



衛生署疾病管制局

## Confirmation of Homologous Strains as the Cause of Bacillary Dysentery Outbreaks in Miaoli County and Taichung County by Molecular Epidemiology

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<http://www.cdc.gov.tw>



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## Shigellosis in Taiwan

- 30-50 cases annually
- 90% caused by *S. sonnei*
- Outbreak in mountainous areas



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## Index case of shigellosis in Miaoli County

- Reported on November 26, 2005
- 9-year-old girl from Nanjhung Township
- Onset on November 18, 2005
- Symptoms included diarrhea, abdominal pain, fever, and headache
- *S. sonnei* isolated from stool
- Did not travel out of the country in the 3 months prior to illness



## Miaoli County outbreak

- Cases discovered in Nanjhung Township
  - Dong Village, Si Village, Nanjiang Village, Dongho Village
- Diarrhea cases: 23
- *S. sonnei* positive cases: 11
  - Age range (years): 3-77
  - Symptom onset: Nov 18-Dec 5, 2005
- Asymptomatic case : 1



## Index case of shigellosis in Taichung County

- Reported on January 14, 2006
- 7-year-old boy from Heping Township
- Onset on January 7, 2006
- Symptoms included diarrhea, abdominal pain, fever, and headache
- *S. sonnei* isolated from stool
- Did not travel out of the country in the 3 months prior to illness

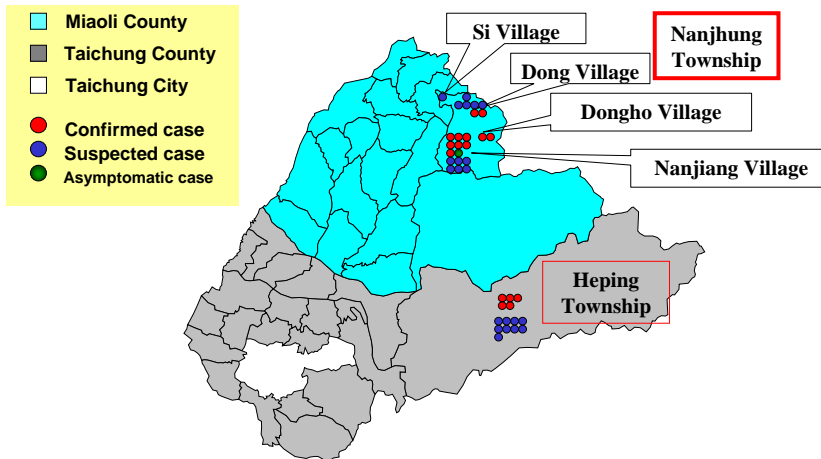


## Taichung County outbreak

- Cases discovered in Heping Township
- Diarrhea cases: 14
- *S. sonnei* positive cases: 5
  - Age range (years): 7-59
  - Symptom onset: January 7-17, 2006



## Geographic distribution of confirmed cases (n=37)



## Objectives

- Use pulsed-field gel electrophoresis (PFGE) to explore the relationship between the two outbreaks
- Compare PFGE patterns with the *Shigella* DNA fingerprint database of the Taiwan CDC to trace the origin of the bacteria



## Epidemiological investigation

- Index cases and there close contacts
  - Family members
  - School classmates
- Local clinical doctors
- Neighbors
  - Foreign members
  - Diarrhea patients with relevant travel histories



## Case definition

- **Confirmed:**  $\geq 2$  diarrheal episodes/day, positive for *Shigella*
- **Suspected:** diarrhea, negative for *Shigella*
- **Asymptomatic case:** no diarrhea, positive for *Shigella*



## Environmental investigation

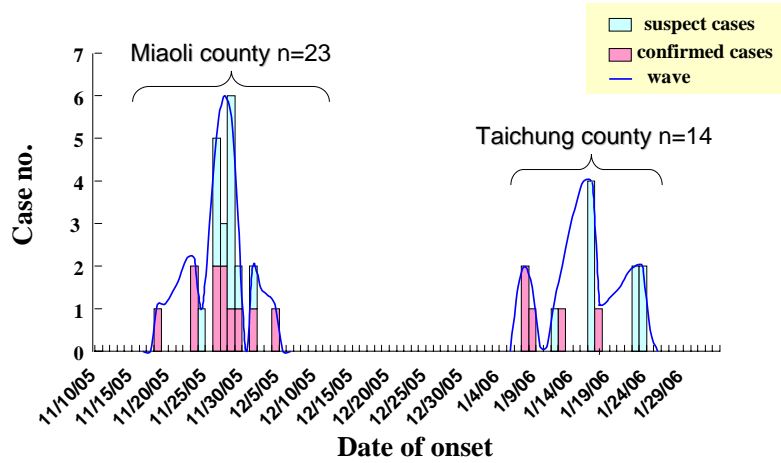
- **Water taken from**
  - Residences
  - School
- **Water tested for**
  - Residual chloride
  - Bacteria



## Laboratory examination

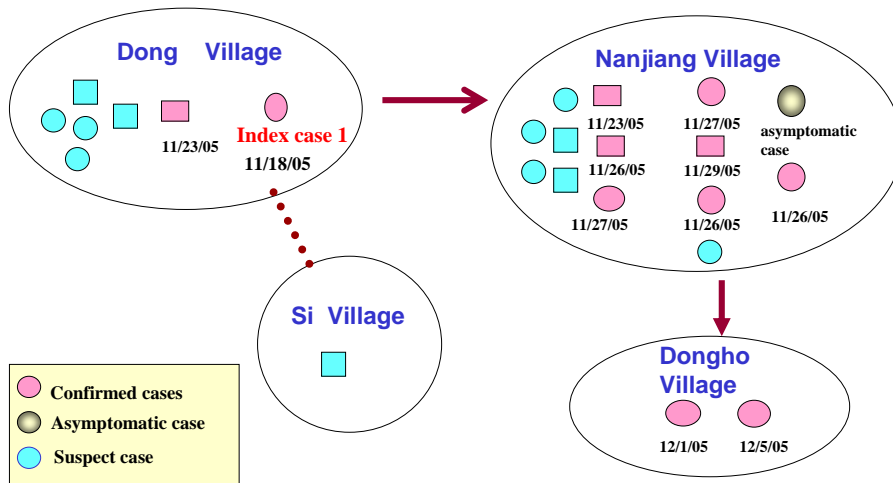
- **Rectal swabs and water were collected for bacterial isolation and identification**
- **PFGE pattern analysis and comparison**
  - Using standardized PulseNet method developed by US CDC
  - PFGE pattern were analyzed by BioNumerics
  - Compared with Taiwan CDC *Shigella* DNA fingerprint database

## Shigellosis outbreaks in Miaoli and Taichung counties — 11/18, 2005-1/23, 2006



**Taiwan CDC**  
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## Epidemiological relationship for the Miaoli County outbreak



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# Rectal swab examination

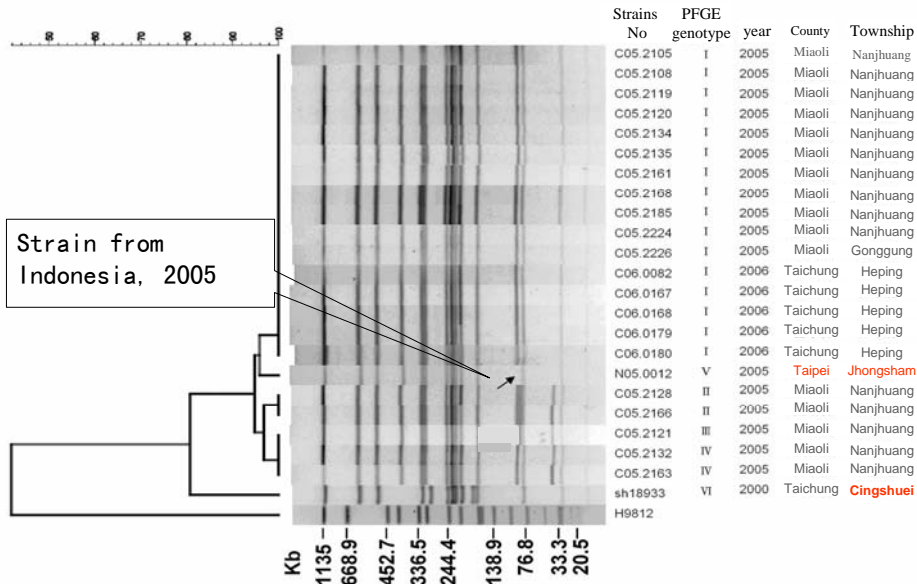
|                 | symptomatic |           |                  | asymptomatic |            |                    | Total       |                   |                   |
|-----------------|-------------|-----------|------------------|--------------|------------|--------------------|-------------|-------------------|-------------------|
|                 | Shigella    |           | Total (%)        | Shigella     |            | Total (%)          | Specimen No | Shigella positive | Positive rate (%) |
|                 | positive    | negative  |                  | positive     | negative   |                    |             |                   |                   |
| Miaoli County   | 11          | 12        | 23 (47.8)        | 1            | 42         | 43 (2.3)           | 66          | 12                | 18.2              |
| Taichung County | 5           | 9         | 14 (42.9)        | 0            | 99         | 99 (0)             | 113         | 5                 | 4.4               |
| <b>Total</b>    | <b>16</b>   | <b>21</b> | <b>37 (43.2)</b> | <b>1</b>     | <b>141</b> | <b>142 (0.007)</b> | <b>179</b>  | <b>17</b>         | <b>9.5</b>        |



# Water specimens examination

|                 | No. of specimens | No. of Shigella    |  | Residual chloride (ppm) |
|-----------------|------------------|--------------------|--|-------------------------|
|                 |                  | positive specimens |  |                         |
| Miaoli County   | 22               | 0                  |  | 0.5-1.0                 |
| Taichung County | 60               | 0                  |  | 0                       |
| <b>Total</b>    | <b>82</b>        | <b>0</b>           |  | -                       |

## The dendrogram of PFGE fingerprints



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## Discussion

- Study demonstrated value of *Shigella* DNA fingerprint database
  - Compare and trace strains
  - Investigate the mode and route of transmission
  - Monitor disease status
  - Share information with international disease prevention organizations

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## Conclusion

- Water contamination excluded in both outbreaks
- Resulted from human-to-human transmission
- The strains in the outbreak in Taichung County was from Mioali County
- Strains in the two outbreaks might have originated from Indonesia



## Recommendation

- Enhance international cooperation
- Establish international information database



## Acknowledgment

- Health Bureaus of Miaoli County and Taichung County
- Members of the FETP
- We-Gong Hospital and Fong-Yen Hospital



Thank you for your attention