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

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- ✓ *Competent authority for regulation, control and encourangement to protect public health*
- ✓ *Federal agency dependent from the Secretariat of Health*
- ✓ *Technical and operationally autonomous*

2

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
- Tabacco
- Cosmetics
- LMO´s

Occupational health

Environmental risks

Basic sanitation

3

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

Processes

Administrative staff

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COORDINATION AGREEMENTS

Cofepris

Regulation & policies

Entidades federativas States

Operation

Inspection, control and encouragement

FEDERAL SANITARY SYSTEM

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Impact Assessment

Epidemiologic Analysis:

Contamination of food and health impacts

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• 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.

•FDB 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 FDB cases, prevent the spread of disease and early detection of outbreaks . (Rosa R & Castro M. Food Inocuity. 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)

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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's **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, bacterias and parasites (like E. coli, Hepatitis A, Listeriosis, salmonellosis, shigellosis, toxoplasmosis, viral gastroenteritis (rotavirus and others), amebiasis, taeniasis, trichinosis, vibrio and others)

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• 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)

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- In 1997…

	Deaths
Developing countries	17.2 mills
Undeveloped countries	120 thousand

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

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- 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

(INSP. Health National Survey (HNS). 2006).

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- 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.

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Illness	Etiological agent	Mechanism of Transmission	Reported on Unique Mexican Information System for Epidemiological Surveillance
Typhoid and paratyphoid	*Salmonella typhimurium / Salmonella enteritidis*	Food (animal and human feces) Raw foods (egg, milk, water, meat, poultry, fruits and vegetables)	Reported
Shigellosis	*Bacillary dysentery*	Hand to mouth Physical contact Contaminated food (milk or water)	Reported
Food poisoning	*Staphylococcus aureus*	Food (food handlers) Milk products Meat products (cooked inadequately)	Reported
Brucellosis	*Brucella melitensis*	Raw milk Unpasteurized cheese Tissues of infected animals	Reported
Amebiasis	*Entamoeba hystolitica*	Water and food contaminated with amoeba cysts eggs Hand to mouth	Reported
Giardiasis	*Giardia lamblia*	Hand-mouth (person to person) Contaminated food and water	Reported
Cholera	*Vibrio cholerae / Vibrio parahaemolyticus*	Ingestion of seafood (raw) Contaminated food and water	Reported

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Diseases transmitted by food and water

Illness	Water	Food
Cholera	90%	10%
Giardiasis	90%	10%
Intestinal Amebiasis	80%	20%
Shigellosis	80%	20%
Other Intestinales Infections [&]	70%	30%
Typhoid fever (Salmonellosis)	20%	80%
By protozoos	10%	90%
Paratyphoid and others salmonellosis	5%	95%
Bacterial food poisoning	0%	100%

[&] Of these diseases, 50% may be caused by rotavirus and the other half by E coli

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Unique Mexican Information System for Epidemiological Surveillance

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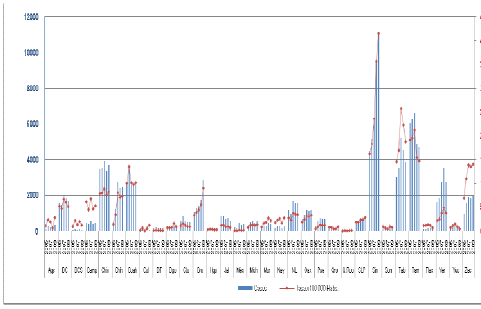
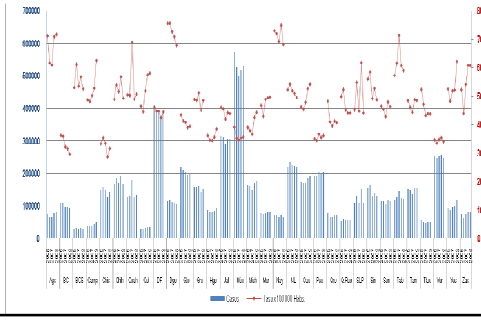
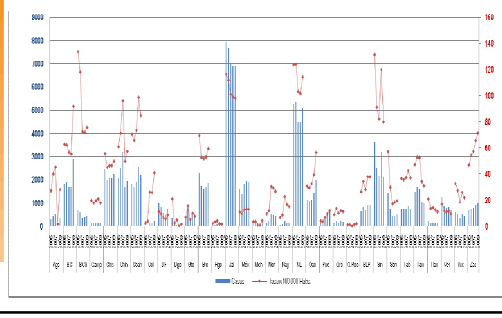
Typhoid fever cases and rates on 32 states of Mexico. 2005-2009



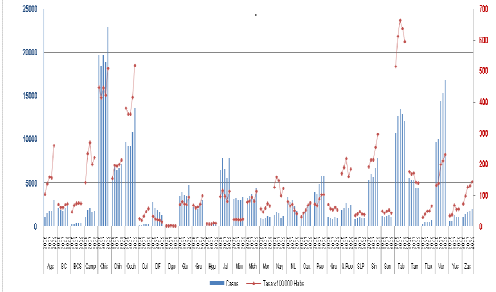
Intestinal infections (other organisms and bad defined) cases and rates on 32 states of Mexico. 2005-2009



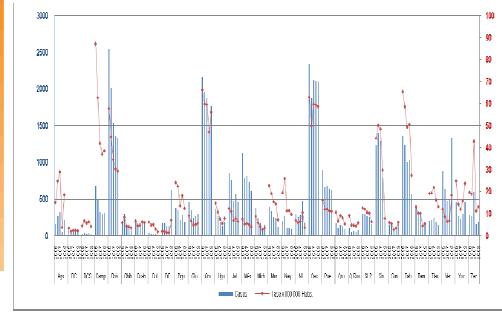
Bacterial food poisoning cases and rates on 32 states of Mexico. 2005-2009



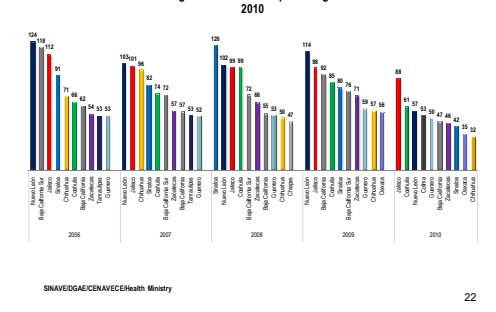
Paratyphoid and other salmonellosis cases and rates on 32 states of Mexico. 2005-2009



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



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



SINAVE/DGAE/CENAVECE/Health Ministry

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

- 2003 (13 %) Human positive samples
- 2003 (14%) Environmental positive samples
- 2004 (30%) Human positive samples
- 2004 (24%) Environmental positive samples
- 2005 (19%) Human positive samples
- 2005 (12%) Muestras ambientales positivas
- Infectious agents mainlye reported on human samples: ***E. coli, Salmonella Sp, y tiphy***, *Citrobacter, Enterobacter cloacae, Enterobacter agglomerans, Pseudomona cepasi, Klebsiella oxitoca y pneumoniae, Rotavirus.*
- *On environmental samples* ***E. Coli, Salmonella spp, Staphylococcus dorado y aureus****, Total and fecal choliformes , V. parahemolytic.*

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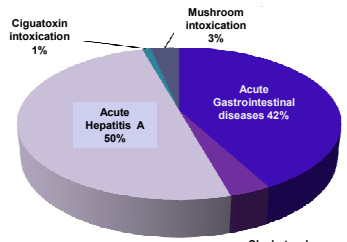
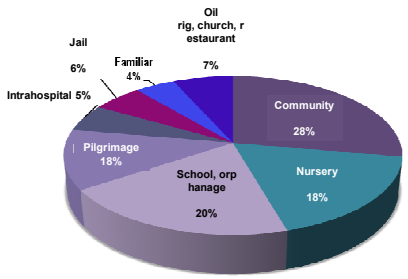
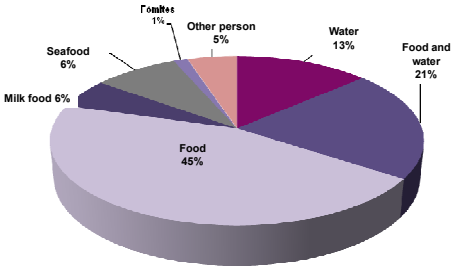
Gastrointestinal diseases outbreaks. Mexico, 2010



Gastrointestinal diseases outbreaks. Mexico, 2010 by occurrence site



Gastrointestinal diseases outbreaks. Mexico, 2010 by source



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

Source	Times	%
Food*	128	72
Water & food	27	15
Water**	22	12
Total	177	100

* Served in party, buy in: street snack, market, community, scholar 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

Source	Times	%
Chicken*	10	50
Meat**	6	30
Pork***	2	20
Lamb	2	20
Total	20	100

* With: rice, nuggets, roast, etc.

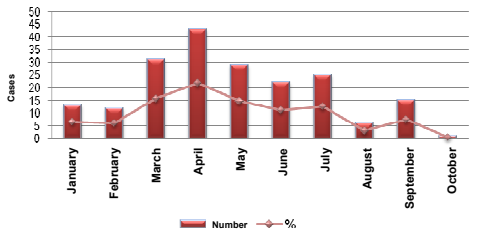
** With sauce, taco on street snack

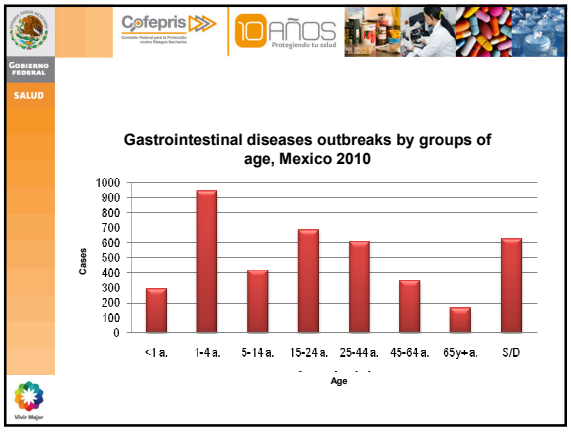
*** Loin

Times mentioned others as outbreak source

Source	Times	%
Other person (hands, nails)	6	38
Fruit water (jamaica, watermelon)	4	25
Fomites (kitchen utensils)	3	19
Milk formula	2	13
Expired canned juice	1	6
Total	16	100

Gastrointestinal diseases outbreaks by month. Mexico, 2010




Gastrointestinal diseases outbreaks by groups of age, Mexico 2010
Cases
1000
900
800
700
600
500
400
300
200
100
0
<1 a.
1-4 a.
5-14 a.
15-24 a.
25-44 a.
45-64 a.
65y+a.
S/D
Age


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
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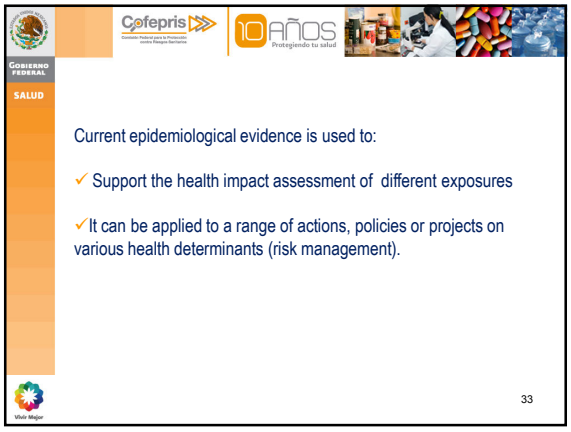
Current epidemiological evidence is used to:
✓ Support the health impact assessment of different exposures
✓ It can be applied to a range of actions, policies or projects on various health determinants (risk management).
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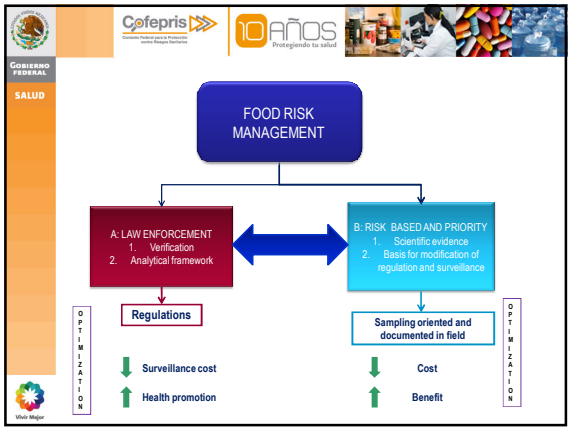
FOOD RISK MANAGEMENT
A: LAW ENFORCEMENT
1. Verification
2. Analytical framework
B: RISK BASED AND PRIORITY
1. Scientific evidence
2. Basis for modification of regulation and surveillance
Regulations
Sampling oriented and documented in field
OPTIMIZATION
Surveillance cost
Health promotion
Cost
Benefit
OPTIMIZATION


Pesticide Surveillance Program, Mexico 2011
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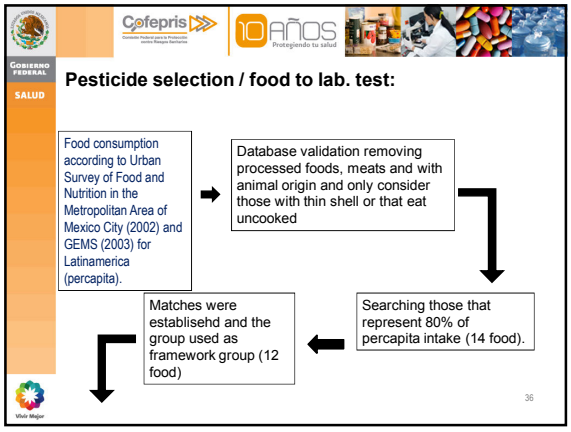
Pesticide selection / food to lab. test:
Food consumption according to Urban Survey of Food and Nutrition in the Metropolitan Area of Mexico City (2002) and GEMS (2003) for Latinamerica (percapita).
Database validation removing processed foods, meats and with animal origin and only consider those with thin shell or that eat uncooked
Searching those that represent 80% of percapita intake (14 food).
Matches were establisehd and the group used as framework group (12 food)
36

Food in framework groups:
1. Rice
2. Onion
3. Chili
4. Bean
5. Tomate (Red)
6. Corn
7. Apple
8. Orange
9. Potato
10. Banana
11. Tomate 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 matrix

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	Culture/ Pesticide	TOXICITY LEVEL				
		1	2	3	4	5
1	**Corn**	carbofuran	paraquat	clorpirifos	acetoclor	2,4 d
2	**Banana**	paraquat	ametrina	propiconazol	diazinon	glifosato
3	**Rice**	carbofuran	clorpirifos	deltametrina	tiobencarb	glifosato
4	**Tomate (red)**	fenpropatrin	oxamil	paraquat	dimetoato	clethodim
5	**Potato**	paraquat	clethodim	cymoxanil	glifosato	setoxidim
6	**Bean**	aldicarb	paraquat	clorpirifos	clethodim	glifosato
7	**Orange**	paraquat	clorpirifos etil	dimetoato	diazinon	glifosato
8	**Tomate (green)**	metamidofos	endosulfan	clethodim	permetrina	diazinon
9	**Onion**	paraquat	diazinon	glifosato	setoxidim	clorotalonil
10	**Apple**	oxamil	paraquat	vamidotion	fosmet	dimetoato
11	**Carrot**	paraquat	linuron	glifosato	clorotalonil	malation
12	**Chili**	carbofuran	oxamil	paraquat	clorpirifos etil	clethodim

	Corn	Banana	Rice	Tomate (red)	Potato	Bean	Orange	Tomate (green)	Onion	Apple	Carrot	Chili	Toxicity level	Import	Disponibility
ORGANOCLORADOS															
Endosulfan								X					5		X
Acetoclor	X												3		X
FOSFORADOS															
Metamidofos								X					1		
Clorpirifos	X		X			X							2	X	X
Etil clorpirifos							X					X	4		
Diazinon		X					X		X				3		X
Dimetoato				X			X	X		X			2		X
Vamidotion										X			4		
Fosmet										X			2		
Malation											X		4	X	X
CARBAMATOS															
Carbofuranno	X		X									X	1		X
Aldicarb						X							1		X
Oxamil				X						X		X	1		X
Tiobencarb			X										3		
PIRETROIDES															
Fenpropatrin				X									1		
Ametrina		X											3		
Deltametrina			X										3		
Permetrina								X					3	X	
HERBICIDAS															
Paraquat	X	X		X	X	X	X		X	X	X	X	2	X	
Clethodim				X	X	X		X				X	3		
Linuron											X		3		
Glifosato		X	X		X	X	X		X		X		4	X	
Setoxidim					X				X				1		
2,4-D	X												4		
FUNGICIDAS															
Propiconazol		X											3		
Clorotalonil									X		X		4		
Cimoxanil					X								5		

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Rules to evaluate pesticide monitoring

1. **Health risk**: authorized, prohibited y/o restricted.
2. Presence in basic consumption products.

Commission of Evidence and Risk Management

3. Methodology: Multiresidues pesticide analysis.
4. Trained personnel on pesticide analysis.
5. Instalations andequipment.
6. State laboratories participation

Laboratories




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Proposal

1. Selection of pesticides to monitoring: organophosphate pesticide.
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.




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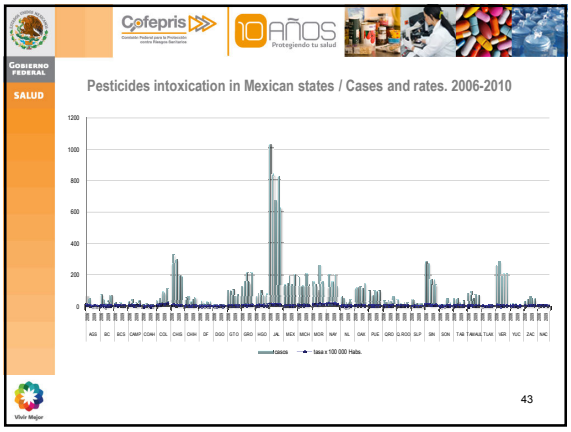
Pesticides Acute Intoxications in Mexico

2006-2010


Cofepris
10 AÑOS
Protegiendo tu salud
GOBIERNO FEDERAL
SALUD
Pesticides intoxication in Mexican states / Cases and rates. 2006-2010
1200
1000
800
600
400
200
0
AGS BC BCS CMEP COAH COL CHIS CHIH DF DGO GTO GRO HGO JAL MEX MICH MOR NAY NL OAX PUE QRO QROO SLP SIN SON TAB TAMAUL TLAX VER YUC ZAC NAC
casos
tasa x 100 000 Habs.
Vivir Mejor
43


Cofepris
10 AÑOS
Protegiendo tu salud
GOBIERNO FEDERAL
SALUD
Thank you
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Vivir Mejor
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