

Health protection service bulletin Septer

September 2010

Foreword

Welcome to the current edition of *Transmit* which, as always, covers a range of health protection issues and, for the first time, includes a full update from two of our health protection teams:

- 1. The gastrointestinal, waterborne disease and zoonoses team led by Dr Michael Devine.
- 2. The respiratory infections team led by Dr Brian Smyth.

Trends in food-borne disease are reported here and, of note, during 2009 there were no food-borne outbreaks reported to the Public Health Agency. The respiratory team provides an overview of tuberculosis (TB) in Northern Ireland that is very relevant given that we have been dealing with cases of resistant TB during 2010.

This month's *Transmit* also highlights the need to ensure that children immigrating to Northern Ireland are properly immunised as it is never too



late for a child or adult to catch up on missed immunisations.

A short update on PVL *Staphylococcus aureus* is included for information and I would ask you to take a look at the information available through the HPA website and the web link that is provided for you in the article in this issue.

We are, as ever, very willing to receive comments, feedback and suggestions for content for *Transmit*. Please share any thoughts on this by email to emma.walker@hscni.net

Lonaire Dety

Dr Lorraine Doherty Assistant Director of Public Health (Health Protection)

Immunisation

A common query is ensuring children immigrating to Northern Ireland are appropriately immunised.

These children will present to the GP or health visitor for assessment. Occasionally, there may be comprehensive immunisation records accompanying the child; however, often there is little or no verbal or written immunisation history available. One of the best resources is the Health Protection Agency's chart 'Vaccination of individuals with uncertain or incomplete immunisation status' available at: www.hpa.org.uk/web/HPAwebFile/ HPAweb_C/1194947406156

This chart guides health professionals when deciding what vaccines, if any, are required, and when to give them so that the person's immunisation is in line with the UK immunisation schedule. It also provides more general information; for example, where no reliable vaccine history is available, it is safe to assume the person is unimmunised and plan a full course of immunisation according to the UK recommendations, as not all countries

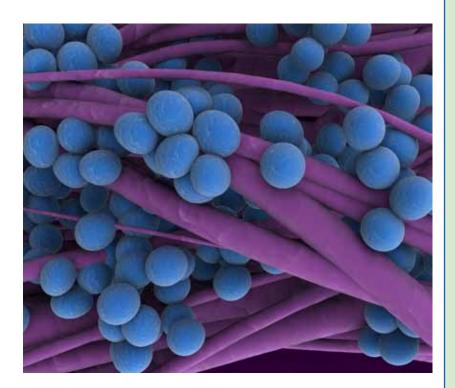
offer protection against all antigens currently protected against in the UK. See the following website for further information: http://apps.who. int/immunization_



monitoring/en/globalsummary/ scheduleselect.cfm

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Panton-Valentine Leukocidin positive *Staphylococcus aureus* (PVL-*SA*)



Over the last two years, health protection staff have advised on the follow-up of close contacts of four cases of PVL *Staphylococcus aureus (S. aureus)*. *S. aureus* is a common bacteria found on the skin, which can cause skin and wound infection. PVL is a toxin produced by a small percentage of *S. aureus* (PVL-*SA*) strains. This can cause more serious infections in wounds and joints. Although several other countries have encountered widespread problems with PVL-related disease, infections caused by PVL remain uncommon in the UK and, to date, most have been caused by bacteria that are sensitive to a range of antibiotics.

There are high risk groups for transmission of PVL-SA, which can spread in situations where individuals are in close contact, such as families/households, educational settings including nurseries, and other situations involving close contact sports. The main risk factors for PVL-SA include compromised skin integrity, skin to skin contact, and sharing of contaminated items such as towels.

PVL-SA should be suspected when there are pus-producing skin infections, which vary in severity and may be recurrent. Other symptoms can include pain and erythema that is out of proportion with the severity of the cutaneous findings.

If PVL disease is suspected, it is important to carry out a risk assessment. Under certain circumstances, screening and/or decolonisation of contacts may be required. Further information is available through the HPA website: www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/ PantonValentineLeukocidinPVL/ It is never too late for a child or adult to catch up on missed immunisations, though the appropriate intervals between doses need to be observed. Where an immunisation course has been interrupted it should be resumed – there is no need to restart the course. Occasionally, specialist advice may be needed where the person has undergone cancer treatment. Usually it is relatively straightforward to align the person's immunisations with the standard UK immunisation schedule using these resources. Where a health professional requires further advice, the duty room staff will be happy to assist.

Further resources

HPA website: www.hpa.org.uk



Immunisation against infectious disease (The Green Book) 2006, Chapter 11, pp79–82 www.dh.gov.uk/prod_consum_ dh/groups/dh_digitalassets/@dh/@en/ documents/digitalasset/dh_063631.pdf



Gastrointestinal, waterborne and zoonoses team

This team, led by Dr Michael Devine, has a wide remit including port health. The team undertakes a weekly review of all laboratory confirmed cases of gastrointestinal infection reported to the duty room, and their follow-up.

This enables the surveillance of gastrointestinal disease and quality assurance of public health interventions. The team has established an interagency group to consider public health aspects of port health. Work has also commenced with colleagues from NI Water, Environmental Health, and the Drinking Water Inspectorate to develop guidance for the public health management of water-related microbiological and chemical incidents.

The following sections provide an update in trends of the main gastrointestinal pathogens.

Notifications of food poisoning

Food poisoning notifications steadily increased between 1991 and 2000. Between 2000 and 2002 they decreased by 47%, followed by a large increase in 2004 mainly attributable to three salmonella outbreaks in that year, although laboratory reports of campylobacter also increased. Following a 4% decrease between 2007 and 2008, notifications have risen by 13% to 1,436 in 2009 (Figure 1).

Campylobacter 2500 Salmonella Cryptosporidium Food poisoning notifications 2000 Number of notifications/laboratory reports 1500 1000 500 0 ,₉₉9 2000 2005 -200° 1990 ,09² ୖ୶ 'ay, ,9⁹⁶ ,9⁹¹ ,₀₉₀ 2002 ¹⁰⁰³ 2004 2000 2001 2009 ,0°^ 2001 °og Year

Figure 1: Food poisoning: Notifications and laboratory reports, 1990–2009, Northern Ireland

Campylobacter

Laboratory reports of campylobacter first exceeded reports of salmonella infection in Northern Ireland in 1991 and campylobacter remains the most common form of bacterial food poisoning, with 977 reports received in 2009. After reaching a peak of 1,002 in 2000, the number of reports declined steadily over the next three years to 743 in 2003 before starting to rise again. The 2009 figure represents an increase of 15% (848) on 2008 (Figure 1).

Campylobacter reports normally increase sharply in May and then decline in the second half of the year. In 2009 the rise was more marked than in previous years (Figure 2).





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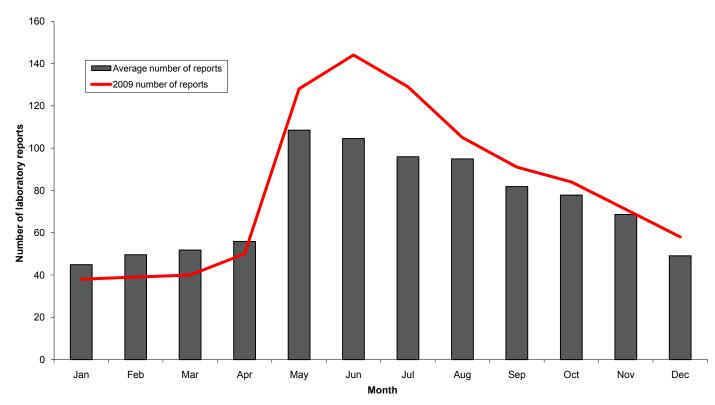


Figure 2: Laboratory reports of campylobacter, by month, 2000-2009, Northern Ireland

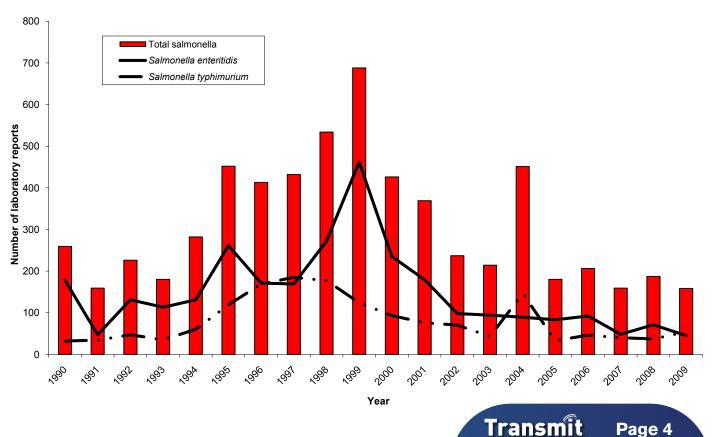
The age specific rate of laboratory reported campylobacter infection in 2009 was highest in the under five years age group.

Salmonella

There were 158 laboratory reports of salmonella in 2009, a decrease of 18% on the number reported in 2008 (187). Laboratory reports peaked in 1999 but since then they have steadily decreased, apart from the outbreaks in 2004 secondary to *Salmonella typhimurium* DT 104, *Salmonella virchow* and *Salmonella newport*, which accounted for more than half of the 451 laboratory reports received in 2004 (Figure 3). From 2005–2009, salmonella reports have ranged from 159–206 reports annually.



Figure 3: Laboratory reports of salmonella, 1990-2009, Northern Ireland



As with campylobacter, the highest age specific incidence rate of laboratory reported salmonella in 2009 was in the under five years age group.

Table 1 lists serotypes for which more than one report was received from 2005 to 2009. *S. enteritidis* and *S. typhimurium* remain the two most frequently reported serotypes in Northern Ireland.

2005*		2006		2007*		2008*		2009	
Total		Total		Total		Total		Total	
salmonella	180	salmonella	206	salmonella	159	salmonella	187	salmonella	158
enteritidis	83	enteritidis	92	enteritidis	48	enteritidis	71	enteritidis	45
typhimurium	33	typhimurium	46	typhimurium	40	typhimurium	37	typhimurium	54
virchow	7	virchow	5	schwarzengru	ind 3	virchow	8	newport	6
gold-coast	4	schwarzengru	nd 5	infantis	3	agona	5	virchow	4
saint-paul	4	agona	5	montevideo	3	stanley	5	javiana	3
kentucky	3	montevideo	4	arizonae	2	kentucky	4	kottbus	3
kottbus	3	infantis	3	hadar	2	oranienburg	4	oranienburg	3
muenchen	3	dublin	2	kentucky	2	dublin	2	saint-paul	3
stanley	2	java	2	panama	2	hadar	2	arizonae	2
-		manhattan	2	saint-paul	2	infantis	2	gold-coast	2
		newport	2	senftenberg	2	kottbus	2	heidelberg	2
		stanley	2	stanley	2	newport	2	java	2
		weltevreden	2	tennessee	2	saint-paul	2	muenchen	2
						thompson	2		

Table 1: Frequently reported serotypes of salmonella, 2005-2009, Northern Ireland

*Totals include *S. typhi* (typhoid) or *S. paratyphi* (paratyphoid) as follows: 1 *S. typhi* and 2 *S. paratyphi* in 2005; 2 *S. typhi* and 2 *S. paratyphi* in 2007; 1 *S. typhi* and 1 *S. paratyphi* in 2008.

Salmonella enteritidis

S. enteritidis is usually the most commonly reported serotype in Northern Ireland, accounting for 40–50% of the total salmonella reports in recent years (with the exception of 2004 and 2009). Reports peaked at 462 in 1999 and have since declined by 90% to 45 reports in 2009 (Figure 3).

Until 2002, *S. enteritidis* (phage type) PT 4 was the predominant phage type in Northern Ireland. Since then, other phage types have predominated (Table 2).

Table 2: Most frequently reported S. enteritidis phage types, 2005-2009, Northern Ireland

2005		2006		2007		2008		2009	
S. enteritidis	83	S. enteritidis	92	S. enteritidis	48	S. enteritidis	71	S. enteritidis	45
PT 1	24	PT 1	34	PT 14B	8	PT 21	11	PT 1	5
PT 4	13	PT 14B	13	PT 8	5	PT 4	10	PT 14B	5
PT 21	9	PT 4	13	PT 21	4	PT 14B	9	PT 4	4
PT 14B	6	PT 21	8	PT 6	4	PT 1	7	PT 21	3
PT 8	3	PT 6	6	PT 4	3	PT 8	10	PT 6A	3

Salmonella typhimurium

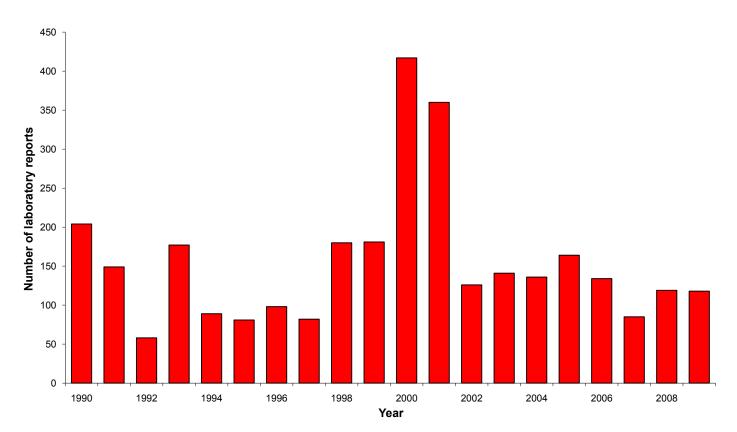
Reports of *S. typhimurium* exceeded reports of *S. enteritidis* in 1997 and then declined. An outbreak in 2004 resulted in a greater than three-fold increase on the previous year (figure 3). There were 54 reports received in 2009, an increase of 46% on the 37 reported in 2008 and exceeding the number of reports of *S. enteritidis* in 2009. The most frequently reported phage type in 2009 was *S. typhimurium* (definitive type) DT 8 (Table 3).

2005		2006		2007		2008		2009	
S. typhimurium	33	S. typhimurium	46	S. typhimurium	40	S. typhimurium	37	S. typhimuri	<i>um</i> 54
DT 104	4	DT 104B	12	DT 193	6	DT 104B	11	DT 8	13
DT 193	З	DT 104	11	DT 104B	5	DT 104	5	DT 191	6
DT 8	2	DT 193	6	U 311	4	DT 193	5	DT 193	6
DT 135	2	DT 56	2	DT 1	2	U 311	2	DT 104	5
DT 104B	2	RDNC	2					U 302	3

Cryptosporidium

Between 2002 and 2009, laboratory reports of *cryptosporidium* averaged 128 per annum. High numbers in 2000 and 2001 were due to outbreaks associated with the drinking water supply. A total of 118 reports were received in 2009 (Figure 4).

Figure 4: Laboratory reports of cryptosporidium, 1990-2009, Northern Ireland



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Cryptosporidium reporting follows a seasonal pattern as shown in Figure 5. There is a large peak in spring with another smaller peak later in the year.

The age specific incidence rate of laboratory reported *cryptosporidium* infection in 2009 was highest in the under 1–4 years age group and lowest in those aged 45 years and older.

Since January 2008, positive samples from Northern Ireland have been sent to the UK Cryptosporidium Reference Laboratory in Swansea for genotyping. This has provided information on the proportion of cases of *cryptosporidium* that are due to *C. parvum* or *C. hominis*. Previously, genotyping was only undertaken in outbreak situations.

At least two species of *cryptosporidium* cause human infection. *C. hominis* (formerly genotype 1) has a narrow host range, almost exclusively associated with infection in humans. *C. parvum* (formerly genotype 2) has a broad host range of animals and humans.

Figure 5 shows the proportion of cases that were speciated. In all, 63% were genotyped. Fifty six cases were identified as *C. parvum*, 13 as *C. hominis*, and there were five where DNA was not detected. *C. parvum* is mainly associated with the spring peak, with *C. hominis* increasing in the autumn.

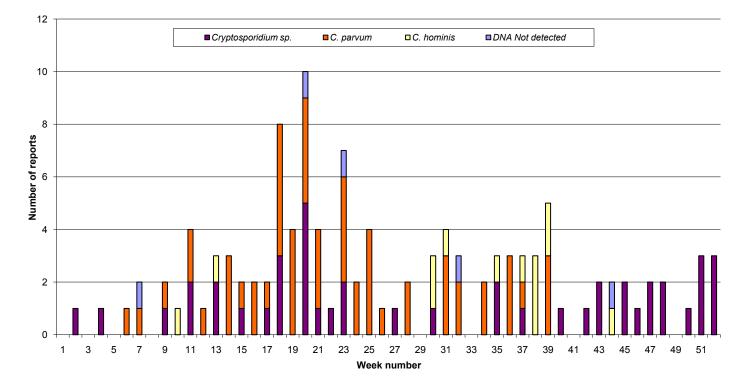
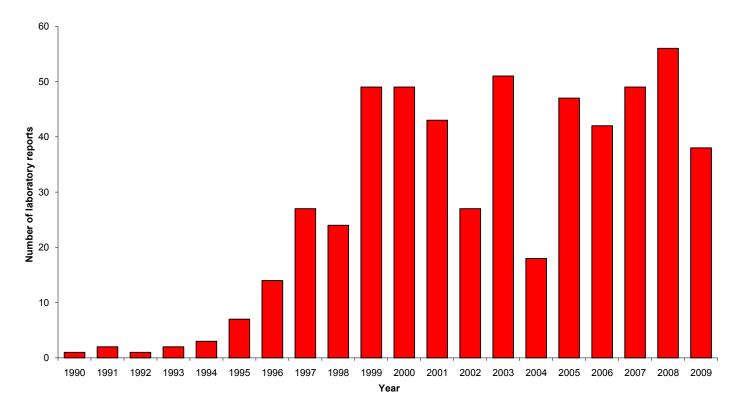


Figure 5: Laboratory reports of *cryptosporidium*, 2009, Northern Ireland

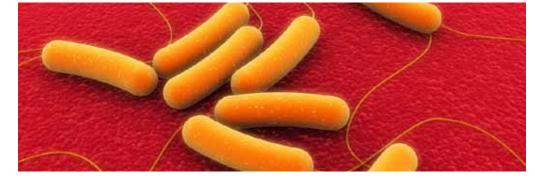
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Escherichia coli O 157

In Northern Ireland there were 48 reports of *E. coli* O 157 in 2009, 38 of which were VT positive. In 2008 there were 59 reports, of which 56 were VT positive. There were no *E. coli* O 157 outbreaks reported during 2009 (Figure 6).







The highest age specific incidence rate of laboratory reported *E. coli* O 157 infection in 2009 was in the under five years age group.

Food-borne and gastrointestinal outbreaks, 2009 (provisional)

During 2009, no food-borne outbreaks were reported to the PHA. Ninety seven other gastrointestinal outbreaks were recorded and these were thought to be caused by person to person transmission. This compares with two food-borne and 74 other gastrointestinal outbreaks in 2008.

Eighty (82%) of the non-food-borne gastrointestinal outbreaks were attributed to Norovirus (NV) alone, with another caused by NV together with Rotavirus. NV infections can spread rapidly in facilities such as hospitals, hostels, and nursing or residential homes. *C. difficile* was implicated in one outbreak in a residential institution.

Altogether, 43 hospital outbreaks were reported, affecting at least 250 people; 51 outbreaks at residential institutions, affecting at least 732 people; two nursery school outbreaks and one at a day centre.



Travel-associated gastrointestinal infections, 2009

Salmonella

There were 158 laboratory reports of individuals with salmonella infection in 2009, of which 22% (35) were associated with travel outside the United Kingdom (Table 4).

Table 4: Laboratory reports of salmonella and countries where infections are thought to have been acquired, 2009, Northern Ireland

Serotype	Number of reports received	Number thought to have been acquired abroad	Countries visited
S. agona	1	1	Spain
S. anatum	1	0	
S. apapa	1	1	Spain
S. arizonae	2	0	
S. ati	1	0	
S. bleadon	1	0	
S. bredeney	1	0	
S. corvallis	1	0	
S. derby	1	0	
S. dublin	1	0	
S. enteritidis	45	16	Cuba, Egypt, Netherlands, South
			Africa, Spain (3), Turkey (7), UAE, Zambia
S. gold-caost	2	0	
S. hadar	1	0	
S. heidelberg	2	1	Philippines
S. hvittingfoss	1	1	Austria
S. indiana	1	1	India
S. infantis	1	0	
S. isangi	1	1	Spain
S. java	2	0	
S. javiana	3	1	France
S. kintambo	1	0	
S. kottbus	3	0	
S. lagos	1	0	
S. manhattan	1	0	
S. montevideo	1	0	
S. muenchen	2	1	France
S. muenster	1	0	
S. newport	6	1	Uganda
S. oranienburg	3	0	
S. poona	1	0	
S. saint-paul	3	2	China, India
S. schwarzengrund	1	0	
S. typhimurium	54	6	China, Croatia, India, Poland, Republic of Ireland, Spain
S. virchow	4	0	
S. spp	5	2	Thailand, Spain
S. weltevreden	1	0	
Grand total	158	35	

Eight were thought to have acquired their infection in Spain (including the Canary and Balearic Islands) and Turkey – these areas being popular holiday destinations from Northern Ireland.

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Other gastrointestinal infections

During 2009, there were 60 cases of other gastrointestinal infections with a history of having travelled abroad reported, including campylobacter, *C. difficile, cryptosporidium, E. coli* O 157, *giardia*, hepatitis A, *shigella* and Norovirus (Table 5).

Organism	Number of reports received	Number thought to have been acquired abroad	Countries visited
Campylobacter	977	28 (3%)	Ghana, Mexico, France (3), India, Morocco, Peru, Portugal, Rol, South Africa, Spain (9), Thailand (2), Turkey (4), USA (2)
Clostridium difficile	1001	1	Spain
Cryptosporidium	118	6 (5%)	Malawi, Rol, Spain (4)
E. coli O 157	48	8 (17%)	France, Italy (2), Rol (2), Spain (2), Turkey
Giardia	38	7 (18%)	Bulgaria, China, New Zealand (2), Spain, Thailand, Turkey
Hepatitis A	36	3 (8%)	Republic of Ireland (2), Spain
Shigella spp	13	6 (46%)	Cuba, Egypt (2), India (2), Spain
Norovirus	425	1	Thailand
Total	2,656	60	

Respiratory team

The respiratory team is led by Dr Brian Smyth and covers influenza, tuberculosis (TB) and Legionnaires' disease. Issues associated with influenza include surveillance and public health preparedness/response for pandemic, avian and seasonal influenza viruses. The TB programme includes reviewing current arrangements for TB in Northern Ireland and then developing an action plan for prevention and control, including a care pathway for the management of multi-drug resistant TB. The public health aspects of TB will be covered in a future issue of *Transmit*.



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Tuberculosis (TB)

TB is a notifiable disease in Northern Ireland. It is caused by the *Mycobacterium tuberculosis* complex, which include *M. tuberculosis*, *M. africanum and M. bovis*. Clinical teams are required to notify TB patients, both pulmonary and non-pulmonary, to the PHA. This enables prompt identification and screening of contacts, which is coordinated by the PHA TB team.

The surveillance programme collects information on treatment outcome 12 months after notification. It also includes laboratory typing data and drug susceptibility. This enables the TB team to monitor the effectiveness of control measures, identify any linked cases, and also monitor changes in the local epidemiology of TB. It is also used to aid the monitoring of compliance with the Northern Ireland respiratory framework and the development of the regional TB action plan.

A detailed epidemiological report is prepared annually - see future issues of *Transmit* for details.

TB summary 2008

- There were 66 TB cases notified in 2008, giving a Northern Ireland rate of 3.7/100,000 population.
- Thirty four cases (52%) had pulmonary TB, of which 14 (41%) were sputum smear positive.
- The proportion of cases diagnosed with TB during 2008 born outside the UK/Ireland was similar to 2007 at 53%.
- Three healthcare workers were notified with TB.
- There were two culture confirmed case of *M. bovis*.



The annual notification rate for pulmonary TB in Northern Ireland during 2008 was lower than in 2007 (2.6/100,000 population) at 1.9 cases per 100,000 population (Figure 7). Of the 66 notified cases in 2008, 34 had pulmonary disease and 32 had non-pulmonary disease. Fifty one (77%) of the 66 notified cases were culture confirmed; 49 with *M. tuberculosis* and two with *M. bovis*. Both *M. bovis* cases were adults and lived on farms. Of the 34 pulmonary cases, 14 (41%) were sputum smear positive at the time of notification and all were subsequently confirmed by culture as being *M. tuberculosis*. This is lower than in 2007 when 55% of pulmonary tuberculosis cases notified were sputum smear positive.

Twenty three of the 32 non-pulmonary tuberculosis cases were confirmed by culture (21 *M. tuberculosis* and 2 *M. bovis*).

The annual notification rate for non-pulmonary tuberculosis increased slightly from 1.4/100,000 population in 2007 to 1.8/100,000 population in 2008.

Antimicrobial susceptibility information was received on 50 of the 51 culture confirmed cases. Of these, one *M. tuberculosis* isolate was resistant to both isoniazid and rifampicin (MDR) and three other isolates were resistant to isoniazid only (Figure 8). Both *M. bovis* isolates, as expected, were resistant to pyrazinamide.

Figure 7: Rates of pulmonary and non-pulmonary tuberculosis per 100,000 population, by year, in Northern Ireland

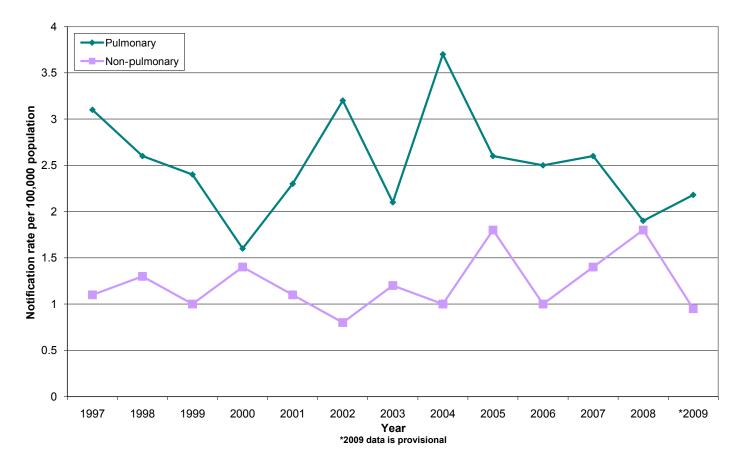
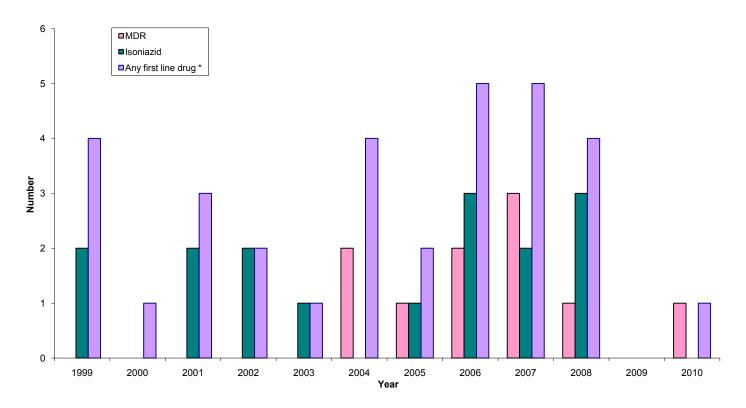


Figure 8: Incidence of drug resistance in isolates of *M. tuberculosis*, by year, in Northern Ireland



TB provisional data 2009

There were 56 notified cases of TB. This corresponds to a notification rate of 3.1 cases per 100,000 population. Of these, 39 (70%) had pulmonary disease and 17 (30%) were non-pulmonary. Forty eight of the 56 notified cases were culture confirmed as *M. tuberculosis* and one as *M. bovis* infection.

Antimicrobial sensitivity testing results are currently available for 43 of the 49 culture confirmed isolates. There were no instances of resistance to first line drugs, with the exception of the *M. bovis* isolate, which was resistant to pyrazinamide.

Incidence rates of TB in Northern Ireland remain substantially lower than those reported elsewhere in the UK and the Republic of Ireland.

Table 6: Respiratory viruses reported to the PHA

Respiratory viruses		2009		
	Q1	Q2	Cumulative Q1-Q2	Cumulative Q1-Q2
Influenza – pandemic A* (H1N1)	17	0	17	0
Influenza – A* (other)	0	0	0	50
Influenza – B*	0	0	0	21
RSV*	181	4	185	122
Adenovirus (excluding faeces)	30	30	60	45
Coronavirus	10	8	18	17
Metapneumovirus**	41	18	59	15
Parainfluenza	8	45	53	23
Rhinovirus	98	117	215	102

* includes spotter swabs (spotter swabs have only been tested for RSV since week 53, 2009).

** a new laboratory assay was introduced in 2010.

Table 7: Respiratory bacteria reported to the PHA

Respiratory bacteria	2010			2009
	Q1	Q2	Cumulative Q1-Q2	Cumulative Q1-Q2
Coxiella burnetii	0	0	0	0
Mycoplasma pneumoniae	0	0	0	1
Chlamydia pneumoniae	0	0	0	1

Table 8: Mycobacteria laboratory reports*

Mycobacteria		2010		2009						
	Q1	Q2	Cumulative Q1-Q2	Cumulative Q1-Q2						
Mycobacterium tuberculosis complex										
M. tuberculosis	12	14	26	26						
M. africanum	0	0	0	0						
M. bovis	0	1	1	0						
Atypical mycobacterium	Atypical mycobacterium									
M. abscessus	1	0	1	2						
M. avium-intracellulare group	12	7	19	15						
M. chelonae	2	2	4	4						
M. cosmeticum	0	0	0	0						
M. fortuitum	1	1	2	0						
M. gordonae	5	2	7	8						
M. interjectum	0	1	1	0						
M. kansasii	3	0	3	2						
M. lentiflavum	0	1	1	2						
M. malmoense	4	2	6	4						
M. marinum	0	0	0	1						
M. peregrinum	1	1	2	1						
M. simiae	0	1	1	0						
M. xenopi	2	0	2	2						

*Based on specimen date and excludes duplicates within 26 weeks, as per HPA guidelines

News section

Seasonal influenza immunisation programme

The DHSSPS has recently issued its annual letter regarding the 2010–2011 seasonal vaccination programme, which is available at: www.dhsspsni.gov.uk/hss-md-31-2010.pdf

This draws upon last year's experiences during the pandemic. The forthcoming seasonal vaccine contains the H1N1 swine flu strain as well as influenza A/H3N2 and B-like viruses. Some patients may require the monovalent H1N1 swine flu vaccine as well as the trivalent seasonal vaccine, and the guidance contains an algorithm to help determine the appropriate vaccine and schedule. Reference is also made to the possible risk of febrile convulsions in children under five years and seasonal influenza vaccines marketed by Pfizer Vaccines (Enzira and CSL Biotherapies generic influenza vaccine), with GPs being advised to avoid offering Enzira to children aged under five years.

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Other key points include:

- ensuring those with chronic neurological disease (especially children and young people) are prioritised;
- pregnant women in a clinical at risk group are to be offered vaccination by their GP;
- all other pregnant women not in a clinical at risk group will be offered vaccination as part of their antenatal appointments;
- the DHSSPS uptake target for those aged over 75 years has been raised from 70% to 75%, but the uptake target for the under 65 at risk group remains at 60%.

The PHA is organising a series of training sessions for primary care and trust staff in August and September in advance of the seasonal vaccination programme starting on 1 October.

Malaria: information for people travelling overseas

The HPA has produced a short publication for travellers on the prevention of malaria. This is based on the ABCD approach:

- A be **A**ware of the risks
- B use **B**ite protection
- C take Chemoprophylaxis
- D seek early **D**iagnosis

This is available at: www.hpa.org.uk/web/HPAwebFile/HPAweb C/1279888824011

Polio in Tajikistan

There is an ongoing polio outbreak in Tajikistan (more than 200 cases) and clinicians have been reminded in a CMO letter (www.dhsspsni.gov.uk/hss-md-24-2010.pdf) to consider the possibility of polio in those with symptoms of acute flaccid paralysis after travelling from Tajikistan and neighbouring countries. Travellers to this area should have completed their primary vaccination course against polio and should be offered a booster dose of a polio containing vaccine if they have not received one in the last 10 years.

Further information

Additional information is available from the National Travel Health Network and Centre (NaTHNaC) at: www.nathnac.org/pro/clinical_updates/polio_tajik_270410.htm and through the 'Green Book' at: www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/ dh_108823.pdf





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Further information for health professionals and other agencies:

Health protection duty room Public Health Agency 4th Floor 12–22 Linenhall Street Belfast BT2 8BS

Tel: 028 9055 3997 or 028 9055 3994 Email: pha.dutyroom@hscni.net





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