APEC Scientific Seminar-Workshop on Food Safety Risk-Benefit Analysis

Federal Commission for the Protection from Sanitary Risks (COFEPRIS)
Ministry of Health

22-24 November 2011
Manila, Philippines

Competent authority for regulation, control and encouragement to protect public health

Federal agency dependent from the Secretariat of Health

Technical and operationally autonomous

FIELD OF RESPONSABILITY

Production, commercialization, imports, exports and publicity

Medicine & health technologies
- Medical devices
- Medicine & drugs
- Herbal remedies
- Tissue transplants
- Medical services

Toxic & dangerous substances
- Pesticides
- Fertilizers
- Chemical precursors
- Essential chemicals

Consumer products
- Food
- Beverages
- Tobacco
- Cosmetics
- LMO’s

Occupational health

Environmental risks

Basic sanitation

COFEPRIS OPERATIVE MODEL

International and National Legal Assistance

Evidence and Sanitary Risk Management

Sanitary Risk Authorization and Registries

Sanitary Risk Surveillance and enforcement

Sanitary Risk Communication

Sanitary Risk Analytical Laboratory

Administrative staff

Impact Assessment

Epidemiologic Analysis:

Contamination of food and health impacts
Foodborne diseases (FBD) are a growing problem worldwide. There are several critical points in the process of food surveillance, which involves aspects related to the processing and handling of food as well as the characteristics of germs and their transmission mechanisms.

FBD is defined as the one episode that a person has diarrhea syndrome that is associated with food intake; by that is essential to establish an epidemiological surveillance to identify early FBD cases, prevent the spread of disease and early detection of outbreaks. (Rosa R & Castro M. Food Incocuity. IICA. 2010)

A foodborne disease outbreak is the episode in which two or more people have a similar illness after eating and/or water, linked by their origin, place of consumption or sale (excluding the cases of botulism, red tides, and Amanita phalloides poisoning).

In worldwide recognizes two major types of food-intake diseases transmitted:

- Intoxications
- Intestinal Infections

Both terms has been used to refer a FBD, however is convenient to be more specific

The most common diseases that have been identified as caused by contamination of food are:

- Those caused by microorganisms' toxins (Staphylococcus aureus y Bacillus cereus)
- Toxins from some fish (increasing histamine levels) or cause local damage such as Clostridium perfringens
- The greatest group of intestinal infections that includes virus, bacteria and parasites (like E. coli, Hepatitis A, Listeriosis, salmonellosis, shigellosis, toxoplasmosis, viral gastroenteritis (rotavirus and others), amebiasis, taeniasis, trichinosis, vibrio and others)

WHO has reported that 88% of cases of diarrhea worldwide are attributable to: sanitation, potable water availability and hygiene behaviors (particularly within the household (Corvalan and Prüss-Üstün, WHO 2006).

Globally, in 2004 reported that about 1.5 million deaths from diarrhea (mainly in children under 5 years), were attributed to environmental factors, mainly water, sanitation (excreta disposal and drainage systems) and poor hygiene (Corvalan and Prüss-Üstün, WHO 2006).

In the european child population, these factors have been evaluated and determined that 5.3% of deaths from diarrheal disease is caused by the consumption of water of poor quality and inadequate sanitary measures (Valent et al 2004)

In 1997…

<table>
<thead>
<tr>
<th></th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing countries</td>
<td>17.2 mls</td>
</tr>
<tr>
<td>Undeveloped countries</td>
<td>120 thousand</td>
</tr>
</tbody>
</table>

(INSP. Urban Survey of Food and Nutrition in the Metropolitan Area of Mexico City. 2002).

Some age ranges are specially susceptible. In 2000, the prevalence on children <5 years was 11.5% and in 2006 increased to 12.9% in Mexico

• In the same Mexican survey (HNS, 2006), 11.7% of children under five years said have diarrhea (on the two weeks previous), from which almost half (49.8%) went to the doctor. By this way, the under-registry can be calculated as 1:1.

### Diseases transmitted by food and water

<table>
<thead>
<tr>
<th>Illness</th>
<th>Water</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholera</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>Giardiasis</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>Intestinal Amebias</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Shigellosis</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Other Intestinias Infections</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>Typhoid fever (Salmonellosis)</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>By protozoos</td>
<td>10%</td>
<td>90%</td>
</tr>
<tr>
<td>Paratyphoid and others salmonellosis</td>
<td>5%</td>
<td>95%</td>
</tr>
<tr>
<td>Bacterial food poisoning</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*CTT those diseases, 50% may be caused by bacteria and the other half by E. coli.

### Unique Mexican Information System for Epidemiological Surveillance

Typhoid fever cases and rates on 32 states of Mexico, 2005-2009

Intestinal infections (other organisms and bad defined) cases and rates on 32 states of Mexico, 2005-2009
APPENDIX 12

Bacterial food poisoning cases and rates on 32 states of Mexico. 2005-2009

Paratyphoid and other salmonellosis cases and rates on 32 states of Mexico. 2005-2009

Shigellosis cases and rates on 32 states of Mexico. 2005-2009

Mexican states with highest bacterial food poisoning incidence rate. 2006-2010

Positive results reported that identify microorganism involved on human and environmental samples.

- 2003 (13%) Human positive samples
- 2003 (14%) Environmental positive samples
- 2004 (20%) Human positive samples
- 2004 (24%) Environmental positive samples
- 2005 (19%) Human positive samples
- 2005 (12%) Muestras ambientales positivas

Infectious agents mainly reported on human samples: E. coli, Salmonella Sp, Y. sp, Citrobacter, Enterobacter cloacae, Enterobacter agglomerans, Psudomonas cepasi, Klebsiella oxytoca y pneumovia, Rotavirus.

On environmental samples E. Coli, Salmonella spp, Staphylococcus durod y aureus, Total and fecal choliformes , V. parahaemolytic.

Gastrointestinal diseases outbreaks. Mexico, 2010

Ciguatoxin intoxication: 1%
Mushroom intoxication: 3%
Acute Hepatitis A: 36%
Acute Gastrointestinal diseases: 42%
Clindamycin intoxication: 4%
Gastrointestinal diseases outbreaks. Mexico, 2010

by occurrence site

- Intrahospital: 5%
- Jail: 6%
- Oil rig, church, restaurant: 7%
- Community: 28%
- School, camp, hospital: 18%

by source

- Milk food: 6%
- Seafood: 6%
- Other person: 5%
- Water: 13%
- Food and water: 21%
- Food: 45%

Source Times %

- Food*: 128 72
- Water & food: 27 15
- Water**: 22 12
- Total: 177 100

* Served in party, buy in: street snack, market, school, cooperative, restaurant, inadequate sanitary food management, in schools, hospitals and jails
** From: water tank, spring, stream, treadmill, well, water supply network. Without chlorination and improperly stored.

Gastrointestinal diseases outbreaks by month. Mexico, 2010

- January: 38
- February: 25
- March: 19
- April: 13
- May: 6
- June: 1
- July: 1
- August: 1
- September: 6
- October: 5

Times mentioned "food", "water & food" and only "water" as outbreak source

<table>
<thead>
<tr>
<th>Source</th>
<th>Times</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food*</td>
<td>128</td>
<td>72</td>
</tr>
<tr>
<td>Water &amp; food</td>
<td>27</td>
<td>15</td>
</tr>
<tr>
<td>Water**</td>
<td>22</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>177</td>
<td>100</td>
</tr>
</tbody>
</table>

* Served in party, buy in: street snack, market, school, cooperative, restaurant, inadequate sanitary food management, in schools, hospitals and jails
** From: water tank, spring, stream, treadmill, well, water supply network. Without chlorination and improperly stored.

Times mentioned meat as outbreak source

<table>
<thead>
<tr>
<th>Source</th>
<th>Times</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken*</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Meat**</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td>Pork***</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Lamb</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

* With: rice, nuggets, taco, etc.
** With sauce, taco on street snack
*** Loin

Times mentioned others as outbreak source

<table>
<thead>
<tr>
<th>Source</th>
<th>Times</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other person (hands, nails)</td>
<td>6</td>
<td>38</td>
</tr>
<tr>
<td>Fomites (kitchen utensils)</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Milk formula</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Expired canned juice</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100</td>
</tr>
</tbody>
</table>

Gastrointestinal diseases outbreaks by month. Mexico, 2010

Current epidemiological evidence is used to:

- Support the health impact assessment of different exposures
- It can be applied to a range of actions, policies or projects on various health determinants (risk management).

**Pesticide Surveillance Program, Mexico 2011**

Food consumption according to Urban Survey of Food and Nutrition in the Metropolitan Area of Mexico City (2002) and GEMS (2003) for Latinamerica (percapita).

- Searching those that represent 80% of percapita intake (14 food).
- Matches were established and the group used as framework group (12 food).
- Database validation removing processed foods, meats and with animal origin and only consider those with thin shell or that are uncooked.

**Mexican regulations have two major objectives:**
- Rules for regulated agents;
- Direct protection to the population

**Regulations are update as:**
- New risk assessed
- New analytical methodologies
Food in framework groups:
1. Rice
2. Onion
3. Chili
4. Bean
5. Tomato (Red)
6. Corn
7. Apple
8. Orange
9. Potato
10. Banana
11. Tomato green
12. Carrot

Authorized pesticides for these were considered from Mexican Pestice Catalog.

The pesticide import volume was determined to select those with highest probability to be found in food.

From this, the more toxic pesticides were selected, determining the following "right list":

Rules to evaluate pesticide monitoring
1. Health risk: authorized, prohibited y/o restricted.
2. Presence in basic consumption products.
4. Trained personnel on pesticide analysis.
5. Installations and equipment.
6. State laboratories participation

Commission of Evidence and Risk Management
Laboratories

Proposal
1. Selection of pesticides to monitoring: organophosphate pesticides.
2. Pesticide analysis by matrix: seeds and grains.
3. Pesticide analysis by geographic zone.
4. Health state laboratories participation
5. Train to state laboratories in methodologies according to each matrix.

Pesticides Acute Intoxications in Mexico
2006-2010

<table>
<thead>
<tr>
<th>Culture/ Pesticide</th>
<th>Toxicity level</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
</tr>
<tr>
<td>Banana</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
</tr>
<tr>
<td>Rice</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
</tr>
<tr>
<td>Tomato (red)</td>
<td>oxamyl</td>
<td>oxamyl</td>
<td>oxamyl</td>
<td>oxamyl</td>
<td>oxamyl</td>
<td>oxamyl</td>
</tr>
<tr>
<td>Potato</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
</tr>
<tr>
<td>Bean</td>
<td>acetamidoxan</td>
<td>acetamidoxan</td>
<td>acetamidoxan</td>
<td>acetamidoxan</td>
<td>acetamidoxan</td>
<td>acetamidoxan</td>
</tr>
<tr>
<td>Orange</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
</tr>
<tr>
<td>Tomato (green)</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
</tr>
<tr>
<td>Onion</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
</tr>
<tr>
<td>Apple</td>
<td>oxamyl</td>
<td>oxamyl</td>
<td>oxamyl</td>
<td>oxamyl</td>
<td>oxamyl</td>
<td>oxamyl</td>
</tr>
<tr>
<td>Carrot</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
<td>paraoxonax</td>
</tr>
<tr>
<td>Chili</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
<td>carbaryl</td>
</tr>
</tbody>
</table>

Thank you

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