Department for Work and Pensions

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Social Security Administration Act 1992

Conditions due to Biological Agents

Report by the Industrial Injuries Advisory Council in accordance with Section 171 of the Social Security Administration Act 1992 reviewing the prescription of conditions due to biological agents.

Presented to Parliament by the Secretary of State for Work and Pensions
by Command of Her Majesty
November 2003

Cm 5997 £12.00

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INDUSTRIAL INJURIES ADVISORY COUNCIL

Secretary of State for Work and Pensions

Dear Secretary of State,

REVIEW OF THE SCHEDULE OF PRESCRIBED DISEASES

CONDITIONS DUE TO BIOLOGICAL AGENTS

As part of its review of the complete schedule of prescribed occupational diseases the Council has now completed its investigations into the biological ("B") diseases. These, by definition, are conditions caused by animals and plants or their constituents. It is not an entirely satisfactory grouping as many causes of occupational asthma (PD D7) and occupational rhinitis (PD D4) are also caused by agents of biological origin. However, provided this overlap is appreciated the grouping of most of the diseases in this way is still logical and the Council does not recommend any change to the list in this respect.

As well as reviewing the diseases currently on the list, IIAC also reviewed the evidence in relation to other diseases drawn to its attention through literature reviews and by experts invited to our meetings.

I enclose our report which recommends that no currently prescribed disease be removed from the list, because whilst some are rare, none have been eradicated and they still remain a threat to human health. We recommend that (1) prescription of viral hepatitis (PD B8) be amended to reflect recent evidence of differences between the different types of viral hepatitis, their routes of transmission and various workers at risk; (2) for ankylostomiasis (PD B4), the scheduled list of occupations be amended to reflect the changing epidemiological nature of this disease; (3) clarifications to the terms of prescription for anthrax (PD B1), glanders (PD B2), and infections with leptospira (PD B3); (4) exposure to latex be included in the terms of prescription as a cause of occupational asthma (PD D7) and allergic rhinitis (PD D4); and (5) Lyme disease and anaphylaxis should be added to the scheduled list of prescribed diseases, as enough evidence has accumulated to be confident that there exists an occupational risk for certain groups of workers, sufficient to satisfy the terms of prescription.

Yours sincerely,
Professor A J Newman Taylor
Chairman

Date: 5th November 2003

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REPORT BY THE INDUSTRIAL INJURIES ADVISORY COUNCIL REVIEWING CONDITIONS CAUSED BY BIOLOGICAL AGENTS - THE 'B' DISEASES

1. SUMMARY

1. This report presents a review of conditions due to biological agents - the B diseases – which are defined as "conditions caused by animals, plants or other living organisms". The diseases in this category that are currently prescribed are anthrax, glanders, leptospirosis, ankylostomiasis, tuberculosis (TB), extrinsic allergic alveolitis, brucellosis, viral hepatitis, infections by *Streptococcus suis*, chlamydiosis, Q fever, orf and hydatidosis. The layout of the list largely reflects the chronological order in which the diseases were prescribed.

2. The advances in combating occupational infections in the last century altered their relative importance in terms of the morbidity and mortality they caused among the working population. However, the optimism that they could be eradicated has been replaced by recognition that the fight to control them is continuous and ever changing. Thus, while some of the existing prescribed diseases, such as glanders, are currently very rare in the UK, others, particularly TB, have re-emerged as occupational hazards. The Council has considered whether or not they can recommend that any infectious disease should be removed from the list. Their conclusion is that none should be removed, because none of the diseases has been eradicated worldwide and the risk of occupational infection persists in all cases.

3. Since the last review of the B diseases in 1981 (Cmnd. 8393), research findings have increased scientific knowledge. For example, research into hepatitis has characterised the range of viruses causing the condition, the clinical features and the groups of workers most at risk. The Council has updated the references for each prescribed disease, and reviewed the prescribed occupations in each case. The Council has also looked at other infectious diseases and allergic conditions, some of which were unrecognised at the time of the last review of the schedule, such as variant Creutzfeldt Jakob disease (vCJD) and infections with human immunodeficiency virus (HIV), and others for which the occupational risks were unidentified such as Lyme Disease and latex allergy. Conditions studied by the Council to see whether they met the terms of prescription were: anaphylaxis, erysipelothrix, foot and mouth disease (FMD), hantavirus infections, infections by Hendra and Nipah viruses, infections by HIV, latex allergy, Legionnaires' disease, louping ill, Lyme disease, Newcastle disease, pasteurellosis, infections with rabies virus, ringworm, small round structured virus (SRSV) gastroenteritis, toxocariosis, toxoplasmosis, vCJD, infections with West Nile virus and yersiniosis. Epidemiological studies provide sufficient evidence to warrant the prescription of Lyme disease for workers exposed to *Borrelia* - the causative agent of this illness.

4. The effects of biological agents may be acute or chronic changes brought on by the damage to body tissues that the organism attacks, or immediate or delayed allergic reactions to the presence of the organisms themselves. The Council, in reviewing extrinsic allergic alveolitis, chose to broaden the scope of the review, to consider the way in which allergic conditions, as a whole, are covered by the Industrial Injuries Disablement Benefit (IIDB) scheme, taking into account that many of the substances on the lists for the diagnosis of Prescribed Diseases D4 (allergic rhinitis) and D7

(occupational asthma) are derived from animals and plants. It considered allergy to natural rubber latex in its review. The Council concluded that latex allergy poses an occupational risk to certain workers, and is recommending that exposure to natural rubber latex be included in the terms of prescription as a cause of occupational asthma (PD D7) and allergic rhinitis (PD D4). The Council also considered anaphylaxis, an immediate life-threatening allergic response, to see how well incidents of anaphylaxis, particularly in relation to exposure to latex, insect bites and stings, are covered under the Accident provisions. It concluded that anaphylaxis where sensitisation has occurred at work should be added to the list of prescribed diseases for healthcare workers exposed to natural rubber latex.

5. In brief, the Council's recommendations are as follows:

- No currently prescribed disease should be removed from the current schedule.
- Amendment of the prescription for:
- anthrax (PD B1) to include work involving contact with anthrax spores;
- glanders (PD B2) to include work involving contact with equine animals or their carcasses;
- infection by Leptospira (PD B3) to include work at dog kennels or in the care of, or handling of dogs;
- ankylostomiasis (PD B4) to include work involving contact with sources of ankylostomiasis;
- viral hepatitis (PD B8) by splitting into work involving contact with raw sewage for infection by hepatitis A virus (PD B8a) and work involving contact with a) human blood products; or b) a source of hepatitis B or C viruses for infection by hepatitis B and C viruses (PD B8b); and
- exposure to natural rubber latex to be included in the terms of prescription as a cause of occupational asthma (PD D7) and allergic rhinitis (PD D4).

6. Lyme disease to be added to the scheduled list of prescribed diseases for workers exposed to a source of *Borrelia*.

7. Anaphylaxis due to sensitisation caused at work to be added to the scheduled list of prescribed diseases for healthcare workers exposed to latex.

2. INTRODUCTION

The Industrial Injuries Scheme

8. The Industrial Injuries Scheme provides a benefit that can be paid to an employed earner because of an industrial accident or prescribed disease. The benefit is non-contributory and 'no-fault', and is paid in addition to other incapacity and disability benefits, although income-related benefits are taken into account in determining the level of payment. It is tax-free and administered by The Department for Work and Pensions.

The Role of the Industrial Injuries Advisory Council

9. The Industrial Injuries Advisory Council (IIAC) is an independent statutory body set up in 1946 to advise the Secretary of State for Social Security on matters relating to the Industrial Injuries Scheme. The major part of the Council's time is spent considering whether the list of prescribed diseases for which benefit may be paid should be enlarged or amended.

History of prescription of diseases caused by biological agents

10. The first schedule of prescribed diseases was introduced by an Act of Parliament in 1906 in connection with the Workmen's Compensation scheme. Of the six diseases in that schedule, two were "biological" diseases (anthrax and ankylostomiasis). The schedule, as amended, was later inserted into the regulations made under the 1946 Industrial Injuries Act which introduced the present scheme. Further diseases of "biological" origin have been added to the list since 1946 and there are now thirteen in all. The diseases and the occupations for which they are prescribed are set out in Schedule 1 of the Social Security (Industrial Injuries) (Prescribed Diseases) Regulations 1985. The Council's recommendation, in a report published in 1981 (Cmnd. 8393), resulted in a restructuring of the list of prescribed diseases so that those caused by exposure to biological agents were grouped together in one section and numbered with a prefix letter 'B'. Conditions due to biological agents were defined as those which were "caused by animal, plant or other living organism". The majority of the B diseases currently prescribed are caused by infectious agents, such as bacteria and viruses, but one allergic disease is currently included, extrinsic allergic alveolitis.

Claims activity

11. It is important to differentiate between claims and assessments. Many claims are submitted which fail to meet the requirements for prescription. Only those claims, which meet the occupational and medical criteria for diagnosis of a prescribed disease are assessed for disablement.

Claims

12. Claims for B diseases form only a very small part of the total number of claims for prescribed diseases. During the two calendar years 2000 and 2001 combined there were approximately 40 claims for B diseases out of a total of 88,000 claims for all prescribed diseases (i.e. accounting for just 0.05% of all claims).

13. However, these figures do not reveal the full picture of illness from occupationally acquired diseases caused by biological agents. The scheme only covers prolonged periods of disability (i.e. > 90 days) where most infections and allergic conditions currently covered by the schedule resolve in a matter of days or weeks, so that no claim is submitted. Also many healthcare workers, who are among those at highest risk of occupationally acquired infections, are also covered by the NHS Temporary Injury Benefit Scheme.

Assessments

Assessments from 1996-2000 for all 'B' diseases

14. Currently, benefits are being paid in relation to some 900 assessments of disablement due to B diseases. Disablement, which is the sum of the disabilities arising from the relevant loss of faculty resulting from the prescribed disease, is assessed by comparison to a person of the same age and sex whose physical and mental condition is normal, and is expressed as a percentage. The following table shows the range of new assessments made during the 5 year period from 1996-2000.

% Disablement	Number of cases
95-100	4
85-94	1
75-84	3
65-74	0
55-64	3
45-54	9
35-44	6
25-34	19
20-24	17
14-19	21
1-13*	22

* Payments of benefit are not made for cases where assessment of disablement in respect of the B diseases is less than 14%, unless they can be aggregated with assessments for other industrial injuries or diseases to give a higher overall assessment.

Accident provisions of the Industrial Injuries Scheme

15. Payment of Industrial Injuries Disablement Benefits (IIDB) is made in two circumstances: either when there has been an occupational accident or when a person has developed a prescribed disease – either of which must arise from work as an employed earner. An accident for the purposes of IIDB is generally classed as any untoward event that arises out of and in the course of an employed earner's employment. Payments under the accident provisions account for a larger proportion of the total (78% in 2000) awards of IIDB than do prescribed diseases. They cover not only immediate and short-term disabling effects of accidents, but also long-term (chronic) effects, and effects that may not occur until some time after the accident (e.g. arthritis).

16. There are two stages to the compensation process following an industrial accident. First, the claimant must seek an accident declaration. Once an incident has been accepted as an accident, the claimant can then apply for an assessment of disablement. An assessment of disablement can only begin 91 days after the accepted accident took place, so short periods of disability are not compensated under the scheme.

17. A person who acquires an infection as a result of, and in the course of, his/her work may be able to claim for an industrial accident - for example, if contaminated liquid is spilled in a laboratory with subsequent infection of a member of staff. An abnormal reaction to immunisation would also fall within the accident provisions.

The legal requirements for prescription

18. The Social Security Contributions and Benefits Act 1992 states that the Secretary of State may prescribe a disease where he is satisfied that the disease:

> a) ought to be treated, having regard to its causes and incidence and any other relevant considerations, as a risk of the occupation and not as a risk common to all persons; and
>
> b) is such that, in the absence of special circumstances, the attribution of particular cases to the nature of the employment can be established or presumed with reasonable certainty.

19. In other words, a disease may only be prescribed if there is a recognised risk to workers in an occupation, and the link between disease and occupation can be established or reasonably presumed in individual cases.

20. In seeking to address the question of prescription for any particular condition, the Council first looks for a workable definition of the disease. The Council then searches for a practical way to demonstrate in the individual case that the disease can be attributed to occupational exposure with reasonable confidence. For this purpose, reasonable confidence is interpreted as being based on the balance of probabilities according to the available evidence in the scientific literature. As already described, accidental exposure at work is specifically catered for within the IIDB scheme. However, if the condition might result from occupational exposure in the absence of an identifiable accident, the Council must consider whether it should be included in the list of diseases that are prescribed for benefit purposes. In these circumstances, it may be possible to ascribe a disease to a particular occupational exposure in two ways – from specific clinical features of the disease or from epidemiological evidence that the risk of disease is at least doubled by the relevant occupational exposure.

<u>Clinical features</u>

21. For some diseases attribution to occupation may be possible from specific clinical features of the individual case. For example, the proof that an individual's dermatitis is caused by his occupation may lie in its improvement when he is on holiday, and regression when he returns to work, and in the demonstration that he is allergic to a specific substance with which he comes into contact only at work. It can be that the disease only occurs as a result of an occupational hazard (e.g. coal workers' pneumoconiosis).

Doubling of risk

22. Other diseases are not uniquely occupational, and when caused by occupation, are indistinguishable from the same disease occurring in someone who has not been exposed to a hazard at work. In these circumstances, attribution to occupation on the balance of probabilities depends on epidemiological evidence that work in the prescribed job, or with the prescribed occupational exposure, increases the risk of developing the disease by a factor of two or more. The requirement for, at least, a doubling of risk is not arbitrary. It follows from the fact that if a hazardous exposure doubles risk, for every 50 cases that would normally occur in an unexposed population, an additional 50 would be expected if the population were exposed to the hazard. Thus, out of every 100 cases that occurred in an exposed population, 50 would do so only as a consequence of their exposure while the other 50 would have been expected to develop the disease, even in the absence of the exposure. Therefore, for any individual case occurring in the exposed population, there would be a 50% chance that the disease resulted from exposure to the hazard, and a 50% chance that it would have occurred even without the exposure. Below the threshold of a doubling of risk only a minority of cases in an exposed population would be caused by the hazard, and individual cases therefore could not be attributed to exposure on the balance of probabilities. The epidemiological evidence required should ideally be drawn from several independent studies, and be sufficiently robust that further research at a later date would be unlikely to overturn it.

3. BACKGROUND TO THE REVIEW

23. In February 1997, the Council announced that it would be undertaking a review of the current schedule of occupational diseases for which benefits are paid. The terms of reference for the review were to examine the diseases currently prescribed in the Social Security (Industrial Injuries) (Prescribed Diseases) Regulations 1985 (as amended) and, in particular:

- to confirm that the statutory requirements for prescription continue to be satisfied in respect of each of the prescribed diseases considered;
- to identify amendments required to the wording, layout and grouping of the diseases prescribed to ensure they reflect current scientific knowledge and clearly express the Council's intention;
- to identify measures to improve the speed and ease of processing claims for prescribed diseases and reduce the administrative cost of identifying those entitled to benefit, and of assessing and paying benefit;
- to review the effectiveness of benefits, given the different circumstances of people with different prescribed diseases.

Scope of the review

24. This report describes a part of the review relating to various diseases caused by biological agents. Most of these diseases are currently included in section B of the prescribed list. In addition, we examine the case for extending the schedule to include a number of other infectious diseases. We also consider disability associated with anaphylactic, allergic reactions to insect stings and natural rubber latex, and with other allergic responses to latex.

25. The report does not cover byssinosis (PD D2), or allergic rhinitis and occupational asthma caused by biological agents other than latex (included in PD D4 and PD D7). A report on the miscellaneous prescribed diseases listed in section D of the schedule will be published separately at a later date.

26. The diseases currently prescribed in section B of the schedule are as follows: anthrax, glanders, leptospirosis, ankylostomiasis, tuberculosis (TB), extrinsic allergic alveolitis, brucellosis, viral hepatitis, infections by *Streptococcus suis*, chlamydiosis, Q fever, orf and hydatidosis.

Issues addressed in the review

27. In the course of its review, the Council considered several issues:

- **Whether in the light of current scientific evidence the legal requirements for prescription continue to be satisfied for the diseases already prescribed in relation to biological agents**. The Council's understanding of the legislative requirements for prescription has been clarified as the scheme has evolved, and a steady growth in scientific knowledge has meant that they can now be applied more rigorously than in the past. Historically, some diseases were recommended for prescription on the basis of evidence that would not now be acceptable. However, in its review of whether to remove diseases from the list that now rarely occur,

the Council also considered whether there was the possibility of recurrence of the disease due to its prevalence elsewhere in the world. If there was evidence of such a risk, the Council would not recommend removal of a prescribed disease from the list. The Council has made recommendations in each case on whether the disease should be retained in the list.

- **Whether the accident provisions of the scheme would adequately cover some of the diseases.** If this applied, they would not necessarily need to remain prescribed.
- **Whether other diseases should be added to the list.** The following diseases were considered during the review: anaphylaxis, erysipelothrix, infections with foot and mouth disease (FMD), hantavirus infections, infections by Hendrah and Nipah viruses, infections with human immunodeficiency virus (HIV), latex allergy, Legionnaires' disease, louping ill, Lyme disease, Newcastle disease, pasteurellosis, infections with rabies virus, ringworm, small round structured virus (SRSV) gastroenteritis, toxocariosis, toxoplasmosis, variant Creutzfeldt Jakob Disease (vCJD), West Nile virus infections and yersiniosis.
- **The precise definition of the diseases prescribed.**
- **The nature and level of the occupational exposures necessary to satisfy the requirements for prescription.**
- **The practicality of dealing with claims in relation to the proposed terms of prescription.**

Infection and allergy

28. Two types of disease process are covered in this review, infection and allergy. A brief overview of the key features of each of these processes is given below.

Infection

29. Infectious agents are transmitted from one host to another (e.g. from animal to human or human to human) and reproduce within that host. They cause disease by destroying the body's tissues, disrupting bodily functions and/or activating immune responses within the host that may have damaging effects until the infection is overcome, lies dormant or latent, or the host dies. Infectious agents may enter the host through cuts in the skin, by inhalation, by ingestion, through mucous membranes (e.g. the conjunctiva of the eye) or via sexual contact or inoculation (e.g. via needlestick injury).

30. Infectious agents may be:

- **Bacteria** – small, single celled organisms capable of living independently and reproducing by cell division. Bacteria are classified as prokaryotes; i.e. their genetic material is not contained within a nucleus. The bacteria may be round (cocci), rod-shaped (bacilli) or spiral (spirochaetes). An example of a bacterium is *Bacillus anthracis*, the causative agent of the disease anthrax. The first word of a bacterial name (e.g. *Bacillus*) refers to the name of the genus (i.e. class) and the second word refers to the name of the

particular species (i.e. sub-class) (e.g. *anthracis*); within the same genus may be species which have very different characteristics, e.g. *Bacillus subtilis* does not cause disease in humans.

- **Viruses** – non-cellular organisms consisting of a core of DNA or RNA and an outer envelope of proteins. Viruses, like bacteria, are prokaryotic. Viruses can exist outside their host cells, but must enter cells to replicate. The virus then takes over the metabolic pathways of the host cell and uses them to reproduce new copies of the virus. Once the virus has replicated, often to high numbers, the virus goes on to infect another cell. An example of a virus is the hepatitis A virus which causes the disease hepatitis A.
- **Fungi** – organisms with characteristics of both plants and animals. Fungi, like plants and animals, are classified as eukaryotes, as cells contain genetic material within a distinct nucleus. Fungal cell walls are similar to those of plants, but have no chlorophyll and, like animals, fungi must feed off other organic matter. Although several infectious diseases are caused by fungal proliferation within human hosts, none of these diseases fall within the list of prescribed occupational diseases. However, the reproductive spores of fungi living off decaying matter, such as mouldy hay, can induce an allergic reaction if inhaled. This disease is called extrinsic allergic alveolitis and is a prescribed disease (PD B6) which is discussed later.
- **Helminths** – animals which are parasitic worms. These include flukes, nematodes (also called roundworms) and cestodes (also called tapeworms). Ankylostomiasis, caused by hookworms of the nematode family, is the only currently prescribed disease caused by helminths.
- **Protozoa** – eukaryotic organisms which are single celled. There are several parasitic protozoal infections, but none come within the current list of the prescribed occupational diseases.
- **Prions** – infectious proteins derived from conformationally altered normal host proteins. They have no DNA or RNA. These infectious agents are different from bacteria and viruses, and currently are not well understood. Creutzfeldt Jakob Disease (CJD) is caused by prions.

Allergy and immunity

31. Humans, in common with most animals, are able to distinguish 'self' from 'non-self' and mount a specific immunological response to microbes and other foreign materials. Proteins recognised as foreign by the body, which stimulate a specific immunological response, are called antigens. Immunological responses are mediated by cells (lymphocytes) and proteins (called antibodies or immunoglobulins), made by specialised lymphocytes (plasma cells), which bind specifically to antigens. Plasma cells make several different types of immunoglobulin such as Immunoglobulin (Ig) G, IgM, IgA and IgE. Where infection with a microbe stimulates specific antibodies, the presence of these antibodies may provide evidence of the infection, either at the time or in the past.

32. The primary function of immunological reactions is defence against microbes such as bacteria, viruses and protozoa. In these circumstances, the specific immunological response, in concert with other mediators of inflammation, rids the body of an infectious agent with limited host tissue damage, and provides resistance against further infection by the particular micro-organism, giving a state of immunity. However, in some circumstances the specific immunological response is directed against foreign proteins which pose little threat, and the associated inflammatory response causes disproportionate tissue damage. Such reactions are called **allergic** or **hypersensitivity** reactions. The immunological responses underlying immune and allergic reactions are in general not different; it is the disproportionate damage to host tissue in relation to the threat posed by their triggers (e.g. pollens and mites) which distinguishes the allergic or hypersensitivity response. One widely used classification of hypersensitivity reactions is based on that proposed by Gell and Coombs, which divides hypersensitivity reactions according to the pattern of tissue damage caused.

Types of hypersensitivity reaction

33. Type I (immediate, anaphylactic) This reaction is mediated by IgE antibody, which binds to tissue mast cells and circulating basophils. Subsequent encounter with allergen, which binds to cell bound IgE, leads to the release of mediators such as histamine and leucotrienes, which cause dilatation of small blood vessels, leakage of protein-rich fluid across capillary walls into tissue, and smooth muscle contraction. Type I reactions operate in hay fever, urticaria, asthma and anaphylaxis.

34. Type II When exposed to an antigen, IgG or IgM antibodies bind directly to the membranes of cells, injuring or killing the cell. An important example of a Type II reaction is a blood transfusion reaction.

35. Type III (late 'Arthus' reaction) Antigens and antibodies bind in tissue spaces to form antigen-antibody complexes which stimulate a local inflammatory reaction. Serum sickness - a reaction to foreign serum injected to provide passive immunity - and reactions to drugs such as penicillin are examples of Type III hypersensitivity.

36. Type IV These reactions are mediated directly by lymphocytes. Antibody is not involved. Mediators released by the lymphocytes stimulate a local inflammatory reaction. Examples of Type IV reactions include tuberculin skin test responses, allergic contact dermatitis and extrinsic allergic alveolitis.

37. Two additional types of allergic reactions Types V and VII are now also recognised.

Sensitisation and anaphylaxis

38. Sensitisation occurs when, after contact with allergen, an individual produces specific IgE antibody. Sensitisation does not cause symptoms, but the immune system has been primed so that further exposure to the sensitiser can cause a symptomatic reaction. Sensitisation does not necessarily occur when the person is first exposed to an allergen, but can occur after several months of exposure. However, it can also occur after a single exposure in circumstances where the level of sensitiser is so small that the person is

unaware of any exposure at all. In both circumstances a subsequent hypersensitivity reaction can be unexpected. In other circumstances, persons may be aware they are sensitised and adopt avoidance strategies or carry medication with them.

39. Following sensitisation, allergen specific IgE antibodies circulate in the blood, either freely or bound to basophils, or are bound to tissue mast cells. If the body encounters the allergen again, through skin contact (e.g. latex), injection (e.g. bee stings), inhalation (e.g. pollens) or ingestion (e.g. nut allergy), binding of allergen to IgE on the surface of mast cells in the tissues, or basophils in blood triggers the release of chemical mediators such as histamine, prostaglandins and leucotrienes. In the tissues this causes local swelling (oedema), mucus secretion and smooth muscle contraction. The release of the chemical mediators into the bloodstream can cause a fall in blood pressure, an important feature of anaphylaxis. Allergic reactions can be self-limiting but often require treatment and can occasionally be fatal.

4. METHOD OF INVESTIGATION

40. In June 2000, the Council announced that it would be reviewing those conditions currently prescribed in relation to infectious agents, and the conditions resulting from allergic reactions to biological agents encountered at work. The review was to address questions posed in section 3 ‘Issues addressed in the review’.

41. The Council’s research librarian and scientific advisor undertook reviews of the relevant scientific literature. Members of the Council's Research Working Group examined the information obtained together with other relevant data submitted to the Council, both before its call for evidence, and in the course of its review. In addition, oral evidence was taken at meetings of the Council's Research Working Group from several experts. A list of the experts who provided evidence, either written or oral, is given in Appendix 1.

42. Sections 5 and 6 summarise the evidence and sets out the conclusions reached by the Council. The evidence of occupational risk shown is derived from either a) epidemiological studies – which generally pertain to diseases of relatively high incidence, thus, providing sufficient numbers for meaningful data analysis to occur (e.g. viral hepatitis and tuberculosis); or b) case reports – where the disease is rare and no epidemiological studies exist (e.g. glanders and ankylostomiasis).

5. INFECTIOUS DISEASES

CURRENTLY PRESCRIBED INFECTIOUS DISEASES

B1 – ANTHRAX

Prescribed disease	Occupation
B1 Anthrax	Contact with animals infected with anthrax or the handling (including the loading and unloading or transport) of animal products or residues.

History of prescription

43. Anthrax was the first disease on the first schedule of diseases of the Workmen's Compensation Act 1906. The reference to loading and transport was added from 30 October 1983.

Description of disease

44. Anthrax is a zoonotic disease (i.e. a disease passed from animals to humans) caused by the bacterium *Bacillus anthracis*. Generally, humans contract anthrax by exposure to infected herbivorous animals or their products. Bacterial spores enter the human body via the skin (cutaneous anthrax), the lungs (pulmonary anthrax) or the gut (intestinal anthrax). Cutaneous anthrax is the most common type of infection in humans, accounting for approximately 95% of all cases. It is characterised by an itchy skin lesion (or papule) which becomes a vesicle. This vesicle bursts forming a characteristic eschar (sloughed off dead tissue), with surrounding oedema and lymphangitis. This form of anthrax is readily treatable with antibiotics, but if left untreated can lead to death in a small proportion of cases. Pulmonary anthrax accounts for around 5% of human infections and has a high fatality rate. It is characterised by flu-like symptoms, which may lead to respiratory failure and death in a few days. Intestinal anthrax is rare, and is usually found outside the UK where infected meat may be eaten. Septicaemia and meningitis are possible complications of all forms of anthrax infection. Anthrax is common in livestock from parts of Turkey, Sudan and Pakistan.

Evidence of occupational risk

45. Historically, pulmonary anthrax was known as ‘woolsorters’ disease’, as infections were common amongst mill workers handling contaminated wool. According to the PHLS (Public Health Laboratory Service), in England and Wales between 1975 and 2002, there were 23 occupationally linked cases of cutaneous anthrax (out of 28 total cases); 5 cases were due to exposure to wool, hair or bristles, 6 cases were due to exposure to hide or skins and 12 cases were in other unstated occupations. The last case of cutaneous anthrax was in 2001, and previous to that there was a case in 1995 when a wool mill worker became infected after deep cleaning a cashmere combing room. Cases have been noted in abattoir workers, leather workers, butchery, farming, carpet workers and wool factory workers in the UK and abroad.

46. In the US in 2001, there were 22 cases (10 pulmonary anthrax, 12 cutaneous anthrax) of anthrax due to a bioterrorism campaign in which spores were dispatched via the mail. Several of those affected were mailroom workers, but a journalist, a hospital worker and a laboratory worker were also affected. In 1997, a knackery worker in Northern Victoria, Australia contracted cutaneous anthrax from infected dairy cattle and the disease was treated successfully. In 2002, there was a case of suspected cutaneous anthrax in a cowhide worker in Hong Kong. Anthrax outbreaks have also been noted in Turkey in 2002 and in Southern India during 1998-2001. Due to the hardy nature of the spores, there is a potential risk of contracting anthrax when excavating archaeological and construction sites where anthrax spores exist, although there is no evidence in the scientific literature of any cases arising due to these activities.

Numbers affected

47. Since the introduction of vaccination for workers in key industries, such as the leather and wool trade (in 1965), the numbers of cases of anthrax have been decreasing decade by decade. According to the PHLS, between 1975 and 2002, 28 cases of cutaneous anthrax were recorded with no deaths. Pulmonary anthrax is very rare in the UK, with no cases reported in the 27 year period between 1975 and 2002 according to PHLS data. Anthrax is also now rare in farm animals.

Conclusion

48. We conclude that anthrax remains an occupational hazard and should continue to be a prescribed disease. We recommend that the prescription should be clarified as follows:

Prescribed disease	**Occupation**
B1 Anthrax	Work involving contact with anthrax spores, including contact with animals, or the handling (including the loading, unloading or transport) of animal products or residues.

B2 – GLANDERS

Prescribed disease	Occupation
B2 Glanders	Contact with equine animals or their carcasses.

History of prescription

49. Glanders was added to the scheduled list of diseases following the Samuel Report in 1906.

Description of disease

50. Glanders is caused by the bacterium *Burkholderia mallei* (formerly known as *Pseudomonas mallei*). Primarily, it is a disease of horses, mules and donkeys. However, it is a zoonosis and humans coming into contact with infected animals are at risk of contracting the disease. Bacteria can enter the human body via cuts in the skin, mucous membranes of the eyes and nose, or by inhalation. After an incubation period of up to 14 days, fever, muscle and joint pains occur. The infection typically spreads to the lungs, causing lung infection (pneumonia), inflammation of the lining of the lungs (pleurisy) and pus in the lungs (pyaemia). Occasionally, chronic illness develops characterised by abscesses in the skin, joints and muscles. If untreated, death occurs in about 95% of cases within 3 weeks. Although certain antibiotics have been found to be useful, few clinical data exist as to their efficacy.

Evidence of occupational risk

51. Glanders was eradicated in horses in the UK in 1928 and, prior to 2000, the last reported human case worldwide was in 1949. However, the disease still exists in North Africa, Asia and parts of Europe. Potentially, occupations where humans are in contact with infected horses, mules and donkeys are at risk, e.g. veterinary staff and grooms, especially if they travel to areas where glanders still occurs, or if infected horses are imported.

52. In 2000, a microbiologist accidentally contracted glanders at the US Army Medical Research Institute of Infectious Diseases. Hence, research laboratory staff working with *Burkholderia mallei* may also be at risk, but this risk should be minimal with good laboratory practice.

Numbers affected

53. Glanders is extremely rare worldwide in both humans and animals.

Conclusion

54. Although this disease is rare, *Burkholderia mallei* has not been eradicated worldwide, thus, the potential for infection remains. We recommend that glanders continue to be prescribed with the prescription remaining the same. It should be noted that accidental infection in a laboratory setting, would be covered under the accident provisions of the scheme.

Prescribed disease	Occupation
B2 Glanders	Work involving contact with equine animals or their carcasses.

B3 – INFECTION BY LEPTOSPIRA

Prescribed disease	Occupation
B3 Infection by Leptospira	a) Work in places which are, or are liable to be, infested by rats, field mice or voles, or other small mammals; or (b) work at dog kennels or the care or handling of dogs, or (c) contact with bovine animals or their meat products or pigs or their meat products.

History of prescription

55. Leptospirosis was originally prescribed in 1979 by SI 1569 laid before Parliament on 7 January 1980. Commissioner's decisions have awarded benefits to a colliery worker in R(I)92/53 and a building site labourer in R(I)20/52.

Description of the disease

56. Leptospirosis is a zoonotic disease caused by the bacterium *Leptospira interrogans*. Many mammals, in particular cattle, rats and dogs, can be carriers of Leptospira, with the bacteria being excreted in their urine. Human leptospiral infection follows exposure to this urine, either directly or via contaminated water, soil or food. Bacteria enter the body either by cuts in the skin or via mucous membranes, such as the conjunctiva of the eye. The incubation period is generally 7-12 days, with the disease lasting up to three weeks, or longer, if left untreated. Leptospires spread via the blood stream, affecting blood vessels, the liver, kidneys, muscles (including heart muscle) and the central nervous system. Symptoms range from mild flu-like illness to jaundice, aseptic meningitis, renal failure and death. Severe infections are known as Weil's disease, but typically the disease is mild and self-limiting. On occasion, leptospirosis can persist leading to long-term sequelae, including chronic fatigue, headaches and depression. Leptospirosis has also been associated with increased risk of abortion in pregnant women. Antibiotic therapy can be used to treat leptospiral infections.

57. There are various serovars (sub-species) of *Leptospira interrogans*, many of which can cause Weil's disease, but those most commonly responsible for human infection are:

- *Leptospira interrogans* serovar Icterohaemorrhagiae which mostly infects rats. The urine of infected rats contaminates the stagnant or slow moving water in sewers and canals.
- *Leptospira interrogans* serovar Hardjo from infected cattle and pigs.
- *Leptospira interrogans* serovar Canicola from infected dogs.

58. Generally, exposure to animal urine can be avoided by the use of adequate preventive measures, including special clothing and gloves. Vaccination can also protect workers at risk.

Evidence of occupational risk factors

59. Cases in the UK have been described in a range of occupations including dairy farmers, meat and abattoir workers, soldiers, fish farmers, builders, gardeners, garage workers and sewage and canal workers. One UK report described a pregnant woman who contracted leptospirosis from milking cattle with subsequent death of her unborn child.

Numbers affected

60. According to the PHLS, there were 20 notified cases of human leptospirosis in the general population of England in 1995, increasing to 41 cases in 1999 and 54 cases in 2000. Of the cases in 2000, 25 were due to *Leptospira interrogans* serovar Icterohaemorrhagiae with 50% of these cases being occupationally linked (i.e. 6 cases were farmers and 6 cases were fish farmers). The number of cases of *Leptospira interrogans* serovar Hardjo increased from 4 in 1995 to 12 in 2000. There has only been one human case of *Leptospira interrogans* serovar Canicola since the introduction of the canine immunisation programme in 1985. Between 1998 and 2002, an average of 8 cases of leptospirosis per year among workers were reported to the Health and Safety Executive (HSE) under the Reporting of Injuries, Dangerous Diseases and Occurrences Regulations (RIDDOR).

Conclusion

61. Leptospirosis remains a risk for certain occupations. The Council, therefore, recommend that it should continue to be prescribed with the prescription clarified as follows:

Prescribed disease	**Occupation**
B3 Infection by Leptospira	a) Work in places which are, or are liable to be, infested by rats, field mice or voles, or other small mammals; or (b) work at dog kennels or in the care of, or handling of dogs, or (c) contact with bovine animals or their meat products or pigs or their meat products.

B4 – ANKYLOSTOMIASIS

Prescribed disease	Occupation
B4 Ankylostomiasis	Work in or about a mine.

History of prescription

62. Ankylostomiasis was one of the six diseases on the first list of scheduled diseases of the Workmen's Compensation Act of 1906.

Description of the disease

63. Ankylostomiasis is a zoonotic disease caused by nematodes called hookworms, with the commonest types to infect humans being *Ancylostoma duodenale* and *Necator americanus*. The adult hookworms live, and lay eggs, in the intestines of humans and animals (in particular, dogs and cats). Infected humans or animals excrete the eggs in their faeces. In conditions of poor hygiene, the eggs develop into larvae which contaminate the soil. The larvae can enter the body via cuts in the skin or, if food is grown in the soil, may be swallowed and then penetrate the stomach wall. The larvae then make their way through the blood vessels to the lung. They are coughed up and swallowed, so completing their life cycle as adult hookworms in the intestine.

64. Individuals infected with hookworms may exhibit acute ankylostomiasis, characterised by skin eruptions that occur at the site of larval entry. Chronic ankylostomiasis is characterised by fatigue caused by anaemia from iron deficiency due to loss of blood into the tissues and gut. Other symptoms of chronic ankylostomiasis include vague abdominal pains and, occasionally, a cough and sore throat. In severe cases, cardiac complications from larval migration can occur, such as endomyocardial fibrosis.

Evidence of occupational risk factors

65. Ankylostomiasis was originally prescribed in relation to mining where unsanitary conditions underground, as existed at the turn of the 20th century, left miners exposed to infection. However, the Council was informed that most cases in the UK now occur in holidaymakers returning from tropical resorts where the disease may be acquired through walking bare foot. The disease does not appear to occur in industry. Hookworm infections are still prevalent in Africa, Asia and Latin America according to the World Health Organisation.

Numbers affected

66. The disease is rare in the developed world. No human cases have been reported in England and Wales since 1996 according to the PHLS.

Conclusion

67. Although there are no reports of any recent cases in this country, ankylostomiasis remains an important disease in the developing world. The possibility exists that the disease could be contracted abroad and then be introduced into the workplace. This disease should, therefore, remain on the

list of prescribed diseases. However, the prescription should be altered to reflect the fact that contact with sources of ankylostomiasis is not restricted to work in mines. We recommend that the scheduled occupations be amended as follows:

Prescribed disease	**Occupation**
B4 Ankylostomiasis	Work involving contact with sources of ankylostomiasis.

B5 – TUBERCULOSIS

Prescribed disease	Occupation
B5 Tuberculosis	Contact with a source of tuberculous infection.

Original Prescription

68. This was the first disease on which IIAC reported. In November 1950, the Council published its command paper "Tuberculosis and other Communicable Diseases in Relation to Nurses and Other Health Workers" (Cmnd. 8093) in which it recommended the prescription of tuberculosis (TB) for nurses and other health workers. The recommendations were accepted and implemented on 1 March 1951. The terms of prescription were extended from 3 October 1983.

Description

69. TB is a chronic necrotising bacterial infection with a wide range of clinical manifestations. Human TB is predominantly the result of infection by the bacterium *Mycobacterium tuberculosis*. TB can also be caused by *Mycobacterium bovis* infections, which affect humans, cattle, badgers and deer. Transmission usually occurs during close contact with an infected source via inhalation of the tubercule bacilli emitted during coughing, sneezing or spitting. However, *Mycobacterium bovis* is mainly transmitted via ingestion of contaminated milk. Human infections by *Mycobacterium bovis* are now rare, due to pasteurisation of milk. Nontuberculosis, atypical mycobacterial infections, due to other *Mycobacterial* species, also result in human diseases, but are not causes of TB.

70. The lung is the main portal of entry for the tubercule bacilli and pulmonary TB is the most common manifestation of the disease. The incubation period for pulmonary TB is a few months and the illness is characterised by a chronic productive cough, fever, night sweats, malaise and weight loss. However, TB can affect any part of the body, due to dissemination via the lymphatics or bloodstream. For example, miliary TB is characterised by the presence of numerous small, 'millet seed'-like lesions which are present throughout the body.

71. Only 5-10% of infected patients develop active tuberculous disease. The vast majority of infected individuals develop inactive TB infections, where they are asymptomatic, are not infectious to others, but retain evidence of an immune response to the infection (most often shown by a positive skin reaction to tuberculin). The reason why the outcome of TB infection varies between individuals is believed to relate to differences in immune status and genetic susceptibility. Individuals with inactive TB can go on to develop the active infection at a later stage, especially if their immune system becomes compromised, such as by poor nutrition or the development of acquired immunodeficiency syndrome (AIDS). If left untreated, tuberculous infection can be fatal. In the UK in the 1950s, a national programme of vaccination against tuberculosis was started using the BCG vaccine. However, since the late 1990s only selected regions of the UK have continued to vaccinate against tuberculosis. Good practice in infection

control reduces the risk of transmission. Treatment consists of a 6-9 month chemotherapy regime. In recent years, multi-drug resistant *Mycobacteria tuberculosis* strains have emerged world wide, particularly in HIV-positive patients.

Evidence of occupational risk factors

Healthcare workers

72. A recent resurgence of TB due to *Mycobacterium tuberculosis* in healthcare workers has reawakened concern about the occupational risk. A study of English and Welsh healthcare and associate health professionals published in 1996, reported an increased risk of TB infection in comparison with other professional groups, after allowance for sex, age and ethnicity. The risk relative to non-healthcare professionals was higher in health professionals (2.7) than in associate health professionals (2.0). Another UK study investigated the incidence of TB infections in NHS hospitals in the West Midlands between 1992-1995. While most of the infections among doctors were in foreign-born individuals, who may have had reactivation of infection acquired outside the UK, there was also evidence of an excess risk of TB in UK-born nurses, probably indicating occupational risk. In contrast, a study of TB notifications in Northern Ireland found no statistically significant increased incidence of TB infections in health service workers over a 10 year period from 1982-1991. However, it should be noted that the comparison was with the general population, which could include persons at high risk of contracting TB, rather than with comparable professional groups.

73. In Melbourne, Australia, among employees in city hospitals, healthcare workers were 1.5 times more likely than non-healthcare workers to be tuberculin skin test positive. The highest rate of positive skin tests was in a hospital with no negative pressure rooms for nursing TB patients. A Mexican study suggested that, despite a high background rate of TB infection and high rate of BCG vaccination, increased rates of tuberculin reactivity could be found in certain occupational groups in the hospital, including doctors, nurses and mortuary attendants who participated in autopsies.

74. All recent studies that have compared clinical healthcare workers with a relevant comparison group have found an increased risk in healthcare personnel, including both clinical and laboratory staff.

Other occupations and risk factors

75. Cases of *Mycobacterium tuberculosis*-associated TB have also been reported in the UK in laboratory and necropsy workers, social workers, a child care worker, a barmaid, a plasterer and a manager. In other countries, cases have also been reported in dental workers, funeral home employees and prison workers. A Canadian study in 1997, suggested that there was an increased rate of tuberculin reactivity in 118 prison employees which was related to the number of years of work at provincial prisons (odds ratio = 2.5 per 5 years of employment). A study of 24487 New York State prison employees in 1992, reported that those employed at jails with high numbers of prisoner cases had an odds ratio for tuberculin reactivity of 2.2, compared

to those working where there were no prisoner cases. They concluded that approximately one third of new TB infections among their study group were due to occupational exposure. There appears to be strong evidence for an increased risk in prison employees, although it should be noted there are no UK studies of prison workers.

76. There is a well-recognised risk of TB as a complication of silicosis, and development of TB may be responsible for rapid progression of silicosis. Studies in South African gold miners have shown that the risk of TB is further increased in HIV-positive cases of silicosis.

77. Reports of human TB due to *Mycobacterium bovis* are rare in the UK. The majority of recent cases have been reactivations of previous infections, or infections acquired abroad or through person-to-person spread. However, *Mycobacterium bovis* infections are increasing in cattle, and badgers are another important reservoir of the disease. In 1999, there was a human case of TB following contact with cattle, according to Ministry for Agriculture, Fisheries and Food (MAFF) reports. Thus, potentially, workers in contact with infected sources could be at risk, such as farmers, veterinarians, abattoir workers, laboratory workers and gamekeepers.

Numbers affected

78. In England and Wales, TB due to *Mycobacterium tuberculosis* used to be a common disease, with over 50,000 cases notified per annum in the general population in the 1940s. According to PHLS figures, the disease reached its lowest levels in 1987 when 5992 cases were notified in the general population. Since then, the incidence of TB has been gradually increasing with 6797 cases notified in the general population in 2000. The London region accounts for 43% of all cases in England and Wales. According to Occupational Disease Intelligence Network (ODIN) scheme figures for 1996 to 1997, eight occupationally-related cases were reported; 4 healthcare workers, a child carer, a barmaid, a plasterer and a manager. There were on average 15 cases of TB reported annually to HSE under RIDDOR between 1998 and 2002.

79. In the general population, there were 28 cases of *Mycobacterium bovis* infection in the UK in 2000, 40 cases in 1999 and 25 cases in 1998, with the majority of those cases being reported in England. As stated previously, according to MAFF in 1999 there was one occupationally-acquired case, following exposure to infected cattle.

Conclusion

80. TB remains a hazard for certain occupational groups and, therefore, we recommend that this disease should continue to be prescribed, with the prescription remaining unchanged.

Prescribed disease	**Occupation**
B5 Tuberculosis	Contact with a source of tuberculous infection.

B6 – EXTRINSIC ALLERGIC ALVEOLITIS (including farmer's lung)

81. See Section 6 ‘Currently prescribed allergic conditions’.

B7 – BRUCELLOSIS

Prescribed disease	Occupation
B7 Infection by organisms of the genus *Brucella*	Contact with: a) animals infected by *Brucella*, or their carcasses or parts thereof, or their untreated products; or b) laboratory specimens or vaccines of, or containing, *Brucella*.

History of prescription

82. In May 1972, the Council published its command paper "*Brucellosis*" (Cmnd. 4971) in which it recommended that "infection by *Brucella abortus*" should be prescribed. The Council's recommendations were accepted and implemented. The terms of prescription were further extended as from 3 October 1983.

Description of the disease

83. Brucellosis is a zoonotic disease caused by infection with bacteria of the genus *Brucella*. There are three main bacterial species that cause brucellosis in humans – *Brucella abortus, Brucella melitensis* and *Brucella suis*. In the UK, the most common form is caused by *Brucella abortus*, acquired from infected cattle. Although *Brucella abortus* has been eradicated from cattle in Britain, it is still problematic in livestock from Northern Ireland. Globally, the most common form is *Brucella melitensis* acquired from goats. *Brucella suis* may be caught from pigs.

84. Brucellosis is transmitted via cuts in the skin when handling infected animals or by ingesting contaminated milk or dairy products. Transmission can also occur via inhalation of infectious fluid. The incubation period of the disease is usually 2-3 weeks. Brucellosis can either be acute or chronic. The acute form is typified by a flu-like illness with headache, night sweats and weakness. The chronic form is associated with fatigue, fever, depressive episodes and arthritis, and can persist in a latent form for several months or years, able to reactivate at a later date. Antibiotics can be used successfully to treat brucellosis.

Evidence of occupational risk factors

85. Cases have been reported in farmers, abattoir workers, veterinary staff and laboratory staff. In 1996, a London research scientist contracted brucellosis from laboratory samples of infected animals. In 2000, 14 cases were reported in Northern Ireland, all of which were occupationally linked, occurring in either farm workers or meat plant workers.

Numbers affected

86. According to the PHLS, there are typically fewer than 10 cases of brucellosis per year in England and Wales in the general population. The majority of cases reported in England are believed to be from imported sources or reactivations of chronic infections acquired abroad or indigenously. Between 1978 and 1991, of 488 cases in the UK, 43% were in farmers, 9% were in abattoir workers, 11% were in vets and 1% were in labourers. Between 1992 and 1995, there were 43 cases in the UK, of which

14 were acquired indigenously and 16% were in farmers. There were no cases reported to HSE under RIDDOR during 1997/1998 to 2001/2002.

Conclusion

87. This disease has not been eradicated and various occupations remain at risk. Thus, brucellosis should continue to be prescribed with the prescription remaining unchanged.

Prescribed disease	**Occupation**
B7 Infection by organisms of the genus *Brucella*	Contact with: a) animals infected by *Brucella*, or their carcasses or parts thereof, or their untreated products; or b) laboratory specimens or vaccines of, or containing, *Brucella*.

B8 – VIRAL HEPATITIS

Prescribed disease	Occupation
B8 Viral hepatitis	Contact with – a) human blood or human blood products; or b) a source of viral hepatitis.

History of prescription

88. The Secretary of State for Social Security first referred the question of whether viral hepatitis should be a prescribed disease to IIAC in July 1974. IIAC published its command paper "Viral Hepatitis" (Cm. 6257) on the subject in October 1975. It concluded that viral hepatitis should be prescribed for occupations involving close and frequent contact with human blood or blood products. Prescription was also recommended for persons with close and frequent contact with a source of viral hepatitis infection during the medical treatment or nursing of a person (or persons) suffering from viral hepatitis, or in a service ancillary to such treatment.

89. IIAC considered the terms of prescription of viral hepatitis in its review of the schedule (Cm. 8393) published in October 1981, and recommended that a full investigation should be carried out. The results of that investigation were published in its command paper "Viral Hepatitis" (Cm. 9147) in February 1984. IIAC commented that there was a lack of epidemiological evidence demonstrating an increased incidence in many of the occupations where staff were felt to be at increased risk. It also commented that the number of cases were low. However, what was known about the causation and methods of transmission of various forms of the disease made it possible to identify certain occupations where staff were likely to be at risk. IIAC considered the various types of hepatitis under the groupings A, B and 'non-A non-B'. While commenting on the different outcomes arising from infection with each type, the Council did not feel that any distinction should be made between the various forms of the disease for the purposes of benefit. IIAC concluded that the wide range of occupations known to bring workers into close contact with a source of viral hepatitis more often than is normal in the general population made it impractical to list them. It recommended that prescription should be extended to cover employment involving contact with human blood or blood products, or contact with a source of viral hepatitis. These recommendations were accepted in full and led to the current definition of the prescribed disease.

Description of the disease

90. Hepatitis means inflammation of the liver. The liver is a large organ in the abdomen with many metabolic functions making it essential for life. Hepatitis can arise from several causes including alcohol abuse and certain metabolic disorders, but the most frequent cause is viral infection. Viral hepatitis is a common disease, with hepatitis A, B, C and E viruses being the most important causes. The main differences between these hepatitis viruses are structural and in their mode of transmission.

Occupational statistics

91. According to RIDDOR statistics, there have been on average 12 cases of hepatitis reported per annum as occupationally acquired during 1997/1998 to 2001/2002. However, these numbers are not broken down according to the type of viral hepatitis.

Hepatitis A – Description of the disease

92. Hepatitis A is caused by the hepatitis A virus (HAV) of the family picornaviridae. This is the most common form of hepatitis infection. It is spread by faecal-oral contamination. The incubation period is normally 2-7 weeks. Studies show that serological evidence of infection is common even in non-occupationally exposed groups, indicating that infection is frequently sub-clinical (i.e. presence of anti-hepatitis A antibodies without symptoms of disease) or undiagnosed.

93. The epidemiology of the infection is changing in that the disease used to occur mainly in children, where it is mostly asymptomatic. It now occurs in older children and adults, causing jaundice in 70% of cases. Most people who have an acute illness are fully recovered in about 6 weeks from the date of onset. Some cases require hospital admission, and there is a fatality rate of 1.8% in people over 50 years old. There is no evidence that hepatitis A progresses to chronic liver disease, but hepatitis A can be more severe in patients who have chronic liver disease. Vaccination can protect against hepatitis A.

Hepatitis A – Evidence of occupational risk factors

94. The possibility of occupational risks from hepatitis A is controversial. Several studies have reported a statistically significant increased risk of seroprevalence in sewage workers, including a 1998 UK study of raw sewage workers (odds ratio, 3.73, 95% confidence interval 1.48 to 9.37). Similarly, a US study published in 2000, found that in wastewater workers as compared to drinking water workers the odds ratio for anti-HAV antibodies was 2.0 (95% confidence interval 1.0 to 3.8), after control for age, educational attainment and ethnicity. However, a systematic review of the literature, published in 2001 and based on 17 research reports concluded that there was no significant difference overall in seroprevalence between groups of water/sewage workers and control groups, after adjustment for age as a potential confounding factor.

95. The variation between different studies may, in part, be due to the different approaches used. For example, some studies have focused specifically on workers exposed to raw sewage, whereas others have also included other categories of sewage workers. It should also be noted that the published studies have tended to measure seroprevalence (i.e. individuals with antibodies against HAV, but who were not necessarily ill with the disease) rather than clinical cases of hepatitis A. There does, however, appear to be a clear doubling of risk of contracting hepatitis A for workers whose job involves handling raw (untreated) sewage.

96. Cases of hepatitis A, both clinical and sub-clinical, with a presumed relation to work, have also been reported in healthcare workers, staff working in residential or day care centres, food handlers, laboratory workers,

prison staff and armed services personnel. However, there is no epidemiological evidence of a doubling of risk among any of these occupational groups. It has also been suggested that increased risk may occur through occupationally related overseas travel to areas where hepatitis A is endemic.

97. It should be noted that due to increased standards of hygiene and reduced childhood infection in Western Europe it is likely that more workers enter employment without having already developed immunity to HAV, and thus, are more susceptible to infection. The PHLS recommends vaccination against hepatitis A for the following key workers: sewage workers coming into direct contact with raw sewage, staff working in residential and day care centres and laboratory workers who are working directly with HAV or non-human primates susceptible to HAV. The PHLS does not recommend routine vaccination for food handlers, healthcare workers or child care workers.

Hepatitis A – Numbers affected

98. According to PHLS figures for the general population, there were an average of 1488 cases per annum between 1997 and 2001, with 1138 cases in 2001 and 1271 cases in 2000. Of the cases in 2000, the ratio of male to female infection was 1.5:1, the majority of cases were between 5 and 34 years of age, and most were indigenously acquired. The overall incidence of hepatitis A due to HAV infection declined from 1991 to 2001; in 1991 7430 cases were reported in the general population. In 1999, an outbreak of hepatitis A occurred at a special needs school in Kent, involving two members of staff and three children. Between 1996 and 1997, ODIN reported three occupational cases involving a caterer, an airline steward and a school ancillary worker.

Hepatitis B – Description of the disease

99. Hepatitis B is caused by the hepatitis B virus (HBV), of the family hepadnaviridae. Hepatitis B is a bloodborne disease, spread by direct transfer of body fluids containing the virus from one person to another. Incubation normally lasts 7 to 23 weeks. Viral particles may persist in the blood after an acute infection, and 5% to 10% of adults who recover become carriers able to transmit the virus. In some cases the infection persists, leading to chronic liver disease, cirrhosis and hepatic tumours.

Immunisation and Prevention

100. HBV consists of a central core composed of DNA, enzymes and proteins, called core antigen (HBcAg). The central core is surrounded by the viral envelope, which is composed mostly of surface antigen proteins (HBsAg). There is also another viral antigen, HBeAg, which is associated with high levels of viral replication. All the HBV antigens can be detected by the body's white blood cells (lymphocytes). The body responds to the presence of antigen by producing antibodies that are specific to the viral antigens HBcAg, HBsAg and HBeAg – anti-HBc, anti-HBs and anti-HBe respectively. In persistent infection the antibody response fails to clear the infection; HBsAg is detectable, and in highly infectious carriers HBeAg is also present in the blood. Screening for HBsAg makes routine detection of carriers possible.

101. Infected blood donors may transmit the disease, though this is rare. A survey revealed that the prevalence of carriers among adults in England and Wales was 0.37%. Measures are necessary to protect workers in contact with infected blood and body fluids, who are at risk of infection, particularly after injury from contaminated sharp instruments. If the source of infection is HBeAg positive, there is a 30% risk of transmission from a single percutaneous exposure. Vaccination, available since 1982, makes it possible to provide primary prevention for occupations where the risk of contact with contaminated blood and other body fluids is high. Within seven years of vaccination 30-50% of individuals lose detectable levels of antibody, although immunological memory probably persists and may provide long-term protection. However, there is evidence that 2-10% of the adult population do not respond adequately to standard vaccination; some of these are hyporesponders (i.e. they have responded but produced low levels of antibodies). Repeat doses of vaccine can help generate a response in some resistant cases. The fact that some people do not respond to immunisation makes it important that employees in at-risk occupations have follow-up serological tests to confirm protection. Combined hepatitis A and B vaccination is now available. Post-exposure prophylaxis for non-immune subjects exposed to infected blood reduces the risk of seroconversion. This is usually by a combination of passive immunisation (with Ig against HBV) and active immunisation with HBV vaccine.

102. It would be unreasonable to restrict the definition of occupational causation of HBV infection among healthcare workers to cases with documented sero-conversion after recognised blood exposure incidents. HBV is highly transmissible especially if the source is HBeAg positive, so that very minor, often unrecognised, exposures to infected blood may be sufficient to transmit the infection.

Hepatitis B – Evidence of occupational risk factors

103. In the late 1960s, there were outbreaks of HBV-associated hepatitis in dialysis units around the UK, including in Edinburgh, London and Birmingham. The most serious outbreak occurred in the renal unit at the Royal Infirmary in Edinburgh, where 40 clinical cases of hepatitis were reported, 12 of which were in healthcare workers (surgeons, nurses and technicians). Seven patients died, including two laboratory technicians and two transplant surgeons. The Rosenheim Report, published in 1972, proposed practical guidelines to prevent the transmission of HBV in renal units. These guidelines were later expanded to include preventive measures against transmission of other blood-borne viruses, including HCV. However, whilst vaccination and infection control measures have reduced the prevalence of hepatitis B in healthcare workers, these employees remain at risk of HBV infection through accidental exposure to infected blood and body fluids. Evidence from the era before widespread vaccination shows a clearly elevated risk, more than twice that in the general population. Furthermore, it is estimated that 5-10% of all reported cases still occur in healthcare workers.

104. Studies have also looked at the risk in mortuary workers, undertakers and embalmers. The risk of acquiring HBV from the discarded needles of drug-addicts is greatly reduced because of drying and inactivation of the

virus. There is no evidence that workers who might be so exposed, such as hostel staff, have a doubling of risk of contracting the disease through their work.

Hepatitis B – Numbers affected

105. According to data from PHLS, between 1997 and 2001 there were 4543 cases of viral hepatitis due to HBV infection in the general population of England and Wales, with 1028 cases occurring in 2001 and 1035 cases occurring in 2000. The incidence of notifications has been increasing as the numbers of cases reported in 1991 was 488.

Hepatitis C – Description of the disease

106. Hepatitis C is caused by the hepatitis C virus (HCV) of the flaviviridae family, identified in 1989. Its role as the cause of what was then termed non-A, non-B hepatitis was quickly established. There are six main genotypes of HCV, of which 1a, 1b, 2a, 2b and 3a are the most common in the UK (type 4 is mostly found in the Middle East). In the UK, hepatitis C is particularly seen in intravenous drug users, with the seroprevalence in this group being as high as 90% in areas of Scotland. Other exposures associated with increased risk, include having a transfusion of blood or blood products, tattooing and being born abroad.

107. The incubation period is normally 2-8 weeks, though it may be up to 6 months. Only 20-30% of infected people have acute symptoms. The majority of infected people (60-70%) develop chronic infection, of which some 20% may develop cirrhosis or liver cancer over a period of years

108. Screening can detect antibodies to core antigen. It is also possible to identify the presence of virus in the blood. As yet, no vaccine is available for HCV. The risk of transmission of HCV from a single needlestick injury with a contaminated needle is about 3%. This is much less than the risk of transmission of HBV if the source is HBeAg positive (up to 30%) but substantially more than the risk of transmission of HIV (around 0.3%). Blood tests at the time of exposure and at intervals up to six months afterwards can detect seroconversion for HCV. There is some evidence to suggest that early detection of HCV RNA after an exposure, and treatment with anti-viral agents (such as interferon), can help to prevent persistent HCV infection.

Hepatitis C – Evidence of occupational risk factors

109. Cases have occurred in healthcare workers, who came into contact with contaminated blood, usually via injury from contaminated needles and other sharp instruments. One study in the UK reported a prevalence of HCV antibodies among healthcare workers with varying degrees of contact with blood and body fluids to be 0.28%, similar to that among blood donors in the area. This study did not estimate the prevalence specifically among healthcare workers at particularly high risk of exposure to blood. The prevalence of antibodies to HCV is higher in healthcare workers in the USA and other countries of Western Europe than in the UK according to a 1999 PHLS report. The main way to reduce the risk is by reducing the risk of blood exposure through good infection control procedures. Dental workers have also been reported to have higher incidence of hepatitis C.

110. From the Council's review of the literature, it was apparent that there were clear gaps in the evidence about occupationally-acquired HCV infection. Thus, although the evidence did not indicate a doubling of risk of HCV infection among any group of UK employees, including healthcare workers, compared to the general population, the Council feels that because hepatitis C is now the commonest bloodborne virus involved in reported occupational exposures in England and Wales, sub-groups of healthcare workers, such as Accident and Emergency staff in city centres, could have a higher occupational risk.

Hepatitis C - Numbers affected

111. According to PHLS data, there were 2846 cases of hepatitis C in the general population of England and Wales between 1999 and 2001, with 1042 cases in 2000 and 1061 cases in 2001. The seroprevalence in the UK general population is estimated to be below 1%.

Hepatitis D, E, F, G – Description of the disease

112. Hepatitis D can only affect individuals who are also infected with HBV. Evidence suggests that hepatitis E may be a zoonosis contracted from exposure to pigs. There is little known about hepatitis F and G, and there seems to be some doubt as to whether the G virus is a liver-specific virus.

Hepatitis D, E, F, G - Evidence of occupational risk

113. In 2001, a study reported increased seroprevalence of HEV infection in 264 swine workers (odds ratio, 2.46), and linked infection rates to years of occupational exposure (odds ratio, 1.04 per year in employment). There was one reported case of hepatitis E due to exposure to pigs while cleaning barns and assisting sows at birth. Travellers in countries with poor sanitation are at risk of contracting hepatitis E. In France, hepatitis E has been added to the list of occupational diseases following a case in a foreman who came in contact with wastewater. He had not visited any country where the disease was endemic, nor had any known contact with infected persons.

114. No evidence of occupational risk was noted in relation to hepatitis D, F or G.

Hepatitis D, E, F, G – Numbers affected

115. In the UK general population, there were 31 cases of HEV infection in 1999 and 33 cases in 2000 according to the PHLS. The majority of the cases were associated with travel abroad. Only one case in 1999 was thought to have originated in the UK.

Conclusions

116. The Council has carefully examined the evidence from the published scientific literature, and has noted the changes in nomenclature since the identification of types C and E. There is now substantially more epidemiological evidence on which the Council can base its recommendations.

117. In particular, the Council has reviewed hepatitis A infection in sewage workers. There is evidence the risk is more than doubled in sewage workers working with raw sewage, although overall sewage workers do not have a significantly increased risk of disease.

118. In relation to hepatitis C, the Council found that the evidence did not indicate a doubling of risk of the disease in workers in exposed occupations. However, the fact that there are clear gaps in the evidence, and seroconversion can be documented in specific cases, suggests that some sub-groups of health workers are at elevated risk. Furthermore, HCV infection is the most commonly reported occupationally acquired blood-borne disease in England and Wales. In view of the uncertainty about the risk in some sub-groups of health workers and the similar mode of transmission to hepatitis B, the Council feels that prescription of both hepatitis B and C should continue, with wording similar to the present prescription, for all those in contact with blood or body fluids.

119. The Council is not recommending prescription of HEV infection for any workers as the evidence showing occupational risk is derived from serology rather than clinical cases of disease. There is no clear evidence showing doubling of risk of disease for any occupations in relation to HEV disease and there is only weak evidence from case reports. However, the Council will continue to monitor future research in this area.

120. The Council recommends that a) viral hepatitis be categorised according to the route of transmission; i.e. blood-borne (hepatitis B and C) and faecal-oral (hepatitis A); b) that hepatitis A be prescribed for sewage workers in contact with raw sewage; and c) that blood-borne viral hepatitis continue to be prescribed as at present.

Prescribed disease	**Occupation**
B8a Infection by hepatitis A virus	Work involving contact with raw sewage.

Prescribed disease	**Occupation**
B8b Infection by hepatitis B or C viruses	Work involving contact with a) human blood or human blood products; or b) a source of hepatitis B or C viruses.

B9 – Infection by Streptococcus suis

Prescribed disease	Occupation
B9 Infection by *Streptococcus suis*	Contact with pigs infected by *Streptococcus suis*, or with the carcasses, products or residues of pigs so infected.

History of prescription

121. Infections with *Streptococcus suis* were added to the list of prescribed diseases as from 5 October 1983.

Description of the disease

122. *Streptococcus suis* is an important bacterial pathogen of pigs, that can also infect humans; it is a zoonosis. Human infections are predominantly caused by *Streptococcus suis* Type 2, but recently Type 14 strains have also been implicated in disease causation. Humans become infected with *Streptococcus suis* from either contact with infected pigs or ingestion of contaminated meat. Bacteria enter the body either via abrasions in the skin or via the tonsils. After entering the bloodstream, bacteria target the central nervous system. The incubation period is believed to be 2-4 days. *Streptococcus suis* infections cause meningitis and septicaemia, which occasionally result in arthritis and blindness. In 50% of cases, *Streptococcus suis* infections result in deafness. Hearing may recover but generally deafness is permanent and may be associated with problems of balance, such as vertigo. Occasionally infections can result in death, but generally patients respond to penicillin therapy.

Evidence of occupational risk factors

123. Infections have occurred in workers handling infected pork carcasses, or products, or live pigs, such as abattoir workers, butchers, pig farmers, meat processors and veterinary surgeons. In the UK in 2001, a pig farm worker was reported with septicaemia due to *Streptococcus suis* infection. In 2000, a pig farmer in Leeds contracted Type 14 *Streptococcus suis* and subsequently died. In Germany in 2002, a truck driver transporting pigs became infected. In the Netherlands in 2000, a poacher contracted *Streptococcus suis* meningitis from a wild boar, which suggests that the risk may not be restricted to contact with farm-reared pigs.

124. The Netherlands Reference Laboratory for Bacterial Meningitis in Amsterdam published a study based on 30 cases of meningitis associated with *Streptococcus suis* occurring between 1968 and 1984. It concluded that the estimated annual risk of developing S*treptococcus suis* meningitis among Dutch abattoir workers and pig breeders was approximately 1,500 times higher than that among persons not involved in the pork industry.

125. A 1993 French report, based on 108 cases reported over 20 years, further investigated the incidence of *Streptococcus suis* infections. It suggested that the higher incidence in men than woman was indicative of an occupational origin for the disease and noted that contact with pigs or pork products was present in every infected case. Furthermore, it noted that

infections were more common in countries with high levels of pig farming, such as the Netherlands and Denmark, or high levels of pork consumption, such as in Hong Kong.

126. Asplenic people are particularly susceptible to *Streptococcus suis* infections, with the disease tending to be more severe.

Numbers affected

127. This is a rare infection with a total of 20 cases in the general population of England and Wales reported to the PHLS between 1991 and 2000 - an average of approximately two per annum. Between 1975 and 1991, there were 36 cases reported, which occurred in abattoir workers, butchers, pig farmers and meat processors. According to HSE under RIDDOR, there was an average of less than one reported case per annum between 1998 and 2002.

Conclusion

128. Infection by *Streptococcus suis* remains a risk of occupation among those in contact with infected pigs or their products. Thus, the Council recommends that this disease should continue to be prescribed with the prescription remaining unchanged.

Prescribed disease	**Occupation**
B9 Infection by *Streptococcus suis*	Contact with pigs infected by *Streptococcus suis*, or with the carcasses, products or residues of pigs so infected.

B10 – CHLAMYDIOSIS

History of prescription

129. In July 1989, the Council published its command paper "Chlamydiosis and Q Fever" (Cm. 742) in which it recommended the prescription of avian and ovine chlamydiosis to cover those persons whose work brings them into contact with infected birds and sheep, their remains or untreated products. The Council's recommendations were accepted and implemented from 9 August 1989.

Description of the disease

130. Chlamydiosis is a zoonotic disease caused by the bacterium *Chlamydia psittaci* (this differs from the sexually transmitted disease caused by *Chlamydia trachomatis*). Human infections can arise from contact with infected birds (avian chlamydiosis) or sheep (ovine chlamydiosis).

Numbers affected

131. In the general population of England and Wales, there were a total of 1321 laboratory-confirmed cases of chlamydiosis reported to the PHLS between 1996 and 2000; the sources of infection were not specified. In England and Wales in the general population, there were 177 laboratory-confirmed cases in 2000 and 206 in 1999. Avian chlamydiosis is reported more frequently than ovine chlamydiosis. The number of reported cases of chlamydiosis has declined in recent years. According to RIDDOR reports, there were on average two cases per annum of occupational chlamydiosis during 1997/1998 to 2001/2002.

B10A - AVIAN CHLAMYDIOSIS

Prescribed disease	Occupation
B10a Avian chlamydiosis	Contact with birds infected with *Chlamydia psittaci*, or with the remains or untreated products of such birds.

Description of avian chlamydiosis

132. Avian chlamydiosis (also known as avian psittacosis, ornithosis or parrot fever) is common among several bird species, including psittacines (e.g. parrots and cockatiels), turkeys, ducks and geese. Infected birds contaminate their environment by shedding bacteria in their faecal and nasal discharges. Primarily, humans contract chlamydiosis from inhaled aerosolised discharges from infected birds. The incubation period is generally 6-19 days. Avian chlamydiosis is characterised by a febrile pneumonia which can be accompanied by headache, rash and myalgia. The disease ranges from asymptomatic to moderate in nature, but can be more severe in the elderly. Occasionally, severe cases arise which are associated with endocarditis, hepatitis, neurological complications and death. Avian chlamydiosis can be treated with antibiotics.

Evidence of occupational risk factors

133. In the UK, between November 1999 and June 2000, there were seven outbreaks of *Chlamydia psittaci* infection, associated with stores supplying birds and other pets to the public. Infections occurred in staff members and members of the public. In 1981, 15 veterinary surgeons visiting a duck processing plant contracted avian chlamydiosis in the UK.

134. In 1989, three workers at a duck farm and processing plant in Australia contracted the disease. Evidence indicated a high level of seroconversion (antibodies to *Chlamydia psittaci*) amongst workers which could be correlated with the number of years of employment at the plant. There was also a reported case in a customs officer in Antwerp.

Numbers affected

135. There were 10 cases of avian chlamydiosis reported between November 1999 and June 2000 associated with pet shops. The information regarding occupational exposure is scant, but between 1996 and 1997 ODIN reported four occupational cases of avian chlamydiosis, of which two were in pet shop workers, one was in a turkey plucker and one in a pest controller.

Conclusion

136. Avian chlamydiosis is still a cause of disease in various occupations. Thus this disease should remain prescribed with the prescription unchanged.

Prescribed disease	Occupation
B10a Avian chlamydiosis	Contact with birds infected with *Chlamydia psittaci*, or with the remains or untreated products of such birds.

B10B - OVINE CHLAMYDIOSIS

Prescribed disease	Occupation
B10b Ovine chlamydiosis	Contact with sheep infected with *Chlamydia psittaci*, or with the remains or untreated products of such sheep.

Description of ovine chlamydiosis

137. Ovine chlamydiosis (ovine psittacosis) is an acute flu-like illness which in pregnant women is associated with intrauterine death and abortion of fetuses. It is contracted by exposure to the afterbirth from infected sheep. The Department of Health issues yearly warnings to women concerning the risks of contracting the disease during lambing season.

Evidence of occupational risk factors

138. Since the 1980s, ovine chlamydiosis has been recognised as a risk for women in certain occupations, such as farm workers and vets, who assist at lambing or come into contact with the products of conception. In 1992, an abattoir worker in Glasgow contracted ovine chlamydiosis and subsequently suffered fetal loss.

Numbers affected

139. Ovine chlamydiosis is rare in the UK, with the number of reports of human infections being between 0-9 cases per annum since 1975. According to a MAFF report published in 2000, there were two new cases of the disease in that year. However, ovine chlamydiosis remains an important cause of abortions in sheep globally, so, the potential for human exposure to this disease remains; in 2000, *Chlamydia psittaci* infections caused 759 out of 1757 reported abortions in sheep in the UK (Zoonoses Report United Kingdom 2000, MAFF), indicating a continuing reservoir from which human infection might arise.

Conclusion

140. Whilst this disease rarely occurs in the UK in humans, the potential for infection from infected sheep exists. We recommend that the disease should remain prescribed with the prescription remaining the same.

Prescribed disease	**Occupation**
B10b Ovine chlamydiosis	Contact with sheep infected with *Chlamydia psittaci*, or with the remains or untreated products of such

B11 – Q FEVER

Prescribed disease	Occupation
B11 Q fever	Contact with animals, their remains or their untreated products.

History of prescription

141. In July 1989, the Council published its command paper "Chlamydiosis and Q Fever" (Cm. 742) in which it recommended the prescription of Q Fever to cover those persons whose work brings them into contact with infected birds and sheep, their remains or untreated products. The Council's recommendations were accepted and implemented from 9 August 1989.

Description of the disease

142. Q fever is a zoonotic infection caused by the bacterium *Coxiella burnetii*. There are two forms of the disease, an acute and a chronic form. Acute Q fever is usually a self-limiting, febrile illness during which pneumonia or hepatitis can occur. Chronic Q fever is a more severe infection, which occurs in around 20% of cases and lasts for more than 3 months. Characteristics of chronic Q fever include endocarditis and chronic fatigue. *Coxiella burnetii* is usually contracted from sheep, cattle or goats. The bacteria concentrate in the placenta of infected livestock. Thus risks of infection are associated with exposure to aborted fetuses and afterbirth. The products of birth can also contaminate hay and straw, which when dry can become aerosolised. It is estimated that 20% of dairy herds are infected with *Coxiella burnetii*. The bacteria can form spores, which are particularly hardy and can survive for months or years. The incubation period for Q fever is 14 – 40 days. The acute form of Q fever can be treated with antibiotics but the chronic form can be more difficult to treat. An effective vaccine has been available since 1989.

Evidence of occupational risk factors

143. Outbreaks have occurred on farms and in abattoirs, but also in urban settings with no animal contact. Q fever predominantly occurs in men, suggesting a possible occupational link to the disease. In 1989, an outbreak occurred in Solihull near Birmingham which affected 147 people; 88% of the cases of Q fever were in men of working age (i.e. 16-64 years). Whilst 77% of the cases were in paid employment, only 4 cases had exposure to animals or their products at work and only one of those was a farm worker. It was also noted that Q fever was more prevalent in smokers. The probable source of the outbreak was thought to be windborne spread of spores from surrounding farmland to the urban areas where the patients lived. Four people who assisted in the cull associated with the foot and mouth disease outbreak in 2001 contracted Q fever, according to DEFRA. An offal porter in the UK contracted the disease from infected sheep livers in 1997.

144. In 1996, an outbreak in a slaughterhouse in the French Alps was reported resulting in 29 cases of Q fever. In 2001, a Q fever outbreak occurred amongst kitchen employees in an urban hospital in Israel. In 2001, 29 workers at an abattoir in Australia contracted Q fever. In 2001, a study of 267 Japanese veterinary surgeons found that 13.5% had antibodies against

Coxiella burnetii compared with 3.6% of healthy blood donors. This study suggests that veterinary surgeons are at greater risk of infection by Coxiella burnetii than the general population.

Numbers affected

145. According to RIDDOR reports of occupational diseases, there were on average two cases per annum of Q fever during 1997-2001. In 2000, in the general population, 71 laboratory-confirmed cases were reported in England and Wales, 35 in Northern Ireland and six in Scotland, compared with 57, 53 and 14 respectively for 1999. Q fever is typically characterised by sudden unexplained outbreaks. In October 2002, there was an outbreak with 50 laboratory-confirmed cases in Newport, South Wales, without any known animal contact, similar to the outbreak in Solihull mentioned previously. There are approximately 70 sporadic cases per annum, which are not associated with outbreaks and for which the origin of infection is unknown. The incidence of Q fever declined in 2001, a possible explanation for which may have been the outbreak of foot and mouth disease which saw the slaughter of sheep and cattle before they reached the age for giving birth.

Conclusion

146. Q fever has not been eradicated and remains a risk of certain occupations. Thus, the Council recommends that this disease should continue to be prescribed with the prescription remaining the same.

Prescribed disease	**Occupation**
B11 Q fever	Contact with animals, their remains or their untreated products.

B12 – ORF

Prescribed disease	Occupation
B12 Orf	Contact with sheep or goats, or with the carcasses of sheep or goats.

History of prescription

147. In October 1990 the Council published its command paper "Occupational Zoonoses" (Cm. 1243) in which it recommended the prescription of orf for people working with sheep, goats or their carcasses.

Description of the disease

148. Orf (also known as ecthyma contagiosum) is caused by a virus of the *Parapoxvirus* species. Humans contract the disease through cuts in the skin when exposed to contaminated sheep or goats, or their products. Orf is a contagious pustular dermatitis, which is characterised by blisters on the skin which are usually localised on the hands. The incubation period for the disease is 5-6 days. Orf is generally a mild, self-limiting disease, which resolves in 3-6 weeks. However, orf can occasionally lead to secondary infections by *Staphylococcus* and *Streptococcus* bacteria, which can result in septicaemia. It tends to be under-reported by farmers and veterinary surgeons, who recognise the symptoms and do not need laboratory confirmation of the diagnosis.

Evidence of occupational risk factors

149 Orf is most commonly seen in shepherds, veterinary surgeons, meat industry workers, butchers and farmer's wives who bottle-feed lambs. In 1999, a UK study found that in three areas of England, 23% of those employed or living on a sheep farm reported themselves as having had orf. Among those who reported the disease, 4% had antibodies to orf. The risk factors that were identified were contact with sheep, size of the sheep flock and contact with dogs. In 2001, three cases of orf occurred in individuals contracted to work in animal disposal during the foot and mouth disease outbreak. In 2001, a shepherd's wife in the USA contracted orf, which would not resolve and had to be treated with antibiotics. In New Zealand in 1983, 231 cases of orf were reported from 18 meat works involved in slaughtering lambs and sheep, which represented 1.4% of the total workforce. It was noted that the risk of a worker contracting orf did not decrease with the number of years employed at the meat works and 18 cases of re-infection were reported.

Numbers affected

150. Orf is rarely reported, with 33 cases reported to the PHLS between 1995 and 2002, most of whom had known exposure to sheep. However, it is probably under-diagnosed and under-reported.

Conclusion

151. Orf generally is a self-limiting, mild disease, but occasionally can result in a more serious secondary infection. The Council, therefore, recommends that this disease should continue to be prescribed with the prescription remaining the same.

Prescribed disease	Occupation
B12 Orf	Contact with sheep or goats, or with the carcasses of sheep or goats.

B13 – HYDATIDOSIS

Prescribed disease	Occupation
B13 Hydatidosis	Contact with dogs.

History of prescription

152. In October 1990, the Council published its command paper "Occupational Zoonoses" (Cm. 1243) in which it recommended the prescription of hydatidosis for shepherds, veterinary workers and people working with dogs.

Description of the disease

153. Hydatidosis is caused by cysts formed by the tapeworm *Echinococcus granulosus*, found in the tissues of an infected host. The definitive hosts for the tapeworms are dogs and foxes, where the lifecycle can be fully completed from cysts to shedding eggs. Sheep and man are intermediate hosts (i.e. they can only harbour cysts, thus, the lifecycle cannot be completed). Tapeworm infection in sheep and dogs is especially prevalent in mid-Wales, Herefordshire and the Western Isles. Sheep become infected by grazing on pastures polluted with dog or fox faeces contaminated with tapeworm eggs. Dogs fed the carcasses of infected sheep can subsequently become infected with hydatidosis. Humans become infected by accidental ingestion of tapeworm eggs.

154. Cysts can establish in various tissues of the body, such as the liver and lungs. Problems arise when the cysts grow and impair the physiological function of the surrounding tissues or organs. Death can ensue from anaphylaxis if the cyst ruptures. The incubation period can be from a few months to years. Treatment in humans is by surgical removal of the cyst or by chemotherapy. Adoption of good practices, such as not feeding dogs the carcasses of sheep, and regular worming of sheep dogs, could lower the incidence of hydatidosis in humans.

Evidence of occupational risk factors

155. Cases have been reported in shepherds and farmers. One study investigated the epidemiology of hydatidosis in Sardinia from 1969 to 1984. It was concluded that tapeworms are endemic in that region and that the human infections centred on sheep-rearing areas. The prevalence of hydatidosis in shepherds was 47 per 1000 people compared to 8.9 per 1000 people employed in service industries in Sardinia.

Numbers affected

156. There were 11-15 cases per annum in the UK between 1999 and 2002 according to PHLS sources. Most of the cases are believed to have been contracted abroad.

Conclusion

157. Although this disease is rare hydatidosis has not been eradicated and the potential risk remains. We recommend that this disease should continue to be prescribed with the prescription remaining as follows:

Prescribed disease	Occupation
B13 Hydatidosis	Contact with dogs.

OTHER INFECTIOUS DISEASES CONSIDERED

Erysipelothrix

Description of disease

158. Erysipelothrix (also known as erysipeloid) is a human skin infection caused by the bacterium *Erysipelothrix rhusiopathiae*. This zoonotic infection also affects many wild and domestic animals. Human infections occur through handling infected meat with abraded skin. The infection is usually confined to the hand, but can extend to the forearm. Erysipelothrix is characterised by a progressively painful, purplish swollen area around the initial site of bacterial entry, which can be followed by complications, such as arthritis and endocarditis (which in one study was associated with a 38% fatality rate). Rarely, septicaemia is observed. Infections can be successfully treated with penicillin.

159. The Council considered erysipelothrix for prescription in its report on Occupational Zoonoses (Cmnd. 1243), but concluded that there was insufficient evidence on which to base a recommendation.

Evidence of occupational risk factors

160. Occupational risk factors involve exposure to infected animals or contaminated products.

Numbers affected

161. This disease is rare. According to the PHLS, one occupational case was reported, in 1997, of a slaughterhouse worker who had handled a large number of pigs.

Conclusion

162. Since the last review of erysipeloithrix, there has been no additional evidence on which the Council can base its recommendations. Thus, currently there remains insufficient evidence to recommend prescription. However, the Council will continue to monitor future research.

Foot and Mouth Disease (FMD)

Description

163. FMD is caused by a highly infectious virus (Aphthovirus) which can affect all cloven-hoofed animals. In animals, the disease is characterised by high fever and blisters in the mouth and feet. Early reports suggested that it was a zoonotic disease, which rarely infects humans. It is unclear exactly how humans might contract FMD, but the reported cases all had contact with infected animals. The case reports suggest an incubation period of two to three days, and that the disease is usually mild and self-limiting, resulting in fever, sore throat and blisters on the hands, feet and tongue. It should be noted that FMD is not to be confused with hand, foot and mouth disease, which is a human childhood disease caused by the Coxsackie virus.

Evidence of occupational risk factors

164. Early reviews published in the 1960s attributed cases to contact with infected animals.

Numbers affected

165. There have been 40 recorded cases in the general population of the UK up to 2002. The last human infection occurred in the UK in 1967. There were no proven cases of human infection in the recent outbreak in cattle and sheep during 2000-2001. It should be noted that there has never been any serological confirmation of FMD in humans, and some studies suggest that FMD is not a human disease.

Conclusion

166. Currently, the evidence from case reports is weak and there is some doubt as to the existence of the disease in humans at all. Furthermore, the reported cases of human FMD have only had minor illness which did not result in long-term disablement. Thus, the Council does not recommend prescription but will continue to monitor any new research as it emerges.

Hantavirus

Description of the disease

167. The hantavirus family of viruses was first identified in the Korean striped field mouse in 1978. It is now a worldwide zoonosis, infecting various hosts, including field mice, bank voles and rats. Hosts excrete the virus in their urine and saliva. Humans can contract the infection through skin abrasions, with the incubation period being 2-3 weeks. The clinical features of hantavirus infections can resemble those of leptospirosis. In the severe form of hantavirus infections, they include fever, headache, nausea and vomiting, hypotension, thrombocytopenia and oliguric renal failure accompanied by purpura. However, a report by MAFF published in 2000, suggested that the pronounced renal impairment described in Korean and Scandinavian human cases had not been seen in the UK.

Evidence of occupational risk factors

168. One case has been reported in a soldier posted to an area where hantavirus was endemic. Seroprevalence of antibodies has sometimes been found in workers exposed to rodents or water, such as farm workers, sewage workers and laboratory animal handlers. Studies to detect the hantavirus, Sin Nombre virus, amongst workers with frequent contact with rodents in the US, failed to identify seroprevalence in any individual. However, a study in the Netherlands suggested that 6% of animal trappers, 4% of forestry workers, 2% of laboratory workers and 0.4% of farmers were seropositive for hantavirus specific antibodies.

Numbers affected

169. Hantavirus is rare in the UK. Four cases of hantavirus infection have been reported in the UK in the general population. In 1995, a British soldier serving with the United Nations in Bosnia returned with hantavirus infection according to the PHLS. There were no cases reported in 2000.

Conclusion

170. This disease is rare. There is some evidence of occupational risk. However, at present, there is insufficient evidence on which to recommend prescription. The Council will continue to monitor new research.

Hendra virus and Nipah virus

Description of the disease

171. Hendra virus belongs to the paramyxovirinae sub-family. This virus was first identified in 1994 in Australia where it caused an outbreak of infection in racehorses and humans. Hendra virus has been shown to be widely distributed in certain species of fruit bats, but is not widely distributed amongst horses. The mode of transmission to horses and humans is unclear as studies have shown no serologic evidence of infection in humans who have had frequent contact with infected fruit bats. Humans may become infected from bodily fluids of infected horses.

172. Another member of the paramyxovirinae, called Nipah virus, was responsible for an outbreak of encephalitis in Malaysia and Singapore among pig-handlers (farmers and abattoir workers) in 1998 and 1999; 265 people were infected, of whom 105 died. Fruit bats were again thought to be the primary host, but serological evidence of infection by the virus was found in dogs, cats, horses and goats.

173. The symptoms of both diseases are similar. The incubation period is 4-18 days, although in one case a 12 month incubation was reported. Symptoms start with a flu-like illness, high fever and muscle pains. The disease may then subside or progress to respiratory illness and encephalitis. About 50% of people with symptomatic infection die from the disease.

174. The Malaysian authorities introduced strict controls, including the slaughter of over a million pigs and the use of protective equipment for exposed workers. There was also a health education programme for members of the public. The European Commission introduced import controls in 1999 on horses, bats, dogs and cats from Australia and Malaysia, prohibiting entry into the EU unless the animal was certified as being free of both viruses. There have been no cases of human infection in the UK.

Evidence of occupational risk factors

175. In Australia, the patients that contracted Hendra virus all had close contact with infected horses.

176. The majority of human cases in the 1998-1999 Nipah virus outbreak in Malaysia and Singapore were pig farmers, who had sick pigs on their farm or who had to perform activities requiring direct contact with the pigs. In 1999, another outbreak occurred among abattoir workers in Singapore. The abattoir and pig farmer incidents may have been connected.

Numbers affected

177. Of the three outbreaks associated with Hendra virus in Australia, two occurred in 1994, involving three people (two of whom died from respiratory failure and encephalitis respectively) and 15 horses. Another outbreak occurred in 1999, which involved one horse.

178. The Nipah virus outbreak in Malaysia in 1998-1999 affected 265 patients, with 105 fatalities. The outbreak stopped when the pigs in the affected area were slaughtered and buried. In the outbreak of Nipah virus that occurred in Singapore in 1999, 11 abattoir workers became ill, three of whom died.

Conclusion

179. The reported outbreaks of Hendra and Nipah virus infections have all occurred in other countries. There is no evidence of infections occurring in the UK. Thus, prescription is not currently warranted. However, the Council will continue to monitor new developments.

Human Immunodeficiency Virus (HIV)

Description of the disease

180. HIV is a human viral infection which causes the disease AIDS. HIV is spread mainly via blood-to-blood or sexual contact. In Western countries, the average time from infection to the onset of symptoms is 10 years. The virus attacks immune cells in the body. Subsequently, the body becomes immunocompromised and is unable to defend itself against a variety of diseases. Death can ensue from these various diseases.

Evidence of occupational risk factors

181. As with other blood-borne viral diseases, such as hepatitis B, healthcare workers have been suspected of being at particular risk. Needlestick injury is cited as the most frequent form of transmission of the disease from patient to health care worker, either by accidental injury during injection or by poor needlestick disposal. Precautions, including use of masks, gowns and eyewear, and good practices, such as implementation of codified hospital rules and guidance, have lowered the risk over the last five years. Needlestick design has also improved.

182. In the UK, studies have indicated that the risk of HIV infection is not as much as doubled in healthcare workers. The risk of transmission after a single penetrating injury through the skin from an infected source is 0.3%, and, for a mucocutaneous exposure it is 0.03%. Studies conducted in the USA, of healthcare workers with non-occupational risk factors have confirmed very low rates of infection from occupational exposure.

183. An increased rate of infection has been found in several occupations, for example airline workers, but there is no evidence that this is occupationally acquired.

Numbers affected

184. According to data from the PHLS, during 1997 to 2001, 396 occupational exposures to HIV were reported, of which 239 cases were percutaneous exposures and 110 were mucocutaneous exposures. Between 1997 and 2002 in the UK, there were five documented cases of HIV transmission related to work according to PHLS data. In addition, a further 11 cases have been reported amongst healthcare workers in the UK, associated with work abroad in areas of high HIV prevalence. All the reported cases had occurred following needlestick injuries.

Conclusion

185. The available evidence does not suggest that a doubling of risk of occupationally acquired HIV infection occurs in any group of workers. Thus, the Council does not recommend the prescription of HIV infection for any occupation. The Council will continue to monitor future research. However, it should be noted that where HIV infection occurred through accidental injury, such as a needlestick injury, benefit could be awarded under the accident provisions of the Industrial Injuries scheme.

Legionnaires' disease

Description of the disease

186. Legionnaires' disease was originally identified at an American Legion convention in 1976 in Philadelphia, USA. This human disease is caused by the bacterium *Legionella pneumophila*, which is found ubiquitously in freshwater environments. It is an 'accidental' pathogen of humans, its natural hosts being freshwater protozoa. In man-made water systems, such as whirlpool spas, plumbing and air-conditioning units, the bacteria may grow to very high numbers due to the warm, slow-flowing water conditions. Recent estimates suggest that around 60% of all large buildings are contaminated with Legionella. Problems arise when humans inhale aerosolised water droplets from contaminated man-made water systems. Bacteria then replicate in the lungs, causing a severe pneumonia. Symptoms develop 2-10 days following bacterial exposure and, with antibiotic therapy, usually resolve within 3 weeks. However, long-term respiratory problems can occur in some patients. Occasionally, death results, especially in the immunocompromised. Public health authority guidelines suggest regular cleaning and disinfection of man-made water systems to prevent the occurrence of Legionnaires' disease.

Evidence of occupational risk factors

187. In 1999 in the UK, two workers from a plastics factory were diagnosed with *Legionella pneumophila* infections related to a machine cooling system. In 2002 in Barrow-in-Furness, an outbreak of Legionnaires' disease was associated with the air-conditioning unit of a council building. A 1992 report from the University of Dresden, indicated that dentists had higher levels of antibodies against *Legionella pneumophila* than the general population, suggesting increased exposure to the bacterium. However, none of the 113 dentists had contracted Legionnaires' disease. One US report found that among 30 sporadic cases of *Legionella pneumophila* infection, patients commonly had occupations related to hospitals, construction or travel. Whilst some studies suggest an occupational risk, the only well-established risk factors for Legionnaires' disease are being male, being immunocompromised, smoking and being an alcoholic. The incidence of Legionnaires' disease in men is three times that of females, but this difference is likely to be due to causes other than occupation.

Numbers affected

188. According to the PHLS, in the UK between 1997 and 2002 there were on average 203 cases of Legionnaires' disease per annum in the general population. According to RIDDOR data, there were on average nine cases of

legionellosis per annum reported as occupational diseases during the period 1997/1998 to 2001/2002.

Conclusion

189. Evidence linking Legionnaires' disease to work has come solely from identifiable accidental exposures, which would be covered by the accident provisions of the Industrial Injuries scheme. There is insufficient evidence of occupational risk for the Council to recommend prescription. The Council will continue to monitor new developments.

Louping ill

Description of disease

190. Louping ill is a disease caused by infection with a tick-borne virus of the flaviviridae family. 'Louping' means 'leaping' in Norse, so named as this describes the signs observed in infected sheep. Louping ill is characterised as a fatal encephalomyelitis with cerebellar ataxia in sheep, and has been observed in Scotland, the north of England and Ireland. Human infections were first noted in 1934. In humans, the disease is characterised by flu-like symptoms, followed by an aseptic meningitis. The incubation period for this disease is 6-18 days. It is a self-limiting illness, but must be distinguished from Lyme disease, the treatment of which requires antibiotics. Louping ill can be prevented by regular sheep dipping.

191. Louping ill was considered for prescription in the Council's report on Occupational Zoonoses (Cmnd. 1243), but prescription was not recommended due to a lack of evidence.

Evidence of occupational risk factors

192. Cases have been reported in shepherds and crofters, general practitioners, butchers, deer farmers, deer stalkers and foresters.

Numbers affected

193. Between 1934 and 1991 there were 39 cases of Louping ill in the UK in the general population.

Conclusion

194. This disease is rare in the UK and there is insufficient evidence for the Council to recommend prescription. However, the Council will continue to monitor new research.

Lyme Disease

Description of the disease

195. Lyme borreliosis was first described in 1977 following an outbreak in Old Lyme, Connecticut, although retrospective analysis of case reports suggests that the disease had been occurring in Europe for over one hundred years. Lyme disease, as originally described, is caused by a spirochaete bacterium, *Borrelia burgdorferi*, carried by the tick, *Ixodes ricinus*. The reservoir hosts are deer and rodents which are infested with ticks.

196. Since the disease was first described several different strains of *Borrelia* have been identified which cause Lyme disease. The most common strains in Europe are *Borrelia afzelii* and *Borrelia garinii*. The strain of spirochaete is significant in that it affects the way the disease manifests itself, and the severity and frequency of the manifestations. Lyme disease was originally reported as an infective arthritis, but *Borrelia afzelii* is associated with skin changes (acrodermatitis) and *Borrelia garinii* with nervous system effects. All the strains produce the characteristic sign of a tick bite with a red ring around it. The redness spreads outwards over days or weeks, while the centre of the ring frequently returns to normal. This is called erythema migrans. Fatigue with fever, joint pain and muscle pain may occur at the same time. The condition may be self-limiting and can subside spontaneously. However, without treatment the disease may recur, worsen, or persist in a chronic form. The skin, muscles, joints, nervous system and heart may all be affected.

197. In order for musculo-skeletal and cardiac conditions to be attributed to Lyme borreliosis, there must be a high level of serum specific antibodies, and alternative diagnoses must be excluded. Mostly, the effects are transient, but chronic synovitis in one or more joints has been recorded, and episodes of cardiac rhythm disturbances, endomyocarditis and pericarditis also occur. It is reported that chronic cardiac conditions may be associated with Lyme borreliosis but no causal relation has been established.

198. The neurological effects include meningitis, facial palsy and nerve root inflammation (meningo-radiculitis). The cerebrospinal fluid shows lymphocytic pleocytosis (presence of more cells than normal) with plasma cells. Specific IgM and IgG antibodies develop after some six weeks. Chronic neurological involvement is reported as uncommon, and should not be diagnosed in the absence of lymphocytic pleocytosis and high levels of specific antibodies in the cerebrospinal fluid.

Evidence of occupational risk factors

199. Humans contract the disease when bitten by infected ticks that attach themselves to skin and clothing as people walk through grasslands and forests where deer and other host mammals are living. Among those at risk are vets, deer farmers and forestry workers.

Numbers affected

200. Between 1997 and 1998, there were 334 cases of Lyme disease reported in England and Wales, of which 5.8% were occupationally linked – 9 deer hunters, 7 forestry workers, 3 farm workers, 1 vet, and 1 student. Taking the numbers of occupationally acquired cases of Lyme disease in deer hunters and forestry workers alone, these figures are likely to represent a doubling of risk, given the small number of people employed in these occupations. According to RIDDOR reports, there were on average 4 cases per annum of occupationally acquired Lyme disease in England and Wales between 1997 to 2001.

Conclusion

201. Since Lyme disease was first considered by IIAC in 1990, enough evidence of occupational risk has accumulated that the Council believes it is

sufficient to warrant prescription. The high incidence of the disease in deer hunters and forestry workers suggests a clear occupational risk. The Council recommends that Lyme disease be added to the scheduled list of prescribed diseases as follows:

Prescribed disease	Occupation
B14 Lyme disease	Work involving exposure to *Borrelia* species.

Newcastle disease

Description of disease

202. Newcastle disease is due to infection by a virus of the paramyxovirus family. The virus affects domesticated and wild birds and can be transmitted to humans via inhalation or conjunctival contact with contaminated aerosols. Newcastle disease results in a painful conjunctivitis accompanied by flu-like symptoms. The disease is self-limiting and resolves within a few days without treatment. Immunisation of birds and adopting good hygiene practices when handling birds helps prevent human infections.

Evidence of occupational risk factors

203. Newcastle disease can be transmitted to workers in contact with infected birds; poultry workers, laboratory workers, veterinary workers and pet shop staff.

Numbers affected

204. The number of human cases of Newcastle disease is unknown.

Conclusion

205. The disease is self-limiting and would not result in long-term disablement. Thus, the Council does not recommend prescription. However, the Council will continue to monitor new developments.

Pasteurellosis

Description of disease

206. Pasteurellosis is caused by an infection with the bacterium *Pasteurella multocida*. Cats, dogs and other domestic and wild animals harbour these bacteria in their mouths. It is estimated that 50% of pet cats and dogs carry *Pasteurella multocida* asymptomatically. *Pasteurella multocida* can also be found in livestock, where clinical signs of infection vary from mild subclinical involvement to severe respiratory disease and death. Humans become infected after receiving bites or scratches from an infected animal, and after a few days incubation, symptoms can develop. The area surrounding the bite or scratch shows signs of acute inflammation with serosanguinous discharge, and usually becomes necrotic with painful cellulitis. Individuals with regular contact with domestic animals can develop exacerbations of chronic bronchitis or bronchiectasis, as organisms

can colonise the respiratory tract. The infection responds successfully to treatment with antibiotics.

Evidence of occupational risk factors

207. No evidence was found of occupational risk factors. Cases generally occur in persons over 65 (40% of cases) with no sex difference in incidence according to MAFF.

Numbers affected

208. Between 1997 and 1999, there were, on average, 216 laboratory confirmed reports of human pasteurellosis in the general public according to the PHLS.

Conclusion

209. This disease is generally mild, and as such, does not warrant prescription.

Rabies

Description of the disease

210. Rabies is a viral disease of mammals caused by a virus of the *Lyssavirus* genus, called rabies virus. Another related virus is the European Bat Lyssavirus, which causes a rabies-like disease in bats and humans. Humans contract rabies by being bitten or being exposed to the saliva of an infected animal (e.g. through being scratched). Rabies virus targets the central nervous system, causing encephalopathy and usually death within days of the onset of symptoms. However, the incubation period prior to the onset of symptoms can be months. Vaccination can protect against rabies.

Evidence of occupational risk factors

211. Due to the extreme rarity of cases in the UK there is little solid information available about occupational risk of rabies. However, workers handling imported animals, such as vets and quarantine staff may be at risk. In November 2002, a voluntary bat handler from Dundee died from rabies after being bitten by a bat infected with European Bat Lyssavirus. The volunteer had declined rabies vaccination both prior to and after being bitten by the rabid bat. This was the first indigenously acquired case since 1902. In July 2002, the PHLS reported another incidence of a voluntary bat warden being bitten by a bat infected with rabies. The warden was treated prophylactically and did not subsequently develop rabies. These cases highlight the potential risks to those handling bats and the importance of immunisation in this occupational group. However, it should also be noted that European Bat Lyssavirus is very rare in the UK bat population, with only three confirmed cases in the last fifteen years.

Numbers affected

212. Since 1946, there have been 20 cases of human rabies in the general population, all of which were acquired while abroad. The last case was in 1996, when a man died after being bitten by a stray dog in Nigeria. There have been three cases of human European Bat Lyssavirus in the last 25 years in the general population, all of which were fatal. Worldwide, there are 30-

40 thousand cases per year, with the majority occurring in developing countries.

Conclusion

213. There is a very low incidence of rabies in the UK and there is no evidence of a doubling of risk of infection for any occupational group. The Council does not recommend that rabies be added to the scheduled list of prescribed diseases. The only case of rabies acquired in the UK was the result of an identifiable accident. The Council recognises that the presence of European Bat Lyssavirus in the bat population make rabies an occupational hazard for bat wardens. Bites and scratches from rabid bats occurring during work would be covered under the accident provisions of the Industrial Injuries scheme.

Ringworm

Description of disease

214. Ringworm is a common zoonotic infection which is due to a fungal infection of the skin. Human cases can arise from cattle (due to the fungus, *Trichophyton verucosum*) or dogs (due to the fungus, *Microsporum canis*), but can also arise from horses, pigs, sheep and rats. The disease is characterised by round, crusty annular lesions. Humans contract the infection through skin abrasions in direct contact with lesions from an infected animal. The fungi also produce spores, which can survive for long periods of time. Prevention of ringworm infection is by spray treatment of infected animals. Human ringworm infection can be treated with antifungal creams, but can disappear without intervention, if given time.

Evidence of occupational risk factors

215. There is no evidence of occupational risk.

Numbers affected

216. Ringworm is likely to be common amongst the general population, but there is a lack of reliable data. Routine laboratory surveillance does not provide any estimate of prevalence in either humans or animals.

Conclusion

217. There is no evidence on which to recommend prescription, but the Council will continue to monitor new research.

Small Round Structured Virus (SRSV) gastroenteritis

Description of disease

218. SRSV, also known as Norwalk-like virus or 'Winter Vomiting virus', is a major cause of human gastroenteritis, accounting for the majority of cases of occupationally acquired diarrhoea according to the HSE. In 2001, 78% of all occupationally acquired infections were diarrhoeal illnesses, with 39% attributable to SRSV according to the HSE reporting scheme for infections (SIDAW – Surveillance of Infectious Diseases at Work). The virus can be caught by eating various infected foodstuffs and is spread from person

to person either by contact with faeces or from the vomit of an infected individual. Following a 24-48 hour incubation period, the illness is characterised by violent vomiting for 24 hours. The disease usually resolves within two days, even in the elderly, with no long-term side-effects.

Occupational risk factor

219. SRSV is commonly associated with gastroenteritic outbreaks in places where large numbers of people are in close contact, such as nursing homes, hospitals and cruise liners.

Numbers affected

220. In 1994, 114 members of staff in a group of West Glamorgan hospitals contracted SRSV gastroenteritis. According to the PHLS, there were an average of 1921 cases of SRSV in the general population in England and Wales between 1997 and 2001.

Conclusion

221. This disease is a common cause of gastroenteritis in the UK workforce. However, as it generally resolves within days with no long-term sequelae, it does not require prescription.

Toxocariosis

Description of disease

222. Toxocariosis (also known as toxocariasis) is a worldwide zoonotic disease, especially common in Europe. It is caused by an infection with roundworms whose hosts include dogs, cats and livestock. Humans become infected via accidental ingestion of soil or herbage contaminated with roundworm eggs or by consumption of raw vegetables or undercooked meat from infected host animals, including chickens, cattle and sheep. Following ingestion, the eggs require 1-3 weeks incubation. Human diseases occur due to migration of larval forms into various tissues, which can cause pneumonitis, chronic abdominal pain, skin rash and blindness. Regular deworming of animals can help prevent infection, as can good hygiene practices.

223. Toxocariosis was first considered for prescription in IIAC's review of Occupational Zoonoses (Cmnd. 1243), but was not recommended due to insufficient evidence.

Evidence of occupational risk factors

224. There is no evidence of occupational risk.

Numbers affected

225. There were nine laboratory-confirmed reports of toxocariosis in the UK general population in 2000, and an annual average of 15 reports between 1997 and 1999 according to MAFF.

Conclusion

226. There is no evidence on which to recommend prescription. The Council will continue to monitor new developments.

Toxoplasmosis

Description of disease

227. Toxoplasmosis is a relatively common illness in animals and humans worldwide. Toxoplasmosis is caused by infections with the protozoan parasite *Toxoplasma*, of which the majority of human infections are caused by *Toxoplasma gondii*. Most warm-bloodied animals can act as hosts but the protozoan lifecycle is only complete in cats and wild felidae. Humans become infected via consumption of undercooked meat, accidental ingestion of cat faeces or from handling contaminated soil or cat litter trays. The disease may be asymptomatic or cause mild flu-like illness. Infections occurring during pregnancy can result in abortion or congenital malformation. Toxoplasmosis is also an important cause of abortion in sheep, accounting for a third of all cases examined at a government veterinary laboratory in Great Britain.

Evidence of occupational risk factors

228. There is no evidence of occupational risk.

Numbers affected

229. In the UK general population, there were 128 laboratory-confirmed human cases in 2000, 181 in 1999 and 222 in 1998, according to the PHLS. Between 1989 and 2000, the incidence of toxoplasmosis in the UK declined for unknown reasons. The incidence in pregnant women is unknown.

Conclusion

230. There is no evidence currently on which to recommend prescription, although the Council will continue to monitor new research developments.

Variant Creutzfeldt Jakob Disease (vCJD)

Description of the disease

231. Creutzfeldt Jakob Disease (CJD) was first described in 1920 as a rare fatal neurodegenerative disease, generally occurring in persons over 70 years of age. It was grouped with other diseases which caused similar pathological characteristics (spongy vacuolation of the brain), described as spongiform encephalopathies. The infectious agents for CJD and other spongiform encephalopathies are believed to be prions (proteinaceous infectious particles). Prions are derived from a normal protein in the human body, called PrPc, which is a constituent of cellular membranes. The prion is formed due to a conformational change of the normal PrPc to a pathogenic form of the protein, called PrPsc. The abnormal PrPsc, or prion, is insoluble and unable to carry out its role in the cell membrane. The PrPsc protein is also able to convert more normal PrPc to the abnormal prion form, thus generating a chain reaction although it remains unclear how this leads to the pathological changes associated with CJD. CJD can arise sporadically, iatrogenically (i.e. via contamination from medical procedures) or familially.

232. In 1996, the national CJD surveillance team in Edinburgh noticed a new form of CJD, variant CJD (vCJD), where the onset of the disease generally occurred in younger persons (i.e. less than 70 years old) which was

increasing in incidence in the general population. Evidence suggests that vCJD is due to exposure of humans to material infected with bovine spongiform encephalopathy (BSE). The incubation period for vCJD is thought to be several years and there is, as yet, no established treatment.

Evidence of occupational risk factors

233. Due to the low numbers of cases of vCJD there is very little information concerning occupational risk. A cluster of five cases of vCJD was identified in Leicestershire, but these were thought to be linked to consumption of infected meat, contaminated during butchering practices which were stopped in the 1980s. In 2002, one report suggested a link between sporadic CJD (not vCJD) and residence or employment on a farm or market for over 10 years. However, no other studies have found links between the incidence of CJD or vCJD and occupation.

Numbers affected

234. According to October 2002 Department of Health statistics, there were a total of 669 cases of CJD and 117 cases of vCJD between 1990 and 2002 in the UK general population.

Conclusion

235. Currently, the incidence of vCJD is low and there is no evidence of occupational risk. There is insufficient evidence to recommend prescription. However, the Council will continue to monitor new research.

West Nile Virus

Description of disease

236. West Nile virus was first identified in 1937 as cause of fever in women in the West Nile region of Uganda. Later it was linked with inflammation of brain and spinal cord in Israel in 1957. The disease has now spread to many parts of the world and caused outbreaks in humans and horses in Europe during the 1960s. It is a disease of birds, but mosquitoes are carriers and it is believed that transmission to humans is via insect bites. There is no evidence to suggest that direct transmission can occur from birds to humans, but the Centre for Disease Control in the USA advises caution when handling infected or dead birds. West Nile virus arrived in the USA in 1998, and between 1998 and 2002 the incidence of human and animal infection steadily increased. In October 2002, the Centre for Ecology and Hydrology in Oxford warned the Department for Food and Rural Affairs (DEFRA) and the Department of Health that there was evidence of West Nile virus infections in the UK bird population, although no human cases have been identified. The mosquito population is not as numerous as in the USA, thus, the impact of the arrival of West Nile virus in the UK remains uncertain.

Evidence of occupational risk factors

237. There is no evidence of occupational risk.

Numbers affected

238. Between January 2002 and October 2002, there were 3346 human cases in the USA general population, with 183 deaths according to the Centre

for Disease Control. West Nile virus has also been responsible for the deaths of thousands of birds and some horses in the USA.

Conclusion

239. In the USA, West Nile virus is a growing problem in both birds and humans. It appears the virus has entered the bird population in the UK recently, but the effect this will have on humans remains to be seen. There have been no reported human cases in the UK and there is no evidence of occupational risk. There is no evidence to recommend prescription of this infection, but the Council will continue to monitor new developments.

Yersiniosis

Description of disease

240. Yersinosis is a zoonotic bacterial infection caused by *Yersinia enterocolitica*. The disease affects livestock, but is usually not diagnosed as it is generally a subclinical infection.

Evidence of occupational risk factors

241. A butcher is reported to have developed arthritis from a *Yersinia enterocolitica* infection.

Numbers affected

242. There were 66 cases in the UK in 2000. In 1998 and 1999, there were 108 and 100 cases respectively in the general population according to MAFF. The incidence is higher in Northern Ireland than in England and Wales. It should be noted that reporting of yersiniosis to the relevant authorities is voluntary, so these numbers may not necessarily reflect the true incidence of the disease in humans.

243. In animals, the carriage rates at slaughter have been estimated to be 6% in cattle, 14% in sheep and 26% in pigs.

Conclusion

244. There is insufficient evidence to support recommendation of yersiniosis as a prescribed disease. However, the Council will continue to monitor research on this disease.

SECTION 6: ALLERGIC CONDITIONS CAUSED BY BIOLOGICAL AGENTS

CURRENTLY PRESCRIBED ALLERGIC CONDITIONS

B6 Extrinsic allergic alveolitis (including farmer's lung)

Prescribed disease	Occupation
B6 Extrinsic allergic alveolitis	Exposure to moulds or fungal spores or heterologous proteins by reason of employment in: a) agriculture, horticulture, forestry, cultivation of edible fungi or malt-working; or b) loading or unloading or handling in storage of mouldy vegetable matter or edible fungi; or c) caring for or handling birds; or d) handling bagasse.

History of prescription

245. In July 1964, the Council published its command paper "Farmer's Lung" (Cmnd. 2403) in which it recommended the prescription of farmer's lung in relation to "any occupation involving exposure to the dust of mouldy hay or other mouldy vegetable produce." The Council's recommendations were accepted and implemented. The terms of prescription were extended as from 3 October 1983.

Description of the disease

246. Extrinsic allergic alveolitis arises when various organic dusts or aerosols are inhaled and lodge in the alveoli of the lungs in sensitised individuals, resulting in a specific inflammatory reaction. The agents of extrinsic allergic alveolitis are many and varied but all have common elements, such as small size (1-5μ), presence in high doses during exposure (1600 million spores/m^3) and poor degradability in the environment. The type of occupational exposure is reflected in the specific names of the extrinsic allergic alveolitis caused by the different dusts or chemicals as can be seen in the following table.

Disease	Source
Organic dusts	
Farmer's lung	Mouldy hay, straw, grain, etc.
Bird fancier's lung	Avian excreta and bloom
Bagassosis	Mouldy bagasse
Malt-workers' lung	Mouldy maltings
Mushroom worker's lung	Spores released during spawning
Ventilation pneumonitis	Contamination of air conditioning units

247. Farmer's lung and bird fancier's lung are the most common of the allergic alveolitic diseases. The other diseases listed in the above table are now rare due to changes in occupational practices. For example, mushroom worker's lung has now been reduced due to the introduction of mechanical spawning.

248. Extrinsic allergic alveolitis can present as an acute or a chronic form. Acute allergic alveolitis is caused by exposure to the allergen in high concentrations, and is typified by breathlessness and flu-like symptoms. The symptoms of the acute disease can resolve in 48 hours without further exposure, although lung function can take 4-6 weeks to improve and up to 6 months to fully recover. Chronic allergic alveolitis is caused by either recurrent episodes of the acute form or from low dose allergen exposure which is insufficient to cause acute disease but sufficient to cause lung damage. The chronic form is typified by the development of irreversible pulmonary fibrosis, with the most prevalent symptom being breathlessness on exertion. Symptoms do not resolve with avoidance of further allergen exposure. Early diagnosis is important to reduce the risk of development and progression of chronic allergic alveolitis. Acute allergic alveolitis accounts for the majority of cases, and affected workers may be able to continue in their occupations by taking adequate precautions.

Evidence of occupational risk factors

249. Cases have been reported in agricultural workers, workers in contact with birds, maltworkers and mushroom farmers. Outside the UK, cases have also been reported in industries which produced certain inhalable dusts or fumes including wood trimmings, biodegradable garbage, compost and a detergent enzyme. Inhaled matter from food manufacture in sausage and rice production has also been reported to cause the disease.

Numbers affected

250. Data from the Surveillance of Work-Related Occupational Respiratory Disease (SWORD) scheme indicate that between 1998 and 2001 there was an estimated average of 33 cases per annum of farmer's lung disease and other allergic extrinsic alveolitis. The highest annual rates of extrinsic allergic alveolitis reported to SWORD were in farming and veterinary work, where the attributed causes were hay, mushrooms and avian proteins. According to RIDDOR data, there are an average of four cases per annum reported as occupationally linked extrinsic allergic alveolitis.

Conclusion

251. Extrinsic allergic alveolitis still affects various occupational groups. Therefore, this disease should continue to be prescribed with the prescription remaining the same.

Prescribed disease	Occupation
B6 Extrinsic allergic alveolitis	Exposure to moulds or fungal spores or heterologous proteins by reason of employment in: a) agriculture, horticulture, forestry, cultivation of edible fungi or malt-working; or b) loading or unloading or handling in storage of mouldy vegetable matter or edible fungi; or c) caring for or handling birds; or d) handling bagasse.

OTHER ALLERGIC CONDITIONS CONSIDERED

Latex Allergy

Description of the disease

252. Natural rubber latex is predominantly produced from the sap of the rubber tree *Hevea braziliensis*. It has two main uses: 90% is processed into dry sheets for moulding into tyres, rubber soles and rubber stoppers, while 10% is used for dipped rubber products such as gloves, condoms and balloons. Proteins contaminating the latex can cause IgE associated Type I hypersensitivity reactions, which include rhinitis, contact urticaria, asthma and anaphylaxis. Chemicals added during rubber processing can induce a Type IV cell-mediated hypersensitivity response.

253. Individuals may encounter latex in many circumstances, including as part of their work:

- Medical and surgical procedures
- Dentistry
- Laboratory work
- Latex processing and product manufacture
- Food preparation
- Dishwashing and cleaning
- Use and manufacture of condoms
- Use and manufacture of actors' masks
- Use and manufacture of sports equipment
- Use and manufacture of balloons and rubber bands, such as during teaching and nursery school work
- Scene of the crime work

254. The majority of IgE associated reactions to latex reported in relation to occupation are due to latex in rubber gloves. This is particularly likely in those using powdered gloves with a high protein content. Powder-free low protein latex gloves provide a means to reduce this risk.

255. Because latex is widely distributed, latex allergy can severely limit an individual's activities. Latex proteins may be encountered in washing up gloves, balloons, condoms, rubber bands and latex gloves used in healthcare and in laboratories. In addition, individuals allergic to latex proteins may also react to various foods (which contain cross reacting proteins), in particular bananas, kiwi fruits, chestnuts and avocados.

256. The diagnosis of latex allergy is based on the clinical history of symptoms of Type I allergic reactions following contact with latex, an immediate skin prick test response to an extract of latex protein and (less reliably) specific serum IgE to latex protein.

Evidence of occupational risk factors

257. Latex allergy has been associated with the use of natural rubber latex gloves, particularly by healthcare workers. One study in France suggested that the prevalence of latex allergy in healthcare workers was up to 17% compared to 0.7% in the general population. Another study of healthcare workers in Canada, found that the prevalence of latex sensitivity was higher in laboratory workers, nurses and physicians compared to other healthcare workers, such as housekeepers and technicians.

Numbers affected

258. Estimates of the prevalence of sensitisation to natural rubber latex in healthcare workers range widely with values of 0.5% to 12% reported from the UK, 5% in Belgium, 9.5% in Canada and up to 30% in the USA. A Finnish study estimated that, over the course of a 1 year study, there was a 1% conversion rate to latex sensitisation among healthcare workers using latex gloves. The wide range in estimates of the prevalence of latex sensitisation in healthcare workers may reflect differences in study design.

259. According to SWORD data there were an estimated 14 cases of occupational asthma due to latex reported to chest physicians between 1999 and 2001. Between 1989 and 1991, latex was reported as the cause of occupational asthma in <1% of cases. In 2002, latex was reported as the cause of occupational asthma in an estimated 5% of cases according to SWORD/OPRA (Occupational Physicians Reporting Activity) data.

Conclusion

260. The Council recommends that latex should be added to the list of prescribed causes of occupational rhinitis (PD D4) and recognised as a cause of occupational asthma under category PD D7 of the current schedule of prescribed diseases.

Prescribed disease	Occupation
D4 Allergic rhinitis which is due to exposure to any of the following agents:(a) isocyanates;(b) platinum salts; (c) fumes of dusts arising from the manufacture, transport or use of hardening agents (including epoxy resin curing agents) based on phthalic anhydride, tetrachlorophthalic anhyride, trimellitic anhydride or triethylenetetramine; (d) fumes arising from the use of rosin as a soldering flux; (e) proteolytic enzymes; (f) animals including insects and other arthropods used for the purposes of research or education or in laboratories; (g) dusts arising from the sowing, cultivation, harvesting, drying, handling, milling, transport or storage of barley, oats, rye, wheat or maize, or the handling, milling, transport or storage of meal or flour made there from; (h) antibiotics; (i) cimetidine; (j) wood dust; (k) ispaghula; (l) castor bean dust; (m) ipecacuanha; (n) azodicarbonamide; (o) animals including insects and other arthropods or their larval forms used for the purposes of pest control or fruit cultivation, or the larval forms of animals used for the purposes of research, education or in laboratories; (p) glutaraldehyde; (q) persulphate salts or henna; (r) crustaceans or fish or products arising from these in the food processing industry; (s) reactive dyes; (t) soya bean; (u) tea dust; (v) green coffee bean dust; (w) fumes from stainless steel welding; (x) natural rubber latex products	Exposure to any agents set out in column one of this paragraph.

D7 Asthma which is due to exposure to the following agents: (a) isocyanates; (b) platinum salts; (c) fumes or dusts arising from the manufacture, transport or use of hardening agents (including epoxy resin curing agents) based on phthalic anhydride, tetrachlorophthalic anhydride, trimellitic anhydride or triethylenetetramine; (d) fumes arising from the use of rosin as a soldering flux; (e) proteolytic enzymes; (f) animals including insects and other arthropods used for the purposes of research or education or in laboratories; (g) dusts arising from the sowing, cultivation, harvesting, drying, handling, milling, transport or storage of barley, oats, rye, wheat or maize, or the handling, milling, transport or storage of meal or flour made there from; (h) antibiotics; (i) cimetidine; (j) wood dust; (k) ispaghula; (l) castor bean dust; (m) ipecacuanha; (n) azodicarbonamide; (o) animals including insects and other arthropods or their larval forms, used for the purposes of pest control or fruit cultivation, or the larval forms of animals used for the purposes of research, education or in laboratories; (p) glutaraldehyde; (q) persulphate salts or henna; (r) crustaceans or fish or products arising from these in the food processing industry; (s) reactive dyes; (t) soya bean; (u) tea dust; (v) green coffee bean dust; (w) fumes from stainless steel welding; (x) natural rubber latex products; (y) any other sensitising agent	Exposure to any agents set out in column one of this paragraph.

Anaphylaxis

Description

261. Anaphylaxis is a life-threatening IgE-mediated allergic Type I hypersensitivity reaction due to contact of a sensitised individual with an allergenic protein. Common allergens which can provoke anaphylactic shock include drugs, insect stings, latex and certain food ingredients, such as nuts. Initial exposure to the allergen induces specific IgE antibody. Subsequent contact can provoke an anaphylactic reaction. An anaphylactic-like (anaphylactoid) reaction can occur during first exposure to certain drugs; but these are a manifestation of a toxic, rather than an allergic, reaction to the drug. Anaphylactic shock is due to a sudden massive release of histamine and other mediators from basophils into the bloodstream. These trigger constriction of the airways and swelling of tissue (angioedema), resulting in difficulty breathing, and dilatation of blood vessels, leading to shock and pulmonary oedema. Other symptoms of anaphylaxis include urticarial skin rash and gastrointestinal reactions, such as vomiting, abdominal cramps and diarrhoea. The onset of anaphylaxis can be very rapid, with symptoms occurring within minutes of contact with the allergen.

262. An anaphylactic reaction does not occur inevitably after a person has developed IgE antibody. Nor is an anaphylactic reaction necessarily provoked by contact with an allergen which has previously provoked anaphylaxis. Indeed, the likelihood of having an anaphylactic reaction on further exposure, having had one before, is between one in two and one in eight. Three-quarters of people who die from anaphylactic shock have never had a severe reaction before. The severity of a previous reaction is also no guide to the severity of a future reaction. The Council sees this uncertainty as part of the disabling effect of sensitisation, to the extent that it restricts the day-to-day activities of the affected person. The fear that another reaction could be fatal may lead to significant anxiety.

263. The level of the physical effects of anaphylaxis varies widely. Anaphylaxis usually resolves rapidly if the individual does not die. However, the rapid loss of circulating blood volume can lead to irreversible brain damage from inadequate oxygenation, the harmful effects varying according to the severity of the damage. Careful treatment with adrenaline can reverse the effects of severe anaphylaxis in minutes, but incautious use of adrenaline can itself lead to death from abnormalities of heart-rhythm (arrhythmias). Prevention is only securely achieved by avoidance of further allergen exposure.

264. The commonest occupational cause of anaphylactic reactions is natural rubber latex (see earlier paragraphs). There is also some evidence of anaphylactic reactions to bee and wasp stings, animal fur and waste and foods. However, it is difficult to distinguish between occupational and non-occupational causes.

Testing and desensitisation

265. Allergy tests are not, in themselves, able to predict whether someone is likely to have an anaphylactic reaction. For example, three-quarters of people screened for wasp-venom allergy had immediate skin test reactions, evidence of specific IgE antibody, a far higher proportion than are likely to develop anaphylaxis. Identification of the responsible allergen following an anaphylactic reaction involves taking a detailed clinical history, skin prick tests and specific IgE antibody immunoassay.

Evidence of occupational risk factors

266. Anaphylaxis due to latex allergy has been reported in dentists and other healthcare workers. Anaphylaxis has been reported from occupational contact with bees in bee keepers. A laboratory research director, with a history of allergy to rat urinary protein, developed anaphylaxis following a laboratory rat bite.

Numbers affected

267. A UK study published in 2000 by Sheikh and Alves reported that between 1991 and 1995 there was an almost two-fold increase in discharges from NHS hospitals in England for which the primary diagnosis was anaphylaxis; in 1991-1992 there were 5.6 cases per 100,000 compared with in 1994-1995 when there were 10.2 cases per 100,000 discharges. The causes of the anaphylactic reactions were therapeutic drugs (62%), food (15%) and insect venom (11%).

Coverage under the Industrial Injuries scheme

268. The Council focussed its attention on sensitising agents at work, not covered by the prescribed diseases regulations, and whether any resulting anaphylactic reaction, either occurring at the same time or later, could be accepted as an industrial accident. The Council recommend that where a precipitating exposure occurred **at work** an ensuing anaphylactic reaction would be covered by the accident provisions, provided the claimant was in employed earner's employment. Under the terms of the scheme, disablement must be present 91 days after the accident has occurred. Generally, anaphylaxis resolves or results in death within a few days. However, on occasion, anaphylaxis can result in long-term neurological sequelae due to a lack of oxygen to the brain during an attack. The Council recommends that such neurological disorders continue to be taken into account when assessing disablement. In addition, the Council recommends that anxiety, which may be caused by a life-threatening anaphylactic reaction should also be taken into account during assessments of disablement.

269. However, employed earners who become sensitised during the course of their employment (and therefore develop a latent risk of anaphylaxis), could have an anaphylactic reaction following contact with the relevant allergen outside the place of work or after employment which would go uncompensated by the accident provisions.

270. This risk is most manifest in the case of latex allergy, where the allergen causes sensitisation at work (and only uncommonly outside it), but is widely encountered outside the workplace. Therefore, the Council recommends that anaphylaxis should be added to the list of prescribed diseases where sensitisation occurs at work for healthcare workers exposed to latex. There is clear evidence of increased risk of occupational sensitisation in these workers and on the balance of probabilities, it is reasonable to assume that anaphylaxis occurring outside of work due to latex (for healthcare workers) would probably be due to sensitisation occurring during employment. Although sensitisation occurs due to insect stings in other occupations, there was not sufficient evidence to be able to distinguish the causal role of occupational from non-occupational sensitisation. It should be noted that sensitisation itself is not a disabling condition and individuals may be unaware of being sensitised until the onset of an anaphylactic reaction.

Conclusion

271. In summary, the Council recommends that:

a) anaphylaxis and its sequelae that is triggered in the workplace, should be considered an industrial accident;

b) anaphylaxis and its sequelae that result from allergy to natural rubber latex in healthcare workers should be considered as a prescribed disease.

Prescribed disease	**Occupation**
B15 Anaphylaxis	Healthcare workers exposed to natural rubber latex products.

SECTION 7: PREVENTION AND IMMUNISATION

272. The Control of Substances Hazardous to Health Regulations 2002 (COSHH) requires employers to assess the risks to their employees from being exposed to biological agents. When there is a significant health risk from exposure to an agent, the employer must introduce appropriate measures to prevent, or control that risk. Depending on the circumstances, control measures may include: better design of work processes; control of exposure at source (e.g. ventilation systems); and where adequate control of exposure cannot be achieved by other means, the provision of appropriate personal protective equipment (e.g. masks). The use of low protein, powderless gloves can be used to protect workers against development of allergy to natural rubber latex. There are also effective vaccines against some of the biological agents outlined in this report. In addition to the other measures designed to prevent or control the risks from exposure to such agents, and when appropriate, employers should make arrangements for vaccination, free of charge, to employees who are vulnerable to the biological agents to which they are exposed or likely to be exposed at work.

SECTION 8: RECOMMENDATIONS

Amendments to the current list

273. The Council recommends that the terms of prescription for the following currently prescribed diseases be amended as indicated in the following table:

Prescribed disease	Occupation
B1 Anthrax	Work involving contact with anthrax spores, including contact with animals, or the handling (including the loading, unloading or transport) of animal products or residues.
B2 Glanders	Work involving contact with equine animals or their carcasses.
B3 Infection by Leptospira	a) Work in places which are, or are liable to be, infested by rats, field mice or voles, or other small mammals; or (b) work at dog kennels or in the care of, or handling of dogs, or (c) contact with bovine animals or their meat products or pigs or their meat products.
B4 Ankylostomiasis	Work involving contact with sources of ankylostomiasis.
B8a Infection by hepatitis A virus	Work involving contact with raw sewage.
B8b Infection by hepatitis B or C viruses	Work involving contact with a) human blood or human blood products; or b) a source of hepatitis B or C viruses.

D4 Allergic rhinitis which is due to exposure to any of the following agents: (a) isocyanates; (b) platinum salts; (c) fumes of dusts arising from the manufacture, transport or use of hardening agents (including epoxy resin curing agents) based on phthalic anhydride, tetrachlorophthalic anhyride, trimellitic anhydride or triethylenetetramine; (d) fumes arising from the use of rosin as a soldering flux; (e) proteolytic enzymes; (f) animals including insects and other arthropods used for the purposes of research or education or in laboratories; (g) dusts arising from the sowing, cultivation, harvesting, drying, handling, milling, transport or storage of barley, oats, rye, wheat or maize, or the handling, milling, transport or storage of meal or flour made there from; (h) antibiotics; (i) cimetidine; (j) wood dust; (k) ispaghula; (l) castor bean dust; (m) ipecacuanha; (n) azodicarbonamide; (o) animals including insects and other arthropods or their larval forms used for the purposes of pest control or fruit cultivation, or the larval forms of animals used for the purposes of research, education or in laboratories; (p) glutaraldehyde; (q) persulphate salts or henna; (r) crustaceans or fish or products arising from these in the food processing industry; (s) reactive dyes; (t) soya bean; (u) tea dust; (v) green coffee bean dust; (w) fumes from stainless steel welding; (x) natural rubber latex products	Exposure to any agents set out in column one of this paragraph.

D7 Asthma which is due to exposure to the following agents: (a) isocyanates; (b) platinum salts; (c) fumes or dusts arising from the manufacture, transport or use of hardening agents (including epoxy resin curing agents) based on phthalic anhydride, tetrachlorophthalic anhydride, trimellitic anhydride or triethylenetetramine; (d) fumes arising from the use of rosin as a soldering flux; (e) proteolytic enzymes; (f) animals including insects and other arthropods used for the purposes of research or education or in laboratories; (g) dusts arising from the sowing, cultivation, harvesting, drying, handling, milling, transport or storage of barley, oats, rye, wheat or maize, or the handling, milling, transport or storage of meal or flour made there from; (h) antibiotics; (i) cimetidine; (j) wood dust; (k) ispaghula; (l) castor bean dust; (m) ipecacuanha; (n) azodicarbonamide; (o) animals including insects and other arthropods or their larval forms, used for the purposes of pest control or fruit cultivation, or the larval forms of animals used for the purposes of research, education or in laboratories; (p) glutaraldehyde; (q) persulphate salts or henna; (r) crustaceans or fish or products arising from these in the food processing industry; (s) reactive dyes; (t) soya bean; (u) tea dust; (v) green coffee bean dust; (w) fumes from stainless steel welding; (x) natural rubber latex products; (y) any other sensitising agent	Exposure to any agents set out in column one of this paragraph.

Diseases to be added to the list

274. The Council recommends that sufficient evidence exists to warrant prescription for the following occupational diseases as laid out in the table below:

Prescribed disease	Occupation
B14 Lyme disease	Work involving exposure to *Borrelia* species.
B15 Anaphylaxis	Healthcare workers exposed to natural rubber latex products.

275. Several other diseases were considered by the Council (see Section: Other Infectious Diseases considered), but the evidence either did not exist or was not sufficiently robust that prescription could be recommended. However, the Council will continue monitor future developments in the scientific literature.

Diseases to be removed from the list

276. Certain prescribed diseases on the current list are rare in the UK, such as ankylostomiasis and rabies, and current epidemiological evidence of occupational risk is scant. However, the rare occupationally acquired prescribed diseases, such as rabies and ankylostomiasis, still occur in other parts of the world and there are continuing reservoirs of infection. The Council feels that while the potential for these diseases to re-emerge due to spread from other countries remains, they should not be removed from the prescribed list.

APPENDIX 1

The following experts were invited to contribute to the proceedings of the Council:

Oral presentations:

• Dr Anne Cockcroft	Visiting Professor for the Department of Public Health Sciences, George's Hospital Medical School, London (received prior to Dr Cockcroft's appointment to IIAC)
• Dr Paul Cullinan	Department of Occupational and Environmental Medicine, National Heart and Lung Institute, Imperial College, Royal Brompton and Harefield Hospital Trust, London
• Professor Alasdair Geddes	Department of Infection, Birmingham University Medical School, Birmingham
• Professor Stephen Palmer	Department of Epidemiology and Public Health, University of Wales, Cardiff
• Dr Richard Pumphrey	Clinical Manager, Department of Immunology, Central Manchester and Manchester Children's University Hospitals NHS Trust

Written submissions:

• Professor Brian Duerden	Medical Director and Medical Microbiologist, PHLS
• Dr Christopher Harling	Medical Director, NHS Plus
• Professor Corbett McDonald	Department of Occupational and Environmental Medicine, Royal Brompton Hospital Trust

The Council also considered evidence from various individuals and organisations who submitted information in response to the press release.

APPENDIX 2

Database searches:

The database host Dialog was used to conduct a search for the most relevant databases covering bacterial diseases and occupational health and safety. Those identified appear below:

Database Name	Database Number	Timescale covered	No of records
Pascal	144	10 Years	4,337,000
Biosis Previews	5	10 Years	4,085,000
Scisearch	34	10 Years	3,349,000
Medline	154	10 years	2,866,000
PubMed	N/a	Since 1966	12,000,000
Emed	72	10 Years	2,830,000

Note. Pascal and Biosis Previews cover 30 years from which 10 years of the most recent research was taken to give the above figures on number of records searched.

GLOSSARY

Allergen	A substance capable of eliciting an allergic response
Anaemia	A condition where the level of haemoglobin in the blood is below normal, leading to oxygen deprivation of tissues
Antigen	A substance capable of eliciting an immune response, usually a protein
Asplenic	Without a spleen
B diseases	A group of prescribed occupational diseases that are caused by biological agents
Bagasse	Residue remaining after certain plants have been processed
Carrier	An asymptomatic individual who is infected with an agent, and may be a source of infection for others
Cellulitis	Inflammation of subcutaneous tissue, and sometimes muscle, that may be associated with abscess formation
Cirrhosis	Liver disease characterised by fibrosis
Endocarditis	Inflammation of the valves and the tissues lining the chambers of the heart
Epidemiology	The study of the distribution and determinants of disease in populations
Eschar	A dry scab formed on skin
Eukaryotes	Organisms whose genetic material is enclosed in a nucleus
Fibrosis	Formation of fibrous tissue
Genotype	The genetic constitution of a living organism or cell
Heterologous proteins	Proteins which are different from one another
Hypersensitivity	A state of altered immunological reactivity, where the body reacts with an exaggerated immune response to an antigen
Hypotension	Loss of blood pressure
Hypovolaemia	Loss of blood volume
Immunocompromised	A condition in which the immune system is unable to respond adequately to challenge by antigens
Immunogenic	Evoking an immune response
Immunoglobulin	A specific protein produced by immune cells to fight infection
Intrauterine	In the uterus (womb)

Jaundice	Yellowing of the skin by a bile pigment, e.g. as a consequence of some types of liver disease
Lymphangitis	Inflammation of lymphatic vessels
Mast cells	Specific cells of the immune system, involved in some types of allergy
Meningitis	Inflammation of the meninges surrounding the brain and spinal cord
Mucocutaneous	Pertaining to the mucous membrane and skin
Myalgia	Pain in muscles
Oedema	Excess fluid in the extracellular spaces of tissues
Papule	A small circumscribed, superficial, solid elevation of the skin
Percutaneous	Through the skin (e.g. an injection)
Pleocytosis	The presence of more cells than normal
Pleurisy	Inflammation of the lining of the lungs
Pneumonia	Inflammation of the lungs
Prokaryote	Organisms whose genetic material is not in a nucleus
Pulmonary	Pertaining to the lungs
Pyaemia	Pus in the lungs
Sensitised	Having hypersensitivity as a consequence of exposure to an allergen
Septicaemia	Systemic disease associated with the presence of micro-organisms or their toxins in the blood
Seroconversion	Change of a serological test from negative to positive, indicating the development of antibodies in response to an infectious agent or vaccine
Serology	Evidence of the presence of antibodies from a blood test
Seropositive	Showing a positive outcome (i.e. presence of antibodies) in a serological test
Spirochaete	A spirally shaped bacterium
Spores	Dehydrated cellular products, usually highly resistant to adverse environmental conditions, from which bacteria or fungi can be regenerated
Tuberculin	A protein derived from the bacterium *Mycobacterium tuberculosis*
Tuberculin Skin Test	A test which checks the immune reaction to an injection of tuberculin to see if the body has immunity to *Mycobacterium tuberculosis*
Vesicle	A small blister

ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
Anti-HBc	Antibody to Hepatitis B core antigen
Anti-HBe	Antibody to Hepatitis B viral particle antigen
Anti-HBs	Antibody to Hepatitis B surface antigen
BCG	Bacille Calmette-Guerin vaccine
CJD	Creutzfeldt Jacob Disease
Cm.	Command paper
Cmnd.	Command paper
DEFRA	Department for the Environment, Farming and Rural Affairs
DNA	Dideoxyribonucleic acid
FMD	Foot and mouth disease
HAV	Hepatitis A virus
HBV	Hepatitis B virus
HBcAg	Hepatitis B core antigen
HBeAg	Hepatitis B viral particle antigen
HBsAg	Hepatitis B surface antigen
HCV	Hepatitis C virus
HEV	Hepatitis E virus
HIV	Human Immunodeficiency virus
Ig	Immunoglobulin
IIAC	Industrial Injuries Advisory Council
IIDB	Industrial Injuries Disablement Benefits
NHS	National Health Service
PD	Prescribed Disease
PHLS	Public Health Laboratory Service
RNA	Ribonucleic Acid
SRS-A	Slow Release Substance-A
vCJD	variant Creutzfeldt Jacob Disease

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