, immunisation may be postponed until they have fully recovered

Vaccination should be delayed in individuals suffering from acute gastro-intestinal illness. Pre-existing gastro-intestinal disorders are not a contraindication to giving the vaccine.

Pregnancy and breast-feeding

No data are available on the safety of oral cholera vaccine in pregnant or breast-feeding women. There is no evidence of risk from vaccinating pregnant women or those who are breast-feeding with inactivated viral or bacterial vaccines or toxoids (Plotkin and Orenstein, 2004). If the risk of cholera is high then the vaccine should be

considered in these circumstances.

Immunosuppression and HIV infection
Individuals with immunosuppression or with HIV infection (regardless of CD4 counts) should be considered for cholera vaccination in accordance with the recommendations above. However, these individuals may not develop a full antibody response if they are immunosuppressed, and vaccine protective efficacy has not been studied. Specialist advice may be required in which case Occupational Health will liaise with the Consultants in the Blanche Heriot Unit.

14.6 Cholera Vaccine Side Effects

Adverse events described in trials comparing individuals taking oral cholera vaccine with those ingesting buffer without the vaccine were comparable and in the range of 11% to 14% (Sánchez *et al*., 1997).
More than 1 million doses of this vaccine have been sold in Sweden and Norway. Based on passive reporting from clinical trials and post-marketing surveillance, mild gastro-intestinal symptoms (abdominal pain, cramping, diarrhoea, nausea) are the most commonly reported symptoms occurring at a frequency of 0.1% to 1%.
Serious adverse events, including a flu-like syndrome, rash, arthralgia and paraesthesiae are rare, occurring in fewer than one per 10,000 doses distributed (Summary of Product Characteristics, 2004).

15 DIPHTHERIA, POLIO & TETANUS, PERTUSSIS

Diphtheria is an acute infectious disease affecting the upper respiratory tract and occasionally the skin caused by the diphtheria toxin.
Transmission – droplet infection and through contact with infected articles solid by infected persons. Incubation is from 2 to 5 days, persons with untreated disease are infectious for up to 4 weeks
Symptoms; membranous pharyngitis with fever, enlarged anterior cervical lymphnodes and oedema of soft tissue giving a ‘bull neck’ appearance.

Polio is an acute illness that follows invasion through the gastro intestinal tract by one of three seortyps of polio virus, (serotypes 1,2 and 3)
Transmission – contact with faeces or pharyngeal secretions of an infected person.
Incubation ranges from 3 to 21 days but can be excreted up to 3-6 weeks in faeces and 2 weeks in saliva.
Symptoms; range in severity from a fever to aseptic meningitis or paralysis. Headache, gastrointestinal disturbance, malsise and stiffness of the back and neck may occur.

Tetanus is an acute disease caused by the tetanus toxin.
Transmission – Tetanus spores are present in soil and manure and transmission to humans is normally through a puncture wound, burn or scratch. Incubation ranges from 4 to 21 days but is most commonly around 10 days.
Symptoms; generalised rigidity, spasms of the skeletal muscles including lockjaw and neck stiffness.

Pertussis also known as Whooping Cough is a highly infectious disease that is caused by Bordetella Pertussis. A similar illness is caused by B, Para pertussis, but this is not preventable with presently available vaccines.

There is an initial catarrhal stage, followed by an irritating cough that gradually becomes paroxysmal, usually within one to two weeks. The paroxysms are often followed by a characteristic ‘whoop’ or by vomiting. In young infants, the typical ‘whoop’ may never develop and coughing spasms may be followed by periods of apnoea. The

illness often lasts for two to three months. In older children and adults, the disease may present as persistent cough without these classic symptoms and therefore not be recognised as whooping cough.

Pertussis may be complicated by bronchopneumonia, repeated vomiting leading to weight loss, and cerebral hypoxia with a resulting risk of brain damage. Severe complications and deaths occur most commonly in infants under six months of age. Minor complications include subconjunctival haemorrhages, epistaxis (nosebleeds), facial oedema, ulceration of the tongue or surrounding area, and suppurative otitis media.

Transmission of the infection is by respiratory droplet, and cases are most infectious during the early catarrhal phase. The incubation period is between six and 20 days and cases are infectious from six days after exposure to three weeks after the onset of typical paroxysms.

15.1 Diphtheria, Polio & Tetanus combined vaccine (REVAXIS) & Recommended Use

Revaxis vaccine is an inactive vaccine and does not contain any live organisms.

Revaxis should be used where protection is required against DPT in order to provide long term protection against all three diseases.

15.2 REVAXIS Dosage & Schedule

All staff should have received their primary courses of vaccination against Td/IPV. Where it is identified that this has not been given a primary course should be administered

The primary course of DPT vaccination consists of three doses of a Revaxis with an interval of one month between each dose. DPT is recommended for all individuals aged ten years or over. If the primary course is interrupted it should be resumed but not repeated, allowing an interval of one month between the remaining doses.

Individuals aged ten years or over who have only had three doses of a diphtheria-containing vaccine should receive the first diphtheria booster combined with tetanus and polio vaccines.

The second booster dose of DPT should ideally be given to all individuals ten years after the first booster dose. Where the previous doses have been delayed, the second booster should be given provided a minimum of five years have elapsed between the first and second boosters. This will be the last scheduled opportunity to ensure long-term protection.

If a person attends for a routine booster dose and has a history of receiving a vaccine following a tetanus-prone wound, attempts should be made to identify which vaccine was given. If the vaccine given at the time of the injury was the same as that due at the current visit and was given after an appropriate interval, then the routine booster dose is not required. Otherwise, the dose given at the time of injury should be discounted as it may not provide long-term protection against all antigens, and the scheduled immunisation should be given. Such additional doses are unlikely to produce an unacceptable rate of reactions (Ramsay *et al.*, 1997).

15.3 REVAXIS Contraindications

There are very few individuals who cannot receive diphtheria-containing vaccines.

The vaccine should not be given to those who have had:

- a confirmed anaphylactic reaction to a previous dose of a DPT containing vaccine, or
- a confirmed anaphylactic reaction to any of the components of the vaccine.
- a confirmed anaphylactic reaction to neomycin, streptomycin or polymyxin B (which may be present in trace amounts).

15.4 REVAXIS Side Effects

Pain, swelling or redness at the injection site are common and may occur more frequently following subsequent doses. A small, painless nodule may form at the injection site; this usually disappears and is of no consequence. The incidence of local reactions is lower with diphtheria vaccines combined with acellular pertussis vaccines than with whole-cell pertussis vaccines, and similar to that after DT vaccine (Miller, 1999; Tozzi and Olin, 1997).

Fever, convulsions, high-pitched screaming, and episodes of pallor, cyanosis and limpness (HHE) occur rarely but with equal frequency after both DTaP and DT vaccines (Tozzi and Olin, 1997).

Confirmed anaphylaxis occurs extremely rarely

All suspected adverse reactions to vaccines occurring in individuals of any age to vaccines labelled with a black triangle (▼), should be reported to the Commission on Human Medicines through the Yellow Card scheme. Serious, suspected adverse reactions to vaccines in adults should be reported through the Yellow Card scheme.

15.5 Diptheria, Tetanus, Pertussis and Poliomyelitis – Boostrix – IPV and Recommended Use for Health Care Workers

Boosterix- IPV – IPV vaccine is an inactive vaccine and does not contain any live organisms.

Boostrix should be used where protection is required against whooping cough for Health Care Workers, Public Health England (2016) In addition to parents, other adults in close contact with vulnerable young infants including healthcare workers may be responsible for transmission. Serological studies suggest that infection in healthcare workers can be frequent, but often unrecognised. Outbreaks in healthcare settings may be prolonged due to waning immunity in adults, with multiple opportunities for secondary and tertiary transmission.

As such, specific guidance for the public health management of pertussis incidents in healthcare settings is also available. Likely transmission from healthcare worker to patient and vice versa has frequently been described, although the greatest risk of nosocomial transmission is likely to be from a healthcare worker to a patient or other member of staff.

A 5 year analysis of clusters of pertussis infection in France revealed that the most frequent reports of healthcare associated clusters were from paediatric, maternity and neonatal units.

Due to the risk of ongoing transmission to individuals vulnerable to severe or complicated pertussis, healthcare staff and any other individuals working with infants or pregnant women are therefore considered a priority group for public

health action.

A booster dose of an acellular pertussis-containing in the event of exposure, contacts over 10 years (many of whom would only have been eligible to receive a 3-dose primary course), whether they be unvaccinated, partially or fully immunised, are likely to benefit from a dose of pertussis-containing vaccine, especially given their role in transmission. Public Health England (2016).

15.5.1 Boostrix – IPV Dosage & Schedule

1 dose (0.5ml) Boostrix IPV given intramuscularly into the upper arm as chemoprophylaxis to Health Care Workers.
As chemoprophylaxis should be offered to contacts within 21 days of significant exposure to Health Care Workers who have not received a booster dose of pertussis containing vaccine in the preceding 5 years and no Td-IPV in the preceding month.

Boostrix –IPV Vaccine contains a low dose diphtheria and tetanus to avoid the higher rate of side effects observed with full dose preparations.

Diphtheria Toxoid:
>2IU

Tetanus Toxoid:
>20IU

Pertussis Agents:
Pertussis Toxoid 8ug
Filamentous Haemagglutinin 8ug
Pertactin 2.5ug

Inactivated Poliovirus
Type 1 40 D antigen units
Type 2 8 D antigen units
Type 3 32 D antigen units

(Absorbed on aluminium hydroxide and aluminium phosphate. Trace amounts neomycin, polymyxin)
Vaccine is thiomersal free.

Suitable for pregnancy

15.5.2 Boostrix IPV Contraindications

There are very few individual who cannot receive pertussis containing vaccines.
The vaccine should not be given to those who have had:
A confirmed anaphylactic reaction to a previous dose of pertussis containing vaccine

or
A confirmed anaphylactic reaction to neomycin, streptomycin or polymyxin B (which may be present in tract amounts).

Minor illness without fever or systemic upset is not a valid reason to postpone vaccination.

15.5.3 Boostrix Side Effects

Local and or general reactions are less frequent after acellular than whole cell pertussis vaccines. Pain swelling or redness at the injection site is common. A small painless module may form at the injection site; this usually disappears and is of no consequence.

Confirmed anaphylaxis occurs extremely rarely

Fever, convulsions, high-pitched screaming, and episodes of pallor, cyanosis and limpness (HHE) occur rarely but with equal frequency after both DTaP and DT vaccines (Tozzi and Olin, 1997).

Confirmed anaphylaxis occurs extremely rarely

All suspected adverse reactions to vaccines occurring in individuals of any age to vaccines labelled with a black triangle (▼), should be reported to the Commission on Human Medicines through the Yellow Card scheme. Serious, suspected adverse reactions to vaccines in adults should be reported through the Yellow Card scheme.

16 HEPATITIS A

Hepatitis A is an infection of the liver caused by hepatitis A virus. The disease is generally mild, but severity tends to increase with age.

Transmission - Usually by the faecal–oral route through person to person spread or contaminated food or drink

Symptoms - Jaundice may occur in 70–80% of those infected as adults. Fulminant hepatitis can occur but is rare. The overall case–fatality ratio is low but is greater in older patients and those with pre-existing liver disease. There is no chronic carrier state and chronic liver damage does not occur.

The incubation period is usually around 28–30 days but may occasionally be as little as 15 or as much as 50 days.

16.1 Hepatitis A Vaccines

Monovalent Hepatitis A Vaccines

Although there are 4 Monovalent Hepatitis A vaccine available Havrix®, Vaqta® Avaxim®, and Epaxal® vaccine, OH usually administer Avaxim ® vaccine. Where this vaccine is unavailable suitable alternatives may be sought by Pharmacy as these vaccines can be used interchangeably.

Combined Hepatitis A & Hepatitis B vaccine

Combined vaccines containing purified inactivated hepatitis A virus and purified recombinant hepatitis B surface antigen adsorbed onto aluminium hydroxide (Twinrix®) or aluminium phosphate (Ambirix®), may be used when protection against both hepatitis A and hepatitis B infections is required.

If rapid protection against hepatitis A is required for adults, for example following exposure or during outbreaks, then a single dose of monovalent vaccine is recommended as this contains the higher amount of hepatitis A antigen and will therefore provide hepatitis A protection more quickly than Twinrix.®

Combined Hepatitis A & Typhoid vaccine

Combined vaccines containing purified inactivated hepatitis A virus adsorbed onto aluminium hydroxide and purified Vi capsular polysaccharide typhoid vaccine (Hepatyrix® or ViATIM®) may be used where protection against hepatitis A and typhoid fever is required (See Section 21 on Typhoid).

16.2 Hepatitis A Vaccine Recommended Use

Most healthcare workers are not at increased risk of hepatitis A and routine immunisation is not indicated. Hepatitis A vaccination is usually recommended for the following groups:

- **laboratory workers:** individuals who may be exposed to hepatitis A in the course of their work, in microbiology laboratories and clinical infectious disease units, are at risk and must be protected.

- **sewage workers:** raw, untreated sewage is frequently contaminated with hepatitis A. A UK study to evaluate this risk showed that frequent occupational exposure to raw sewage was an independent risk factor for hepatitis A infection (Brugha *et al*., 1998). Immunisation is, therefore, recommended for workers at risk of repeated exposure to raw sewage, who should be identified following a local risk assessment. E.g. Plumbers.

- **People travelling to or going to reside in areas of high or intermediate prevalence:** for those aged one year and over travelling to areas of moderate or high endemicity, such as the Indian subcontinent, for prolonged periods, particularly if sanitation and food hygiene is likely to be poor. Vaccine is also recommended for all individuals going to reside in or likely to be posted for long periods to hepatitis A virus-endemic countries.

16.3 Hepatitis A Vaccine Dosage & Schedule

Dosage for Monovalent Hepatitis A immunisation

Vaccine product	Ages	Dose	Volume
Havrix Monodose®	16 years or over	1440 ELISA units	1.0ml
Avaxim®	16 years or over	160 antigen units	0.5ml
Vaqta Paediatric®	One to 17 years	~25 units	0.5ml
Epaxal®	One year or over	500 RIA units	0.5ml

Dosage of Combined Hepatitis A and Typhoid vaccines

Vaccine product	Ages	Dose HAV	Dose Vi P ty	Volume
Hepatyrix®	15 years or over	1440 ELISA units	25µg	1.0ml
ViATIM®	16 years or over	160 antigen units	25µg	1.0ml

The immunisation regimes for hepatitis A vaccine and for combined hepatitis A and typhoid vaccine consist of a single dose.

Dosage of Combined hepatitis A and hepatitis B vaccines

Vaccine product	Ages	Dose HAV	Dose HbV	Volume

Twinrix Adult®	16 years 720 ELISA units or over	20µg	1.0ml

The standard schedule for the combined hepatitis A and hepatitis B vaccine depends on the product. For Twinrix® the schedule consists of three doses, the first on the elected date, the second one month later and the third six months after the first dose.

An accelerated schedule of Twinrix Adult® at 0, 7 and 21 days may be used when early protection against hepatitis B is required (e.g. for travellers departing within one month).

16.4 Hepatitis A Primary Immunisation Schedules

The primary immunisation course for hepatitis A vaccine and for combined Hepatitis A and typhoid vaccine consists of a single dose.
Protection from a primary course of single or combined vaccines lasts for at least one year.

16.5 Hepatitis A Immunisation For Travel

Hepatitis A vaccine should preferably be given at least two weeks before departure, but can be given up to the day of departure. Although antibodies may not be detectable for 12–15 days following administration of monovalent hepatitis A vaccine, the vaccine may provide some protection before antibodies can be detected using current assays.

16.6 Hepatitis A Reinforcing (Booster) immunisation

A booster dose of hepatitis A vaccine should be given at 6 to 12 months after the initial dose. This results in a substantial increase in the antibody titre and will give immunity beyond ten years. Until further evidence is available on persistence of protective immunity, a further booster at 20 years is indicated for those at ongoing risk (Van Damme, 2003).

Where a combined hepatitis A and typhoid vaccine has been used to initiate immunisation, a dose of single antigen hepatitis A vaccine will be required 6 to 12 months later in order to provide prolonged protection against hepatitis A infection.

For individuals who have received combined hepatitis A and B vaccine in an accelerated schedule, a booster dose is required at 1 year.

16.7 Delayed administration of the Reinforcing (Booster) immunisation

Ideally, the manufacturers' recommended timing for the administration of the booster dose of hepatitis A vaccine should be followed. In practice, and particularly in infrequent travellers, there may be a delay in accessing this injection. Studies have shown that successful boosting can occur even when the second dose is delayed for several years (Landry *et al*., 2001; Beck *et al*., 2003), so a course does not need to be re-started.

16.8 Hepatitis A vaccine Contraindications

There are very few individuals who cannot receive hepatitis A-containing vaccines. When there is doubt, appropriate advice should be sought from a consultant paediatrician, immunisation co-ordinator or local HPU rather than withholding vaccine.

The vaccine should not be given to those who have had:

- a confirmed anaphylactic reaction to a previous dose of a hepatitis A-containing

vaccine, or

- a confirmed anaphylactic reaction to any component of the vaccine.

Epaxal should not be given to those who have had a confirmed anaphylactic hypersensitivity to egg products as a component of the vaccine is prepared on hens' eggs.

16.9 Hepatitis A vaccine Side Effects

Adverse reactions to hepatitis A vaccines are usually mild and confined to the first few days after immunisation.

The most common reactions are mild, transient soreness, erythema and induration at the injection site. A small, painless nodule may form at the injection site; this usually disappears and is of no consequence.

General symptoms such as fever, malaise, fatigue, headache, nausea and loss of appetite are also reported less frequently.

Serious, suspected adverse reactions to vaccines should be reported through the Yellow Card scheme.

17 HEPATITIS B

Hepatitis B is an infection of the liver caused by the hepatitis B virus (HBV). Acute infection may occasionally lead to fulminant hepatic necrosis, which is often fatal.

Symptoms include:
Anorexia & nausea; Ache in the right upper abdomen; Mild Fever; Malaise; Jaundice with progressive darkening of the urine and lightening of the faces;

The HBV is transmitted by parenteral exposure to infected blood or bodily fluids and mostly occurs;

- Through vaginal or anal intercourse
- As a result of a blood to blood contact e.g. sharing or needles and other equipment by injecting drug users, inoculation injuries including Needlestick/sharps injuries, human bites, scratches, splash injuries.
- Through perinatal transmission from mother to child.

There is a 30% risk of infection from Hepatitis B through inoculation injuries where the exposed person is not immune to HBV.

Incubation period 40 - 160 days with an average of 60 – 90 days.

Occupational Health recommend that any employee who may come into contact with blood or bodily fluids during the course of their work consider receiving the HBV vaccination to reduce their risk of contracting the HBV.
Examples of staff include; All Medical and Nursing staff, Housekeeping/Domestic staff, Porters, All Laboratory staff, Mortuary technicians, SDU staff, Physiotherapist, Radiographers, etc.

17.1 Hepatitis B Vaccination

Energix B and Hep B Vac Pro are a recombinant vaccine, they do not contain live organisms and it cannot cause HBV.

Energix B and Hep B Vac Pro are indicated for active immunisation against HBV. *It can be expected that Hepatitis D will also be prevented by immunisation with Hepatitis B vaccine as Hepatitis D does not occur in the absence of HBV infection.*

About 85-90% of adults respond to the three doses of the vaccine. Poor response is associated with being over 40 years of age, obesity and smoking.

76.2 Hepatitis B vaccine Dosage

Energix B 20 µg dose vaccine in 1.0 ml suspension is intended for use in subjects 16 years of age and above.

Hep B Vac Pro 10 µg vaccine in 1.0 ml suspension is intended for use in subjects 16 years of age and above.

17.3 Hepatitis B vaccine Schedules & Post Serological Testing

Two primary immunisation schedules can be recommended for use. Schedule 1 is used for the routine HBV vaccination programme and Schedule 2 is recommended for use as an accelerated course where an employee has sustained an inoculation injury and has no record of receiving HBV vaccination in the past.

Schedule 1 is a course of three vaccinations given at;

- 0,1 and 6 months
- Hepatitis B Surface Antibody (Anti-HBs) screen between 8 – 12 weeks post the 6 month vaccination.

Schedule 2 is an accelerated course of vaccinations given at:

- 0,1,&2 months
- Anti-HBs screen between 8 – 12 week post the 2 month vaccination
- Booster dose of vaccine at 12 months post first vaccine.

- A Hepatitis B vaccine booster is recommended at 5 years post completion of a primary vaccination course and post

- A further Hepatitis B booster is recommended post Inoculation Injury exposure, Occupational Health will recommend a hepatitis B booster to Trust staff where one has not been received within the past 12 months.

17.4 Hepatitis B vaccine Immune response & Action required

Depending on the results of the blood screen the following action should be taken by Occupational Health;

Hepatitis B surface Antibody **<10mIU/ml** no immunity

Employees should have their blood screened for Hepatitis B surface Antigen (HBsAg) and Hepatitis B Core Antibody (Anti-HBc) to screen for any present of past or present infection with HBV. If both these screens are negative a second course of vaccination should be offered using Engerix B.

If following a second vaccination course using Engerix B the employee continues to have no immunity to HBV (**Anti-HBs <10mIU/ml**) they are then classified as a **Non-Responder**.

The employee should be given advice on actions to take should they sustain an inoculation injury and the actions that will be taken to manage any exposure incident (see Appendix 4 below)

Hepatitis B surface Antibody **10-49mIU/ml** – Low level of immunity
Hepatitis B surface Antibody **50 -99mIU/ml** – Sub-optimal immunity

Where the antibody response is between **10-99mIU/ml** the employee has obtained some immunity to HBV however they should be offered further individual booster vaccines (no more than 3) followed by a blood screens 8-12 weeks post booster each vaccine in an attempt to obtain a good level of immunity.

If following 3 further booster the employee continues to have an antibody response is between **10-99mIU/ml** they are then classified as a **Low responder**.

Hepatitis B surface Antibody **>100mIU/ml** – Good level of immunity.

Employees who obtain a good level of immunity against HBV following a primary course of Hepatitis B vaccination requires one further booster of Hepatitis B at 5 years post their primary course.

17.5 Hepatitis B vaccine Contraindications

Hepatitis B should not be administered to subjects with the following:
- Known hypersensitivity to any component of the vaccine
- Signs of hypersensitivity after previous Hepatitis B vaccine administration.
- Acute sever febrile illness, (high temperature).

17.6 Hepatitis B vaccine Side Effects

The most common side effects from Hepatitis B vaccines are soreness and redness at the injection site.
Other reactions that have been reported but may not be caused by the vaccine include: fatigue, fever, malaise, influenza like symptoms athralgia, abnormal liver function test, nausea, vomiting, diarrhoea, abdominal pain, headache, dizziness, parenthesis.

17.7 Hepatitis B virus - Post Exposure Prophylaxis Hepatitis B Immunoglobulin (HBIG)

When an employee has been involved in an incident where there is potential blood borne virus exposure a risk assessment need to be completed in line with the Trusts Management Of Needlestick, Sharps, Human Bites & Contamination Accidents (Inoculation Injuries) Policy
(See Appendix 6 below for the HBV prophylaxis for reported exposure incidents.)

If Hepatitis B Immunoglobulin (HBIG) is required it must be remembered that it may interfere with the subsequent development of active immunity from live virus vaccines, (such as MMR or Varivax) If HBIG has been administered first then an interval of three months should be observed before administering a live vaccine. If a live vaccine has been given within the past three weeks prior to HBIG administration the vaccine should be repeated three months later. However this does not apply to yellow fever.

17.8 Adverse Reactions to HBIG

HBIG is well tolerated. Very rarely anaphylactic reactions occur in individuals with hypogammaglobulinemia who have IgA antibodies, or those who have had an atypical reaction to blood transfusions.

Supplies of HBIG are very limited, HBIG is only available via the on-call Microbiologist.

17.9 Hepatitis B vaccine immune response - Exposure Prone Procedure Staff

Both new and existing members of staff who undertake Exposure Prone Practice (EPP) within their role must provide Occupational Health of their UK laboratory copies of results for their Hepatitis B status this includes both Hepatitis B surface antibody (Anti-HBs), Hepatitis B surface Antigen (HBsAg) and Hepatitis B core Antibody (HBcAb) derived from an Identified Validated Sample.

New employees will not be cleared to undertake EPP duties in their post until the above information is received and reviewed by the Occupational Health department.

17.10 Hepatitis B vaccine Non-Responder - Exposure Prone Procedure Staff.

Any EPP staff member who is classified as a Non-Responder to the Hepatitis B vaccine MUST have 6 monthly blood test for Hepatitis B surface Antigen to confirm they are not an Infected health care worker and as a result can continue to carryout EPP duties in their role.
Occupational Health will contact those identified as Hepatitis B non-responder EPP staff between 2-4 weeks before their blood test is due.

Where an EPP staff members fails to attend for the 6 monthly Hepatitis B surface antigen blood test Occupational Health will contact their line/department manager to advise on a restriction of EPP duties until the blood test has been taken and the result known.

Where a Hepatitis B non-responder EPP staff member refuses to have their hepatitis B surface antigen blood screen their clearance to undertake EPP duties will be revoked.

17.11 Hepatitis B vaccine Low Responder – Exposure Prone Procedure Staff

Any EPP staff member who is classified as a Non-Responder to the Hepatitis B vaccine should have a 3 yearly booster of the hepatitis B vaccine.
Occupational Health will contact those identified as Hepatitis B low-responder EPP staff every 3 years to inform them of their booster vaccine.

17.12 Hepatitis B infected Health Care Workers

If an employee is known or identified as being infected with the Hepatitis B virus please refer to the Trusts Hepatitis B Infected Health Care Worker Policy.

18 INFLUENZA (PANDEMIC & SEASONAL FLU)

Influenza is an acute viral infection of the respiratory tract. There are three types of influenza virus: A, B and C. Influenza A and influenza B are responsible for most clinical illness. Influenza is highly infectious with a usual incubation period of one to three days.

Symptoms -Sudden onset of fever, chills, headache, myalgia and extreme fatigue. Other common symptoms include a dry cough, sore throat and stuffy nose. For otherwise healthy individuals, influenza is an unpleasant but usually self-limiting disease with recovery usually within two to seven days.

Transmission - By aerosol, droplets or through direct contact with respiratory secretions of someone with the infection.

18.1 Pandemic Influenza (Flu)

Pandemic influenza occurs when an influenza A virus subtype emerges or re-emerges which is markedly different from recently circulating strains. Therefore, this is able to spread widely because few, if any, people have natural or acquired immunity to it. It is readily transmissible from person to person and capable of causing illness in a high proportion of those infected.

18.2 Pandemic Flu vaccine

There are two distinct types of pandemic vaccine:

- Pre-pandemic vaccines that are produced in advance of a pandemic and are designed to protect against a strain of influenza virus that experts judge to be a potential cause of a future pandemic eg H5N1. The degree of protection will depend on how similar the pandemic viral strain is to the strain used to prepare the vaccine.

- Pandemic-specific vaccines that are developed specifically to protect against the pandemic viral strain, once it has been isolated. Once available, a pandemic-specific vaccine should protect most recipients from clinical illness and may also reduce illness severity.

As an influenza pandemic will result unexpectedly from an entirely new viral strain or subtype, seasonal influenza vaccines could not be expected to provide any protection against pandemic influenza.

The production process for Pandemic specific vaccines is highly complex and it is likely to take at least four to six months after the start of a pandemic before a pandemic-specific vaccine would start to become available.

The prioritisation of a Pandemic specific vaccine will depend on the emerging profile of at-risk groups for a new pandemic virus, with priority given to clinical risk groups and front-line health and social care workers.

Specific information regarding Pandemic vaccine will be published by the Department of Health when a pandemic occurs, this will be highlighted to ALL Trust staff by Occupational Health.

18.3 Seasonal Influenza (Flu)

Because of the changing nature of influenza viruses, WHO monitors the epidemiology of influenza viruses throughout the world. Each year it makes recommendations about the three strains to be included in vaccines for the forthcoming winter for the northern and southern hemispheres (www.who.int/ csr/disease/influenza).

Influenza vaccines are prepared using virus strains in line with the WHO recommendations. Current seasonal influenza vaccines are trivalent, containing two subtypes of influenza A and one type B virus.

Trivalent seasonal influenza vaccines have been found to give around 60-70% protection against infection when influenza virus strains in the vaccine are well matched with those in circulation (Fleming *et al*., 1995 and 2010). Protection afforded by the vaccine is known to last for at least one influenza season, although the level of protection provided in subsequent seasons is uncertain.

After immunisation, antibody levels may take up to 10 to 14 days to reach protective levels.

18.4 Seasonal Flu Vaccine - Recommended Use

The seasonal influenza vaccine is offered to All Trust staff to help reduce the transmission of influenza within health and social care premises, to contribute to the protection of individuals who may have a suboptimal response to their own immunisations, or to avoid disruption to services that provide their care.

Priority is give to offer the vaccine to all Frontline health care workers first in line with recommendations from the Department of Health.

18.5 Seasonal Flu vaccine - Dosage & Schedule

A single injection of 0.5ml annually

18.6 Seasonal Flu vaccine - Contraindications

There are very few individuals who cannot have the seasonal influenza vaccine.
The vaccines should not be given to those who have had:

- a confirmed anaphylactic reaction to a previous dose of the vaccine, or
- a confirmed anaphylactic reaction to any component of the vaccine (other than valbumin – see precautions).

18.7 Seasonal Flu vaccine Precautions

Minor illnesses without fever or systemic upset are not valid reasons to postpone immunisation. If an individual is acutely unwell, immunisation may be postponed until they have fully recovered.

18.8 Seasonal Flu vaccine use in Pregnancy & Breast Feeding

Pregnant women should be offered seasonal influenza vaccine. A review of studies on the safety of influenza vaccine in pregnancy concluded that inactivated seasonal influenza vaccine can be safely and effectively administered during any trimester of pregnancy and that no study to date has demonstrated an increased risk of either maternal complications or adverse fetal outcomes associated with inactivated influenza vaccine (Tamma *et al*., 2009). A number of studies show that seasonal influenza vaccination during pregnancy provides passive immunity against influenza to infants in the first few months of life following birth (Benowitz *et al*, 2010; Eick *et al*, 2010; Zaman *et al*, 2008).

18.9 Seasonal Flu vaccine -Immunosupression & HIV

Individuals who have immunosuppression and HIV infection (regardless of CD4 count) should be given influenza vaccine in accordance with the recommendations above.

18.10 Seasonal Flu vaccine & Egg Allergy

Individuals who have egg allergy may be at increased risk of reaction to influenza vaccines. Influenza vaccines with an ovalbumin content < 0.12 µg/ml have been shown to be safe in patients with egg allergy (Gagnon *et al*, 2010). Patients who have either confirmed anaphylaxis to egg or egg allergy with uncontrolled asthma (BTS SIGN step 4 or above) can be immunised with an egg-free influenza vaccine (if available) as a single dose. If no egg-free vaccine is available, patients should be referred to specialists for vaccination in hospital using vaccine with an ovalbumin content less than

0.12 µg/ ml.

Vaccines with ovalbumin content (more than 0.12 µg/ml i.e. containing more than 0.06µg per 0.5ml dose) or where content is not stated **should not be used** in egg-allergic individuals.

18.11 Seasonal Flu vaccine - Side Effects

Pain, swelling or redness at the injection site, low grade fever, malaise, shivering, fatigue, headache, myalgia and arthralgia are among the commonly reported symptoms after vaccination.

A small painless nodule (induration) may also form at the injection site.

These symptoms usually disappear within one to two days without treatment

Immediate reactions such as urticaria, angio-oedema, bronchospasm and anaphylaxis can occur, most likely due to hypersensitivity to residual egg protein.

Serious, suspected adverse reactions to vaccines in adults should be reported through the Yellow Card scheme.

19 JAPENESE ENCEPHALITIS

Japanese encephalitis (JE) is a mosquito-borne viral encephalitis caused by a flavivirus. It is the leading cause of childhood encephalitis in Asia, with 20,000 to 50,000 cases per annum (Halstead *et al.*, 2008; World Health Organization, 1998).

This disease is not transmitted from person to person.

The incubation period is from five to 15 days. Illness ranges from asymptomatic infection (about one in 250 infections is estimated to become clinically apparent) to severe encephalitis with a high mortality and a high rate of permanent neurological sequelae (approximately 30%) in survivors (Halstead *et al.*, 2008).

19.1 JE Vaccine & Recommended Use

There are currently two vaccines available for use in the UK – IXIARO® and 'Green Cross'. IXIARO® is licensed for individuals aged 18 years and older and Green Cross vaccine is not licensed in the UK**.**

The Occupational Health department will therefore only be using the IXIARO®

IXIARO® is an inactivated vaccine produced in Vero cells and adsorbed onto an adjuvant of aluminium hydroxide to improve its immunogenicity.
IXIARO® does not contain thiomersal.

IXIARO® is an inactive vaccine.

The objective of JE vaccination is to protect individuals at high risk of exposure during travel or in the course of their occupation.

Occupational Health will complete a Pre-Travel Health questionnaire with individuals which will include an assessment for vaccination requirements.

19.2 JE Vaccination Dosage &Schedule

The recommended vaccine schedule is two doses of IXIARO®: 0.5ml on days 0 and 28.

Full immunity takes up to one week to develop after the second dose.

A booster dose (third dose) should be given within the second year (i.e. 12-24 months) after the two-dose primary immunisation series and prior to potential exposure to Japanese encephalitis virus. Individuals at continuous risk of acquiring JE, e.g. laboratory personnel and long-term travellers who expect to reside in JE endemic areas for appreciable periods of time, should receive a booster dose at 12 months after primary immunisation.

19.3 JE vaccine IXIARO® Contraindications

There are very few individuals who cannot receive either IXIARO® or Green Cross vaccine. When there is doubt, appropriate advice should be sought from a travel health specialist.
IXIARO® should not be given to those who have had

- a confirmed anaphylactic or serious systemic reaction to a previous dose of IXIARO® vaccine, or
- a confirmed anaphylactic reaction to any component of the vaccine.

19.4 JE vaccine IXIARO® Pregnancy & Breastfeeding

As a precautionary measure, administration of IXIARO® during pregnancy or lactation should be avoided.
However, travellers and their medical advisers must make a risk assessment of the theoretical risks of JE vaccine in pregnancy against the potential risk of acquiring JE. Miscarriage has been associated with JE virus infection when acquired in the first two trimesters of pregnancy (Canadian Medical Association, 2002).

19.5 JE vaccine IXIARO® Side Effects

The most common adverse reactions observed after administration of IXIARO® are pain and tenderness at the injection site, headache, and myalgia. Other reactions commonly reported are erythema, hardening, swelling and itching at the injection site, influenza-like illness, pyrexia and fatigue.

20 MEASLES, MUMPS, RUBELLA (MMR)

Clinical characteristics of the diseases.

Measles – It is caused by morbillivitius.
Incubation period – approximately 10 -12 days from exposure to prodrome, and 14 days from exposure to rash (7 – 18 days range).
Infectious period – beginning of prodromal period to 4 days after appearance of rash.
Mode of transmission – airborne or droplet transmission.
Symptoms – usually are a fever lasting about 2 to 4 days, cough, runny nose, and/or conjunctivitis. The rash usually appears about 14 days after exposure and lasts 5 to 6 days. Rash appears on the face and gradually proceeds downward and outward. The disease can be severe in an adult and prolonged if person is immunocompromised. In immunocompromised HCWs typical rash may be absent and virus shedding could occur for several weeks after acute illness.

Mumps – It is caused by a paramyxovirus.
Incubation period – 14 – 25 days after exposure average 17 days.
Infectious period – several days before and after parotid swelling.

Mode of transmission – airborne or droplet.
Symptoms – Persons with classical Mumps have bilateral or unilateral parotitis. Mumps can present as asymptomatic or mild respiratory symptoms. Most serous complications occur more commonly in adults. Although orchitis may occur in 38% of post pubertal males, sterility occurs only rarely.

Rubella (German measles) – is caused by Togavirus.
Potential for transmission in hospital settings persist because 10 -15% of adults are still susceptible. Although not as infectious as measles, rubella can be transmitted effectively by males and females.

This is an exanthematous illness which can be characterised by non specific signs and symptoms including transient erythematous and pruritic rash 14 – 17 days after exposure and suboccipital/post auricular lymphadenopathy. The Congenital rubella syndrome is the most important adverse consequence if the illness is contracted during pregnancy.

Incubation period ranges from 12 – 23 days.
Infectious period one week before symptoms to 4 days after onset of rash.
Mode of transmission - by droplet transmission.

20.1 MMR Vaccines & vaccination Schedule

MMR is the vaccine of choice when protection against any of these three diseases is required. This is a freeze-dried preparation containing live attenuated measles, mumps and rubella viruses.

Occupational Health use either the MMR Priorix® vaccine or the MMRVaxPRo® vaccine.

Priorix is supplied as a whitish to slightly pink pellet of lyophilised vaccine for reconstitution with the diluent supplied. The reconstituted vaccine must be shaken well until the pellet is completely dissolved in the diluent.

MMRVaxPRO is supplied as a lyophilised powder for reconstitution with the diluent supplied. The reconstituted vaccine must be shaken gently to ensure thorough mixing. The reconstituted vaccine is yellow in colour and should only be used if clear and free from particulate matter

Each vaccine contains 0.5ml dose of the reconstituted attenuated live strains of measles, mumps and rubella viruses.

MMR is a live vaccine and should be delivered as two doses, separated by at least one month.

MMR will not be routinely offered to employees who are not in direct clinical contact.

20.2 MMR vaccine Serology and Immunity

The antibody responses of persons vaccinated with MMR are similar to those given by single vaccines for these illnesses. Immunisation provides protection for around 90% of recipients for measles and 61 -91% for mumps and over 95-100% for rubella. Almost all persons who do not respond to the measles component of the first dose will respond to the second dose. Two doses are needed for mumps protection for both individual and community. For rubella a single dose induces protective immunity. There is very little evidence that immunity to the measles, mumps or rubella vaccine wanes with time.

Data indicates that the favourable cost benefit ratio for MMR vaccination is greater when administered as combined MMR rather than as mono vaccines. Monovaccines are also no longer available within the NHSe.

Persons who lack evidence of immunity generally should be vaccinated without serological testing.

Serological screening should only be undertaken if vaccination is refused and serological proof of relevant antibodies is required.

Post vaccination serological testing to verify an immune response to MMR is not recommended. A copy of the MMR consent form will be given to the employee to provide proof of immunisation.

20.3 MMR – Accepted Evidence of Immunity

Neither self reported disease nor a history of vaccination is considered as adequate evidence of immunity for a HCW. Written documentation of vaccination of 2 doses of MMR or single Measles or Rubella vaccine or serological evidence of immunity against Measles or Rubella is considered sufficient.

20.4 MMR - Suceptible HCWs

HCWs who are susceptible to Measles and Rubella and who refuse vaccination, should be advised on possible work restrictions and their professional duty of care towards colleagues and patients as encouraged by the appropriate code of professional conduct.

Refusal of the MMR vaccine will be documented in their OH records. OH will inform also inform the HCWs Line Manager of their vaccine refusal and that they remain susceptible to the disease which may require exclusion from work should be they exposed to that disease in the future.

20.5 MMR - Recommended priority of order for HCWs:

When undertaking look back exercises to ensure all employees are protected they will be dealt with in the following order

1. HCWs working in high risk areas such as maternity, paediatrics, NICU, A&E and with immunocompromised patients.
2. Existing HCWs should be immunised opportunistically when attending for other immunisations/interviews with OH.

20.6 MMR Vaccine Contraindications

There are very few individuals who cannot receive MMR vaccine. When there is doubt, appropriate advice should be sought from consultant in communicable disease control rather than withholding the vaccine.

But definitive contra-indications are as follows;

- Pregnancy, counsel to prevent falling pregnant for 3 months after MMR
- HIV severely immunocompromised
- Severe immunocompromise due to other illnesses
- Thrombocytopenia
- Anaphylaxis to MMR vaccine
- confirmed anaphylactic reaction to neomycin or gelatine

20.7 MMR vaccine Side Effects

Adverse reactions following the MMR vaccine (except allergic reactions) are due to effective replication of the vaccine viruses with subsequent mild illness. Following the first dose of MMR vaccine, malaise, fever and/or a rash may occur, most commonly about a week after immunisation, and last about two to three days.
Such events are to be expected in some individuals.

Events due to the measles component occur six to 11 days after vaccination.
Events due to the mumps and rubella components usually occur two to three weeks after vaccination but may occur up to six weeks after vaccination.

These events only occur in individuals who are susceptible to that component, and are therefore less common after second and subsequent doses.

Individuals with vaccine-associated symptoms are not infectious to others.

20.8 MMR Post exposure Management

Manager of area exposed to send a list of exposed workers to OH to ascertain the immunity status and protect the exposed non immune staff as best as possible.

The manager should be advised to ensure that only staff who are immune to be delegated for care of the infected case. In case of doubt or non immunity HCWs should be asked to contact OH for assessment and should be kept away from the index case until further advised.

Serological testing of HCWs during an outbreak before vaccination is not generally recommended as rapid vaccination is required.

Measles

Susceptible non pregnant HCWs exposed to measles should receive a dose of MMR promptly, preferably within 3 days and excluded from work from 7 – 18 day after exposure where feasible. Serological testing may be considered following discussion with the Consultant Microbiologist.

In pregnant workers Measles IgG should be undertaken before considering immunoglobulin.

HCWs who become ill with symptoms or rash should be excluded from work until 4 days after onset of rash.

Rubella

During rubella outbreaks pregnant HCWs who lack of evidence of rubella immunity should be excluded from duty from the 7th day after first exposure to 21st day after last exposure or until 5 days after the rash appears. They should also be advised to speak to their midwife as Rubella is screened at the booking interview.

Non pregnant HCWs should be advised to have the MMR vaccination.

Mumps

As mumps virus is shed by infected persons before clinical symptoms become evident and because often infected persons remain asymptomatic an effective routine MMR vaccination programme is the best practice.

HCWs who develop the disease should be excluded from work until 9 days after the onset of symptoms. To prevent droplet transmission of the disease respiratory precautions for persons with mumps should be maintained for 9 days after onset of symptoms.

21 MENINGOCCOAL

Meningococcal disease occurs as a result of a systemic bacterial infection by *Neisseria meningitidis*. Meningococci are gram-negative diplococci, divided into antigenically distinct serogroups. There are at least 13 serogroups, of which groups B, C and Y were historically the most common in the UK. Other less common serogroups included A, W135, 29E and Z.

The incubation period is from two to seven days and the onset of disease varies from fulminant with acute and overwhelming features, to insidious with mild prodromal symptoms.

Symptoms - Malaise, pyrexia and vomiting. Headache, neck stiffness, photophobia, drowsiness or confusion and joint pains may occur variably.

In meningococcal septicaemia, a rash may develop, along with signs of advancing shock and isolated limb and/or joint pain. The rash may be non-specific early on but as the disease progresses the rash may become petechial or purpuric and may not blanch. This can readily be confirmed by gentle pressure with a glass (the 'glass test') when the rash can be seen to persist

Transmission; By aerosol, droplets or direct contact with respiratory secretions of someone carrying the organism. Transmission usually requires either frequent or prolonged close contact.

21.1 Meningococcal ACWY Vaccine

Quadrivalent (ACWY) conjugate vaccine
The MenACWY conjugate vaccine (Menveo®) is made from capsular polysaccharide that has been extracted from cultures of serogroup A, C, W135 and Y *Neisseria meningitidis*. The polysaccharides are conjugated to CRM197. The process of conjugation improves the immunogenicity, especially in young children and older people.
Meningococcal ACWY is an inactive vaccine and cannot cause the disease against which it protects.

The vaccine should be reconstituted immediately before use with the diluent supplied by the manufacturer. After reconstitution, the vaccine must be used within one hour.
Discard any vaccine that is unused one hour following reconstitution.

The diluent must not be frozen.

21.2 Meningococcal ACWY Vaccine Recommended Use

Individuals who are particularly at risk are visitors who live or travel 'rough', such as backpackers, and those living or working with local people. Large epidemics of both serogroup A and W135 meningococcal infection have occurred in association with Hajj pilgrimages, and proof of vaccination against A, C, W135 and Y serogroups is now a

visa entry requirement for pilgrims and seasonal workers travelling to Saudi Arabia. Immunisation is recommended for long-stay or high-risk visitors to sub-Saharan Africa, for example those who will be living or working closely with local people, or those who are backpacking.

For information on country specific vaccinations visit www.travax.nhs.uk or www.fitfortravel.nhs.uk

21.3 Meningococcal ACWY Vaccine Dosage & Schedule

Quadrivalent (ACWY) polysaccharide vaccine
Children over five years of age and adults:

- Single dose of 0.5ml.

A reinforcing dose should be given every five years to those at continued risk.

21.4 Meningococcal ACWY Vaccine Contraindications

There are very few individuals who cannot receive meningococcal vaccines. The vaccines should not be given to those who have had:

- a confirmed anaphylactic reaction to a previous dose of the vaccine
- a confirmed anaphylactic reaction to any constituent of the vaccine, including meningococcal polysaccharide, diphtheria toxoid or the CRM197 carrier protein or tetanus toxoid.

21.5 Meningococcal ACWY Vaccine Side Effects

Generalised reactions are rare although pyrexia occurs more frequently in young children than in adults.

Injection site reactions occur in approximately 10% of recipients and last for approximately 24 to 48 hours.

21.6 Meningococcal Post Exposure Management

See Section 27 below on Rifampicin.

22 RABIES

Rabies is an acute viral encephalomyelitis caused by members of the lyssavirus genus. The disease may be caused by rabies virus genotype 1 (classical rabies) or less commonly by rabies-related lyssaviruses. The presentations are clinically indistinguishable. Rabies-related lyssaviruses implicated in human disease include European bat lyssaviruses (EBLVs) and Australian bat lyssavirus (ABLV).

Transmission - Infection is usually via the bite or scratch of a rabid animal, most frequently a dog. In some parts of the world, other animals such as bats, cats and monkeys are important sources of exposure. In parts of Europe (including the UK) EBLV-1 and EBLV-2 are found in insectivorous bats and have occasionally caused human disease.
On rare occasions, transmission of the virus has occurred through body fluids from an infectious animal coming into contact with an individual's mucous membranes. Exposure through mucous membranes has a low probability of infection but must be managed as a significant event.

The incubation period is generally between 3 and 12 weeks, but may range from 4 days

to 19 years. In more than 93% of patients, the onset is within one year of exposure.

Symptoms - Early symptoms may include paraesthesiae around the site of the wound, fever, headache and malaise. The disease may then present with hydrophobia, hallucinations and maniacal behaviour progressing to paralysis and coma, or as an ascending flaccid paralysis and sensory disturbance. Rabies is almost always fatal, death resulting from respiratory paralysis. There is no specific treatment other than supportive care once clinical symptoms develop.

22.1 Rabies Vaccine

There are currently two rabies vaccines licensed for use in the UK – human diploid cell vaccine (HDCV) (Rabies Vaccine BP Pasteur Merieux) and purified chick embryo cell rabies vaccine (PCEC) (Rabipur®). Other cellculture-derived vaccines are available in other countries and include rabies vaccine viruses grown in Vero cells.

The vaccines available in the UK are thiomersal-free. The vaccines are inactivated, do not contain live organisms and cannot cause the disease against which they protect.

HDCV is a freeze-dried suspension of Wistar rabies virus strain PM/WI 38 1503-3M cultured in human diploid cells and inactivated by betapropiolactone. The potency of the reconstituted vaccine is not less than 2.5IU per 1.0ml dose. It contains traces of neomycin, and human albumin is used as an excipient.

The PCEC rabies vaccine is a freeze-dried suspension of the Flury LEP-25 rabies virus strain cultured in chick embryo cells and inactivated with betapropiolactone. The potency of the reconstituted vaccine is not less than 2.5IU per 1.0ml dose. It contains traces of amphotericin B, chlortetracycline and neomycin.

These vaccines may be used interchangeably to provide protection pre- or post-exposure.

22.2 Rabies Vaccine Dosage & Schedule

The potency of the reconstituted RABIPUR vaccine is not less than 2.5IU per 1.0ml dose

For primary pre-exposure immunisation, three doses of 1.0ml of rabies vaccine should be given on days 0, 7 and 28. The third dose can be given from day 21 if there is insufficient time before travel.

For those at regular and continuous risk, a single reinforcing dose of vaccine should be given one year after the primary course has been completed. Further doses should be given at three- to five-year intervals thereafter. For those at intermittent risk or who are travelling again to rabies-enzootic areas without ready access to safe, medical care, a booster dose should be given, from two years after the primary course has been completed.

Serological testing is advised only for those who work with the live viruses. Such individuals should have their antibodies tested every three to six months, and be given reinforcing doses of vaccine as necessary to maintain their immune status. The World Health Organization (WHO) currently considers a minimal acceptable antibody titre to be 0.5IU/ml.

22.3 Rabies Vaccine Recommended Use

The aim of the rabies immunisation programme is to protect those who are at most risk of exposure to rabies.

22.4 Rabies Pre-exposure (prophylactic) immunisation

Pre-exposure immunisation with rabies vaccine by Occupational Health should be offered to:

- laboratory workers handling the virus
- health care workers who are about to be at risk of direct exposure to body fluids or other tissue from a patient with probable or confirmed rabies.

Occupational Health will also offer pre-exposure immunisation for some travellers, including:

- those living in or travelling for more than one month to rabies-enzootic areas, unless there is reliable access to prompt, safe medical care (see below)
- those travelling for less than one month to enzootic areas but who may be exposed to rabies because of their travel activities, or those who would have limited access to post-exposure medical care.

22.5 Rabies Post Exposure Management

Post-exposure management normally consists of wound treatment and risk assessment for appropriate immunisation. Treatment and immunisation after a possible rabies exposure will depend on the circumstances of the exposure, including the local incidence of rabies in the species involved and the immune status of the person.

Each case requires a full, expert risk assessment based on the information outlined below. Advice on the assessment of the risk and appropriate management should be obtained from the Health Protection Agency (HPA) Centre for Infection, Colindale, London (Tel: 020 8200 6868); in Scotland from Health Protection Scotland (Tel: 0141 300 1100); and in Northern Ireland from the Public Health Laboratory, Belfast City Hospital (Tel: 028 9032 9241).

For updated information on rabies by country, see WHO's *Rabies Bulletin Europe* (www.who-rabies-bulletin.org), or the epidemiology website of the Centers for Disease Control and Prevention (CDC), USA (www.cdc.gov/ncidod/dvrd/rabies/epidemiology/epidemiology.htm).

22.6 Rabies Post-exposure immunisation and immunoglobulin

As the incubation period for rabies can be prolonged, treatment should still be considered even if the interval from exposure is lengthy. Specialist advice should be sought (as above).

Guide to Post exposure prophylaxis following risk assessment

Post-exposure prophylaxis		
Rabies risk	**Unimmunised /incompletely immunised individual***	**Fully immunised individual**
No risk	**None**	**None**
Low risk	Five doses (each 1ml) rabies vaccine on days 0, 3, 7, 14 and 30	Two doses (each 1ml) rabies vaccine on days 0 and 3

High risk	Five doses (each 1ml) rabies vaccine on days 0, 3, 7, 14 and 30 plus HRIG on day 0 only	Two doses (each 1ml) rabies vaccine on days 0 and 3
* Persons who have not received a full course of pre- or post-exposure tissue culturerabies vaccine.		

22.7 Rabies Vaccine Contraindications

Pre-exposure rabies vaccine should not be given to those who have had:

- a confirmed anaphylactic reaction to a previous dose of rabies vaccine, or
- a confirmed anaphylactic reaction to any component of the vaccine.

There are no absolute contraindications to post-exposure rabies vaccine.

In the event of a hypersensitivity reaction to a dose of a pre-exposure course, such individuals should still receive post-exposure vaccination if indicated, because the risks of rabies outweigh the risks of hypersensitivity.

When a hypersensitivity reaction occurs during post-exposure immunisation, further doses should be given under close medical supervision.

22.8 Rabies Vaccine Pregnancy & Breastfeeding

Pregnant women and breast-feeding mothers should only be given pre-exposure vaccination if the risk of exposure to rabies is high and rapid access to post exposure prophylaxis would be limited. Post-exposure treatment should be given to pregnant women when indicated.

22.9 Rabies Vaccine - Immunosuppression and HIV infection

Individuals with immunosuppression and HIV infection (regardless of CD4 count) should be given rabies vaccines in accordance with the recommendations above. These individuals may not make a full antibody response.

Re-immunisation should be considered after treatment is finished and recovery has occurred.

Individuals who are immunosuppressed or with HIV who are exposed may require a different regime for post-exposure management. Specialist advice should be sought urgently.

22.10 Rabies Vaccine Side Effects

Rabies vaccine may cause local reactions such as redness, swelling or pain at the site of injection within 24 to 48 hours of administration. Systemic reactions such as headache, fever, muscle aches, vomiting and urticarial rashes are rare.

Delayed hypersensitivity reactions have been reported from the US.

Reactions may become more severe with repeated doses.

Neurological conditions, such as Guillain-Barré syndrome, have been reported

extremely rarely; a causal association with vaccination is not established.

All suspected adverse reactions to vaccines occurring in individuals of any age to vaccines labelled with a black triangle (▼), should be reported to the Commission on Human Medicines through the Yellow Card scheme. Serious, suspected adverse reactions to vaccines in adults should be reported through the Yellow Card scheme.

22.11 Rabies – Management of cases

Human rabies is a notifiable disease. In the event of a case of human rabies, the Consultant in Communicable Disease Control (in England, Wales or Northern Ireland) or the Consultant in Public Health Medicine for Communicable Disease and Environmental Health (in Scotland) should be informed.

23 TICK-BORNE ENCEPHALITIS (TBE)

Tick-borne encephalitis (TBE) is caused by members of the flavivirus family that can affect the central nervous system. Although TBE is most commonly recognised as a meningo-encephalitis, mild febrile illnesses can also occur. There are three forms of the disease related to the virus subtypes, namely European, Far Eastern and Siberian (Hayasaka, 2001).

The incubation period is from two to 28 days (Dumpis *et al*., 1999).

The European form of the disease is biphasic with an initial viraemic phase of fever and influenza-like symptoms followed in some cases (after an afebrile period of one to 20 days) by central nervous system involvement.
The case fatality rate of the European form is 1%. Long-lasting or permanent neuropsychiatric sequelae are observed in 10–20% of affected patients.
The Far Eastern version is more gradual in onset and normally takes a more severe and longer course with a reported mortality of 5–20%.

TBE is transmitted to humans by the bite of an infected tick or, less commonly, by ingestion of unpasteurised milk from infected animals, especially goats. The virus is maintained in nature by small mammals, domestic livestock and certain species of birds.

23.1 TBE Vaccine & Recommended Use

One licensed vaccine (FSME-IMMUN) is available currently. It is produced from virus grown in chick fibroblasts and then inactivated by formaldehyde.

The vaccine contains the Neudörfl virus strain, has been shown to be effective against the European subtype of TBE, and is probably effective against the more aggressive Far Eastern subtype.

The vaccine contains aluminium hydroxide and trace quantities of neomycin and gentamicin, and is thiomersal-free.

It is inactivated vaccine and cannot cause the disease against which it protects.

TBE vaccine is used for the protection of individuals at high risk of exposure to the virus through travel or employment.

The vaccine is recommended particularly for spring and summer travel in warm, forested parts of the endemic areas, where ticks are most prevalent.

Individuals who hike, camp, hunt and undertake fieldwork in endemic forested areas should be vaccinated.

TBE vaccine is recommended for those who will be going to reside in an area where TBE is endemic or epidemic, and particularly for those working in forestry, woodcutting, farming and the military (WHO, 1995).
More detailed country-by-country information is contained in *Health information for overseas travel* (Department of Health, 2001).

Laboratory workers who may be exposed to TBE should be vaccinated.

Occupational Health will complete a Pre-Travel Health questionnaire with individuals which will include an assessment for vaccination requirements.

23.2 TBE Vaccine Dosage and Schedule

TBE Vaccine is supplied as a suspension of 0.5ml for injection in a pre-filled syringe.

The vaccine should be administered at the following intervals;

- First dose at day 0.
- Second dose between one to three months after the first dose.
- Third dose between five to 12 months after the second dose.

For rapid short-term protection of children and adults the second dose may be given two weeks after the first dose and gives at least 90% protection (Plotkin and Orenstein, 2004)

A booster dose is recommended every three years (Dumpis *et al*.,1999) afteran initial three-dose schedule, if the individual continues to be at risk.

23.3 TBE Vaccine Contraindications

The vaccine should not be given to those who have had:

- a confirmed anaphylactic reaction to a previous dose of TBE vaccine
- a confirmed anaphylactic reaction to one of the vaccine components
- a confirmed anaphylactic reaction to egg ingestion.

23.4 TBE Vaccine Pregnancy and breast-feeding

TBE vaccine has not been associated directly with adverse outcomes of pregnancy. There is no evidence of risk from vaccinating pregnant women, or those who are breast-feeding, with inactivated virus or bacterial vaccines or toxoids (Hayasaka *et al*., 2001).

23.5 TBE Vaccine Side Effects

Reported reactions to TBE vaccine are rare. Local reactions such as swelling, pain and redness at the injection site may occur.

Pyrexia, particularly after the first dose, can occur in children and adults, usually occurring within 12 hours of immunisation and settling within 24–48 hours (Dumpis *et al*., 1999; Kunz *et al*., 1980). Febrile convulsions have rarely occurred, and antipyretic treatment and cooling should be initiated in good time.

24 TYPHOID

Typhoid fever is a systemic infection caused by the gram-negative bacterium *Salmonella enterica*, subspecies *enterica*, serotype *typhi*. Paratyphoid fever is an illness clinically similar but usually less severe than typhoid and is caused by S. paratyphi A, B and C.

Following ingestion of contaminated food or water, *S. typhi* penetrates the intestinal mucosa, replicates and enters the bloodstream.

Symptoms - Clinical features range from mild fever, diarrhoea, myalgia and headache to severe disseminated disease with multi-organ involvement in 10 to 15% of cases.

Transmission - Primarily via the oral route following ingestion of food or water contaminated by faeces and occasionally the urine of persons acutely ill with typhoid or those who are chronic carriers.

Direct faecal–oral transmission can also occur.

In healthy individuals, one million or more organisms may be required to cause illness; however, ingestion of fewer organisms may still result in illness, especially in susceptible individuals.

The incubation period varies from 1 to 3 weeks, depending on host factors and the size of the infecting dose (Glynn and Bradley, 1992).

The risk of contracting typhoid fever is highest for travellers to areas of high endemicity. In the Indian subcontinent, a region of high incidence of typhoid fever (more than 100 cases per 100,000 people per year (Crump et al., 2004)), the attack rate for travellers has been estimated at 1 to 10 per

24.1 Typhoid Vaccine

One of the typhoid vaccines available in the UK is composed of purified Vi capsular polysaccharide from *S. typhi*. Each 0.5ml dose contains 25µg of antigen.

Vi-containing vaccines

- Typhim Vi (typhoid vaccine)
- ViATIM (combined hepatitis A/typhoid vaccine)

A four-fold rise in antibody against Vi antigen has been detected seven days following primary immunisation with Vi vaccine. Maximum antibody response is achieved one month following vaccination and persists for about three years (Keitel *et al*., 1994; Tacket *et al*., 1998).

Re-vaccination is necessary when continuing protection is required.

Protection by vaccination may be less if a large number of infective organisms are ingested. Because of the limited protection offered by the vaccine, the importance of scrupulous attention to personal, food and water hygiene must still be emphasised for those travelling to endemic areas.

24.2 Typhoid Vaccine - Recommended Use

Typhoid vaccine is indicated for active immunisation against typhoid fever and is recommended for:

- travellers to countries where typhoid is endemic (e.g. South Asia, parts of South-East Asia, the Middle East, Central and South America, and Africa),

especially if staying with or visiting the local population
- travellers to endemic areas (see above) with frequent and/or prolonged exposure to conditions where sanitation and food hygiene are likely to be poor
- laboratory personnel who may handle *S. typhi* in the course of their work.

24.3 Typhoid Vaccine Dosage & Schedule

Dosage of Injectable monovalent typhoid vaccines

Vaccine product	ages	Dose	Volume
Typhim Vi	Two years and older	25µg	0.5ml
Typherix	Two years and older	25µg	0.5ml

Dosage of combined typhoid and hepatitis A vaccines*

Vaccine product	Typhoid ages	Dose	Dose HaV†	Volume
Hepatyrix	15 years and older	25µg	1440 ELISA units	1ml
ViATIM	16 years and older	25µg	160 antigen units	1ml

* For booster doses of either typhoid or HAV, single antigen vaccines can be used † HAV – hepatitis A vaccine

A single dose of Vi vaccine should be administered at three-year intervals in adults and children over two years of age who remain at risk from typhoid fever.

24.4 Typhoid Vaccine Contraindications

There are very few individuals who cannot receive typhoid vaccine.
Typhoid Vi vaccine should not be given to those who have had a confirmed anaphylaxis to a Vi antigen-containing vaccine.

24.5 Typhoid Vaccine - Side Effects

Local reactions (pain, swelling, erythema and induration at injection site) are the most commonly reported symptoms following Vi vaccine (Engels *et al*., 1998; Tacket *et al*., 1986; Begier *et al*., 2004). These symptoms are usually mild and transient

25 VARICELLA (CHICKEN POX)

Varicella (chickenpox) is an acute, highly infectious disease caused by the varicella zoster virus (VZV)

Clinical Characteristics of the disease
The illness usually starts with one to two days of fever and malaise although this may be absent, particularly in young children. Vesicles begin to appear on the face and scalp, spreading to the trunk and abdomen and eventually to the limbs. After three or four days, the vesicles dry with a granular scab and are usually followed by further crops. Vesicles may be so few as to be missed or so numerous that they become confluent, covering most of the body.

Main Symptoms include:-

- Occasional Malaise and Fever
- Vesicles usually on face and scalp, spreading to trunk and abdomen and eventually to limbs

Infectious period - is from one to two days before rash appears until vesicles are dry.

Incubation period - is between one and three weeks and transmission is usually by personal contact or droplet spread.

25.1 Varicella Vaccine

- The vaccine contains a live attenuated virus.
- The Occupational Health Department utilises the Varivax vaccine which contains the Oka/Merck strain.
- The two-dose vaccination schedule provides about 75% protection, and adults should receive 2 doses of 0.5ml at least 4 weeks apart.

25.2 Varicella Vaccine Contraindications

The Varicella vaccine should not be given to;

- Immunosuppressed patients
- Women who are pregnant and Pregnancy should be avoided for 3 months following the last dose of varicella vaccine.
- Those who have had a confirmed anaphylactic reaction to a previous dose of the vaccine.
- Those who have had a confirmed anaphylactic reaction to any component of the vaccine including neomycin or gelatine.
- Acutely unwell individuals with a fever. Vaccination should wait until they have recovered.

25.3 Varicella Vaccine Side Effects

The most commonly reported reactions are at the injection site including; pain, redness and rash. Generalised symptoms such as fever and rash can also occur.

Up to 10% of adults develop a vaccine associated rash within one month of immunisation. The rashes may be popular or vesicular. A blood sample from rashes following vaccine should be sent for analysis to the HPA Varicella Zoster Reference Service at Barts and the London NHS Trust.

The employee should be advised to attend Occupational Health if a rash occurs following administration.

If the rash is generalised and consistent with a vaccine-associated rash the healthcare worker will be advised to avoid patient contact until all lesions are crusted.

If the rash is localised it should be covered with a bandage and/or clothing and allowed to continue working unless in contact with immunocompromised or pregnant patients.

25.4 Post Varicella vaccine serological testing.

As evidence of 2 varicella vaccinations is deemed sufficient to confirm protection against Varicella disease, post varicella vaccination serology screening it is not routinely recommended

25.5 Varicella Vaccine Recommended Use

PRE-EXPOSURE PROPHYLAXIS
For all non-immune Health Care Workers (HCWs) who have direct patient contact, Appendix X demonstrates the algorithm and procedure for vaccinating and determining non-immune Health Care Workers.

POST-EXPOSURE PROPHYLAXIS
The varivax vaccine can be given within 3 days of contact with an infected person as it may prevent the illness appearing at all or may reduce the severity of the illness. If it is given 3-5 days after contact with an infected person there is a good chance that it can reduce the severity of the illness.

26 YELLOW FEVER

Yellow fever is an acute flavivirus infection spread by the bite of an infected mosquito. The disease occurs in tropical Africa and South America. A detailed map of those countries affected is available on the website of the National Travel Health Network and Centre (Nathnac), www.nathnac.org and www.travax.nhs.uk

Symptoms - Yellow fever ranges in severity from non-specific, self-limited symptoms of fever, malaise, photophobia and headache to an illness of sudden onset with fever, vomiting and prostration which may progress to jaundice and haemorrhage.

Transmission - Three epidemiological patterns of yellow fever are recognised – urban, jungle and intermediate – although the disease is clinically and aetiologically identical.
In urban yellow fever, the viral reservoir is man and the disease is spread between humans by the *Aedes aegypti* mosquitoes that live and breed in close association with humans.
Jungle yellow fever is transmitted among non-human hosts (mainly monkeys) by forest mosquitoes.
Intermediate yellow fever - occurs only in Africa in humid savannah regions where mosquitoes infecte both monkeys and humans causing localised outbreaks.

Humans may become infected when they enter into the forest habitat and can become the source of urban outbreaks.

Yellow fever can reappear with outbreaks after long intervals of apparent quiescence.

Rural populations are at greatest risk of yellow fever but in recent years urban outbreaks have occurred both in West Africa and South America.

There is no specific treatment for yellow fever. Preventive measures such as the eradication of *Aedes* mosquitoes, protection from mosquito bites, and immunisation reduce the risk. Jungle yellow fever can only be prevented by immunisation and personal protection against mosquito bites because of the wide range and distribution of mosquito vectors and mammalian hosts.

26.1 Yellow Fever Vaccination (Stamaril)

Yellow fever vaccine is a live, attenuated preparation of the 17D strain ofyellow fever virus grown in specific pathogen-free embryonated chick eggs. Each 0.5ml dose contains not less than 1000 mouse LD_{50} units.

26.2 Yellow Fever Vaccine Recommended Use

The yellow fever vaccination is recommended for the following groups:
laboratory workers handling infected material

- persons aged nine months or older who are travelling to countries that require an International Certificate of Vaccination for entry
- persons aged nine months or older who are travelling to or living in infected areas or countries in the yellow fever endemic zone (see maps on www.nathnac.org), even if these countries do not require evidence of immunisation on entry.

Vaccination is recommended for those individuals travelling to countries where they may be at risk of yellow fever infection and to prevent the international spread of the disease by *protecting countries* from the risk of importing or spreading the yellow fever virus. These are mandatory requirements established by the country.

26.3 Yellow Fever Vaccine Dosage & Schedule

First dose is 0.5ml. Further intervals if required.

A single dose correctly administered confers immunity in 95 to 100% ofrecipients. Immunity persists for at least ten years and possibly for life (Groot and Riberiro, 1962; Rosenzweig *et al*., 1963; Poland *et al*., 1981).

Re-immunisation every ten years is recommended for those at risk, although the vaccine is considered to confer longer protection.

26.4 Yellow Fever Vaccination Certification

Under the International Health Regulations (both those of 1969, and those of 2005, which are due to come into force in June 2007), states may require immunisation against yellow fever. A valid International Certificate of Vaccination is required as evidence. Country requirements are published annually by WHO in *International travel and health* (available at www.who.int/ith) (WHO, 2004), and are included in *Health information for overseas travel* (Department of Health, 2001).

The International Certificate of Vaccination is valid for ten years beginning from the tenth day after primary immunisation and immediately after re-immunisation if re-immunisation occurs within the ten-year period.

Countries that require proof of vaccination are those where the disease may or may not occur and where the mosquito vector and potential non-human primate hosts of yellow fever are present. Any importation of the virus by an infected traveller could result in its propagation and establishment, leading to a permanent risk of infection for the human population.
Proof of vaccination is often required for travellers coming from countries with risk of yellow fever transmission (including, sometimes, for travellers transitting through such countries). Some countries require proof of vaccination from all travellers.

For those who intend to visit countries where an International Certificate of Vaccination against yellow fever is required for entry, a letter of exemption should be issued by the Yellow Fever Vaccination Centre or by the practitioner treating the patient. This should be taken into consideration by the port health authorities at the destination

The Occupational Health department is a registered yellow fever vaccination centre with NaTHNaC.

26.5 Yellow Fever Vaccine Contraindications

There are very few individuals who cannot receive yellow fever vaccine when it is recommended..
The vaccine should not be given to:

- those aged five months or under
- those who have had a confirmed anaphylactic reaction to a previous dose of yellow fever vaccine
- those who have had a confirmed anaphylactic reaction to any of the components of the vaccine
- those who have had a confirmed anaphylactic reaction to egg
- those who have a thymus disorder
- and also to:
- patients considered immunocompromised due to a congenital condition, disease process or treatment (see Chapter 6).

Patients with any of the conditions described above who must travel should be informed of the risk of yellow fever and instructed in mosquito avoidance measures.

26.6 Yellow Fever Vaccine Precautions

People over 60 years of age
Based on the current evidence, for individuals who are aged 60 years or older, the risk of neurological and viscerotropic adverse events increases several-fold, such that neurological events occur at a rate of about 17 cases per million doses and viscerotropic events at a rate of 20.5 cases per million doses (Martin *et al*., 2001b; Marfin *et al*., 2005).

Host factors for yellow fever associated viscerotropic disease are not well understood, but it is clear that those with existing thymus disease and older adults are at more risk

A travel health risk assessment needs to take account of this.

26.7 Yellow Fever Vaccine – Side Effects

Adverse reactions following yellow fever vaccine are typically mild and consist of headache, myalgia, low grade fever and/or soreness at the injection site and will occur in 10 to 30% of recipients

Injection site reactions tend to occur from days one to five after immunisation. Systemic side effects also occur early but may last up to two weeks. Reactions are more likely to occur in persons who have no prior immunity to yellow fever virus .

Since 2001, a new pattern of neurological adverse events was recognised that occurred in older individuals. These events have now been termed yellow fever vaccine-associated neurological disease (YEL-AND). The clinical presentation of this new pattern of neurological events begins 4 to 23 days following receipt of vaccine with the onset of fever and headache that may progress to include one or more of confusion, focal neurological deficits, coma and Guillain-Barré syndrome.

Yellow fever vaccine-associated viscerotropic disease (YEL-AVD) is a newly recognised syndrome of fever and multi-organ failure that resembles severe yellow fever, first described in 2001 (CDC, 2001; Chan *et al*., 2001; Martin *et al*., 2001a; Vasconcelos *et al*., 2001). 2 to 7 days following vaccination, patients develop fever, malaise, headache and myalgias that progress to hepatitis, hypotension and multi-

organ failure; death has occurred in more than 60% of reported cases. Vaccine-derived virus has been isolated from several of the cases and yellow fever viral antigen has been detected in post-mortem samples (Martin *et al*., 2001a). As with YEL-AND, all cases have occurred in primary vaccinees without underlying yellow fever immunity.
In the reports of viscerotropic disease, 17% have had a history of thymus disease with subsequent thymectomy (Barwick Eidex, 2004). Thus, all patients with thymus disorders should not receive vaccine.

27 OCCUPATIONAL HEALTH MEDICATIONS

Occupational Health will offer the following topical and oral drugs to those staff where deemed necessary following risk assessment by the Occupational Health Nurse who is Registered on parts 1 or 2 of the NMC Register or Physician who is registered with the GMC in conjunction with the Consultant Microbiologist.

When dealing with HIV Post Exposure Prophylaxis the Occupational Health department will liaise with the GUM Consultant as per the Trust Inoculation Injury policy.

All new staff to Occupational Health are named as parties to this policy on joining the service. Those staff must have received instruction and undergone supervised practice in the administration of vaccines and oral/topical drugs. The Occupational Health Manager or Nurse Consultant will supervise this training.

The Occupational Health Physician, on agreement of competence, gives written authorisation (see Appendix 1). The written instruction is also signed by the individual Occupational Health Nurse, who retains a copy for their records and the original will be kept on file by the Occupational Health manager.

The following **intramuscular (IM) medicines** are administered by Occupational Health
Adrenaline

The following **oral medication/vaccines** are provided by Occupational Health
HIV Post Exposure Prophylaxis (PEP) (Truvada, Raltegravir)
Rifampicin
Cholera oral vaccine (See section 14 above)
Clarithromycin

The following **topical medication** are provided by Occupational Health;
Aciclovir cream
Bactroban Nasal ointment
Chlorempenicol Eye ointment
Permethrin 5% topical cream

27.1 Recommended Use of Medications in Occupational Health

Those oral and topical drugs listed above will only be administered by Occupational Health for staff in one of the following circumstances;

- those “at risk” from occupational exposure to blood borne viruses including HIV and infectious diseases such as Meningoccal meningitis infection.
- staff identified as having acquired MRSA infection and requiring clearance treatment
- staff who develop infectious disease such as herpes simplex (coldsores), conjunctivitis
- anaphlyaxis in staff post vaccination received in OH dept.

278 IM MEDICATION

28.1 ADRENALINE

Adrenaline injection 1:1000 BP for Anaphylaxis is kept for emergency use in the Occupational health department. See also the local Occupational Health Anaphylaxis guidelines which following the Resuscitation Council (UK) anaphylaxis algorithm

28.2 Adrenaline Recommended Use

Adrenaline 1:1000 injection should only be administered in the event of an anaphylactic response to medication / vaccination given by Occupational Health staff.

Anaphylaxis is defined by the Resuscitation Council UK as “a severe, life-threatening, generalised or systemic hypersensitivity reaction”.

28.3 Adrenaline Dose & Schedule

Adrenaline 1:1000 (1mg/ml) should be given IM preferably to the anterolateral thigh, in the event of anaphylactic reaction to medication / vaccination given to an individual by Occupational Health.

28.4 Adrenaline Contraindications

The main contraindication is hypersensitivity to adrenaline or sodium metabisulphite.

28.5 Adrenaline Precautions

As adrenaline is being administered by Occupational Health in a life threatening situation the benefits of administering the adrenaline would outweight the risk to the individual.

29 ORAL MEDICATIONS

29.1 HIV PEP

An emergency 3 day supply of HIV PEP medication is stored in the Occupational Health drug cupboard as provided by Pharmacy. It contains both Truvada and Raltegravir antiviral medication.

29.1.1 HIV PEP Recommended Use

HIV PEP will only be commenced by Occupational Health staff following completed of the Trust Inoculation Injury Risk Assessment/Action Form following potential Blood Borne Virus (BBV) exposure incident in health care work or other injured person and in consultation with the GUM Consultant, or if unavailable Occupational Health staff will liaise with the Consultant Microbiologist.

Occupational Health will provide an initial 3 day supply of HIV PEP to staff, or if a Bank holiday weekend two 3 day packs of HIV PEP will be given to ensure the staff member has enough HIV PEP medication to take until the GUM clinic is next open and they are seen by the GUM Consultant.

In view of the possible side effects from HIV PEP medication Occupational Health must also take bloods from the staff members for baseline LFT, U&E’s and FBC before

commencing HIV PEP treatment.

29.1.2 HIV PEP Dosage & Schedule

HIV PEP medications should be taken at the following intervals;

- **TRUVADA** – 1 tablet once daily with food
  [contains tenofovir disoproxil 245mg (equivalent to 300mg of tenofovir disoproxil fumarate and emtricitabine 200mg]
- **RALTEGRAVIR** – 400mg 1 tablets twice a day, twelve hours apart

The HIV PEP pack contains a medication information sheet for the staff member while the Trust Inoculation Injury policy also contains further information on HIV PEP which is provided to staff if HIV PEP is commenced.

29.1.3 HIV PEP Contraindications

The main contraindication for both Truvada & Raltegravir medication is Hypersensitivity to the active substances or to any of the ingredients.

Truvada – Nephrotoxic

Raltegravir caution with psychiatric illness (may be exacerbated underlying illness including depression) risk factors for myopathy and rhabdomyolysis

29.1.4 HIV PEP Side Effects

The most common side effects to Truvada & Raltegravir are nausea, vomiting diarrhoea hypertriglyceridaemia and hypercholesterolemia.

Other potential side effects include:

- Truvada: neutropenia, hyperglycaemia, hypertriglyceridemia, headache, insomnia, abnormal dreams, dizziness, rash, pruritus, urticaria and skin discolouration.

- Raltegravir: Abdominal Pain, abnormal dreams, asthenia, depression, diarrhoea, dizziness, dyspepsia, flatulence, headache, hyperactivity, hypertriglyceridemia, insomnia, nausea, rash, vomiting

29.1.5 HIV PEP use in Pregnancy & Breastfeeding

Advice should be sought from the GUM Consultant / Consultant Microbiologist where HIV PEP is recommended and a member of staff is or could be pregnant or breastfeeding.

29.2 Ciprofloxacin

Ciprofloxacin 500mg Stat oral medication is stored in the Occupational Health drug cupboard.

29.2.1 Ciprofloxacin Recommended Use

Ciprofloxacin will only be administered by Occupational Health staff where staff have been exposure to meningococcal meningitis in the course of their work.

Following a risk assessment of the exposure the need for chemoprophylaxis will be determined by Occupational Health in conjunction with the Consultant Microbiologist.

Chemoprophylaxis is recommended for those Health Care Workers whose mouth or nose is directly exposed to infections, respiratory droplets/secretions from a probable or confirmed case of meningococcal disease e.g. those staff who undertake airway management during resuscitation without wearing a mask.

Droplets and facial secretions are considered to be infectious from the onset of the acute illness until 24 hours of antibiotic treatment

General medical or nursing care of cases should not be regarded as an indication for prophylaxis

Health care workers should wear mask when carrying out procedures which may result in exposure to infections respiratory droplets

29.2.2 Ciprofloxacin Dosage & Schedule

Recommended Prophylaxis is Ciprofloxacin 500 mg stat dose. Once Only.

Exposed staff should be counselled about the low risk of meningococcal meningitis and subsequent invasive disease.

29.2.3 Ciprofloxacin Contraindications

Side-effects of the quinolones include nausea, vomiting, diarrhoea (rarely antibiotic-associated colitis), headache, and dizziness. Less frequent side-effects include dyspepsia, abdominal pain, anorexia, sleep disturbances, asthenia, confusion, anxiety, depression, hallucinations, tremor, blood disorders (including eosinophilia, leucopenia, thrombocytopenia), arthralgia, myalgia, rash (very rarely Stevens-Johnson syndrome and toxic epidermal necrolysis), disturbances in vision and taste. Other side-effects reported rarely or very rarely include hepatic dysfunction (including jaundice and hepatitis), hypotension, vasculitis, dyspnoea (more frequent with levofloxacin and moxifloxacin), convulsions, psychoses, symptoms of peripheral neuropathy (sometimes irreversible), renal failure, interstitial nephritis, tendon inflammation and damage (see also Tendon Damage above), photosensitivity, disturbances in hearing and smell. The drug should be **discontinued** if psychiatric, neurological or hypersensitivity reactions (including severe rash) occur

29.2.4 Ciprofloxacin Side Effects

Flatulence, pain and phlebitis at injection site; *rarely* dysphagia, pancreatitis, chest pain, tachycardia, syncope, oedema, hot flushes, abnormal dreams, sweating, hyperglycaemia, hypoglycaemia, and erythema nodosum; *very rarely* movement disorders, tinnitus, intracranial hypertension, and tenosynovitis; *also reported* peripheral neuropathy and polyneuropathy

29.2.5 Ciprofloxacin Use in Pregnancy & Breastfeeding

Pregnancy
Should be avoided in pregnancy because they have been shown to cause arthropathy in *animal* studies; safer alternatives are available; however, a single dose of

ciprofloxacin may be used for the prevention of a secondary case of meningococcal meningitis

Breastfeeding

Amount too small to be harmful but manufacturer advises avoid

29.3 Pertussis Antibiotic treatment for post exposure prophylaxis - Clarithromycin

Outbreaks of pertussis can occur in health care settings. If outbreak is detected promote action including chemoprophylaxis and vaccination of contacts can limit the spread.

29.3.1 Clarithromycin Recommended Use in Post Exposure Prophylaxis

Exposure in a health care setting unprotected direct face to face contact (<2 metre distance) for greater than a cumulative period of 1 ours with an infectious case or direct contact with respiratory secretions from an infectious case e.g. performing aerosol generating procedures or examination of nose and throat without appropriate personal protective equipment.

Antibiotic therapy should be instituted according to current PHE guidelines 2016: Guidelines for the Public Health Management of Pertussis in England

Following risk assessment of the exposure the needs for chemoprophylaxis will be determined by Occupational Health in conjunction with the Consultant Microbiologist.

General medical or nursing are of cases should not be regarded as an indication for prophylaxis
Clarithromycin will only be administer by Occupational health Staff were HCW have been exposed to Pertussis in course of their work.

29.3.2 Clarithromycin Dose and Schedule

Adult Health Care Worker who are not pregnant
Oral 500mg twice a day for 7 days

29.3.3 Clarithromycin Contraindications

Caution with concomitant use of drugs that prolong the QT interval.

29.3.4 Clarithromycin Side Effects

Main side effects include: dyspepsia, headache, hyperhidrosis, insomnia, taste disturbances.

30 TOPICAL MEDICATIONS

30.1 ACICLOVIR

Aciclovir 5% cream is stored in the Occupational Health drug cupboard.

30.1.1 Aciclovir Recommended Use

Aciclovir cream should only be used in the treatment of Trust Staff who have herpes simplex infection of the lips and face (cold sores)

30.1.2 Aciclovir Dosage & Schedule

Treatment should be initiated as soon as possible after the start of the infection, ideally during the prodromal period or when lesions first appear.

Aciclovir cream should be applied up to 5 times a day at 4 hourly intervals during the day.

Staff should wash their hands before and after applying the cream and avoid touching the affected area.

30.1.3 Aciclovir Contraindications

Known hypersensitivity to aciclovir constituents.

30.1.4 Aciclovir Use in Pregnancy & Breastfeeding

No specific studies have been carried out on the use of topical aciclovir cream on pregnant women. As a result aciclovir cream should only be used in Pregnancy where potential benefits outweigh the risk. If the individual is or could be pregnancy further advice should be sought from the Consultant Microbiologist or other relevant Specialist.

30.1.5 Aciclovir Side Effects

Mild drying of the skin.

30.2 BACTROBAN

Bactroban 2% nasal ointment (mupirocin calcium) is stored in the Occupational Health drug cupboard.

30.2.1 Bactroban Recommended Use

Bactroban should only be used in the clearance treatment for staff identified as having MRSA positive status and following discussions with the Consultant Microbiologist.

30.2.2 Bactroban Dosage & Schedule

Ointment should be applied to both nostrils three times a day for 5 days.

30.2.3 Bactroban Contraindications

Known hypersensitivity to any of bactroban ointment constituents.

30.2.4 Bactroban Use in Pregnancy & Breastfeeding

As there is no clinical experience of using Bactroban in pregnancy, it should only be used in Pregnancy where potential benefits outweigh the risk. If the individual is or could be pregnancy further advice should be sought from the Consultant Microbiologist or other relevant Specialist.

30.2.5 Bactroban Side Effects

It uncommon (≥1/1000, <1/100) to experience side effects as a result of Bactroban nasal ointment use, though Nasal irritation can occur

30.4 Permethrin 5% topical cream – Lyclear Dermal Cream – Scabies Topical Treatment

Scabies is treated with topical cream (Lyclear) permethrin.

30.4.1 Scabies is a highly infectious disease caused by Sarcoptes scabei.

Scabies, crusted: A severe form of scabies caused by delayed treatment of the initial infestation, characterized by mite-filled lesions covered with scabs. These lesions often fall victim to secondary infections, as with Staphylococcus bacteria. Crusted scabies is most common in people with immune-system problems, including AIDS, diabetes, and lupus. Also known as keratotic scabies.
Symptoms:-

Scabies almost always affects people with a compromised immune system and is observed most frequently in the elderly, those who are mentally or physically disabled, and in patients with AIDS, lymphoma, or other conditions that decrease the effectiveness of the immune response.

30.4.2 Permethrin 5% topical cream recommended use

Symptoms of Scabies

Presentation of Lesions
The lesions of this distinctive form of scabies are extensive and may spread all over the body. The elbows, knees, palms, scalp, and soles of the feet are most commonly the original sites of involvement, and the scaly areas eventually take on a wart like appearance. The fingernails can be thickened and discoloured. Interestingly, itching may be minimal or absent in this form of scabies.

The lesion occur mainly on the hands, finger webs, wrists and inside of arms, abdomen/waist, groin and under buttocks

Itching

Intense itching is aggravated by warmth and moistness, Itching occurs especially at night or after a hot bath or shower

Secondary Infection

A particular danger of crusted scabies is that these lesions often predispose to the development of secondary infections, as with Staphyloccoccus bacteria.

Transmission

The mite is transferred to other people by prolonged, direct skin to skin contact, epically via the hands.

Transfer from underclothes or bed linen may occur if these items have been contaminated by an affected person**.**

Incubation period - is up to 8 weeks after contact with an affected person. Skin penetration is visible as papules, vesicles or tiny linear burrows containing the mites

and their eggs

30.4.3 Dosage and Schedule

Adults – apply 5% preparation over whole body and wash off after 8-12 hours including face neck, scalp and ears: if hands are washed within 8 hours of application, they should be treated again with cream.
Repeat again after 7 days

Clean, cool, dry skin not directly after a bath

30.4.4 Permethrin 5% topical cream Contraindications

Avoid contact with eyes and mucous membranes
Do not use on broken or secondarily infected skin

30.4.5 Permethrin 5% topical cream Side Effects

The following side-effects have been associated with people having this medicine for treating scabies

- itching - this may persist for up to four weeks after treatment
- skin discomfort such as burning, stinging or tingling sensations
- redness of the skin
- skin irritation
- oedema
- eczema rash

31 DISSEMINATION & IMPLEMENTATION

The policy will be circulated to Drugs & Therapeutics committee for approval and forwarded to Clinical Governance for ratification. Once ratified the policy will be disseminated through the Aspire global email.

32 MONITORING

This policy will be monitored by the Occupational Health manager in conjunction with Pharmacy.

33 ARCHIVING

This is a Trust-wide document and archiving arrangements are managed by Quality Dept. who can be contacted to request master/archived copies.

34 REFERENCES

The Medicines Act 1968
The Prescriptions Only Medicines (Human Use) Order 1997
Immunisations against Infectious Diseases (The Green Book)
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_079917
Health Service Circular 2000/026 Patient Group Directions. Department of Health
See also Trust Policies on
Medicines Management Policy
Medicines & Vaccines Cold Storage Policy.
Management of Needlestick, Sharps, Human Bites & Contamination Accidents

(Inoculation Injuries) Policy
Guidelines for Public Health Management of Pertussis in England 2016
PHE Guidelines for the Public Health Management of Pertussis Incidents in Healthcare Settings 2016
Management of Infected Health Care Workers Policy
Pre Placement Policy
PHE Guideline for Public Health Management of Meningococcal Disease in the UK 2012
British National Formula https://www.medicinescomplete.com/mc/bnf/current/

Appendix 1

Occupational Health Medication / Vaccination Scheme

The following Prescription Only Medicines and Vaccination may be supplied and administered by Occupational Health nurses in accordance with this guideline

VACCINATION	FORM	DOSAGE & ROUTE	INDICATIONS
Bacullus Calmette-Guerin (BCG) Status Serum Institut (Danish strain 1331)	Single dose	0.1ml intrademral	Post Negative t-spot blood test, mantoux/heaf test result.
Cholera	Single dose	Sachet of sodium hydrogen carbonate mixed with 150ml cool water + 3ml Oral Cholera vaccine	Laboratory Workers / Travel vaccine

		solution added – taken orally.	
Diphtheria, Tetanus & Polio combined vaccine	Single dose vial	0.5ml intramuscular	Health Care workers / Laboratory Workers / Estates & Facility Workers / Travel vaccine
Diptheria, Tetanus Pertussis inactive polio combined vaccine Boosterix - IPV	Single dose pre filled syringe	0.5ml intramuscular	Health Care Worker in Post occupational exposure to pertussis. Only on advice from microbiologist.
Hepatitis A - Avaxim vaccine	Single dose pre-filled syringe	160u Antigens 0.5ml intramuscular	Laboratory Workers / Estates & Facility Workers / Travel vaccine
Hepatitis A – Havrix vaccine	Single dose pre-filled syringe	1440 elisa units 1ml intramuscular	Laboratory Workers / Estates & Facility Workers / Travel vaccine
Hepatitis A & Typhoid combined (Viatim) vaccine	Single dose pre-filled syringe	160 antigen units/25µg in 1ml intramuscular	Laboratory Workers / Travel vaccine
Hepatitis A & Typhoid combined (Hepatyrix) vaccine	Single dose pre-filled syringe	1440 elisa units / 25µg in 1ml intramuscular	Laboratory Workers / Travel vaccine
Hepatitis A & B combined (Twinrix) vaccine	Single dose pre-filled syringe	720 ELISA units 20 µg in 1ml	Laboratory Workers / Estates & Facility Workers / Travel vaccine
Hepatitis B (Engerix B) vaccine	Single dose pre-filled syringe	20u in 1ml intramuscular	Health Care workers / Laboratory Workers / Estates & Facility Workers / Travel vaccine
Hepatitis B (HepB vacc Pro) vaccine	Single dose pre-filled syringe	10u in 1ml intramuscular	Health Care workers / Laboratory Workers / Estates & Facility Workers / Travel vaccine
Hepatitis B Immunoglobulin	500Iu	5mls intramuscular (gluteal)	Post exposure prophylaxis following inoculation injury
Influenza Flu vaccine	Single dose pre-filled syringe	0.5ml intramuscular	All Staff
Japanese Encephalitis	Single dose pre-filled syringe	0.5ml intramuscular	Travel vaccine
Meningococcal ACWY	Single dose vial	0.5 ml deep subcutaneous	Travel vaccine
Measles Mumps Rubella (MMR II) vaccine	Single dose vial	0.5ml intramuscular	Health Care workers / Laboratory Workers / Travel Vaccine
Measles Mumps Rubella	Single dose vial	0.5ml intramuscular	Health Care workers /

(Priorix) vaccine			Laboratory Workers / Travel vaccine
Rabies vaccine	Single dose vial	1ml intramuscular	Travel vaccine
Tick-Borne Encephalitis	Single dose vial	0.5ml intramuscular	Travel vaccine
Typhoid (Typhim VI) vaccine	Single dose pre-filled syringe	0.5ml intramuscular	Travel vaccine
Varicella (Varivax) vaccine	Single dose vial	0.5ml subcutaneously	Health Care workers / Laboratory Workers
Yellow Fever (Stamaril)	Single dose	0.5 ml subcutaneously	Travel vaccine
Medication	**FORM**	**DOSAGE & ROUTE**	**INDICATIONS**
Aciclovir 2%	Cream	5 times daily Topically to lesion	Herpes simplex (cold sore) to lips or face.
Adrenaline 1:1000	Minijet	0.5 ml – 1ml intramuscular	Treatment of Anaphylaxis
Ciprofloxacin	500mg tabs	500mgs Stat PO	Chemoprophylaxis treatment in consultation with Consultant Microbiologist following occupational exposure to meningococcal disease.
Clarithromycin	500mg tablets	500mg bd PO for 7 days	Chemoprophylaxis treatment in consultation with Consultant Microbiologist following occupational exposure to pertussis.
Mupirocin (Nasal Bactroban) 2%	Nasal ointment	Apply 2-3 times day to both nostrils	MRSA positive staff
Permethrin 5% topical cream	Cream	Adults – apply 5% preparation over whole body and wash off after 8-12 hours including face neck, scalp and ears: if hands are washed within 8 hours of application, they should be treated again with cream. Repeat again after 7 days	Health Care Worker in Post occupational exposure to scabies. Only on advice from Consultant microbiologist.

Competency: **Occupational Health Medication / Vaccination Administration**

Standard Statement: **The Registered Occupational Health Professional will be competent in Medication / Vaccination Administration and can perform the activities satisfactorily without supervision or assistance with acceptable speed and quality of work.**

	Element of Competency The Registered Health Care Professional must:	**Assessment(s)** (Please record 'achieved' or 'not achieved' as '**A**' or '**N**' and date and initial)								**Comments**
		Date	Self	Mentor	A/N	Date	Self	Mentor	A/N	
A	Discuss Trust policy and procedures including, Medicines Management Policy and Single Nurse Drug Administration									
B	Demonstrate awareness of the medicines / vaccine cold chain storage requirements.									
C	Identify and discuss rationale for Single Nurse Drug Administration within Occupational Health									
D	Identify and discuss potential risks and complications, and how to deal with them for example, anaphylaxis									
E	Check the individual for sensitivities and drug interactions, note and act appropriately on any special instructions									

F	Explain procedure and rationale to the individual, and obtain valid consent									
G	Ensure that the individuals privacy and dignity is maintained at all times									
H	Discuss the possible side effects of vaccines and action to be taken including both live and inactive vaccines and medications.									
I	Identify and prepare equipment needed and demonstrate the ability to administer oral / topical medication and subcutaneous, intramuscular and intradermal vaccines. • Discuss health and safety issues and procedures related to administering vaccines									
J	Demonstrate the ability to order vaccines and medicines.									
K	Maintain accurate records, and ensure that all the relevant documentation is completed under Information Governance.									
L	Demonstrate the ability to record medication / vaccinations onto the OH specific IT system.									

M	Discuss any infection control risks associated.									
N	Explain and discuss the route of reporting complications and drug errors									
O	Complete the NHS Immunisation Programme training.									

OHA Name: _____

OHA Signature: _____ Date: _____

OH Manager /Nurse Consultant Name: _____

OH Manager /Nurse Consultant Signature: _____ Date: _____

OCCUPATIONAL HEALTH DEPARTMENT

Authorisation for the Administration of Medicines and Vaccinations under Ashford and St Peters Hospitals NHS Foundation Trust Only

This agreement refers to:_Insert Name of OHA

The Occupational Health Physician giving authorisation to this specific written instruction is

OH Physician Name:_____

GMC Registration Number _____

Signature:_____ Date:_____

I _____ am willing and authorised to

undertake treatments involving the use of prescription only medicines as listed in the guidelines for Administration of Prescription only Medicines and Vaccines of Ashford and St Peters Hospitals NHS Foundation Trust only. Furthermore I am willing to supply the pharmacy medicines listed by Ashford and St Peter's Hospitals NHS FT, exercising professional judgement and discretion.

OHA Name _____

NMC Registration Number _____

Signed_____ Date_____

Appendix 2

Ashford and St. Peter's Hospitals NHS
NHS Foundation Trust

OCCUPATIONAL HEALTH DEPARTMENT
GENERAL CONSENT FOR VACCINATION

Name: _____ Date of Birth: ____/____/____

PLEASE READ CAREFULLY AND SIGN BELOW

1.	**Are you pregnant or likely to become pregnant within the next month?**	**Yes**	**No**
	If Yes Do Not administer any LIVE vaccines and consider if Inactive vaccines can be delayed until after pregnancy.		
2.	**Are you taking any medication?**	**Yes**	**No**
	If yes, Please list medication:		
3.	**Have you any allergies, including eggs, antibiotics, latex?**	**Yes**	**No**
	If Yes, please specify your allergies:		
4.	**Any history of asthma, dermatitis, skin condition?**	**Yes**	**No**
	If Yes please provide details:		
5.	**Are you currently in good health and feeling well today?**	**Yes**	**No**
	If No please provide details, the vaccination may need to be delayed:		
6.	**Are you or any members of your household Immunocompromised in any way?**	**Yes**	**No**
	If Yes, consider if vaccination should be delayed and/or any advice sought from the relevant Specialist.		
7.	**Have you ever had a reaction from a vaccination in the past?**	**Yes**	**No**
	If Yes, please describe the reaction experienced:		
8.	**Are there any relevant medical problems you wish to discuss with the nurse?**	**Yes**	**No**
	If Yes, please provide details:		
9	**What type of vaccination is being given today?**		
	Live vaccine		
	• Ensure the staff member is aware they must not become pregnant for at least 4 weeks after having Varicella, Priorix MMR vaccine, Yellow Fever or BCG vaccine and up to 3 months post the MMR II vaccine being given. • Live vaccines can be give at the same time, otherwise there must be at least 4 weeks between each vaccine.		
	Inactive vaccine		
	• If the staff member is or could be pregnant consider if vaccination can be delayed.		
• I have read and understood the questions above and by signing below I declare that the information provided by me in this entire form is true and completed to the best of my knowledge. • I also confirm that I will update the Occupational Health Nurse if there have been any changes to my health between each vaccination received in Occupational Health.			
OH Nurse Comments:			

Signed:..... Date: ……..

Signed:..... Date: ……..

Signed: ..... Date: ……..

Signed: ..... Date: ……..

Signed: ..... Date: ……..

Signed: ..... Date: ……..

Ashford and St. Peter's Hospitals NHS
NHS Foundation Trust

VACCINATION RECORD

NAME:_____ **Date Of Birth:**____/____/_____

Hepatitis B Vaccination	**Date**	**Batch No.**	**Expiry Date**	**Injection Site**	**Signature**
Hepatitis B Primary 1					
Hepatitis B Primary 2					
Hepatitis B Primary 3					
Hepatitis B Repeat 1					
Hepatitis B Repeat 2					
Hepatitis B Repeat 3					
Hepatitis B Booster 1					
Hepatitis B Booster 2					
Hepatitis B Booster 3					
MMR Dose 1					
MMR Dose 2					
Varicella 1					
Varicella 2					
BCG Vaccination					
Hepatitis A Primary vaccination					
Hepatitis A Booster vaccination					
Revaxis (Diphtheria/ Tetanus/Polio)					
Typhoid:					

Appendix 3

Ashford and St. Peter's Hospitals NHS
NHS Foundation Trust

OCCUPATIONAL HEALTH DEPARTMENT
PRE-TRAVEL HEALTH QUESTIONNAIRE

Name	
Date of Birth	
Address	
Destination including stopovers	
Date of Travel / Departure	
Duration of Stay	
Type of Accommodation	
Will you be undertaking travel to rural, urban or both	
Purpose of Journey/Style of holiday	

Travel Health Assessment

Questions	**Yes**	**No**	**Comments if applicable**
Past Medical History			
Current Medical History / current medical/health conditions			
Current Medication			
Are you allergic to anything?			
Are you pregnant or planning a pregnancy?			
Are you feeling well today?			
Do you consider yourself to be immunocompromised? (Steroids, Chemotherapy, Radiotherapy, HIV)			
General Travel Health Advice	**Yes**	**No**	**Comments if applicable**
Has the client been provided with information leaflet regarding food, water, general safety/accidents, health insurance, safe sun, sexual health and bites prevention			
Anti malarial advice? If anti malarial are required has the client been directed to a pharmacist or GP practice for further information and necessary prescriptions			

Please list previous travel vaccinations with dates where applicable		**Recommended for this trip.**	
Travel Vaccines	**Dates Given / History known/Unknown**	**Yes**	**No**
Diphtheria, Polio & Tetanus			
Hepatitis A			
Hepatitis B			
MMR			
Meningococcal ACWY			
Rabies			
Typhoid			
Yellow Fever			

I have read and understood the above and consent to the administration of the vaccines identified by the nurse and any further appointments have been discussed

Client Signature		Date	
OH Nurse Name			
Signature of Nurse		Date	

PRE –TRAVEL VACCINATION RECORD

NAME:_____ Date Of Birth:____/____/_____

	Date	Batch No	Expiry Date	Site	OH Signature
Diphtheria, Polio, Tetanus combined(Revaxis)					
Hepatitis A Dose 1					
Hepatitis A Booster					
Hepatitis A & Typhoid combined (Hepatyrix / Viatim)					
Hepatitis A & B combined (Twinrix) 1					
Hepatitis A & B combined (Twinrix) 2					
Hepatitis A & B combined (Twinrix) 2					
Hepatitis B Dose 1					
Hepatitis B Dose 2					
Hepatitis B Dose 3					
Hepatitis B Booster					
MMR Dose 1					
MMR Dose 2					
Meningococcal ACWY					
Meningococcal ACWY Booster					
Rabies Dose 1					
Rabies Dose2					
Rabies Dose 3					
Rabies Booster					
Typhoid					
Typhoid booster					
Yellow Fever					

Appendix 4

OCCUPATIONAL HEALTH DEPARTMENT
INFLUENZA VACCINATION CONSENT FORM

SURNAME:- (BLOCK CAPITALS)		
FIRST NAME;- (BLOCK CAPITALS)		
DATE OF BIRTH:-		
JOB TITLE:-		
DEPARTMENT		
DIRECT PATIENT CARE	**YES**	**NO**
EMPLOYER / ORGANISATION		

Please inform the Occupational Health Advisor if any of the questions below are applicable to you.

Tick questions below as appropriate	**YES**	***NO***
Are you pregnant, or could you be?		
Do you consider yourself to be immunocompromised ?		
Are you allergic to eggs or chicken products?		
Are you allergic to Gentamicin/Neomycin?		
Do you currently have a fever, or do you feel unwell?		
Do you know of any reason why you should not receive the flu vaccine?		
Have you read the Flu Advice Leaflet (overleaf)?		
Comments		

I have read and understood the above and know of no reason why I should not receive the seasonal flu vaccine.	**Signature:**	

Flu Vaccine	Batch No.	Expiry Date	Administered by	Date Administered	Injection Site IM
					Left Deltoid Right Deltoid

WHAT is INFLUENZA

Influenza or flu is an infection caused by a virus.
It affects mainly the nose, throat, and the lungs.
There are three broad types of Flu virus A, B, and C. Most outbreaks of flu are caused by Type A.
Anyone can catch flu.
Most influenza infections occur during the winter months.
Flu is caught by breathing in the air containing the virus.
Flu is highly infectious and can spread rapidly from person to person.
Flu is worse than an ordinary cold. It usually starts suddenly with a high fever which lasts 3 -4 days. Headaches, chills and a dry cough are common as are general muscle aches and pains which can be server. A stuffy nose, sneezing and sore throat can also be present.

WHY IMMUNISE HEALTH CARE WORKERS

"Influenza immunisation is highly effective in preventing influenza to working age adults.
In addition, influenza immunisation of staff may reduce the transmission of influenza to vulnerable patients, some of whom may have impaired immunity and thus reduced protection from any influence vaccine the have received themselves."

Vaccination Info

The virus in the flu vaccine is inactivated and cannot cause flu.
Following vaccination you may get a slight temperature and aching muscle for a couple of days.
The Flu vaccine gives 70- 80% protection against infection with influenza virus which matches those in the vaccine.
The vaccination takes approx 10 -14 days for antibodies to reach protective levels. Protections last for about one year.
The flu vaccine should not be given to those who have experienced anaphylactic reaction to the flu vaccination or any part of the vaccine including neomycin, kanamycin and gentamicin and or reaction to egg products.

TELL THE NURSE **BEFORE** your flu vaccine if…….

- You feel unwell and have a temperature
- You are allergic to either eggs or chickens
- You have had a reaction to a previous flu jab
- You are pregnant
- You are allergic to antibiotics

AFTER YOU HAVE HAD YOUR FLU VACCINATION…….

- If you have a sore arm – *apply a cold flannel*
- If you have a headache or slight fever – *drink plenty of water. Painkillers may help*
- Flu vaccines do not cause Flu

This year's seasonal flu vaccine will protect against;
…….

If you are pregnant you will also be offered the flu vaccination. This is because the H1N1 virus will be circulating this winter and pregnant women who catch this strain are at an increased risk of severe disease and flu related hospital admissions. Further information is also available from the department of health website at www.dh.gov.uk

Ashford and St. Peter's Hospitals NHS
NHS Foundation Trust

Appendix 5

Occupational Health Department

BCG After-care advice

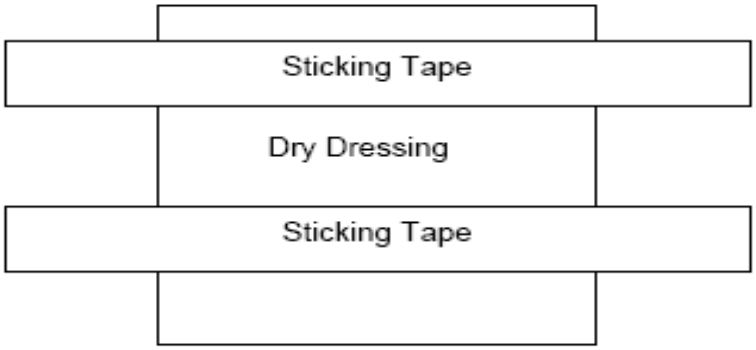
2-6 weeks after vaccination a small red pimple will appear at the site of the vaccination. This will increase in size over a few weeks, widening into a circular area of around 7mm in diameter. It may have scaling or crusting and occasionally bruising or an oozing discharge. Please do not squeeze this! This crust will regularly crack and fall off as part of the healing process. It should however, be kept dry as much as possible. Only apply a dry dressing to cover it as protection, if absolutely necessary (following the sketch below). Take care not to dislodge any scab that may have formed.

It is quite normal to have a small amount of swelling at and around the injection site after vaccination and you may even experience slight swelling in the glands in the armpit.

If the site is cracking and oozing, apply a water proof dressing over the site while swimming or bathing/showering but the plaster should be removed immediately afterwards. Take care when drying the site.

It normally takes 2-3 months for the site to heal up completely, leaving a small flat white scar. However, it is also normal for some sites to take several months to heal fully. BCG takes approximately 6 weeks to build an immune response to Tuberculosis.

When BCG is given, no further immunisation should be given in the same arm for 3 months. BCG may be given at the same time as another live vaccine (i.e. measles, MMR and rubella). However, if they are not given at the same time, a delay of 4 weeks is recommended between two live vaccines.



If you are concerned about the BCG site please contact the Occupational Health Department for advice on 01932 722404.

Appendix 6 Hepatitis B virus prophylaxis for report exposure incident

	Significant exposure			Non-significant exposure	
HBV status of person exposed	**HBsAg positive source**	**Unknown source**	**HBsAg negative source**	**Continued risk**	**No further risk**
< 1 dose of HB vaccine pre- exposure	Accelerated course of HB vaccine* HBIG x 1	Accelerated course of HB vaccine*	Initiate course of HB vaccine	Initiate course of HB vaccine	No HBV prophylaxis. Reassure
>2 does of HB vaccine pre-exposure (anti-HBs not known)	One does of HB vaccine followed by second dose one month later	One dose of HB vaccine	Finish course of HB vaccine	Finish course of HB vaccine	No HBV prophylaxis. Reassure
Known responder to HB vaccine (anti-HBs >10mIU/ml)	Consider booster dose of HB vaccine	Consider booster dose of HB vaccine	Consider booster dose of HB vaccine	Consider booster dose of HB vaccine	No HBV prophylaxis. Reassure
Known non-responder to HB vaccine (anti-HBs <10mIU/ml 2-4 months post immunisation)	HBIG x 1 Consider booster dose of HB vaccine A second dose of HBIG should be given at one month	HBIG x 1 Consider booster dose of HB vaccine A second dose of HBIG should be given at one month	No HBIG Consider booster dose of HB vaccine	No HBIG Consider booster dose of HB vaccine	No prophylaxis. Reassure

*An accelerated course of vaccine consists of doses spaced at zero, one and two months.

A hepatitis B booster vaccine should be considered when the injury occurs if the individual has not received one within the past 12 months and may also be given at 12 months post injury to those at continuing risk of exposure to HBV.

*HBIG to be obtained from consultant microbiologist on duty

Source: PHLS Hepatitis Subcommittee (1992)

Appendix 7 EQUALITY IMPACT ASSESSMENT

Background

- Description of the aims of the policy
- Context in which the policy operates
- Who was involved in the Equality Impact Assessment

This Policy aims to provide clear guidance to the Trust on the use of medications and vaccinations within the Occupational Health department.

This policies affects all Occupational Health staff administering medication and vaccinations.

Nadine Williams was involved in this risk assessment with comments from the Occupational Health manager and Deputy Chief Pharmacist before submission to the Drugs & Therapeutics Committee.

Methodology

- A brief account of how the likely effects of the policy was assessed (to include race and ethnic origin, disability, gender, culture, religion or belief, sexual orientation, age)
- The data sources and any other information used
- The consultation that was carried out (who, why and how?)

The Trust's Occupational Health Staff regardless of their race and ethnic origin, disability, gender, culture, religion or belief, sexual orientation, age are subject to the guidance set out in this policy.

This policy is informed by:
The Medicines Act 1968
The Prescriptions Only Medicines (Human Use) Order 1997
Immunisations against Infectious Diseases (The Green Book)
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_079917
Health Service Circular 2000/026 Patient Group Directions. Department of Health
See also Trust Policies on
Medicines Management Policy
Medicines & Vaccines Cold Storage Policy.
Management of Needlestick, Sharps, Human Bites & Contamination Accidents (Inoculation Injuries) Policy

The policy was submitted to the Occupational Health Manager and Deputy Chief Pharmacist for comment before submission to the Drugs & Therapeutics Committee for ratification.

Key Findings

- Describe the results of the assessment
- Identify if there is adverse or a potentially adverse impacts for any equalities groups

Measures required for those staff exposed to communicable disease are set out in this policy and applies to all staff regardless of their equality group.

Conclusion

- Provide a summary of the overall conclusions

This policy provides clear guidance to Occupational Health staff on the use of medication and vaccines within the department.

Recommendations

- State recommended changes to the proposed policy as a result of the impact assessment
- Where it has not been possible to amend the policy, provide the detail of any actions that have been identified
- Describe the plans for reviewing the assessment

No further changes are required to the policy as a result of the impact assessment.

The policy will be reviewed again in 3 years or as required if there is a significant change in medicines / vaccination guidance from the Department of Health.