Background

- *Campylobacter* sp. is the most common foodborne bacterial pathogen in the USA. (Mead *et al* 1999).
- *Campylobacter* sp. is the most common foodborne pathogen in England and Wales. (Adak *et al* 2002).
Background

- Campylobacters - rarely speciated
- \( C. \textit{jejuni} \approx 90\% : C. \textit{coli} \approx 9\% \)
- Epidemiological studies - \textit{Campylobacter} sp.
  - findings describe the epidemiology of \( C. \textit{jejuni} \)
- Epidemiology of \( C. \textit{coli} \)
  - poorly described/understood
Do *C. coli* and *C. jejuni* have the same epidemiology?

Case-case comparison

*C. coli* (n=272) vs. *C. jejuni* (n=3489)
**C. coli (n=272) vs. C. jejuni (n=3489)**

<table>
<thead>
<tr>
<th>Exposure</th>
<th>OR</th>
<th>P value</th>
<th>Lower</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
<td>0.64</td>
<td>0.029</td>
<td>0.42</td>
<td>0.95</td>
</tr>
<tr>
<td>Summer (50 to 59 yrs)</td>
<td>3.10</td>
<td>0.013</td>
<td>1.27</td>
<td>7.59</td>
</tr>
<tr>
<td>Asians (abroad)</td>
<td>9.70</td>
<td>0.006</td>
<td>1.89</td>
<td>49.73</td>
</tr>
<tr>
<td>Pâté</td>
<td>1.53</td>
<td>0.049</td>
<td>1.00</td>
<td>2.34</td>
</tr>
<tr>
<td>Pâté (50 to 60 yr olds)</td>
<td>0.21</td>
<td>0.05</td>
<td>0.05</td>
<td>1.00</td>
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<tr>
<td>Meat pies (retired indiv.s)</td>
<td>3.41</td>
<td>0.005</td>
<td>1.45</td>
<td>8.01</td>
</tr>
<tr>
<td>Bottled water</td>
<td>1.45</td>
<td>0.042</td>
<td>1.01</td>
<td>2.08</td>
</tr>
<tr>
<td>Men (abroad)</td>
<td>0.42</td>
<td>0.028</td>
<td>0.19</td>
<td>0.91</td>
</tr>
</tbody>
</table>

Controlling for age & sex
Do *C. coli* and *C. jejuni* have the same epidemiology?

Case-case comparison

*C. coli* (n=272) vs. *C. jejuni* (n=3489)

- Pâté
- Meat pies
- Bottled water
- Ethnicity (travel)
- Seasonality
Aims

To estimate the health impact of indigenous foodborne *C. coli* infection in England and Wales (E&W) in 2000 (population 53M).
Objectives

To derive estimates for the number of:

- Cases of illness due to indigenous foodborne C. coli infection
  - patients presenting to family doctors
  - patients hospitalized
  - patient days spent in hospital
  - deaths
  - patient/healthcare costs
Methods

Laboratory reports of *C. coli* to PHLS/sentinel surveillance data

Data for England and Wales
Methods

Laboratory reports of *C. coli* to PHLS/sentinel surveillance data

IID (Population) study

All illness *C. coli* in England & Wales

Data for England and Wales
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IID (Population) study

Sentinel surveillance data

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All indigenous *C. coli* illness

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GSurv Data

All illness *C. coli* in England & Wales

All indigenous *C. coli* illness

Indigenous foodborne *C. coli*

Data for England and Wales
Methods

- Sentinel surveillance data
- IID (Population) study
  - Laboratory reports of *C. coli* to PHLS/sentinel surveillance data
  - All illness *C. coli* in England & Wales
- Sentinel surveillance data
  - All indigenous *C. coli* illness
- GSurv Data
  - Indigenous foodborne *C. coli*
- IID study
  - Family doctor

Data for England and Wales
Methods

Laboratory reports of *C. coli* to PHLS/sentinel surveillance data

IID (Population) study

Sentinel surveillance data

GSurv Data

IID study

Sentinel surveillance data

Family doctor

Hospitalizations

Sentinel surveillance data

All illness *C. coli* in England & Wales

All indigenous *C. coli* illness

Indigenous foodborne *C. coli*

Data for England and Wales
Methods

- Laboratory reports of *C. coli* to PHLS/sentinel surveillance data
- IID (Population) study
  - All illness *C. coli* in England & Wales
  - Sentinel surveillance data
  - All indigenous *C. coli* illness
    - GSurv Data
      - Indigenous foodborne *C. coli*
        - IID study
          - Family doctor
            - Sentinel surveillance data
              - Hospitalizations
                - HES
                  - Hospital occupancy
                  - Data for England and Wales
Methods

- Laboratory reports of *C. coli* to PHLS/sentinel surveillance data
- IID (Population) study
- Sentinel surveillance data
- GSurv Data
- IID study
- Sentinel surveillance data
- HES
- GSurv Data

Sentinel surveillance data

All illness *C. coli* in England & Wales

All indigenous *C. coli* illness

Indigenous foodborne *C. coli*

Family doctor

Data for England and Wales

Deaths

Hospitalizations

Hospital occupancy
Methods

Laboratory reports of *C. coli* to PHLS/sentinel surveillance data

- IID (Population) study
- Sentinel surveillance data
- GSurv Data

All illness *C. coli* in England & Wales

- All indigenous *C. coli* illness

Indigenous foodborne *C. coli*

- Family doctor
  - Hospitalizations
  - Hospital occupancy
- IID Study
- GSurv Data

Costs

- Deaths
- Hospitalizations
- Hospital occupancy

Data for England and Wales
Results

C. coli infection England and Wales 2000

• 24,560 cases of disease (indigenous foodborne)
• 11,695 patients presenting to family doctors
• 990 hospitalizations (acute phase)
• 5,500 patient days in hospital (acute phase)
• 6 deaths
• Cost $5.25M (acute phase: 1995 prices)
Results - Illness due to IFD

Pathogen

- STEC O157
- Listeria
- NLV
- Cl. perfringens
- Salmonella
- Campylobacter

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEC O157</td>
<td></td>
</tr>
<tr>
<td>Listeria</td>
<td></td>
</tr>
<tr>
<td>NLV</td>
<td></td>
</tr>
<tr>
<td>Cl. perfringens</td>
<td></td>
</tr>
<tr>
<td>Salmonella</td>
<td></td>
</tr>
<tr>
<td>Campylobacter</td>
<td>350,000</td>
</tr>
</tbody>
</table>
Results - Illness due to IFD

Pathogen

- **Campylobacter**
- **Salmonella**
- **Cl. perfringens**
- **NLV**
- **Listeria**
- **STEC O157**
- **S. Typhimurium 7100**
- **C. coli 24600**

Cases
Results - Presentations due to IFD

Pathogen

- STEC O157
- Listeria
- NLV
- Cl. perfringens
- Salmonella
- Campylobacter

Presentations

- S. Typhimurium
- C. coli
Results - Hospitalizations due to IFD

Pathogen

- STEC O157
- Listeria
- NLV
- Cl. perfringens
- Salmonella
- Campylobacter

Hospitalizations

- S. Typhimurium
- C. coli
Results - Hospital occupancy due to IFD

Pathogen

- STEC O157
- Listeria
- NLV
- Cl. perfringens
- Salmonella
- Campylobacter

Days in hospital
Results - Deaths due to IFD

Pathogen

- STEC O157
- Listeria
- NLV
- Cl. perfringens
- Salmonella
- Campylobacter

Deaths

- S. Typhimurium
- C. coli
Conclusions

• *C. coli* is a common foodborne pathogen in E&W
• Foodborne *C. coli* infection gives rise to:
  – severe illness
  – high levels of demand for family doctor services
  – high levels of demand for hospital services
  – considerable financial costs to:
    • the families of individuals infected
    • the National Health Service
Conclusions

What we don’t know!

• Risk factors
  – What
  – How many
  – Population attributable risks

• How do we design effective interventions?
Conclusions

We need:

Creative, targeted EPIDEMIOLOGY & MICROBIOLOGY