Using a Tiered Approach to Employee Health Guidelines to Address the Control of Norovirus in the FDA 2005 Food Code

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Presentation Overview

- The approach
- Pathogens of concern for food workers
  - The critical factors
  - Why the concern about Norovirus?
- 4-tiered Employee Health System

The Approach
Risk-Based Employee Health

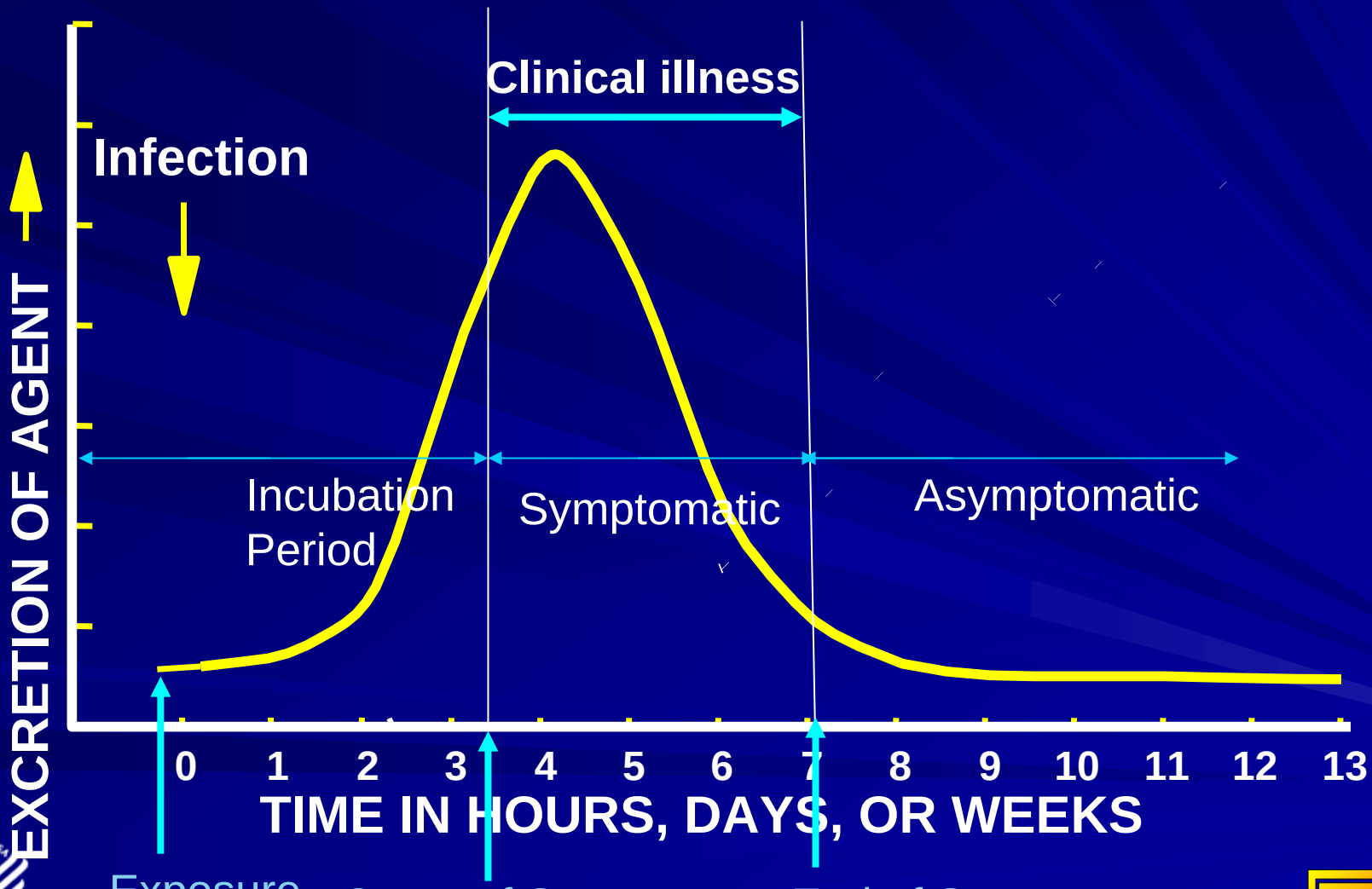
- Based on 4 Levels of Risk
- Removes infected food workers when most likely to transmit a pathogen to food items
- Balances employee's needs with risk to the public
- Provides guidance on safely allowing infected employees to return to duties

How to translate the levels of risk into a tiered approach to protect public health

- Risk
  - **How much organism is being excreted?**
  - **How close is the person to the food?**

- The more that is excreted and the closer to food - the greater the risk

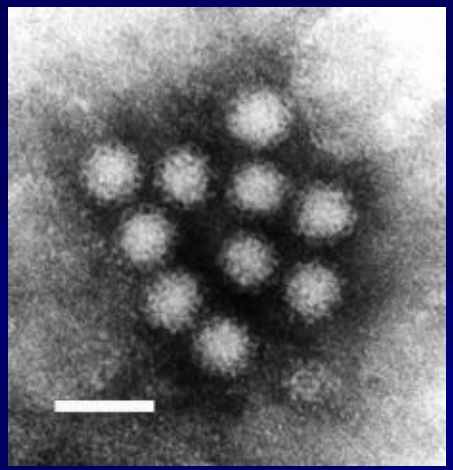
Disease Process Timeline



Factors that determine the pathogens with highest risk of transmission

- **Pathogenicity**
  - **Ability of the organism to cause disease**
- **Virulence factors**
  - **The factors that allow the organism to make someone sick**
- **Communicability**
  - **Ease of spread**
- **Epidemiology**
  - **The data we have to show transmission from food Outbreaks etc.**
- **Other**
  - **CDC List of Infectious & Communicable Diseases**

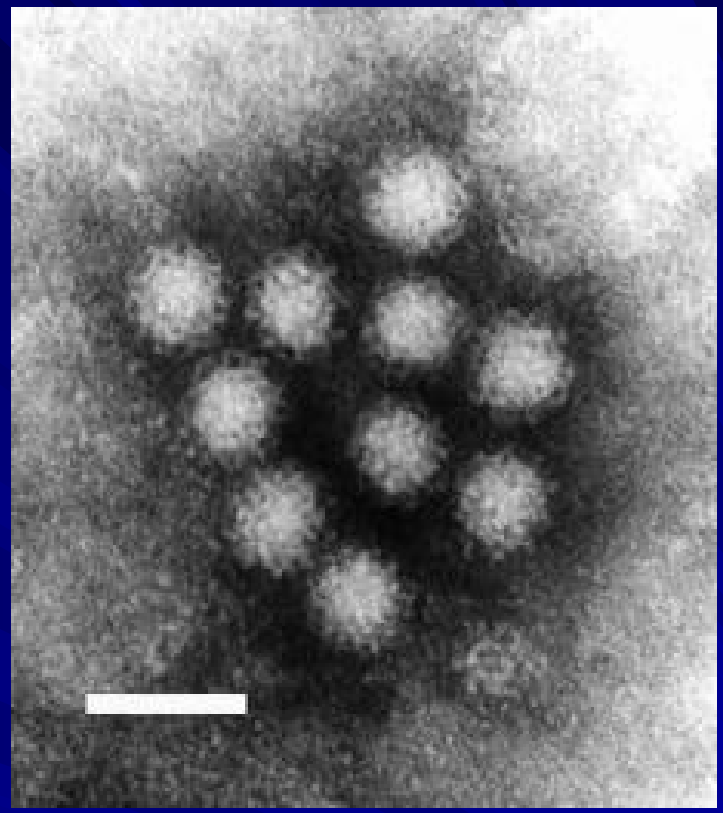
THE "BIG FIVE"
GI pathogens listed in the Food Code



Source: CDC

- **Norovirus**
- *Salmonella* Typhi
- Hepatitis A Virus
- *Shigella spp.*
- Enterohemorrhagic or Shiga toxin-producing *E.coli*

Norovirus Virus



Bar = 50 nanometers

Reported as the single most common cause of gastroenteritis in the western world

Recent Norovirus Outbreaks 2005[1]

Month	State	Facility Type	Number Ill
Jan. 14	Kent County, MI	Restaurant- Sub Sandwich shop	87
July	Virginia	Boy Scout Camping Event	56
September	Colorado	River Tours	100
Sept.-Nov.	Nebraska	Elementary Schools	125
October	Nebraska	Hotel	300
November	Nebraska	University	40
December	Cincinnati, OH	Hotel	200
December	Santa Cruz County, CA	Upscale Restaurant	90

[1]As Reported in 2005 News Articles

Recent Norovirus Outbreaks 2006[1]

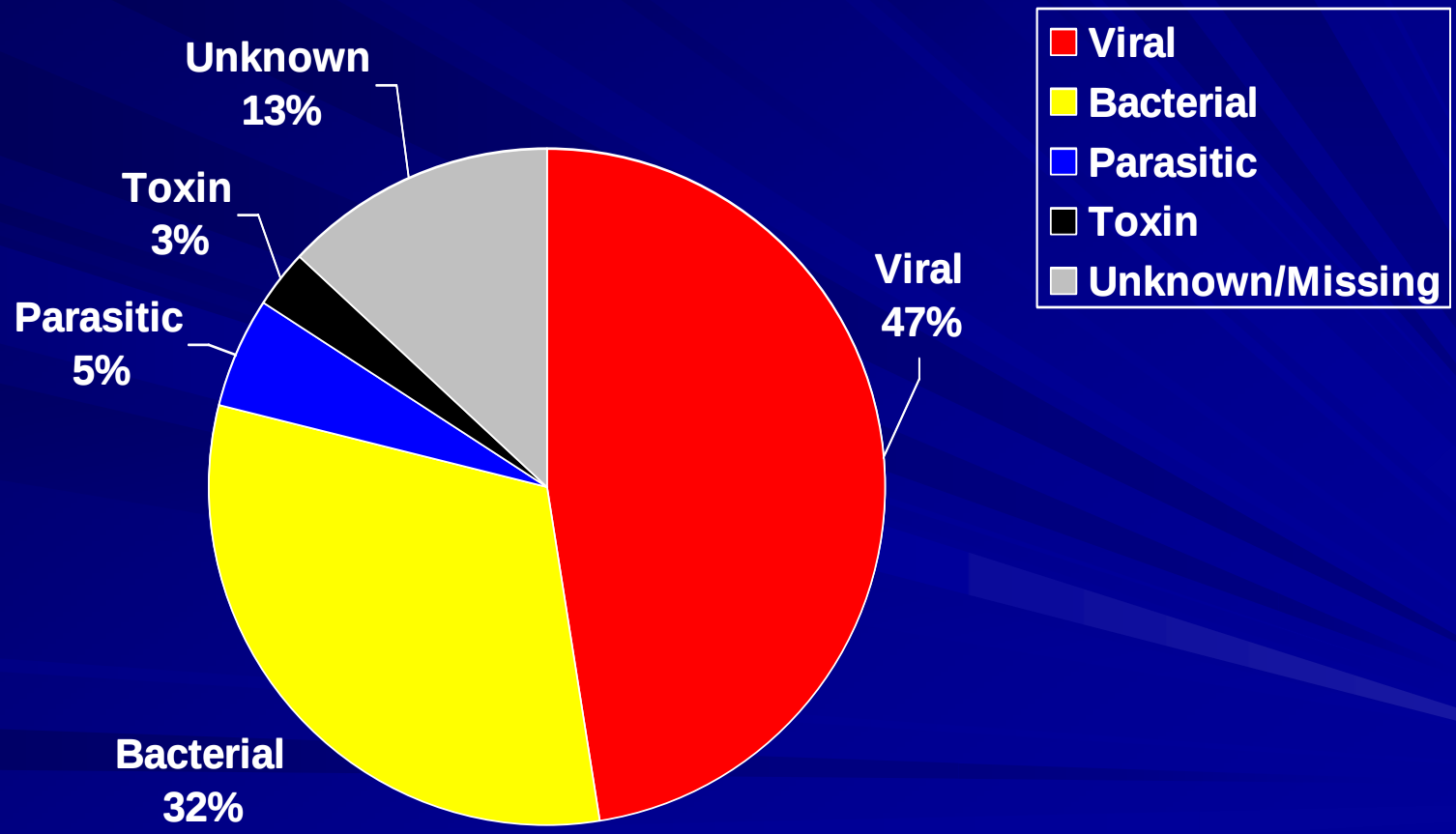
Month	State	Facility Type	Number Ill
Jan. 14	Indiana	Middle School	245
Jan. 27-30	Michigan	Italian Restaurant	> 430
February	Chicago, IL	Hotel AMA Meeting	>150
Jan.-Feb.	Minnesota	Restaurants, hotels, nursing homes, and schools	>29 Outbreaks
March	Florida & California	Cruise Ships	>500
April	Florida	University	150
April	Vancouver, WA	Assisted Living Facility	55 residents & staff—3 deaths

[1]As Reported in 2006 News Articles

CDC's EHSNET OUTBREAK/NONOUTBREAK STUDY

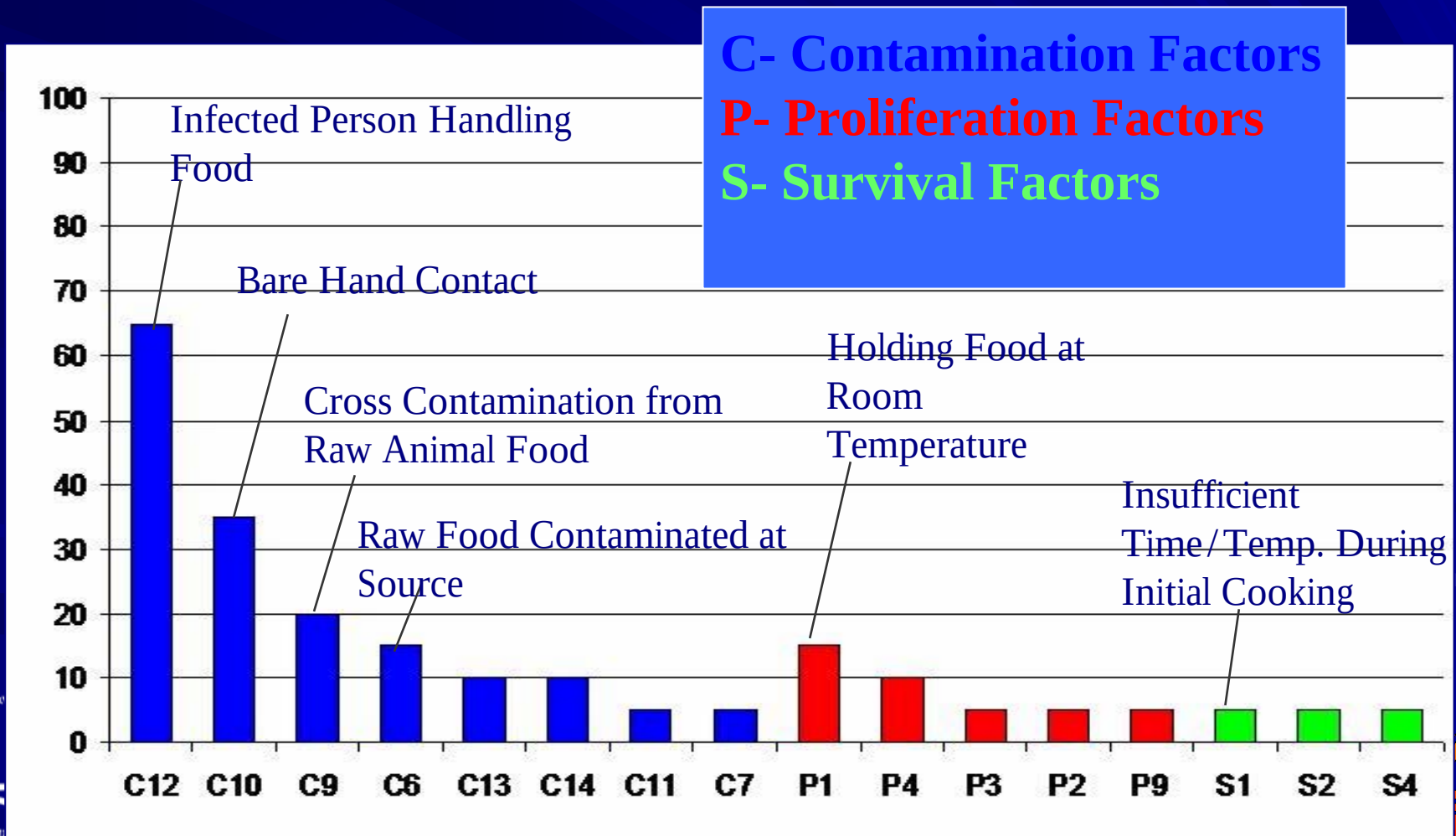
6/2002 – 6/2003

EFORS-Listed Outbreaks Evaluated by EHS-Net



CDC's EHS NET OUTBREAK/NONOUTBREAK STUDY

Contributing Factors Identified in Outbreaks, EHSNET, 2002-2003



Potential Transmission Level Norovirus

- Shed in the feces at levels up to 10,000,000 viral particles per gram of feces.
- One projectile vomiting incident can potentially contaminate the environment with 30,000,000 viral particles.
- Infectious dose of NoV is estimated from 10-100 viral particles.

Transfer from Contaminated Fingers

- Barker (2004) found that NV can transfer from contaminated fingers, sequentially to 7 different environmental surfaces
- Secondary Transfer of NV (from contaminated surfaces to clean fingers, to other surfaces)
  - can transfer sequentially to 4 different surfaces
- Detergent cleaning, followed by rinsing was not effective in cleaning contaminated surfaces, unless followed with a disinfectant.

All Food Code Listed Pathogens Have an Extremely Low Infectious Dose

- Hepatitis A virus ~ 10 or less viral particles
- Norovirus ~ 10 to 100 viral particles
- EHEC is as low as 10 bacterial cells
- *Shigella* spp. can be as low as 10 bacterial cells
- *S.*Typhi is considered low for bacteria ~ 1000 bacterial cells

Potential Contamination Level per Gram of Feces:

- Hepatitis A (HAV): 10^8 viral particles
- Noroviruses (NoV): 10^7 viral particles
- Bacterial infections: 10^6

The tiered approach

- **Risk**
  - **How much organism is being excreted?**
  - **How close is the person to the food?**
- **The more that is excreted and the closer to food the greater the risk**

Need to Base Exclusion on Active Symptoms

- Gastrointestinal Symptoms of Concern:
  - Vomiting
  - Diarrhea
  - Jaundice
- Other symptoms of concern
  - Sore throat with fever
  - Infected wound, pustule or boil

Note: Fever is Deleted as a Symptom of Concern

Risk-Based Employee Health

- **Level I:**
  - **Active Gastrointestinal Symptoms: or diagnosis with S. Typhi or hepatitis A virus**
- **Level II:**
  - **Diagnosis and symptom resolution**
- **Level III:**
  - **Diagnosis and never developed symptoms.**
- **Level IV:**
  - **Exposure to Listed Pathogen**

Level I: Most Hazardous or Most Likely to Cause Foodborne Illness

- Symptomatic-- with active vomiting, diarrhea, or jaundice – no diagnosis
- Diagnosed with *S. Typhi*
- Diagnosed with hepatitis A within 14 days of symptoms
- Active symptoms of diarrhea or vomiting, and Diagnosed with Norovirus, EHEC, or *Shigella* spp. infection.
- Exclusion (Highly susceptible and general population)

Level II: Less Likely to be Carrying Pathogen in Intestinal Tract, but Still a Hazard

- Diagnosed with Listed Pathogen, but gastrointestinal symptoms have resolved

- Periods of Exclusion (in an HSP Facility), or Restriction (in a general population facility) are recommended, based on the pathogen.

Level III: Even Less Likely to be Shedding Pathogen, but Identified as a Potential Hazard

- Diagnosed & asymptomatic food workers who never developed symptoms
- Typically identified during a foodborne illness outbreak
- Periods of Exclusion (in an HSP Facility), or Restriction (in a general population facility) are recommended, based on the pathogen.

Level IV: Least likely to be shedding a listed pathogen, but still a potential hazard

- Food Worker who reports an exposure to a listed pathogen, but has not developed symptoms
- The potential hazard is enough to recommend restriction for food workers in a HSP
- The period of restriction is linked to the upper end of the average incubation period for each listed pathogen

Conclusions

- **Multiple ways used to protect public health**
  - **Employee health**
  - **Handwashing**
  - **No bare hand contact with ready-to-eat foods**
- **New focus is based on new science regarding the agents that are most likely to be transmitted from a sick food worker via food.**
  - **Norovirus**
  - **Hepatitis A virus**
  - ***S.* typhi**
  - ***Shigella***
  - ***E.coli* O157:H7 or other EHEC**
- **Success will be dependent on raising awareness and education**

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Questions?