

Code of Practice for the Prevention and Control of *Salmonella* in Turkey Flocks

Defra deals with
the essentials of life
– food, air, land,
water and people

www.defra.gov.uk



Department for Environment, Food and Rural Affairs
Defra Publications, Admail 6000, London SW1A 2XX
Tel 0645 556000

© Crown Copyright 2010.

www.defra.gov.uk

PB 13401

Preface

This voluntary Code of Practice is issued by the Department for Environment, Food and Rural Affairs (Defra), the Department of Agriculture and Rural Development Northern Ireland (DARDNI), the Scottish Government Rural Directorate and the Welsh Assembly Government and has been drawn up in consultation with Veterinary Representatives of the poultry industry, the Animal Health Agency and the Veterinary Laboratories Agency (VLA). All DEFRA Codes of Practice are available from Defra Publications, Admail 6000, London SW1A 2XX, telephone 08459 335577.

Contents

	Page
Introduction	7
Preventing the Introduction of Infection	8
1. Farm	8
1.1 Location	8
1.2 Poultry Site	8
1.3 Houses	9
2. Livestock	10
2.1 Poultry	10
2.2 Domestic Animals	10
2.3 Wild and Feral Animals	10
3. Feed And Water	11
3.1 Feedstuffs	11
3.2 Water Supply	12
4. Personnel	12
4.1 Farm Staff	12
4.2 Visitors	13
5. Supplies	14
5.1 Litter	14
5.2 Equipment	14
6. Disposal Of Farm Waste	15
6.1 Birds	15
6.2 Used Litter	15
7. Routine Hygiene And Husbandry	16
7.1 Personnel	16
7.2 Feedstuffs	17
7.3 Cleaning, Disinfectants and Chemicals	17
7.4 Staff and Visitor Hygiene	18

Code of Practice for the Prevention and Control of *Salmonella* in Turkey Flocks

Monitoring of the <i>Salmonella</i> Status of the Flock	20
8. Time To Sample	20
8.1 Poults	20
8.2 Growing Birds	20
Cleaning and Disinfection at Depopulation	25
9. Cleaning And Disinfection Procedures	25
9.1 Forward Planning	25
9.2 Dry Cleaning	25
9.3 Washing	26
9.4 Feed Bins	27
9.5 Water Systems	27
9.6 Repairs and Maintenance	27
9.7 Disinfection	27
9.8 Assembly and Check of Equipment	28
9.9 Fogging or Fumigation	28
9.10 Vehicles	29
9.11 Microbiological Assessment of Cleaning and Disinfection	29
10 Restocking	30
10.1 Rodent Control	30
10.2 Transport	31
10.3 Aids to <i>Salmonella</i> Control	31

Introduction

Small numbers of *Salmonella* organisms occur in nature and their complete elimination from the environment of all turkey farms is unlikely to be economically feasible other than at the breeding and Grandparent level. Despite this, good management can reduce the risk of introduction and persistence of infection to minimal levels, particularly since improved *Salmonella* control in the breeding sector and in feed production has reduced the risk from these major sources of infection.

The purpose of this Code is to assist turkey flock owners in preventing the introduction, spread and persistence of *Salmonella* infection.

They are therefore strongly encouraged to include the Code as part of their standard management practice. This Code has been drawn up taking into account the fact that turkeys are predominantly produced in controlled environment housing systems and that not all practices can be applied in full to free range or small scale rearing systems. Nevertheless, many of the basic principles are applicable and should be followed as far as possible.

Preventing the Introduction of Infection

1. Farm

1.1 Location

Where circumstances permit newly constructed turkey farms should be located as far away as possible (ideally more than 2km) from other commercial poultry premises, other livestock enterprises and other potential sources of contamination such as abattoirs, sewage treatment plants, land fill sites etc.

When an existing farm is close to such sites then a higher level of disease security is required, including wildlife control and ensuring that no drainage or waste from the nearby property enters the farm.

It is unwise to deliberately place large turkey flocks on other livestock farms, especially breeding flocks. When planning new turkey production sites it is advisable to design them as stand-alone farming operations with adequate separation from other livestock and poultry species.

1.2 Poultry Site

Good biosecurity is extremely important to prevent the introduction of a wide range of micro-organisms into turkey farms and where possible site design and management practices should be planned to facilitate this.

If possible the site should be fenced and entry restricted to personnel and essential visitors, under supervision, with clean parking facilities provided away from the turkey buildings. A notice should be displayed at the entrance of the site requesting visitors to attract attention by means of a bell or telephone line/number provided or vehicle horn rather than entering the site unsupervised. A disinfectant footbath and brush should be placed at the entrance to the site and/or near the vehicle parking area. Where possible a separate gatehouse should be provided where visitors can change into overalls, boots and hair protection, sanitise their hands and sign a visitors' book. Suitable disinfectant spraying facilities should be provided for vehicles which have to enter the site, but where

Preventing the Introduction of Infection

possible it is best to keep unnecessary vehicles away from the main part of the site.

The site should be kept clean and tidy to discourage wild birds, rodents and flies.

All feed spillages outside the houses should be cleaned up immediately, disposed of as waste, not used as feed and the area surrounding the houses kept as free of vegetation and as well drained as possible. It is also good practice to remove litter which has escaped from doors of houses and to fill puddles as these may act as a source of infection for wildlife pests which may enter the site, and a means of contaminating workers' footwear, trolleys, vehicles, etc.

1.3 Houses

Buildings should be of sound construction and well maintained to prevent access by wild birds and to deter rodents. Damaged insulation cladding or poorly maintained block walls allow easy refuge for rodents and in-house storage areas should be carefully designed and maintained for the same reason. Main doors can be sealed by loose concrete or lime after placing the birds. Naturally ventilated turkey houses should be netted to prevent the entry of wild birds and a high standard of rodent control should be maintained across the whole site, focusing on potential entry points and areas where signs of rodent activity have been identified. Areas around feed bins and hoppers are particularly attractive to rodents entering the unit for the first time.

Where possible surfaces of buildings, floors and surroundings should be smooth, hard and impervious to enable effective cleaning and disinfection. Ancillary buildings such as storage rooms, rest rooms, toilets etc. should be of a similar standard. Drains should be kept in good condition and running freely, but arrangements should be made to prevent entry of rodents via drains.

2. Livestock

2.1 Poultry

Day old poults should be obtained from a reputable breeding flock or hatchery which has implemented a *Salmonella* monitoring programme in line with the statutory one required for domestic fowl under the CSPO 2007, or equivalent EU schemes in the case of imported day old poults or hatching eggs. A check on results of this monitoring can be made by the private veterinary surgeon for the turkey flock if required by contacting the suppliers. Additional *Salmonella* tests can be carried out on Dead-on-Arrival poults and delivery box liners if there is a suspicion of infection in replacement poults. The whole site should be managed on an all-in all-out basis with sufficient time (ideally at least 6 days) allowed between cleaning the last house and restocking the first to minimise the risk of reinfection.

2.2 Domestic Animals

The entry of dogs, cats and other livestock to poultry buildings and feed and equipment stores (including during cleaning) should be forbidden.

2.3 Wild and Feral Animals

All buildings, including store rooms, should be proofed against entry by wild birds. Their presence in the vicinity should be discouraged by maintaining general tidiness, clearing vegetation and other perching places, cleaning up feed spillages and good drainage to reduce pooling of surface water. Rodent habitats should be eliminated by maintaining the premises in a tidy state and a planned programme of baiting and trapping in and around the buildings and around the site perimeter should be undertaken. This programme should be intensified during periods when houses are empty. Further guidance on rodent control is available in the Defra Code of Practice for the prevention and control of rodent infestations on poultry farms (PB13233). On free range farms foxes and other small mammals as well as wild birds may also be carriers

Preventing the Introduction of Infection

of *Salmonella* and these should also be deterred. Co-grazing with sheep or cattle may also present a risk of introduction of infection.

3. Feed And Water

3.1 Feedstuffs

Finished feed or ingredients for home mixing should be obtained from a mill or supplier who operates in accordance with the relevant Defra Codes of Practice for the Control of *Salmonella* during the Production, Storage and Transport of Compound Feeds, Premixtures, Feed Materials and Feed Additives (PB13303) and will make available the results of *Salmonella* monitoring of feed and the milling process. The private veterinary surgeon for the turkey flock is a suitable person to assist with interpretation of these results.

Ingredients known to present a higher risk of *Salmonella* of human health concern, such as cereals stored in flat stores or open bins on livestock farms should be avoided. There may also be advantages in treating protein ingredients with aldehyde/acid mixtures before mixing.

Feed should be heat treated for a sufficient time and at an adequate temperature to control *Salmonella*. Medicated feedingstuffs should only be obtained from mills which are registered with the Feedingstuff Manufacturers Code of Practice under the Veterinary Medicines Regulations. Ideally, finished feed should be delivered in vehicles that are dedicated to that purpose and that are not backloaded with ingredients or other non heat treated feeds. If this is not possible, vehicles should be sanitised before finished feed is carried and wet cleaning should be avoided to reduce *Salmonella* risk. Home mixers should take special care to avoid carrying contamination from livestock areas to feed milling areas, and should ensure a high standard of control of wildlife pests and effluents.

Drivers of delivery vehicles should wear clean boots and overalls and should not enter poultry or storage buildings.

Code of Practice for the Prevention and Control of *Salmonella* in Turkey Flocks

Feed should be stored in closed bulk storage bins, sealed hoppers or bags. Any rainwater leaks or condensation problems in feed storage areas should be corrected. Storage areas and slave hoppers etc., should be kept free of birds and rodents, and should be included in the terminal disinfection programme.

Attention should be paid to regular cleaning of bulk storage bins, augers, hoppers and feeders.

Addition of organic acid products to feed can help to reduce the risk of introduction of infection via feed but is not 100% reliable. Such treatments also reduce the risk of establishment of contamination within feed pipes in pan feeder systems.

Long term planning should consider replacement of open feed delivery systems with closed systems delivering feed to suspended tube feeders.

3.2 Water Supply

Water should be from a mains or other chlorinated source and the delivery system, including any header tank, should be enclosed to prevent contamination. Chlorine will inactivate live virus vaccines and data sheet recommendations should be followed if these are to be administered in the drinking water. Bowl or bell drinkers are more likely to become contaminated than nipple lines, and should be subject to a high level of cleaning and disinfection between flocks.

4. Personnel

4.1 Farm Staff

Management should ensure that all farm staff, including relief and casual staff, understand the importance of personal hygiene and are aware of the means by which infection can be spread on hands, clothing and equipment. A farm hygiene guide, which incorporates the principles of this Code should be displayed in a prominent place. Adequate

Preventing the Introduction of Infection

toilet and washing facilities should be available and work boots and overalls provided for use on the farm only. Alcohol gel based hand sanitisers should be provided at the entry to the site and to each house. Disposable plastic gloves should be available for use for carrying out dirty jobs such as collecting dead birds.

Staff should not keep or have contact with any other poultry and should avoid working with other livestock if possible. If this is not possible turkeys should be serviced before other livestock and protective clothing changed between different livestock categories.

Those who enter poultry buildings should wear disposable overalls or overalls which are capable of being laundered and boots which can be cleaned and disinfected. When they leave the poultry house they should wash their hands, and/or use a hand sanitiser and disinfect their boots. Ideally separate boots should be used in each house as well as using the boot dips at the entry to the service area of the house and the area occupied by birds.

4.2 Visitors

Visitors (such as fieldsmen, maintenance personnel, delivery and collection staff, veterinarians, officials etc.) are a potential means of introducing infection, especially if they visit other poultry farms. Catching and cleaning gangs and their vehicles are a particular hazard and should be encouraged to use the same high hygiene standards as farm staff.

Non-essential visitors to the farm should be discouraged. Visitors should enter turkey buildings only if this is essential and should wear protective clothing and waterproof boots provided by the farm.

5. Supplies

5.1 Litter

Litter should be obtained from a reliable and traceable source and should be free from contamination by livestock, wild birds and/or rodents. It is preferable to obtain straw bedding from specialist arable farms without pigs, poultry or cattle. Litter should be transported on cleaned and disinfected vehicles and stored in a clean rodent and bird proof area. Wood shavings should be made from sources of timber which present no risk of *Salmonella*. Treatment of bedding with organic acids can reduce the risk of introduction of infection by this route.

5.2 Equipment

Equipment used for catching and transporting birds poses a high risk of introducing *Salmonella* onto a site. On each occasion, before and after items are used they should be cleaned and disinfected with a Defra approved disinfectant applied at rates of at least General Orders Concentration. These precautions should also apply to equipment and vehicles used for moving poult between brooding and fattening accommodation, or for moving breeding turkeys to the laying site.

It is best to avoid sharing equipment with other farms. If this is unavoidable any equipment (such as weighers etc.) transferred from other sites should be disinfected before transport and again before use on the site.

It is advisable that facilities are available for spray disinfection of the exterior of cleaning and catching team vehicles by power washer before entry to the turkey houses.

6. Disposal Of Farm Waste

6.1 Birds

Any dead birds and birds that have to be culled should be removed as soon as possible and placed in a closed leak proof and pest proof and lockable container at the perimeter of the site ready for disposal in accordance with Animal By-Products legislation. Carcasses can be incinerated on site or they may be carefully removed for suitable disposal off site, taking care to avoid leaks and spillages. Where facilities exist the incineration of used litter is preferred on site.

6.2 Used Litter

Poultry manure should be disposed of following the guidelines given in the Defra Codes of Good Agricultural Practice for *farmers, growers and land managers (CoGAP)* and should not be spread on land to which other livestock have access. When possible litter should be stacked for at least four weeks before spreading. Where facilities exist the incineration of used litter is preferred. Any litter spilled during the removal process should be cleaned up, and preferably avoided by appropriate loading and sheeting of vehicles.

Animals should not be grazed on land on which poultry litter has been spread for at least five weeks if possible. It is preferable to dispose of litter on arable land, especially if *Salmonella* is known to have been present in the house from which the litter originates.

Vehicles and equipment should be cleaned and disinfected after being used for removal of litter. They should not be used for carrying feedstuffs or new litter but if this is unavoidable, on small farms, the items should be cleaned and disinfected immediately after litter removal, left to dry completely then re-disinfected and dried before use for feedstuffs or new litter.

7. Routine Hygiene And Husbandry

Each farm should have its own operating procedures, preferably as a manual of working instructions, which contains a check list of routine hygiene and husbandry tasks.

7.1 Personnel

A footbath containing a Defra approved, preferably chlorocresol or 'synthetic phenolic'-based, disinfectant made up at the maximum recommended concentration and a brush should be provided outside each turkey house and used each time the building is entered or left. Boots should be cleaned of gross soiling before dipping. The bath should be replenished regularly to maintain sufficient depth and the disinfectant renewed once soiled or at least once a week. Dilution of footdips by rainwater should be avoided but any lids should be easy to use to avoid staff not consistently using the bootdips. The use of separate boots for outside the house and a step-over barrier to the inside where inside boots are put on are more effective than footbaths alone.

Rest rooms, toilets etc., should be kept clean and tidy and sweepings disposed rather than returned to the house. Adequate washing facilities should be provided. Hands should be washed with antibacterial soap and sanitised before and after smoking and meals as well as after visits to the toilet. Protective clothing should be laundered regularly, ideally daily, and kept separate from that which is in use. Non-farm clothing should also be kept separate. On large farms separate boots and overalls should ideally be maintained and used in each separate building. This should be considered essential on multi age sites.

Hand washing facilities or disinfectant hand sprays should be provided in poultry buildings and hands should be washed and sanitised after handling birds and on leaving a poultry building. Disposable plastic gloves may be used for operations which would lead to gross hand contamination.

7.2 Feedstuffs

Equipment for storage and distribution of feed should be properly maintained and any spillage that does occur should be cleared away promptly. A regular check should be made of bird proofing and pest control measures and baiting increased if higher levels of rodents, droppings, tracks, chewing damage or disturbed bait are seen.

7.3 Cleaning, disinfectants and chemicals

Cleaning and disinfection schedules and methods must be available for all parts of the process in farms and transport. These must include surfaces, equipment, machinery and transport.

Where a *Salmonella* Enteritidis and/or Typhimurium-positive flock was found previously, environmental swabs may be taken after cleaning, disinfection and drying of surfaces such that they are representative of the whole building and should include swabs from each of the following areas: walls/roofs, floor swabs or sweepings, in-house feed hoppers, high beams and pipe-work, feeders, drinkers, ventilation systems, nest boxes and AI equipment on breeding farms, and tested for *Salmonella*. There should ideally be no restocking until negative results have been obtained. If this is not possible the replacement flock should be tested for *Salmonella* after 1-2 weeks and plans for improved cleaning and disinfection at the next turnaround period, as well as scheduling the positive flock at slaughter, should be made.

Only “approved” chemicals/disinfectants may be used as required by The Diseases of Animals (approved disinfectants) (amended) Order 2003. Usage must be in accordance with recommended dosages/dilutions. In general disinfectants which are least likely to be easily inactivated by residual organic matter and biofilms should be used. Such disinfectants currently include those based on formaldehyde blends, chlorocresol or high potency glutaraldehyde based products. It is best to obtain advice from a Defra specialist when designing a disinfection programme for turkey production.

Code of Practice for the Prevention and Control of *Salmonella* in Turkey Flocks

All disinfectants and chemicals must be stored and used in compliance with COSHH regulations.

7.4 Staff and visitor hygiene

All farm staff and visitors should have access to a toilet, hand washing facilities, alcohol-based hand sanitisers, changing and canteen facilities appropriate to numbers of staff. They should sanitise hands before entering and on exiting any site. They should wash their hands before and after using the toilet, eating, drinking and smoking.

All farm staff and visitors should change into protective clothing and footwear on entering sites. The clothing and footwear should be left at the site on departure. All protective clothing is to be laundered regularly and clean clothes should be available at all times.

Visitors should be asked to certify that they are not suffering from any illness which could compromise the health and hygiene of stock.

Visitors should be asked to declare their last visit to any other poultry sites.

In respect of visitors, management should exercise discretion to refuse entry if there are grounds for concern.

Hygiene procedures must be followed by farm staff and visitors.

Employees should not keep poultry or any other avian species outside work, or work on other farms with poultry unless this is a requirement of the job on multi-site poultry companies.

Visitors to all agricultural sites must be accompanied at all times by an authorised member of staff.

Preventing the Introduction of Infection

From 2010 there is a statutory requirement to monitor the *Salmonella* status of turkey flocks. Many producers already have monitoring regimes in place. Knowledge of the *Salmonella* status of flocks can help with decision making on disinfection at depopulation and possibly organisation of slaughter. This will allow positive flocks to be slaughtered late in the day to reduce contamination of the processing plant, or to be directed to heat-treated products.

The monitoring regime to be used from 2010 should ideally be implemented in advance and should be discussed with the flock owners' veterinary advisors to ensure correct implementation. Veterinary advice should be sought if the results of tests on any samples are positive.

8. Time to sample

Samples should be sent, at least by first class post but preferably by express mail or courier, to an approved laboratory on the day of collection (or at the latest 24 hours of the sample being taken).

In exceptional circumstances, when samples cannot be sent within 24 hours being taken, they must be kept refrigerated at 4°C until they are sent to an approved laboratory. **Samples MUST be submitted within 48 hours of being taken and testing begun within 96 hours**, otherwise they will not be eligible for testing and a repeat sample will have to be taken.

8.1 Poult

If day old poults are obtained from a breeding flock which is monitoring voluntarily for *Salmonella* using a sampling system in line with the one required under the CSPO 2007 and such monitoring has given negative results, no further testing should be necessary unless further confirmation of freedom from infection acquired in the hatchery or during transit is required. In this case, and in the case of poults obtained from untested flocks, delivery box liners and poults dead on arrival should be examined for *Salmonella*. It is especially important to take delivery box liner samples in an aseptic manner, using disposable plastic gloves, immediately after unpacking as these can be easily contaminated by residual *Salmonella* in dust even in a thoroughly disinfected house.

8.2 Growing Birds

It is best to take these samples as late in the growing stage as possible, to maximise detection of late infection (e.g. after thinning). Results of testing must be available in time to take action so 2-3 weeks before depopulation is the optimum time for sampling. New EU regulations

¹ Under the Zoonoses Order 1989 the presence of a *Salmonella* must be reported by the laboratory to Defra.

Monitoring of the *Salmonella* Status of the Flock

specify sampling using two pairs of boot swabs, during the three week period before slaughter. In thinned flocks the test result remains valid for six weeks, after which a further sample must be taken before slaughter of subsequent batches.

In breeding flocks samples of poult delivery box liners and poult dead-on-arrival should be taken according to EU Commission Regulation 213/2009 and the UK NCP. Two pairs of boot swabs, or optionally one pair of boot swabs plus a dust sample, should be taken 2-3 weeks before transfer to the laying house. Whilst in the laying house five pairs of bootswabs (or one pair plus a dust sample) must be taken every three weeks from each flock on the site. Any sample taken for *Salmonella* should be tested as soon as possible after collection and suitable arrangements made with the laboratory. Samples must be tested in a Defra approved laboratory using the ISO6579: Annex D method.

A proportion of flocks will also be visited by officials of the competent authority who will take samples to be sent to the National Reference Laboratory. This sampling can replace one of the operator samples.

The table below summarises sampling requirements under the National Control Programme.

Code of Practice for the Prevention and Control of *Salmonella* in Turkey Flocks

Reg. 584/2008	Fattening flocks	Breeding flocks – rearing	Breeding flocks – adults
<p>Operator (producer) sampling</p>	<p>Three weeks before slaughter (results valid for 6 weeks)</p>	<p>Day old + Four weeks of age + Two weeks before moving/ changing to laying unit</p>	<p>Every third week during laying period in holdings over 250 (at hatchery or holding) + Three weeks before slaughter (if not already included in three weekly sampling)</p>
<p>Competent Authority (official) sampling</p>	<p>Once a year all flocks on 10 % holdings with at least 500 fattening turkeys, including holdings exempt from operator sampling + All flocks on the holding when one flock tested positive for <i>S. Enteritidis</i> or <i>S. Typhimurium</i> during operator sampling within the previous 12 months, unless the meat of the turkeys in the flocks is destined for industrial heat treatment or another treatment to eliminate <i>Salmonella</i> + All flocks on the holding when one flock tested positive for <i>S. Enteritidis</i> or <i>S. Typhimurium</i> during routine sampling by the operator + When the Competent Authority considers it necessary.</p>	<p>None</p>	<p><i>Competent Authority routine official sampling for breeding flocks will usually take place at the hatchery. Positive trace-backs will include sampling at the holding.</i> Once a year all flocks on 10% holdings with at least 250 adult breeding turkeys – taken between 30 and 45 weeks of age – including: All adult flocks on all holdings with elite, great grandparent and grandparent breeding stock; + All holdings where <i>S. Enteritidis</i> or <i>S. Typhimurium</i> was detected during the previous 12 months + All flocks on holdings in case of trace-back of <i>S. Enteritidis</i> or <i>S. Typhimurium</i> from samples taken at hatchery/holding by operator/official controls.</p>

Monitoring of the *Salmonella* Status of the Flock

Reg. 584/2008	Fattening flocks	Breeding flocks – rearing	Breeding flocks – adults (Continued)	
<p>Samples</p>	<p>Two pairs boot swabs – (samples may be pooled for testing) OR One pair boot and one 900cm² dust swab (samples may be pooled for testing) OR Four hand-held 900cm² dust swabs if <100 turkeys and boot swabbing is impractical</p>	<p>DAY OLD Ten poult box liners per hatchery source plus all poults found dead or culled on arrival FOUR WEEKS of age AND TWO WEEKS BEFORE MOVE TO LAYING PHASE Five pairs boot swabs submitted as two batches of five individual boot swabs OR One pair boot swabs and one 900cm² dust swab (submitted separately) OR Four hand-held 900cm² dust swabs if <100 turkeys and boot swabbing is impractical</p>	<p>Holding Five pairs boot swabs (submitted as two batches) OR One pair boot swabs and one 900cm² dust swab (submitted separately) OR Four hand-held 900cm² dust swabs if <100 turkeys and boot swabbing is impractical (submitted in two batches)</p>	<p>Hatchery Visibly soiled liners from five hatchery baskets covering 1m² OR 900cm² swabs from five places in hatchers or hatchery baskets OR 10g broken eggshells from each of 25 hatchery baskets</p>

Code of Practice for the Prevention and Control of *Salmonella* in Turkey Flocks

Thorough cleaning and disinfection (including rodent and arthropod control) should be part of every turkey farm's routine. The programme used should be capable of eliminating *Salmonella* from the environment even if it has not been identified as a minority of flock infections will always evade detection. If *Salmonella* has become persistent in a house, ideally it is advisable to allow sufficient time after depopulation for both cleaning and disinfection to be carried out thoroughly, for its effectiveness to be checked by bacteriological examination and for the process to be repeated if necessary.

On multi-age sites precautions should be taken during cleaning to reduce the chances of transmitting infection to buildings that are still occupied. Likewise care should be taken to avoid transferring infection from older birds to newly introduced birds (see Sections 4-7 above).

It is helpful to have a check list detailing each step of the cleaning and disinfection process to ensure that all aspects are dealt with.

Careful attention must be given to Health and Safety before and during cleaning and disinfection procedures.

9. Cleaning and disinfection procedures

9.1 Forward Planning

The timing of depopulation and restocking and organisation of cleaning and disinfection should allow for the maximum possible empty time. Planning will include booking contract workers in advance and arranging for minimal feed and other supplies to remain after depopulation. A list of items needing maintenance, repair or replacement once the buildings are empty should be made.

Rodent and insect control should be part of the normal routine. If rodent infestations have built up intensive baiting and trapping will be necessary at depopulation to reduce their dispersal into the surrounding environment and subsequent re-entry to buildings after restocking. Detailed guidance on rodent control can be obtained in the Defra Code of Practice for the Prevention and Control of rodent infestations on poultry farms (PB13233).

Disinfectant footbaths should be maintained at the entrances to the houses throughout the cleaning and disinfection procedure. Clean footbaths should be put in place immediately after washing is completed.

9.2 Dry Cleaning

Dead birds should be removed for incineration in an on-site approved incinerator or for disposal to a suitably approved Animal By-Product plant off the site. Surplus feed should also be removed from the site. All moveable equipment should be taken to a hard standing for cleaning and disinfection or returned to the house after cleaning for disinfection, ensuring that floor surfaces beneath are still accessible for treatment.

Buildings should be treated for arthropods, such as litter beetles, if present immediately after removing the birds and rodent control measures intensified as necessary. In cases of severe arthropod infestation a residual insecticide/acaricide should also be applied after

Code of Practice for the Prevention and Control of *Salmonella* in Turkey Flocks

completion of disinfection and drying. Rodent baiting points should however be removed immediately before the washing and disinfection process and replaced with new or disinfected equipment and new bait as soon as possible after completion of disinfection or fogging/fumigation. If there is a gap between washing and disinfection baiting should be resumed during this period.

Dust should be blown down or vacuumed from high fittings before mucking out and litter removed for disposal off the site. Floors should be swept clean of remaining litter. When litter is removed from the site loads should be covered with sheeting.

Buildings, including passages, feed and equipment stores, rest rooms and other ancillary buildings should be cleaned of dust by vacuum or sweeping. The external surfaces and fittings of the house and the entrances and pathways should be well cleaned.

9.3 Washing

Use of a detergent/sanitiser applied through a power washer may assist with loosening adherent dirt or steam cleaning may be useful for cleaning difficult equipment, such as metal tube feeders. Some manual scrubbing may also be necessary. Steam cleaning may also be used for the structure of the house but it has no sterilising effect so adequate disinfection should also be carried out. The shell of the building, ancillary rooms and equipment should then be cleaned by power washing paying particular attention to litter trapped in cracks and holes in dwarf walls at bird level.

If the electric system is not waterproof a higher standard of dusting together with fogging or fumigation should be used for high fittings. Small fittings such as switch boxes which cannot be power washed may be wiped with a cloth soaked in disinfectant after dry cleaning. The insides, and outside of the house should reach the same stage of cleaning before disinfection to avoid recontamination. After washing surfaces should be allowed to dry as fully as possible before disinfection and in particular all pooled wash water should be washed away.

9.4 Feed Bins

Feed bins, together with other parts of the distribution system such as augers, pipes, slave hoppers, reservoirs, pans, etc., should be emptied and cleaned to a high standard and allowed to dry completely. Feed and water trays or pans, gas heaters and wire to be used in brooders as well as space heaters and mobile stir fans should also be cleaned and disinfected to a high standard. Cleaning equipment such as scrapers, brushes, power washers etc., should be cleaned and disinfected before transferred to another house.

9.5 Water System

Water lines should be cleaned by flushing through followed by internal disinfection using a water system sanitiser. The header tank and surrounding platforms, beams etc., should be thoroughly cleaned and disinfected. Limescale aggregate on bell drinkers should be removed using acid products before disinfection.

9.6 Repairs and Maintenance

Staff and contractors carrying out repairs etc., should wear protective clothing provided by the farm. The exterior of toolboxes and stepladders etc., used by contractors should be disinfected on entry to the farm. Holes which allow easy access to rodents should be sealed. This includes drain holes which can be sealed with wiremesh plugs. All repairs which are likely to dislodge hidden litter or dust should be completed, preferably before washing but certainly before disinfection. If this is not possible the area worked on should be cleaned and redisinfectant.

9.7 Disinfection

Cleaning of buildings and equipment should be followed by disinfection using a Defra approved disinfectant. **It is important that all disinfectants are made up to the correct concentration otherwise they are likely to be ineffective.** In most cases the Defra General

Code of Practice for the Prevention and Control of *Salmonella* in Turkey Flocks

Orders concentrations are appropriate for *Salmonella* control on clean surfaces but in difficult to clean houses (e.g. old structures, earth floors etc.) higher concentrations can be used.

For houses that have not completely dried or are recurrently infected, higher concentrations of disinfectant (e.g. Defra T.B. Orders Concentration or concentrations up to the manufacturer's maximum recommended concentration) may be more appropriate. In general formaldehyde based disinfectants and, to a lesser extent, chlorocresol or synthetic phenolic disinfectants are the most effective when residual organic matter or biofilms are present. All surfaces should be thoroughly sprayed to saturation point with disinfectant and special attention should be given to floor surfaces, slave hoppers and reservoirs, nest boxes, dwarf walls, partitions, ventilation ducting and high beams, platforms and pipes. Ancillary rooms and the outside areas surrounding doors and ventilation ducts should also be disinfected.

In houses which are repeatedly infected it is advisable to commission a specialist contractor who is equipped to apply 10% formalin by high pressure power wash as this is much more effective than routine disinfection procedures.

9.8 Assembly and Check of Equipment

After it has been cleaned and disinfected equipment should be reassembled and replaced in the buildings. It is advisable to also include as much equipment as possible in the house disinfection to avoid recontamination (e.g. by wild bird droppings, splashes from pressure washing etc.) All equipment should be checked to ensure that it is functioning correctly. Drinkers should remain empty until after fogging or fumigation.

9.9 Fogging and Fumigation

Fogging with formaldehyde or a formaldehyde based product is the most effective method for secondary disinfection, but is not necessary when the main disinfection is carried out correctly. All doors and hatches

Cleaning and Disinfection at Depopulation

should be kept closed and fans turned off for as long as possible during fogging. Surfaces should be allowed to dry as much as possible after disinfection before fogging. Careful attention should be given to health and safety considerations during fogging. It is also possible to repeat fogging after laying new litter and final setting up of the house but this is not fully effective and should not be seen as a substitute for high standards of prior disinfection.

Changes in disinfection programmes should only be made after seeking specialist veterinary advice. In large turkey companies an in-house field trial of any new disinfectants under consideration would be appropriate.

9.10 Vehicles

Vehicles used for transporting birds and removal of manure and feed during cleaning should be cleaned and disinfected before use on another site. It is a legal requirement that Livestock vehicles **MUST** be disinfected using a disinfectant Defra approved against general orders. Farm vehicles used for serving poultry houses or handling wastes should be cleaned and disinfected as part of the routine site programme before repopulation. When necessary other vehicles used on the farm, including the inside floor and boot of private cars, should be cleaned.

9.11 Microbiological Assessment after Cleaning and Disinfection

The purpose of this is to ensure that, if *Salmonella* was detected in the house before depopulation, the cleaning and disinfection procedures have been effective. Ideally if *Salmonella* is detected after disinfection the process should be repeated but in some cases there will be insufficient time to allow this before restocking and positive results may signal the need for a higher standard of disinfection in future.

For reasons of safety buildings which have been treated with formaldehyde-based products should be thoroughly ventilated before they are entered for sampling. Ideally disinfectants should have had time

Code of Practice for the Prevention and Control of *Salmonella* in Turkey Flocks

to dry before samples are taken. It is recommended that the following samples are taken: floor swabs or sweepings, litter trapped in holes and cracks in dwarf walls, swabs (large gauze or cotton wool swabs in all cases taken over a large surface area of at least 1m², until there is visible soiling of the swab) from high fittings (i.e. beams, pipes, header tank platforms, roof extractors), bases of wooden support posts and partitions, wall mounted fan boxes and mobile stir fans, slave feed hoppers and reservoirs, brooder feed and water pans and floors and fittings in ante-rooms. If appropriate, any dead rodents or droppings found in the house should also be tested for *Salmonella*. On breeding farms nest boxes and associated ramps and egg collection equipment should also be sampled.

Samples should be taken after drying of disinfectants – ideally directly into pre-enrichment medium – and tested as soon as possible after collection in a Defra approved lab, ideally on the same day. Additional tests to determine surface coliform counts may also be useful to assess the effectiveness of cleaning and disinfection in the absence of *Salmonella*.

10. Restocking

10.1 Rodent Control

Baiting should be resumed as soon as possible after completion of washing and disinfection as this is a key time to attract rodents to bait when no feed is present. In heavily infested houses contact rodenticides and traps can be used on rodent runs which are out of reach of the birds, to supplement feed based baiting points placed in safe positions inside and outside the building and around the perimeter of the site. The take of bait should be regularly checked to ensure that there are no issues of poor palatability and that bait is replaced or refreshed as necessary. Whole wheat based bait is often used and is normally attractive to rats but not mice. A range of granular or sachet formulations are available and the most acceptable choice for local rodent populations should be determined empirically. Baiting should be

Cleaning and Disinfection at Depopulation

suitably thorough and intensive when rodent populations have built up to avoid the development of bait-averse descendants of rodents which evade the baiting programme.

10.2 Transport

Equipment and vehicles used for transporting poults from the hatchery should be dedicated to that purpose and should be cleaned and disinfected with a Defra approved disinfectant at General Orders Concentration before each occasion on which it is used.

10.3 Aids to *Salmonella* Control

In a situation where *Salmonella* has become prevalent within a turkey company the chance of acquiring infection or the prevalence of positive birds within the flock may be reduced by the adoption of additional measures including flock treatment with competitive exclusion products (CE) or treatment of feed or water with certain organic acid products. CE should be applied as soon after hatching as possible, preferably at the hatchery. Acidic feed additives containing the highest level of free acids are generally the most effective for protection of feed but specific blends of different organic acids may be more effective in the gut of the birds. You should consult your veterinary surgeon or a Defra *Salmonella* specialist for detailed advice on *Salmonella* control and the measures most applicable to an individual site problem.

In breeding flocks vaccination of birds with live or killed vaccines for *S.Typhimurium* may provide additional protection where there is a high risk of exposure or persistent infection on the farm. Detailed veterinary advice is required to design a suitable vaccination programme for the farm and to ensure correct delivery of the vaccines.

Published by the Department for Environment, Food and Rural Affairs.

© Crown Copyright 2010.

**Printed on material that contains a minimum of 100% recycled fibre
for uncoated paper and 75% recycled fibre for coated paper.**

www.defra.gov.uk

PB 13401