



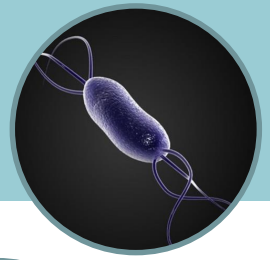
Netherlands Food and Consumer
Product Safety Authority
Ministry of Economic Affairs

Activities on *Listeria monocytogenes* in RTE foods in The Netherlands: a RA point of view

Aarieke de Jong

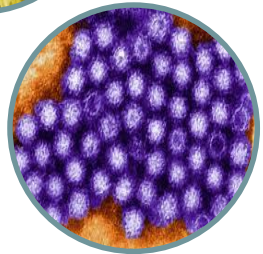
NVWA – BuRO

(Netherlands Food and Consumer Product
Safety Authority -
Office for Risk Assessment & Research)



A broader perspective....

- *Listeria* is not the only hazard
- Not all foods are as important

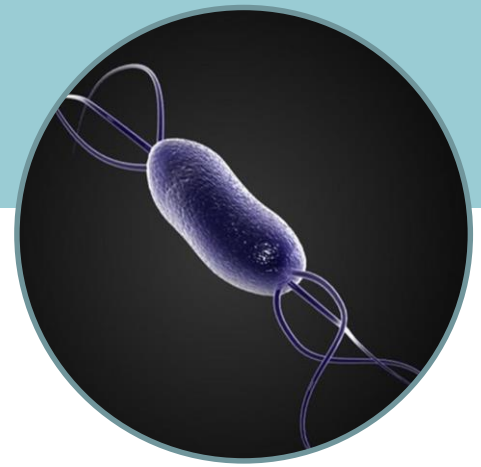


NVWA



NVWA (FSA NL): Focussing surveillance Risk based – Knowledge driven





Activities on *Listeria*

Big question is:

What is the most important route of exposure?

To solve the problem:

Risk assessment



Risk Assessment

On *Listeria*:

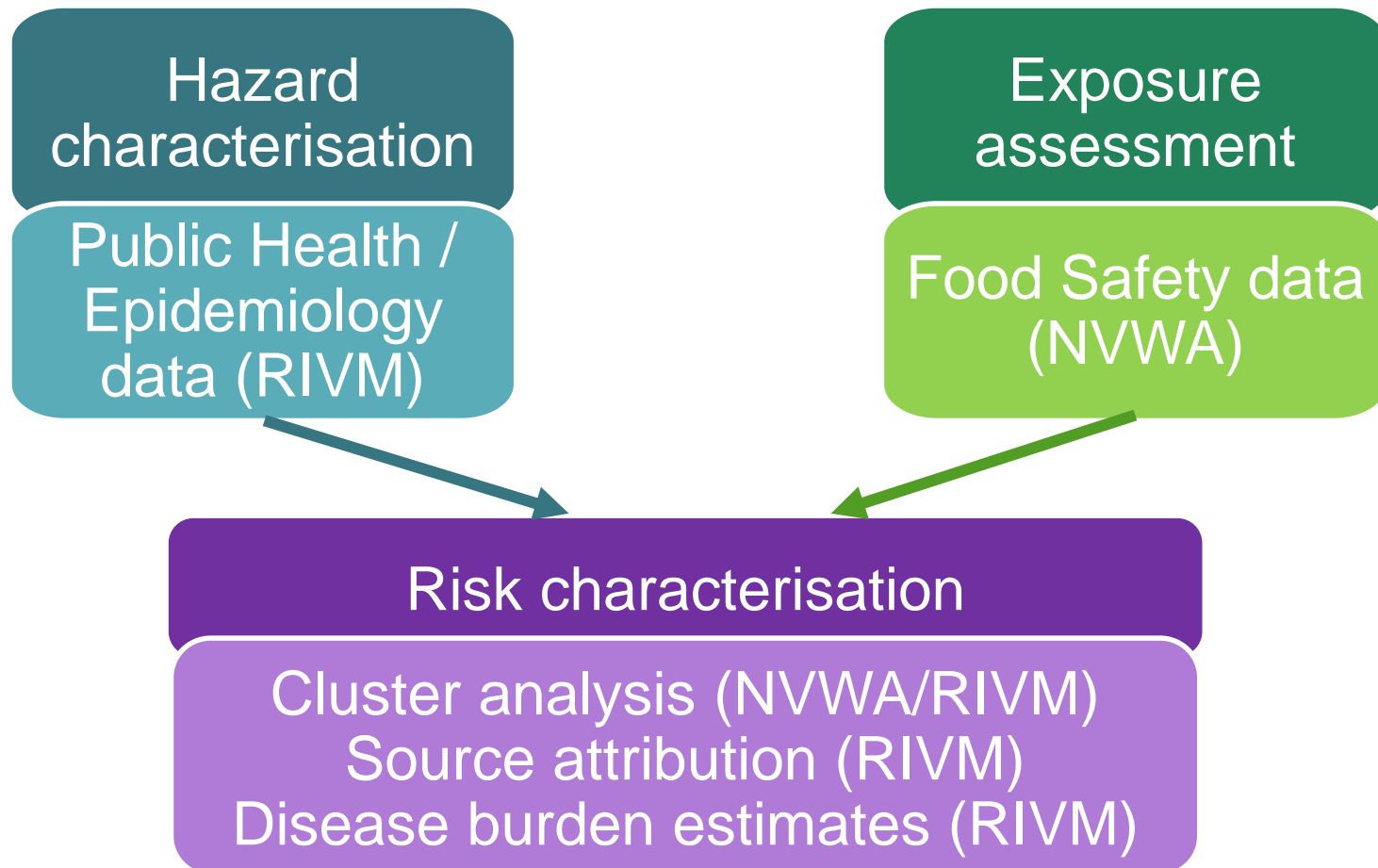
Where to look

On Surveillance system:

How to improve where you look



Listeria: a risk assessment point of view





Listeria: a risk assessment point of view

Hazard
characterisation

Public Health /
Epidemiology
data (RIVM)

Exposure
assessment

Food Safety data

Risk char

Cluster analy
Source att
Disease burden



 National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

**Epidemiology of
Listeria in The
Netherlands**

Eelco Franz
Head of Department
Epidemiology and Surveillance
of Enteric Infections and
Zoonoses, RIVM



Surveillance *Listeria* in NL

Notifiable disease (since December 2008)

- Patient interview

Patient: gender, age, postal code

Symptoms / diagnosis & hospitalisation & death

Co-morbidities / use of medicines

Possible source (open question)

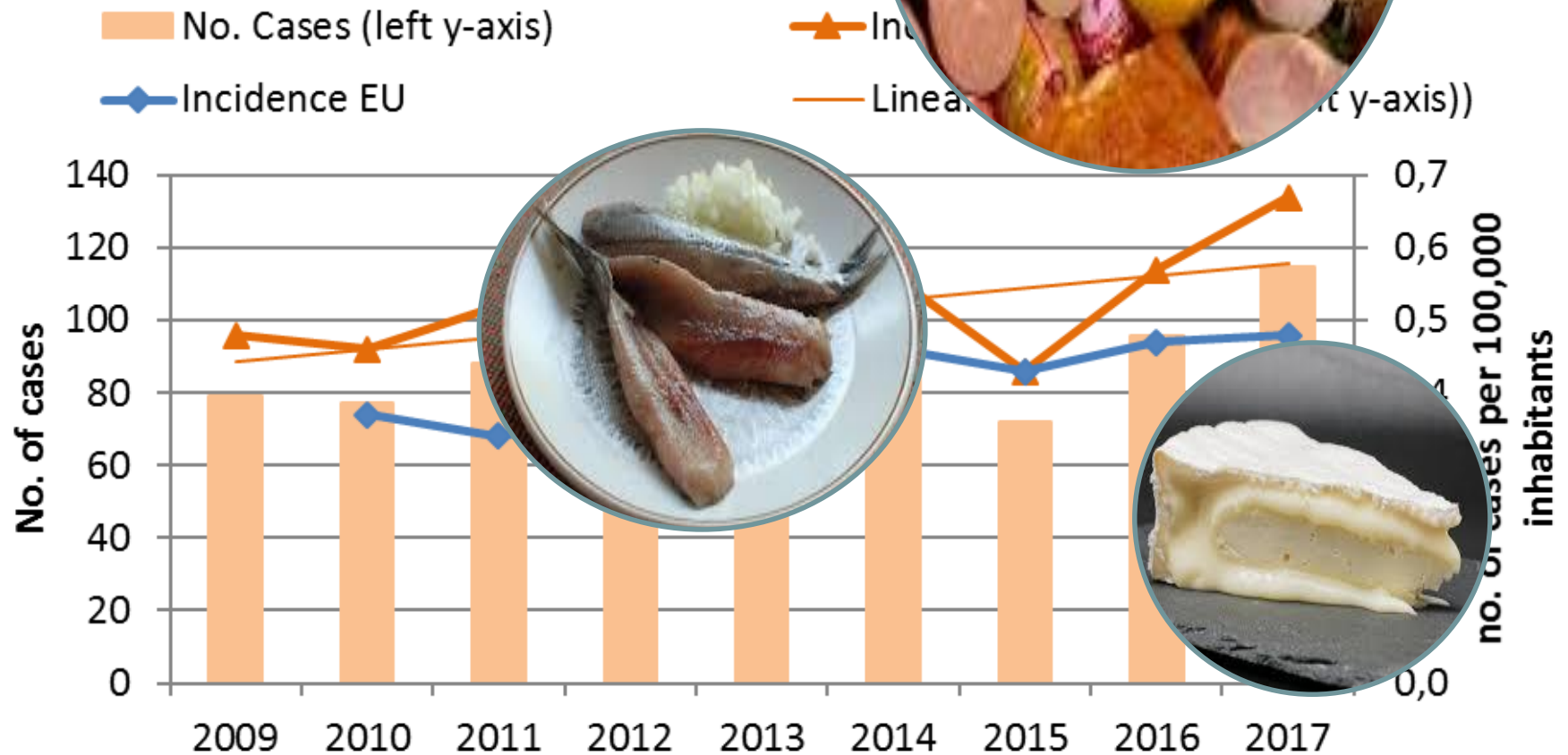
Food history

Travel history

Profession related



Surveillance *Listeria* in NL





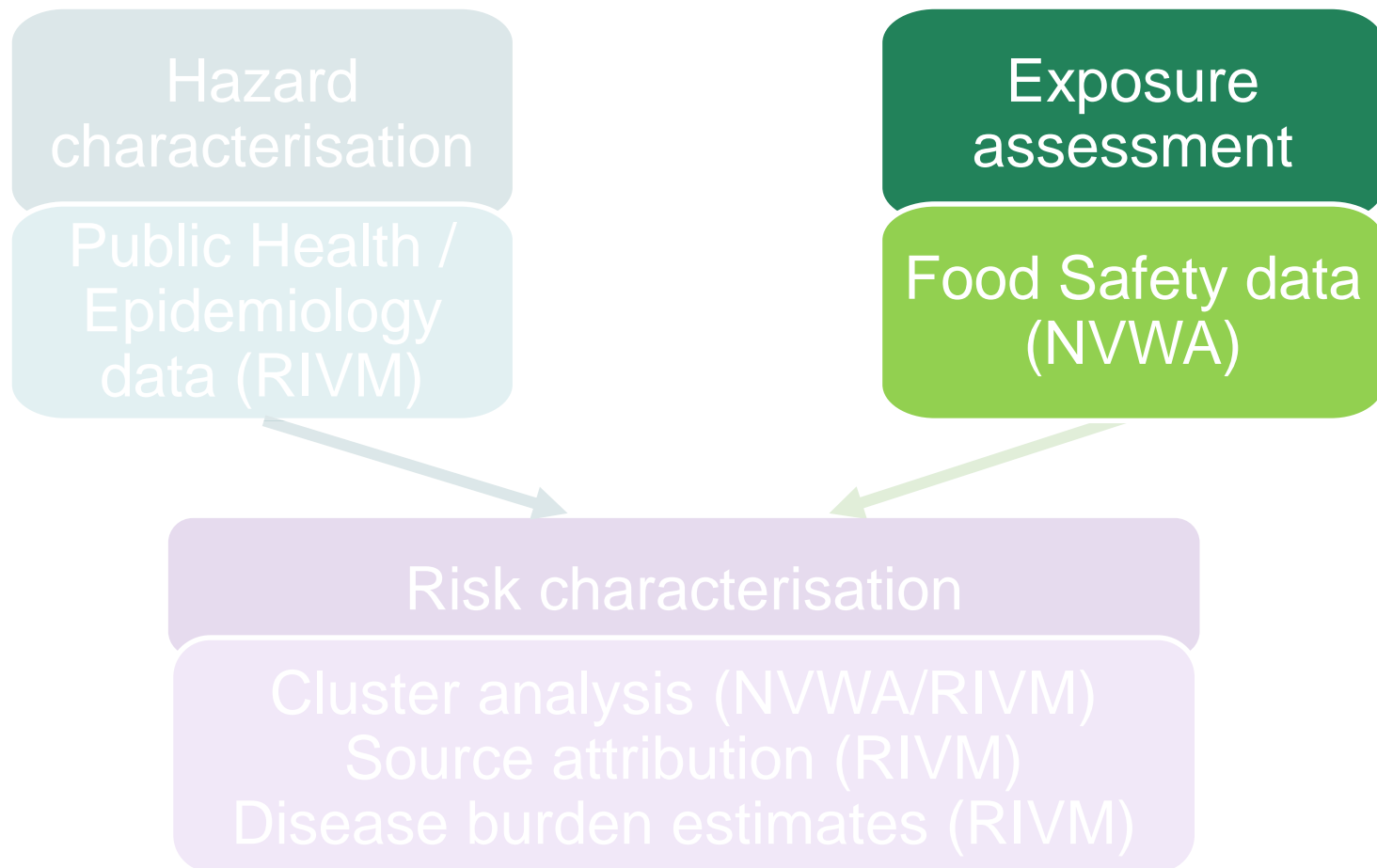
Surveillance *Listeria* in NL

Notifiable disease (since December 2008)

- Patient interview
- Typing isolates:
 - › Serotyping
 - › PFGE(→WGS per 2017, retrospect. from 2010)

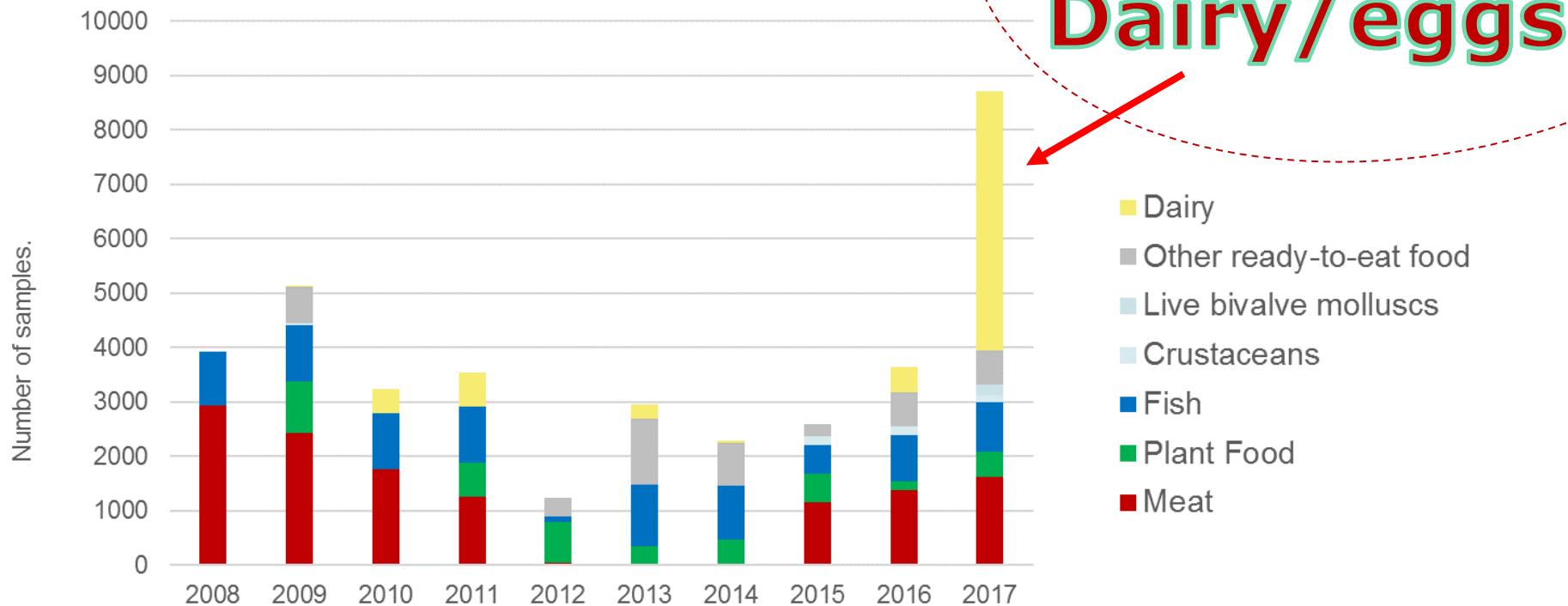


Listeria: a risk assessment point of view



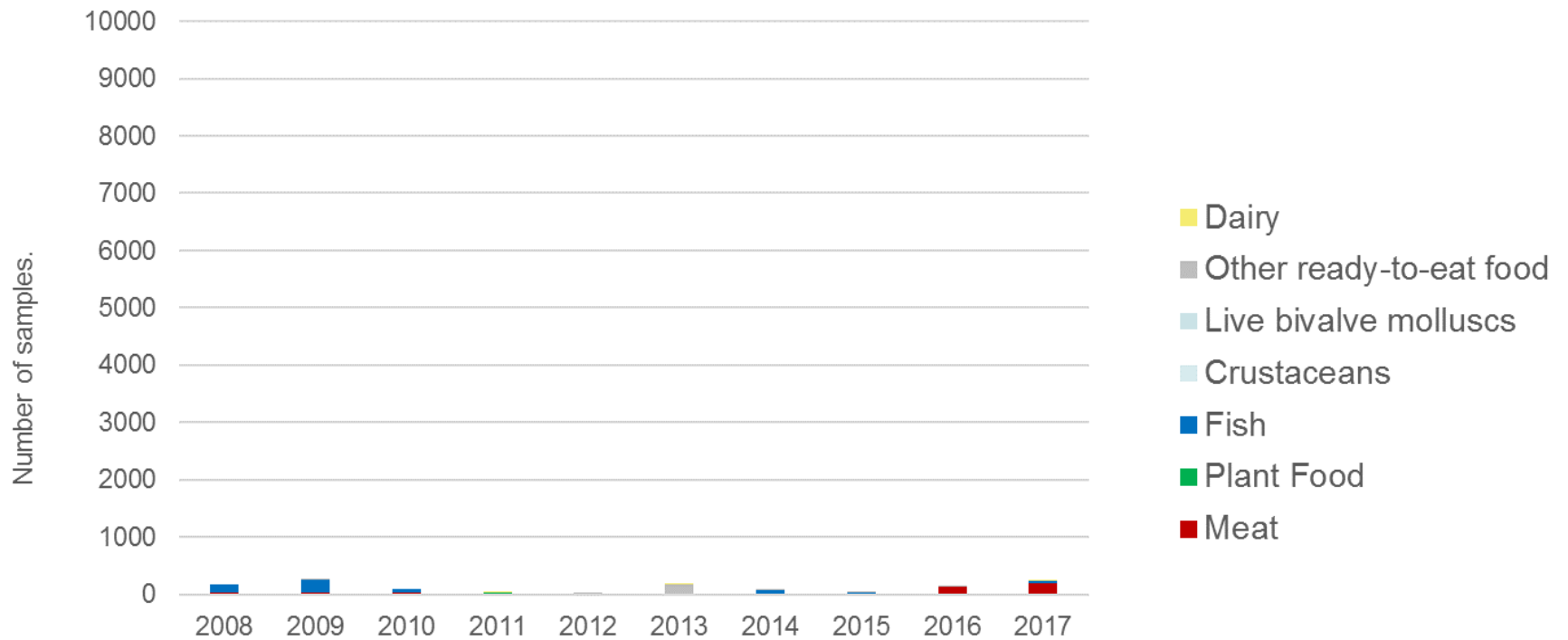


Food: #samples taken



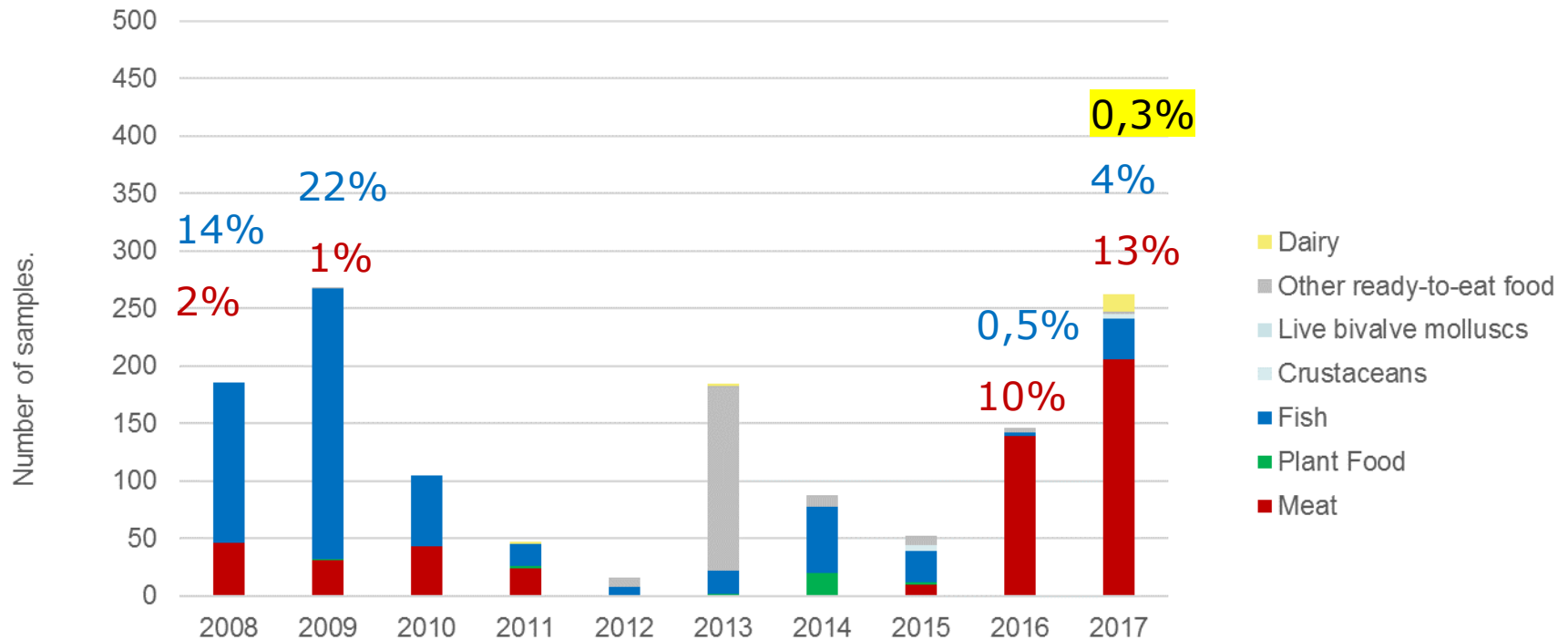


Food: #samples positive



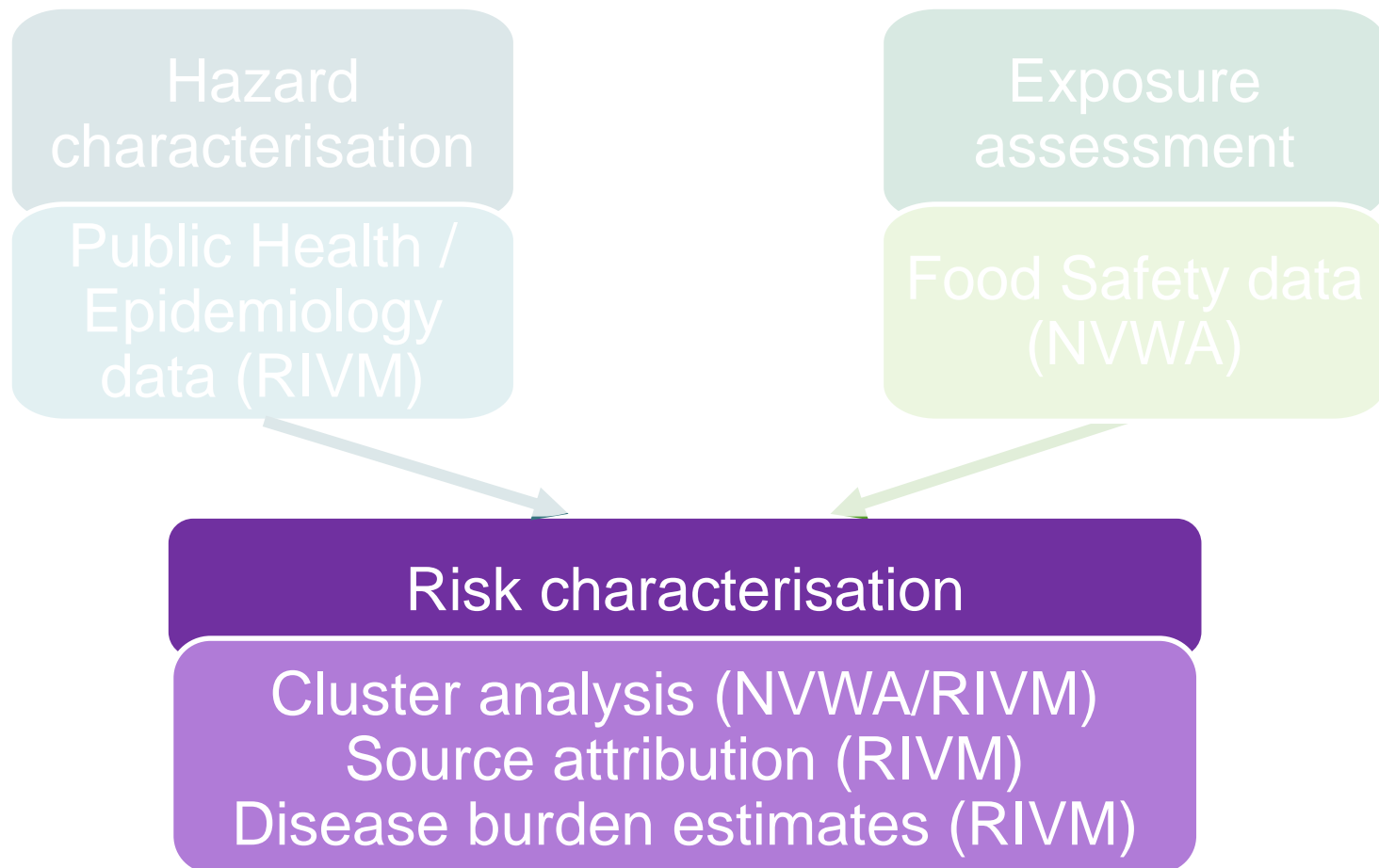


Food: #samples positive





Listeria: a risk assessment point of view





Cluster analysis

- Both **food** and **human** isolates **≤ 2017**
- PFGE
- On a yearly basis

Food Safety data
(NVWA)

Public Health /
Epidemiology
data (RIVM)

Infectieziekten Bulletin

Surveillance van *Listeria monocytogenes* in Nederland, 2016

I.H.M. Friesema, S. Kuiling, M.E.O.C. Heck, E.G. Biesta-Peters, A. van der Ende, E. Franz



Cluster analysis

- Both **food** and **human** isolates ≤ 2017
- PFGE
- On a yearly basis

Food Safety data
(NVWA)

≥ 2017

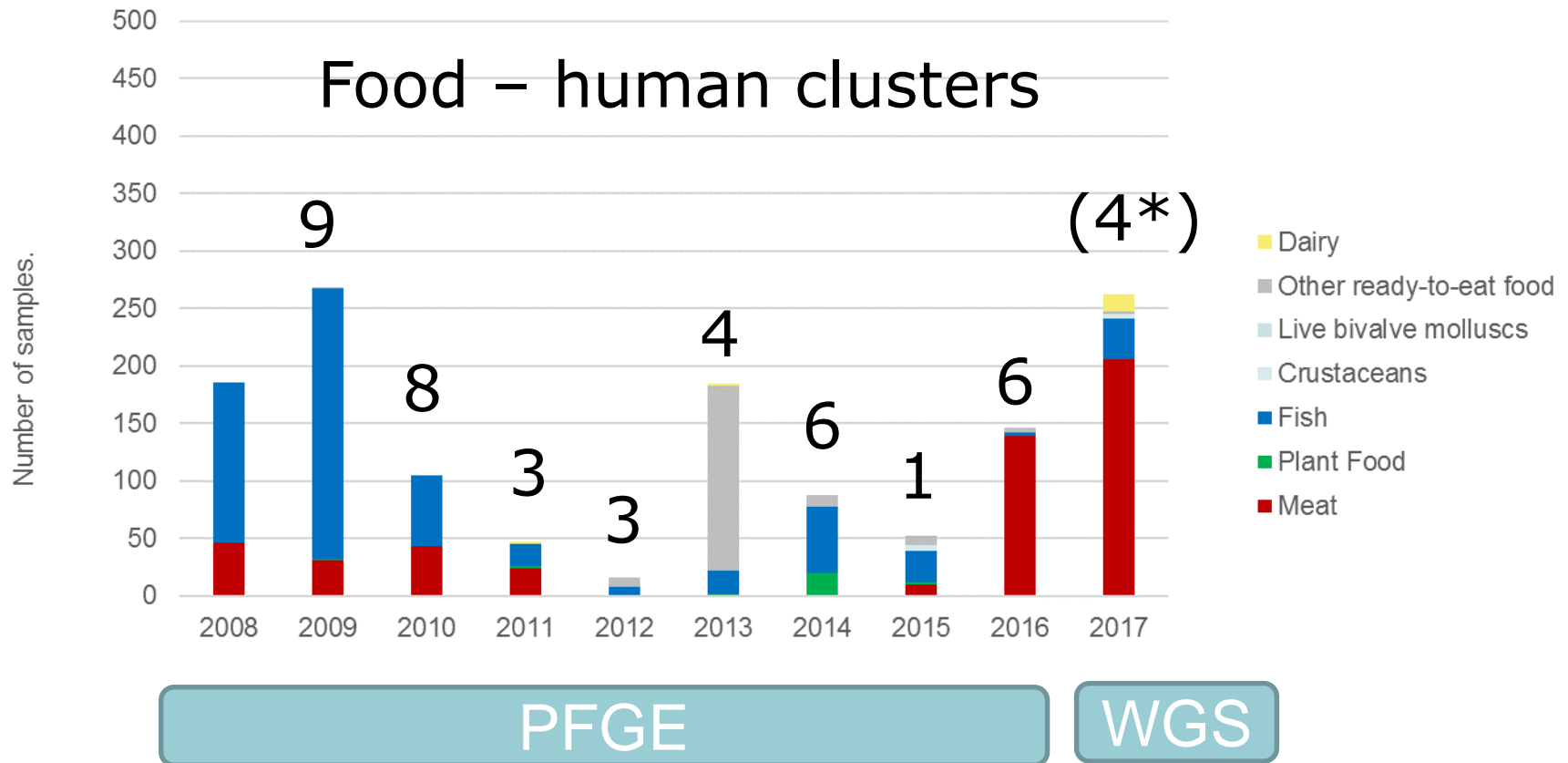
- WGS
- All typed isolates
- + typing of “old” isolates

Public Health /
Epidemiology
data (RIVM)



2009-2017
72-115 patients

Food: #samples positive



		PFGE
2009	beef RTE	1
2014	vegetable	1
2014	salmon	2
2014	salmon	2
2014	salmon	2
2015	salmon	1
2015	salmon	1
2015	salmon	1
2015	salmon	2
2015	salmon	2
2016	salmon	1
2016	salmon	1
2016	salmon	1
2016	beef	1
2016	chicken	2
2017	chicken	1
2017	beef	1
2017	chicken	1
2017	chicken	1
2017	chicken	1
2017	salmon	2
2017	salmon	2
2017	chicken	2
2017	salmon	2

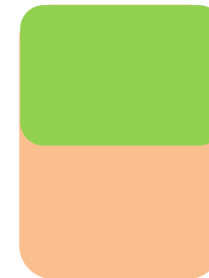
PFGE

Salmon
Chicken

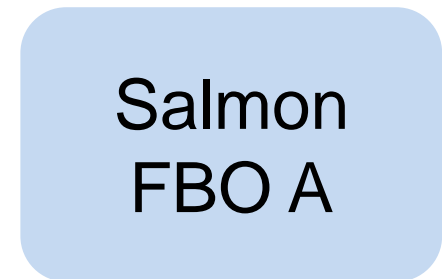
RTE beef
Vegetable
Salmon
Chicken

		PFGE	WGS
2009	beef RTE	1	
2014	vegetable	1	
2014	salmon	2	
2014	salmon	2	
2014	salmon	2	
2015	salmon	1	12
2015	salmon	1	12
2015	salmon	1	12
2015	salmon	2	12
2015	salmon	2	12
2016	salmon	1	12
2016	salmon	1	
2016	salmon	1	
2016	beef	1	
2016	chicken	2	7
2017	chicken	1	11
2017	beef	1	
2017	chicken	1	11
2017	chicken	1	1
2017	chicken	1	11
2017	salmon	2	12
2017	salmon	2	
2017	chicken	2	7
2017	salmon	2	12

PFGE



WGS



		PFGE	WGS
2009	beef RTE	1	
2014	vegetable	1	
2014	salmon	2	
2014	salmon	2	
2014	salmon	2	
2015	salmon	1	12
2015	salmon	1	12
2015	salmon	1	12
2015	salmon	2	12
2015	salmon	2	12
2016	salmon	1	12
2016	salmon	1	
2016	salmon	1	
2016	beef	1	
2016	chicken	2	7
2017	chicken	1	11
2017	beef	1	
2017	chicken	1	11
2017	chicken	1	1
2017	chicken	1	11
2017	salmon	2	12
2017	salmon	2	
2017	chicken	2	7
2017	salmon	2	12

PFGE
did bring us
quite far

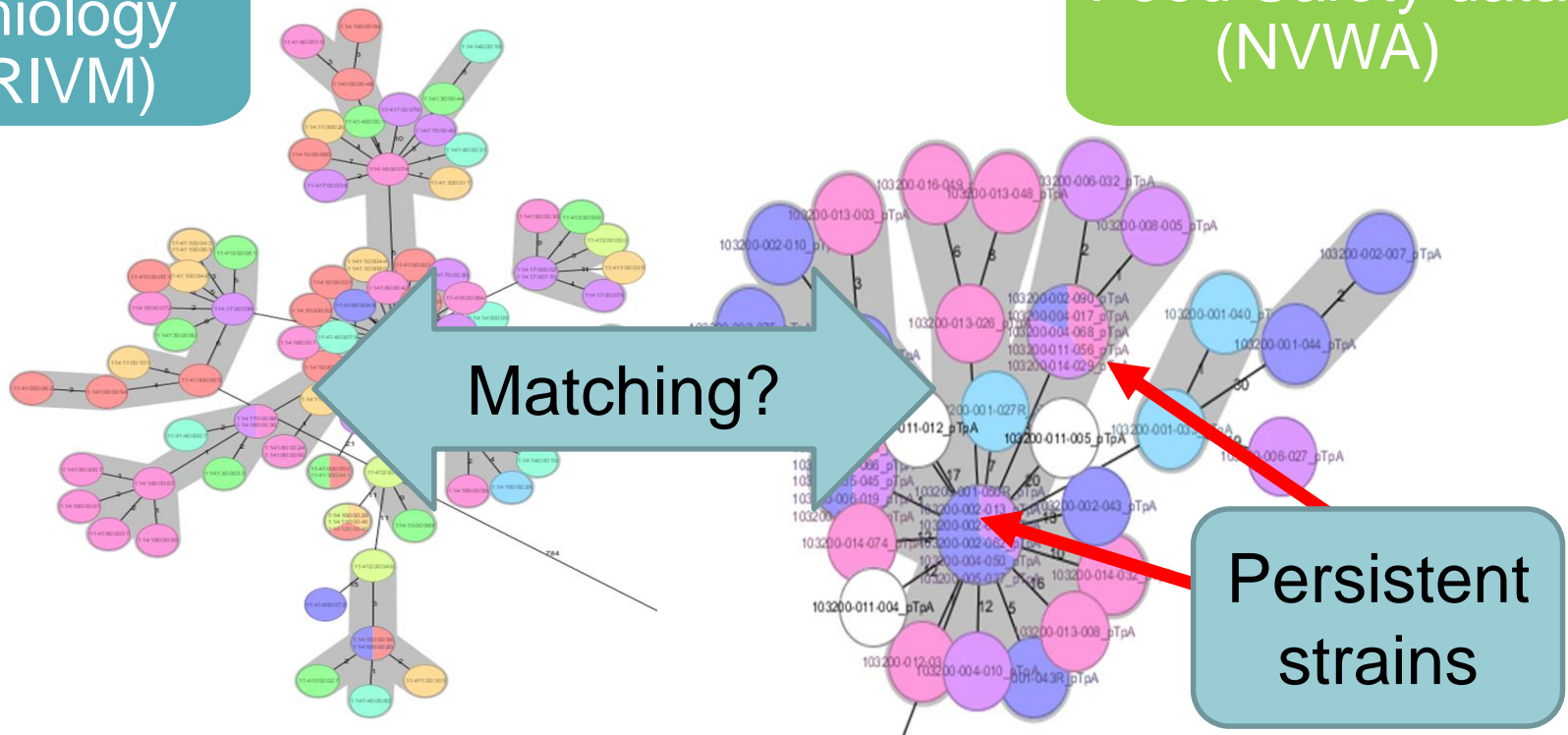
WGS
is bringing us
further



Cluster analysis

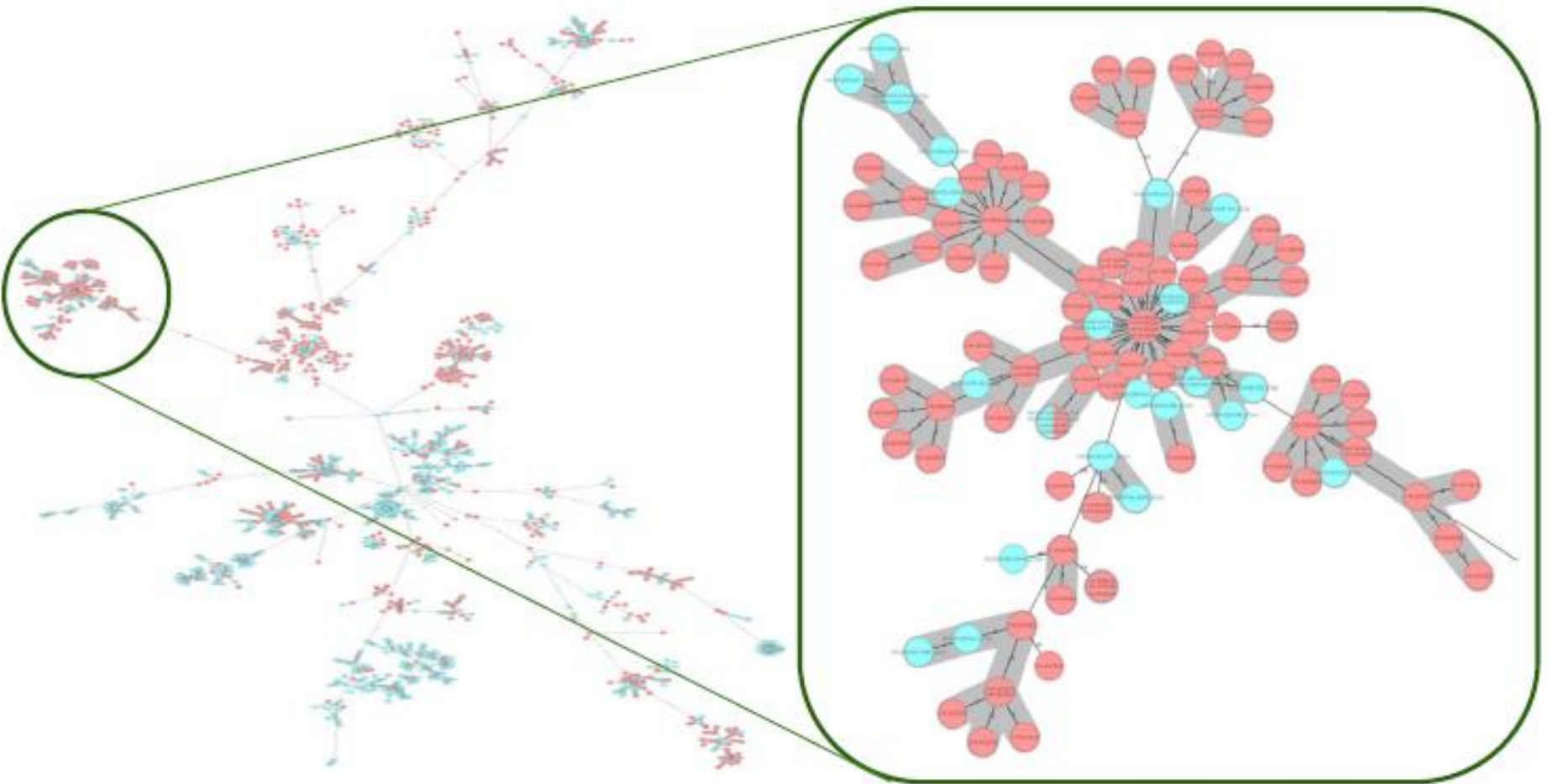
Public Health /
Epidemiology
data (RIVM)

Food Safety data
(NVWA)





Source attribution



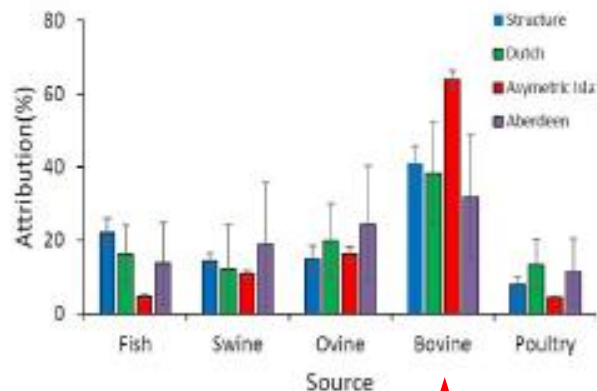


Source attribution

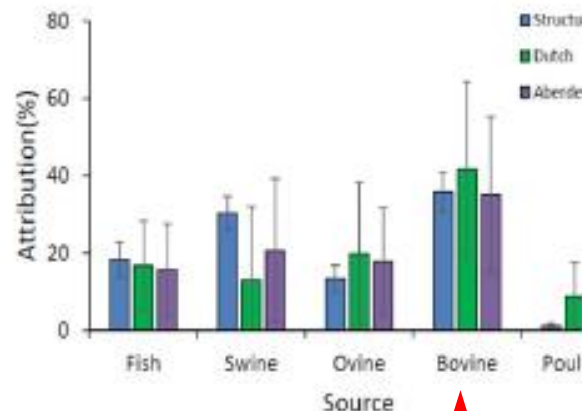
- EU isolates
- Different attribution methods
- Bovine most important reservoir

Dairy/eggs

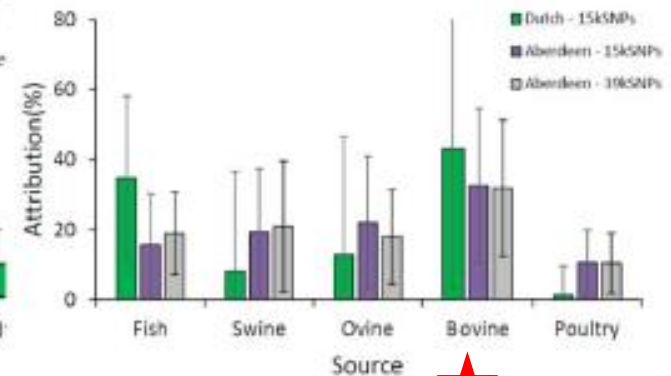
7-locus MLST



CG-MLST

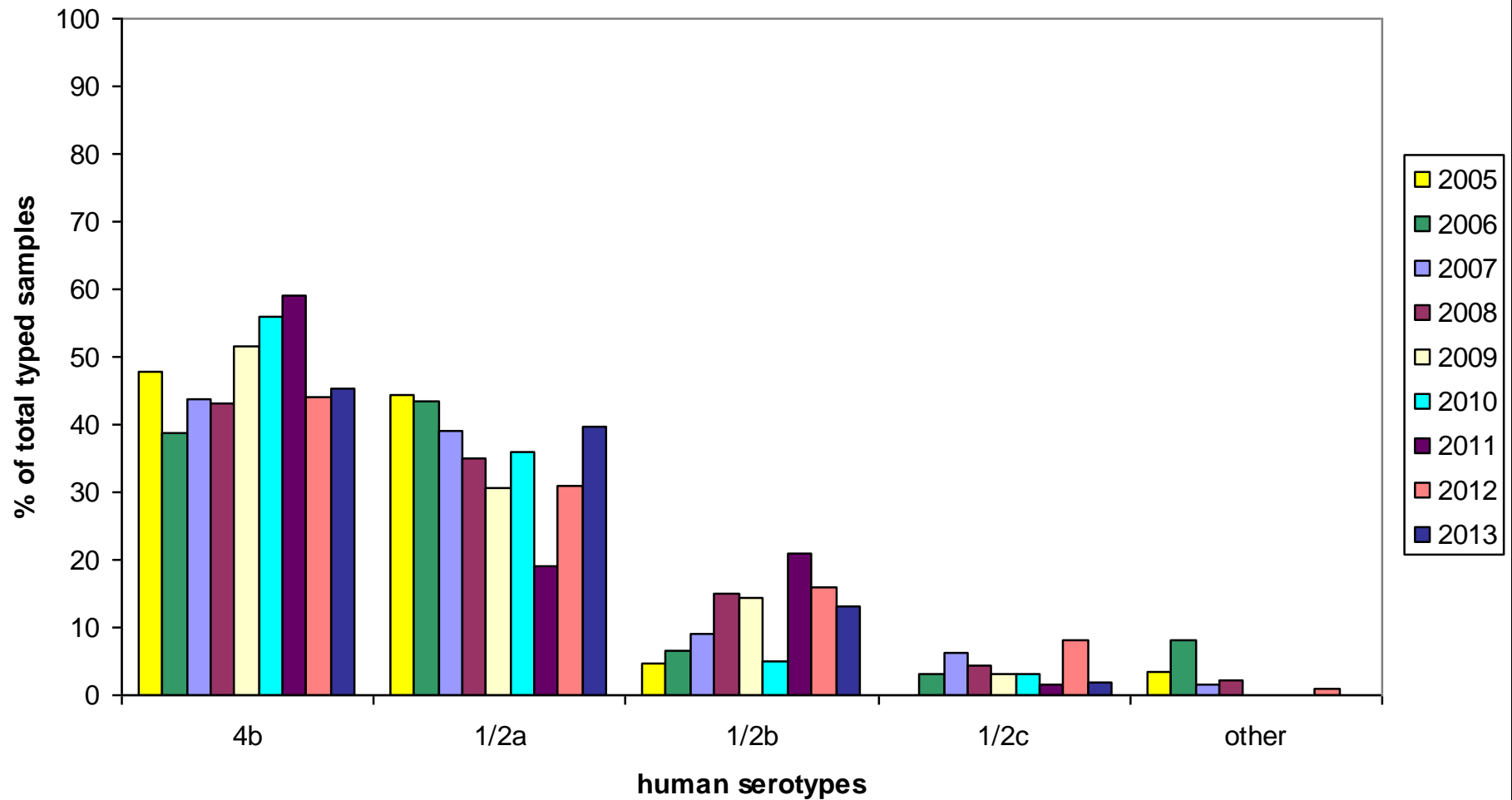


CG-SNP

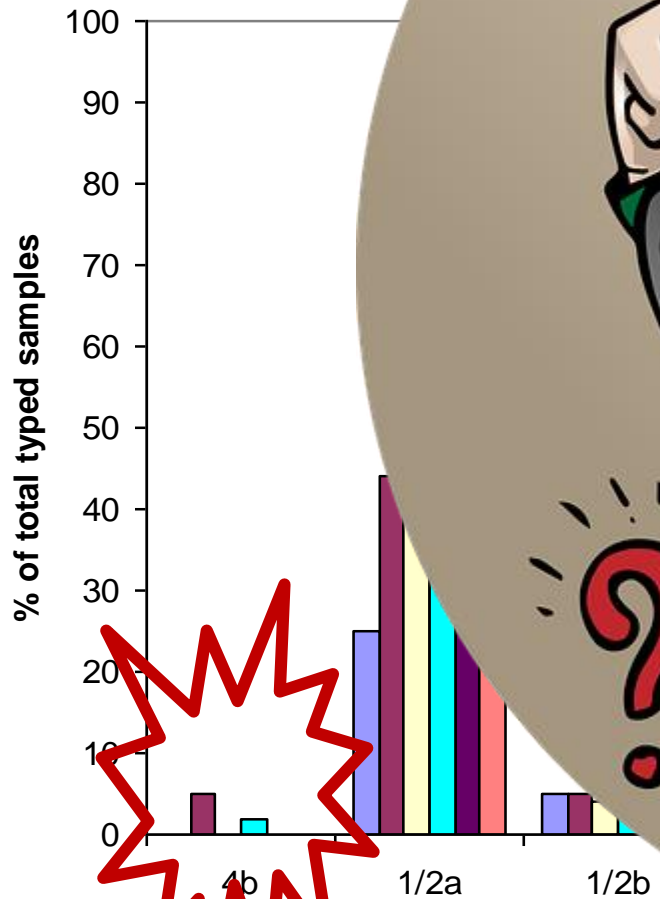




Serotyping: human isolates



Serotyping:



food

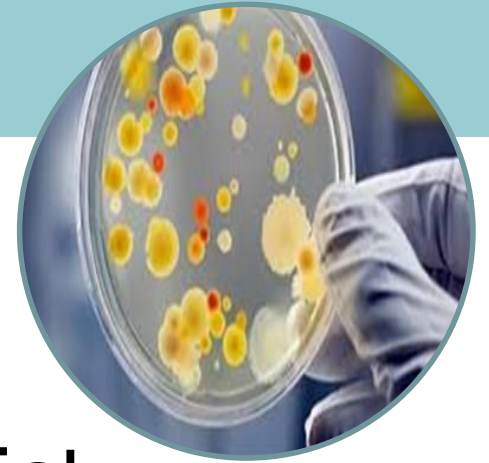


7
8
9
10
2011
2012



Where's 4b?





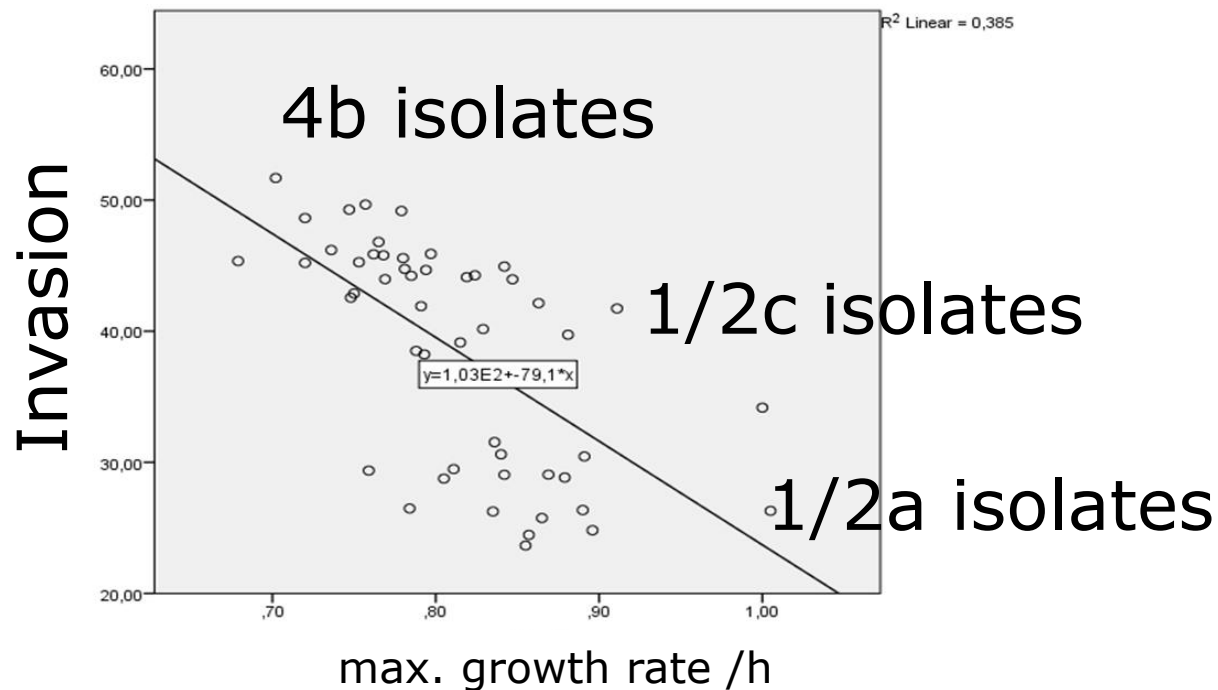
Method

- 1 cfu per sample is typed
- Multiple strain outbreaks exist
- Growth vs virulence



Growth vs Virulence

Data from
RIVM





Food

Supply chains Risk Assessment

Red meat

Dairy

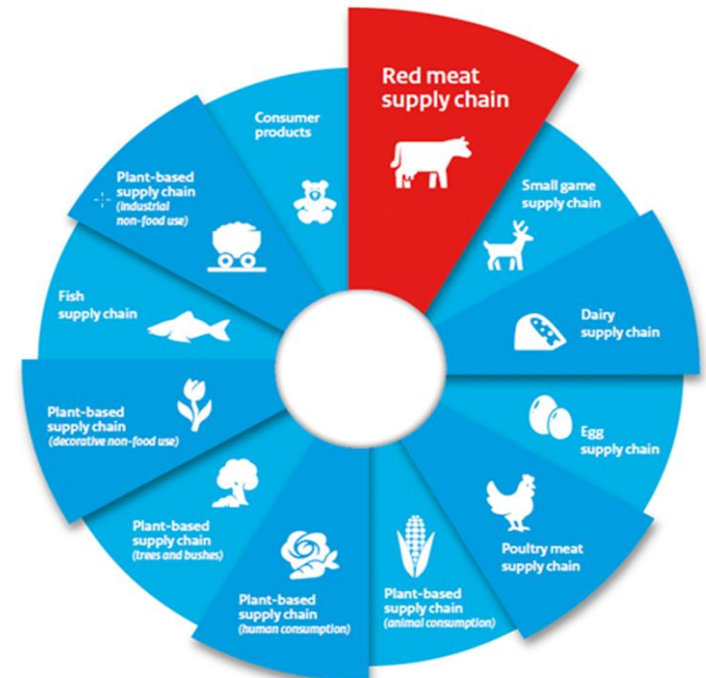
Eggs

Poultry meat

(Feed)

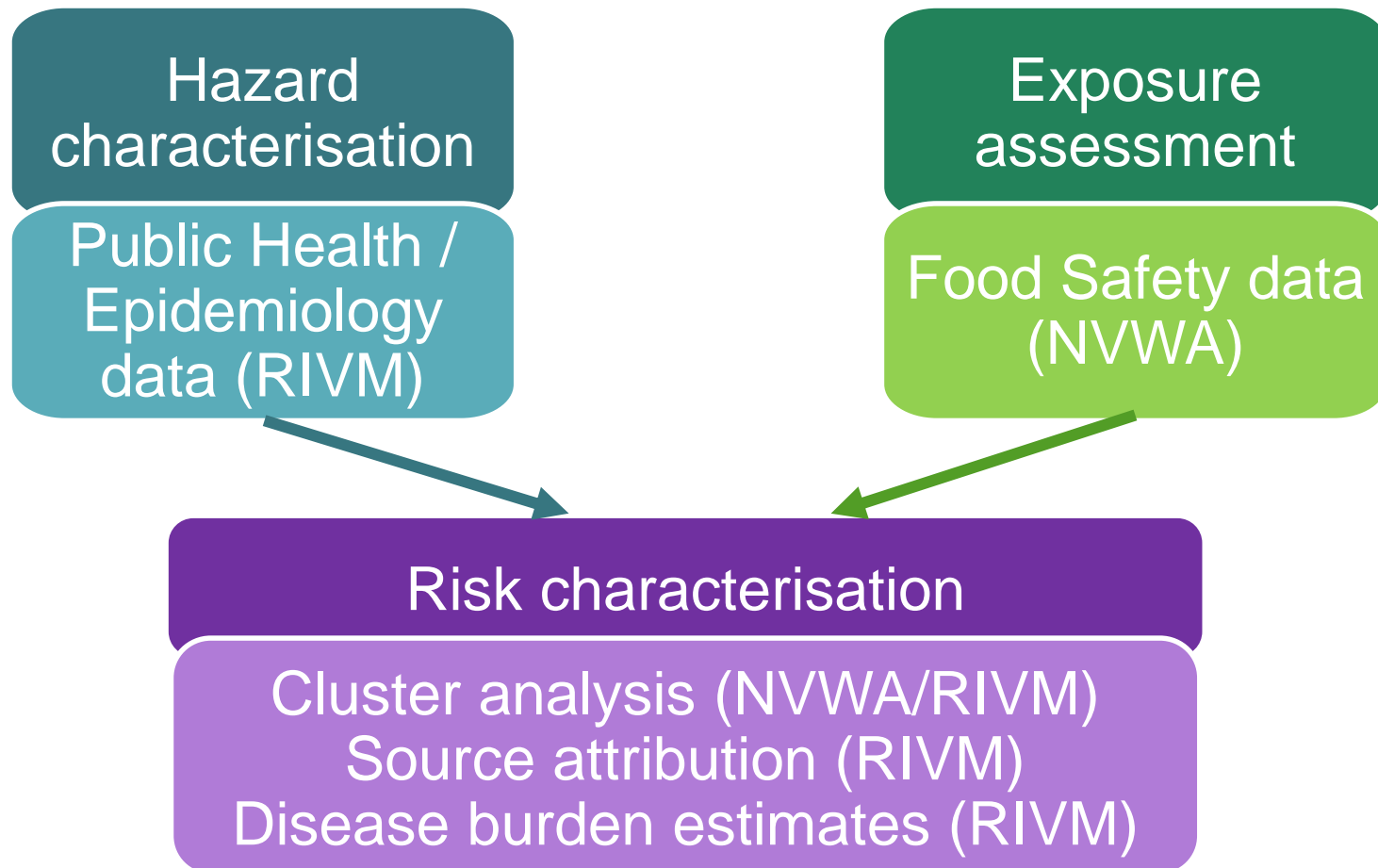
(Fish, bivalves, crustaceans)

(Plant Food)



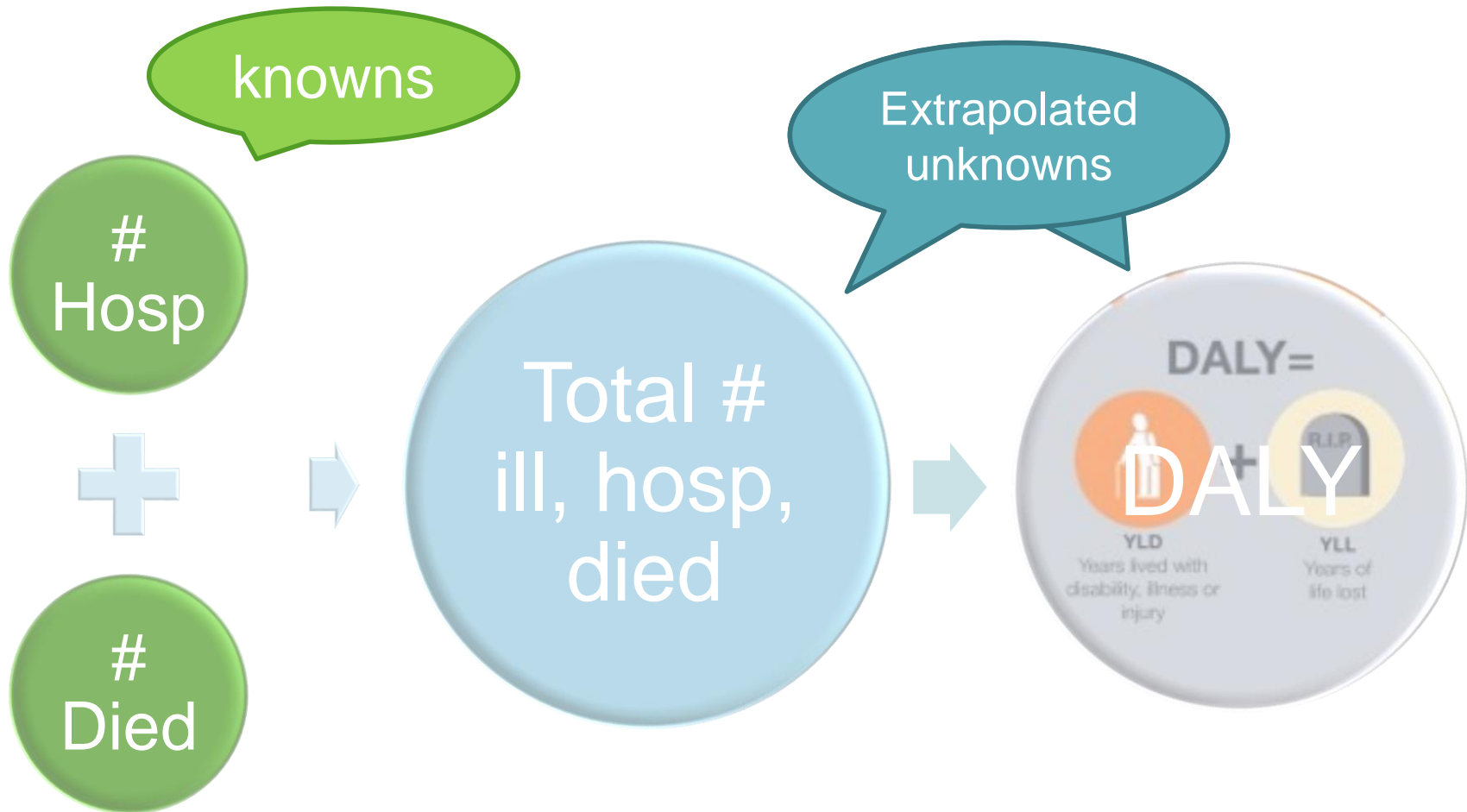


Listeria: a risk assessment point of view



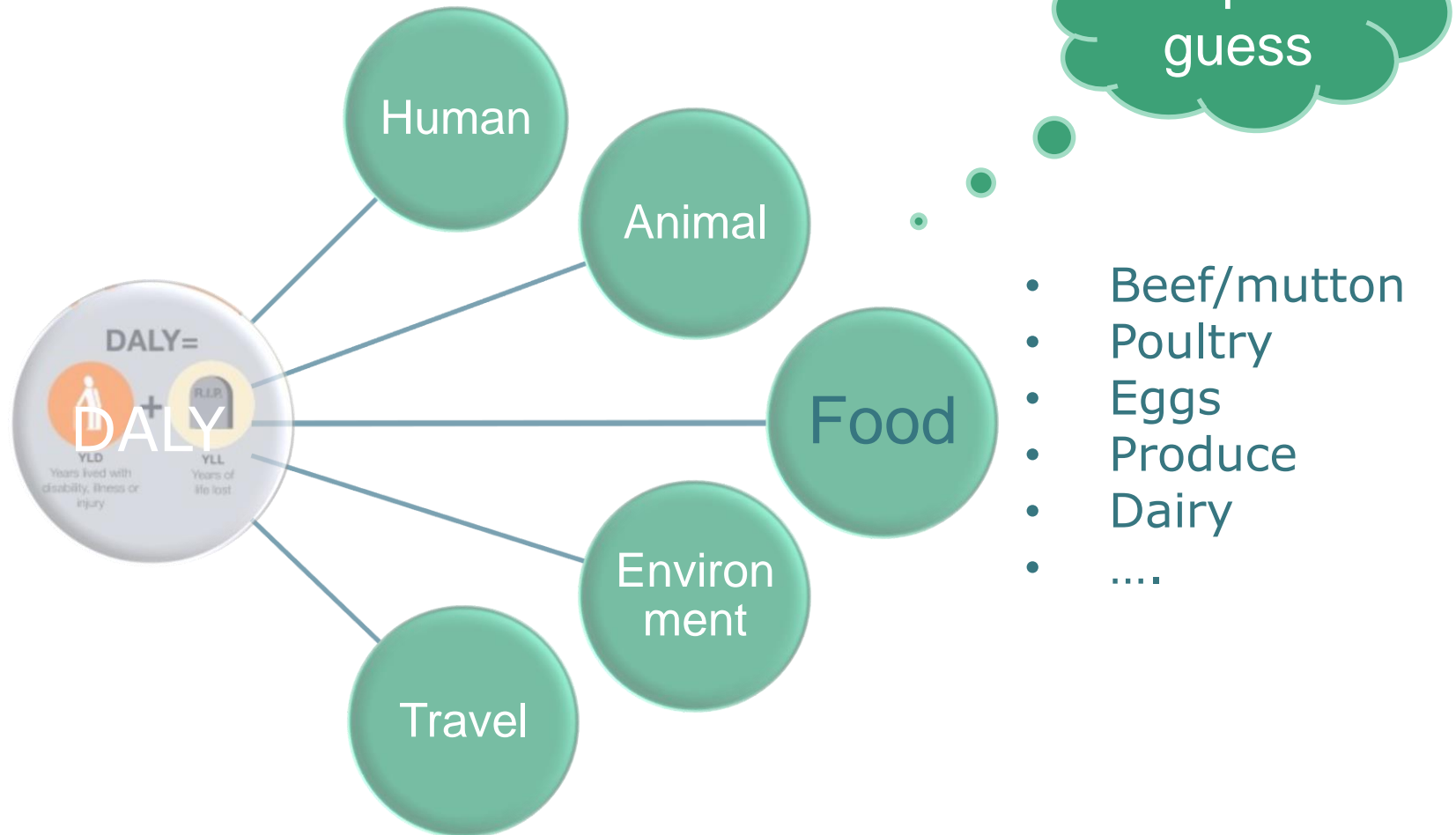


Disease Burden Estimates: *Listeria*



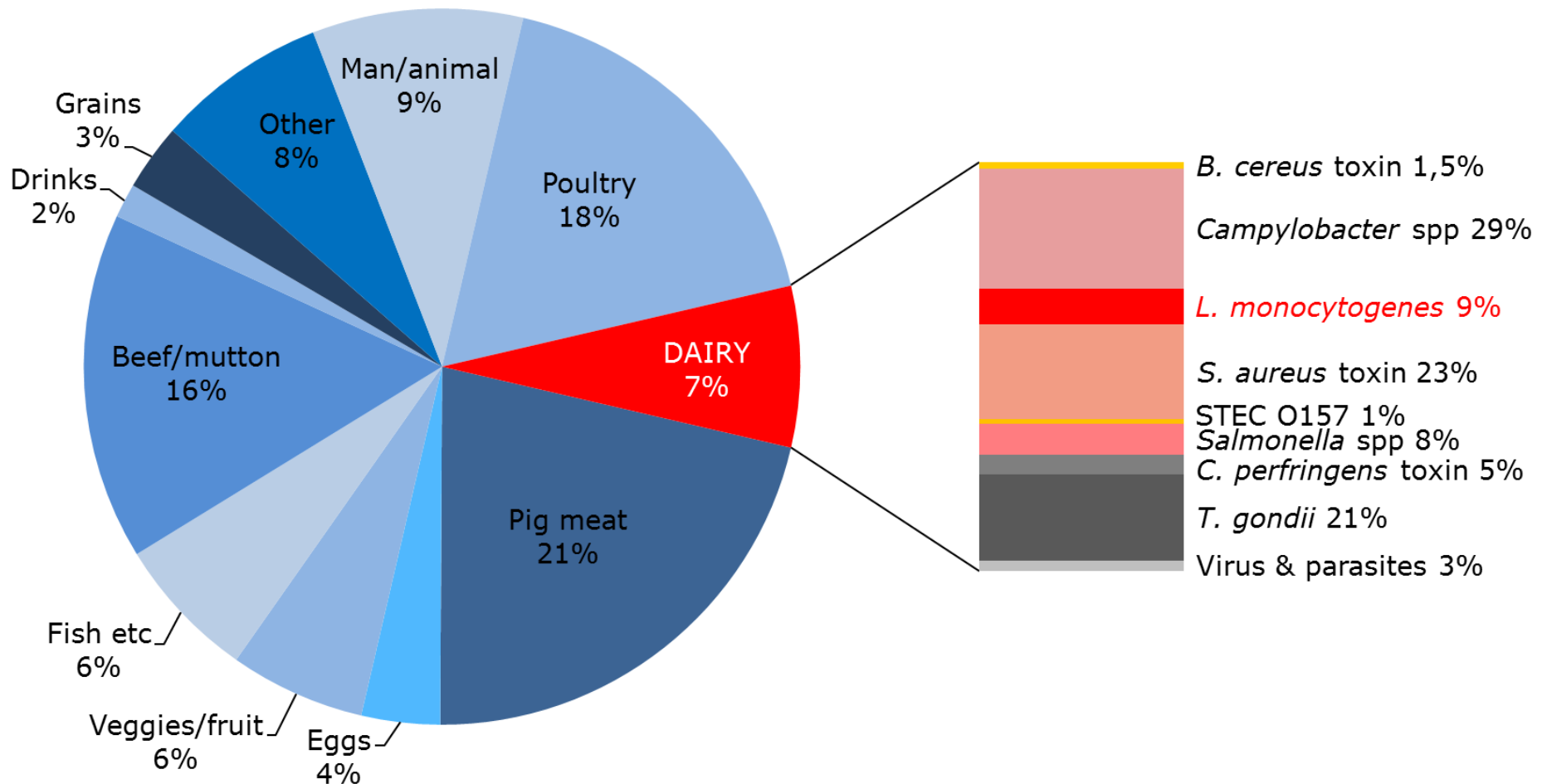


Disease Burden Estimates: *Listeria*





Disease Burden Estimates: Food → Dairy (detail)





DBE

2006



?



?

Expert guess



DBE

2019



Data:
Prevalence
Typing strains



Data:
Epidemiology
Typing strains

← Educated guess →



Risk Assessment

On *Listeria* and food chain:

Where to look

On Surveillance system:

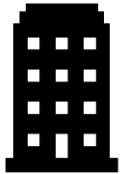
How to improve where you look



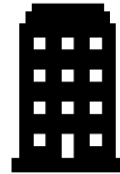
Back in the old days

< \pm 2010: 3 food units

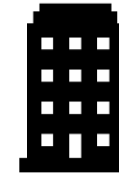
Dairy/eggs



FoAO



FoNAO

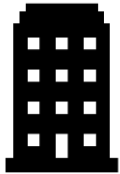


Mixed



Back in the old days

< ± 2010: 3 food units: **Inspection projects**



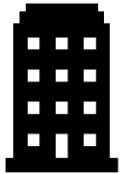
- Slaughterhouse
- Cutting plant
- Meat Industry
- Incl. Fish

- Food Industry
- **Retail**
- Small/medium sized enterprises



Back in the old days

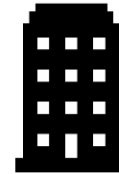
< ± 2010: 3 food units: Food sampling



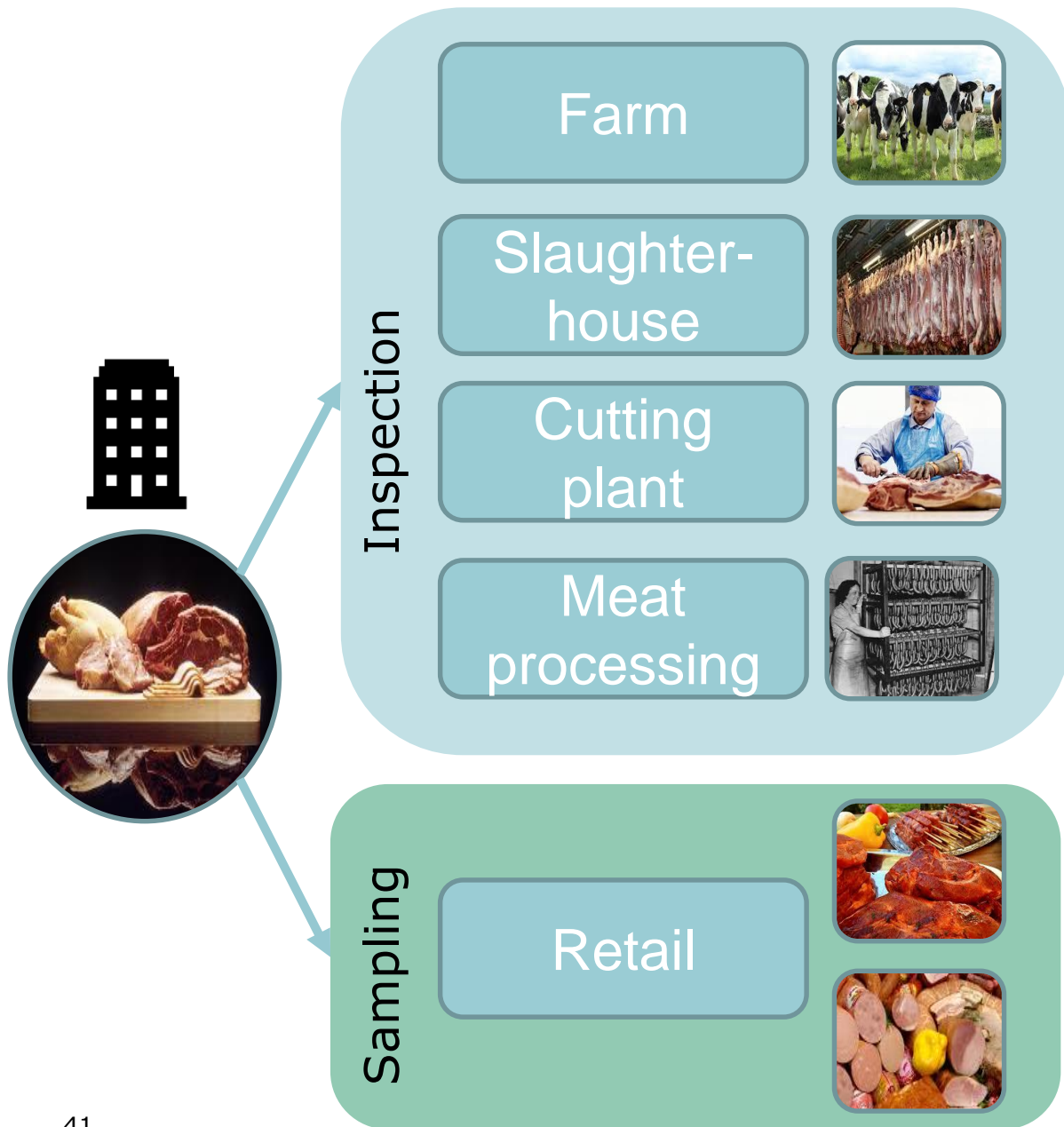
- Slaughterhouse
- Cutting plant
- Import
- **Retail**

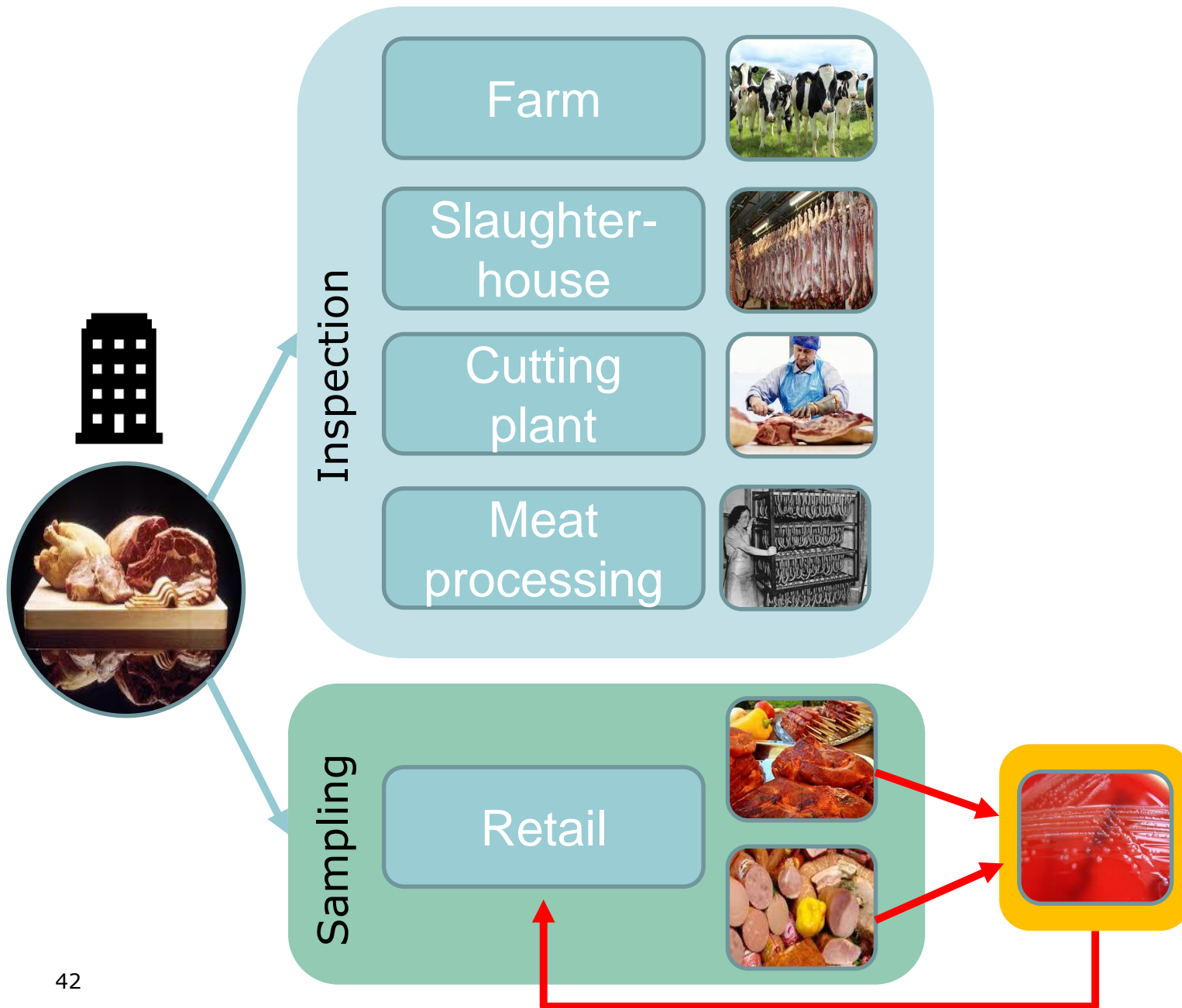


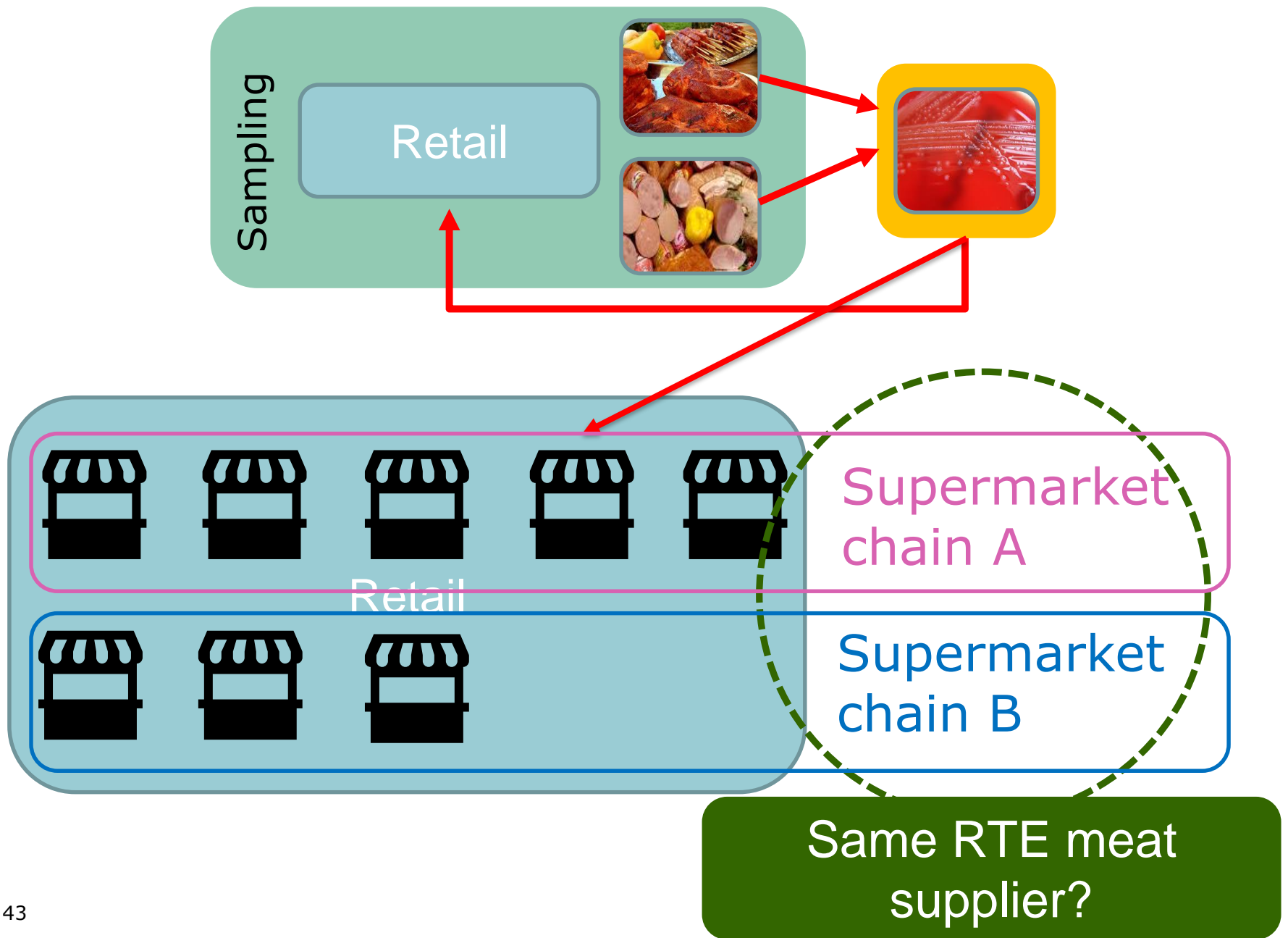
- Import
- DC
- **Retail**

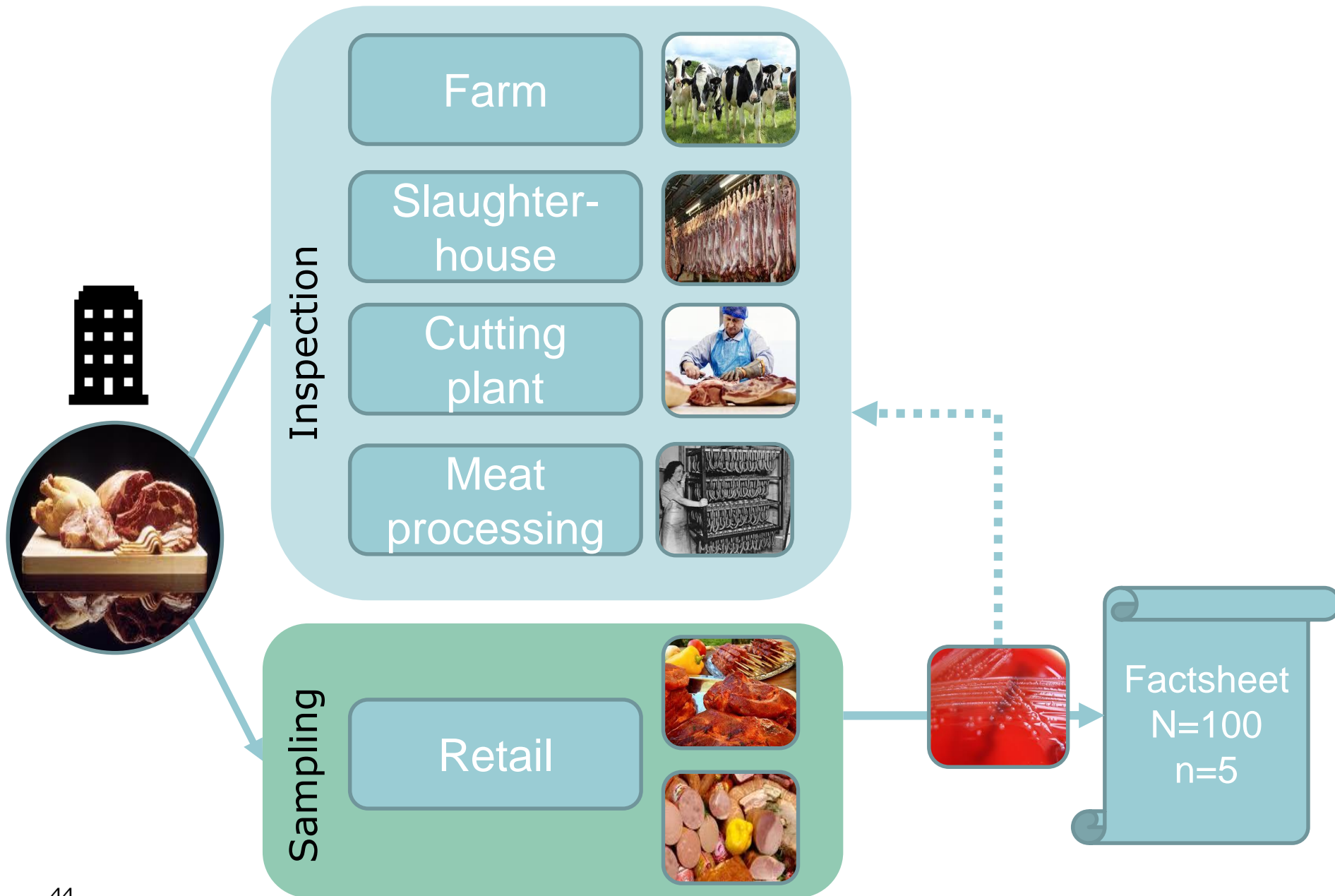


- Industry
- **Retail**
- Small/medium sized enterprises











Risk assessment of the system

- Reorganized: 1 food supervision unit



Risk assessment of the system

- Reorganized: 1 food supervision unit
- Actions taken on sample results
Only @ place of sampling



Risk assessment of the system

- Reorganized: 1 food supervision unit
- Actions taken on sample results

Only @ place of sampling

→ Supermarket chain + inspector

→ Food processor + inspector



of samples

→ label info available



Risk assessment of the system

- Reorganized: 1 food supervision unit
- Actions taken on sample results
 - Only @ place of sampling
 - Supermarket chain
 - Food processor
 - Only when exceeding the limit
 - Also when *Listeria* is present
 - Studies present?



Risk assessment of the system

- Reorganized: 1 food supervision unit
- Actions taken on sample results
- Sampling ↔ Inspections
 - Only by fact sheet (end of year)
 - Direct contact



Risk assessment of the system

- Reorganized: 1 food supervision unit
- Actions taken on sample results
- Sampling ↔ Inspections
- Studies on *Listeria*

Focus @ FBO

→ Laboratories



Activities on Listeria

- Food chain Risk Assessment
- Typing method + source attribution
→ obtain strains from FBO
- Laboratory method
- Optimise Disease Burden Estimates
- Food?



Special thanks

Colleagues @NVWA
Supervision
Laboratory

RIVM