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# Foodborne Hepatitis A

## New Tools for an Old Disease

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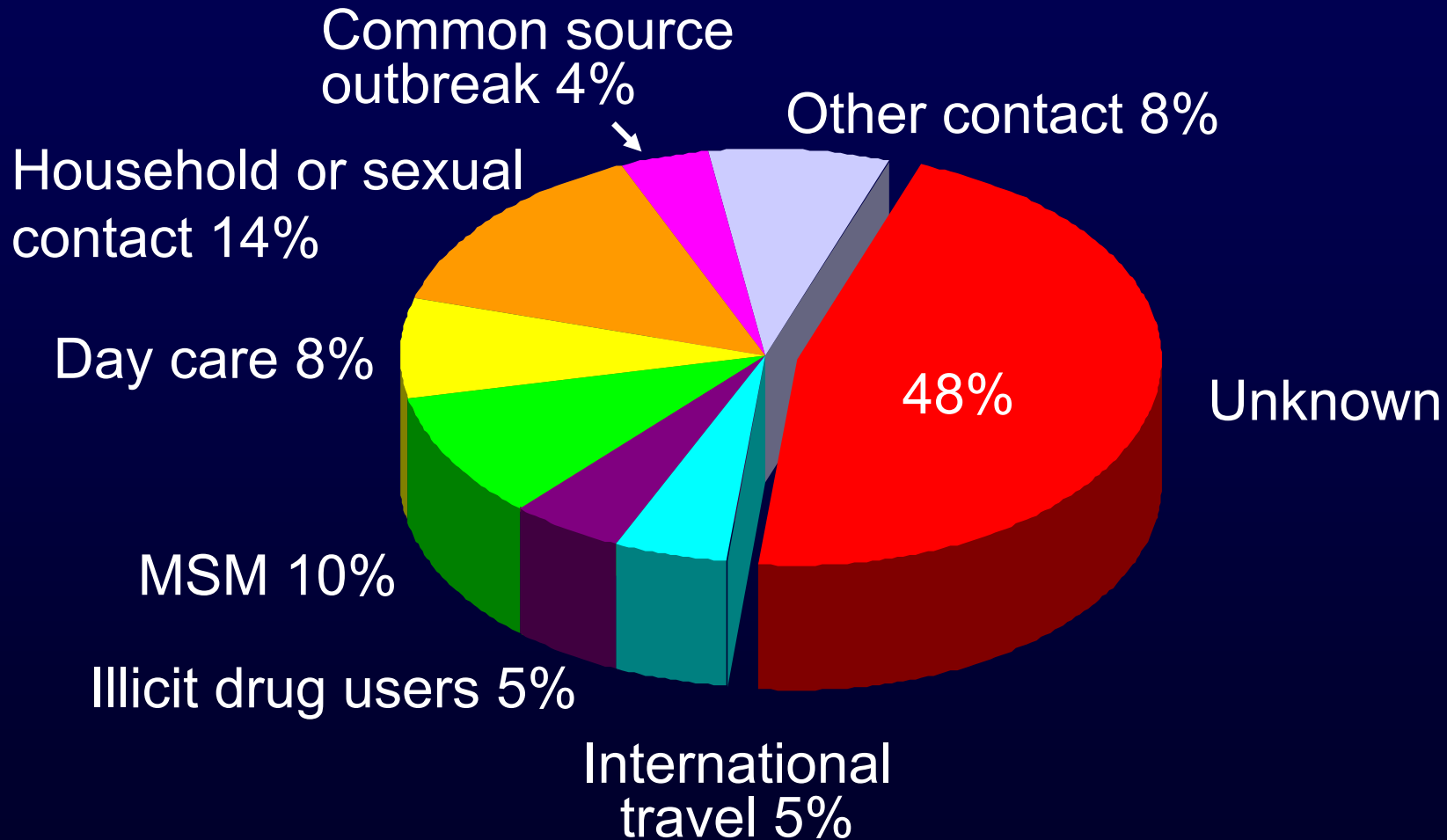


# Outline

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- What every health department food epidemiologist should know about hepatitis A
- What's new and exciting
- What you can do to prevent foodborne hepatitis A

# Risk Factors Among Persons with Hepatitis A, Reported Cases, United States, 1990-2000



Source: Viral Hepatitis Surveillance Program



**Chi-Chi's restaurant at the Beaver Valley Mall's foodcourt has been closed**



**Friday, April 29, 2005**

**Chi-Chi's to Pay \$800K for Hepatitis Shots**

By JOE MANDAK Associated Press Writer

**(AP) - PITTSBURGH-Bankrupt Chi-Chi's Inc. and its subsidiaries have tentatively agreed to pay \$800,000 to compensate nearly 9,500 people who got inoculated because of a hepatitis outbreak linked to a western Pennsylvania restaurant.**

# Transmission of Hepatitis A Virus

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- Fecal-oral transmission
  - close personal contact
  - contaminated food or water
- Period of communicability: 2 weeks before onset of jaundice to 1 week after
  - HAV-infected persons are capable of transmitting HAV before they become ill
- HAV in organic material is stable in the environment for weeks
- Infectious dose is unknown but likely low
- Stool contains 1 billion virus particles per gram

# Identifying Foodborne Hepatitis A: Challenges

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- Background cases (person-to-person transmission)
  - Difficult to detect food-associated cases
- Limitations of routine surveillance
  - Under-reporting
  - No information regarding food-related exposures
  - Long incubation period, so getting food history is difficult
- Attack rates may be low
  - No multiplication in food – contamination pockets
  - Asymptomatic or unrecognized HAV infection
  - Focal contamination of foods
- No methods to identify HAV in most foods

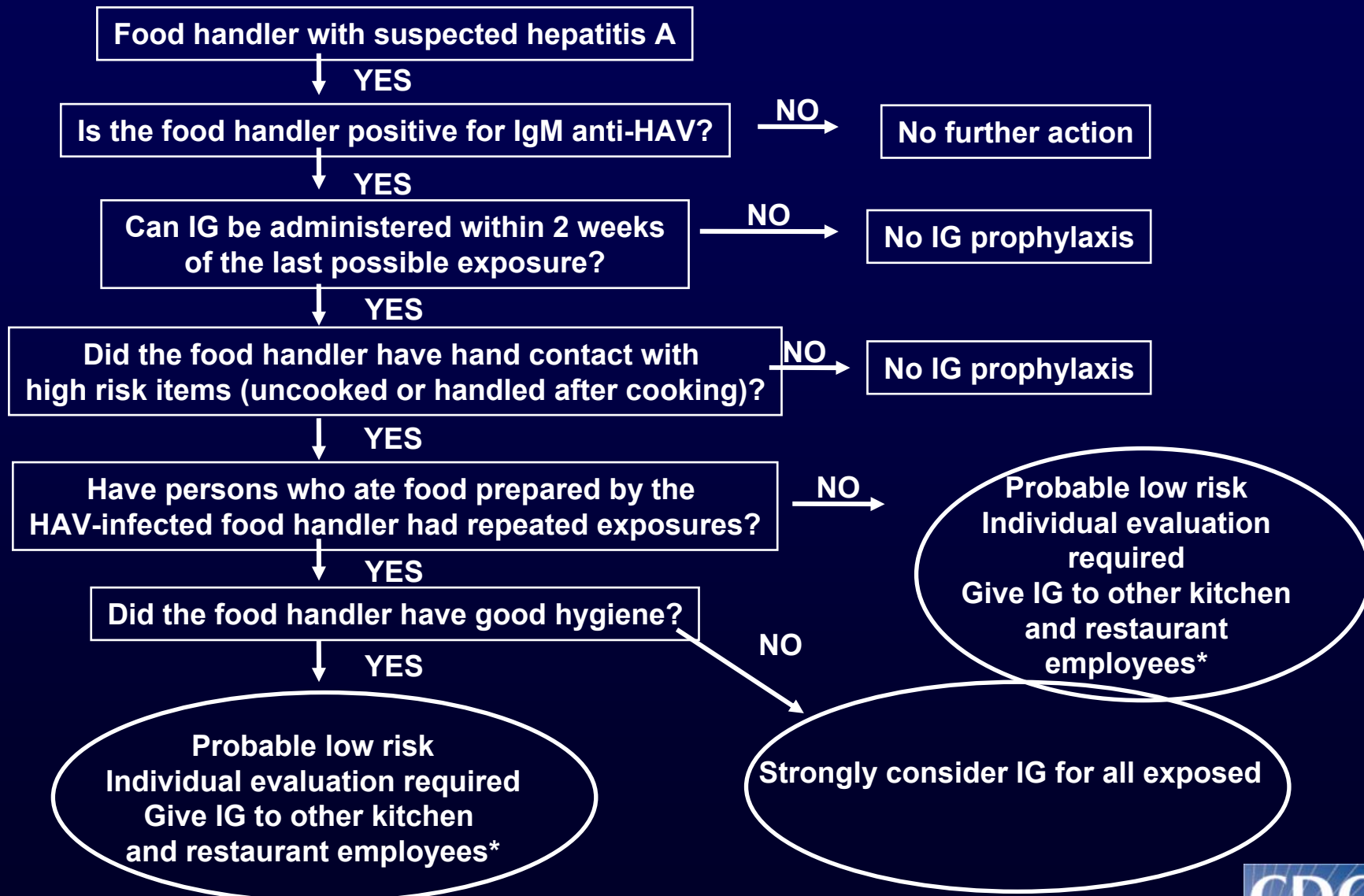
# Sources of Foodborne HAV Transmission

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## *Two sources of foodborne hepatitis A outbreaks:*

- Food contaminated by an HAV-infected person working as a food handler at a restaurant
  - Exposure to restaurant is associated with illness
  - Restaurant food handler with illness preceding the outbreak is identified
  - Exposure to food prepared by the ill worker is associated with illness
- Food contaminated before distribution by HAV-infected workers during harvest / processing, then distributed
  - Exposure to restaurant can be associated with illness
  - Restaurant food handler with illness preceding the outbreak is not identified
    - Food workers with illness at same time as community cases may be identified
  - Exposure to particular food ingredient, and menu items containing that ingredient, is associated with illness

# Evaluating Risk of Transmission from Food Handlers with Hepatitis A



\*Consider simultaneous hepatitis A vaccine for those with indications



# Review of health department responses to food handlers with hepatitis A

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- 236 investigations of food handlers with hepatitis A reviewed (8 years)
  - 16 public notices (9%)
  - 57 investigations included increased surveillance efforts (33%)
  - Ill patrons identified in 5 investigations (2%)
  - Co-employees with HAV infection in 28 (12%)
- IG given in 121 (51%) investigations
  - Mean 16 co-employees given IG / investigation
  - Patrons received IG in 12 (7%) investigations
    - Mean 377 IG doses / investigation

# Food Handlers with Hepatitis A Summary

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- Food service workers not at higher risk due to occupation
  - May have other risk factors
- Most infected food handlers probably do not transmit
- Evaluating food handler risk is
  - Inherently subjective
  - Time and fund-consuming
- Co-employees often infected
- Secondary cases not often found, however...
- “Increased surveillance” not done if assessed risk is low

# Using Molecular Epidemiology to Investigate Foodborne HAV Transmission

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- Method: Nested RT-PCR on serum specimens
  - Can be same specimen as used for diagnostics
  - Viral sequence recovered from > 90% of specimens collected within 4 weeks of onset
- Complement epidemiologic data
- Link geographically separated cases or investigations
- Suggest
  - Origin of contaminated product
  - Sequence-risk factor relationships
    - Example: FH with hepatitis A who also uses illicit drugs as source of foodborne outbreak

## Foodborne Hepatitis A Outbreaks 2003

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- Knoxville, Tennessee: 1 restaurant
- Georgia: at least 2 restaurants
- Asheville, North Carolina: 1 restaurant
- Monaca, Pennsylvania: 1 restaurant

# Molecular Epidemiology: Results

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- Sequences obtained from >150 restaurant-associated cases in Tennessee, Georgia, North Carolina and Pennsylvania
- All sequences identical within each restaurant-associated outbreak
- Three distinct outbreak sequences (TN, GA-NC, PA)
- >99% similarity between outbreak sequences
- Outbreak sequences were similar or identical to sequences previously obtained from:
  - Persons with hepatitis A who traveled to or live in Mexico
  - Persons with hepatitis A living along the U.S. - Mexico border
  - Persons with hepatitis A living in Hispanic communities in the U.S.

# Sequence Analysis

 2003 Outbreak (n=353)

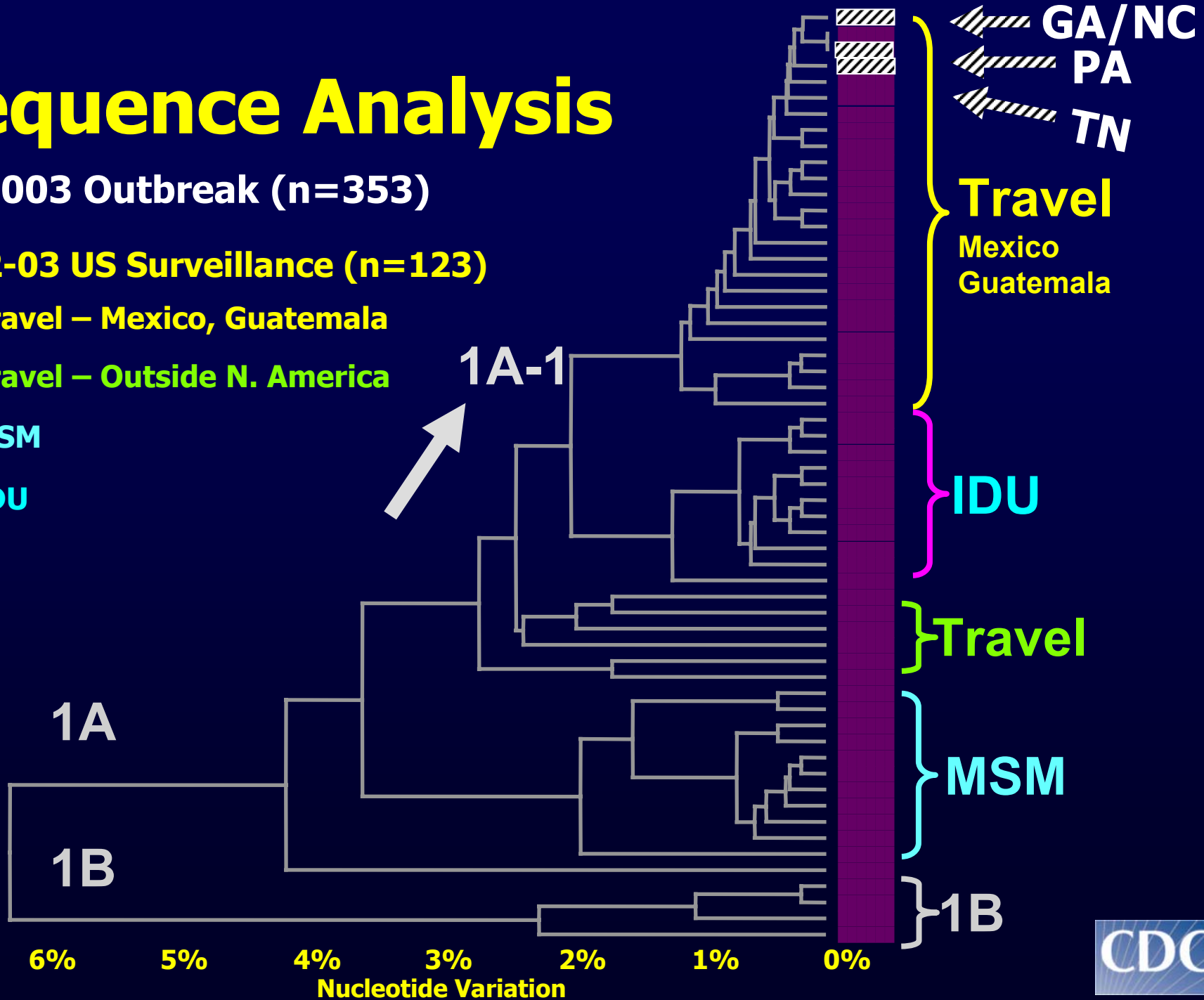
2002-03 US Surveillance (n=123)

 Travel – Mexico, Guatemala

 Travel – Outside N. America

 MSM

 IDU

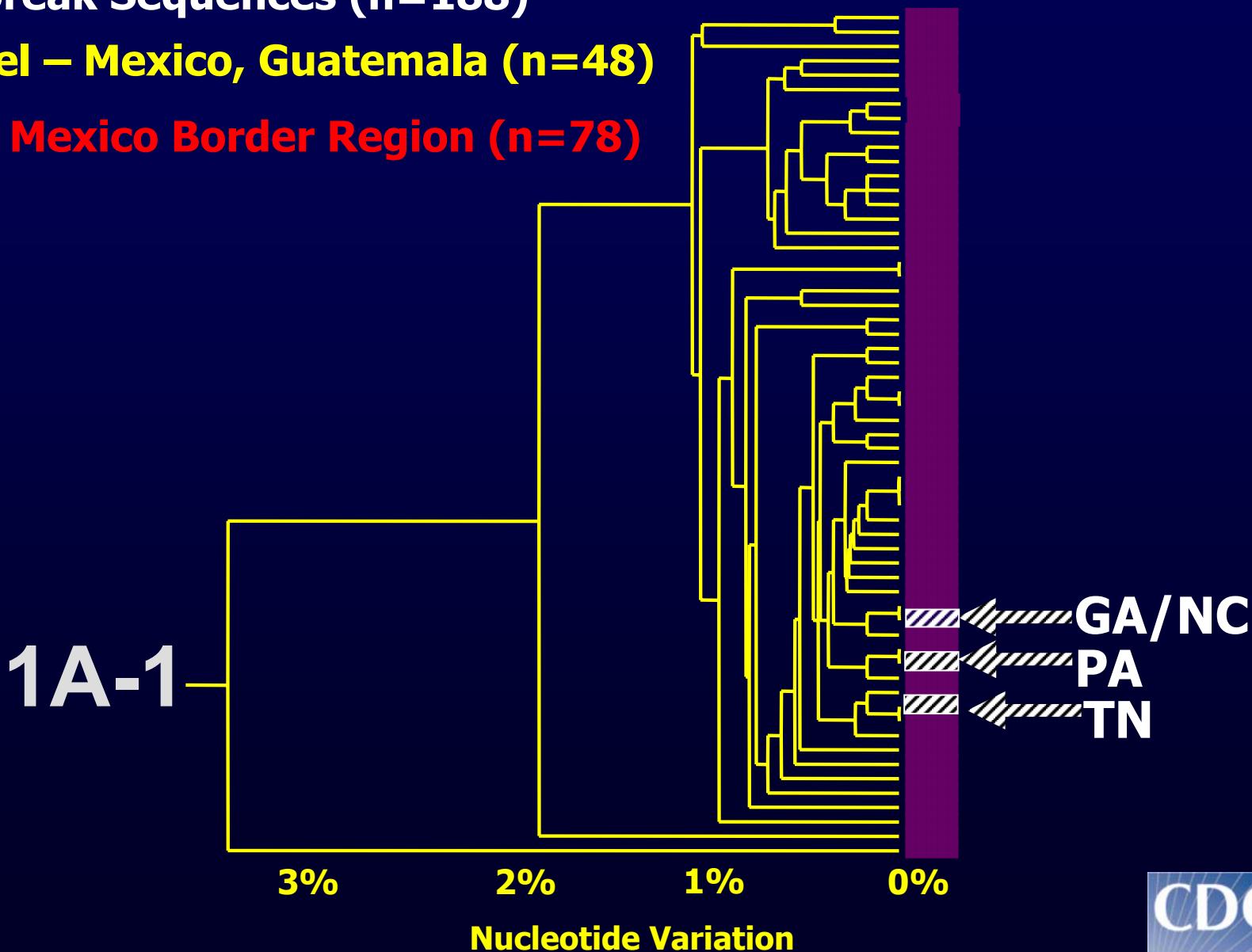


# Sequence Analysis

▨ Outbreak Sequences (n=188)

■ Travel – Mexico, Guatemala (n=48)

■ US – Mexico Border Region (n=78)



# Hepatitis A Caused by Foods Contaminated Before or During Distribution

## Emerging Themes

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- HAV can contaminate food during harvesting, processing, or distribution
- Suggested when no food handler source is found and exposure to particular food item or ingredient associated with illness
- Can cause large outbreaks
- Scattered clusters with low attack rates might be difficult to detect
  - Potential for multifocal outbreaks
    - might be widely separated geographically
    - might identify isolated cases that can be connected only by sequence and common food exposure
- Molecular epidemiology particularly useful
- Emergence of possible problem food item(s) (e.g., green onions)

# Ongoing assessment of food exposures among hepatitis A cases

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- Hepatitis A cases in Sentinel Counties receive:
  - Expanded food consumption questionnaire
  - Serologic testing for confirmation
  - Viral sequence analysis
  - If a food handler:
    - Breakout questionnaire
      - Foodhandling activities
      - Hygiene practices
      - Access to handwashing
- Provides potential platform to formulate and test food hypotheses, link sequences to particular foods

# Foodborne Hepatitis A Prevention

## What You Can Do

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- Look at your data
  - Very small clusters or increase in cases can be suggestive
- Think food
  - Single restaurant does not rule out non-food handler source
- Evaluate food handlers promptly and completely
  - Vaccinate those with indications
- Save serologic specimens
- Consult early
- Encourage timely reporting in your community
- Encourage responsible policies in restaurants

