



Opinion of
the Scientific Panel on Biological Hazards (BIOHAZ)
and of
the Scientific Panel on Animal Health and Welfare (AHAW)
on “Review of the Community Summary Report on Trends and Sources
of Zoonoses, Zoonotic Agents and Antimicrobial Resistance in the
European Union in 2004”¹

(Question N° EFSA-Q-2006-050/051)

Adopted by
BIOHAZ Panel on 7th September 2006
and by
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The BIOHAZ Panel addressed, in particular, the following food-borne zoonoses and items: *Salmonella*, *Campylobacter*, *Listeria monocytogenes*, VTEC *E. coli*, *Yersinia*, *Trichinella*, *Echinococcus*, *Toxoplasma*, *Cysticercus*, antimicrobial resistance and food-borne outbreaks. See Chapters 3 – 13.

The AHAW Panel addressed specifically bovine tuberculosis and brucellosis, as information concerning these zoonoses are mainly from the primary production level, and also considered rabies. See Chapters 14 – 16.

Both Panels reviewed the opinion at the drafting stage and commented on each other's submissions, since both the public and animal health aspects were required to be addressed from the perspective of each Panel.



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BACKGROUND

Zoonoses² are animal infections that can be transmitted from animals to humans, (usually through the food chain). In order to prevent transmission, it is important to identify which animals and foodstuffs are the main sources of zoonoses. For this purpose, information is collected from all over the European Union (EU) and analysed, so that the right control measures can be taken in a timely manner to protect human health.

The Community system for monitoring and collection of information on zoonoses was established by Council Directive 92/117/EEC (The Zoonoses Directive). This Directive sets rules for the Member States (MS) of European Union (EU) to collect, evaluate and report to the Commission, each year, data on specific zoonoses and zoonotic agents in animals, foodstuffs and feedingstuffs. The Directive 92/117/EEC was replaced by a new Zoonoses Directive 2003/99/EC, adopted by the Council and the European Parliament on 17 November 2003. The new Directive came into force on 12 June 2004.

In 2004, data were collected according to the former Directive 92/117/EEC covering 11 zoonotic agents and zoonoses: *Salmonella*, *Campylobacter*, *Listeria monocytogenes*, verotoxin producing *E. coli*, tuberculosis due to *Mycobacterium bovis*, *Brucella*, *Yersinia*, *Trichinella*, *Echinococcus*, *Toxoplasma* and rabies. In addition, data on antimicrobial resistance in *Salmonella* and *Campylobacter* and *E. coli* as well as foodborne outbreaks were reported. The European Food Safety Authority (EFSA) was asked to examine the data collected and to prepare the Community Summary Report. The Zoonoses Collaboration Centre (the Danish Institute for Food and Veterinary Research) was commissioned to prepare the Community Summary report 2004 under the supervision of EFSA and it was published on the EFSA website on 21 December 2005.

The 25 MS (EU-25), including the 10 new MS (EU-10), and Norway submitted national zoonoses reports for 2004. The Community Summary Report 2004 is divided into 3 levels. Levels 1 and 2 are combined, and they consist of a general summary and a Community assessment with interpretation of the trends and sources, covered by data analysis for each hazard, as well as an overview of monitoring programmes implemented in the Community. The combined levels 1 and 2 are published in print form as well as on EFSA website and are made available to European Community stakeholders. Level 3 of the report consists of an overview of all data submitted by the MS. This level of the report is available only on the EFSA website or on a CD ROM.

The Council Conclusions from 6 - 7 December 2004 on Emerging Zoonotic Diseases invite EFSA, in close collaboration with the European Centre for Disease Prevention and Control (ECDC), to present a detailed analysis of the risk factors. This should be based on the annual Community report on zoonoses. EFSA has decided to allocate this task to the Biological Hazards and Animal Health and Welfare panels.

² See "Introduction" for the definition used in this document

Terms of reference

The panels are asked, in the light of the results presented in the Community Summary Report on trends and sources of zoonoses, zoonotic agents and antimicrobial resistance in European Union 2004, to review the situation. The review might include:

- drawing conclusions on the situation in the Community and identifying public and animal health priorities;
- considering the risk factors related to zoonoses, antimicrobial resistance and food-borne outbreaks covered by the report;
- recommending, when appropriate, actions to be taken to improve the protection of public and animal health in the Community; and
- suggesting improvements for monitoring and reporting of zoonoses, zoonotic agents, antimicrobial resistance and food-borne outbreaks and the analyses of the information.

The BIOHAZ panel is asked, in particular, to consider the following food-borne zoonoses and items: *Salmonella*, *Campylobacter*, *Listeria monocytogenes*, VTEC *E. coli*, *Yersinia*, *Trichinella*, *Echinococcus*, *Toxoplasma*, *Cysticercus*, antimicrobial resistance and food-borne outbreaks.

The AHAW panel is requested to consider specifically bovine tuberculosis and brucellosis, as information concerning these zoonoses are mainly from the primary production level, and also to consider rabies.

The panels are invited to share the draft parts of the opinion and to comment on each other's submissions, since both public health and animal health aspects should be addressed regarding each zoonosis.



1. INTRODUCTION

The Community system for monitoring zoonoses was established by Council Directive 92/117/EEC³, and was subsequently revised in 2003. The new Directive 2003/99/EC⁴ was adopted by the Council and the European Parliament on 17 November 2003 and entered into force on 12 June 2004.

From 1994 to 2004, the Community Reference Laboratory for the Epidemiology of Zoonoses (CRL-E) has prepared an annual report on “Trends and sources of zoonotic agents in the European Union and Norway”.

The European Food Safety Authority (EFSA) was assigned the tasks of collecting the data and preparing the Community Summary Report for the year 2004 and onwards. The Zoonoses Collaboration Centre (the Danish Institute for Food and Veterinary Research) prepared the Community Summary Report under the supervision of EFSA. Data was collected according to the former Directive 92/117/EEC.

The 25 Member States (MS) (EU-25), including the 10 new MS (EU-10), and Norway submitted national zoonoses reports for 2004. The 15 old MS (EU-15) and Norway have submitted zoonoses reports in previous years, and four of the new MS, Latvia, Lithuania, Cyprus and Slovenia reported on a voluntary basis already for 2003.

For the first year, MS submitted data using a new online web-based zoonoses reporting system that was created and is maintained by EFSA. The final version of the Community Summary Report was published first on the EFSA website on 21 December 2005 and subsequently as printed hard copy in March 2006 (EFSA, 2005c).

It should be recognised that the first summary report demonstrates its considerable potential as a basis for community and stakeholder actions aimed at preventing infections transmitted from animals to humans. This first Community Summary Report on zoonoses and antibiotic resistance has substantial potential to develop into a most valuable tool that will enable preventive actions to be taken to control foodborne and other zoonotic infections in all the member states as was suggested in the White Paper on food safety. (EC, 2000).

³ Council Directive 92/117/EEC of 17 December 1992 concerning measures for protection against specified zoonoses and specified zoonotic agents in animals and products of animal origin in order to prevent outbreaks of food-borne infections and intoxications. Official Journal L 062, 15/03/1993, 38-48.

⁴ Directive 2003/99/EC of the European Parliament and of the Council of 17 November 2003 on the monitoring of zoonoses and zoonotic agents, amending Council Decision 90/424/EEC and repealing Council Directive 92/117/EEC. Official Journal L 325, 12/12/2003, 31-40.

The Panels were informed by EFSA that the current request for an opinion on the Community Summary Report on trends and sources of zoonoses was expected to be made annually on a regular basis.

It is important to note that the data and information included in the Community Summary Report must be carefully interpreted since they derive from monitoring, surveillance or, more generally, sampling schemes that are not harmonised between different MS.

For the purposes of this Opinion, the following definitions, as stated in Directive 2003/99/EC, shall apply:

- ‘zoonosis’ means any disease and/or infection⁵ which is naturally transmissible directly or indirectly between animals and humans;
- ‘zoonotic agent’ means any virus, bacterium, fungus, parasite or other biological entity which is likely to cause a zoonotic disease;
- ‘antimicrobial resistance’ means the ability of microorganisms of certain species to survive or even to grow in the presence of a given concentration of an antimicrobial agent that is usually sufficient to inhibit or kill micro-organisms of the same species;
- ‘food-borne outbreak’ means an incidence, observed under given circumstances, of two or more human cases of the same disease and/or infection, or a situation in which the observed number of cases exceeds the expected number and where the cases are linked, or are probably linked, to the same food source;
- ‘monitoring’ means a system of collecting, analysing and disseminating data on the occurrence of zoonoses, zoonotic agents and antimicrobial resistance related thereto.

For the purposes of this Opinion, all factors able to potentially increase or significantly associated with a human health impact (incidence and/or severity) of zoonoses or antimicrobial resistance were considered as risk factors. Thus, factors impacting on the occurrence of hazards in the production chain are also included.

Both Panels recognise that the setting of priorities is a task for risk managers and that this often results in a compromise between food safety/animal health needs and economic, political and other societal factors. However, predominant epidemiological features from a scientific point of view are highlighted in the Opinion. Accordingly, the following elements were considered in order to identify priorities: (a) human incidence data, (b)

⁵ Including parasite infestation.



severity of illness (based on scientific literature), (c) epidemiological trends, (d) the emergence of new or re-appearance of potential threats to public health (SCVPH, 2000a).

This Opinion addresses the content of the Trends and Sources of Zoonoses, Zoonotic Agents and Antimicrobial Resistance as listed in the Community Summary Report under the following headings:

- the situation in the Community;
- considering the risk factors related to each hazard covered by the report;
- identifying public health priorities;
- recommending, when appropriate, actions to be taken to improve the protection of public health in the Community;
- suggesting improvements for monitoring and reporting of each hazard covered by the report and the analyses of the information.

All references to tables and figures and abbreviations used in the present document are related to the “Community Summary Report on trends and sources of zoonoses, zoonotic agents and antimicrobial resistance in European Union 2004”.

2. OVERALL CONCLUSIONS AND RECOMMENDATIONS

The following were identified as the key conclusions and recommendations to be drawn from the 2004 Annual Community Zoonoses Report. They are not presented in any order of priority.

Overview of the situation in the Community

- The most commonly reported zoonotic infections in humans in the EU are, by far, those caused by bacterial zoonotic agents that can be shed by asymptomatic farm animals: salmonellosis (192 703 reported cases in total) and campylobacteriosis (183 961)⁶; followed by yersiniosis (10 381) and HP-VTEC infections (4 143). Comparably, there are significantly fewer reported cases of human listeriosis (1 267). Total number of reported cases of parasitic zoonoses is 2 349 (trichinellosis, toxoplasmosis and echinococcosis put together). Compared to the main bacterial foodborne infections mentioned above (395 455; put together), reported human cases of “classic” zoonoses are relatively low: brucellosis (1 337), tuberculosis due to *M. bovis* (86) and rabies (2 imported).
- However, it is important to keep in mind that the Community Summary Report gives only an indication of the situation in the Community due to assumed under-detection and under-reporting which vary by countries. Furthermore, the prevalence of sequelae is not reported. Thus, it is not possible to determine the total disease burden in EU from the Community Summary Report and to compare the public health impact in the MS.
- Most of the cases of salmonellosis seem to be linked to the consumption of contaminated eggs and egg products.
- *Listeria monocytogenes* was the agent responsible for most reported deaths associated with foodborne diseases.
- Contaminated water (recreational water, drinking water, irrigation water) has been identified as an important transmission route for zoonotic agents, and has been implicated in both sporadic cases and outbreaks.
- Emerging fluoroquinolone resistance in *Salmonella* spp. and *Campylobacter* spp. isolated from food animals and meat is a public health concern.

⁶ Considering the incidence (cases / 100 000 inhabitants) campylobacteriosis was reported by 21 MS with an overall incidence of 47.6 cases/100 000, while salmonellosis was reported by 24 MS with an overall incidence of 42.2 cases/100 000.

- Parasites (*Toxoplasma gondii*, *Echinococcus* spp., *Trichinella* spp. and *Taenia* spp. / *Cysticercus* spp.) have been reported less frequently in humans, and have caused fewer outbreaks, than bacteria and viruses in the EU in 2004. However, in many instances their impact (severe illness, disability, death, and costs related to diagnostic procedures, hospitalization and treatment) on vulnerable groups of the population, and often in immunocompetent persons, has probably been considerable.
 - Toxoplasmosis, despite having the highest reported human incidence amongst the parasitic zoonoses recorded in the Community Summary Report, is particularly considered to be an under-detected and under-reported disease.
 - *Echinococcus multilocularis* is considered to be an emerging zoonotic risk in the Community.
 - *Echinococcus granulosus* still causes the majority of human cases of echinococcosis in the Community, and the number of cases has not decreased in 2004, as is suggested by the numbers recorded by WHO and OIE.
 - There has been an increase of reported human cases of trichinellosis in the EU, due in part, to the inclusion of reports from new MS.
- The data presented in the report indicate that the situation regarding human brucellosis in Europe has improved during the reporting period. Brucellosis in humans appears to be mainly due to *B. melitensis* and is therefore most probably linked to infection in small ruminants. There is no general decline in the occurrence of bovine brucellosis, although brucellosis in small ruminants has declined in several of MS.
- Due to insufficient data it is currently not possible to draw definitive conclusions on the Community situation for tuberculosis due to *Mycobacterium bovis* in humans. The epidemiological evidence in relation to the tuberculosis situation generated by the existing surveillance reporting systems is of varying quality.
- Rabies continues to pose a serious (fatal) human health risk in areas with rabies in wildlife. The widespread occurrence of wildlife rabies in some Eastern European countries both inside and outside EU can lead to an occasional spill-over into domestic animals. Compulsory vaccination of dogs against rabies is implemented in some countries but an insufficient level of vaccination coverage may explain the continued incidence in these species.

Additional conclusion specifically related to animal health:

- *Salmonella* contaminated feed is an important route for introducing *Salmonella* into animal production*.

Recommended actions

- As *Salmonella* Enteritidis is the cause of the majority of reported cases of salmonellosis, and as contaminated eggs are identified as a major source of *Salmonella* Enteritidis, the setting of targets for *Salmonella* in laying hen flocks is supported.
- As contaminated poultry meat is identified as a major source of *Salmonella* Enteritidis and *Salmonella* Typhimurium, the setting of targets for *Salmonella* spp. in poultry flocks is supported.
- As contaminated poultry meat is identified as a major source of *Campylobacter* spp., measures to reduce *Campylobacter* spp. at different stages along the poultry food chain are recommended.
- The apparently higher incidence of infection with the zoonotic agents *Salmonella* spp., *Yersinia* spp., and VTEC in young children merits further investigation.
- It is recommended that GMP, GHP and HACCP be applied effectively and monitored closely to decrease the proportion of foods with high prevalences and/or concentrations of *Listeria monocytogenes*.
- GMP, GHP, HACCP and official controls should be applied effectively and closely monitored to decrease the risk of contamination by *Salmonella*, and other relevant zoonotic agents in food and feed.
- The importance and the role of contaminated water in the epidemiology of zoonoses and foodborne outbreaks require further clarification.
- It is recommended that risk communication measures be implemented stressing the importance of prudent use of antimicrobials in animals, targeted at farmers and veterinary practitioners. In particular, strategies to prevent development of fluoroquinolone resistance are needed.

* Wierup, M: *Salmonella* i foder – en utredning på uppdrag av Jordbruksverket om orsaker och risker och förslag till åtgärder (*Salmonella* Contamination of Feed – an assessment on behalf of Swedish Board of Agriculture of risks in Sweden), pp 1-132, 2006, Swedish Board of Agriculture, ISBN 91 88 264-32-7; <http://www.sjv.se/download/18.1ac7fbb10dac953d9c8000516/Utredning+-+Salmonella+i+foder+-+Wierup+-+till+SJV+2006-08-31%284b%29.pdf>; <http://www.medvetnet.org/cms/templates/doc.php?id=57>

- Risk communication initiatives aiming at the improvement of food hygiene procedures and hygienic food handling are recommended. These educational campaigns should be targeted at food operators, vulnerable groups in the population as well as the general public.
- The capacity for laboratory testing, epidemiological investigations and reporting for human brucellosis could be strengthened. Non-Officially Brucellosis Free (non-OBF) MS should allocate sufficient resources to eradication/ control programmes adapted to the epidemiological situation with the overall goal of OBF status.
- In relation to brucellosis and tuberculosis, increasing the percentage of herds covered by the programme that are effectively tested, will improve the reliability of the eradication/ control programme already in place. Tuberculosis in cattle, might be regarded as a re-emerging disease in some MS.
- In Europe, the key to control of rabies is through infection control in the major reservoir species (fox, racoon dog) by oral immunisation. Since endemic areas may span several MS and third countries, successful control relies heavily on cross-border cooperation and implementation of vaccination plans. It is therefore highly recommended that vaccination plans should be coordinated at Community level in terms of strategic planning, regulatory and financial support. It is also recommended that systematic prophylactic vaccination and identification of pets be implemented in all endemic areas.

Additional recommendations specifically related to animal health

- Efforts should be made to decrease the risk of *Salmonella* contamination of the food chain through feed.
- Data allowing an evaluation of the possible influence that different husbandry systems might have on the risk of intestinal colonisation by zoonotic agents, such as *Salmonella* should be collected.

Recommended improvements for the monitoring and reporting

- There is a need for a common strategy on data collection, monitoring and reporting as well as improvement of harmonisation of definitions, in order to improve the usefulness of the data presented in the Community Summary Report.
- To improve the comparability of reported data and to assess the incidence and underreporting of (foodborne) zoonoses in the Community, studies to analyse the reported rates at different levels of the surveillance pyramid (general population, general practitioner, hospitals) in different MS are encouraged.

- More extensive use of molecular methods for microbiological typing should be made, as this will allow the comparison of isolates, improve the traceability of infections and contamination along the food chain and the identifying of epidemiological links *e.g.* between human outbreaks and infection in animals.
- Mandatory monitoring of antimicrobial usage in animals, preferably according to animal species and antimicrobial categories, is recommended as this would enable better epidemiological analyses of occurrences and trends of antimicrobial resistance and would provide a basis for conducting risk assessment as well as for implementing and evaluating interventions.
- A clear definition of *human pathogenic* VTEC, in particular the serotypes and virulence factors that are of public health importance, would aid in the interpretation of the results of the Community Summary Report.
- The introduction of an improved surveillance and reporting system for toxoplasmosis is considered to be crucial for assessing its true disease burden.
- Mandatory notification should be considered for cysticercoses to improve the efficiency of control measures.
- When reporting cases and outbreaks, there is a need to distinguish between human cases where the infection was acquired domestically and those acquired abroad to enable a better analysis of the data.
- Data on the origin of implicated food should be included when reporting on the identification of food sources for outbreaks.
- The priorities for microbiological monitoring should be reassessed periodically.
- It is difficult to assess disease burden from the data presented. In future, other approaches, for example the use of DALYs (Disability-Adjusted Life Years) rather than reporting solely the numbers of cases, might lead to more comprehensive analyses and interpretation at the EU level and aid in risk-based priority setting.
- Discrepancies need to be resolved between data collected by other international organizations (*e.g.* OIE, WHO) along with data presented in scientific publications and data presented in the Community Summary Report such as identified for parasitic diseases.
- The reporting of *Brucella* in food products in countries where *Brucella* is still endemic should be improved. Brucellosis in wildlife should be monitored and reported in areas where the role of wildlife as a reservoir has been established.



- The reporting of brucellosis and tuberculosis in animals should account for the percentage of the herds tested which are covered by eradication/ control programmes.
- Data supplied to EFSA by some MS on *Mycobacterium bovis* infections in humans do not accord with that available in the public domain in these MS. There is a need to ensure that communication and linkage with existing databases in MS is harmonised. The geographical resolution of the data and the analyses related with *Mycobacterium bovis* should be at the very least at regional (or an analogous geographical unit) level to allow meaningful descriptive analyses of spatial and as well as temporal patterns.

DETAILED ANALYSIS

3. *SALMONELLA*

The situation in the Community

- Almost 193 000 cases of salmonellosis were reported in 2004, giving an incidence rate of 42.2 per 100 000 population for the EU-25, an increase over 2003 that is mainly due to first time reporting from some of the new EU-10, making it the second most frequently reported zoonosis in the Community.
- In the old EU-15, salmonellosis has continued to decline in recent years, probably due to increased awareness and the preventive measures that have been implemented in many countries, particularly in poultry production,.
- In 2004, *Salmonella* Enteritidis and *Salmonella* Typhimurium were the serovars most frequently reported as causing human salmonellosis in the Community (76% and 14% respectively of reported cases) and have consistently been so over the past five years.
- Reported outbreaks of salmonellosis were most frequently associated with infected eggs and contaminated egg products, broiler meat and bakery products, of which the latter may also be egg-associated.
- There is a great variation in the prevalence of *Salmonella* in different types of animal production and between the MS which is likely to reflect the differing levels of the efficacy and the approach used by each MS when implementing different control measures.
- Although the prevalence of *Salmonella* Enteritidis in eggs has declined in some MS since 2000, eggs and broiler meat remain major sources of *Salmonella* and egg products are often implicated in reported outbreaks of salmonellosis.
- The majority of food samples tested were of meats and meat products. The lowest prevalences of *Salmonella* in poultry, pig, and bovine meat over the last five years were reported in Finland, Sweden and Norway, where stringent control programmes are in place.
- In most countries, *Salmonella* was detected at all levels of poultry meat production with the highest rates of contamination at the slaughterhouse and processing plants. Proportions of positive samples in poultry meat were generally below 10%, and lowest in countries with control programmes. At retail, in those MS reporting, 2% to 18.5% of fresh poultry meat samples were positive for *Salmonella*, with

Salmonella Enteritidis the most common serotype, followed by *Salmonella* Typhimurium and *Salmonella* Infantis.

- In most countries, the prevalence of *Salmonella* in pig meat was below 10%. *Salmonella* prevalences in bovine meat were generally considerably lower.

Considering the risk factors related to salmonellosis covered by the report

- From the data in the Community Summary Report combined with the current state of knowledge, the following risk factors are identified:
 - consumption of contaminated products containing raw or undercooked eggs, eating ground raw beef and/or pork and drinking contaminated raw (unpasteurized) milk.
- From data other than the Community Summary Report:
 - outbreaks have also been traced to fresh produce that has been irrigated with contaminated water.
- Detailed reviews of the foods commonly associated with salmonellosis can be found elsewhere (ACMSF 1993, 2001; d'Aoust, 2000; ICMSF, 1996, 2002, 2005; SCVPH, 2003a).

Identifying public health priorities

- From the current state of knowledge, all *Salmonella* should be regarded as a public health risk.
- Reduce carriage of *Salmonella* in primary production *via* control programmes and microbiological monitoring of the effectiveness of these programmes. In particular, the reduction of carriage of *Salmonella* in poultry meat and egg products and, in some MS, reduction of carriage in pork and beef are the main priorities.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Reduction of carriage of *Salmonella* by the implementation of control programmes and microbiological monitoring of the effectiveness of those programmes in primary production and maintenance of good standards in accordance with GMP and GHP along the food and feed chain are recommended.
- As *Salmonella* Enteritidis is the cause of the majority of reported cases of salmonellosis, and as infected or contaminated eggs are identified as a major source of *Salmonella* Enteritidis, the Panel supports the setting of targets for *Salmonella* in laying hen flocks.

- As contaminated poultry meat is identified as a major source of *Salmonella* Enteritidis and *Salmonella* Typhimurium, the Panel supports the setting of targets for *Salmonella* in poultry flocks.
- Further investigation into the apparently higher incidence of infection with *Salmonella* in young children is recommended.

Additional recommendations specifically related to animal health

- Although the data in the Community Summary Report do not depict a clear and unequivocal picture of the *Salmonella* situation in animal primary production, the role of infected animals as the primary and major source of infection, and of *Salmonella* contaminated feed as a continuous risk for new introduction to herds in all MS, should be considered for further action.
- The occurrence of *Salmonella* in poultry breeding animals should be further reduced due to the great potential for vertical transmission of the infection.
- The ongoing movement away from cage housing systems in order to improve the welfare of laying hens might have an influence on the risk for intestinal colonisation by *Salmonella*. Ongoing studies should be considered to determine whether such an influence occurs, and where it does, there should be an analysis of its importance in relation to the general welfare level of the birds. There should be studies of the risk for *Salmonella* colonisation in other farm animal husbandry systems.

Suggested improvements for monitoring and reporting of salmonellosis and *Salmonella* and the analyses of the information

- Whenever possible, MS should send data by means of electronic systems which are of relevance to the detection of unusual trends and unusual sources of pathogens.
- It is desirable to harmonize sample type and size, and analytical methods. Sampling schemes adapted to size of herd/flock and to intensive or extensive production systems should be considered. These types of schemes have already been drafted for the *Salmonella* baseline study in laying hens⁷, as reported recently, and in broilers⁸.

⁷ Commission Decision 2004/665/EC of 22 September 2004 concerning a baseline study on the prevalence of salmonella in laying flocks of *Gallus gallus*. Official Journal L 303, 30/09/2004, 3-34.

⁸ Commission Decision 2005/636/EC of 1 September 2005 concerning a financial contribution by the Community towards a baseline survey on the prevalence of *Salmonella* spp. in broiler flocks of *Gallus gallus* to be carried out in the Member States. Official Journal L 228, 03/09/2005, 14-18.

- The Panels emphasises the importance of harmonised sampling and diagnostic procedures.
- Data related to the effect of different animal husbandry systems, especially in poultry production, should, when available, be reported in order to allow for the evaluation of their influence on the risk of intestinal colonisation by *Salmonella*. A study of the effects of movement away from caged-laying systems for poultry would be of special interest.

Additional recommendations specifically related to animal health

- In relation to the harmonisation of sampling and diagnostic procedures, the advantages and disadvantages of currently applied bacteriological or immunological methods in particular require careful evaluation, (see the Opinion of the Scientific Panel on Biological Hazards on risk assessment and mitigation options of *Salmonella* in pig production - EFSA, 2006a).

4. *CAMPYLOBACTER*

The situation in the Community

- Campylobacteriosis was the most commonly reported zoonotic disease in 2004 with a Community incidence of 47.6 cases per 100 000 population.
 - *Campylobacter* spp. were the causative agents in 18% of foodborne outbreaks reported in 2004.
 - The most commonly reported sources for *Campylobacter* spp. outbreaks were contaminated broiler meat and contaminated drinking water.
 - Most cases of human campylobacteriosis are reported as sporadic cases.
 - Food of poultry origin was the commodity most intensively sampled. The highest prevalence (>80%) was found in poultry meat at slaughter. Reported prevalences in pig meat and bovine meat at slaughter were considerably lower, from apparent absence to 12%. *Campylobacter* were also isolated from a variety of other foodstuffs such as fishery products, cheese and vegetables.
 - The most common *Campylobacter* species isolated from poultry and poultry meat was *C. jejuni*. In pigs and cattle, *C. coli* or *C. jejuni* predominated, respectively.
-

- Voluntary or mandatory control programs for *Campylobacter* in broilers exist in six MS and Norway. The control programs include e.g. ensuring a high level of biosecurity in the flocks, and scheduling of positive flocks to freezing or heat treatment. Meanwhile, there are several efficient control options for *Campylobacter* along the poultry food chain. Their effectiveness in the various countries will depend on the *Campylobacter* situation, production systems, consumer behaviour, etc. (EFSA, 2005a)

Considering the risk factors related to campylobacteriosis covered by the report

- It is not possible to identify risk factors for human campylobacteriosis as such from the data in the Community Summary Report. However, for outbreaks of campylobacteriosis, the most common sources reported were contaminated broiler meat and contaminated water. This agrees with several other studies dealing with risk factors for campylobacteriosis outbreaks (EFSA, 2005a).
- Several case-control studies for sporadic human campylobacteriosis have been conducted and the following risk factors have typically been identified: journeys abroad; eating undercooked poultry meat; eating poultry liver; handling raw poultry; drinking non-potable water; drinking raw milk or dairy products thereof; eating barbecued pork, beef or poultry meats; frequent contacts with (diarrhoeic) dogs and cats, in particular puppies and kittens (EFSA, 2005a).
- Risk assessments have suggested that the incidence of human campylobacteriosis associated with consumption of chicken meals could be reduced by reducing the flock prevalence, by reducing the number of *Campylobacter* on chicken carcasses (e. g. by physical or chemical decontamination) and by improving kitchen hygiene (Rosenquist *et al.*, 2003; Nauta *et al.* 2005).
- Human incidence data and data regarding the incidence in poultry flocks and poultry meats cannot be compared since data on the origin of poultry meat consumed (domestic, imported, countries of origin) in the different MS are not provided in the Community Summary Report, neither is the proportion of domestically acquired human campylobacteriosis cases.

Identifying public health priorities

- The data in the Community Summary Report supports priority being given to contaminated poultry meat and contaminated drinking water as important sources for human campylobacteriosis. Attention should be given to other sources of *Campylobacter* such as (surface) water, raw milk, fresh produce and direct contact with animals, and infection during travelling abroad.
- With respect to poultry meat, one of the most important presumed routes of infection is through handling contaminated raw poultry meat and subsequent cross-

contamination to other ready-to-eat (RTE) foods, such as salads, in domestic kitchens and in food service.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- The Panel recommends that different risk management options be defined, including targets, at different levels of the poultry food chain,. The effectiveness of such measures can readily be estimated from different existing risk assessment models.
- The Panel also recommends that public health goals aiming to reduce the human incidence of campylobacteriosis be defined in all MS and that national control programs be implemented.
- The Panel recommends that the effectiveness of the implemented control programs in each MS be formally audited and evaluated.
- *Campylobacter* infections may result in *sequelae* such as Guillain-Barré syndrome and reactive arthritis. There is increasing evidence of an association of campylobacteriosis with Inflammatory Bowel Disease and Irritable Bowel Syndrome. These *sequelae* add considerably to the disease burden of *Campylobacter* infections, but few data are available. Further studies are recommended to help estimate the incidence of *sequelae* and the fraction thereof that can be attributed to *Campylobacter* in order to establish the true impact of this zoonosis.

Suggested improvements for monitoring and reporting of campylobacteriosis and *Campylobacter* and the analyses of the information.

- To evaluate the efficacy of control measures, monitoring of *Campylobacter* in poultry flocks and poultry meat is recommended.
- Common guidelines for monitoring should be developed and applied. Depending on the purpose, data on prevalence and/or concentration should be generated.
- Access to data on consumption of fresh/ frozen poultry products by consumers in the MS (including the country of origin) is important if the effectiveness of national control programmes is to be evaluated by looking at human incidence.
- More information on contaminated water as a source of human campylobacteriosis should be sought and made available.

5. *LISTERIA MONOCYTOGENES*

The situation in the Community

- There were 1 267 cases of human listeriosis reported in the EU-25 in 2004. The reported incidence rate appears to have been stable, at 0.2-0.3 cases per 100 000 population. The proportion of deaths, however, is relatively high with 107 deaths reported, giving a case fatality rate of 8% (data from 12 MS and Norway).
- No foodborne outbreaks due to *Listeria monocytogenes* were reported in EU Member States and Norway in 2004. Therefore, no information on food products involved in human infections is available.
- Overall, infections in males and females are represented equally in the Community Summary Report. However, there were higher incidences reported in females in the 25-44 age group (due to cases associated with pregnancy) and also amongst males in the older age groups (over 45 years), for reasons that are not yet evident.
- Findings of *Listeria monocytogenes* in numbers above the critical contamination level (100 CFU/g) were most commonly reported from fishery products, and occasionally from cheeses and some ready-to-eat meat products.

Considering the risk factors related to listeriosis covered by the report

- For vulnerable populations (e.g. the very young, pregnant women, the elderly, immuno-compromised individuals), RTE foods containing *Listeria monocytogenes* at the point of consumption are the main risk factor.
- Some RTE food categories have been considered as posing higher risk of human *Listeria monocytogenes* infections than others. Those include RTE foods that are more frequently contaminated and/or enable growth of the pathogen (e.g. milk and soft cheeses, some salads, certain sliced and vacuum-packed meat products, uncooked seafood). However, it is difficult to quantitatively associate the prevalence and/or the level of contamination to a level of the risk of human foodborne disease. For instance, some fishery RTE products are known to occasionally have relatively higher incidence and/or levels of *L. monocytogenes* but have been more rarely associated with foodborne listeriosis than other at-risk RTE categories.

Identifying public health priorities

- To decrease the prevalence of RTE food portions with high concentrations of *Listeria monocytogenes*.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- It is recommended that GMP, GHP and HACCP be applied effectively and closely monitored to decrease the proportion of foods with high prevalences and/or concentrations of *Listeria monocytogenes*.
- Advising vulnerable populations (i.e. the very young, pregnant women, the elderly, immuno-compromised individuals) on the risks linked to the consumption of certain RTE food products, in order to contribute to reduction of their exposure to the pathogen, is recommended.

Suggested improvements for monitoring and reporting of listeriosis and *Listeria monocytogenes* and the analyses of the information

- Harmonisation of reporting of human cases, (for example, at present certain MS only report hospitalised cases).
- Improved identification of sources (food or other) of *L. monocytogenes* associated with human cases including characterisation of the *Listeria monocytogenes* isolates from suspect foods comparable in details to that applied for human isolates.
- Reports on findings of *L. monocytogenes* in foods that clearly differentiate foods into those that can, and those that cannot, support growth of *L. monocytogenes* so as to be better able to judge the significance of the detection of low concentrations of *L. monocytogenes* in different food categories.

6. VEROTOXIGENIC *ESCHERICHIA COLI* (VTEC)

The situation in the Community

- Although only in its second year of reporting in the Community Summary Report the situation appears to be stable, with approximately 1.3 reported cases of VTEC disease in humans (4 143 cases) per 100 000 population and slightly less than 0.1 per 100 000 (approximately 300 cases) of reported Haemolytic Uraemic Syndrome (HUS) cases associated with VTEC in 2004.
- It is noted that, in particular, the serotype O157 is linked to foodborne outbreaks.
- Reported findings of VTEC in foodstuffs are in the range of 0-5%; however, relatively few samples are taken routinely, the nature of samples is not specified and the serotype is seldom specified. It appears that VTEC is present in foodstuffs of animal origin at a sporadic and low prevalence. Moreover, it is unclear, from the

Community Summary Report, to what extent these findings are indicative of a public health threat.

- Cattle and small ruminants appear to be the principal reservoir of VTEC O157.
- The public health importance of findings of VTEC in pigs and pork, poultry and poultry meat and in fishery products is uncertain, as the pathogen is not indicated in the Community Summary Report for these categories and very few, if any, human VTEC outbreaks have been linked to them.
- Non-O157 VTEC serotypes are rarely included in monitoring programs.

Considering the risk factors related to human infection with VTEC covered by the report

- Young children appear to be at higher risk of catching VTEC-infection and developing acute complications, such as HUS and their *sequelae*.
- Exposure to faecal material from cattle, either directly or indirectly (*via* foodstuffs, or the environment), appears to be the main risk factor based on the prevalence data presented in the Community Summary Report and in the scientific literature, with regard to serotype O157 (SCVPH, 2003b).

Identifying public health priorities

- To establish the link between human cases and the suspected sources of infection.
- To define and apply effective preventive measures to protect public health.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- To provide comparable data on the human health risk originating from cattle, it would be useful to conduct Community level baseline studies.
- The apparently higher incidence of infection with VTEC in young children merits further investigation.

Suggested improvements for monitoring and reporting of VTEC and VTEC infections and the analyses of the information.

- A clear definition of human pathogenic (HP) VTEC and, in particular, the HP VTEC serotypes and associated verotoxins of concern, would aid the interpretation of results in the Community Summary Report.
- Identifying the sources of outbreaks of VTEC infections in humans.

- The reasons for the widely differing incidences of human infections, as reported in different MS, should be investigated and explained.
- Non-O157 HP VTEC serotypes should be included in monitoring programs.

7. *YERSINIA*

The situation in the Community

- The total number of reported cases of yersiniosis amounted to 10 381, with an average of 2.4 cases/100 000 population.
- *Y. enterocolitica* was cultured from 98.5% of human cases, and *Y. pseudotuberculosis* from 1.3%.
- The reported incidences have not changed greatly since 2001. However, two countries reported a slight increase.
- Although 51 outbreaks of human yersiniosis have been reported, the source of the infection was identified in only 2, *viz.* consumption of raw hamburger meat in Portugal (*Y. enterocolitica*) and of grated carrots in Finland (*Y. pseudotuberculosis*).
- Little data were available on the prevalence of *Y. enterocolitica* in animals as only a few countries presented data. Nevertheless, from the few reports available, the bacterium was frequently found in pigs and cattle. The reported prevalence of *Yersinia enterocolitica* in pig meat and bovine meat appears to be quite similar, and higher than the occurrence observed in other food sources.
- The data presented do not differentiate between pathogenic and non-pathogenic strains of *Yersinia enterocolitica*.

Considering the risk factors related to yersiniosis and *Yersinia* covered by the report

- The data in the Community Summary Report do not allow identification of risk factors. However, putative risk factors indicated in the literature include consumption of raw pork and/or prolonged storage of RTE food.
- From the data presented, it appears that, compared to other population groups, children may be more susceptible to *Yersinia* spp., and to *Y. pseudotuberculosis* in particular.

Identifying public health priorities

- The apparently higher incidence of *Yersinia* infection in young children merits further investigation.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- The apparently higher incidence of infection with *Yersinia* in young children and the means of preventing such infection, merit further investigation.

Suggested improvements for monitoring and reporting of yersiniosis and *Yersinia* and the analyses of the information.

- More information is needed concerning the diagnostic criteria and methods, used by the MS, for detecting human yersiniosis.
- The difference in reported incidence rates between MS should be investigated and explained.
- Clarification of the reporting systems used to differentiate between the two species (*Y. enterocolitica* and *Y. pseudotuberculosis*) that cause yersiniosis would be useful.
- Serotyping to differentiate between human pathogenic and non-human pathogenic strains would considerably improve the interpretation of data.
- More basic research is advisable, for example, to clarify the virulence mechanisms of both organisms (*Y. enterocolitica* and *Y. pseudotuberculosis*), to better define their growth characteristics (effect of pH, temperature, water activity etc.) and to assist outbreak analysis.

8. *CYSTICERCUS*

The situation in the Community

- In the 2004 Community Summary Report, cysticerci are the least reported agents of parasitic zoonoses, as only one MS has reported data on their presence in bovine carcasses. However, bovine cysticercosis, caused by *Taenia saginata* cysticerci (aka *Cysticercus bovis*), is more prevalent across EU than reported here. According to the World Organisation for Animal Health (OIE), seven MS reported cases of bovine cysticercosis in 2004 (OIE, 2006), and a paper published in 2006 (Abuseir *et al.*, 2006), reported cases detected in another MS in 2004. Moreover, it is highly probable that bovine cysticercosis was been detected – but not reported – in other MS also during 2004. In addition, the actual prevalence of bovine cysticercosis is

even higher than reported, since light infestations of the carcasses are unlikely to be detected at meat inspection (SCVPH, 2000b).

- The disease in humans linked to bovine cysticercosis is taeniosis due to *Taenia saginata*, the adult form of the tapeworm. Human cases in only 3 MS have been reported in 2004 to the OIE; however, the disease in humans is most probably under-reported, also due to the poor relevance of its clinical presentation and possibly to the associated social stigma. Thus the actual number of cases is unknown. Estimates of the real incidence rely on prescription and consumption data of taenicidal drugs.
- Neither swine cysticercosis caused by *Taenia solium* cysticerci (aka *Cysticercus cellulosae*) nor human cases are mentioned in the 2004 Community Summary Report. However, although there are no data in the recent scientific literature concerning the occurrence of swine cysticercosis in pigs reared in the EU, three MS reported cases in pigs in 2004 to the OIE (OIE, 2006). In particular, the high incidence reported by one MS needs further attention.
- *T. solium* causes two diseases in humans, depending on the stage of development of the parasite. The disease due to the adult form, the tapeworm *Taenia solium*, is taeniosis, while the disease due to the larval stage, *T. solium* cysticerci, is human cysticercosis. Two MS reported cases of the disease in humans in 2004 (OIE, 2006). Sporadic cases of human cysticercosis have been detected in the last few years in the MS, mostly in immigrants (Terraza *et al.*, 2001; Giménez-Roldan *et al.*, 2003; Jimenez Caballero *et al.*, 2005), but also in tourists returning from endemic countries (Wabbels *et al.*, 2000) and in the residential population (Wiegand *et al.*, 1999; Castellanos *et al.*, 2000; Rodríguez-Sánchez *et al.*, 2002).

Considering the risk factors related to taeniosis and cysticercosis covered by the report

- The risk factor for taeniosis caused by *T. saginata* in humans is the consumption of raw or undercooked contaminated bovine meat (SCVPH, 2003c).
- The risk factor for bovine cysticercosis infection in cattle is the ingestion of vegetation contaminated with *T. saginata* eggs shed in human faeces. Cattle can become infected when grazing contaminated vegetation in or around the farm or close to railways or camping sites where human carriers of *T. saginata* have defecated, or grazing pastures where contaminated urban sewage sludge have been applied for fertilization. Accidental overflow of sewage polluted rivers onto pastures has also been identified as a risk factor for bovine cysticercosis.
- Concerning *T. solium* taeniosis in humans, the sole risk factor is consumption of raw or undercooked contaminated pork.

- Concerning human cysticercosis, the ingestion of food and water contaminated with *T. solium* eggs shed in human faeces and auto-infestation of humans harbouring the tapeworm *T. solium* in their intestine, are the only risk factors.
- With regards to swine cysticercosis, the risk factor for infection in pigs is the ingestion of *T. solium* eggs shed in human faeces.

Identifying public health priorities

- *T. saginata* taeniosis is not currently addressed as a public health priority due to the low number of reported cases in the EU and to the low severity of its clinical presentation in humans. However, it should be noted that *T. saginata* is listed among the organisms that may cause reactive arthritis (enteropathic arthropathy) as a secondary disease state (WHO, 1999; Minerva, 2006).
- Taeniosis by *T. solium* is not considered a public health priority *per se* in the EU due to the low number of reported cases in humans and the mild clinical signs. Human cysticercosis is a public health priority since the infection of humans by the larval form of the parasite can lead to a severe condition due to the frequent localization of the cysticerci in the eye and in the brain (neurocysticercosis).
- It is worth considering that swine cysticercosis and human cysticercosis can be introduced into new regions of the EU by human carriers of *T. solium* (immigrants, tourists, etc.). Over the last 20 years, this has happened in the United States of America (USA), where the disease is still considered to be emerging (Wallin and Kurtzke, 2005).

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Increased awareness of human taeniosis and cysticercosis, and of bovine and swine cysticercosis, should be developed among medical doctors, veterinarians and farmers (SCVPH, 2000b).
- The introduction of serological techniques for the detection of cysticerci antigens in the serum of animals (cattle, pigs) should be considered, since this would allow the detection of 3 - 10 times more cases than visual inspection of carcasses at the slaughterhouse (SCVPH, 2000b). However, it should be emphasised that serological tests would not always detect light infestation of the carcasses, which is also common in the EU.
- The essential measure for avoiding infection of intermediate hosts is the restriction of access of cattle and swine to contaminated human faeces. Thus, strict rules for the hygienic disposal of human faeces should be implemented in farms together with hygiene education of the personnel. Allowing cattle to graze in the proximity

of railways, high-traffic roads and camping sites will potentially expose the animals to contaminated vegetation. In addition the spreading of sludge on land should only be allowed, in compliance with the regulations, after proper sanitisation with a method that inactivates *T. saginata* eggs.

- For the control of both these forms of human taeniosis, a key issue would be advice to, and education of, human carriers and their prompt treatment.

Suggested improvements for monitoring and reporting of cysticercosis and taeniosis and the analyses of the information.

- Reporting in the MS should be carried out in a standardized manner.
- Concerning *T. saginata* taeniosis and bovine cysticercosis, mandatory notification should be considered as a way of improving the efficiency of control measures by removing a continuous source of infection in cattle.
- With regards to *T. solium* taeniosis, it would be worth considering mandatory notification, since *T. solium* eggs shed by human carriers are directly infectious to humans.
- Mandatory notification should be considered for cases of human and swine cysticercosis, in order to improve the efficiency of control measures. In addition, an early warning system could prove beneficial in case of the further emergence of human and swine cysticercosis in the EU-25.
- Special attention should be given to ensuring that all collected data on human taeniosis/cysticercosis and cysticercosis in animals flows efficiently along the whole food chain, both forwards and backwards.

9. ECHINOCOCCUS

The situation in the Community

- In the 2004 Community Summary Report, echinococcosis ranks second in the EU in human prevalence in comparison with all the other parasitic zoonoses considered. With regard to human echinococcosis caused by *E. granulosus* (the agent of cystic echinococcosis), the reported endemic areas are still represented mostly in the Mediterranean countries of EU. In the Community Summary Report, there is evidence of a decreasing trend in the reporting of cases in the EU-15 in 2004 compared to 2003: however, it should be noted that those figures under-report the occurrence of the disease in humans, as is suggested also by a comparison with data collected by OIE (OIE, 2006) and CISID (WHO, 2006) at WHO. When data missing from the Community Summary Report are included, a moderate increase in

the number of human cases of echinococcosis in the EU in 2004 (in comparison with 2003) becomes evident. Recently published data (Buishi *et al.*, 2005) also suggest that canine *E. granulosus* infection has re-emerged in areas of the EU, as a result of the relaxation of control measures during the 2001 foot and mouth disease epidemic, with increasing opportunity for transmission of the parasite to humans.

- The decrease in the number of reported cases of cystic echinococcosis in animals may be due to the introduction of education control programmes which have been implemented in some MS.
- The prevalence of *E. multilocularis* (the agent of alveolar echinococcosis) is expanding in its main host, the red fox, whose population is increasing in Europe in both wild and urban areas, thus increasing the chances of infestation of humans through contaminated fox faeces. Another relevant host, the raccoon dog (*Nyctereutes procyonoides*) has recently been identified and its population is also spreading in the EU (Jenkins *et al.*, 2005). Recently *E. multilocularis* has been listed among the emerging zoonotic agents, with a current and potentially increasing impact in the European continent (WHO/FAO/OIE, 2004).

Considering the risk factors related to echinococcosis covered by the report

- For cystic echinococcosis, the only risk factor is the accidental ingestion of the eggs of the tapeworm, *E. granulosus*, which are shed in the faeces of infected canids (in the EU, dogs and foxes).
- For alveolar echinococcosis, the risk factor is accidental ingestion of the eggs of the parasite, *E. multilocularis*, shed in the faeces of foxes, raccoon dogs and dogs. In particular, as the population of foxes has increased in Europe in the last few years, the opportunity for contact between humans and this wild carnivore, even in urban areas, has consequently increased. With regards to domestic animals, cats have recently been ruled out as hosts of *E. multilocularis*, since the parasite does not fully develop in their intestine.
- Recent papers suggest that farmers comprise one of the most exposed groups in the population. Other possible risk factors include contact with dogs hunting for game and rodents, voles which may be infected with the larval stage of the parasite, and ingestion of contaminated water or contaminated unwashed fresh produce (in particular, strawberries) and vegetables. Chewing grass is another variable practice to be considered under “food consumption” that has been found to be associated with alveolar echinococcosis (Kern *et al.*, 2004). Circumstantial evidence suggests that contamination of the hands during gardening, through contact with contaminated soil, may also carry some risk.

Identifying public health priorities

- The severity of the clinical presentation in humans infested with *E. granulosus* and *E. multilocularis* suggests that both conditions are candidate priorities among the parasitic zoonoses. In particular, alveolar echinococcosis is of public health relevance as it is considered to be the most severe of all parasitic zoonoses since up to 100% of untreated cases in humans may be fatal. The economic burden of cystic echinococcosis (cost of diagnosis, surgery, hospitalisation and postoperative care), and the corresponding permanent decrease in quality of life as measured by DALYs (disability-adjusted life years) is substantial for the community and for the individual, and has been calculated at several thousand dollars (Torgerson, 2003; Budke *et al.*, 2006).

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Cystic echinococcosis should be considered as a case for mandatory notification when the parasite is detected in the intermediate hosts (sheep, goats, cattle and pigs) as well as in humans, in order to plan the medical treatment of the definitive host (dog).
- Mandatory notification of alveolar echinococcosis should also be considered.
- *E. granulosus* - Destruction of contaminated viscera found at the slaughterhouse in order to avoid the infection of dogs, planned treatment of dogs with taenicides and subsequent hygienic disposal of their faeces, and hygienic measures (handwashing after contact with soil and before eating), as basic risk-mitigation actions, are recommended.
- *E. multilocularis* – Until the risk factors for alveolar echinococcosis in humans are better defined in those areas where *E. multilocularis* is present, the following preventative measures are recommended: use of good general hygiene practices such as washing fruit and vegetables before consumption, cooking berries or mushrooms from infected areas, hand-washing after gardening and before consumption of meals, and after contact with dogs, especially if they have direct contact with wildlife or live in areas where wildlife, in particular, foxes, rodents or voles, is abundant. Planned treatment of dogs with taenicides and subsequent hygienic disposal of their faeces in such areas is recommended.

Suggested improvements for monitoring and reporting of echinococcosis

- Concerning cases of echinococcosis caused by *E. granulosus* in humans and animals, considering the limited availability of data in the 2004 Community Summary Report, particular attention should be given to an improvement in the efficiency of the collection and flow of such data.

- Since 1998, the European Echinococcosis Registry has been collecting data (on a voluntary basis) about human cases of alveolar echinococcosis in the EU. It would be worth considering establishing a link of some kind with this registry.

10. *TOXOPLASMA GONDII*

The situation in the Community

- In the 2004 Community Summary Report, toxoplasmosis is presented as the most prevalent parasitic zoonosis in humans in the EU (in comparison with all other reported parasitic zoonoses). The total number of reported cases of toxoplasmosis in humans has increased in the EU each year from 2000 to 2004; however, the number of countries reporting cases has also increased during these years, from 10 (in 2000) to 18 (in 2004). On the other hand, over this period, some MS have not reported any cases of toxoplasmosis in humans, even though data about its occurrence have been published elsewhere in scientific communications or papers (Cook *et al.*, 2000; Kemmeren *et al.*, 2006) and in other reports (AFSSA, 2005). Thus, the issue of a complete lack of reporting has to be considered in respect of these countries. There are slight differences in the number of reported cases in comparison with the OIE summary (OIE, 2006), but the overall concordance between the Community Summary Report and the OIE data is good.
- Toxoplasmosis in animals is mostly considered in the differential diagnosis of reproductive disorders of sheep and goats, and is a common condition in these species all over the EU.

Considering the risk factors related to toxoplasmosis covered by the report

- Contact with contaminated soil, or directly with contaminated cat faeces (e.g. in litter trays), and the consumption of undercooked meat and some meat products containing the tissue cysts of *T. gondii*, or food contaminated with cat faeces containing infectious oocysts of the parasite, are the main risk factors known to date.
- Undercooked pork, mutton, beef and game meat and also some meat products including cured meat (Cook *et al.*, 2000; Warnekulasuriya *et al.*, 1998) are among the most likely foods which may be contaminated with *T. gondii* tissue cysts, while vegetables may be contaminated with *T. gondii* oocysts.
- The consumption of raw contaminated goats' milk should also be mentioned as a risk factor, as some cases of toxoplasmosis have occurred and have been reported in the literature following consumption of that food (EFSA, 2006b).

- The consumption of contaminated water should also be mentioned as a risk factor (Bowie *et al.*, 1997).
- Other risk factors, although not yet unequivocally associated with human infection at present, should also be considered, as should the possibility of acquiring *T. gondii* infection from contaminated shellfish which may concentrate oocysts shed in felids' faeces that reach the sea through streams, urban runoff and sewage effluent. Recently, infectious *T. gondii* oocysts have been also recovered from experimentally exposed mussels (Arkush *et al.*, 2003) and oysters (Lindsay *et al.*, 2004), suggesting that infected filter feeders molluscs may be a source of *T. gondii* for marine mammals and possibly for humans. However, this issue will need to be clarified in the future.
- The risk from contaminated pork may increase due to changes in animal husbandry systems that allow pigs more outdoor access.
- In the Community Summary Report, there are no means of relating cases of toxoplasmosis either to a contaminated food source or to an animal or environmental source. However, a recent multicentric survey carried out in the EU (Cook *et al.*, 2000) reported that 30 - 63% of cases could be related to the consumption of contaminated undercooked meat.

Identifying public health priorities

- Concerning public health, immunocompromised individuals and non-immune pregnant women remain as vulnerable groups in the population. In addition to these groups, in the Community Summary Report there is a relevant (5 to 13 times) increase of reported human cases in the 5 to 14-year-old age group compared to the 1 to 4-year-old age group in some MS; this finding is consistent with recent reports that a considerable percentage of children may get post-natal infections with *T. gondii* and develop symptomatic toxoplasmosis (e.g. ocular disease). Other MS have seen relevant (4 to 18 times) increases of reported human cases in the 15 to 24-year-old age group compared to the 5 to 14-year-old age group. A number of cases of the disease in these age groups may also be referred to as acquired toxoplasmosis in immunocompetent patients, which may present with a range of signs, from lymphadenopathy to retinitis and uveitis.
- Recent outbreaks reported in the scientific literature also suggest that immunocompetent individuals may develop clinical toxoplasmosis more often than previously thought (Isaac-Renton *et al.*, 1998).
- Some recent studies even have suggested a link between toxoplasmosis and schizophrenia or similar psychiatric disorders (Torrey and Yolken, 2003) and altered personality traits (Novotná *et al.*, 2005).

- Thus, the concept of subclinical or asymptomatic toxoplasmosis will need to be revisited, most probably in the next few years. As to the burden of congenital and acquired toxoplasmosis on the health status of the whole population, a recent paper (Kemmeren *et al.*, 2006) suggests a very high value which exceeds those of other common foodborne pathogens. This observation may warrant future discussion among policymakers.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Education campaigns, targeting non-immune pregnant women and immuno-compromised individuals, and addressing the risk of acquiring *T. gondii* from food (contaminated undercooked meat, insufficiently washed vegetables) and contaminated cat faeces, are recommended.
- The introduction of primary prevention strategies, addressed to children (5 to 14-year-old age group), where cases of acquired ocular toxoplasmosis may begin to occur, should be considered.

Suggested improvements for monitoring and reporting of toxoplasmosis, *Toxoplasma* and the analyses of the information.

- There is a need to harmonise the procedures for both indirect and direct tests used in animals for the laboratory diagnosis of toxoplasmosis, and for food.
- In the future, compilation and inclusion of data concerning the presumed or confirmed source of infection in animals and humans would allow for better assessment of their relative importance.
- As differences in reporting among MS are evident from the 2004 Community Summary Report, a more efficient flow of data from both medical and veterinary laboratories should be achieved.
- Listing of human toxoplasmosis as a notifiable disease in all MS should be considered. It should be considered also as affording the opportunity for targeted studies in some countries that do not routinely screen pregnant women.

11. TRICHINELLA

The situation in the Community

- In the 2004 Community Summary Report, trichinellosis is presented as the third most prevalent parasitic zoonosis in humans in the EU (in comparison with all other reported parasitic zoonoses). There has been an overall increase of reported human

cases of trichinellosis in the EU in 2004 compared to previous years, partly due to the reporting from new MS where trichinellosis was already present, and sometimes highly prevalent both in humans and in reared animals, mainly pigs, before joining the EU.

- In animals, the finding in Corsica during 2004 of *Trichinella* in outdoor-reared Corsican pigs that were in contact with wildlife was of particular importance, as previously the island had been considered *Trichinella*-free. This has been a reason (among others) for questioning the feasibility of recognising areas as *Trichinella*-free areas *sensu stricto*, as addressed in a recent Opinion of EFSA's Panel on Biological Hazards (EFSA, 2005b).

Considering the risk factors related to trichinellosis covered by the report

- The only risk factor for acquiring trichinellosis for humans is the consumption of contaminated raw or inadequately cooked meat and meat products from an infested animal. The animals at risk of being infested are in particular:
 - game, in particular wild boar and carnivorous hosts such as the bear and fox;
 - backyard pigs and pigs with extensive outdoor access including pigs from organic farms;
 - horses.

Identifying public health priorities

- Trichinellosis remains a public health priority given the severity of the clinical presentation in humans and the possible occurrence of outbreaks of disease involving many people following consumption of undercooked contaminated meat and meat products. Such outbreaks have also occurred in 2004 in the EU, as reported in the "Foodborne outbreaks" section of the Community Summary Report.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Considering the recent cases in humans, and also the animal species (pig and wild boar) whose meat was contaminated, it is considered advisable to provide information to consumers about the risk of *Trichinella* infections following the consumption of contaminated raw or undercooked meat and meat products of the animals at risk of being infested, as mentioned above.

Suggested improvements for monitoring and reporting of trichinellosis, *Trichinella* and the analyses of the information.

- Since *Trichinella* infections in humans and in animals have been notifiable in most MS for many years, the collection of data is more efficient than for other parasitic zoonoses.
- Overall, the monitoring and reporting of *Trichinella* and trichinellosis in the EU appears generally adequate for pigs and horses. Improvements in the reporting of *Trichinella* in wildlife should be considered.
- Only some of the cases of human trichinellosis reported in the “Foodborne outbreaks” section of the 2004 Community Summary Report are related to the consumption of meat from a specified animal host. As such information is useful when identifying trends in the epidemiology of the disease, its inclusion in the Community Summary Report is strongly advised.

12. ANTIMICROBIAL RESISTANCE

The situation in the Community

- Generally, relatively high prevalences of resistance in *Salmonella* Typhimurium, including multi-resistance, regardless of sources (human, food⁹, animal) and country, were observed, although with large variations.
- Resistance prevalences in *Salmonella* Typhimurium were highest for those antimicrobials that commonly have been used, or still are being used, in food animal production (e.g. streptomycin, sulfonamides, ampicillin, tetracycline).
- Several countries reported resistance to nalidixic acid in *Salmonella* Typhimurium from humans, pigs, cattle, and *Gallus gallus*. This is indicative of a developing fluoroquinolone resistance, which was supported by some findings of fluoroquinolone resistance, and as such represents a public health hazard.
- Generally, relatively low prevalences of resistance in *Salmonella* Enteritidis from humans and *Gallus gallus* were reported, a phenomenon that is frequently reported in the literature. However, many countries reported quite high resistance prevalences for nalidixic acid. This is indicative of a developing fluoroquinolone

⁹ the food isolates are not stratified into *S. Typhimurium* and *S. Enteritidis* hampering interpretation and comparison. However, it is assumed that *S. Typhimurium* dominates the cattle and pork isolates.

resistance, which was supported by findings of fluoroquinolone resistance, and so presents a public health hazard.

- Some countries reported gentamicin resistance in *Salmonella* spp., particularly for isolates from “other broiler meat”. Emergence of gentamicin resistance in *Salmonella* spp. presents a public health hazard.
- Generally, high prevalences of resistance among *Campylobacter coli* from poultry and pigs, particularly fluoroquinolone resistance, were observed, although with large country variations. Some countries also reported high prevalences of resistance to erythromycin. Emergence of fluoroquinolone and macrolide resistance in *Campylobacter* spp. presents a public health hazard.
- Several countries reported high resistance prevalences in *C. jejuni* from cattle and poultry, particularly fluoroquinolone resistance.
- Relatively high prevalences of fluoroquinolone resistance among human *Campylobacter* isolates were observed, but again with large country variations.
- Data for indicator *E. coli* from food animals and meat reveal a reservoir of antimicrobial resistance, typically for those antimicrobials that commonly have been used or are still being used in food animal production (e.g. streptomycin, sulfonamides, ampicillin, tetracycline).
- Many countries reported fluoroquinolone resistance in indicator *E. coli* from food animals and meat, especially poultry.

Considering the risk factors related to antimicrobial resistance covered by the report

- As information on the usage of different antimicrobial agents in different countries and for a range of animal species, is not available, it is not possible to identify risk factors, based upon the data as presented. However, as antimicrobial resistance generally is a result of antimicrobial usage, the resistance patterns can be regarded as a reflection of antimicrobial use. At present, the emergence of fluoroquinolone resistance in *Salmonella*, *Campylobacter* and indicator *E. coli* is assumed to be a result of increasing use of fluoroquinolones in animal production, and the country differences observed are considered likely to be a reflection of differences in usage and [control] policies.

Identifying public health priorities

- Antimicrobial resistance is reported to be relatively widespread in *Salmonella*, *Campylobacter* and indicator *E. coli* from intensively reared beef, pork and poultry and their meat. This is likely to be a reflection of antimicrobial usage in the various countries. Implementation of prudent policies concerning the use of antimicrobials

in food animal production is important in order to contain the development and spread of antimicrobial resistance, as the animal and food reservoirs of antimicrobial resistance present a source for spread to humans, either directly *via* zoonotic bacteria or indirectly *via* the spread of antimicrobial resistance genes.

- Fluoroquinolone resistance emerging in *Salmonella* and *Campylobacter* from food animals and meat, presents a public health hazard. Strategies to prevent development of fluoroquinolone resistance are needed.
- Gentamicin resistance emerging in *Salmonella* spp. presents a public health hazard.
- Macrolide resistance emerging in *Campylobacter* spp. presents a public health hazard.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Antimicrobial resistance is a public health hazard that is associated with antimicrobial resistance in food animal production. The data provided show that antimicrobial resistance in *Salmonella* spp., *Campylobacter* spp. and indicator *E. coli* in animal production is generally relatively high, and that resistance to fluoroquinolones is emerging. Therefore, it is recommended that risk communication measures regarding the importance of prudent use of antimicrobials in animals, specifically targeted at farmers and veterinary practitioners, be implemented.
- Mandatory monitoring of antimicrobial usage in animals, preferably stratified by animal species and categories, is recommended as this would enable better epidemiological analyses of occurrences and trends of antimicrobial resistance. This would also provide a basis for conducting risk assessment as well as for implementing and evaluating interventions in this area.
- As resistance to fluoroquinolones in *Salmonella* spp., *Campylobacter* spp. and indicator *E. coli* seems to be emerging in many countries, it is recommended that the enforcement of measures known to prevent further development of such resistance be considered.
- Due to the ban, in place since January 2006, on using antimicrobials as growth promoters, special attention should be given to the risk of an increased use in animals of antimicrobials for the treatment of gastrointestinal infections.

Suggested improvements for monitoring and reporting of antimicrobial resistance and the analyses of the information.

- It is important to provide detailed information on the *Salmonella* serovar for each food isolate. The undifferentiated inclusion of different *Salmonella* serovars in

reports on susceptibility testing, and in the overall reporting and presentation, makes it difficult to interpret data, and even more difficult to make comparisons.

- It is important to differentiate between *C. coli* and *C. jejuni* when presenting data on antimicrobial susceptibility. The undifferentiated inclusion of different *Campylobacter* serovars in reports on susceptibility testing, and in the overall reporting and presentation, makes it difficult to interpret data, and even more difficult to make comparisons.
- For human and food isolates, information on whether the isolates are domestic or imported in origin would make interpretation of susceptibility data more accurate.
- It is important to harmonise the breakpoints for resistance applied when assessing and reporting on antimicrobial resistance. The application of different breakpoints hampers comparison of data.
- The breakpoints used for defining chloramphenicol resistance in *Salmonella* require to be reviewed and perhaps to be modified, as the high resistance percentages observed in many countries may be artificially high.
- In general, harmonisation of sampling, selection of antimicrobials to be included in the susceptibility testing and the methodologies applied, is recommended in order to enable a more reliable and accurate interpretation of data and to allow comparisons to be made between e.g. different MS.

13. FOODBORNE OUTBREAKS

The situation in the Community

- In 2004, 6 883 food and waterborne outbreaks were reported in the Community Summary Report and over 44 000 people were reported to have been affected during these outbreaks in the Community population of 457 million.
- Reporting frequencies varied greatly between countries. This may have been due to different reporting systems, although true differences may also exist, but these are difficult to verify.
- The most frequently reported causative agents for foodborne outbreaks were *Salmonella* spp. (74%) and *Campylobacter* spp. (18%) (combined total of 92% of reported outbreaks, and 77% of outbreak-associated infections). This is also in line with data on the overall reported numbers of human cases of zoonotic disease (due to food and other sources of infections). This therefore may be a true reflection of the importance of these two hazards in relation to the total (as opposed to reported) number of cases. However, it should be kept in mind that these two bacteria are

also those for which most of the local laboratories in EU have analytical methods available and for which there is a general high awareness.

- Most *Salmonella* (78%) associated with foodborne outbreaks were not serotyped. Consequently, the data concerning serotyping may not be representative of the real situation. Of those isolates that were serotyped, *Salmonella* Enteritidis was the most frequently identified serovar (89.5%). Furthermore, it was the only *Salmonella* serovar that was reported to have caused deaths (12 cases). Unfortunately, based on this dataset, the causes behind this cannot be identified. The possible reasons for this may include, for example, a lower infective dose in general (often associated with egg products), more frequent exposure, higher virulence, particular outbreaks which included more vulnerable persons than other outbreaks caused by *Salmonella* in that year. This phenomenon should be closely monitored in future years.
- *Campylobacter* strains originating from reported outbreaks were typed in only 2.7% of outbreaks. *C. jejuni* was identified in 82% of cases for which such data were available.
- Data on sources of outbreaks remain scarce. The sources most frequently associated with *Salmonella* spp. outbreaks were infected eggs and contaminated egg products, broiler meat and bakery products. For *Campylobacter* spp. outbreaks, the most common sources were contaminated broiler meat and contaminated water.
- Foodborne viruses (especially caliciviruses) and pathogenic *Escherichia coli* were quite often reported, although at a lower frequency than *Salmonella* spp. or *Campylobacter* spp.
- Contaminated drinking water has been reported as an important transmission route for outbreaks during 2004 (and was the third most frequently reported source of outbreak infections with respect to total reported cases). During this period it has been associated with large outbreaks involving *Salmonella*, *Campylobacter*, foodborne viruses and *Giardia*.
- Foodborne outbreaks of brucellosis were rarely reported.
- No listeriosis outbreaks were reported. Compared to the situation regarding the overall number of all reported human cases, this indicates that most of the cases are sporadic or the source is difficult to trace back, due to, e.g., the long incubation period.
- As this is the first year during which outbreak data were collated in the Community Summary Report, comparison to previous years is not possible.
- The share of the outbreaks caused by foodborne bacterial intoxications is low (1.2% of all the outbreaks reported). This is likely to be the result of under-reporting, due

to the usually less severe, short duration and self-resolving nature of these intoxications (except in the case of botulism).

Considering the risk factors related to food-borne outbreaks covered by the report

- For *Salmonella* spp., the sources of infection are the same as have already been known for a long time. However, the results highlight the fact that foods other than of animal origin may cause outbreaks.
- With regard to the zoonotic agents covered by the Community Summary Report, the sources most frequently implicated in outbreak-associated infections were contaminated fruit and vegetables, closely followed by eggs and egg products, water, meat and meat products. In this regard, data for pathogenic *E. coli* are not readily extractable from the Community Summary Report. However, if one considers the association with the number of outbreaks, then eggs and egg products, broiler meat, bakery and pig and wild boar meat are the most frequently reported sources.
- Considering location as a risk, for the three agents most frequently reported to be implicated in foodborne outbreaks (*Salmonella* spp., *Campylobacter* spp. and foodborne viruses), the three locations most often reported in the Community Summary report are the home (50.7% of reported outbreaks), restaurants and other catering establishments (31.8%) and institutions (17.6%).

Identifying public health priorities

Relating outbreak data to the criteria defined by Directive 2003/99/EU for setting priorities, *Salmonella* spp. (and particularly *Salmonella* Enteritidis), *Campylobacter* spp., human pathogenic *Escherichia coli*, foodborne viruses and *Trichinella* spp. can be identified as priorities. However, a note of caution needs to be added, recalling that the data presented only concern outbreaks and not sporadic infections, and thus is not necessarily a complete reflection of the trends in the total health burden on the Community population. No data were available to comment upon regarding either the economic consequences or the epidemiological trends of foodborne outbreaks of zoonotic agents.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- As improved measures in the kitchen (both in homes and restaurants) could help decrease the numbers of foodborne outbreaks within the EU, it is recommended to increase public awareness of the health risks due to poor kitchen hygiene and cross-contamination

Suggested improvements for monitoring and reporting of food-borne outbreaks and the analyses of the information.

- Clear definitions and guidelines for reporting suspected/confirmed detection and identification of agents causing foodborne outbreaks and their sources should be developed in order to obtain more complete and comparable data. Also, the term “bacterial toxins” ought to be replaced with a more precise one, e.g. “foodborne bacterial intoxications”.
- On many occasions it is not possible to isolate or identify the etiological agent causing a detected foodborne outbreak. However, in the 2004 Community Summary Report, only 3.2% of all the reported outbreaks were of unknown origin, and 12 out of 21 MS reported identification of the etiological agent in 100% of their outbreaks. It is therefore probable that not all the detected outbreaks are reported in this system. This illustrates under-reporting at the EU level. This fact should be kept in mind when the overall public health burden is evaluated.
- Encouraging the identification of the causative agents and particularly the sources of outbreaks, would add considerably to the significance of the available data.
- A summary of data on failed control measures associated with outbreaks (particularly large outbreaks), e.g. failed pasteurization, failure of adhering to a cold-chain, no re-heating, etc., would be useful. This would give a useful indication of whether or not new control measures are required or that a stricter application of existing ones is or is not required.

14. TUBERCULOSIS DUE TO *MYCOBACTERIUM BOVIS*

***M. bovis* in humans**

The situation in the Community

- The data reported in Table TB1 of the report are incomplete for most MS, which compromises analyses of time and geographical trends of the disease at EU level.
- Only eight MS provided data for the whole period. For those MS, the number of cases remained stable for the entire period, apart from one country. The major concerns are for human cases recorded in officially free of bovine tuberculosis (OTF) MS and not declared as imported. MS can claim OTF even though up to 1% of herds are infected. Moreover, in some MS, where zero cases were reported before 2000, cases of human tuberculosis due to *M. bovis* were reported for each following year up to 2004.

- It is difficult at the moment to use these data to draw conclusions about the tuberculosis (TB) situation in the EU. For example, human case numbers are not useful presented as they are, due to the change in the denominator (number of countries reporting) and it is unclear whether a uniform description and definition of tuberculosis was applied in all MS.
- Data supplied to EFSA by some MS do not accord with data available in the public domain in these MS.
- Most MS do not appear to speciate the mycobacteria isolated from cases of tuberculosis. As the diseases caused by members of the *Mycobacterium tuberculosis* complex (*M. tuberculosis*, *M. bovis*, *M. africanum*, *M. microti* and the newly described *M. canetti* and *M. caprae*), and indeed other organisms also can present in similar ways, it is important to accurately recognise the organisms in order to identify trends and possible emerging problems.

Considering the risk factors related to tuberculosis

- In the Member States, the risk of transmission of *M. bovis* from domestic animals to humans is extremely low because of the public health measures that have been in place for many years to counter the well-known risk factors.
- It is not possible to identify additional risk factors for TB from the data presented in the report.

Identifying public and animal health priorities

- Considering the lack of data collected in relation to TB in some MS, it is difficult to define the public and animal health priorities at the EU level.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- To harmonise the way of reporting and to improve the quality of data on human tuberculosis, even if this means providing more detailed guidelines for MS data collection.
- To guarantee the identification of the strains involved in the reported human tuberculosis cases by implementation through MS public health legislation, of the use of standard diagnostic methods carried out by an accredited national reference laboratory.
- Improved communication combined with linkage to existing databases in MS would assist with improving data quality and capture.

- Analyses are currently conducted based on data aggregated at national level. This is too general to allow for identification of definitive actions for consumer protection

Suggested improvements for monitoring and reporting of tuberculosis and tuberculosis infections and the analyses of the information.

- The human tuberculosis section of the report should contain an analysis of the source of infection in human cases, and include other risk factors such as HIV status or occupational exposure. The analysis of *Mycobacterium* spp. involved in human cases of tuberculosis in the different MS should be improved.
- Whenever possible, presentation of case numbers should be avoided, or they should always be accompanied by incidence rate calculations so that data can be compared between countries and between years. The diagnostic approaches for determining TB status in humans should always involve speciation of the isolates, particularly differentiation between *Mycobacterium tuberculosis* and *M. bovis*, and genetic typing if necessary.
- Statistical analysis should be performed to accurately identify changing trends in incidence and prevalence.
- The current geographical resolution of the reports, consistency of data collection and specifics of disease control programmes are insufficient to allow meaningful interpretation. To be able to use these reports to define actions for consumer protection, the reports need be based on a higher geographical resolution which should, at the very least, be at regional (or an analogous geographical unit) level. Differences between data sources and programmes need to be clearly documented.
- It needs to be clearly stated what the objectives of these reports are. It should be emphasised that they have a descriptive purpose, and that more complex analyses of the spatial and temporal patterns cannot be undertaken with the current data.
- It would be useful to have additional data on the HIV status of the patients as this virus has been linked with increased susceptibility to *M. bovis*.
- Molecular epidemiology (genotyping of isolates) and more comprehensive bacteriological analysis (see comments above) should be conducted to provide a fuller picture of what is happening and perhaps reveal new risk factors and emerging trends in disease patterns.

Tuberculosis due to *M. bovis* in animals

Cattle - Officially Tuberculosis Free Member States (OTF)

The situation in the Community

- As stated in the report, bovine tuberculosis was detected in 51 cattle herds during the year 2004 in two OTF MS. One of these MS reported human cases of *M. bovis* tuberculosis each year in the last four years (Table TB1), but reported a 100% percentage of OTF herds. For the other MS, there are no data about human tuberculosis caused by *M. bovis* for the last five years, despite the disease being notifiable in humans. The last record in this country (1999) reported 22 human cases, a high number if compared with other MS. Moreover, this MS reported 88.2% of OTF herds, and is the only OTF MS that reported a percentage of OTF herds below 100%. Moreover, no data are provided on routine test controls for five OTF MS. However, in four of these MS, human cases of tuberculosis due to *M. bovis* were reported in the last six years.

Considering the risk factors related to tuberculosis

- No new risk factors can be identified from the data presented for OTF MS. In the case of bovine tuberculosis, past experience shows that drinking raw milk from infected animals and occupational contacts should both be regarded as risk factors for transmission to humans, although companion animals can provide a less common indirect route.

Identifying public and animal health priorities

- Monitoring of TB due to *M. bovis* is undertaken in all MS, but the report appears to contain gaps in the data that impair detailed analysis. Reasons for the gaps in the data were not recorded. The epidemiological evidence in relation to the tuberculosis situation generated by the existing surveillance reporting systems is of varying quality and for this reason no public and animal health priorities can be defined.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Tuberculosis in cattle might be regarded as a re-emerging disease in some MS.
- Current legislation allows MS to claim OTF status even though up to 1% of herds may be infected with *M. bovis*. In fact, the legislation allows for great relaxation of testing, depending on declared duration and level of OTF status *e.g.* a test interval up to four years or even no testing provided certain conditions are fulfilled. According to the EFSA Opinion on the public and animal health risks associated with the adoption of a visual inspection system in veal calves (EFSA, 2006c), this does not provide an adequate safeguard for animal or public health.

Suggested improvements for monitoring and reporting of tuberculosis and tuberculosis infections and the analyses of the information.

- See comments in preceding sections.

Cattle - Non-OTF Member States

The situation in the Community

- Only six MS have been selected for graphical representation of temporal trends of the cattle herds that tested tuberculin positive (2000-2004 period, Table TB2) and cattle herds that were infected with *M. bovis* (1999-2004 period, Table TB3). It is assumed that they were chosen because they were the MS with the highest tuberculosis prevalence.
- If one calculates the percentage of cattle actually tested in 2004 (Table TB2), only two MS have a percentage above 95%. One MS is below 75% of controlled herds, two MS below 60% and one is below 40% of controlled herds. As a consequence of the different levels of control, it is reasonable to assume that the presented data for routine tuberculin testing have different degrees of uncertainty associated and so, may not represent the actual situation for the year 2004 in some MS. In table TB2, for some MS, the number of infected herds at year end (2004) is higher than the number of herds found tuberculin positive during the year. This may suggest either a deficiency in the reporting system or a difficulty for veterinary services in the application of control measures in infected herds. Regarding the number of OTF herds (Table TB2), 10 out of the 15 non-OTF MS show a percentage equal to or above 95%. This should be regarded as a good situation, except for those MS that show a low percentage of controlled herds tested (see above). Moreover, in two MS this percentage is below 70%.

Considering the risk factors related to tuberculosis

- See considerations made in the previous chapter. There is no clear relationship between the number of human cases and the current number of infected herds due to the temporal and geographic dislocation of these two events.

Identifying public and animal health priorities

- For some MS the description and results of the follow-up of the infected herds should be better explained in order to better understand the reasons for the discrepancy between the number of infected herds at year end and the number of herds found tuberculin positive during the year.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Taking into account the epidemiological situation of each case, it is recommended to increase the percentage of testing of herds covered by the eradication programme in order to improve the situation.
- Non-OTF MS with lower percentages of OTF herds should strengthen their efforts to achieve OTF status and should make the achievement of OTF status a firm priority.

Suggested improvements for monitoring and reporting of tuberculosis and tuberculosis infections and the analyses of the information.

- The report should contain data from the previous five years that would allow a comparison to be made between the percentages of herds controlled and the percentage of OTF herds, on the overall number of herds under control.
- There are differences between the number of herds under control and the number of herds actually tested and that should be explained, as well as the differences between the number of tuberculin positive herds and the number of herds declared as infected at the end of the year.
- The differences between the herd testing schemes need to be pointed out, as there are likely to be differences between countries and also within countries due to annual, two or three year testing. It also needs to be clear how the infection status of the herd was determined. Currently it cannot be assumed that all tuberculin test reactors or lesioned animals detected at slaughter were confirmed by culture +/- histopathology.

Tuberculosis due to *Mycobacterium bovis* in other animals

The situation in the Community

- Although *M. bovis* is mainly recognised due to its occurrence in cattle and humans, this organism has a very wide host range. Not all species that are susceptible to these infections are reported, especially wildlife.
- *M. bovis* has been isolated from domestic animals other than cattle (sheep, goats, pigs, farmed deer and cats) and in several wild species (deer, wild boar, badger and several others).
- Nevertheless, since any surveillance, if it is performed at all, is mainly by post-mortem meat inspection, and since the notification of the disease in these species is not compulsory in all MS, the figures may not represent the real distribution of the disease within the Community.

Considering the risk factors related to tuberculosis

- The isolation of *M. bovis* from goats, and perhaps sheep, indicates a role that these species play in maintaining tuberculosis infection in herds living in close contact, thus jeopardizing the efforts of veterinary services in the follow-up of infected herds.
- The role of wild mammal species in spreading the infection, both to domestic animals and humans, is still unclear.

Identifying public and animal health priorities

- From the animal health viewpoint, the presence of tuberculosis in animals other than cattle should be taken into consideration. The real role that TB in wildlife and domestic animals plays on human TB should be evaluated.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- The role of tuberculosis in other domestic animals (sheep, goats, pigs, farmed deer) in human infection should be investigated.

Suggested improvements for monitoring and reporting of tuberculosis and tuberculosis infections and the analyses of the information.

- Tuberculosis in all domestic animals (e.g. sheep, goats, pigs, companion animals) and wildlife should be notifiable in all MS. Appropriate surveillance plans should be implemented in MS, mainly in OTF MS, to avoid the re-emergence of the disease due to domestic animals other than cattle.
- Data from all species that are susceptible to these infections, including wildlife in particular, should be reported.

15. BRUCELLA

Brucellosis in humans

The situation in the Community

- During the six years covered by the report, the overall EU situation relating to human brucellosis improved. The number of human cases decreased during this period by 66%. However in some countries the data collected describe a wide variation in the number of cases from year to year. This might suggest the existence of some deficiencies in the data reporting system. Despite the efforts made, the

annual incidence of human brucellosis in some countries is still more than one case per 100,000 inhabitants.

Considering the risk factors related to brucellosis

- The report seems to confirm what has been reported by several authors, *i.e.* that *B. melitensis* is primarily responsible for human brucellosis cases. However data are not collected in some MS about strains isolated in human cases of brucellosis.

Identifying public and animal health priorities

- Since the report suggests that Officially *Brucella* free (OBF) and Officially *Brucella melitensis* free (OBmF) MS have the lowest incidence of human brucellosis, non-OBF/OBmF MS should consider the pathway that is deemed most adequate under the given epidemiological situation to achieve the OBF status as a priority. They should ensure that sufficient management structures, resources and expertise are available for this purpose.
- For some OBF/OBmF countries, Table BR1 of the Report shows that not all human cases acquired the infection abroad. Therefore it cannot be ruled out that the disease may not have been eradicated from those countries or that case definitions and/or epidemiological investigations are inadequate.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- It is recommended that all strains isolated from humans and/or animals should be sent to a national reference centre for further confirmation and typing and that standard methods are used. In addition, each human (and animal) case should be thoroughly investigated to identify the source of infection, whether it be a local or imported source.

Suggested improvements for monitoring and reporting of brucellosis and *Brucella* infections and the analyses of the information.

- The human brucellosis section of the report should contain an analysis of the source of infection in human cases of brucellosis. This should take into consideration the incidence of the disease related to professional exposure and the incidence of the disease related to food consumption. In addition, it should contain an analysis of *Brucella* strains involved in the human cases of brucellosis in the different MS. Such an analysis would help to identify the trends of the different risk factors associated with human brucellosis in the different MS. In all cases, investigations should be conducted with the aim of identifying the source of infection.

Brucella in food

The situation in the Community

- In Table BR2 of the Report, the majority of controls for *Brucella* are carried out on raw milk. The large differences in the numbers submitted by MS, could be related to a lack of reporting of *Brucella* in dairy products. Moreover, the low number of milk samples tested in some MS that provided data, suggest that they have been collected for brucellosis diagnosis purposes in individual animals and not for monitoring the presence of *Brucella* in milk intended for human consumption. This circumstance can lead to biased conclusions on the level of contamination of milk and, therefore, on the risks for consumers.

Considering the risk factors related to brucellosis

- The apparent lack of data collected does not allow consistent conclusions to be drawn on the contamination of food. In particular, they do not allow for an estimate to be made on the presence of *Brucella spp.* in cheese and other dairy products. In any case, the tested sample sizes provide low confidence levels for the detection of the low frequency of contamination expected in dairy products.

Identifying public and animal health priorities

- Those MS that have not provided data should give information on the frequency of food-borne human brucellosis in cases where high values are found and details of the controls carried out on the milk intended for human consumption, and on dairy products prepared from non-pasteurised milk, should be provided. The public should be informed of any risks from homemade or otherwise uncontrolled dairy products.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- It is recommended to implement surveillance systems for identification of risk factors related to food, *e.g.* *Brucella* infected flocks, the sources of raw milk and cheeses made from un-pasteurised milk.
- Considering the given epidemiological situation, each MS should adopt the most adequate option for risk mitigation, which should aim at control of brucellosis in farm animals while at the same time ensuring a high level of consumer protection.

Suggested improvements for monitoring and reporting of brucellosis and *Brucella* infections and the analyses of the information.

- According to the availability of data, the report should expand on this section, focusing mainly on dairy products and, amongst these, on those listed in the

previous point. Case investigations should be conducted in all situations with the goal of identifying the source of infection.

Brucella in animals

Cattle

The situation in the Community

- The overall occurrence of brucellosis among cattle in the EU-15 MS remained approximately at the same level as in 2003 (Table BR5). Moreover for most of selected non-OBF EU-15 MS, there is no decreasing trend in the proportion of positive herds for the last three years reported.
- Considering the MS that requested Community financial aid for their programmes for the eradication of brucellosis for 2004 (Commission Decisions 2004/923/EC, 2003/743/EC and 2003/849/EC), only two MS seemed to test all the herds under control.

Considering the risk factors related to bovine brucellosis

- The apparent low percentage of herds under control being tested may lead to an underestimation of the prevalence of the disease.
- In cattle brucellosis, contact with abortions and professional contact at slaughterhouses should be regarded as risk factors for the transmission to humans. Nevertheless, data on abortions in general, and on abortions due to brucellosis in particular, are not available, thus limiting the possibilities of assessing the importance of this risk factor.
- The lack of surveillance systems for the detection of *Brucella* spp. in dairy products may hinder the assessment of the risk that these products pose to consumers.

Identifying public and animal health priorities

- A low level of testing of herds covered by the programme in the brucellosis eradication campaign is a risk factor.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Increasing the percentage of herds which are covered by the programme that are tested, will improve the reliability of the eradication/ control programme.
- Non-OBF MS should make an assessment of the reliability of their surveillance system on abortions.

Suggested improvements for monitoring and reporting of brucellosis and *Brucella* infections and the analyses of the information.

- For non-OBF MS, the report should contain a comparison, covering the previous five years, of the percentages of herds controlled, and the percentage of free-OBF herds within the overall number of herds under control. However, it is important to consider the specific situation of each country and, where possible and necessary, even epidemiological situations within one MS.
- A report on the number of abortions in cattle and an analysis on the number of abortions due to brucellosis should be added.

Sheep and goats

The situation in the Community

- In three selected brucellosis high-prevalence non-OBmF MS, the proportion of sheep and goats flocks infected has decreased to less than 5% during the five years reported (Figure BR8). This is in line with the decrease observed in the number of human cases, confirming the direct relationship between human brucellosis and brucellosis in sheep and goats.
- Of the MS with an approved programme for year 2004, only two MS test all flocks to be controlled. In the other MS, the overall percentage of tested flocks is below 50%.

Considering the risk factors related to sheep and goats brucellosis

- The apparent low percentage of flocks under control being tested may lead to an underestimation of the prevalence of the disease.
- The dairy products made from sheep and goats should be regarded as the main risk factor for the transmission of brucellosis to humans. In particular, controls should be focused on the same points for cattle and on raw milk cheese made from non-pasteurised milk.
- In common with the case of bovine brucellosis, the lack of surveillance systems for the detection of *Brucella* spp. in dairy products may hinder the assessment of the risk that these products pose to consumers.

Identifying public and animal health priorities

- A low level of testing of flocks covered by the programme in the brucellosis eradication campaign is a risk factor.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Increasing the percentage of flocks covered by the programme that are tested, will improve the reliability of the eradication/ control programme.
- Human cases attributed to consumption of products from sheep or goats should be investigated including the bacteriological analysis of the food implicated.

Suggested improvements for monitoring and reporting of brucellosis and *Brucella* infections and the analyses of the information.

- For non-OBmF or non-free MS, the report should contain a comparison, covering the previous five years, of the percentages of flocks controlled, and the percentage of free-OBmF flocks, and on the overall number of flocks under control. Figures that illustrate the status of countries (*e.g.* BR6) must be checked carefully against the tabulated results to avoid inconsistencies.
- There are differences between the number of flocks under control and the number of flocks actually tested that should be explained, as well as the differences between the numbers of positive flocks and the numbers of flocks declared as infected at the end of the year.
- Moreover, data on the isolation of *Brucella* in dairy products should be reported and analysed.

Pigs and other animals

The situation in the Community

- Porcine brucellosis is a relatively rare disease in the EU, even though *B. suis*, has been isolated in several MS over the last few years. The role of wildlife in the transmission of brucellosis should be investigated but very few MS have worked on this issue in recent years.

Considering the risk factors related to brucellosis

- Porcine brucellosis is a relatively rare disease in the EU and the probability of transmission to humans is lower when compared with ovine and bovine brucellosis (*B. melitensis* and *B. abortus*). As brucellosis in sheep and goats is the major source of infection for humans, followed by bovine brucellosis, the priority given to them is higher in terms of public and animal health.
- Nevertheless, attention should be given to brucellosis in wild species, as the potential for contact with *B. suis* can be high, particularly for people handling and/or slaughtering game animals.

Identifying public and animal health priorities

- The high prevalence of the disease found in wildlife in some MS could suggest the need for a wider surveillance of wild species. The species to be considered should include at least wild boar, deer and other wild ruminants as well as and hares (Biovar 2 is endemic in wild hare populations in Northern and Central Europe).

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- Those MS that do not provide data on brucellosis in wildlife could implement, at the very least, a passive surveillance system to monitor wild boar, hare, deer, other wild ruminants and foxes.

Suggested improvements for monitoring and reporting of brucellosis and *Brucella* infections and the analyses of the information.

- MS could put in place appropriate surveillance plans for the monitoring of the presence of *B. suis*, particularly in pigs and some wild game animals. In order to evaluate the role of wildlife, data should be produced, reported, and analysed.

16. RABIES

The situation in the Community

- Sylvatic rabies was detected in wildlife in nine MS in 2004 with a clear gradient of increasing occurrence in Eastern Europe. In the Baltic States a significant increase in the density of foxes and racoon dogs has been observed over the last few years and this has been paralleled by an increased number of reported rabies cases that peaked in 2003 despite previous or ongoing oral vaccination of wildlife. Efficient disease control in wildlife by oral vaccination is complicated by the occurrence of sylvatic rabies in neighbouring third countries. Due to possible under-reporting and lack of representation, estimates on incidence and prevalence based on reported figures should be interpreted with caution.
- The widespread occurrence in some Eastern European countries within and outside the EU (e.g. Baltic States, Poland, Slovakia, Hungary, Romania, Croatia and Belarus) is followed by an occasional spill-over into domestic animals (primarily dogs, cats and cattle). Compulsory vaccination of dogs (and sometimes cats and cattle) against rabies is implemented in some countries but an insufficient level of vaccination coverage and a relatively high number of stray dogs and cats may explain the continued occurrence in these species. Although rabies in domestic animals constitutes a risk to humans, dogs and cats are considered dead-end hosts which do not contribute to the maintenance of rabies in wildlife.

Considering the risk factors related to rabies

- Rabies continues to pose a serious human health risk in areas with sylvatic rabies. However, no human cases of rabies originating from exposure to rabid animals within the EU were recorded in 2004. This is mainly due to a high level of awareness in endemic areas combined with efficient post-exposure prophylaxis (PEP) after contact with rabid animals. No systematic monitoring of the number of suspect contacts with rabid animals and PEP exist, but the figures from Estonia may serve as an indicator. In Estonia 3 763 people were referred for medical aid due to animals injures and 1 216 of these (32%) received PEP.
- In some endemic areas, cattle account for a significant number of cases, therefore consumption of raw milk could be considered a potential risk factor although direct evidence for transmission by milk is lacking.
- Two human cases of travel-related exposure to rabies in third countries were recorded in EU in 2004.

Recommending, when appropriate, actions to be taken to improve the protection of public health in the Community

- In Europe, control of rabies in wildlife is primarily mediated through infection control in the major reservoir species (fox, racoon and dog) by oral immunisation. Since endemic areas may span several MS and third countries, successful control relies heavily on cross-border cooperation and implementation of vaccination plans. It is highly recommended that vaccination plans should follow the guidelines and recommendations set out in “Report on the oral vaccination of foxes against rabies” from the Scientific Committee on Animal Health and Animal Welfare (SCAHAW, 2002) and be coordinated at Community level in terms of strategic planning, regulatory and financial support.
- In relation to the peak observed in 2003 of sylvatic rabies cases, one important issue is a country’s preparedness to implement emergency vaccination campaigns when a new focus of rabies outside the vaccination area is found. In practice it is not possible to organise emergency ring vaccination if a stock of efficient rabies vaccine is not available. Good cooperation between MS and neighbouring countries in this issue would be advisable.
- Passive surveillance of rabies should be based on the diagnostic examination of animals showing clinical symptoms, abnormal behaviour or found dead. This should be done throughout the entire territory of the country concerned.
- Numbers derived from passive surveillance should be separated from the numbers of animals shot for the purpose of oral vaccination surveillance. The number of animals tested and the number of animals found positive should be included.

- Information on the efficacy of the oral vaccination programmes at national and cross-border level should be included (percentage of seroconversion in vaccinated foxes and a percentage of tetracycline positive foxes).
- Prophylactic vaccination of domestic animals against rabies should be harmonised across the EU in relation to the epidemiological situation of wildlife rabies (sylvatic and bat).
- Each country should provide information regarding the surface of areas that are vaccinated by oral route and information about these programmes of oral vaccination (number of vaccinations per year and density of baits).

Suggested improvements for monitoring and reporting of rabies and the analyses of the information.

- It is proposed that country reports should use the following template:
 - Rabies in wildlife
 - Rabies in domestic animals
 - Rabies in humans
- The Community summary report should follow the same format.
- It was noted by the working group members on the rabies mandate (EFSA Q-2006-014) that there are some discrepancies between the data presented in the EFSA zoonoses report and the data published by WHO (Rabies bulletin Europe).

Rabies in animals

- The description of rabies in wildlife should make a clear distinction between sylvatic and bat rabies and include epidemiology, surveillance and oral vaccination programmes where applicable.
- Guidelines should be drafted for passive surveillance of dead bats.
- The description of rabies in domestic animals should include notification, estimates of animal population size, number of cases investigated and number of cases found to be positive. Implementation of prophylactic vaccination in domestic species should be described, including documented or estimated indicators of vaccination coverage in each species.
- An estimation of the number of dogs and cats in a country should be included as well as a description of the methods used for the estimation.



- An estimation of the number of stray dogs and cats (no means of identifying the owner) in a country should be included
- Systems in place for the registration and identification of dogs and cats should be described as well as data on the number of pets registered, and the percentage of pets vaccinated against rabies should also be included.

Rabies in Humans

- The description of rabies in humans should include notification, number of suspected cases of exposure, number of post-exposure immunoprophylaxis treatments and number of confirmed cases, if any, including also an indication of the animal species involved.

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