

LEARNING LAB

“You can’t manage what you don’t measure”
metrics for food safety

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ILRI
INTERNATIONAL
LIVESTOCK RESEARCH
INSTITUTE



Food safety metrics for LMIC

Food safety metrics relevant to low and middle income countries

Working paper



Agriculture, Nutrition & Health Academy
Food Safety Working Group

April 2018



Food Safety

WORKING GROUP: TECHNICAL BRIEF

Food safety metrics relevant to low and middle income countries



ANH
Academy
Agriculture, Nutrition
& Health Academy

What is food safety?

- “handling, preparing and storing *food* in a way to best reduce the risk of individuals becoming sick from foodborne.
- “handling, storing and preparing *food* to prevent infection and...” FAO

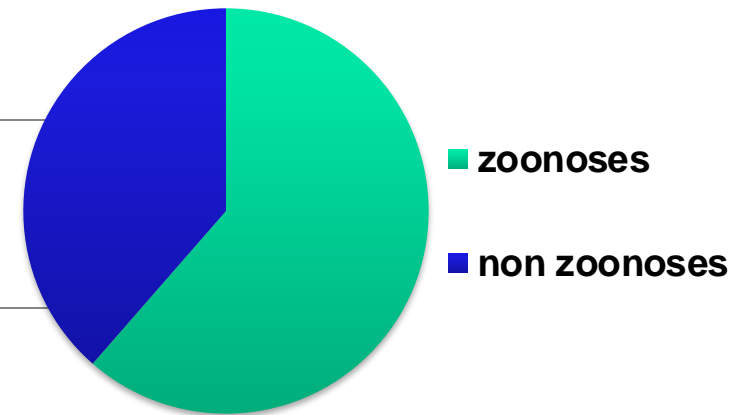
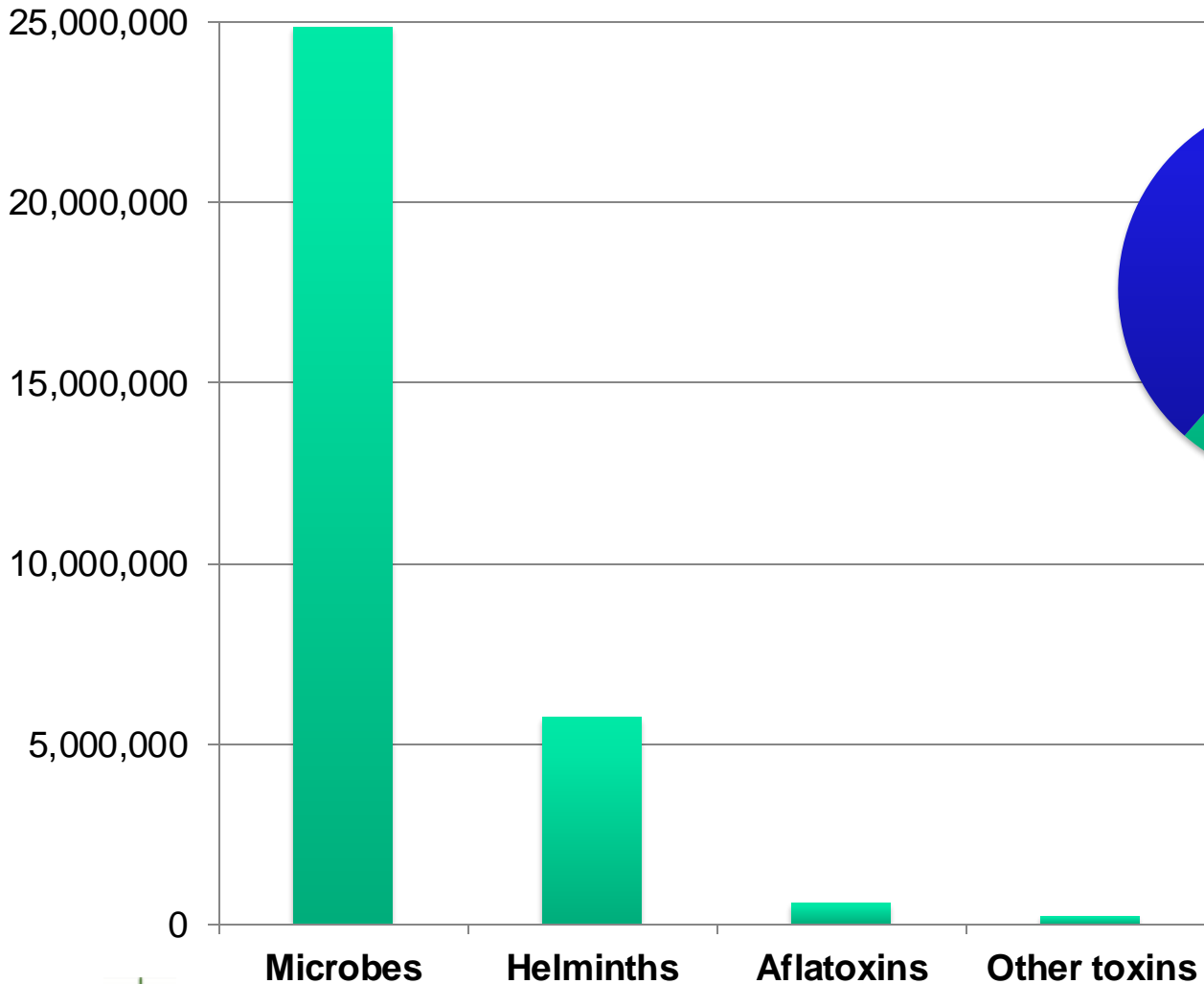
Food safety hazards?

Hazard: an **agent, substance or action** that has the potential to cause an undesired event

	BIOLOGICAL	CHEMICAL	PHYSICAL
Salmonella	X		
Ebola	X		
Aflatoxin		X	
Avian Influenza			
Dioxins		X	
Horse meat sold as beef			
Metal pieces			X

How safe is my food?

Burden LMIC



Unknown burdens

Pesticides
Heavy metals
Ag. chemicals
Industrial chemicals

Dioxins
Cassava CN



How would you MANAGE food safety?

You are the major of Accra and have committed to improving food safety of foods sold in street markets. What would be your MOST PREFERRED food safety management strategy?

REGULAR SURVEILLANCE
(testing foods and
removing from markets
what doesn't meet FS
standards)

BAN FOOD SOLD IN
INFORMAL/STREET
MARKETS

SENSITIZE
CONSUMERS/VALUE
CHAIN ACTORS ON
FOOD SAFETY

Food safety in LMIC

- **100%** of milk in Assam and **40%** in Nairobi doesn't meet standards
- **98%** of beef in Ibadan, **52%** pork in Ha Noi, unacceptable bacteria counts
- **92%** of Addis milk and **46%** of Nairobi milk had aflatoxins over EU standards
- **30%** of chicken from commercial broilers in Pretoria unacceptable for *S. aureus*
- **24%** of boiled milk in Abidjan unacceptable *S. aureus*

REGULAR SURVEILLANCE
(testing foods and removing
from markets what doesn't
meet FS standards)



Food safety and nutrition

BAN FOOD SOLD IN
INFORMAL/STREET
MARKETS

A random town in East Africa....

	Wet market milk	Supermarket milk
Infants consume daily	67%	65%
Most common price/litre	\$0.5	\$1
Boil milk	99%	79%

- Which milk would you recommend for children?
- What are the health implications for poor households?
What are the nutrition implications?
- Which hazards are destroyed by boiling/pasteurization?
Which are not?
- What would be your recommendation?

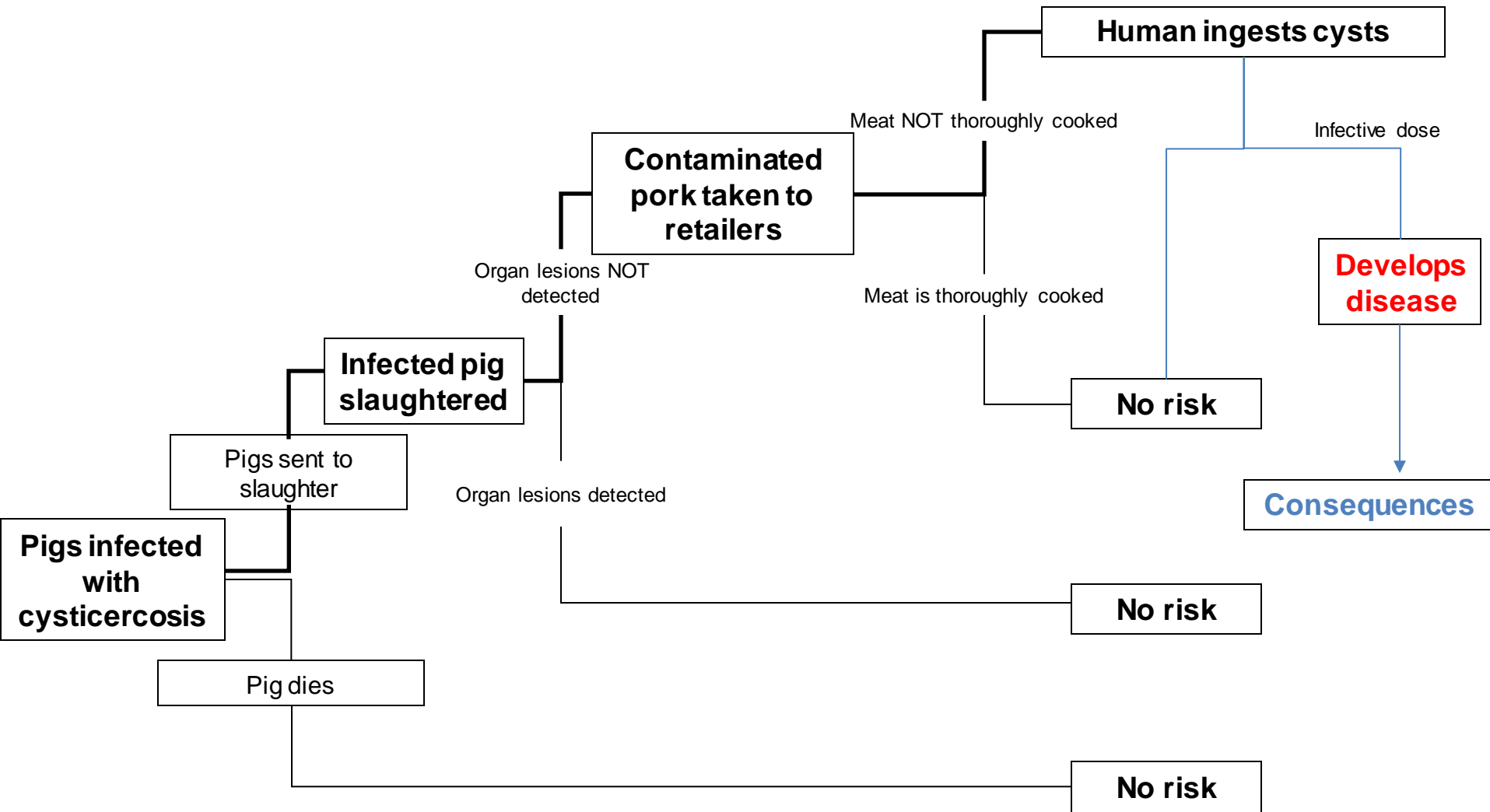
Risk based approaches

Focus on the RISK rather than the HAZARD

Risk: the **probability** of an undesired event and its **consequences**



Risk of cysticercosis for adult women in Ghana



Risk Estimation Matrix

Probability

High	Negligible	Very low	Low	Moderate	High	Extreme
Moderate	Negligible	Very low	Low	Moderate	High	Extreme
Slight	Negligible	Very low	Low	Moderate	High	Extreme
Low	Negligible	Negligible	Very low	Low	Moderate	High
Very low	Negligible	Negligible	Negligible	Very low	Low	Moderate
Extremely low	Negligible	Negligible	Negligible	Negligible	Very low	Low
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Very low
	Negligible	Very low	Low	Moderate	High	Extreme

Consequences

Food safety
and culture

SENSITIZE
CONSUMERS/VALUE
CHAIN ACTORS ON
FOOD SAFETY



Culture and Milk Safety: Experiences in Borana pastoral areas, Ethiopia

Kebede Amenu



Addis Ababa University

College of Veterinary Medicine and Agriculture,



Food Safety Perception

94 Food safety in sub-Saharan Africa

BOX 16 'TAPEWORM INFECTION IS NOT A DISEASE'

In a survey to assess the knowledge of tapeworm infection in central Ethiopia, the following conversation occurred between a researcher and a consumer named Abebe.

Researcher: 'Have you ever suffered from tapeworm infection?'

Abebe: 'Who told you that tapeworm infection is a disease?'

Researcher: 'Do you consider tapeworm infection to be normal?'

Abebe: 'A man without tapeworm is not really a man.'

Milk in Borana

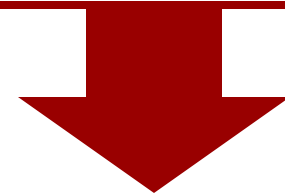
Importance of milk in the diets of pastoral communities

High chance of contamination of milk and milk products

Low education level of communities in safe milk handling practices

Milk consumption behavior (e.g. preference for raw milk)

Livestock keepers and consumers at 'risk' of infection with milk-borne pathogens



Research towards improving milk handling practices and locally adapted strategies to mitigate associated health risks

Milk production and consumption

- Cattle, camels and goats kept for milk production
- Cattle most important:
 - **processing** of cow milk into different dairy products (more stable)
 - cow milk and sometimes goat milk converted into *ititu* (traditional yoghurt), use of butter for hair dressing and cosmetics



Milk production and consumption...

- Seasonal preference for camel milk (dry season)
- Consumption of camel milk considered a taboo by some Borana clans (e.g., *Qallu Karayu*).
- Goat milk mixed in tea (perceived better nutritional value, “good in vitamins”)
- Children drink fresh goat milk during herding directly from udder (luugoo)



“Many hands” for potential contamination of milk



Perception on quality and safety

- Proper smoking of containers ensures good quality and safety of milk and dairy products
- Reasons for smoking of milk containers:
 - increases shelf life of products
 - good consistency of curd milk
 - pleasing flavour
 - health benefits



Perception about milk boiling before consumption

- Boiling of fresh milk was not common practice
 - “long time tradition of Borana people for not doing so”
 - the perception that “**boiling of milk destroys vitamins**”
 - “**boiled milk is considered dead**”
 - boiling of milk reduces the nutritional quality of milk
- However milk is boiled for children: to prevent *qullichoo* (cream, risk when vomiting)

Perception about milkborne diseases

Health benefits of milk, poor awareness of disease risks:

- “People drinking milk don't have problem. Rather, people who don't drink milk get sick”.
- “We haven't seen milk related sickness. We haven't had any problem because of the milk from our animals. We use it to raise our children. We are not aware that one can get disease from milk” (IDI 11)
- “...The milk itself is medicine. Fresh milk can be recommended for TB patients” (IDI 8).

Various risk behaviours identified, thus need to:


- Closely engage with local communities to improve their understanding on milk safety risks
 - Facilitate a change in practices
 - Measuring the effect on milk safety of changed practices
- involve women in research

RESEARCH ARTICLE

Open Access



Important knowledge gaps among pastoralists on causes and treatment of udder health problems in livestock in southern Ethiopia: results of qualitative investigation

Kebede Amenu^{1,2,4*} , Barbara Szonyi², Delia Grace³ and Barbara Wieland²

GROUP WORK

What brings higher **health risks** for a **child** in **rural Ghana**?

1. Drinking milk with aflatoxins above the food safety standards?

2. Eating food prepared with amoeba-contaminated water?

3. Drinking milk from cattle herds having tuberculosis?

4. Drinking milk contaminated with cattle faeces and *E. coli* 0157?

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Patron: Professor Peter C Doherty AC, FAA, FRS

Animal scientist, Nobel Prize Laureate for Physiology or Medicine–1996

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