WHO Initiative to Estimate The Global Burden Of Foodborne Diseases

Claudia Stein, MD, MSc, PhD, FFPH

Department of Food Safety & Zoonoses
What are "Foodborne Diseases"?

• NOT the nutritional disorders (deficiencies, malnutrition and/or obesity)
• Diseases transmitted through the ingestion of contaminated food
• Caused by bacteria, viruses, parasites, prions and chemicals/toxins (incl. allergens)
• ...and they are everywhere
Myth No 1 – the obvious one: 'Foodborne disease problems are very localized'

• Rapid spread of foodborne disease outbreaks (trade, travel, migration, social unrest)
• Emergence of new foodborne diseases (e.g. vCJD)
• Use of food as a vehicle for deliberate contamination (terrorist threats to food)

Foodborne diseases are a global health security issue
Myth No 2: 'Foodborne diseases are mild, self-limited and of short duration'

- **Campylobacter**: Guillain Barré Syndrome, Reactive arthritis
- **Salmonella spp**: Guillain Barré Syndrome, Reactive arthritis, Septicaemia, Meningitis
- **Listeria**: Meningitis, Septicaemia, Perinatal loss
- **E.coli**: Renal failure
- **Pork tapeworm**: Epilepsy
- **Toxoplasma**: Retinopathy
- **Trichinella**: Multi-organ failure
- **Acrylamide**: Cancer
- **Arsenic**: Cancer
- **Aflatoxin**: Cancer
- **Lead**: Mental retardation
- **Dioxins**: Cancer
- **Allergens**: Anaphylactic shock

**USA:**

5,000 deaths from foodborne illness from pathogens alone each year

*(Mead et al, Emerg Infec Dis, 1999)*
Myth No 3: 'Foodborne diseases are becoming less & less frequent'

335 newly emerging infectious diseases:

- 95 pathogens transmitted through food (~27%)
- 50 (15%) due to "changes in agricultural or food industry"
- many resistant to antibiotics

Compounded by effects of climate change
Myth No 4 – the dangerous one:

'Food security is more important than food safety'

- Malnourished people are more vulnerable to foodborne diseases & more likely to die
- Contaminated food is rarely discarded in famine situations
Myth No 5:

'Food safety is a luxury that rich countries can afford'

Foodborne diseases are a global development issue

• 4 out of 8 MDGs: affected directly by progress with food safety

UN Millennium Development Goals (MDGs)
Foodborne diseases – diseases of poverty:

- Poor food regulatory systems and enforcement
- Poor food storage & preparation ➔ contamination
- Foodborne diseases cause high rates of work absenteeism and medical expenses ➔ poverty
- Many foodborne diseases are zoonoses, hence reflection of disease in livestock ➔ poverty & trade issues

UN Millennium Development Goals (MDGs)
Foodborne diseases – contributors to child mortality:

• Children particularly vulnerable to contaminated environments, incl. food
• 1.9 million child deaths from diarrhoeal diseases annually
• Children living with HIV/AIDS especially at risk – opportunistic infections
• Pregnant women especially affected by foodborne diseases (Toxoplasmosis, listeriosis)

Achievement of MDGs jeopardized if food safety not strengthened

UN Millennium Development Goals (MDGs)
How big is the burden of foodborne diseases?

Reported human cases

Actual human disease burden

What we know from surveillance data

What we need to know
Myth No 6 – the understandable one:
'We can never estimate the burden of foodborne diseases'

Yes, we can.

And we are doing it

"How else to assess effectiveness of food safety policies & interventions?"

"What doesn't get measured, doesn't get done"

Recommendation:
WHO to lead efforts & appoint Foodborne Disease Burden Epidemiology Reference Group (FERG)
What is the FERG?

FERG = scientific expert group appointed by & advising the WHO Director General

- representing all regions of the world (North & South)
- representing all areas of foodborne diseases, economics, policy etc.

What are the objectives of FERG?

- To provide epidemiological estimates on the global burden of all relevant foodborne diseases (according to age, sex and WHO regions)
- To assist WHO to strengthen the capacity of countries to conduct burden of foodborne diseases and cost of illness studies
- To assist WHO in bridging the gap between collection of scientific evidence and food safety policy making.
Assembling existing evidence (systematic reviews)

Country studies

FERG strategic framework

Global Report & Global Atlas on FBD morbidity and mortality

Tools for countries to assess effectiveness

Country BoD capacity built

Peer reviewed Paper Series

- Approval of FERG TF/Steering Group/ working procedures
- Priority list of causative agents
- Work plans for short-medium-term
- Interaction with key stakeholders

WHO Secretariat

Core Group

Infectious Diseases (sub-groups on enteric & parasitic diseases)

Chemicals TF

Source attribution TF

TF country protocols

Short-term actions

2007 FERG 1
• Approval of FERG TF/Steering Group/ working procedures
• Priority list of causative agents
• Work plans for short-medium-term
• Interaction with key stakeholders

Country BoD capacity built

Tools for countries to assess effectiveness

Medium-term actions

2008 FERG 2
• Approval of preliminary BoD results
• Major Stakeholders Event

Overall management of the Initiative, incl. fund holding/raising, commissioning/monitoring, reaching out to key stakeholders

Overall technical advice, review of progress, appraisal of results

Long-term actions

2009 FERG 3
• Approval of preliminary BoD results
• Approval of countries for BoD studies

Final outcome

2010 FERG 4
• Final approval of preliminary BoD results
• GBD assessment for priority enteric & parasitic FBD
• Review mortality/incidence for priority diarrheal pathogens and analysis of VR mortality data
• Review of prevalence/incidence of parasitic FBD, health effects, population, foodborne
• GBD assessment for priority chemical FBD
• Review exposure- health effect studies, estimate occurrence and exposure & link to food, food occurrence with FBD
• Development of cause attribution models & estimation of % foodborne
• Devise Global Atlas of Food Consumption & Behaviour
• Development of tools for systematic burden of FBD studies & capacity building modules
• Execution of BoD country protocols
How to bridge the gap between researchers and policy-makers?

FERG Country Studies Task Force

- Tools for systematic burden of FBD studies
- Burden of FBD Country Study Protocols
- Collaboration
- Tools & mechanisms facilitating research up-take
- Food Safety Policy Situation Analyses

- Launched in June 2009
- Aiming for 3 studies in each WHO region
Who are the multi-sectoral stakeholders?

- WHO member states
- Bi/multi-lateral donors
- NGOs
- Consumer groups
- Industry
- Public & scientific media
On the occasion of the third meeting of The Foodborne Disease Burden Epidemiology Reference Group (FERG)

Thursday, 29 October 2009
10:00 – 18:00 hrs, followed by a reception
WHO Headquarters, Executive Board Room, Geneva

Please join us!

- Discuss scientific methods and burden results
- Interact with stakeholders
- Discuss scientific implications with policy makers
- GIVE US YOUR VIEWS
Extending the alliance of partners – Get involved!

• Consider whether and how the Initiative is relevant to your work
• Consider how and to what extent you wish to engage with WHO and contribute to the outcome of the Initiative

What kind of input could be provided?

• Expert scientific input into Initiative (policy/economics/epi)
• Expansion of expert network & raising awareness of FERG
• Other practical inputs:
  • Human resources to Initiative
  • Funding for Initiative – help sponsoring a country study
Thank you

Intestines hanging out to dry, Cambodia
Summary documents

FERG & Stakeholder reports
Extra slides
In summary: **WHO Initiative to Estimate the Global Burden of Foodborne Diseases (FBD)**

**Why?**
- Because information on burden of FBD from **all causes** is poor
- Policy makers require information to assess effectiveness of prevention and interventions (incl. Codex)
- Foster international development and global health security

**What?**
- Estimation of morbidity, disability and mortality of FBD, leading to cost of illness assessments
- Development of tools for countries to conduct BoD studies

**How?**
- Foodborne Disease Burden Epidemiology Reference Group (FERG)
- Time frame of at least 5 years

**Outcome?**
- Global report and global atlas
- Country Burden of Disease studies
Foodborne diseases maim and kill
• Food safety concerns everyone, everywhere
• Foodborne diseases affect global development & global health security
  • Everyone has a role to play in making our food safer
• Estimating the burden of foodborne diseases is a critical element in the improvement of food safety
Myth No 5:

'Foodborne diseases are mild, self-limited and of short duration'

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Guiltain Barré Syndrome</th>
<th>Reactive arthritis</th>
<th>Septicaemia</th>
<th>Meningitis</th>
<th>Perinatal loss</th>
<th>Renal failure</th>
<th>Epilepsy</th>
<th>Retinopathy</th>
<th>Multi-organ failure</th>
<th>Cancer</th>
<th>Cancer</th>
<th>Cancer</th>
<th>Cancer</th>
<th>Anaphylactic shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campylobacter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salmonella spp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listeria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.coli</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pork tapeworm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toxoplasma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichinella</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acrylamide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arsenic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aflatoxin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dioxins</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allergens</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Burden of Disease expert (Chair)
2. Epidemiologists & expert scientists in:
   - Microbiology/enteric diseases
   - Chemicals/Toxicology
   - Parasitic diseases
   - Zoonotic diseases
   - Cause attribution
   - Disease modeling

External experts
1. Enteric diseases
2. Parasitic diseases
3. Chemicals & toxins
4. Source attribution
5. Country Studies

Pictures awaited:
- Dr John C Larssen
- Dr Josef Schlatter
- Prof Rolaf van Leeuwen
Myth No 1:

'Foodborne diseases are mostly a problem in developing countries'

USA:

76 million cases of foodborne illness from pathogens alone each year

(Mead et al, Emerg Infec Dis, 1999)
Myth No 2:
'Foodborne diseases in rich countries are mostly travel-related'

United States and EU:
In most countries majority of cases is domestically acquired

(CDC & European Food Standards Agency)
Myth No 6 – the hopeful one:
'As a vegetarian I am less likely to get foodborne diseases'
Myth No 7 – the easy one:

'Governments hold the sole responsibility for making food safer'

### Five keys to safer food

#### Keep clean
- Wash your hands before handling food and after coming into contact with raw foods
- Wash raw fruits and vegetables before eating
- Wash out a kitchen sink, worktop, and utensils properly after use

#### Separate raw and cooked
- Avoid cross-contamination by avoiding contact between raw and prepared foods
- Use separate equipment and utensils such as knives and cutting boards for handling raw and prepared foods

#### Cook thoroughly
- Cook food to a safe internal temperature to reduce the risk of foodborne illness
- Bring food to a rolling boil before eating
- Reheat previously cooked food to at least 75°C for safety

#### Keep food at safe temperatures
- Use a food thermometer to ensure food is cooked to the correct temperature
- Refrigerate perishable food promptly after cooking
- Keep cold food in the fridge or coolers

#### Use safe water and raw materials
- Use safe water and fresh, raw materials
- Wash fruits and vegetables properly
- Use clean hands and surfaces

---

**Knowledge = Prevention**