

The Role of Surveillance in Developing a Risk-Based Food Safety System



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Approaches to Control of Foodborne Illness

- Risk-based

ENHANCING FOOD SAFETY

THE ROLE OF THE
FOOD AND DRUG
ADMINISTRATION



You Dropped Food on the Floor Do You Eat It?

Was it sticky? — No. — Did anyone see you? — YES.

No.

YES.

Is it an
Emausaurus?

Is it a
raw steak?

Was it a
boss/lover/parent? — No.

**EAT
IT.**

No.

No.

YES.

YES.

Was it expensive? — YES.

YES.

Did the cat
lick it?

Are you
a puma?

No.

Can you cut off
the part
that touched
the floor?

Are you a
Megalosaurus?

YES.

No.

YES.

No.

YES.

No.

Is it bacon?

No.

YES.

YES.

No.

**DON'T
EAT IT**

**EAT
IT.**

**DON'T
EAT IT**

**EAT
IT.**

Is your cat
healthy?

YES.

No.

**YOUR
CALL**

**EAT
IT.**

Approaches to Control of Foodborne Illness

- Risk-based
 - “A systematic means by which to facilitate decision making to reduce public health risk”
- Data intensive
 - Strategic data collection
 - Improved access to data
 - Modern Information Technology (including EMR)
 - Increased analytic capacity

ENHANCING FOOD SAFETY

THE ROLE OF THE FOOD AND DRUG ADMINISTRATION



Roles of Food Safety Agencies

- Short term responsibilities: generally reactive
 - Outbreak recognition
 - Identification of source/trace-back
 - Regulatory action/recall

However, outbreaks constitute only a small fraction of total foodborne disease burden...
- Longer term responsibilities: generally proactive

A well designed proactive approach will enhance many of the elements essential to an optimal short-term/reactive response

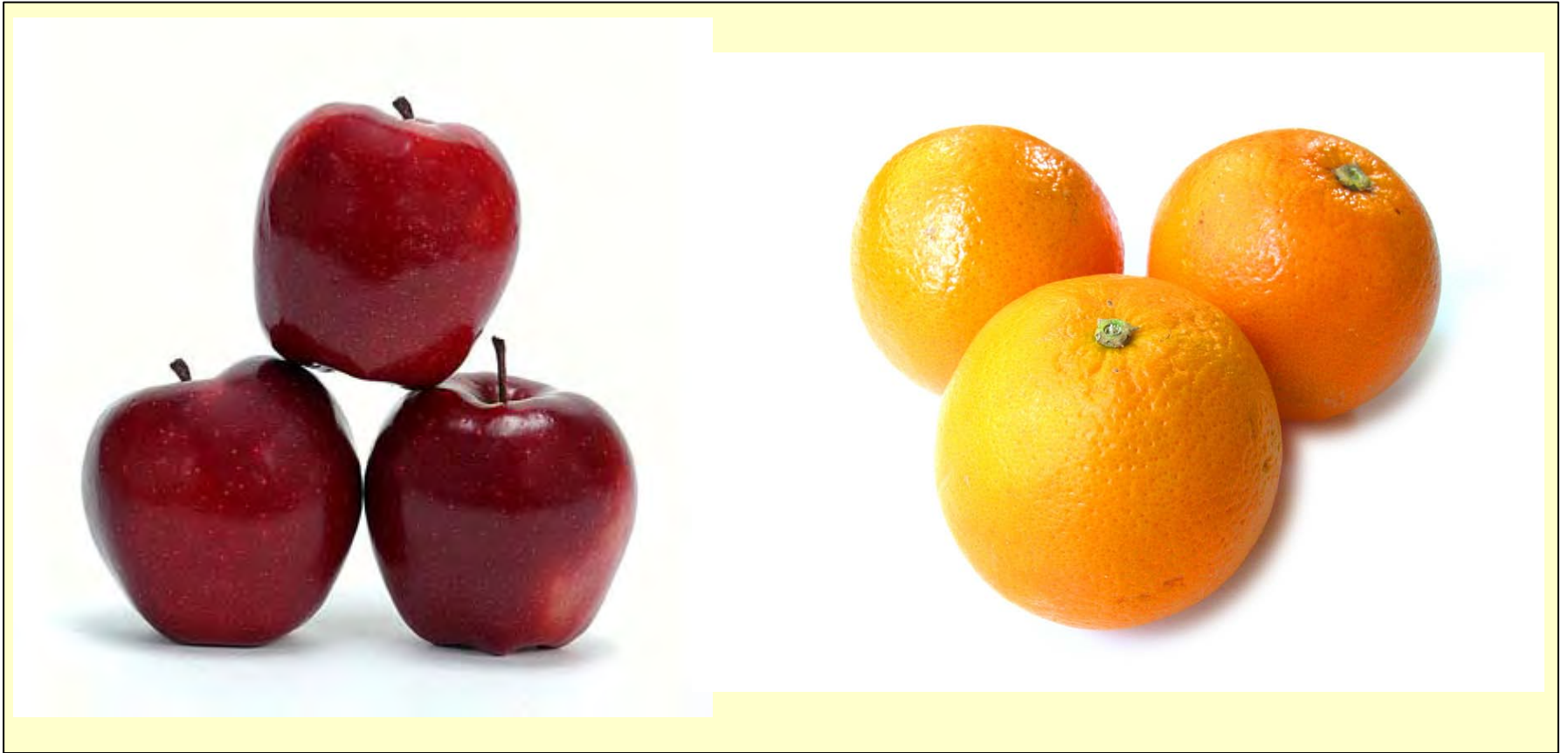
Risk-Based Food Safety System



Step 1: Strategic Planning

- Identify public health objectives related to food safety
- Establish a risk management plan (general and specific strategic plans for meeting public health objectives and for considering and choosing policy interventions to achieve these objectives)
- Establish metrics with which to measure performance in consultation with stakeholders

Integrated Measures of Disease Burden



Step 2: Public Health Risk Ranking

- Develop or select tools (models, measures, or other) for public health risk ranking in consultation with stakeholders
- Rank risks based on public health outcomes
- Report results to stakeholders and solicit feedback

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RANKING THE RISKS:

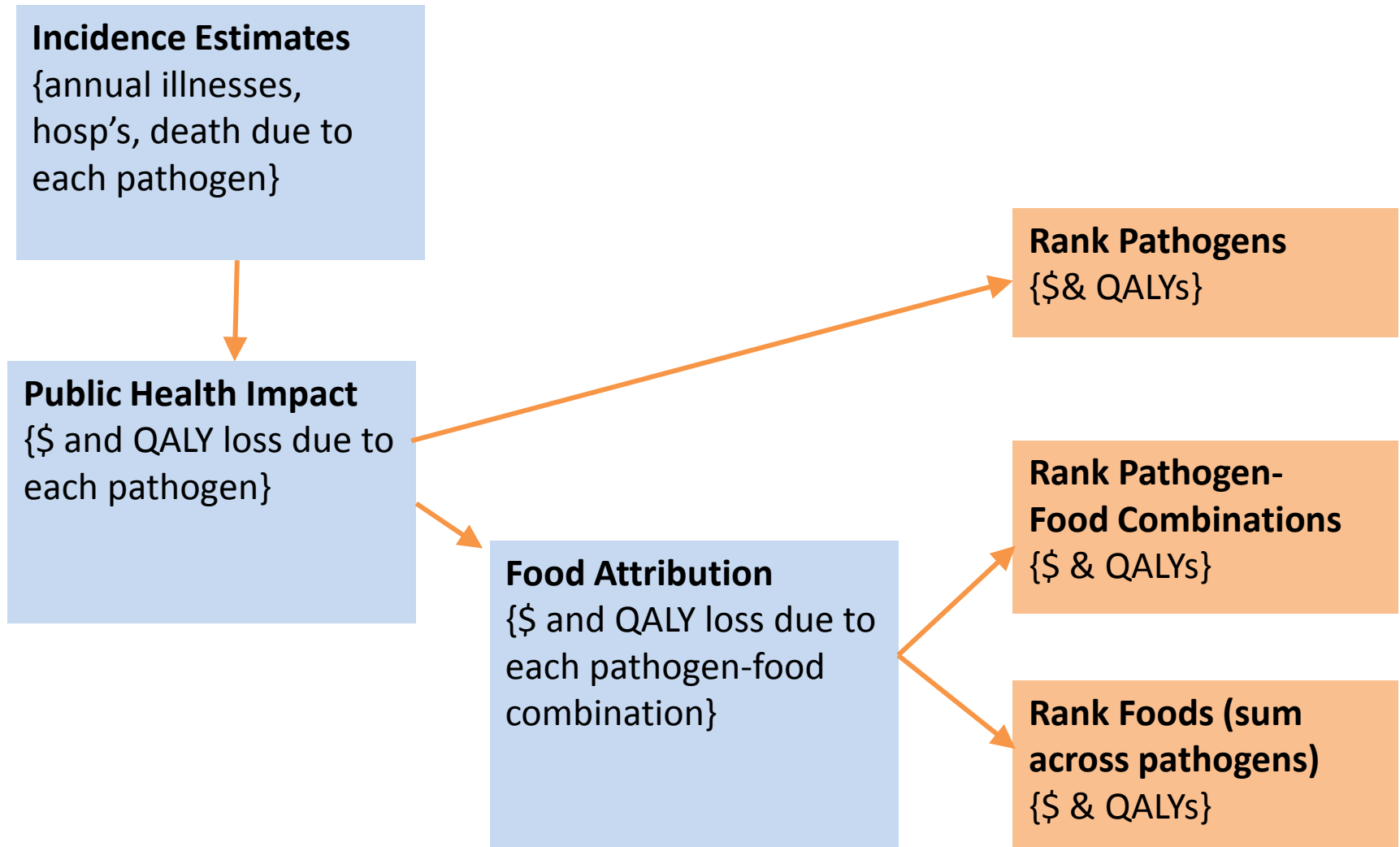
THE 10 PATHOGEN-FOOD COMBINATIONS WITH
THE GREATEST BURDEN ON PUBLIC HEALTH

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Major Steps in Analysis

14 pathogens in 12 food categories



Primary Food Safety Problems in the U.S.

TABLE ES-2: THE TOP 10 PATHOGEN-FOOD COMBINATIONS IN TERMS OF ANNUAL DISEASE BURDEN, BY COMBINED RANK

PATHOGEN-FOOD COMBINATIONS	COMBINED RANK	QALY LOSS	COST OF ILLNESS (\$ MIL.)	ILLNESSES	HOSPITALIZATIONS	DEATHS
<i>Campylobacter</i> – Poultry	1	9,541	1,257	608,231	6,091	55
<i>Toxoplasma</i> – Pork	2	4,495	1,219	35,537	1,815	134
<i>Listeria</i> – Deli Meats	3	3,948	1,086	651	595	104
<i>Salmonella</i> – Poultry	4	3,610	712	221,045	4,159	81
<i>Listeria</i> – Dairy products	5	2,632	724	434	397	70
<i>Salmonella</i> – Complex foods	6	3,195	630	195,655	3,682	72
Norovirus – Complex foods	6	2,294	914	2,494,222	6,696	68
<i>Salmonella</i> – Produce	8	2,781	548	170,264	3,204	63
<i>Toxoplasma</i> – Beef	8	2,541	689	20,086	1,026	76
<i>Salmonella</i> – Eggs	10	1,878	370	115,003	2,164	42
TOTAL		36,915	8,151	3,861,128	29,830	765

Step 3: Targeted Information Gathering on Risks and Consideration of Other Factors that may Influence Decision Making

Step 4: Analysis and Selection of Interventions

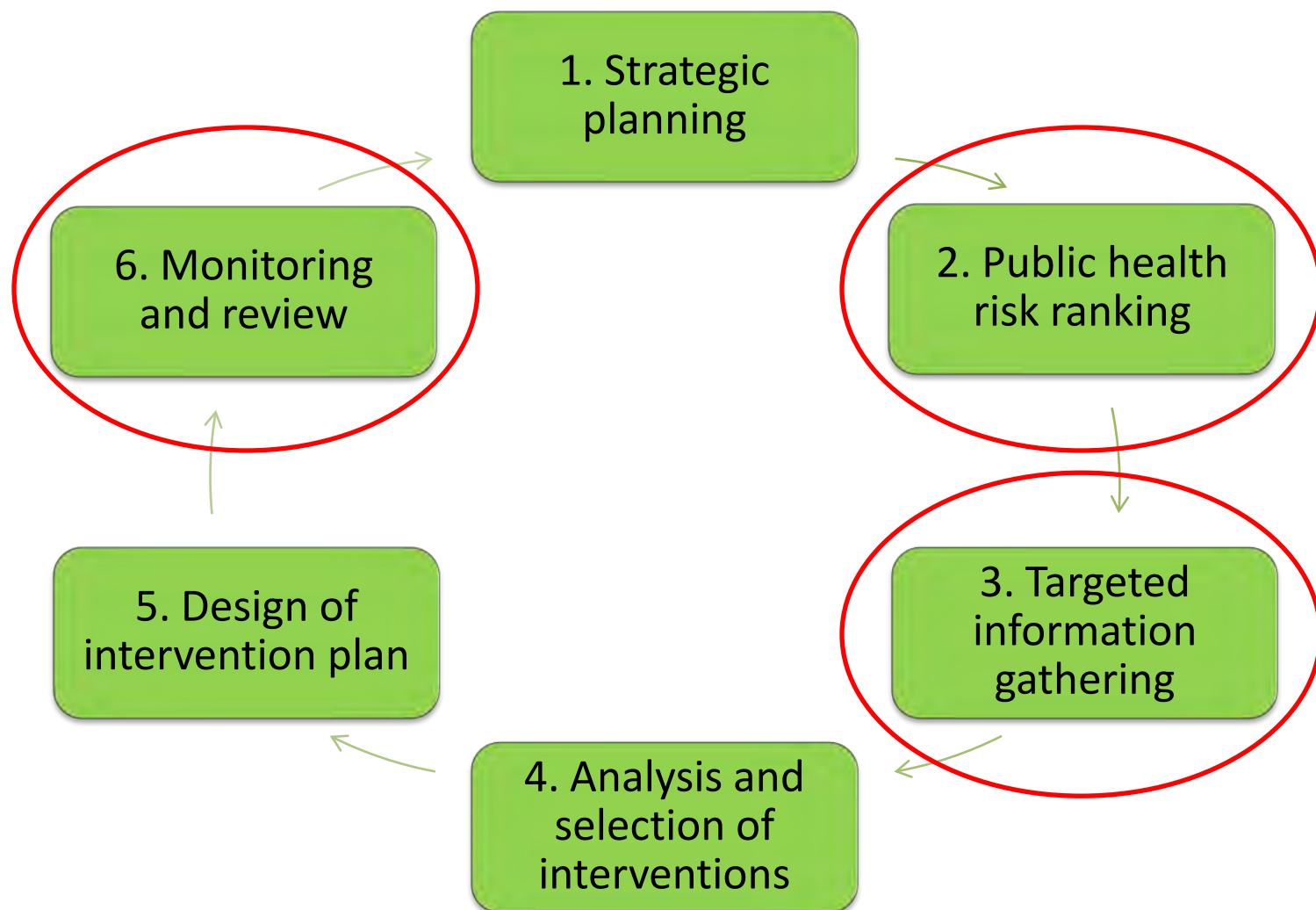
Step 5: Design of an Intervention Plan



Step 6: Monitoring and Review

- Collect and analyze data on evaluation measures selected during strategic planning
- Interpret data and evaluate whether the interventions result in the desired intermediate outcomes
- Determine whether public health objectives are being met by using performance metrics developed in Step 1 (broad strategic planning)
- Communicate the results to stakeholders
- Review and refine the entire process in an iterative manner as necessary to accomplish both intermediate outcomes and public health objectives so as to achieve continuous improvement over time

Risk-Based Food Safety System



Surveillance Data

- Human disease surveillance
- Food/product surveillance
- Animal surveillance
- Environmental surveillance
- Molecular surveillance



Surveillance: Gaps and Challenges

- Legacy systems (and legacy thinking)
- Fragmented data collection
- Lack of data sharing among government entities
- Lack of industry data
- Poor IT capacity
 - Need for data standards
 - Modernization of IT capacity
 - Failure to make use of ESSENCE/EMR
- Poor capacity for development of analytic systems

We have lots of data. What we don't have is good analytic and IT capacity – and we're often missing the specific data necessary to answer our questions (i.e., because of the way things were put together, there are critical data gaps)

Surveillance as Part of a Risk-Based Approach to Food Safety

- Figure out what you want/need before you start
- See surveillance not as an end in itself, but as a carefully designed component of an overall analytic system to identify, prioritize, and mitigate risk of foodborne illness
 - Dump what you don't need (and save money doing it)
 - Keep and refine what is providing useful information
 - Add (creatively) what is essential to do the analyses to build a risk-based system