

SALMONELLA ENTERITIDIS
in the CARIBBEAN

*Need for a ‘Farm to Table’ approach
for Food Safety*

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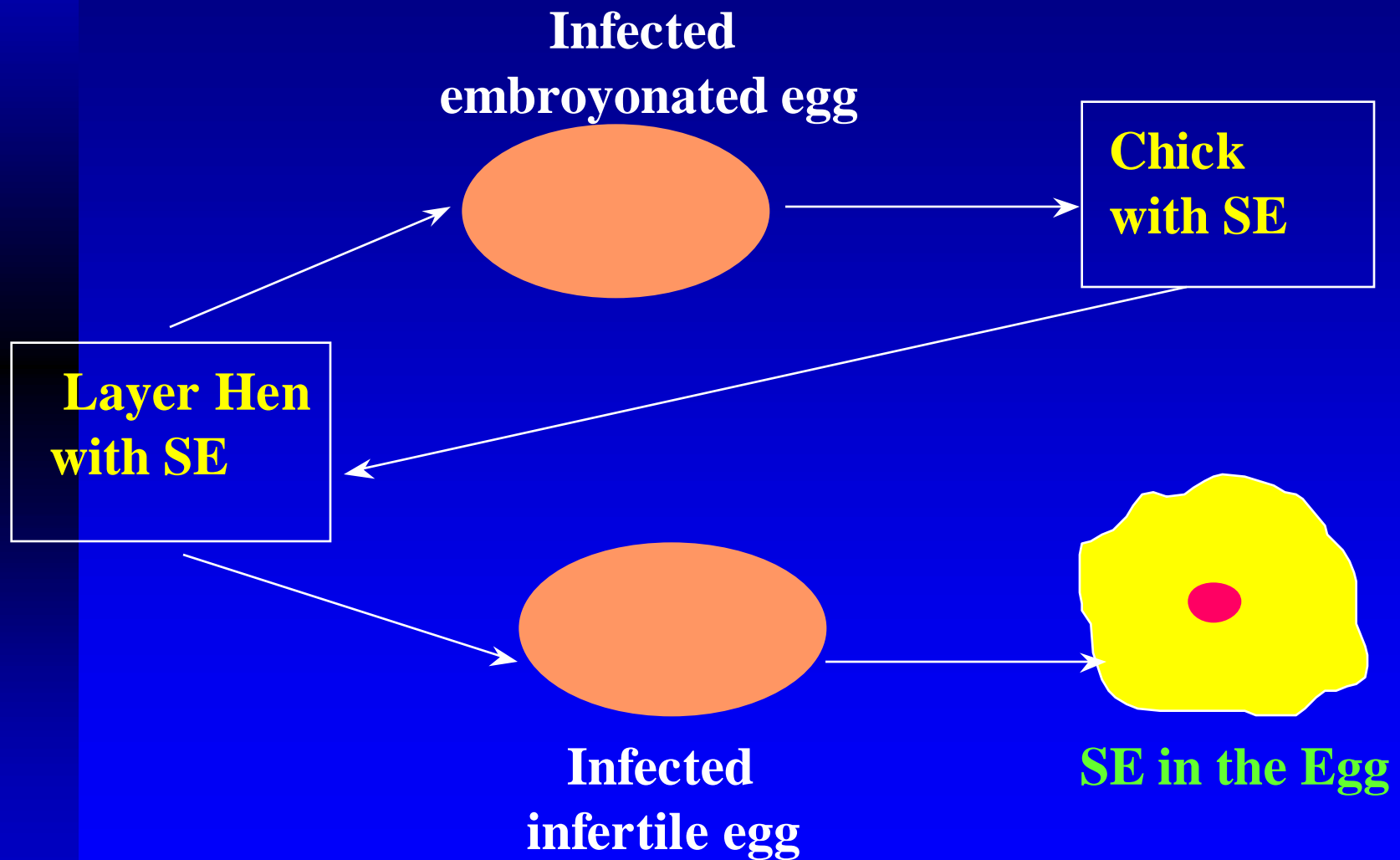
Prevalence of *Salmonella* Enteritidis

- Foodborne pathogen of global public health concern
- Emerged globally 1980s : prevalence rapidly increased
- The most common reported *Salmonella* globally
- **Caribbean: *Salmonella* : most common cause of FBD**
SE: most common *Salmonella*.
- 1989: new pathogen of public health concern
- **Most increase in *Salmonella* since 1995: due to SE**
- **Largest increases :T &T, Jamaica and Barbados**
- **Major and Multiple outbreaks in tourist resorts**
- **Considerable human and economic significance**

Sources and Risk Factors of SE

- Laying Hens , Eggs and Poultry harbor the organism
- Intact Shell Eggs :the main source of SE
- Raw and undercooked eggs and egg- containing dishes and drinks: implicated foods
- SE Infection in US and UK significantly associated with
 - ◆ International travel
 - ◆ Eating undercooked eggs & chickens Outside the home

Infection of Eggs with SE: Transovarian process



Impact of SE infection in Eggs

- **Before SE** : Shell eggs were considered inherently safe
-faecal contamination of eggs (cracked and dirty eggs)
- solved by proper handling and disinfection
- **Because of SE**: which can enter intact, uncracked eggs, image of eggs as a safe & nutritious food is at stake
- **Disinfection has no effect** on SE
- 1990 FDA redesignated **shell eggs as a potentially hazardous food**, *requiring refrigeration, proper cooking*

Study:

Salmonella enteritidis infections in Trinidad,
Barbados and Jamaica,

using a *multidisciplinary approach* of

Epidemiological (*invest. of outbreaks, cases*)

- **Laboratory** (*isolation, phagetyping, DNA*)
- **Environmental** (*traceback to farm, farm practices and sanitation*)

Findings:

Raw and Undercooked
Eggs and their Dishes
are the main sources of
SE infection the
Caribbean

Contributing Factors

- Raw egg consumption
- Undercooking/improper cooking of Egg containing dishes
- Pooling of eggs
- Non Refrigerated storage of eggs
- Poor Hygiene, poor egg handling practices
- Poor farm management and unsanitary practices

SE in Trinidad and Tobago

- Main SE source: shell eggs :
- Major vehicles: Raw & undercooked eggs :
- Main foods: : Homemade eggnog, cake batter, ice cream raw egg containing beverages
(eggs & stout, orange juice, punch a crème, eggnog)
reflect cultural customs
- Pooling of eggs, Handling raw eggs, Non-refrigeration: increased risk of SE
- Refrigerated eggs : protective against SE

SE in Barbados

- SE infection in Barbados is associated with consuming
 - ◆ **undercooked eggs**
 - ◆ **undercooked chickens**
- Main foods: Soft boiled eggs, scrambled eggs, caesar salad
- SE outbreaks and cases -involved Tourists:
Implications for tourism and trade

SE Outbreaks in Barbados

- 81% of outbreaks from 1990-99: due to salmonellosis
 - ◆ 69% occurred in major tourist resorts
 - ◆ 56% were due to SE infections
- From August 1998- Nov. 2000: 9 SE outbreaks
 - ◆ 3 in hotels involving visitors
 - ◆ 6 family clusters
 - ◆ Undercooked eggs and undercooked chickens

SE in Jamaica

- **11% in 1997 to 49% in 2000**
- **37% Tourists, 63% residents**
- **Outbreaks: serious negative impact on tourism**
 - ◆ Large outbreaks at hotels, mainly all-inclusive
 - ◆ **1997**: 3 outbreaks-chain of all-inclusive hotels
 - ☞ most likely due to imported bulk liquid eggs
 - ◆ **2000**: Jan-July 2000: Multiple hotel outbreaks
 - ☞ Common source suppliers for eggs and chickens
 - ☞ SE from eggs from farm that supplied hotels

Egg-Farm Surveillance

- SE found in foods and traced to source (eggs)
- SE repeatedly found in egg contents, shells, environment (faces, litter, manure, egg belt) on implicated egg farms in Trinidad
- Found in contents and shells from farm supplying eggs to hotels where there were SE outbreaks and on shell of other farms in Jamaica.
- Farm and clinical isolates of same PTs

Egg-Farms Practices

- ◆ Poor Sanitation (esp. wet litter, waste build-up)
- ◆ Improper Egg washing: Pooling, stagnant water
- ◆ Non refrigerated storage and distribution
- ◆ Sale of crack eggs
- ◆ Rodent and Fly infestations
- ◆ Overcrowding
- ◆ Molting
- ◆ Improper waste disposal
- ◆ No microbial monitoring program

Impact of SE in the Caribbean

- Emergence of SE: changed epidemiology of Salmonella
- Increasing impact of SE on tourists and local pop.
- Serious Economic Impact and Implications
 - ◆ Public Health
 - ◆ Food Safety
 - ◆ Agriculture
 - ◆ Tourism and Trade
- Tourism is economic mainstay: Barbados and Jamaica
- Ensure health status of visitors and locals via safe food

RECOMMENDATIONS

- Thorough cooking of all egg dishes
- Avoid the use of raw /undercooked eggs : especially in the very young, old and ill persons
- Purchase of refrigerated eggs & refrigerating at home
- Public Health education on the risks of eating raw and undercooked eggs
- Specific messages targeted to consumers, egg farms, grocers, restaurants , hotels, food services, institutions
- On farm traceback studies and testing of flocks for SE
- Virulence studies

Prevention and Control

Farm to Table holistic, multi-level approach

- ◆ Cooperation, coordination and commitment from all levels: source-production-distribution-consumption
- ◆ Food safety organizations, governments, surveillance and laboratory, research, regulations, education

Prevention and Control

- Improvement in Surveillance, Outbreak Identification and investigation and Public Health Response
- Improvements in Laboratory Techniques
- Public Health Education
- Programs for Reduction of SE in flocks
 - ◆ Hatchery surveillance; environmental testing of flocks and eggs, traceback studies
 - ◆ Traceback to imported source
 - ◆ Vaccination
- Regulate importation of table eggs, feeds and chickens
- Research

CAREC's

Foodborne Disease and Prevention program

- Purpose: Improving health, via reducing FBD
- Approach: coordinated Multidisciplinary, Interagency
- Promotion of Farm to Table Interventions
- In collaboration with PAHO (CPC)
 - Include: Improving Surveillance
 - Laboratory Strengthening and coordination
(veterinary, clinical, food, analytical)
 - Training
 - Information to guide Public Health Intervention