

Current Food Safety Initiatives in the European Union.



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Summary

Current food safety initiatives in pigs are mainly focused on *Salmonella* surveillance and control. Within the European Union the current system of reporting by the member states is enhanced to cover not only *Salmonella* in the near future. Also the establishment of a Food Safety Authority is pressing forward. Government and / or private initiatives with regard to *Salmonella* in pigs are described for Sweden, Denmark, Germany, The Netherlands, France, the United Kingdom, Ireland, Austria and Norway.

The overview demonstrates that there are large differences in the surveillance and control programs between countries within the EU and may even exist within countries between different parts of the country. The EU is still far away from a uniform surveillance and control program for *Salmonella* in pigs with harmonized sampling and test procedures. Comparison of programs is therefore laborious and comparison of results very difficult.

Introduction

In order to be able to update you on specific points of food safety initiatives in the European Union it is necessary to limit the scope to this presentation. First of all this presentation will be limited to swine and pork, so BSE will not be an issue. Secondly the field of food safety hazards which will be discussed will be limited to microbiological hazards. Within food safety three areas can be distinguished: physical hazards, chemical hazards and microbiological hazards. Physical hazards are for instance broken off injection needles which can be found mainly in the neck region of a pig carcasses. Also injectable ID-transponders are considered as an important physical hazard which has hampered the wide spread use of injectable ID-transponders in the pig industry. However, these are well known hazards which have not lead to recent changes in their risk management. Chemical hazards are for example residues from antibiotics which are an essential part of pig production. Legally required withholding periods for antibiotics before slaughter augmented by industry initiatives for even longer withholding periods as part of Integrated Chain Management systems (IKB, The Netherlands(Harbers et al., 1992)) prevent residues from showing up in meat at slaughter. Monitoring of random and suspected animal during the slaughter process by the official veterinary inspection (FSIS, USA; RVV, NL) enforces these rules. Incidents with chemical contamination as for example the dioxin crisis in Belgium and The Netherlands in chickens and pigs are also part of this group of chemical hazards (van Larebeke et al., 2001; Bernard et al., 2002). However, prevention and monitoring of this kind of hazards falls well within the range of HACCP-systems which are widely implemented in the Dutch pig feed production industry and in an increasing number of slaughterhouses. Because of the generic nature of

these systems implemented world wide I will not discuss them as specific EU food safety initiatives. Which leaves the third category: the microbiological hazards in which we can distinguish two categories: the parasites and bacteria. The parasites are *Trichinella spiralis* and *Toxoplasma gondii*. Occurrence of *T. spiralis* is extensively monitored as part of an EU directive and has not occurred in pigs in, for example, Denmark since the 1930's. Prevalences of *T. gondii* in pigs are extremely low, probably as a result of current husbandry systems with total confinement (Berends et al., 1991; Nielsen and Wegener, 1997). Therefore I will not discuss these infections. Bacteriological hazards are *Yersinia enterocolitica*, (thermophilic) *Campylobacter coli / jejuni*, Shiga like toxin producing *Escherichia coli* (STEC) and *Salmonella*.

Yersinia enterocolitica is a common bacterium in pigs (Davies, 1999) and is considered the only source of human infections. Estimates of the number of infected people vary between countries (Nielsen and Wegener, 1997)(40 – 50 cases in NL, 16,000,000 inhabitants, personal communication RIVM, NL) and the number of infections is declining. Although considered the Achilles heel of the pig industry there are to my knowledge no intervention programs specifically aimed at *Yersinia*. With regard to *Campylobacter* there is still controversy about the role of pork as a source of human campylobacteriosis. Although it is considered possible to establish *Campylobacter*-free pig production systems (Weijtens et al., 1993; Weijtens et al., 2000)there are to my knowledge no such initiatives. With regard to STEC pork is not considered to be a source of human infection (Nielsen and Wegener, 1997; van der Zee et al., 2001). Which leaves *Salmonella*. *Salmonella* is considered by the WHO as a major source of human foodborne infections (Gerigk, 1992). Also in the latest EU initiative to improve food safety as outlined in the 'White paper on food safety' *Salmonella* is considered one of the major issues (Commission of the European Communities, 2000). In The Netherlands about 2,500 reported cases of salmonellosis occur every year (15.6 cases / 100,000 inhabitants)(RIVM, NL) of which about 15 to 25% are considered to originate from contaminated pork (Berends et al., 1998; van Pelt et al., 1999). What we see is that in a number of European countries current food safety initiatives are focussed on the control of *Salmonella* in pork. Therefore, I will use the rest of this presentation to discuss the initiatives in Europe in general and after that in individual countries.

EUROPEAN UNION

In the 'White paper on food safety' the main objectives for food safety within the EU are laid down:

- To guarantee a high level of food safety;
- To put the primary responsibility for food safety with the producers such as feed manufacturers, farmers and the food industry;
- To establish an integrated chain policy "from farm to fork";
- To enhance traceability;
- To enhance transparency;
- To base this on risk analysis, however with the possibility to consider precautionary principles and other factors

Also the establishment of a Food Safety Authority is initiated (COM(2000) 716 final, 18-11-2000).

New proposals have been made by the Committee (COM(2001) 452 final) which are meant to replace EU regulation 92/117/EU dealing with the monitoring of *Salmonella* and the intervention in *Salmonella* in poultry. These new proposals aim to monitor all zoonotic pathogens selected by the Scientific Committee for Veterinary Affairs as a coordinated action between member states. No longer are only certain *Salmonella* serotypes involved but any zoonotic pathogen can be implemented if the situation requires so. Monitoring and interventions are targeted at primary production units (farms) but can be extended in the rest of the food production chain. Monitoring can also include relevant antimicrobial resistance patterns. Among the first targeted pathogens are *Salmonella*, *Campylobacter*, Verotoxin-producing *E. coli* (VTEC), *Listeria monocytogenes*, *Cryptosporidium* spp. *Echinococcus multilocularis* / *granulosus* and *Trichinella spiralis*, *Mycobacterium bovis* and *Brucella* spp. Harmonisation of data collection should enable risk assessment for zoonotic pathogens. Target populations, sampling schemes, test protocols and reporting frequencies and protocols will be defined. Monitoring in pigs will be aimed at finishers ante mortem. (Whether this means that collection of materials at slaughterhouses (blood, meat) for serological tests is not valid any more is not clear to me.)

The second part of these new proposals give guidelines for the establishment of national intervention programs for zoonotic pathogens. Up until now the primary aim was to have accepted intervention programs for breeding pig herds by the end of 2006. Intervention programs can be set up by the national governments together with relevant industries which have to be submitted to and accepted by the EU. Specific guidelines will be given with regard to the interventions which can be used. These national programs should contain:

- Regulations for tracing zoonosis outbreaks and zoonotic pathogens
- Lay down regulations for food producers
- Establish the intervention methods which are to be used
- Create the possibility to evaluate the progress of the program and make changes if necessary.

These programs should cover the production of feeds, the primary production and the processing and preparation of food of animal origin.

Finally regulations with regard to trade within the EU and third countries will be established. These include that batches of animals and brood eggs are to be tested according to the national zoonosis intervention program before transport. Also third countries wanting to export animals or brood eggs to the EU have to have a national zoonosis intervention program which is in accordance with the EU regulations for EU nations.

SWEDEN

Due to the low incidences of *Salmonella* infections in animals, the control and surveillance programs which were instituted in Sweden is generally held up to be the gold standard on which other countries base their monitoring systems.

General outline

The *Salmonella* control program in swine was instituted more than 30 years ago and has the following requirements.

1/ Testing of all sanitary slaughtered animals as well as any suspect animal at normal slaughter for the presence of *Salmonella*.

2/ General surveillance by clinical checks made by practising and animal health veterinarians.

3/ Control of imported and domestically produced feed.

If *Salmonella* is found infected herds are put under restrictions. The restrictions are lifted when the herd is considered free from infection. Compensation is paid to herd owners for costs due to restrictions on infected farms. As swine, for all practical reasons, are free from *Salmonella*, and as infected herds are put under restrictions it is not considered necessary to create a system for testing all herds.

On farm control

Nucleus and multiplier herds

Depending on herd size 10-55 faeces samples are collected at each farm annually which enables a prevalence of 5% positive animals to be detected (with 95% confidence).

Herds at risk

Sampling is similar to the above.

Herds not covered by slaughter house base control program

All sows are sampled twice a year in herds with 50 sows or less. In larger herds a sufficient number to detect a prevalence of 5% *Salmonella* with 95% confidence are sampled twice a year. Pooled faeces are taken from each pen with growers and finishers. In fattening herds corresponding numbers of samples are taken. The herd is considered as *Salmonella* negative if the 2 successive samplings gave negative results.

Importation

The number of imported animals is very limited. Practically all imported animals have to stay in quarantine stations for varying periods. Therefore, the need for specific *Salmonella* importation regulations has been limited. However, if importation of animals increase specific regulations will be put in place.

Quarantine

Animals have to be isolated on arrival and tested for *Salmonella* with negative results before contact with other animals is allowed. The animals are sampled twice with at least 2 weeks between each sample.

Feed control

Feed producers delivering feed to swine herds have to conform with general rules and hygienic requirements as laid down in the feed legislation. However, there are no requirements for heating of such feed.

Movement control

Control is not considered necessary unless herds are put under restrictions.

Hygienic measures

There is no specific program for hygienic measures as related to *Salmonella* in conventional herds. Rules only exist in herds found infected with *Salmonella*. Hygienic and clinical control is the responsibility of the practising and animal health veterinarians. If conditions might affect animal welfare, the authorities have to be notified.

Abattoirs

The sampling frame is all fattening pigs slaughtered in Sweden during 1 year and will detect a prevalence of *Salmonella* of 0.1% with 95% confidence limits. In 1994, a total of 7697 samples were examined. Sampling is performed on all working days and collected evenly throughout the day and the prevalence of *Salmonella* was 0.1%. In addition, approximately 6000 pigs are slaughtered under special conditions and *Salmonella* isolation is always performed.

Measures if *Salmonella* is isolated

Rules governing measures to be taken if *Salmonella* is found in herds are detailed in: LFSS 1982: 39. Any isolation of *Salmonella* in a herd has to be reported to the authorities and the isolate sent to the National Veterinary Institute for serotyping. The herd is put under restrictions and investigated. Restrictions include access limited to the veterinarians and officials, prevention of the selling and buying of animals and certain other hygienic measures. Restrictions are not lifted until the herd is found free of infection. Stricter rules apply when *S. Typhimurium* is involved.

Animal owners may be compensated for the measures laid down and as a rule up to 70% of the cost may be reimbursed.

Follow up studies

In order to control the efficiency of the *Salmonella* control program slaughter house surveys are performed.

DENMARK

((Nielsen et al., 2001), Jan Dahl personal communication)

The Danish *Salmonella* Surveillance and Control Program for pigs operates at all stages of the production chain and has been applied nationally since 1995. An ELISA technique which can detect 90-95% of the *Salmonella* serogroups in pigs is used for monitoring and in any one year ~800,000 are analyzed and results are available monthly. Based on the results of the previous 3 months the herds are classified into 3 categories:

Level 1. Herd with no or very low *Salmonella* prevalence (95% of herds).

Level 2. Herds with a higher *Salmonella* prevalence (3.1% of herds).

Level 3. A higher proportion of reactors (1.3% of herds).

Animal feeds

The control with feedstuffs continues unchanged. Compound feedstuffs are heat treated at 81°C to eliminate *Salmonella*. Mandatory testing is done in all plants producing animal feed. The testing requires microbiological analysis of compound feedstuffs, as well as

samples from critical control points during production. (In the year 2000 only 0.3% of samples were *Salmonella* positive).

Breeding herds

Each month, 10 serum samples from ready to ship breeding gilts in all herds are tested for *Salmonella* antibodies. Each month the average OD% is calculated. Based on the results of the last 3 months a *Salmonella* index is calculated by weighing the results by 0.6:0.3:0.1, starting with the most recent results. If the index exceeds 5, faeces from pens are collected and cultured for *Salmonella*. A sales ban is no longer imposed on breeding pigs when the index is over 15 as used to be. Buyers should decide for themselves if they want to risk bringing in infection with new gilts.

Multiplying herds

If a sow herd sells weaners to a *Salmonella* level 2 or 3 finishing herd, pen samples must be examined for *Salmonella*.

Slaughter pigs herds

The classification scheme for slaughter pigs:

- ? The sampling frame will be simplified into 60, 75, or 100 samples per year depending on the annual kill, respectively ≤ 2000 finishers, 2001 – 5000 finishers and > 5000 finishers.
- ? Herds with an annual kill of less than 200 pigs are not sampled, which leaves 1.6% of slaughter pigs outside the scheme.
- ? The ELISA cut off for evaluating individual meat-juice samples is OD% 20.
- ? The serological *Salmonella* index is calculated by taking the weighed mean (weighed 0.6:0.2:0.2) of the previous 3 months percentage positive serological samples.
- ? A herd will be assigned to one of three levels monthly. The limit between level 1 and level 2 is set at index 40, and between level 2 and 3 at index 70.

New Financial Penalties

Level 1 - no penalty, level 2-2% of the value of the carcass, and level 3-4% of the carcass value.

Level 2 and 3 herds

The veterinary authorities require that faecal samples are taken in order to identify the *Salmonella* serotype. Herds assigned to level 3 have to be slaughtered under special hygienic precautions. This is done at specially designated slaughterhouses at the end of the day to prevent cross-contamination with other carcasses. Carcasses from level 3 herds also have to be heat-treated or subject to other special treatment.

New surveillance method for *Salmonella* in fresh pork

Since 1993 fresh pork has been surveyed for *Salmonella* sp. at the slaughterhouses every month. A new method of *Salmonella* testing on carcasses was introduced by January 1st 2001; 5 carcasses per slaughter day are swabbed at 3 defined areas (the sternum, the hind leg near the tail and the jowl) at 100cm² for each sample. The swabbing areas were originally defined by USDA, USA. This method is more sensitive than the one previously

used, and the number of positive samples recorded is expected to increase. Preliminary results for 2001 show a prevalence of 1.4-1.8%. This should be regarded as an effect of the improved test sensitivity and not increased *Salmonella* prevalence as such.

DT 104 Herds

Herds infected with multiresistant *S. Typhimurium* DT 104 have to follow additional restrictions. The herd is given a Zoonotic Restrictions Order. This includes a requirement for a herd intervention plan, restriction on livestock trade, and a requirement for special slurry handling. The herd intervention plan is made to ensure that *Salmonella* reducing measures are implemented in the herd for at least 12 months, and the restriction on livestock trade is to prevent the spread of DT 104 infection to other herds.

Hot water decontamination

Finishing pigs infected with multiresistant *Salmonella* Typhimurium DT 104 may either be slaughtered under special hygienic conditions as with level 3 herds with subsequent heat-treatment or may be decontaminated with hot water. Decontamination is applied to carcasses after removal of organs. The carcass is showered with 80°C hot water for 14-16 seconds, which produces a significant reduction in the bacterial count on the surface. Five carcasses from each batch are tested to ensure that the process is effective. If *Salmonella* sp. is not detected, the whole batch may be used for fresh consumption.

The Danish *Salmonella* Control program has been applied nationally since 1995 and the following table shows the prevalence of *Salmonella* especially Typhimurium before and after the commencement of the program.

Prevalence of *Salmonella* before and after the commencement of the program Christensen *et al* (1999).

	1993/94	1998
<i>Salmonella</i> herd prevalence	22.2%	11.4%
Overall prevalence	6.2%	3.2
<i>S. Typhimurium</i> herd prevalence	13.4%	7.1%
Proportion <i>S. Typhimurium</i> isolates	64.4%	60.8%
Herd types in 1998 with <i>Salmonella</i>	breeding/ multiplying	11.7%
	Farrow/ grower	16.7%
	Slaughter	11.4%

THE NETHERLANDS

Current legislation and “voluntary rules” exist in the pig industry which affect the *Salmonella*-status of pork. A proposal for a specific *Salmonella* intervention program is currently being discussed within the sector.

Currently, legislation involving the pig industry originates from two sources: the government which produces mandatory laws for all parties involved in the pig industry and the Product Boards. Product Boards are organisations of a certain kind of industry with regulatory powers. These regulations are mandatory for all companies which under the aegis of that specific Product Board. For example, all farmers and slaughterhouses are under the supervision of the Product Board for Livestock, Meat and Eggs. There is a Product Board Animal Feed for supervision of all feed mills. Legislation or rules made by the Product Boards could be described as “voluntary” because they were set up by the industry itself for purposes of self regulation but once set they are mandatory for that sector. In addition Product Boards facilitate in creating quality control system rules which are not mandatory but truly voluntary rules, for example the IQC schemes. Participants work according to signed contracts and inspection schemes in an industry wide implemented quality scheme.

In the summary given below voluntary and mandatory rules for the pig producing sector are described which could affect the *Salmonella*-status of pig herds.

Feed

About 75% of all weaners, growers, fatteners and finishers (finishers for short) receive heat treated pelleted compound feed, about 98-99% which is produced under GMP guidelines. All IQC-contracted enterprises receive 100% GMP-feed. These GMP guidelines include rules on monitoring and intervention of *Salmonella* contamination of feed and feed ingredients and are set up and carried out on behalf of the Product Board for Animal Feed (PBAF). *Salmonella* is found in less than 1% of the pig feed and *S. Typhimurium* is only a small minority of the isolated strains. By October 1st this year all pig feed mills must have a certified HACCP system (PBAF rule).

The remaining 25% of the finishing pigs receive a complete fermented liquid feed based on by-products from the human food industry of which several risk factor analysis have demonstrated that it has a profound inhibiting effect of *Salmonella*-infections. GMP guidelines for these kind of feeds are being developed.

Tylosin has been banned as a growth promoter in finishing feed.

Pig herds

Government legislation prescribes a hygiene barrier facility including a changing room in which clean boots and overalls are available for visitors and where all people entering the herd should wash their hands with water and soap. Disinfection trays or boot brushes with a disinfectant are required by law at the entrance of all herds. The farmer is required to see that visitors comply to these rules:

1/ Farm yards should be closed (required by law), preventing entrance of unauthorised vehicles. This can be done by a clearly visible rope, chain or gate.

2/ Herds receiving pigs are required by law to have a washing place for vehicles delivering pigs and are required to supply water to enable lorry drivers to clean their vehicles after delivery of the pigs.

3/ The farmer is required to see that lorry drivers comply to these rules. A log book registering all cleaning and disinfection activities should be kept with the vehicle.

4/ Herds are required by law to have a clinical inspection of all pigs by a veterinarian at least once a month (swine vesicular disease [SVD]-control scheme).

5/ Herds are required by law to have a cooled storage facility to store dead pigs until they are picked up by the lorry from the rendering plant.

6/ Finisher herds can have a maximum of three suppliers of pigs (required by law). Identification and Registration (I and R) of all herds (1 and more pigs) and an automated system issuing transport permits upon request by farmers (RVL - Regeling Varkens Leveringen - Regulation Pig Deliveries) allows control on the compliance with this rule.

Integrated Quality Control (IQC) requires:

1/ Bird proofing of pig houses.

2/ Fly and rodent control.

3/ Keeping doors locked to prevent unauthorised entry of visitors.

4/ A bell at the main entrance to announce visitors.

5/ Visitor registration (law).

6/ Limited antibiotic use on veterinary prescription only with longer withdrawal times before slaughter than prescribed by law.

7/ Stress reduction by feed withdrawal before delivery of market age pigs to the slaughterhouse. By using no tranquillizers before and during transport. And no electric goads are to be used.

About 85% of all finishing herds participate in a IQC program.

Practically all pigs are kept on partially slatted floors in total confinement, in an AIAO management system with high pressure cleaning of facilities between batches of pigs. Minimum stocking density for finishers is 0.7 m² per finisher from 25 kg upwards (law).

Transport

Lorries can carry only pigs from one herd at the time to another herd or slaughterhouse (law). After each delivery, lorries have to be cleaned and disinfected. At slaughterhouses the result is checked by an employee of the National Livestock and Meat Inspection Agency (RVV). Data on cleaning and disinfection are registered in a log book kept with the vehicle (law).

The transport sector has its own IQC-system, including guidelines on animal handling, driving habits and stocking density during transport. Stress reduction is realized by a nearly 100% loading lifts on the lorries. Animal welfare is measured by a required inspection on transport loss and carcass damage. In addition, training of drivers and workers is required.

Slaughterhouses

GMP-guidelines (created and controlled by the Product Boards for Livestock, Meat and Eggs [PVE]) include monitoring for proper singeing, full stomachs during slaughter, faecal carcass contamination, carcass contamination with bile, and prescribes a number of carcass samples to be investigated to verify hygienic handling by measuring the quantity of Enterobacteriaceae as a result of faecal contamination.

Some slaughterhouses have a USA export certificate which includes monitoring and, if necessary, corrective action on the *Salmonella* contamination of pig carcasses. Many slaughterhouses are implementing/ have implemented HACCP rules, including *Salmonella* as a hazard.

None of these rules were specifically set up to reduce *Salmonella* contamination of the end product with the exception of GMP guidelines on Enterobacteriaceae monitoring by assessment of Enterobacteriaceae levels that relate to the contamination with *Salmonellae* and intervention for feed before transport and hygiene in the slaughterhouses. However, all of them might contribute to the reduction of *Salmonella* in one way or another. A specific *Salmonella* control scheme to reduce the *Salmonella* contamination of pork has not been set up yet. However, the sector has agreed that such a scheme should be set up and the Product Boards for Livestock, Meat and Eggs is in consultation with the sector on the contents such a scheme which is expected to be set up at the end of this year.

GERMANY

A national *Salmonella* control program has been outlined and legal frame work and implications are being tested. The aim is to start testing at the beginning of 2003 and have a full *Salmonella*-status of all finishing herds by the end of 2003. It will not be a nationally organized operation. The responsibility lays with the herd owner but slaughterhouse integrations, breeding or agricultural integrations or specialized firms can be delegated to carry the program. Data records should be kept for 3 years.

Sampling and testing

The testing protocol will examine 45 animals in herds delivering less than 100 slaughter pigs a year, 50 samples in herds delivering 100-200 animals/year and 60 samples in herd delivering over 200 animals/year. As sampling material blood or meat drip can be used. Blood can be collected at the herd or the slaughterhouse. At the slaughterhouse diaphragm or neck muscle can be used for meat drip production. Sampling at the slaughterhouse is spread out during the year and samples are taken under supervision of or by official veterinary authorities. Samples will be tested in appointed laboratories using a calibrated LPS-*Salmonella*-ELISA, using a cut-off of OD%>40 to determine negative or positive result. The *Salmonella*-status is calculated twice each year using the results of the last year. This status can be altered by full sampling of the herd if the herd owner wishes so. Depending on the results no action will be taken if the seroprevalence is <20% (status 1), if 20-40 (status 2) veterinary consultation and if >40% (status 3) control measures under official veterinary supervision will be established. Pigs from status 3 herds are to be announced to the slaughterhouse in advance in writing and slaughtered separately from status 1 and 2 pigs. After slaughtering status 3 pigs the entire slaughterhouse is to be cleaned and disinfected. In the future separate transport and holding at the slaughterhouse will be mandatory. Meat of status 3 herd pigs is to be sold fresh only when stating the high *Salmonella*-status. Estimated costs are 4 to 5 Euro per sample, including sampling material, collection, shipment, testing and administration.

Herd intervention

Intervention includes: All in-all out by barn or compartment, thorough cleaning and disinfecting between batches, removal of slurry and keeping clean of feed troughs and water bowls. Housing has to be rat, mouse, bird, dog and cat proof and appropriate extermination programs have to be implemented. Hygiene barrier facilities for visitors have to be present and used. Feed components, especially protein components, have to be checked for *Salmonella* contamination. It is advised to investigate the weaners / growers for presence of *Salmonella* and to establish which *Salmonella* is present in the herd. Further actions can be acidification of water and or feed, addition of lactulose to feed and, in the near future, oral vaccination.

FRANCE

In France, companies have their own *Salmonella* control schemes. A preliminary and experimental plan has also been set up nationwide under the aegis of the Ministry of Agriculture since 1999.

UNITED KINGDOM

While individual companies may have their own *Salmonella* control schemes, there is no nationally organised program. Under the 1989 Zoonoses Order, the isolation of *Salmonella* from a number of different animal species including pigs is reportable to The Ministry. Under the Order, The Ministry has powers to carry out further investigations and prevent the movement of animals and equipment. Advice will also be offered to the farmer to help control infection on the farm. To assist the farmer, codes of practice for the prevention and control of *Salmonella* on pig farms (and incidentally, other types of farms) are available (MAFF Publications, Admail 6000, London SW1A 2XX).

The Animal By-Products Order, 1999 requires official quarterly testing of products that may be incorporated in animal feeding stuffs. Likewise, imported animal protein is also subject to legislation and testing. Voluntary codes of practice have also been produced to give guidance to the industry.

IRELAND

(Information provided by Nola Leonard, Dept Vet Microbiology and Parasitology, Faculty Vet Medicine, UCD, Ballsbridge, Dublin 4)

The Irish *Salmonella* program is largely based on the Danish model. At present it is not set up on a statutory basis although it was supposed to be set up quite a while ago. So at present it is still only voluntary and is really a monitoring program rather than a control program because, until the legislation is enacted, there are no official penalties imposed. The (future) legislation is being drawn up through the Department of Agriculture.

In addition, only the large pig processing plants (export plants) are participating at present. However, it is expected that the legislation will be signed in the next few weeks with a start date for the program later in the summer (2002). From then on all pig abattoirs must participate in the program.

The ELISA is carried out in the Dept of Agriculture. The cut-off will be 40% OD - it is not envisaged that this will be adjusted at present. Twenty-four samples of meat juice are tested from each herd 3 times a year. Herds will be categorized on a weighted rolling average Cat 1 < 10% pigs positive, Cat 2 10-50% pos and Cat 3 >50% pos.

Cat 3 pigs will have all head meat, intestinal tract including tongue, liver and lungs condemned so they will not go for human consumption.

No decision has yet been made as to bacteriological monitoring of carcasses as part of the program. A large study is being conducted looking at carcass contamination, caecal isolation rates etc in order to help decide this.

AUSTRIA

The current program in Austria is limited to the province of Styria (Fuchs et al., 1999; Köfer et al., 2000; Köfer et al., 2001; Pless et al., 2001).

Serological surveillance of pig herds

The Austrian surveillance program covers 10 slaughterhouses in which 96% of all finishers are slaughtered. These include 5 large slaughterhouses (>150,000 / yr), 3 medium sized (10,000 – 150,000) and 2 small ones (<10,000 / year). From each herd 10 serum samples are collected per year and analyzed in a commercially available LPS-based *Salmonella*-ELISA. Samples with a OD% over 40 are considered positive and with an OD% between 20 and 40 as suspect. 10,000 samples were tested in 1999 and 7400 in 2000.

Results of the serological sampling:

	1999 (N=10,000)	2000 (N=7400)
Herds with no positive results	95.5%	93.5%
Herds with suspected positive results	4.2%	6.3%
Herds with positive results	0.3%	0.3%

Bacteriological surveillance of meat cutting plants

In 10 slaughterhouses a total of 720 bulk wipe samples from wholesale pork cuts (5 parts), 720 wipe samples from retail pork cuts (25 kg) and 480 wipe samples collected from work surfaces in the cutting department (0.5 m²) were tested for *Salmonella* in 1999. In the following year (2000) sampling was restricted to wholesale cutting in 8 slaughterhouses. The sampling plan comprised a total of 1290 bulk wipe samples (5 parts each) of carcass halves and wholesale cuts. *Salmonella* was detected in 7 of the 720 wipe samples taken prior to retail cutting (5 x *S. infantis*, 2 x *S. enteritidis* PT 4). Two-stage cluster sampling showed the estimated proportion of *Salmonella* contaminated pork cuts in the total population to be 0.15 %. The 95 % confidence interval was in the range (0.12 % to 0.18 %). Only one of the 720 wipe samples taken after retail cutting produced a positive result (*S. typhimurium* DT 104). The examination of the 480 wipe samples taken from the cutting surfaces also yielded only one positive result (*S. infantis*). The situation was similar in the following year. *Salmonella* was detected in 3 (*S. enteritidis*, *S. livingstone*, *S. typhimurium*) of the 1290 bulk wipe samples of carcass halves and wholesale pork cuts (= 0.14%, S = 95 %; CI 0.17 % to 0.25 %).

This favorable situation, which was corroborated by serological examinations of finishing pig herds, does not indicate an urgent call for action in Austrian breeding and finishing establishments.

NORWAY

(Fredriksen et al., 1999)

The *Salmonella* surveillance and control program in Norway was launched in 1995, in connection with negotiations for membership of the EU. The aim of the program is to ensure that food products of animal origin are virtually free from *Salmonella* and to provide reliable documentation of the prevalence of *Salmonella*. When *Salmonella* is found in live pigs, action is taken to eliminate the infection, prevent transmission to other herds and prevent contamination of feed products. In addition, an investigation aiming at finding the source of the infection or contamination is initiated. Isolation of any *Salmonella* sp. must be notified.

Sampling

All pedigree breeder herds are surveyed at herd level once a year. Pooled faecal samples are collected from every pen (max. 20 samples) containing piglets aged 2 – 6 months of age. If there are less than three pens with these piglets, faecal samples of the sows (max 59) are also collected. Surveillance of the rest of the pig population is based on the sampling of a representative proportion of all pigs slaughtered in Norway. Lymph nodes are collected at all abattoirs, the sample size for each abattoir is fixed in proportion to the number of pigs slaughtered. The total national samples size of 3000 is estimated to be sufficient to detect *Salmonella* at a prevalence level of 0.1% at a 95% confidence level. For the surveillance of animal products, slaughterhouses, cutting plants and cold stores the same principles and intensity of sampling are being used. Lymph nodes and swabs are pooled by 5 before testing.

Results

Results show that only one herd was positive for *Salmonella* in 1995 by *S. Agona*. No herds have been positive since. Lymph nodes show a yearly prevalence of 0 to 0.5% each year. Swab and meat samples from installations show a prevalence of 0 to 0.05% positive samples each year.

Conclusions

Since the program started in 1995, no connection between detection of *Salmonella* in the surveillance program and any human cases of salmonellosis has been demonstrated. This indicates that the main purpose of the surveillance program, namely to ensure that food products of animal origin are virtually free from *Salmonella*, is being fulfilled in Norway.

CONCLUSIONS

The overview listed above demonstrates that there are large differences in the surveillance and control programs between countries within the EU and may even exist

within countries between different parts of the country. The EU is still far away from a uniform surveillance and control program for *Salmonella* in pigs with harmonized sampling and test procedures. Comparison of programs is therefore laborious and comparison of results very difficult.

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