

Through-Chain Investigation Guidelines for Egg Associated Outbreaks

Guidance for environmental investigations at retail and egg primary production businesses

Introduction

Outbreaks of salmonellosis associated with inadequate handling of eggs (particularly raw egg based foods) have been reported with increased frequency in recent years.

Investigation of these outbreaks requires a review of food handling through the food chain to accurately determine the contributing factors. At the retail level (where such outbreaks are typically detected) it is essential to determine how eggs have been handled, overall hygiene of the business, and skills and knowledge of food handlers involved in preparation. A single egg carrying *Salmonella* may result in a large outbreak if food handling is inadequate.

Traceback from retail level to a primary production source is also required to ensure that eggs are produced and handled appropriately. Inadequate conditions during production and/or grading can amplify the amount and prevalence of *Salmonella* coming from an egg business.

Development of the guidelines

These through-chain investigation guidelines (the guidelines) are based around separate checklists for inspection at the retail and on-farm environments. As eggs are regularly shipped across jurisdictional boundaries the retail business where an outbreak is detected may be in a different State/Territory to the primary production environment.

The intention of these guidelines is to standardise investigation procedures for egg associated outbreaks across jurisdictions and ensure that findings are consistent. This will assist with interpretation of investigation findings and consideration of further control measures to prevent outbreaks from occurring. Both investigation checklists include guidance for obtaining food/environmental samples and collection of evidence.

Use of these guidelines

These guidelines do not override other procedures that may exist within various jurisdictions.

The document is intended for use by officers with responsibility for investigation and inspection of foodborne illness outbreaks at the retail and/or primary production level. The guidelines would be utilised when there is a possibility or suspicion that an outbreak may be egg-related (such as an epidemiological link to foods with a raw egg component).

Investigation findings should be communicated to relevant food safety officers and OzFoodNet epidemiologists to enable adequate recording and analysis of incidents at jurisdictional and national levels.

These guidelines are limited to the investigation of foodborne illness outbreaks and do not cover enforcement action arising from an incident.

Retail/Foodservice Investigation Checklist (Attachment 1)

The retail investigation checklist covers the following critical areas:

- i. Supplier Management and Product Receiving (eggs come from a reputable supplier and are in good condition)
- ii. Process Control (focusing on use of raw egg foods)
- iii. Product and Process Validation (food production and handling)
- iv. Cleaning and Sanitising (skills and knowledge relating to hygiene and sanitation)
- v. Sampling and Swabbing (collection of samples and critical evidence for the investigation)

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Areas i-iv as described above have been found as contributing factors in previous *Salmonella* outbreaks.

Farm Traceback Investigation Checklist (Attachment 2)

With the introduction of national food safety legislation at the primary production level, all egg farms and grading facilities should have appropriate controls in place to reduce *Salmonella* prevalence.

Key areas covered in this checklist include:

- i. External Farm Environment and Feed (addresses biosecurity of farm and feed/water storage)
- ii. Laying Shed Environment and Equipment (egg production facilities/nesting adequate)
- iii. Egg Processing Environment and Equipment (grading equipment functioning correctly and cleaned & sanitised)

***Salmonella* testing and analysis of samples**

It is essential that all food and environmental samples obtained for analysis of *Salmonella* are submitted to a suitable NATA accredited laboratory within 24 hours of collection from the primary source. Consideration should also be given to appropriate sample sizes and volume of samples, depending on resource and laboratory constraints.

All positive *Salmonella* isolates should be submitted to an appropriate reference laboratory to enable comparison with clinical or environmental isolates from other sources/jurisdictions.

Control actions

Actions required to address *Salmonella* contamination will vary depending on the circumstances of the outbreak, test results, and practices observed at both the retail and primary production environment.

In the retail environment it may be necessary to issue an order or notice to prevent further sale of implicated raw egg foods where this is strongly indicated by epidemiological or other evidence. Full closure of the business may be required in the event of obvious hygiene breaches or poor practices (including use of cracked/dirty eggs or unpasteurised pulp), adverse test results, or a lack of skills & knowledge around food handling.

At the farm level, detection of the outbreak strain of *Salmonella* on its own is not sufficient for justification of additional control measures. Swabbing of grading and packing equipment to determine the effectiveness of cleaning and sanitising measures is important to ensure that cross contamination between eggs is minimised. Where egg washing occurs, thorough review of this is also required to ensure that wash water does not act as a source of *Salmonella* to other eggs.

Attachment 1: Retail/Foodservice Investigation Checklist

Supplier Management and Product Reveal	
• Does the business purchase eggs from a commercial supplier with a certified food safety program?	<input type="checkbox"/>
• Does the business have valid invoices to enable trace back to the egg supplier?	<input type="checkbox"/>
• Do food handlers have adequate food safety training and skills relevant to associated foods and processes, to perform their work?	<input type="checkbox"/>
• Does the business accept eggs only in clean properly labelled packaging	<input type="checkbox"/>
• Does the business inspect eggs for any evidence of cracked and dirty eggs?	<input type="checkbox"/>
• Does the business reject egg deliveries when they find cracked or a high level of unclean eggs?	<input type="checkbox"/>
Comments/Observations:	

Process Control	
• Are eggs found with very minor visual contamination redirected to cooking?	<input type="checkbox"/>
• Are the eggs for raw/minimally processed foods kept under refrigerated storage?	<input type="checkbox"/>
• Are controls in place to minimise the likelihood of cross contamination to and from the eggs?	<input type="checkbox"/>
• Is the raw egg or minimally-processed finished products stored in a manner to prevent contamination?	<input type="checkbox"/>
• Is the raw egg or minimally processed finished products labelled with regard to identity and shelf life?	<input type="checkbox"/>
• Does the business monitor the time these types of raw or minimally processed egg products spend at ambient temperature?	<input type="checkbox"/>
• Is good cleaning and sanitising practiced throughout all aspects of processing including environment, equipment and utensils?	<input type="checkbox"/>
• Are any food products made in domestic premises?	<input type="checkbox"/>
• Are all food products made onsite?	<input type="checkbox"/>
• If so, does the business have established food recall procedures?	<input type="checkbox"/>
Comments/Observations:	

Product and Process Validation	
• Are the raw egg products given a long shelf life?	<input type="checkbox"/>
• How did the business determine the shelf life of the product?	<input type="checkbox"/>
• Is the Shelf life validation adequate?	<input type="checkbox"/>
• Does the raw egg product formulation contain an effective acidity regulator?	<input type="checkbox"/>
• Safe procedures used to separate egg yolks from whites?	<input type="checkbox"/>
• Fully functional hand wash basin or basins present in the relevant areas?	<input type="checkbox"/>
• Hand wash basin(s) stocked with soap and paper towels?	<input type="checkbox"/>
• Hand wash basin(s) only used for hand washing?	<input type="checkbox"/>
• Single use gloves present and being used	<input type="checkbox"/>
Comments/Observations:	

Cleaning and Sanitising	
• Is good cleaning and sanitising practiced throughout all aspects of processing including environment, equipment and utensils?	<input type="checkbox"/>
• Does the business have suitably labelled cleaning chemicals with regard to purpose, use and safety?	<input type="checkbox"/>
• Can the business demonstrate an effective cleaning and sanitising program with regard to complexity of food production; premise's size and equipment?	<input type="checkbox"/>
• Does the business use an appropriate sanitiser for food contact surfaces?	<input type="checkbox"/>
• Is the sanitiser used in the premises at an acceptable concentration to adequately sanitise food contact surfaces?	<input type="checkbox"/>
• Is hot water available in the premises?	<input type="checkbox"/>
• Does the business have a fully functional dishwasher?	<input type="checkbox"/>
• In the absence of a dishwasher does the business have a wash up sink area adequate for cleaning/sanitising the relevant utensils and equipment?	<input type="checkbox"/>
Comments/Observations:	

Sampling and swabbing	
• Left over implicated batch ingredients or finished product present?	<input type="checkbox"/>
• Sample available batch ingredients or finished product?	<input type="checkbox"/>
• Validate relevant process or processes	<input type="checkbox"/>
• Target relevant equipment, utensils and surfaces for swabbing	<input type="checkbox"/>
• Photograph storage, processing and display areas	<input type="checkbox"/>
• Photograph swab sites, relevant processing and where applicable ingredient and product packaging	<input type="checkbox"/>
• Photograph remaining eggs and egg cartons/packaging on site	<input type="checkbox"/>
• Egg delivery invoices for the outbreak time period	<input type="checkbox"/>
• Relevant Recipe, Menu and Booking lists	<input type="checkbox"/>
Comments/Observations:	

Signature

Date

Attachment 2: Farm Traceback Investigation Checklist

1. External Farm Environment and Feed

Farm Operational steps	<i>Salmonella</i> Reduction Strategies	Y or No	Sampling/Operational Verification protocols	Y or No
Outside Farm Environment	- Immediate surrounding areas tidy and not cluttered	<input type="checkbox"/>	- Visual observation of the environment	<input type="checkbox"/>
	- No obvious vermin infestation	<input type="checkbox"/>	- If required take photos and vermin faecal samples or other relevant swabs	<input type="checkbox"/>
	- Adequate drainage to prevent water pooling and mud formation	<input type="checkbox"/>		
External egg conveyors	- Egg Conveyors protected from environmental contamination	<input type="checkbox"/>	- Swab egg conveyor belt surfaces	<input type="checkbox"/>
	- Egg Conveyors in good working condition and suitable for use	<input type="checkbox"/>		
Solid Feed Storage	- Silos and storage sheds integral	<input type="checkbox"/>	- Sample finished feed mix	<input type="checkbox"/>
	- Ingredients for final mixing are protected from contamination	<input type="checkbox"/>	- Sample individual ingredient	<input type="checkbox"/>
Feed Water Supply	- Measures present to prevent fouling of feed and water with faeces	<input type="checkbox"/>	- Sample water from feeders and mains if supplied by tank	<input type="checkbox"/>
Comments/Observations:				

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Farm Operational steps	<i>Salmonella</i> Reduction Strategies	Y or No	Sampling Verification protocols	Y or No
Comments/ Observations: <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>				

3. Egg Processing Environment and Equipment

Farm Operational steps	<i>Salmonella</i> Reduction Strategies	Y or No	Sampling Verification protocols	Y or No
Egg Collection/ Grading Room(s) N.A: <input type="checkbox"/>	<ul style="list-style-type: none"> - Cleaning and sanitising program in place and effective - Equipment constructed and installed for effective cleaning and sanitising - Rooms are adequately constructed and maintained to prevent contamination - Pest Management program in place and effective - Potable water, hot and cold, present for cleaning - Facilities for hand washing present and effective - 2nd Grade Eggs for human consumption put through washing and candling - Staff have appropriate relevant skills and knowledge for their respective job functions 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> - Swab infeed rollers - Swab suction cups - Swab candling booth rollers - Swab any visually unclean areas or equipment (especially from broken eggs) - Sample first eggs at this point if not washed - Sample 2nds separately - Documented Training Program or able to adequately demonstrate necessary skills and knowledge 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Egg Candling N.A: <input type="checkbox"/>	<ul style="list-style-type: none"> - Equipment operational and functioning correctly - Good even lighting in the candling area - Clean mirrors for candling - Candling conveyor speed manageable to prevent operator fatigue - Regular breaks to assist concentration 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> - Visual inspection of candling operation - Review of documented procedures - Assessment of verification process checks 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

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	<ul style="list-style-type: none"> - Automatic detection machinery regularly checked to ensure correct functioning - Verification process checks should be performed at packing 	<input type="checkbox"/> <input type="checkbox"/>		
Egg Washing NA: <input type="checkbox"/>	<ul style="list-style-type: none"> - Effective cleaning, sanitising and drying system for reusable cloths or scourers. - Disposable cloths used as intended - Wet cloths not being used for egg cleaning - Cleanliness of interior of machine (nozzles, brushes, rollers) - Cleanliness of water (adequate replenishment periods if recycling) - Appropriate (and compatible) chemical/s and efficacious levels of active chemicals - Correct temperature of wash and rinse waters. - Adequate drying of eggs. - Appropriate monitoring of food safety management controls 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<ul style="list-style-type: none"> - Swab infeed and discharge rollers - Sample dirty egg wash water or washer brushes particularly if there is a build-up of organic matter - Swab any visually unclean areas or equipment (especially from broken eggs) - Verify efficaciousness of washing system testing pre and post washing egg samples 	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Egg Distribution NA: <input type="checkbox"/>	<ul style="list-style-type: none"> - Storage area visually clean and free of excessive build up 	<input type="checkbox"/>		
Egg Storage Temperatures NA: <input type="checkbox"/>	<ul style="list-style-type: none"> - Sufficient temperature and air circulation within the egg storage area to cool eggs within 24 hours of collection 	<input type="checkbox"/>		
Egg Traceability NA: <input type="checkbox"/>	<ul style="list-style-type: none"> - Egg stamping/packaging true to label and comply with requirements 	<input type="checkbox"/>		

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Comments/ Observations: <hr/> <hr/> <hr/> <hr/>				