Health Protection Agency

CDR WEEKLY

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MAIN STORIES THIS WEEK:

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News

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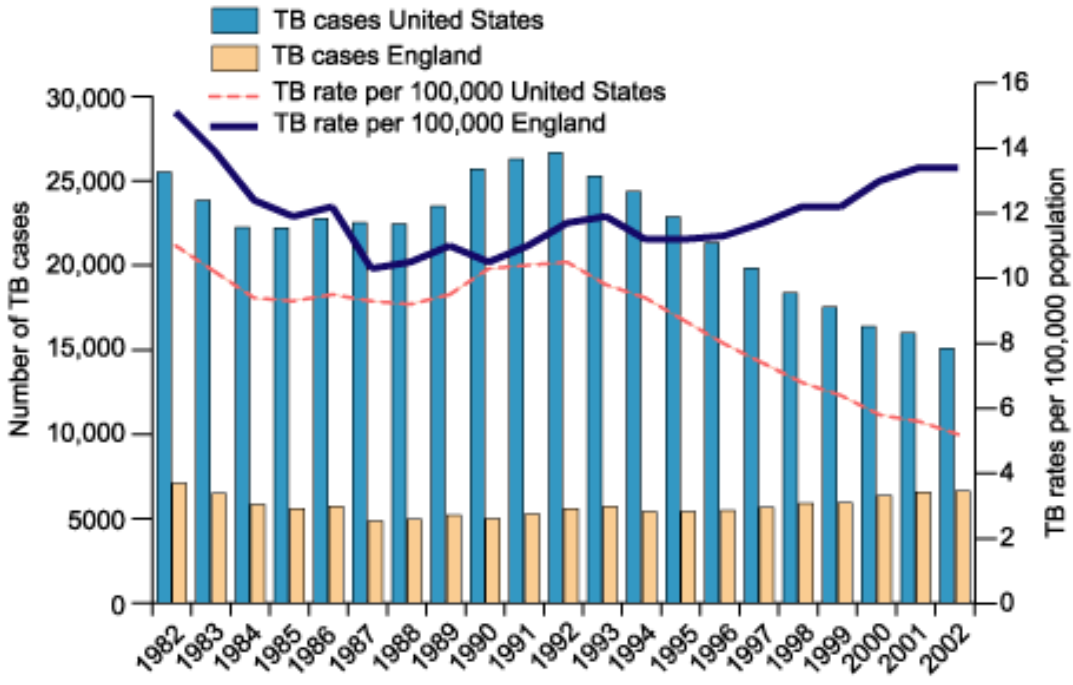
Stopping tuberculosis in England – an Action Plan

An Action Plan to tackle tuberculosis in England was launched by the Chief Medical Officer on 7 October 2004. The plan sets out steps which need to be taken by the government, health services, and local communities to address the increase seen over recent years in cases of the disease, particularly in major cities across the UK. Reference is made to the clear plan, national focus and build up of infrastructure and resources at local and national level that brought tuberculosis back under control in the United States following its re-emergence in the 1980s (figure 1).

Figure 1 Tuberculosis notification rates and number of cases, United States and England: 1982 to 2002



Data sources: United Sates CDC Division of Tuberculosis Elimination - surveillance reports CDSC NOIDS data – the Office for National Statistics (ONS) population denominators.

The long-term goal is to reduce, and ultimately eliminate tuberculosis in England. Working towards this goal, the immediate aims of the national tuberculosis programme are to:

- reduce the risk of people being newly infected with tuberculosis in England
- provide high quality treatment and care for all people with tuberculosis
- maintain low levels of drug resistance, particularly multidrug resistant tuberculosis

The plan makes ten recommendations actions regarded as essential to bring tuberculosis under control and achieve the aims of the programme. The Health Protection Agency is specifically tasked with furthering partnerships between the Agency's Local and Regional Services, and local authorities and NHS organisations, in order to ensure that control of tuberculosis is included as part of local health protection planning. Additionally, the Agency is called on to provide high quality surveillance of the occurrence of TB in England, first-class laboratory services through its network of mycobacterial reference laboratories, and leading edge research in the epidemiology, diagnosis, and treatment of tuberculosis.

Stopping Tuberculosis in England - An Action Plan from the Chief Medical Officer is available from the Department of Health website at: <http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/Tuberculosis/fs/en>.

Enhanced surveillance of Lymphogranuloma Venereum (LGV) in England

The Health Protection Agency (HPA) has launched a new initiative to improve case ascertainment and raise awareness of Lymphogranuloma Venereum (LGV) in England. The move follows a series of outbreaks of LGV in men who have sex with men (MSM) reported from cities in mainland Europe (1) and recent reports to the HPA of MSM presenting with proctitis at genitourinary medicine (GUM) clinics in England.

Lymphogranuloma venereum (LGV) is a sexually transmitted disease caused by a specific type of *Chlamydia trachomatis* (serovars L1, L2, and L3). Unlike other forms of *C. trachomatis,* LGV is invasive and affects the lymphatic system. The symptoms of LGV vary according to the site of infection and may include inflamed and swollen lymph nodes in the groin (inguinal syndrome) and acute hemorrhagic proctitis (anorectal syndrome). If left untreated, the symptoms can become more severe and cause lasting damage to health. The recommended treatment is 100mg doxycycline twice daily for 21 days (2). LGV is highly prevalent in parts of Africa, Asia, and South America but has been rare in western Europe for many decades. The outbreaks of LGV in MSM in Europe have all been of the L2 serovar, and most cases were white, HIV positive and presented with proctitis. High levels of concurrent sexually transmitted infections were also seen with cases reporting sexual contacts in other countries, including the UK.

Details of the HPA's enhanced LGV surveillance initiative are provided in a briefing paper that has been sent to microbiologists and GUM clinicians in England. It details the awareness raising campaigns, LGV case definitions and an algorithm for investigating possible cases. Confirmed cases will be followed up using the enhanced surveillance questionnaire. Further details are available at:<http://www.hpa.org.uk/infections/topics_az/hiv_and_sti/LGV/lgv.htm>.

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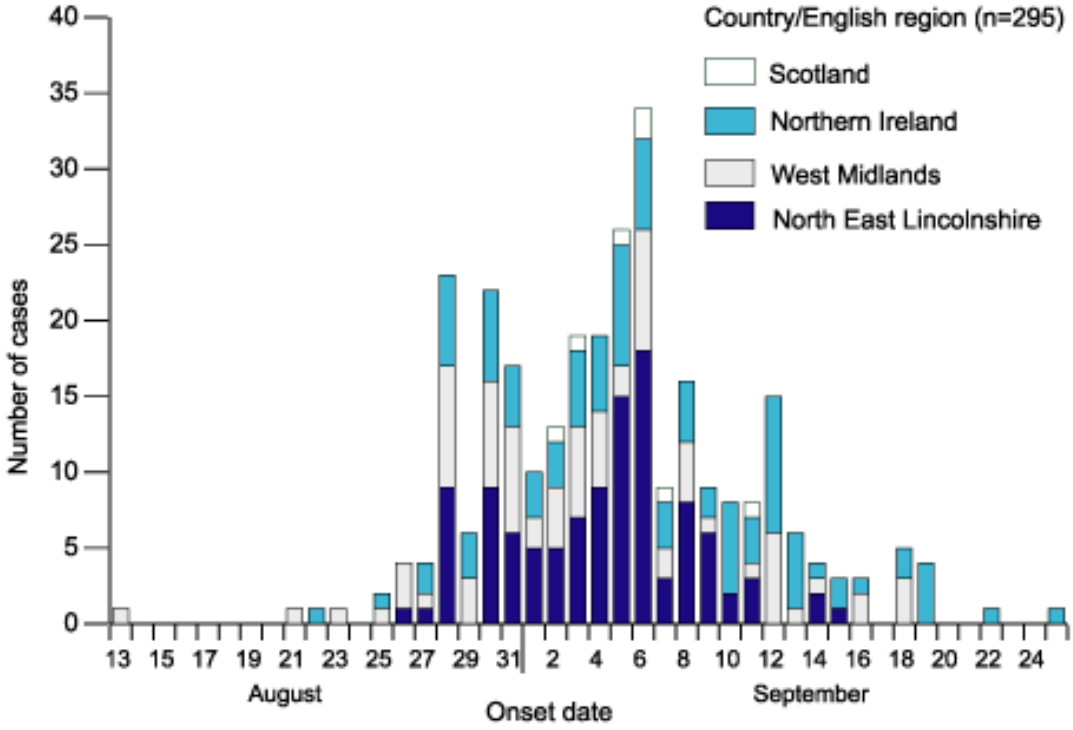
Update – Outbreak of *Salmonella* Newport infection in England, Scotland, and Northern Ireland: association with the consumption of lettuce

Since 9 September 2004, the Health Protection Agency Laboratory of Enteric Pathogens has confirmed 368 cases of *Salmonella enterica* serovar Newport infection in England and in Northern Ireland. Molecular typing performed on 122 of the isolates show that 109 of the strains are indistinguishable from each other and from 14 isolates confirmed by the Scottish Salmonella Reference Laboratory since the 13 September 2004.

At least 372 confirmed or suspected cases are being investigated locally in north east Lincolnshire (147), the West Midlands (95), Northern Ireland (113), and the Isle of Man (17), with a small number of cases occurring throughout other parts of England. All 14 confirmed cases are being investigated in Scotland. Most cases are aged between 20 and 40 years. Thirty-three hospital admissions (9% admission rate) have been reported. Available onset dates (N=295) range from 21 August to 25 September (figure). Food histories collected in England, the Isle of Man, and Northern Ireland have commonly implicated fast-food premises and take-away restaurants as a source of illness.

Figure National outbreak of *S*. Newport infection in England, Scotland, and Northern Ireland. Epidemic curve by region/country



Case-control studies have been undertaken locally in north east Lincolnshire, the West Midlands and in Northern Ireland to try to identify the likely vehicle/vehicles of infection within fast-food premises and take-away restaurants. In each, confirmed and suspected cases of *S*. Newport infection, interviewed as part of the study, were asked to identify controls who had eaten in fast-food/take-away restaurants at the same time, but who had not developed symptoms.

In north east Lincolnshire, studies focusing on two premises that accounted for most of the cases found that the consumption of lettuce (Odds Ratio [OR] 11.43; 95% Confidence Interval [CI] 1.86-70.27; P=0.009, and OR 12.8; 95% CI 3.34-49.12; P<0.001 respectively) was associated with being a case of *S*. Newport infection. The case-control study undertaken in Northern Ireland has also shown an association with lettuce (OR 5.95; 95%CI 1.6-22.2; P=0.008). The case-control study in the West Midlands is ongoing.

Extensive environmental investigations have been carried out and are continuing in an attempt to trace a common source.

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Respiratory

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Laboratory reports of respiratory infections made to CDSC from Health Protection Agency and NHS laboratories in England and Wales: weeks 36-40/04

Laboratory reports of respiratory infections made to CDSC from Health Protection Agency and NHS laboratories in England and Wales: weeks 36-40/04

Data are recorded by week of report, but only include specimens taken in the last eight weeks (*ie*, recent specimens).

Table 1 Reports of influenza infection made to CDSC, by week of report: weeks 36-40/2004

Week	36/04	37/04	38/04	39/04	40/04	
Week ending	**05/09/04**	**12/09/04**	**19/09/04**	**26/09/04**	**03/10/04**	**Total**
Influenza A	–	7	9	10	1	**27**
Isolation	–	–	–	–	–	**–**
DIF	–	–	-	1	–	**1**
Four-fold rise in paired sera	–	–	1	1	–	**2**
PCR	–	–	–	–	–	**–**
Other	–	7	8	8	1	**24**
Influenza B	–	–	1	–	1	**2**
Isolation	–	–	–	–	–	**–**
DIF	–	–	–	–	–	**–**
Four-fold rise in paired sera	–	–	–	–	–	**–**
PCR	–	–	–	–	–	**–**
Other	–	–	1	–	1	**2**
Influenza (untyped)	–	–	–	–	–	**–**
Isolation	–	–	–	–	–	**–**
DIF	–	–	–	–	–	**–**
Four-fold rise in paired sera	–	–	–	–	–	**–**
PCR	–	–	–	–	–	**–**
Other	–	–	–	–	–	**–**

DIF = Direct Immunofluorescence.
'Other' = 'Antibody detection - single high titre' or 'method not specified'.

Table 2 Respiratory viral detections by any method (culture, direct immunofluorescence, PCR, four-fold rise in paired sera, single high serology titre, genomic, electron microscopy, other method, other method unknown), by week of report: weeks 36-40/2004

Week	36/04	37/04	38/04	39/04	40/04	
Week ending	**05/09/04**	**12/09/04**	**19/09/04**	**26/09/04**	**03/10/04**	**Total**
Adenovirus*	22	40	17	22	30	**131**
Coronavirus	–	–	–	–	–	**–**
Parainfluenza†	1	7	1	2	2	**13**
Rhinovirus	–	2	1	4	3	**10**
Respiratory syncytial virus (RSV)	9	11	4	6	9	**39**

*Respiratory samples only. Excludes diagnoses made by electron microscopy (EM).
†Includes parainfluenza types 1, 2, 3, 4, and untyped.

Table 3 Respiratory viral detections by age group: weeks 36-40/2004

Age group (years)	<1 year	1-4 years	5-14 years	15-44 years	45-64 years	≥65 years	Unknown	Total
Adenovirus*	11	20	12	57	19	7	5	**131**
Coronavirus	–	–	–	–	–	–	–	**–**
Influenza A	–	1	5	8	6	7	–	**27**
Influenza B	–	–	–	1	–	1	–	**2**
Parainfluenza†	4	4	1	1	2	–	1	**13**
Rhinovirus	4	4	–	1	1	–	–	**10**
Respiratory syncytial virus (RSV)	23	7	2	2	5	–	–	**39**

*Respiratory samples only, and excludes diagnoses made by electron microscopy (EM).
†includes parainfluenza types 1, 2, 3, 4, and untyped.

Table 4 Laboratory reports of infections associated with atypical pneumonia by week of report (non-pneumonic cases): weeks 36-40/2004

Week	36/04	37/04	38/04	39/04	40/04	
Week ending	**05/09/04**	**12/09/04**	**19/09/04**	**26/09/04**	**03/10/04**	**Total**
Coxiella burnettii	–	–	–	–	–	**–**
Respiratory *Chlamydia* sp*	1	7	5	4	4	**21**
Mycoplasma pneumoniae	1	5	5	8	7	**26**
Legionella sp	16	16	7	11	9	**59**

*Includes *Chlamydia psittaci*, *Chlamydia pneumoniae*, and *Chlamydia* sp detected from blood, serum, and respiratory specimens.

Table 5 Reports of legionnaires' disease (pneumonic and non-pneumonic*) cases in England and Wales, by week of report: weeks 36-40/2004

Week	36/04	37/04	38/04	39/04	40/04	
Week ending	05/09/04	12/09/04	19/09/04	26/09/04	03/10/04	Total
Nosocomial	–	–	–	–	–	**–**
Community	4	9	4	7	3	**27**
Travel abroad	8 (1)	4	2	2	5	**22**
Travel UK	2 (1)	3	1	2	(1)	**10**
Total	**16**	**16**	**7**	**11**	**9**	**59**
Male	13	13	7	2	6	**41**
Female	3	3	–	9	3	**18**

* non-pneumonic cases in brackets

Fifty-six cases were reported with pneumonia and three with non-pneumonic illness. Forty-one males aged between 25 years and 87 years and 18 females aged between 45 years and 69 years. Twenty-seven cases were community acquired infections. Four deaths were reported, (two females aged 62 years and 68 years, and two males aged 59 years and 67 years).

Thirty-two cases were travel-associated: United Kingdom (10), France (4), Spain (4), Bulgaria (2), Cyprus (2), Italy (2), Malta (2), Turkey (2), England, France, and Italy (1), England, France, and Spain (1), France and Germany (1), and France and Italy (1).

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Travel health

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Unusual infections associated with foreign travel - part 4: Helminth infections and intestinal cestodes

The infections that will be discussed in this fourth and final article on unusual infections are those caused by helminths (parasitic worms). It will particularly focus on nematodes (some of which have already been covered in the third part of this *CDR Weekly* series) and intestinal cestodes.

The organisms to be discussed include:

Nematodes

- *Strongyloides stercoralis*
- *Gnathostoma spinigerum*

Intestinal cestodes

- *Taenia saginata* (beef tape worm)
- *Hymenolepis* spp

Nematodes

Strongyloidiasis
Strongyloidiasis is caused by the threadworm *Strongyloides stercoralis*, which has two alternating forms, one parasitic and the other free-living. It has a worldwide distribution in the tropics and sub-tropics, with particularly high prevalence in parts of Africa, Brazil, Colombia, and south east Asia, especially where the climate is wet. It also occurs in temperate areas where poor sanitation or other factors facilitate the occurrence of faecally transmitted organisms. A review of prevalence studies (1) indicated that countries in southern, eastern, and central Europe, and the Appalachian region of the United States might also be regions of risk. It does not generally occur in the United Kingdom (UK), although rare apparent indigenous transmission in the UK has been reported (2,3).

Strongyloides stercoralis is transmitted primarily by contact of the skin with soil contaminated with free-living filariform infective larvae, which are active skin penetrators, although infection through the buccal mucosa (mouth lining) may also occur. The worm then travels to the lungs, and ultimately ends up in the small intestine where it matures into a parasitic adult. As the parasite's eggs hatch internally, a potential for autoinfection exists. The free-living filariform larvae may pass out in the stools, re-infect the perianal area and cause a persistent chronic infection or reinfect in the lungs. In circumstances where immune function is lacking (*eg,* in an HIV positive individual), hyperinfection may occur, which can be fatal.

Many cases of strongyloidiasis, especially in endemic areas, are asymptomatic but when the number of larvae increases in the intestine, a broad spectrum of clinical syndromes may develop. The main symptoms are gastrointestinal, such as diarrhoea or constipation, leading to malabsorption syndromes. There may be pulmonary symptoms resulting from the worms entering the lungs and skin rashes resulting from the larval penetration of the skin (urticaria) and sensitisation to parasite antigens, or from the migration of the filariform larvae under the skin (larva currens), which is more common in Caucasian patients who acquired the infection in south east Asia.

Travellers

A study conducted at the Hospital for Tropical Diseases (4) identified 192 laboratory-confirmed clinical cases of *Strongyloides stercoralis* infection between 1991 and 2001. Sixty-four of those (33%) were defined as travellers and 128 (67%) were defined as immigrants.

Figure 1 Laboratory reports of *Strongyloides stercoralis*, England and Wales: 1990 to 2003

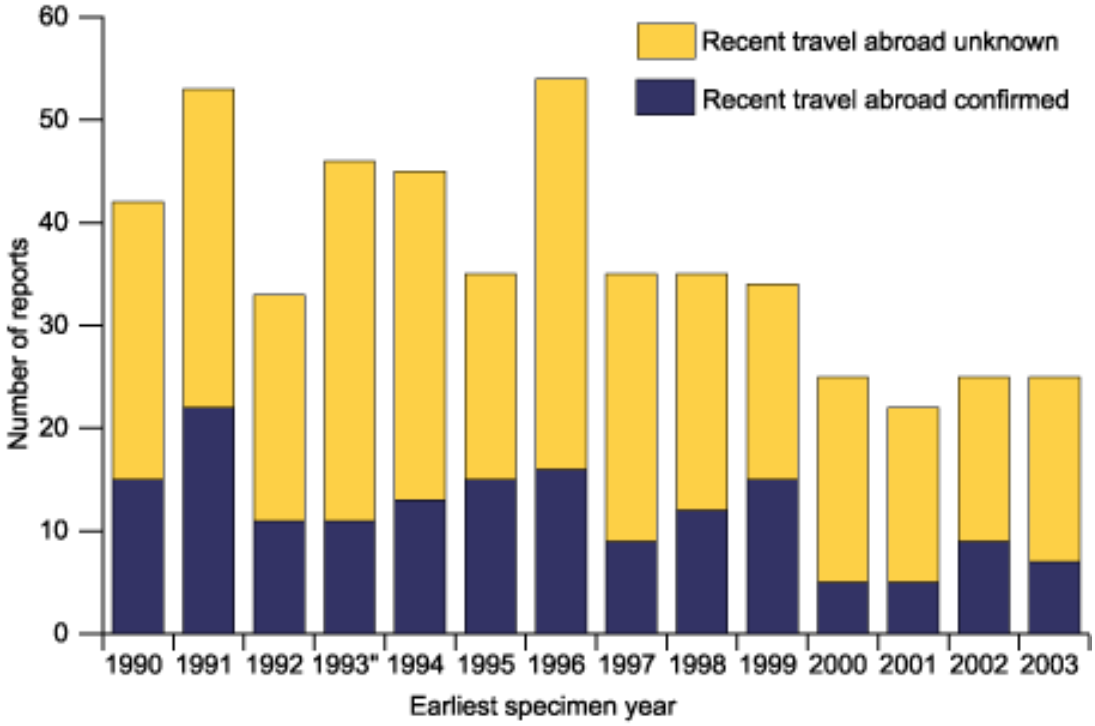

Figure 1 shows the laboratory-confirmed reports to the Health Protection Agency's Communicable Disease Surveillance Centre (CDSC) of *Strongyloides stercoralis* infection from England and Wales between 1990 and 2003. There were 509 reports in total, of which 165 had information about recent travel abroad. Three of those reports explicitly stated that the case was a new immigrant; otherwise there was no other information in the reports to specify residential status. The countries of travel were distributed worldwide, but certain regions were more frequently reported. Sixty-two (38%) reports stated travel to sub-Saharan and southern Africa (Nigeria 12, Ghana 10, Ethiopia 6, other countries 34), 37 (22%) reports stated travel to the Indian sub-continent (Bangladesh 25, India 7, Pakistan 4, Sri Lanka 1), 18 to the Caribbean, and 16 to south east Asia and the far east.

Gnathostomiasis

Gnathostomiasis in humans is caused by four species of *Gnathostoma*, the most important being *G. spinigerum*. The reservoirs for *G. spinigerum* are mammals (*eg*, domestic and wild dogs and cats). The life cycle begins when eggs from the worm, which lives in the stomach wall of infected mammals pass into freshwater via the faeces of the definitive host. These develop into free-living, first stage larvae, which are consumed by copepods (aquatic crustaceans) of the genus *Cyclops*. Second stage larvae develop within the copepod which, when consumed by freshwater fish, pass through the fish's intestine and develop into a third stage within the fish muscles, where it develops into a third stage larva and encysts. The larvae can also transfer from one host to another without developing when one host eats another infected host. Infection in humans is acquired by eating raw or undercooked freshwater fish or poultry contaminated with third stage larvae.

In humans, the parasite seldom reaches sexual maturity; the larva migrates continuously and does not become established in the human stomach. The clinical symptoms may be visceral or cutaneous; in most cases a single larva is responsible for the clinical picture. Once the larva enters the body, it migrates through the tissues and the skin forming transient inflammatory swellings in various parts of the body one or two days later. Lesions often appear on the face, neck, arms, and legs. Symptoms occuring at a later stage are due to migration of the larva into the liver and other organs. Neurological symptoms may occur following larval invasion of the brain. The larva can survive in the body for a long time, possibly years.

The infection is common in south east Asia, particularly Thailand and Japan and has recently become a problem in Peru, Ecuador, and Mexico, including the popular tourist resort of Acapulco (5). Between 1990 and 2003, there were two laboratory reports to CDSC of gnathostomiasis, both in 2003; one possibly acquired in Malaysia; the other of unknown origin. These figures suggest that gnathostomiasis is rare and under-reported in UK patients, however, there have been reports of gnathostomiasis in European travellers to endemic areas (6) and a case series describes 16 cases of gnathostomiasis in travellers and immigrants diagnosed at the Hospital for Tropical Diseases in London.

Intestinal cestodes

Cestodes (or tapeworms) are flatworm parasites and most require at least two different host species to complete their life cycles. There are four species that affect humans: *Taenia saginata* (beef tapeworm), *T. solium* (pig tapeworm), *Hymenolepis nana* (dwarf tapeworm), and *Diphyllobothrium latum* (fish tapeworm). This section will focus on *Taenia saginata* and *Hymenolepis nana*, which are the most common tapeworms that affect humans in the UK.

Tapeworms are endemic worldwide, particularly where beef or pork is eaten raw or undercooked, and where sanitary conditions are poor where cattle and pigs may have access to human faeces. Typically, they are most prevalent in poorer countries, particularly in regions of Latin America, Africa, south east Asia, and eastern Europe where meat which is unlikely to have undergone any meat inspection, freezing, or to have been eaten raw or undercooked on open fires. Food preparation, dietary habits, and preference of eating raw meat or rare beef delicacies (*eg,* beef tartare in Europe and the newly independent states of the former Soviet Union) are contributory factors to the rising incidence of *T. saginata* infections. Instances of *T. saginata* infection in the UK also occur occasionally in travellers or immigrants from endemic countries.

Taenia saginata

The only definitive hosts are humans, in whom the adult stage lodges in the small intestine. The natural intermediate hosts are bovines. Humans acquire this infection by consumption of a tapeworm cysticercus (cyst) from undercooked or raw beef. The cysticercus releases larvae into the human gut and these attach to the intestinal wall and develop into adults. The adult worm, a large white tapeworm, can grow up to several metres in length, weighing around 20 to 30 grams, and may live in the intestine for long periods of time. Smaller chains of the tapeworm (proglottids) bud off and pass out in the faeces. The proglottids contain eggs, which may be ingested by cattle that are infected when their feed or grazing is contaminated by human faeces. The larvae hatch out and develop into oncospheres, which bore into the striated muscle of the cow and within two or three months a cysticercus forms where it may remain until eaten by a human.

The first signs that infection has occurred in humans may be when the proglottids pass out of the anus, but otherwise infection is generally asymptomatic, but ‘irritable bowel syndrome-like’ symptoms may occur.

Travellers

Travellers and immigrants from endemic countries may be at risk of infection following the consumption of raw or undercooked beef. Increased travel and tourism and indiscriminate deposition of human faeces on campgrounds, along main roads and along rail tracks can transfer infection to and from urban individuals (8). *Taenia* infections are under-reported in the UK and travel history is lacking. Between 1990 and 2003, there were 475 laboratory reports to CDSC via LabBase* of *Taenia saginata*, 185 of those reported recent foreign travel. The most reported region of recent foreign travel was sub-Saharan and southern Africa (97/185), 43% (42/97) of those to Ethiopia, which is a country of high-level transmission (4). Furthermore, in this same time period, there were 394 laboratory reports to CDSC of *Taenia* that were unspeciated and, therefore, the above figure is underestimated. It is likely, however, that as *T. solium* is very rarely reported in the UK, that the majority of unspeciated reports are due to *T. saginata*.

Hymenolepis nana

Hymenolepis nana (also known as the dwarf tapeworm) is only 2.5 to 4 centimetres in length. It is unique among the cestodes in that the life cycle is maintained between humans without the necessity for any other intermediate host species. The same individual usually acts an as intermediate and definitive host, with both metacestodes and adults developing in the same host. Consequently, direct human-to-human transmission is the most important route of infection, which is common in humans in endemic areas. Other species, such as rodents, may occasionally act as an intermediate host, but are not important in terms of parasite transmission to humans. The parasite is transmitted to humans by the eating of tapeworm eggs from faecally contaminated material. The ova are activated by the gut and encyst as metacestodes in the villi of the small intestine. After a few days they emerge and develop into adult worms in the intestinal lumen. After about a month, they reach about three to four centimetres in length and egg production begins. Proglottids detach from the adult worm, but degenerate in the intestine releasing ova and are, therefore, not seen in the faeces. Hundreds of worms may inhabit the intestine and eosinophilia† of blood is common with this infection. Spread is by faecal-oral transmission but autoinfection (particularly among children) may also occur, amplifying the intensity of the infection.

H. nana is very common in warmer climates and is most common in south America, Africa, Asia, and eastern and southern Europe where it is the most frequently encountered human cestode. It is common where sanitation is poor and prevalences are highest in institutions such as orphanages or in households with contaminated food handlers. Infection of human or rodent definitive hosts may also occur through eating stored, uncooked food contaminated with beetles (meal worms), or by accidental ingestion of fleas.

The main symptoms of hymenolepiasis are abdominal pain and anorexia but irritability and headaches may also occur.

Travellers

Travellers acquire infection via the faecal-oral route by ingestion of faecally contaminated food and water or directly from faecally contaminated fingers; younger age groups are more likely to be affected. Between 1990 and 2003, there were 445 laboratory-confirmed reports to CDSC of *Hymenolepis nana*; 185 of those had information about recent travel abroad, all of

which reported recent travel. One hundred and fifteen reports stated that the case was a recent immigrant or had been to an immigrant-screening centre; only three of those had extra information about which country the patient had arrived from. For the remaining 69 reports with a recent travel history, 61% (42/69) stated recent travel to the Indian sub-continent (30 Pakistan, 12 India) and 19% (13/69) to sub-Saharan and southern Africa (Somalia 5 , Sudan 2 , Uganda 2).

Conclusion

Helminth infections are under-reported to routine surveillance systems and travel history information is lacking for several reasons (9). Information about reason for travel is not given in laboratory reports in LabBase but would be useful in determining the risk groups for helminth infections. For certain infections*, eg*, hymenolepiasis, there was some additional information in the comments field about whether the patient was a new entrant to the UK and had attended a screening centre. The majority of those reports were from Yorkshire and the Humberside region where there is an immigrant-screening clinic in Bradford. Screening centres for immigrants may be an important resource in terms of estimating the proportion of imported helminth infections that occur in immigrants as opposed to those in short-term travellers from the UK. Case-series from specialist infectious disease units published in the literature are also an important source of additional information about imported helminths.

In the future, it will be important to bring together all the available sources of information on imported helminths as well as for other travel-associated infections in order to (i) determine the risks to travellers from these types of infection; and (ii) in order to better inform clinicians about the range of infections that certain types of traveller may present with, especially those that may present as a mild illness, and to consider more tropical types of infection if the travel history is appropriate.

Previous articles – parts one to three

- Unusual infections associated with foreign travel – part one: Intestinal protozoan infections <http://www.hpa.org.uk/cdr/archive04/travelarchive04.htm#prot>
- Unusual infections associated with foreign travel – part 2: Rickettsial infections <http://www.hpa.org.uk/cdr/archive04/travelarchive04.htm#rick>
- Unusual infections associated with foreign travel – part 3: Helminth infections <http://www.hpa.org.uk/cdr/archive04/travelarchive04.htm#helminths>

*Labbase is the database that collects laboratory reports of all micro organisms isolated at nearly 400 NHS and other laboratories throughout England and Wales. The database is managed and accessed at CDSC.
†Eosinophilia = increase in peripheral blood eosinophilic white blood cells to more than 450 cells/µL.

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Zoonoses

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Common animal associated infections, England and Wales laboratory reports: weeks 36-39/04

Common animal associated infections, England and Wales laboratory reports: weeks 36-39/04

	Total reports for weeks 36-40		Cumulative totals for weeks 01-40	
	2004*	2003	2004*	2003
*Borrelia burgdorferi**‡	67	48	203	256
Leptospira hardjo†§	1	–	2	–
Leptospira icterohaemorrhagiae†§	1	–	4	6
Leptospira other†§	5	1	13	8
Pasteurella haemolytica	8	–	16	3
Pasteurella multocida	35	29	224	207
Pastaurella pneumotropica	–	–	6	7
Pasteurella spp	9	9	64	66
Toxocara spp	–	–	3	4
Toxoplasma gondii	2	2	20	25
Toxoplasma spp	5	2	40	44
Capnocytphaga spp	–	4	3	10
Echinococcus granulosus	1	1	3	8
Coxiella burnettii	1	3	27	30
Chlamydia psittaci	7	4	56	61
Brucella spp	2	–	11	4
Orf-paravaccinia virus	–	3	1	5

* provisional data; † by specimen date; ‡ Lyme Disease Reference Laboratory and CDSC.
§ Leptospira Reference Laboratory and CDSC. NA = Not available.

Comment

Lyme borreliosis
F 49y tick bite (TB) and erythema migrans (EM), F 54y EM, F42y TB & EM, F 35y EM, F 38y EM, F 14y TB Thetford Forest and headaches, F55y EM, F 14y facial palsy, M 28y TB EM and flu-like illness (FLI), M 71y TB and fever, F 43y TB in Scotland and EM, F 66y EM, F 18y rash on thigh, M57y EM, M 35y TB EM malaise and arthralgia, M 50y TB in French forest, M 11y no clinical details (NCD), F 32y TB in French forest EM FLI, M75y NCD, M 49y EM FP

radiculopathy, F 39y NCD, F age not stated puo, M 53y forestry worker TB, M 27y TB north west France EM FLI, F 42y TB EM, M 40y TB EM, F 64y multiple tick bites, M 24y New Forest resident, M 65y TB FLI, M 42y TB rash, lymphadenopathy, F 59y TB rash, F 54y TB EM, M 48y TB EM, F 69y FP TB Richmond Park, F24y rash myalgia, F 3y EM ex Germany, F 63y EM knee, M 59y TB French woods EM, M 61y EM arthralgia FLI, F 30y EM ex Sweden 28/40 pregnant, F 57y EM, M 33y NCD, M 21y FP, M 41y TB EM arthralgia, F 53y tired all the time recent TBs, M 64y NCD, F 9y TB EM, M 3y NCD, F 40y TB France, F 27y TB EM, M 9y EM TB, M 20y EM, M 78y asymptomatic ex forester TBs F 59y Grisedale forest, M 72y recent TBs neuropathy, M 60y TB EM, M 12y bilateral facial palsy, F 52y TB FLI headache, M 60y farmer, M 35y TB rash, F 57y EM FLI, F 62y TB in New England EM, F 59y NCD, M 56y TB EM, F 25y TB in France, F 60y rash arthralgia F 58y NCD.

Leptospirosis
Indigenous:
L. icterohaemorrhagiae: M 31y water sports or windsurfing on a river
L. hardjo*:* M 15y swam in sewage contaminated inland water
Serovar not determined; M 20y No information, M 59y fishing on lake – rats present, M 52y livestock farmer moving straw.

Imported Leptospirosis:
L celadoni; M 24y white water rafting in Thailand.
L. grippotyphosa; M 51y canoeing in southern France.

Pasteurellosis
Pasteurella multocida:
F 57y animal contact, F 64y cat bite, F 68y cat bite, F 40y dog bite, M 67y infected cat bite, 21 females aged from 5y to 88y, nine males aged from 7y to 86y.

Pasteurella haemolytica:
Five males aged from 19y to 67y, three females aged from 21y to 36y.

Pasteurella spp:
M 37y cat bite to hand, two females aged from 38y to 72y, six males aged from 20y to 86 y.

Toxoplasmosis
Toxoplasma gondii:
F 24y lymphadenopathy, M 26y tiredness weight loss enlarged glands in neck and groin.
***Toxoplasma spp*:**
F 26y, F 32y, F 62y, M 26y, M 62y all with no clinical details.

Hydatid disease
Echinococcus granulosus: M 51y with no clinical details.

Q fever
Coxiella burnetii: F 26y with no clinical details.

Psittacosis
Chlamydia psittaci: M 66y, M 67y, M 35y M 44y, M 63y, M age not stated, F 37y 7/40 pregnant fever on holiday in Roumania.

Brucellosis
Brucella melitensis: F age not stated
Brucella spp: F 42y NCD.