

CHILDHOOD DISEASES AND VACCINATIONS

Year One

Parents who refuse to vaccinate their children are inflicting a form of child abuse. They are saying that their opinion is better informed than that of virtually all doctors, university researchers, local councils, state governments, national governments and the World Health Organisation.

In 1956 I can remember as a child queuing for hours at the Hobart Town Hall to receive a polio vaccine as the last polio epidemic to rage across Australia occurred in that year.

THE ONLY DISEASE TO BE EVER ERADICATED BY VACCINATION IS SMALLPOX.
Measles and polio are on the verge of eradication.

2010 AUSTRALIAN CHILDHOOD VACCINATION SCHEDULE

<u>Age</u>	<u>Disease Immunised Against (Abbreviation) [Trade name of vaccine]</u>
Birth	Hepatitis B
2 months	Hepatitis B, Haemophilis Influenzae type B (Hib), Tetanus, Diphtheria, Pertussis, Polio [Infanrix Hexa] Pneumococcal (Strep. Pneumoniae) (7vPCV) [Prevenar] Rotavirus (oral) [Rotateq]
4 months	Hepatitis B, Haemophilis Influenzae type B (Hib), Tetanus, Diphtheria, Pertussis, Polio [Infanrix Hexa] Pneumococcal (Strep. Pneumoniae) (7vPCV) [Prevenar] Rotavirus (oral) [Rotateq]
6 months	Hepatitis B, Haemophilis Influenzae type B (Hib), Tetanus, Diphtheria, Pertussis, Polio [Infanrix Hexa] Pneumococcal (Strep. Pneumoniae) (7vPCV) [Prevenar] Rotavirus (oral) [Rotateq]
12 months	Hepatitis B, Haemophilis Influenzae type B (Hib) [Comvax] Measles, Mumps, Rubella (MMR) [Priorix] Meningococcal C (MenCCV) [Meningitec] Pneumococcal (7vPCV) [Prevenar] (Aboriginal and Torres Strait Islander children only)
18 months	Chickenpox (VZV) [Varilrix] Hepatitis A [Vaqta] (Aboriginal and Torres Strait Islander children only)
2 years	Pneumococcal [Pneumovax 23] (Aboriginal and Torres Strait Islander children only) Hepatitis A [Vaqta] (Aboriginal and Torres Strait Islander children only)
4 years	Diphtheria, Tetanus, Pertussis, Polio [Infanrix IPV] Measles, Mumps, Rubella (MMR) [Priorix]

THIS SCHEDULE CHANGES REGULARLY AS NEW AND MODIFIED VACCINES ARE INTRODUCED
DIFFERENT SCHEDULES ARE USED IN OTHER COUNTRIES

13 injections and 3 oral vaccinations to protect against 12 diseases.
In Aborigines, four additional injections and one additional disease.

CHILDHOOD **VIRAL** DISEASES PREVENTED BY VACCINATION

CHICKENPOX

Chickenpox (varicella) is a generalised infection caused by the virus *Herpes zoster*. Infection occurs when the virus passes to another person from the fluid-filled blisters that cover the body of patients, or in their breath and saliva. Patients are infectious for a day or two before the spots appear, and remain infectious for about eight days. The incubation period is 10 to 21 days.

Early symptoms are similar to those of a common cold, with a vague feeling of being unwell, headache, fever and sore throat. The rash usually starts on the head or chest as red pimples, then spreads onto the legs and arms, and develops into blisters before drying up and scabbing over. New spots may develop for three to five days, and it may be two weeks or more before the last spot disappears. The diagnosis can be confirmed by varicella antibody blood tests, but none are usually necessary.

Treatment involves bed and home rest until the patient feels well, and medications to relieve the itch (eg. calamine lotion, antihistamines), fever and headache. Children must be excluded from school for at least five days from the appearance of the first blisters and until all blisters have developed a dry scab.

There is a vaccine has been available since 2000 to prevent the disease. One injection is necessary if given between 12 months and 12 years of age, but two injections six weeks apart in older children and adults.

Complications are more common in adults, and include chest infections and a type of meningitis. It is unusual for the pockmarks to scar unless a secondary bacterial infection occurs.

Complete recovery within ten days is normal. Once a person has had chickenpox, it is unlikely (but not impossible) that they will ever catch it again.

Once a patient has had chickenpox, the virus never leaves their body but migrates to the nerves along the spinal cord where it remains forever. The virus may be reactivated years later at times of stress to give the patient the painful rash of shingles.

HEPATITIS B

Hepatitis B is not, of course, an exclusively childhood disease, but is vaccinated against in childhood.

Hepatitis B (serum hepatitis) is a viral infection of the liver that can only be caught by intimate contact with the blood or semen of a person who has the disease or is a carrier of the disease. Examples include receiving blood from a carrier, using a contaminated needle, rubbing a graze or cut on an infected person's graze or cut, having an infected person's blood splash into your eye, being bitten by an infected person, or most commonly by having sex (homosexual or heterosexual) with them. 90% of babies born to mothers who are carriers catch the disease. The highest incidences are amongst homosexual men, drug addicts who share needles, Australian Aborigines, and the disease is widespread in Southeast Asia. Blood banks screen all donations for hepatitis B. Splashes of blood into an eye or onto a cut or graze can spread the disease, and doctors, dentists, nurses and other health workers are therefore at risk.

There is a long incubation period of six weeks to six months, and the infection cannot be detected during this period. Once active it causes the patient to be very ill with a liver infection, fever, jaundice, nausea and anorexia. Some patients develop only a very mild form of the disease but they are still contagious and may suffer the long-term effects.

Blood tests are available to detect antibodies against the various hepatitis viruses and diagnose the type of hepatitis and monitor its progress.

It has been possible to vaccinate against hepatitis B since 1986. Three injections at intervals of one month and six months gives at least five years protection. It should not be used during pregnancy unless essential, but accidental vaccination during pregnancy is unlikely to cause any significant problem. It is now given routinely to children from birth onwards. Local soreness, swelling, redness and tissue hardness are the most common side effects. Unusually headache, dizziness, fever, myalgia, tiredness, nausea, diarrhoea, arthralgia and a rash may occur.

Treatment involves bed rest, and a diet that is low in protein and high in carbohydrate, and alcohol is forbidden. Sometimes it is necessary to give medication for nausea and vomiting and to feed severely affected patients intravenously for a short time.

Patients must ensure that they are no longer infectious before having sex with anyone and have regular blood tests throughout their life to detect any liver damage. Nine out of ten patients recover completely after a few weeks, but one in ten become chronic carriers. 10% of patients develop cirrhosis, failure of the liver or liver cancer, and about 1% of patients develop a rapidly progressive liver disease that causes death.

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MEASLES

Measles (technically called morbilli or rubeola) is a highly contagious *Morbilli* virus infection that is contagious from five days before the rash appears until it disappears. The incubation period is 10 to 14 days. It was originally a disease of cattle that was only passed to humans after these animals were domesticated 8000 years ago.

It starts with the cold-like symptoms of a snuffly nose, cough and red eyes. A rash develops about four days later, starting in the mouth where tiny white spots appear on the lining of the cheeks (Koplik spots). Dark red blotches then develop on the face and gradually spread across the body, remaining for a week or more before gradually fading. Other symptoms include a high fever and eye discomfort with bright lights. The patient often starts to feel better once the rash has reached its maximum spread.

The diagnosis can be confirmed by blood tests if necessary, and previous exposure to the measles virus or vaccine can also be confirmed by specific antibody blood tests.

There is no specific treatment. Rest, paracetamol and medication are used to relieve the cold symptoms, and vitamin A supplements appear to reduce the severity of an attack. Children must be excluded from school for at least four days after the appearance of the rash.

Measles may be prevented by a vaccination, which is usually given at one and four years of age in combination with the mumps and rubella vaccine, and with widespread vaccination, it is becoming a rare infection in developed countries, and may be totally eradicated by 2020.

Complications include encephalitis (a serious brain infection), pneumonia, ear infections and damage, and possibly the increased risk of developing multiple sclerosis later in life. Immediately after an attack patients are susceptible to other infections, and a significant number will develop tonsillitis, ear and lymph node infections.

The prognosis is usually very good, but significant complications occur in one in every 200 cases, and death occurs in one in every 5000 cases in developed countries, while in third-world countries one in ten children or adults who catch measles will die.

MUMPS

In the 19th. Century, mumps was believed to be “a specific morbid miasma, generated during peculiar conditions of the atmosphere.” We now know that it is a viral infection of the salivary glands in the neck caused by a paramyxovirus, and it usually occurs in childhood. The responsible virus spreads in microscopic droplets of fluid that come from the nose and mouth. The incubation period is two to three weeks, and the patient is infectious from one or two days before the symptoms appear until all the swelling of the glands has disappeared. An attack usually gives lifelong immunity.

The symptoms may include fever, swollen tender salivary glands just under and behind the jaw, headache, and malaise. Sometimes one side of the neck is involved, and not the other, then the other side may swell up several days after the first side has subsided. Patients often experience additional pain in the gland if spicy or highly flavoured food is eaten, or even smelled. It may be a significant disease, particularly in adults, when inflammation of the brain, testicles (orchitis) and ovaries (oophoritis) may occur. The kidneys, heart and thyroid gland may also be damaged, and very rarely, death may occur. Mumps orchitis may result in permanent damage to the testicles and infertility, particularly in adults.

Treatment involves rest, with aspirin or paracetamol and/or codeine for the pain and fever. Recovery is usually uneventful after an eight to twelve day course. Exclusion from school is mandatory for the course of the disease.

A vaccine is available that gives lifelong protection, and is usually given combined with those against measles and rubella at twelve months and four years of age. The mumps vaccine was first introduced in 1980.

POLIO

Polio (the full name is poliomyelitis) is a generalised viral infection, which passes from one person to another through droplets in the breath or by touch, and attacks muscles. It has been eradicated in developed countries, but still occurs in some poorer countries.

The symptoms are severe muscle spasm followed by paralysis and muscle contractures. If the muscles of breathing or the heart are affected, the patient may die or remain on a respirator for life. It is diagnosed by specific blood tests.

No treatment is available other than general physical support and muscle relaxants, and the overall prognosis is poor. Many patients recover, but most of them have significant disabilities.

Oral (Sabin) and injected vaccines are available. The injected form is now preferred as it is more stable in tropical climates and more effective. They are extremely effective, safe, and have no significant side effects.

Unfortunately, after being nearly totally eradicated in the late 1990s, polio is making a comeback in some areas due to misinformed objections to the vaccine.

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ROTAVIRUS

The rotavirus is responsible for many cases of gastroenteritis, particularly in children. It is named because of it appears like a rotating spoked wheel when seen under an electron microscope. It spreads from the faeces of one person to the mouth of another to continue its infective cycle. Many animals may also act as a reservoir of infection. Children should be excluded from school until no loose bowel movement for 24 hours.

An oral vaccine became available in 2007.

GASTROENTERITIS

Gastroenteritis is a viral infection of the gut. The rotavirus is one of the most common viruses responsible, particularly in children, and it often appears in epidemics, and usually in spring or early summer. It passes from one person to another through contamination of the hands and food. Another virus that may be responsible is the Astrovirus amongst many others.

Patients develop an uncomfortable feeling in the stomach, gurgling, cramping pains and then vomiting. A few hours later the vomiting starts to ease, and diarrhoea develops. The infection lasts from one to three days and young children may become rapidly dehydrated and require urgent hospitalisation.

Usually no investigations are necessary, but faeces tests may be performed if another cause is suspected and blood tests are sometimes necessary for dehydration.

The treatment involves a specific diet to replace the fluid and vital salts that are rinsed out of the body by the vomiting and diarrhoea, and then careful reintroduction of foods. In adults, medications can be used to slow diarrhoea, and paracetamol can be used for belly pain at all ages. Some children develop intolerance to milk sugar (lactose) after the infection, and this may prevent them from returning to a normal diet for weeks or months.

GASTROENTERITIS DIET

Take small amounts of food and fluids very frequently (every hour), rather than large amounts three times a day.

DAY 1 CLEAR FLUIDS ONLY.

Repalyte, Hydralyte and Gastrolyte (available from chemists and taste better if cold) are best, but white grape juice, clear soups, Bonox, very dilute flat lemonade, very dilute cordial, and frozen cordial may be used for a short time in milder cases. Average 50 mLs. an hour for a child, 100 mLs. an hour for an adult.

Do NOT drink plain water.

Isomil, Prosobee, Infasoy etc. can be used as a milk substitute in infants.

Lactose free milk ("Lactaid") may be used.

Breast milk is perfect for infants even with gastroenteritis.

DAY 2 LIGHT DIET.

Continue clear fluids and add bread, toast, boiled rice, dry biscuits (eg: quarter slice of bread, half a dry biscuit every half hour) .

DAY 3 ADD NUTRITION.

Boiled vegetables, fruits, white meats (chicken breast, fish), cereals.

DAY 4 GRADUALLY INCREASE FOOD INTAKE

Until return to normal.

AVOID

All dairy products (eg: milk, cream, cheese, butter, ice cream, custard, yoghurt), eggs, red meat, fatty and fried foods until completely better.

RUBELLA

German measles (rubella) is a contagious viral infection caused by a Togavirus, which is widespread in the community, and causes epidemics every few years. It spreads from one person to another with coughs and sneezes, but can be caught only once in a lifetime, although an infection in a child may be so mild that it is completely overlooked. The incubation period is two to three weeks.

Infection occurs most commonly in children, and produces a fine rash over the body that lasts only two or three days, is not itchy, and is not accompanied by the sore eyes and cold symptoms associated with common measles. There are often some enlarged lymph nodes at the back of the neck, and in severe cases there may be a fever, runny nose and joint pains.

If a pregnant woman catches the disease between the sixth and twelfth weeks of pregnancy, infection may cause blindness, deafness, heart damage and other serious defects to her child. As a result, an antibody blood test is sometimes done to confirm the disease or determine the immune status of a pregnant woman.

Paracetamol for fever and discomfort is all the treatment that is necessary. Children must be excluded from school for four days after the rash first appears.

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An effective vaccine is available, and all children are now given mumps, measles and rubella as a combined vaccine at one and four years of age. Once infected with, or vaccinated against rubella, antibody levels rise permanently and reinfection is not possible.

INFLUENZA

Influenza (the flu or gripe) is a debilitating generalised viral infection caused by one of the more than 80 known strains of the influenza virus. Influenza was originally a disease of pigs and ducks, that passed to humans only after these animals were domesticated seven thousand years ago. It was once thought to be due to “influences in the atmosphere”, thus giving its name. The various flu virus strains are named after the places where they were first isolated. It spreads by microscopic droplets in a cough or sneeze from one person to another.

Muscular aches and pains, overwhelming tiredness, fever, headache, cough, runny nose, stuffed sinuses, painful throat and nausea are the main symptoms. It can be a very serious disease, but deaths are now rare except in the elderly and debilitated.

The diagnosis of influenza, and the specific form present, can be confirmed by a blood test that detects a specific immunoglobulin antibody. The test is not routinely performed as it does not change the treatment and often serves no useful clinical purpose.

Influenza can now be cured, but only if the antiviral medication (zanamivir or oseltamivir) is given within the first 36 hours of symptoms developing. Otherwise rest and time, aspirin, anti-inflammatory drugs and medications to help the phlegm and cough are given. A light nutritious diet that contains minimal fat, and a higher than normal fluid intake are sensible.

Influenza can be prevented by an annual vaccination in autumn, which gives more than 80% protection from contracting the infection, but only for one year as the formulation varies every year to match the strains of flu virus present in the community. Two injections a month apart are required for a first vaccination if under 18 years of age. It may be used in pregnancy and breastfeeding, but is used in children only if specifically indicated. Do not have a flu vaccine if suffering from Guillain-Barré syndrome, AIDS a high fever or if allergic to eggs, poultry products, neomycin, polymyxin or gentamicin. Side effects may include local discomfort and redness at the injection site, and uncommonly fever and muscle pain.

Influenza vaccine gives only limited protection, but this increases with subsequent doses. It should be given to persons over 65 years, persons with debilitating illness, persons with chronic diseases (eg: of the lung, heart, kidneys etc.), persons undergoing immunotherapy, all health and medical personnel and anyone who wishes to avoid catching the flu that season.

Unfortunately the vaccine does not prevent the common cold, and many people who complain that their flu shot has not worked are suffering from a cold caused by yet another group of viruses.

Amantadine tablets will prevent type A influenza while they are being taken. Secondary bacterial infections of the throat, sinuses, lungs and ears may occur, which can be treated with antibiotics.

Influenza normally lasts for seven to ten days, and the vast majority of patients recover without complications.

MORE USELESS MEDICAL INFORMATION

About 12 million bacteria call every square centimetre of your skin home. Germaphobes don't need to worry however, as a majority of these are entirely harmless and some are even helpful in maintaining a healthy body.

CHILDHOOD **BACTERIAL** DISEASES PREVENTED BY VACCINATION

DIPHTHERIA

Diphtheria is a childhood respiratory infection that is now rare in developed countries.

It is caused by infection of the throat and trachea by the bacterium *Corynebacterium diphtheriae* which releases a toxin that is responsible for most of the symptoms and complications. It spreads from one person to another in the breath, and the incubation period is two to seven days.

Symptoms include pharyngitis, fever, rhinitis, hoarse voice, overwhelming malaise, weakness and muscle aches. A thick, grey, sticky discharge forms a membrane across the throat that the patient constantly fights to clear. The diagnosis is confirmed by throat swabs, and heart involvement by an electrocardiograph (ECG).

Rapid, early treatment is critical and involves diphtheria antitoxin injection, antibiotics (kill the bacteria but do not remove the toxin), and medications to control or prevent complications. In severe cases a tracheotomy (cut into the front of the throat) is performed to allow air into the lungs.

Diphtheria can be totally prevented by vaccination. These vaccinations were first introduced in the 1930s. It is normally given in combination with other vaccines at two, four and six months and four years of age, then every ten years through life.

Severe cases may affect the heart, nose, skin and nerves. Survivors may be affected for life by damage to the heart or lungs.

The death rate varies from 10% to 30%, and most deaths occur within the first day or two. Survivors improve in a few days, but must be kept at rest for at least three weeks to prevent complications, as it will take this time to for all the toxin to be removed from the body.

HAEMOPHILUS INFLUENZAE B INFECTION

Haemophilus influenzae B (HiB) is a bacterial infection spread by close contact and can cause infections in any age group, but is far more serious in children.

In children it may cause:-

- Meningitis that results in a fever, irritability, lethargy, seizures and coma. The onset of meningitis may be so rapid that the child may be permanently affected (eg: by deafness, learning difficulties and other forms of brain damage) before any treatment can work.

The meninges are the three membranes surrounding the brain and spinal cord.

- Epiglottitis which is a life threatening infection of the epiglottis that may swell and block the pharynx leading to death by asphyxiation.

The epiglottis is a leaf shaped piece of cartilage that projects up, towards the back of the tongue from the base of the pharynx. The epiglottis moves back and forward to direct food into the top of the oesophagus (gullet) and prevent food from entering the larynx and trachea. If the epiglottis fails to function properly, and food or fluid goes into the larynx, a coughing reflex is stimulated to force it back up and then down into the correct path.

In adults it may cause a serious form of pneumonia and less serious types of pharyngitis, sinusitis, otitis media, bronchitis, septic arthritis, skin infection, endocarditis and meningitis. Adults with reduced immunity (eg: in AIDS) may have the same serious infections as children.

Blood and fluid from the spinal cord can be tested to confirm the diagnosis.

Infections in adults can be readily treated with appropriate oral antibiotics with minimal long-term complications. In children far more potent parenteral antibiotics are needed. The swollen epiglottis may choke the child before the antibiotics can work, so urgent hospitalisation and intubation is essential.

Good recovery occurs if the infection is diagnosed and treated early, but permanent damage or death are possible in children if treatment delayed.

A vaccine for infants has been available since 1993 to prevent HiB infections, starting at two months of age. It is not recommended for use in adults, but is unlikely to cause problems if given accidentally. Common side effects may include redness and soreness at the injection site, while unusual effects may include irritability, tiredness, sleeplessness, diarrhoea and a rash. It should be used with caution in fever, acute infection or immune system problems. It must not be inject into a vein.

MENINGOCOCCAL MENINGITIS

Meningococcal meningitis is an uncommon, serious bacterial infection of the meninges and blood (septicaemia). Sporadic outbreaks occur worldwide, usually in winter, but up to 40% of the population carry the responsible bacteria in their nose and throat without any symptoms. Infection is more common in closed

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communities such as military camps and boarding schools. It affects about one person in every 100,000 every year.

The infection is caused by the bacteria *Neisseria meningitidis*, which occur in 5 common strains (forms), and several dozen uncommon strains. The C strain is the most serious, while strains M, W and Y are probably next in severity, but this varies between patients. It is spread by prolonged close contact with a person who has the disease by inhaling their sputum or phlegm in coughs and sneezes.

Symptoms include a high fever, severe headache, vomiting, neck and back stiffness, limb pains, confusion, convulsions and a rapidly spreading bruise like rash that starts on the arms and legs. The rash does not go white with pressure under a glass slide, a symptom that is critical in differentiating Meningococcal infections from other rashes, although there are some other infective rashes that do the same thing. In terminal stages the patient becomes delirious, and goes into a coma. Rarely, abscesses may form in the brain, and pneumonia may develop.

Cultures of blood and/or spinal fluid from the lower back can confirm the presence of the responsible bacteria, then penicillin, or more potent antibiotics, are given by injection as soon as the diagnosis is suspected. The patient should be admitted to hospital for confirmation of the diagnosis, and continuation of intravenous antibiotics. Life support in an intensive care unit may be necessary. The infection may be rapidly progressive causing death within hours, but overall 80 to 90% of all cases survive, with only 5% of survivors developing long-term consequences such as epilepsy.

A vaccine is available and is now part of the routine childhood vaccination schedule at 12 months of age.

PERTUSSIS

Whooping cough (pertussis) was originally an infection of ducks that only passed to humans after these birds were domesticated many thousands of years ago. It is now a preventable bacterial infection of the respiratory tract that may be very serious in children. A much milder form of the disease (parapertussis) is also known, against which the pertussis vaccine gives no protection.

The cause is the bacterium *Bordetella pertussis*, which is widespread in the community. In adults an infection merely has the symptoms of a cold, but in young children the disease is more severe, and spreads from person to person in the breath, so an adult with minimal symptoms may carry the disease from one infant to another. The incubation period is one to two weeks.

It starts in a child as a cold that lasts a week or two, but then the cough becomes steadily more severe and occurs in increasingly distressing spasms, characterised by a sudden intake of breath before each cough. Coughing spasms may last up to 30 minutes, and leave the child exhausted, then another spasm starts after only a few minutes. As the infection worsens, the child may become blue, lose consciousness, and thick stringy mucus is coughed up and vomited. The patient has no appetite and rapidly loses weight. Severe coughing may cause bleeding in the lungs, throat and nose, that may be severe enough to cause suffocation. If the child survives, the spasms start to ease after a few weeks, but mild recurrences may occur for months. Permanent lung damage is also possible.

The diagnosis can be confirmed by analysis of a sputum or throat swab. Pertussis IgA antibodies are normally not present, but a positive result indicates a recent or current pertussis infection. A swab taken from the nasopharynx is tested. The result is positive early in infection, but short lasting. The equivalent blood test (pertussis IgA antibodies) increase late, and persist long term, but only occur with infection, not vaccination.

No cure is available, but the disease may be completely prevented by a vaccination that is usually combined with those for tetanus, diphtheria and other vaccinations, and is given three times before six months of age, and again at four years of age. The vaccination was first used in the 1930s. The vaccine should not be given if suffering from acute illness, significant fever or epilepsy or if previously infected with whooping cough. The side effects are normally minimal but may include local redness and tenderness at the injection site, a persistent lump, fever, tiredness, irritability and a faint.

The treatment of whooping cough involves oxygen, sedatives and careful nursing isolated within a hospital for several weeks. Antibiotics can be used to prevent the spread of the disease to others.

Even in good hospitals about 2% of patients die, and up to 10% have long term complications. In poorer countries, the mortality rate is much higher.

PNEUMOCOCCUS

The *Pneumococcus* bacteria are a subspecies of the bacteria *Streptococcus pneumoniae* that may cause pneumonia and meningitis. More than 85 subtypes of *Pneumococcus* are known. A vaccine has been developed to give protection against 17 of the most common subtypes responsible for infection in humans. The vaccine is given to children at 2, 4 and 6 months of age. An additional dose is given at 18 months to Aboriginal children who are at higher risk of catching this infection later in life. A similar vaccine is now also used routinely for most older people.

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TETANUS

Tetanus (lockjaw) is a very serious worldwide disease that attacks muscles. The bacterium *Clostridium tetani*, which lives harmlessly in the gut of many animals, particularly horses, is responsible. When it passes out in faeces it forms a hard microscopic cyst, which contaminates soil. It can remain inactive for many years until it enters a cut or wound where it starts multiplying and produces a toxin which spreads throughout the body. Deep wounds, such as treading on a nail, are particularly susceptible to a tetanus infection.

The toxin attacks the small muscles used for chewing making it difficult to open the mouth (thus the common name of lockjaw). Larger and larger muscles are then attacked, irritating them and causing severe spasm. Excruciating pain from widespread muscle spasms may be triggered by the slightest noise. The patient remains conscious, but eventually the muscles that control breathing and the heart are affected.

There is no effective treatment other than muscle relaxants and mechanical ventilation. Although the bacteria may be killed by antibiotics, the toxin remains in the body. Death occurs in about 50% of patients, even in good hospitals.

A vaccine (tetanus toxoid) is available, but it does not give lifelong protection, and revaccination is necessary every ten years until age 50, or after five years with a deep wound.

YET MORE USELESS MEDICAL INFORMATION

Most bacteria are 1000 times larger than a virus.

OTHER COMMON CHILDHOOD VIRAL DISEASES

BRONCHIOLITIS

The respiratory syncytial virus (RSV) is responsible for bronchiolitis, a lung infection of children under two years of age. The infant develops a cough and wheeze, dyspnoea and rhinorrhoea. In severe cases, the child may be very weak, blue around the mouth and dehydrated.

Antibiotics cannot cure this viral condition but are sometimes given to prevent pneumonia. Bronchodilator medications may be used but often are of little help. Placing the child in a warm room with a humidifier, or in a steam tent may give relief. More severe cases will require hospitalisation, where steroids are given and oxygen may be administered into a steam tent to assist with breathing. Tribavirin is an antiviral medication that was introduced 1999 to treat severe bronchiolitis

The vast majority of cases settle without complications in a few days to a week.

COXSACKIE VIRUS INFECTION

There are two main types of *Coxsackie* virus (A and B), but these are further broken down into more than 50 subtypes.

The symptoms depend on where the infection occurs. It may cause viral meningitis, cold like symptoms, fevers, ulceration of the mouth and throat (herpangina), inflammation of the pleura around the lungs (Bornholm disease), hand foot mouth disease, myositis (inflammation of muscles), and inflammation of the heart or the pericardium that surrounds the heart. Rarely, if the heart is infected, it may be permanently damaged.

There is no cure other than time and rest, but symptoms may be eased by appropriate medication when necessary. Most patients recover uneventfully unless the heart is involved.

See also HAND, FOOT MOUTH DISEASE

CROUP

Croup (or stridor) causes a harsh whistling when breathing in, and is usually followed by a cough.

By far the most common cause is a minor viral respiratory infection of children under five years of age, affecting the pharynx (lower throat). If a constant high fever occurs, and the child becomes particularly lethargic, bacteria may be responsible. The condition may be very distressing to both child and parents, but is rarely serious.

Affected children have a seal-like barking cough, difficulty with taking a breath in, and excessive chest movement with breathing. There is usually only a slight fever, and minimal throat pain. Very rarely, the child may develop severe swelling in the throat that totally obstructs breathing, which is a critical emergency.

Medications and steam will ease the symptoms. Nurse the child in a warm, moist, steamy environment (eg. use a vaporiser). Paracetamol is given for fever or discomfort, and lots of fluid to prevent dehydration. In more serious cases, prednisone is prescribed and a steam and oxygen tent may be used in hospital to assist breathing. The vast majority of children recover spontaneously within a day or two.

There are many other causes of croup including epiglottitis, glandular fever (infectious mononucleosis), diphtheria, foreign bodies (eg. peanut, small toy), polyps, cysts, tumours, bruising, an abscess and other growths in the larynx or throat, and laryngomalacia (rare condition of children in which the cartilage of the larynx is softened, and collapses when the patient breathes in heavily with exercise).

CYTOMEGALOVIRUS INFECTION

A cytomegalovirus (CMV) infection is an extremely common viral infection affecting between 10% and 25% of the entire population at any one time. Infection rate may be in excess of 80% in homosexual men. It may be a serious illness in patients who have reduced immunity due to treatment with cytotoxic drugs, have suffered other serious illnesses, are anaemic, suffering from AIDS or other immune affecting diseases, or who are extremely run-down from stress or overwork.

The virus passes from one person to another in saliva or as droplets in the breath, but may also spread through blood transfusions or sexual contact. In all but a tiny percentage of infected people, there are absolutely no symptoms, and they appear and feel totally well. Adults with reduced immunity develop a fever, headaches, overwhelming malaise, myalgia and arthralgia, lymphadenopathy and a tender liver. In patients with severely reduced immunity, pneumonia and hepatitis may develop.

If a pregnant woman with reduced immunity acquires a significant CMV infection, her baby may be affected in the womb and be born with liver damage, hepatomegaly and splenomegaly, poor ability to clot blood, bruises, intellectual disability, and one in six are deaf.

The infection can be detected by specific blood tests, and the virus may be found in sputum, saliva, urine and other body fluids.

CHILDHOOD DISEASES AND VACCINATIONS

There is no specific treatment. Aspirin and/or paracetamol are used to control fever and pain, and prolonged rest is required for recovery. It is not necessary to exclude children from school.

An uneventful recovery is expected in normal patients. In immune compromised patients, pneumonia and hepatitis may be fatal.

HAND FOOT MOUTH DISEASE

Hand foot mouth disease is an infection that virtually every child will eventually catch caused by a *Coxsackie* virus. The infection is usually so mild that it causes no symptoms, but in severe cases a child will develop blisters on the soles and palms, and mouth ulcers. It may be accompanied by a mild intermittent fever, headache and irritability. Paracetamol is the only treatment necessary. The rash persists for three to five days before settling without any problems.

See also COXSACKIE VIRUS INFECTION

LATEROTHORACIC EXANTHEM

Laterothoracic exanthem (asymmetric perfllexural exanthem of childhood or APEC) is an uncommon rash that affects children (mainly girls) between the ages of one and five years in winter and spring. It is probably a viral infection.

The disease is characterised by a rash of tiny red or pink raised spots that are itchy and may be surrounded by a pale halo, that slowly enlarge, and becomes flat and scaly before fading to a dull grey. The patches may merge into a web like pattern. The rash starts in the armpit or groin and slowly extends across one side only of the trunk. It may spread to the genitals, hands and feet and form blood blisters. Some children have an accompanying fever and sore throat with lymphadenopathy in the axilla and groin.

No treatment is necessary. The itching may be relieved by soothing or mild steroid creams, or in severe cases antihistamine mixtures. The condition lasts for one to three months before settling spontaneously.

MOLLUSCUM CONTAGIOSUM

Molluscum contagiosum is a mild contagious viral skin infection spread from one person to another by close contact. It is most common in childhood. If the blisters occur in an adult on the genitals, it has probably been caught by sexual contact. Multiple small (2-4 mm.), dome-shaped, white blisters with a central dimple appear on scattered parts of their body. The abdomen, chest and face are the most commonly affected areas.

No treatment is normally required. Unsightly or persistent blisters can be removed by a doctor scraping out their contents, or heating them with an electrical cautery needle. Secondary bacterial infection of a scratched blister can occur. The rash disappears spontaneously after three to twelve months. It is not necessary to exclude a child from school.

PARVOVIRUS

See ROSEOLA INFECTIOSUM

RESPIRATORY SYNCYTIAL VIRUS

See BRONCHIOLITIS

ROSEOLA INFECTIOSUM

Fifth disease (erythema infectiosum or roseola infectiosum) is a common childhood viral disease caused by the *Parvovirus* that last from two to five days, but occasionally may persist for weeks. It occurs in epidemics every few years, and virtually every child will eventually develop the infection before their teenage years.

The infection is characterised by red flushed cheeks (slapped cheeks appearance), paleness around the mouth and a red patchy rash on the arms and legs. Many children will have very mild symptoms that may be overlooked, or confused with rubella. Rarely joints may become sore and inflamed. Complete recovery is normal and no treatment is necessary.

ROSEOLA INFANTUM

Roseola infantum (baby measles, sixth disease or exanthema subitum) is a contagious viral infection that is caught by virtually every child in the first two or three years of life. It has an incubation period from 7 to 17 days, and most children will have such a mild attack that it will be passed off as a slight cold. Those with a severe attack will develop a fever and a measles-like rash on the trunk and neck, which usually appears after the fever has gone. No treatment is necessary other than paracetamol for the fever, and the child recovers completely within two or three days.

OTHER COMMON CHILDHOOD **BACTERIAL** DISEASES

PARAPERTUSSIS

Parapertussis is a bacterial infection of the nose, throat and lungs that resembles, but is far milder than, pertussis (whooping cough). It is caused by the bacteria *Bordetella parapertussis*, and the symptoms include fever, episodic cough and a sore throat. It is treated in the same way as whooping cough.

TONSILLITIS

Tonsillitis is infection of the tonsils, which are modified lymph nodes that sit on either side of the throat at the back of the mouth. They intercept and destroy bacteria and viruses that enter the body, but if a tonsil is overwhelmed by these organisms tonsillitis occurs. Infection may occur at any age, but is far more common amongst children. The cause may be bacteria (eg. *Streptococci*, *Staphylococci*, *Haemophilus*) or viruses (eg. glandular fever) that enter through the mouth or nose.

The tonsil(s) becomes enlarged, red and covered in pus, and the patient develops a sudden high fever, headache, throat pain, has offensive breath and finds it difficult to swallow or speak. It can easily spread to the other tonsil and to lymph nodes below the jaw and around the ear. The Eustachian tube that drains fluid from, and allows air to enter into the middle ear, opens into the back of the throat between the tonsils and adenoids. As a result infection may spread from the tonsils to the ear. Uncontrolled bacterial infection may cause an abscess (quinsy) or septicaemia.

Tonsillitis is infectious, and may be passed to another person who is in close contact with the patient.

The types of bacteria can be differentiated by a throat swab, and blood tests can detect glandular fever and the likelihood of other viral infections.

Bacterial infections are readily treated by bed rest, fluid diet, aspirin or paracetamol, antiseptic mouth washes and antibiotics (eg. penicillin, erythromycin, tetracycline). No cure is available for viral infections, and painkilling tablets and gargles are used to give relief, while prolonged rest allows recovery. Recurrent attacks may lead to surgical removal of the tonsils (tonsillectomy).

OTITIS MEDIA

Otitis media is a bacterial infection of the middle ear.

The middle ear is a cavity that contains three tiny bones that transmit the vibrations of the eardrum to the hearing mechanism in the inner ear. There is a small tube (the Eustachian tube) connecting the middle ear to the back of the nose, and infection can enter the middle ear from there. Infection can also spread from the outer ear to the middle ear. Children are more commonly affected than adults.

Patients experience a sudden onset of severe pain, often at night, and a fever. Pressure on the outside of the ear causes additional pain and relative deafness. Antibiotics and medications are prescribed to dry up phlegm, but it is sometimes necessary to perform a small operation on the eardrum to relieve the pressure. If left untreated or there is rapid worsening of the infection, the bulging eardrum may burst, and blood and pus will ooze out of the ear canal. The pain may be relieved by rupture of the eardrum, but treatment with antibiotics is essential to ensure that the eardrum repairs itself. If the hole in the eardrum fails to heal after several months, it may be necessary to have an operation to repair it. Rarer complications include a spread of the infection into the surrounding bone (mastoiditis), or into the bloodstream or brain.

Patients get very good results with appropriate treatment, and a ruptured eardrum usually heals in one or two weeks.

CURIOSITY

VIRAL EXANTHEMA

A viral exanthema is any rash caused by a viral infection. These are much more common in children than adults and common examples include measles, roseola infantum (baby measles), chickenpox and German measles (rubella), but a wide range of other viral infections may be responsible.

The rashes that may occur are extremely variable in their appearance. Usually there is a red or maroon, flat, widely scattered, slightly itchy rash in a child with a mild fever who is vaguely unwell, but the rash may also be a raised, crusting and highly itchy as in chickenpox.

No tests are normally necessary, but blood tests and swabs of sores may be necessary to make definite diagnosis.

The rash settles spontaneously within hours or days without treatment. Paracetamol and medication for the itch may be necessary.

TOTALLY, COMPLETELY AND UTTERLY USELESS MEDICAL INFORMATION

Historically, six diseases that caused a rash were known by numbers. They were first disease (measles), second disease (scarlet fever), third disease (German measles - rubella), fourth disease (Duke's disease - Coxsackie virus infection), fifth disease (erythema infectiosum or slapped cheek syndrome) and sixth disease (exanthema subitum - roseola infantum). Only the fifth disease nomenclature is commonly used today.

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