

# Overview of CDC efforts to address food attribution

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FSIS Public meeting: Attributing Illness to Food

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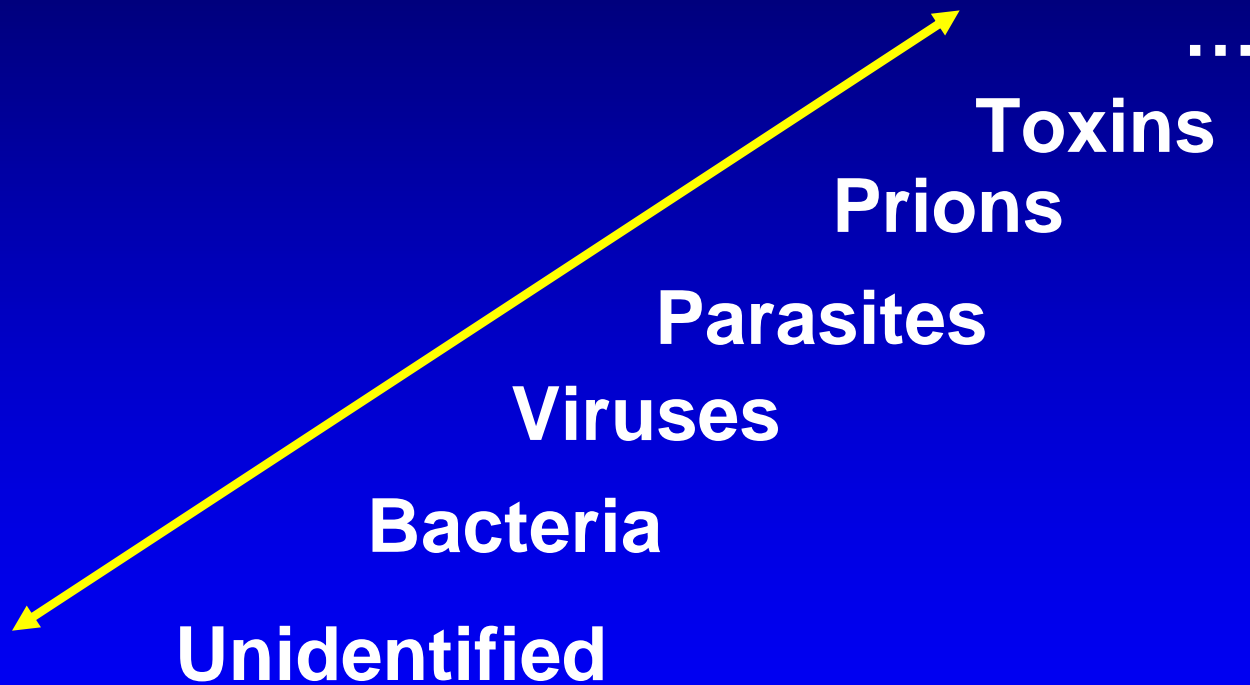
# Attributing health burden to specific food groups

- We estimated the burden of foodborne disease
- How much of those illnesses, hospitalizations and deaths can we attribute to specific categories of foods?
- Not easy - made possible by new data and support
- Discuss today some approaches that we consider “Version 1.0”

# Attributing health burden to specific food groups

- **A conceptual framework**
- **Attribution at multiple levels of food production**
- **Different data and different approaches for the different levels**
  - **EFORS: National foodborne outbreak surveillance data**
  - **FoodNet: case-control studies of specific pathogens**
  - **PulseNet: Molecular subtyping as tool for attribution**

# The pathogen dimension

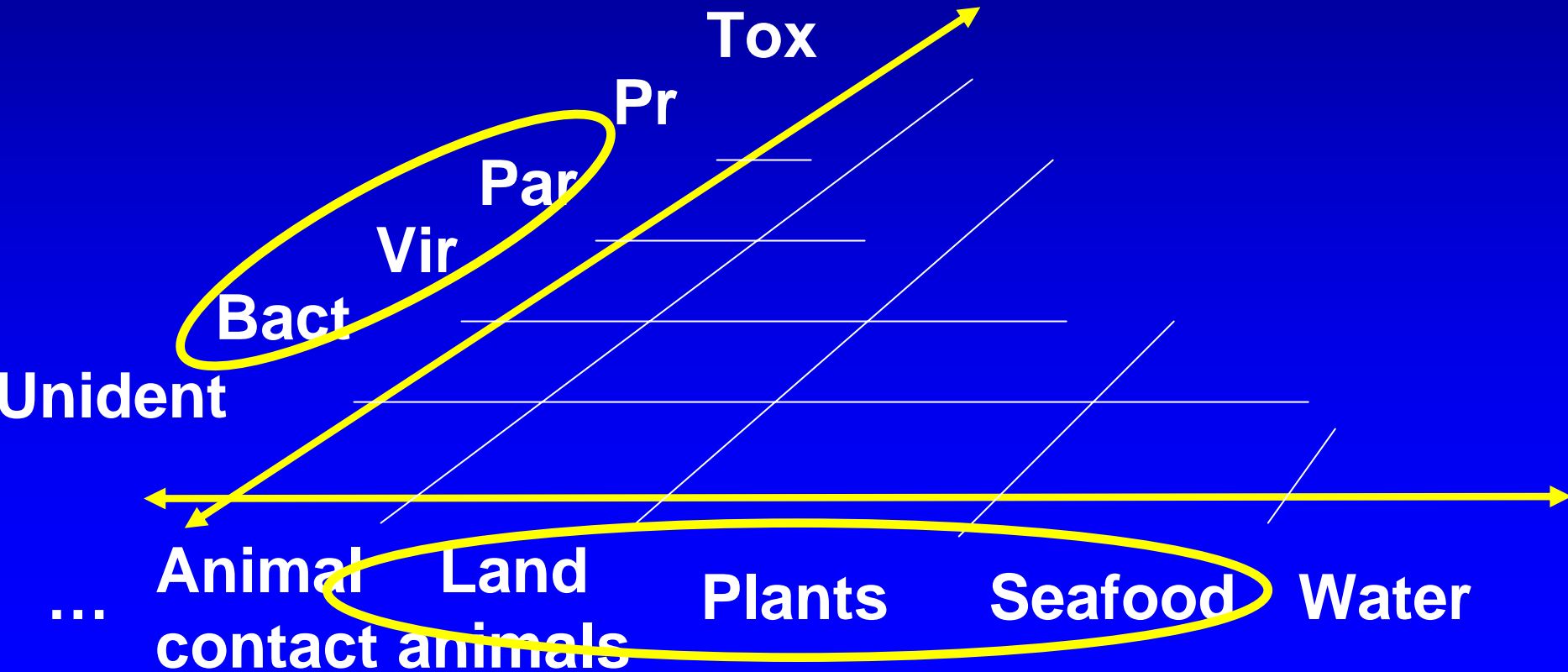


# The vehicle dimension

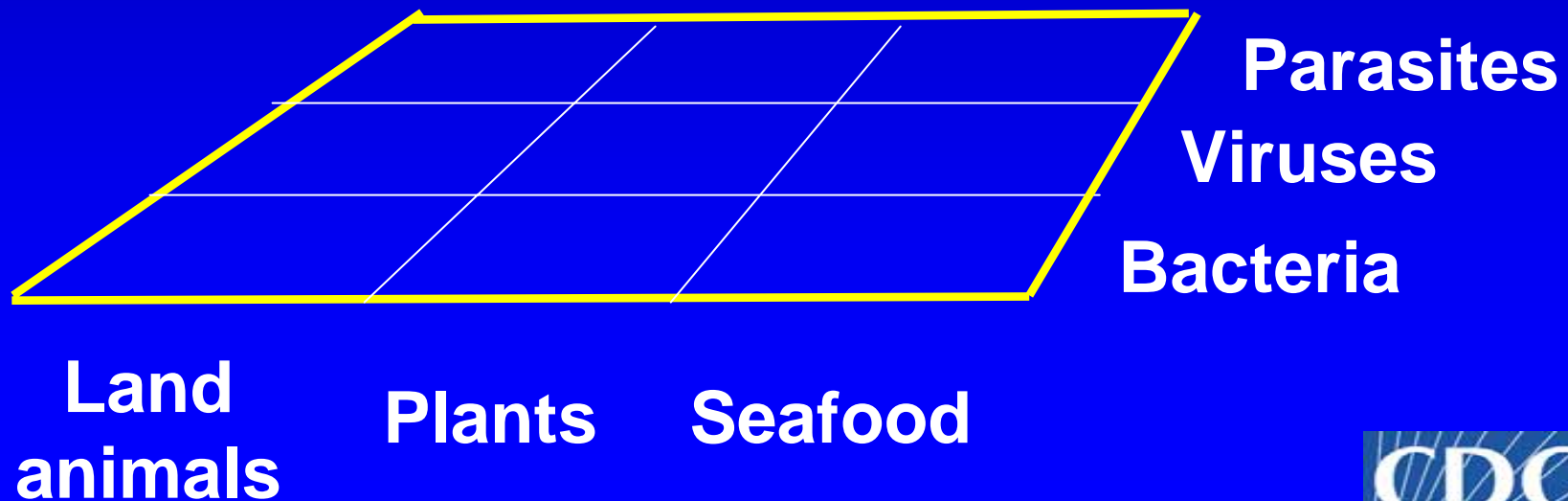


# The pathogen - vehicle plane

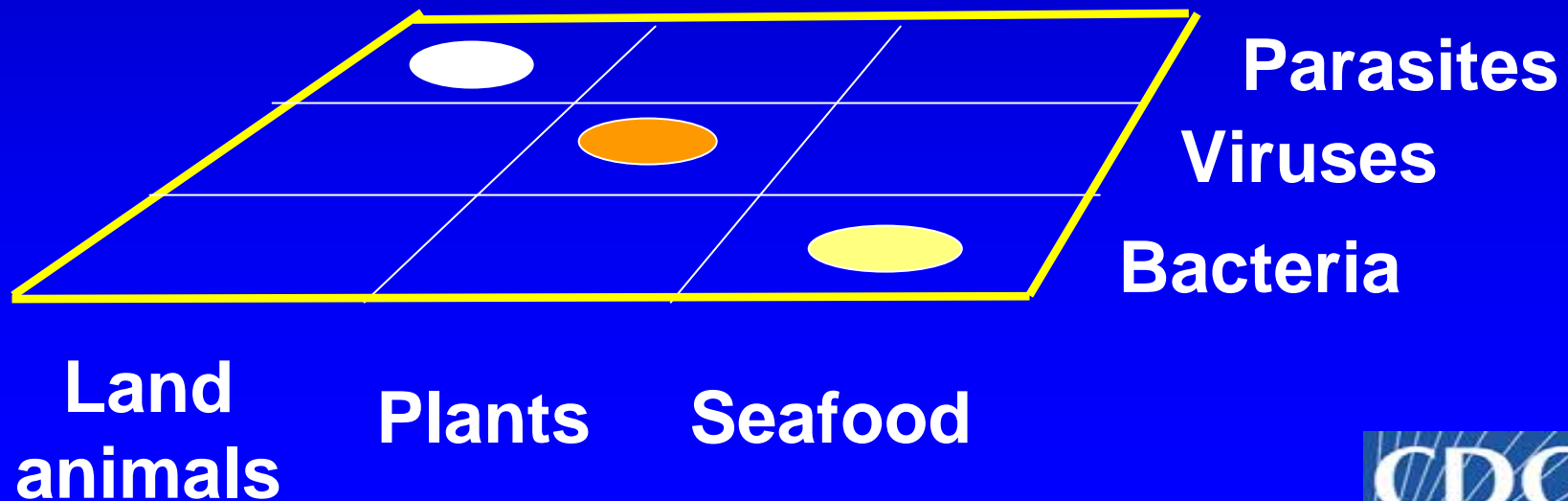
## Placing boundaries



# The bounded pathogen - vehicle plane

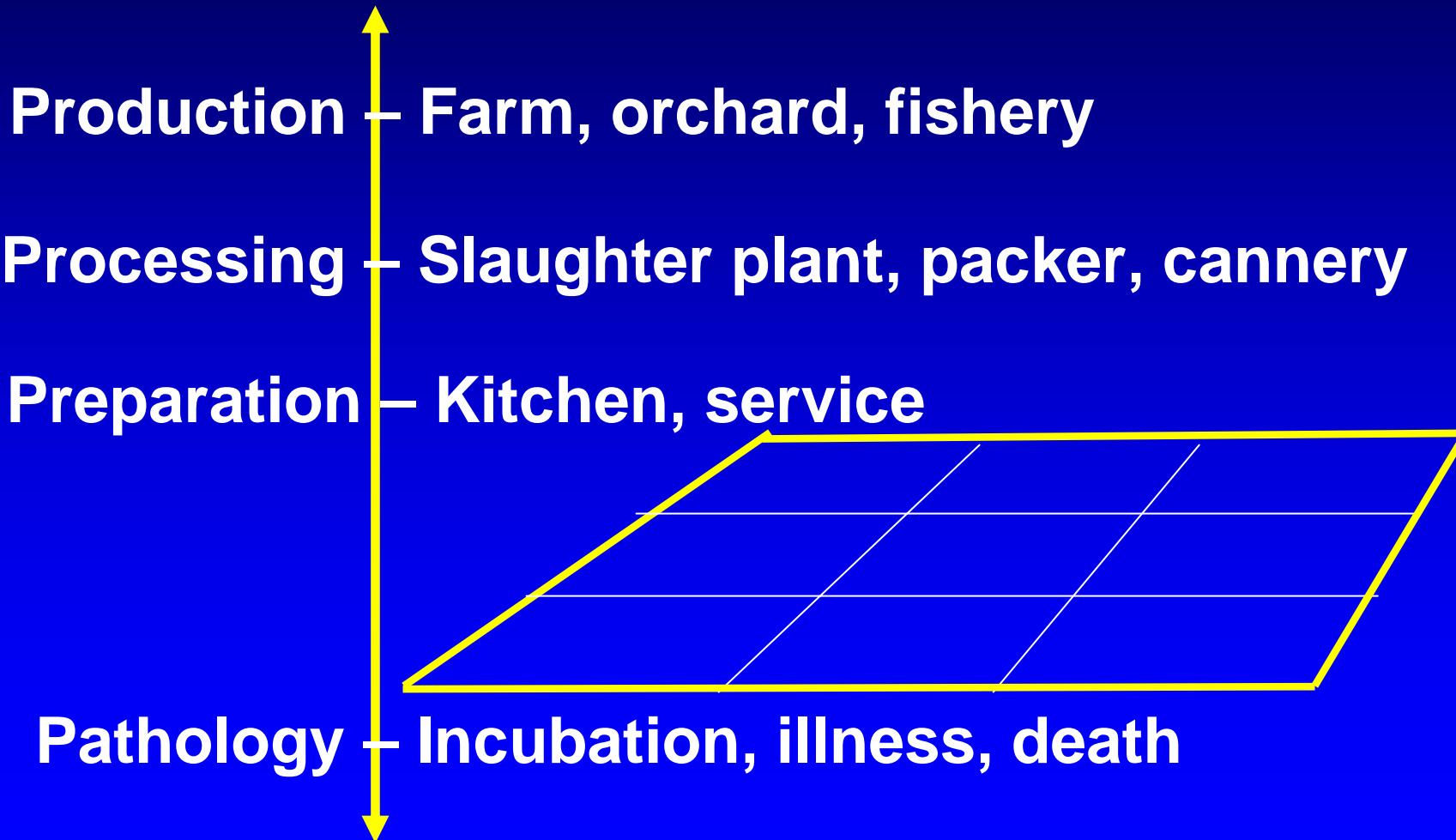


# The bounded pathogen - vehicle plane

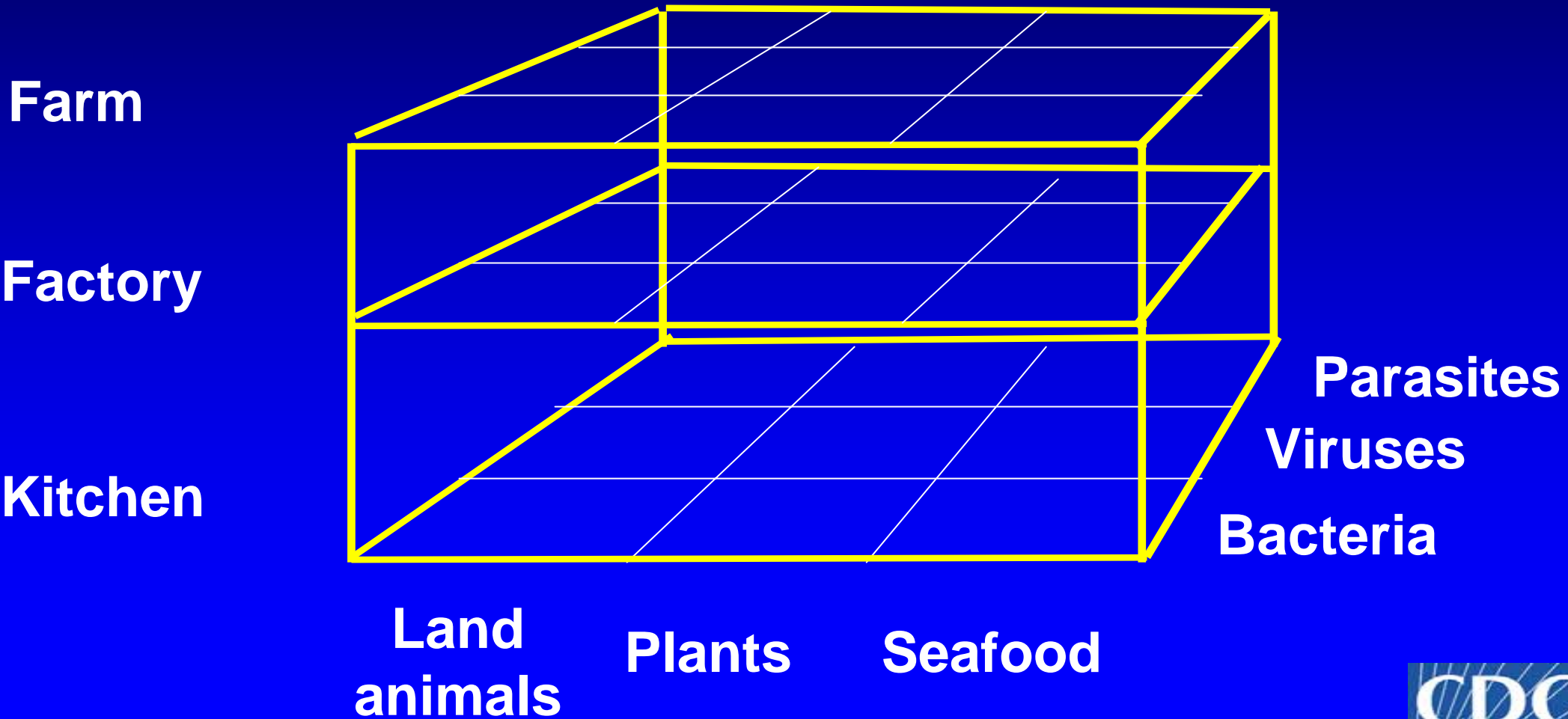




# The food processing continuum



# A food safety box



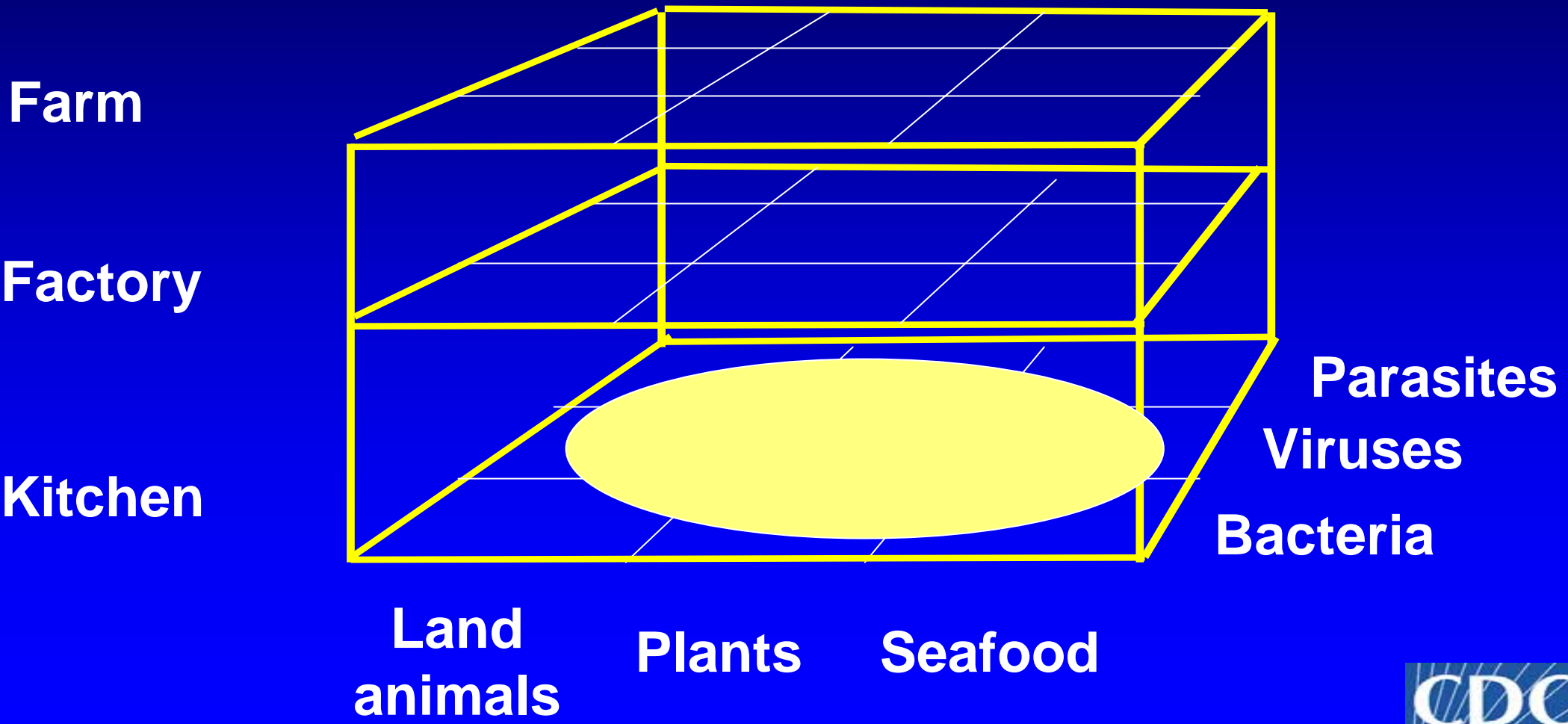
# Attribution: Mapping the boundaries

- **How many infections were related to food?**
- **Data sources:**
  - **For many infections: Series of outbreak investigations**
  - **For some infections: Case-control studies of sporadic cases in FoodNet**
  - **For a few infections: Individual case reports**
  - **Expert elicitation**

# Attribution: Mapping the boundaries

- How many of the infections were related to food consumed in the United States?
- Data sources:
  - Have collected it in FoodNet case-control studies
  - Now collect this in FoodNet on all cases

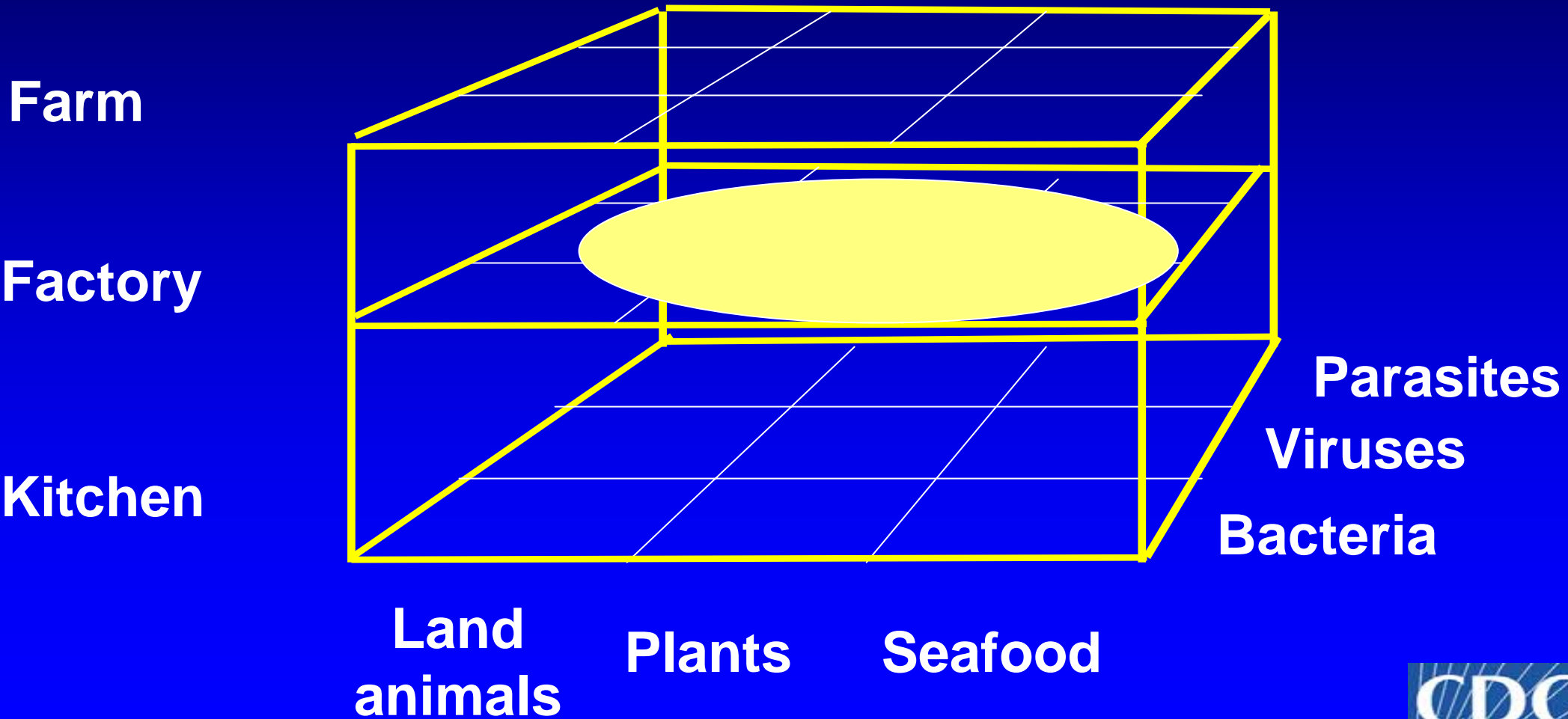
# Attribution at the point of consumption



# Attribution at the point of consumption

- What was the relative contribution of each food group as it was consumed?
- Regardless of original source of contamination
- Can reflect cross-contamination in the kitchen
- Data sources:
  - Series of foodborne outbreak investigations
  - Case-control studies of sporadic cases
- Future challenge to blend them

# Attribution at the point of processing

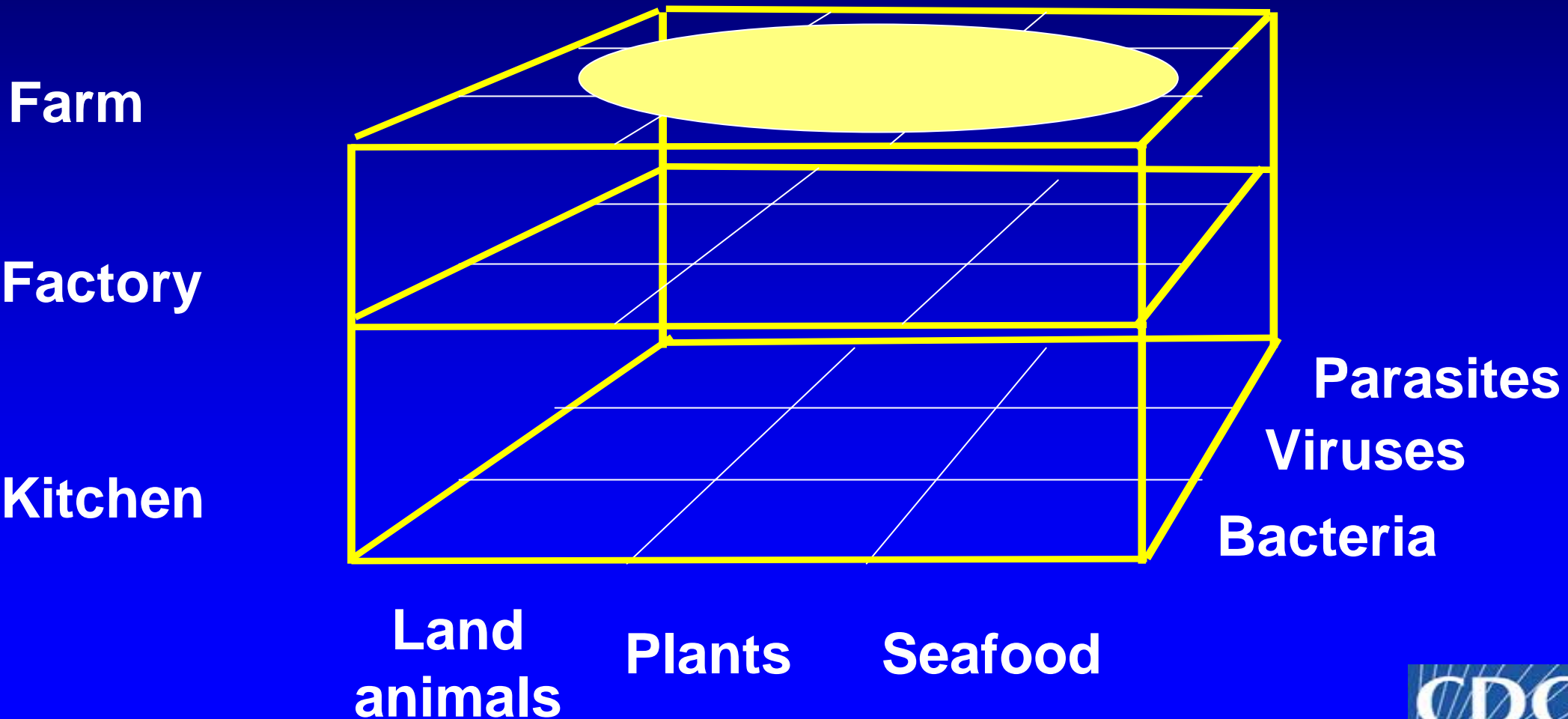


# Attribution at the point of processing

- What was the relative contribution of each food group, based on what food was contaminated with as it passed through food processing?
- Can reflect cross-contamination during shipping and processing
- Data sources:
  - Sampling foods at processing for pathogens
  - Systematic comparison of strains from foods with those from patients (molecular fingerprints)
  - Using the overlap in fingerprint patterns to show the fractional contribution of each food
  - Requires large number of isolates of the pathogen from each food at processing level
  - Most available for Salmonella in meats and poultry



# Attribution that is pre-harvest



# Attribution that is pre-harvest

- What was the relative contribution of each pathogen's main reservoirs (food animals, human, other?)
- Before cross contaminating events
- Data sources:
  - Sampling animals back on the farms
  - Systematic comparison of strains from farm surveys with strains from patients
  - Few systematic collections are available, outside of outbreak traceback testing

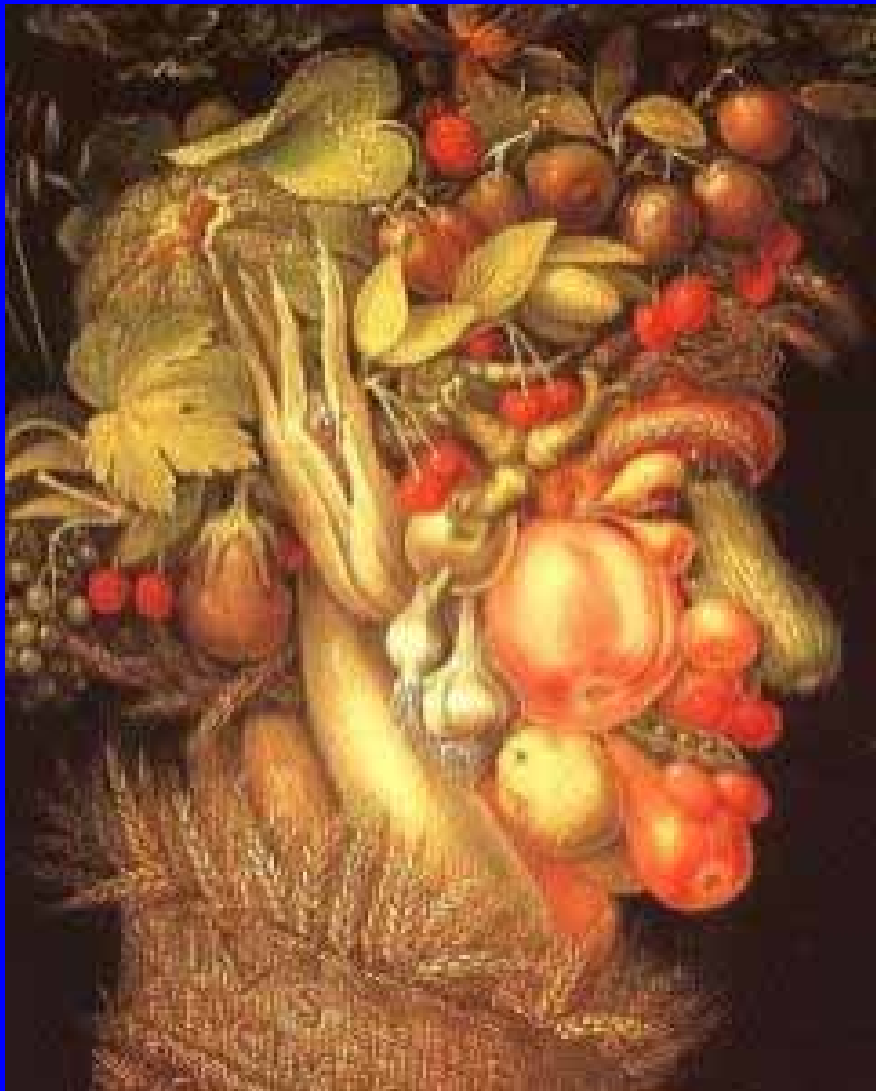
# Summary

- **Food is complex: Requires effort to analyze**
- **Attribution of the burden of illness to specific foods can be done at several levels of food production**
- **Different methods and different data are used for the different levels**
- **Results may not all be the same, but should be complementary**
- **Expect further developments in methods**



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# Thank you

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