

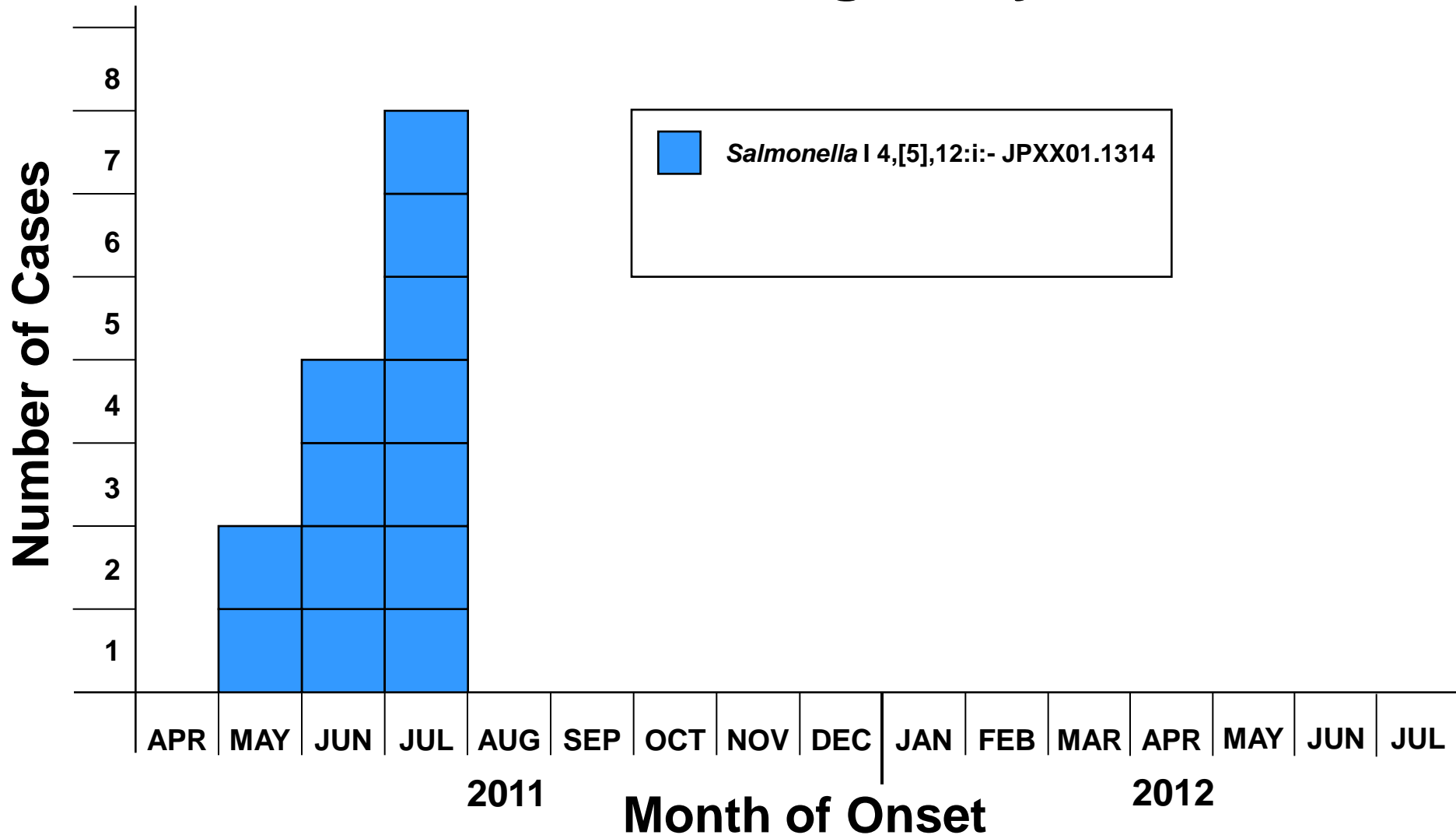
# **Salmonellosis Associated with Exposure to Live Animal Slaughter Markets**

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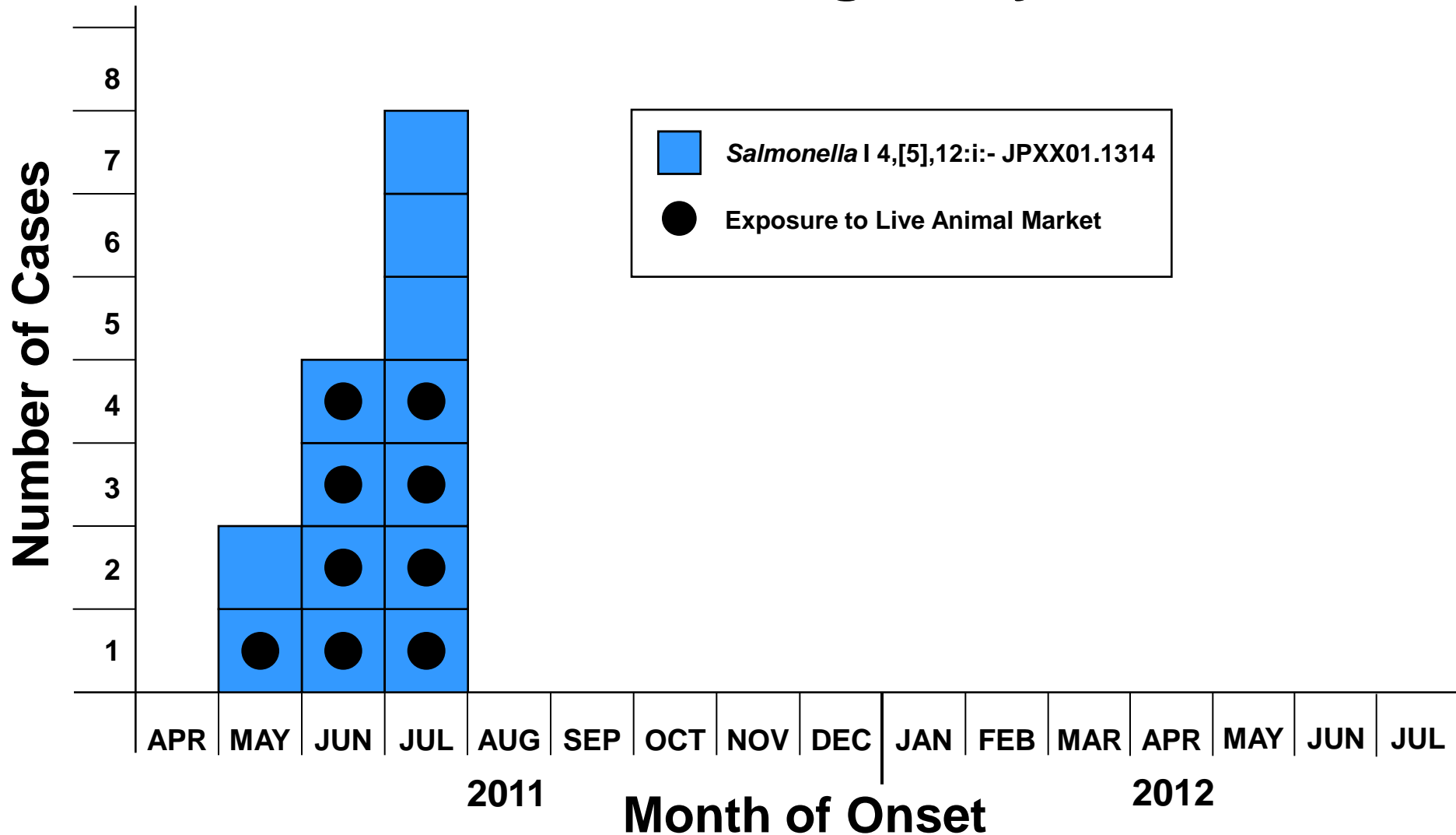
**<sup>1</sup>Minnesota Department of Health**

**<sup>2</sup>Minnesota Department of Agriculture**

# S. I 4,5,12:i:- Pulsed-field Gel Electrophoresis (PFGE) Subtype JPXX01.1314 Cases by Date of Illness Onset, through July 2011



# S. I 4,5,12:i:- Pulsed-field Gel Electrophoresis (PFGE) Subtype JPXX01.1314 Cases by Date of Illness Onset, through July 2011



# Live Animal Slaughter Markets

- Three markets located in adjacent buildings in an industrial area
- Live animals purchased from some of the same sources
- Live animals held onsite
- Custom-exempt slaughter and processing



# Environmental Sampling at Market A

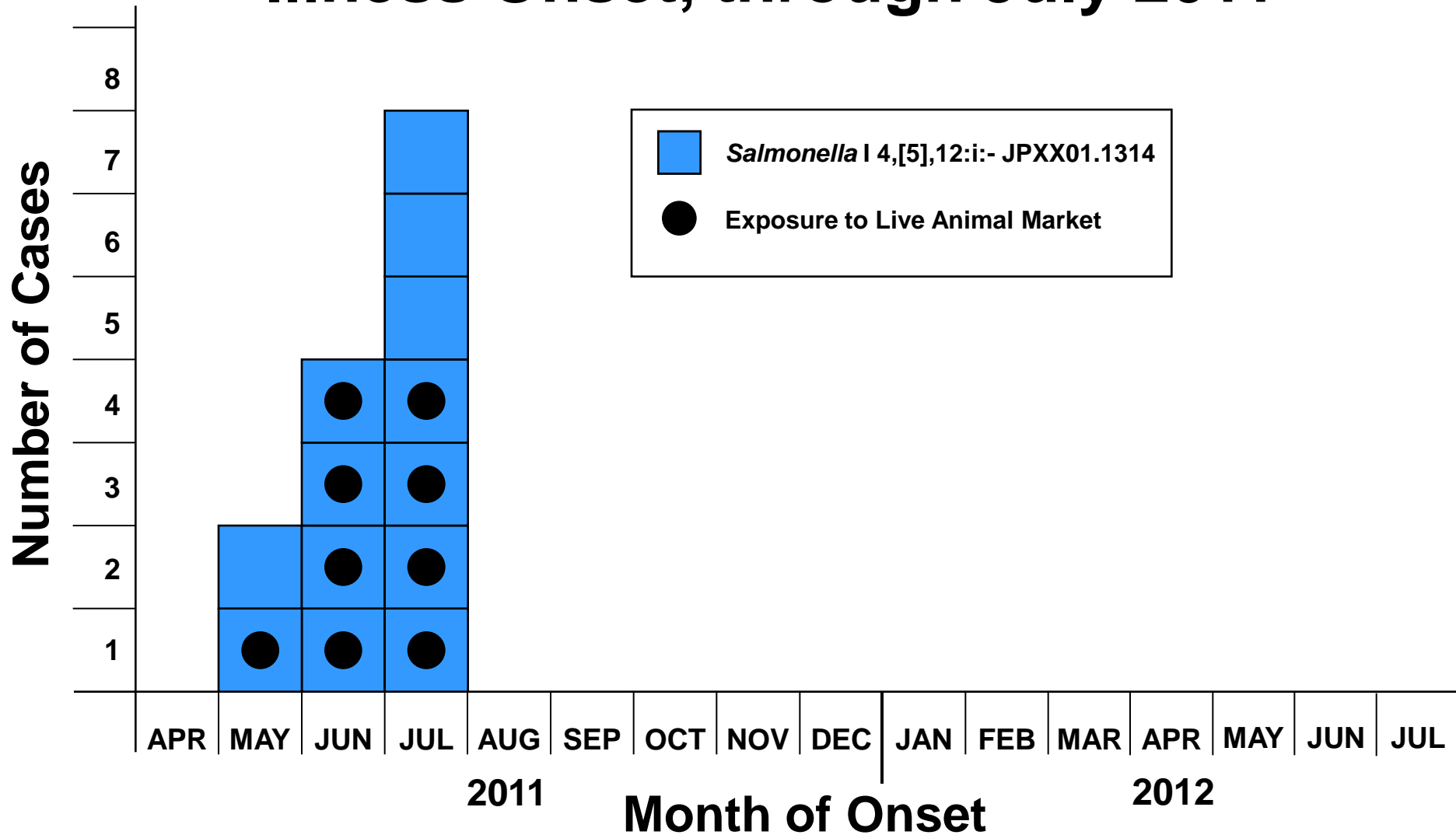
- 22/40 (55%) environmental swabs positive for *Salmonella*
- 10 serotypes found
- Outbreak pattern of *S.* I 4,5,12:i:- isolated from one swab taken inside a live goat/sheep pen

<i>Salmonella</i> Serotype	Number of Positive Swabs
Adelaide	6
Anatum	3
Chailey	1
Derby	3
Give	1
I 4,5,12:i:-	1
Infantis	5
Ohio	2
Rissen	4
Johannesburg	1

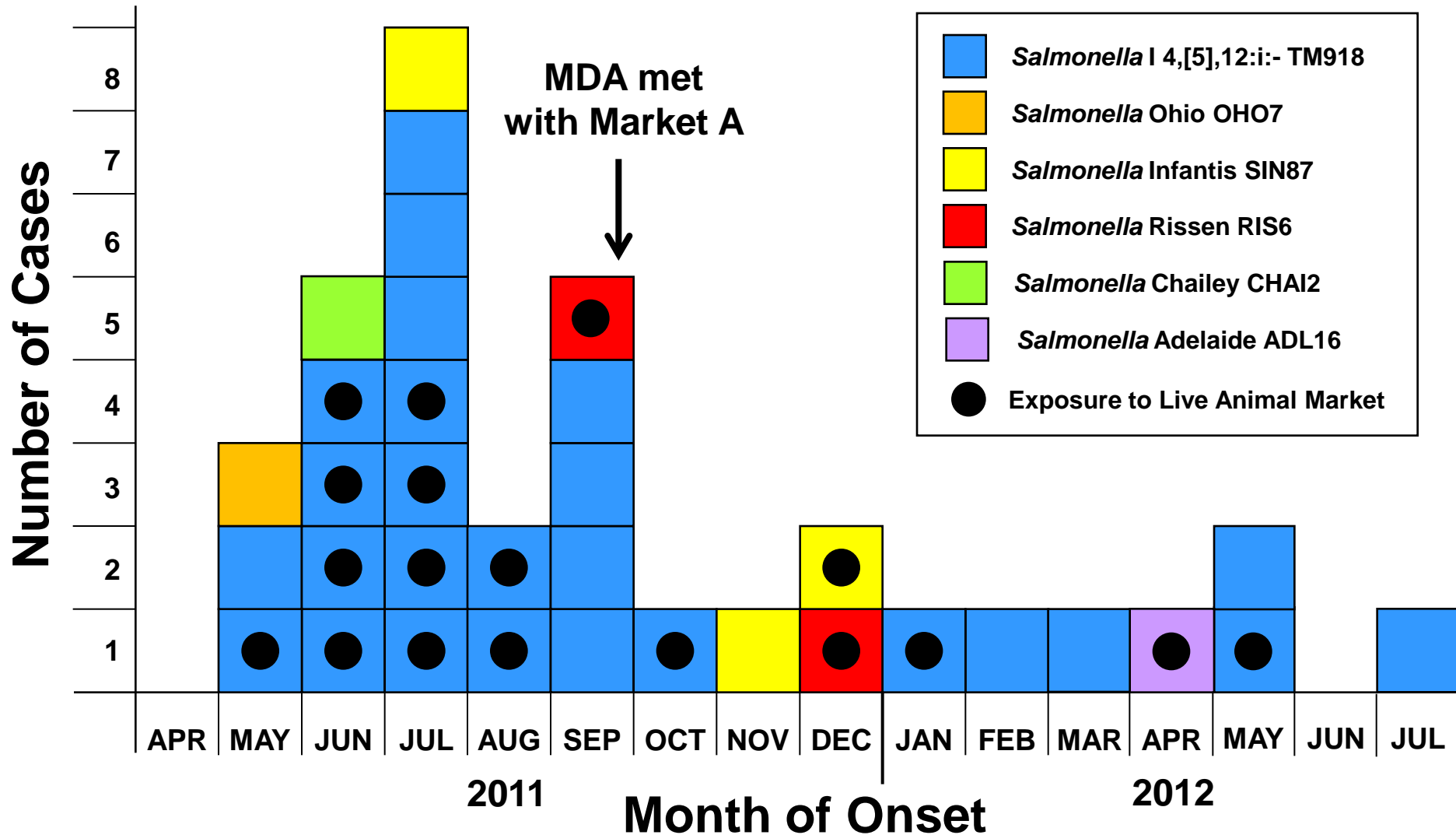
# Case Definition

- **Cases defined as persons positive for a serotype and PFGE pattern of *Salmonella* matching an isolate from Market A**
  - **Cases interviewed with a supplemental questionnaire detailing exposures to live animal markets and to meat from the markets**

# S. I 4,5,12:i:- PFGE Subtype JPXX01.1314 Cases by Date of Illness Onset, through July 2011



# Salmonellosis Cases that Matched a Market A Isolate by Serotype, Date of Illness Onset, and Live Animal Market Exposure Status, 2011-2012





# **Type of Exposure Among Cases with a Link to a Live Animal Market (n=18)**

- **4 (22%) visited the market**
- **14 (78%) lived in or visited a household where meat from the markets was processed, prepared, or consumed**
  - **3 (21%) consumed meat from the markets**

# Exposure to Live Animal Markets

- **Difficult to define**
- **Most cases had indirect exposure**
  - **Living in a household where meat processed (e.g., washed in kitchen sink)**
  - **Visiting relative's home where meat was prepared and served**
  - **Attending an event where meat was served**
- **Visit to market may have taken place months prior to case's onset**

# Case Live Animal Market Exposures (n=18)

- **13 (72%) shopped at Market A**
- **4 (22%) shopped at Market B**
- **6 (33%) shopped at Market C**
- **2 (11%) unknown Market**

<b>Animal Purchased</b>	<b>n (%)</b>
<b>Pig</b>	<b>10 (56%)</b>
<b>Chicken</b>	<b>10 (56%)</b>
<b>Goat</b>	<b>4 (22%)</b>
<b>Cow</b>	<b>2 (11%)</b>
<b>Sheep</b>	<b>2 (11%)</b>

# Case Demographics (n=18)

## Race/Ethnicity

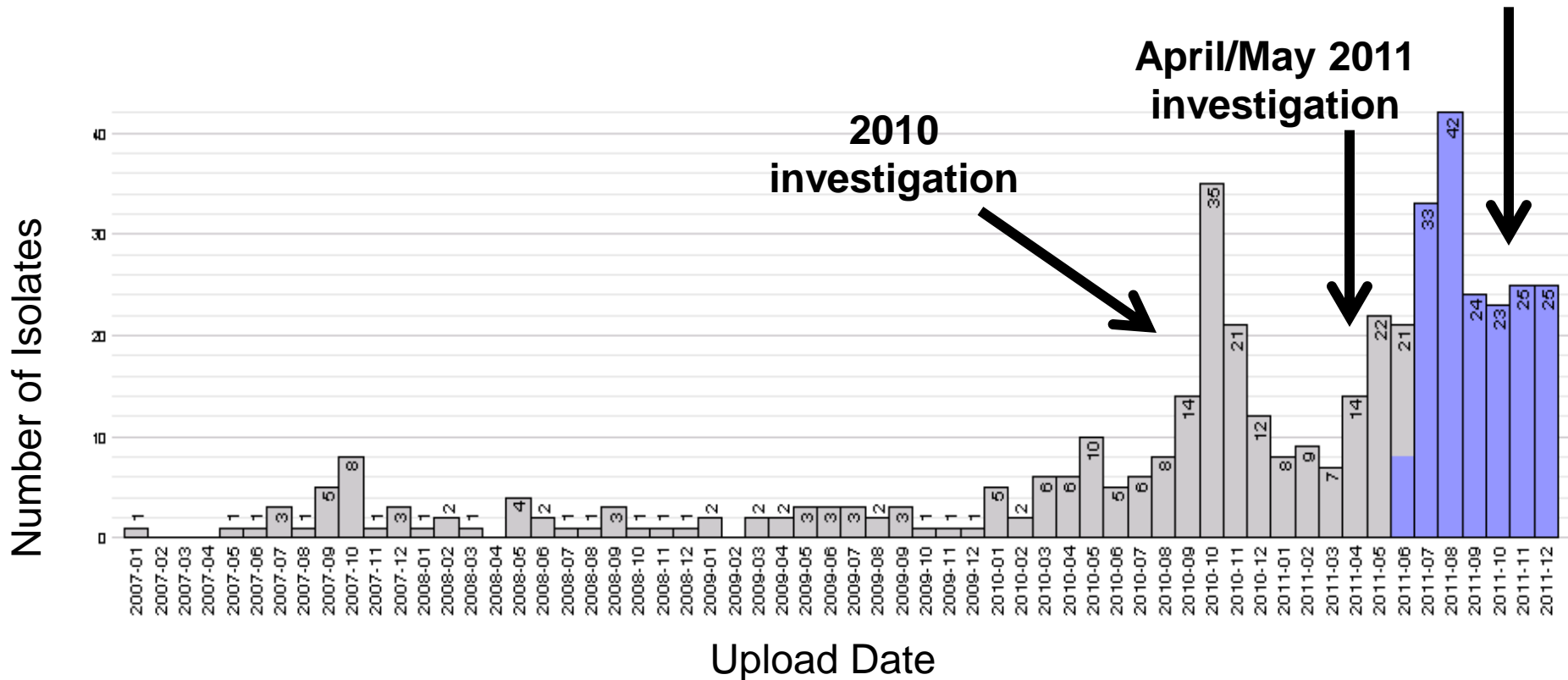
- 11 (61%) Asian (predominantly Hmong)
- 6 (33%) Black
- 1 (6%) Other, Hispanic

## Age

- Median age, 6 mos (range, 1 mo to 64 yrs)
  - 6 (33%) hospitalized; all  $\leq 1$  yr old

# S. 4,5,12:i:- JPXX01.1314 Isolates by Date of Upload to PulseNet, U.S., 2007-2011

May 2011 – February  
2012 investigation  
\*Included MN live  
animal market  
outbreak cases



# Challenges Presented by Outbreaks in Live Animal Market Settings

- **Language barriers**
- **Difficult to capture live animal market exposure during routine interviews**
  - **Market visit not in 7 days prior to case's onset**
  - **Indirect exposure**
  - **No universal term for markets**
- **Product-handling practices (e.g., washing meat at home) can be difficult to characterize**

# Challenges Presented by Outbreaks in Live Animal Market Settings (cont.)

- Live animal pens excellent environment for transmission of *Salmonella*
- Minnesota Department of Agriculture has limited regulatory jurisdiction to mandate interventions

# **Interventions at Market A**

- **Asked to increase frequency of sanitation and disinfection**
- **Market A hired a staff person to clean during operations**
- **Minnesota Department of Agriculture is working with Hmong-speaking students to observe market patron practices and identify potential interventions**
- **Meat-handling signs to be hung at Market A**



# Summary

- **Outbreak of salmonellosis of multiple serotypes associated with exposure to live animal markets**
- **Live animal markets are a unique exposure setting that disproportionately affects minority populations**
- **Large proportion of cases without direct market exposure suggests heavy contamination of meats and unsafe meat handling/preparation at home**

# Acknowledgements

## Minnesota Department of Health

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- Others