Big Data - The Key to Future Risk Assessment?

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Maybe not ”Big” Data, but a lot

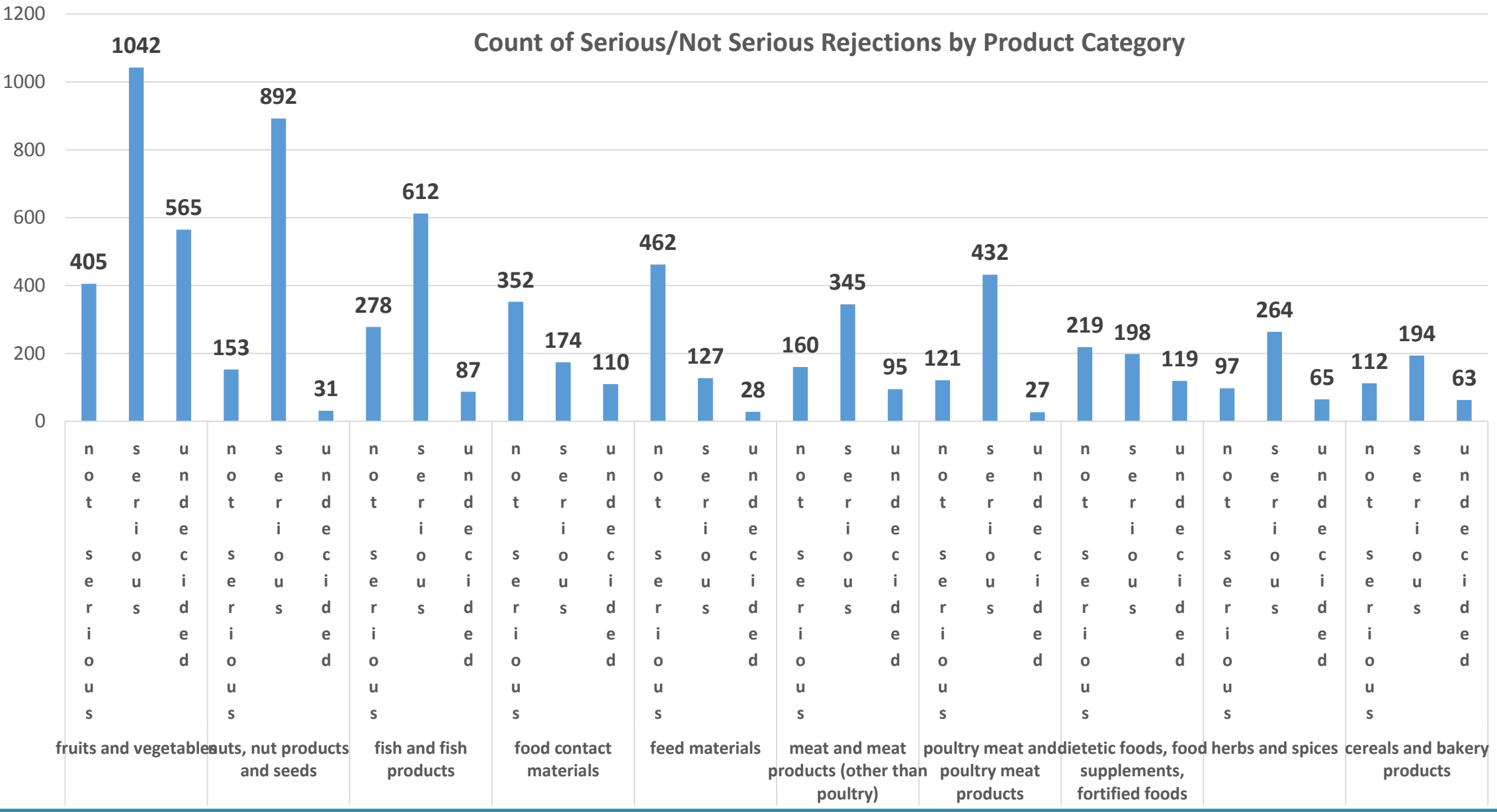
- 3 years of ECRASFF findings
- Contains:
  - Products and product categories
  - Hazards and hazard categories
  - Dates, locations, result
  - Serious vs. Not Serious

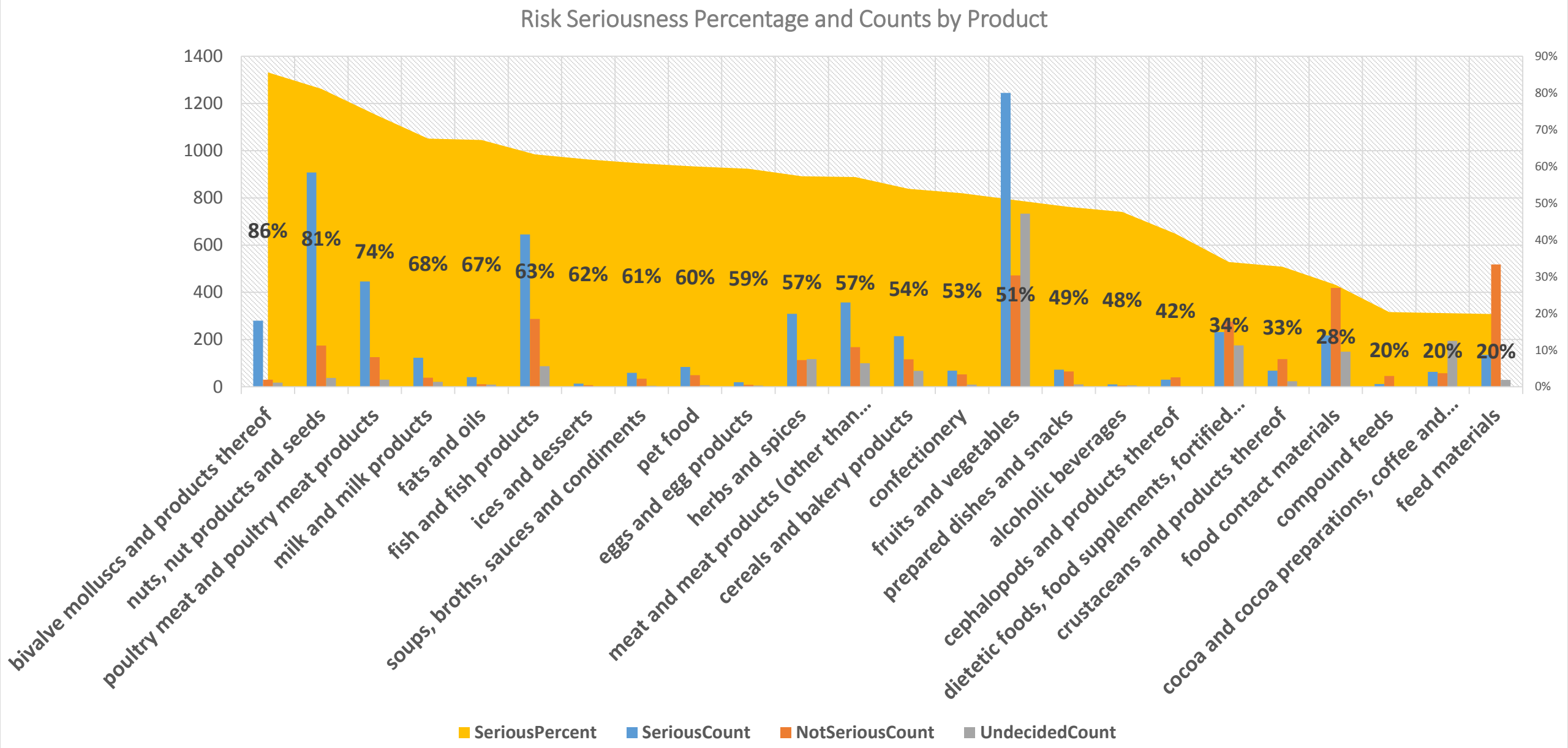
ECRASFF Data

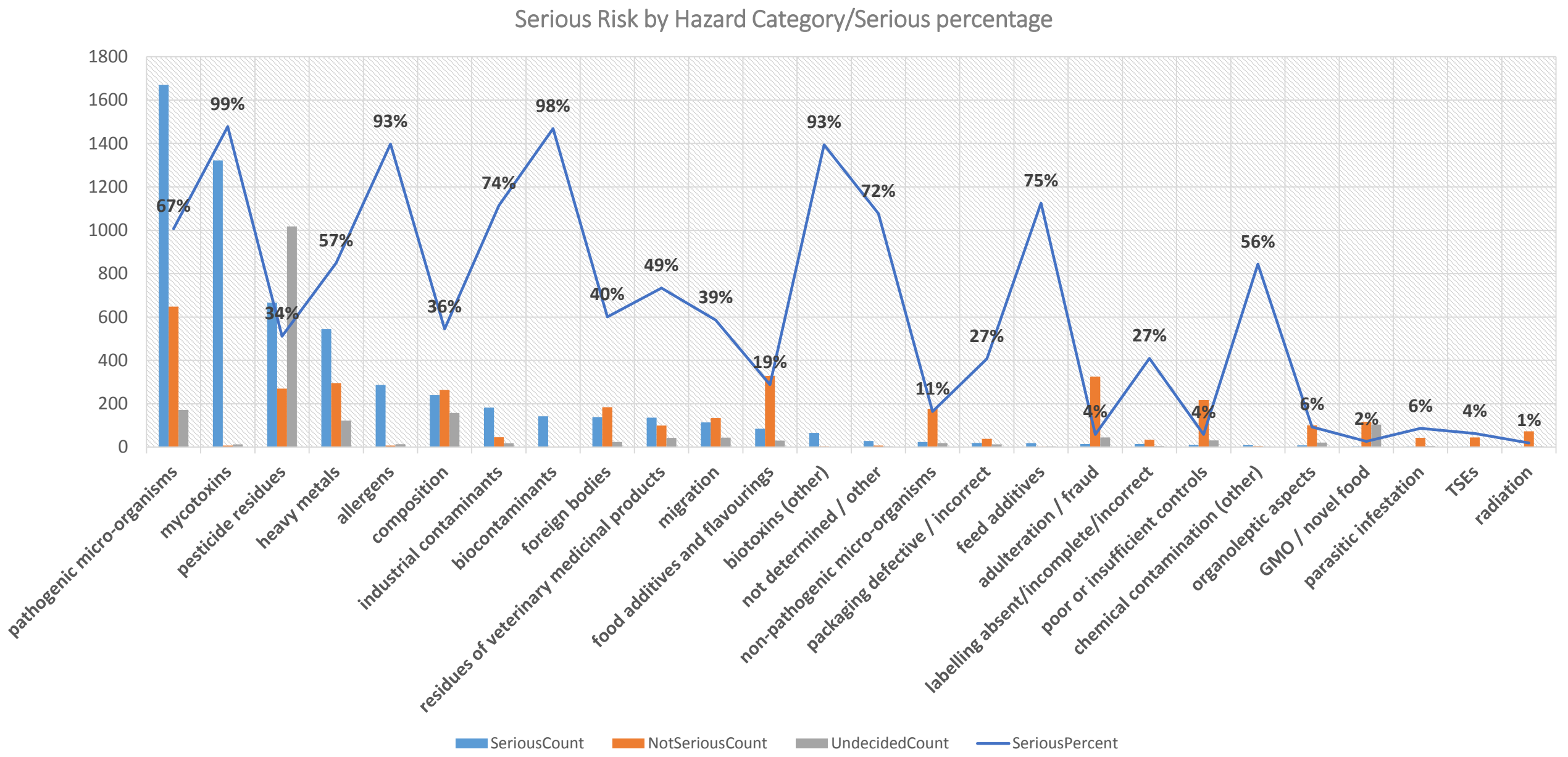
“RASFF notifications shown in the RASFF portal are so-called **"original notifications"**, representing a new case reported on a health risk detected in one or more consignments of a food or feed.”

Top Violation per Product Category

Product Category	Substance	Count
nuts, nut products and seeds	aflatoxins	726
fish and fish products	mercury	298
fruits and vegetables	aflatoxins	202
poultry meat and poultry meat products	Salmonella spp.	161
food contact materials	migration of chromium	153
meat and meat products (other than poultry)	shigatoxin-producing Escherichia coli	151
herbs and spices	aflatoxins	110
bivalve molluscs and products thereof	too high count of Escherichia coli	105
feed materials	Salmonella spp.	89
milk and milk products	Listeria monocytogenes	83
dietetic foods, food supplements	unauthorised placing on the market	40
cocoa and cocoa preparations, coffee, tea	acetamiprid	38
cereals and bakery products	unauthorised genetically modified	32
cephalopods and products thereof	cadmium	28
crustaceans and products thereof	poor temperature control	27
non-alcoholic beverages	too high content of E 210 - benzoic acid	26
pet food	Salmonella spp.	26
prepared dishes and snacks	adulteration	26


Count of Serious/Not Serious Rejections by Product Category
1200
1000
800
600
400
200
0
405
1042
565
153
892
31
278
612
87
352
174
110
462
127
28
160
345
95
121
432
27
219
198
119
97
264
65
112
194
63
not serious
serious
undecided
fruits and vegetables
nuts, nut products and seeds
fish and fish products
food contact materials
feed materials
meat and meat products (other than poultry)
poultry meat and poultry meat products
dietetic foods, food supplements, fortified foods
herbs and spices
cereals and bakery products


Risk Seriousness Percentage and Counts by Product
1400
1200
1000
800
600
400
200
0
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
86%
81%
74%
68%
67%
63%
62%
61%
60%
59%
57%
57%
54%
53%
51%
49%
48%
42%
34%
33%
28%
20%
20%
20%
bivalve molluscs and products thereof
nuts, nut products and seeds
poultry meat and poultry meat products
milk and milk products
fats and oils
fish and fish products
ices and desserts
soups, broths, sauces and condiments
pet food
eggs and egg products
herbs and spices
meat and meat products (other than...
cereals and bakery products
confectionery
fruits and vegetables
prepared dishes and snacks
alcoholic beverages
cephalopods and products thereof
dietetic foods, food supplements, fortified...
crustaceans and products thereof
food contact materials
compound feeds
cocoa and cocoa preparations, coffee and...
feed materials
SeriousPercent
SeriousCount
NotSeriousCount
UndecidedCount


Serious Risk by Hazard Category/Serious percentage
1800
1600
1400
1200
1000
800
600
400
200
0
67%
99%
34%
57%
93%
36%
74%
98%
40%
49%
39%
19%
93%
72%
11%
27%
75%
4%
27%
4%
56%
6%
2%
6%
4%
1%
pathogenic micro-organisms
mycotoxins
pesticide residues
heavy metals
allergens
composition
industrial contaminants
biocontaminants
foreign bodies
residues of veterinary medicinal products
migration
food additives and flavourings
biotoxins (other)
not determined / other
non-pathogenic micro-organisms
packaging defective / incorrect
feed additives
adulteration / fraud
labelling absent/incomplete/incorrect
poor or insufficient controls
chemical contamination (other)
organoleptic aspects
GMO / novel food
parasitic infestation
TSEs
radiation
SeriousCount
NotSeriousCount
UndecidedCount
SeriousPercent

How can we use this data?

- Analyze Hazards by Products
- Make custom Hazard lists
- Have a greater understanding of severity
- Gives hazards context

Most Serious Categories

By Hazard Group:

- Mycotoxins
- Biocontaminants
- Allergens
- Biotoxins
- Industrial Contaminants

By Food Group:

- Bivalve Mollusks
- Nuts and Nut Products
- Poultry and Poultry Products
- Milk Products
- Fish Products

Least Serious Categories

By Hazard Group

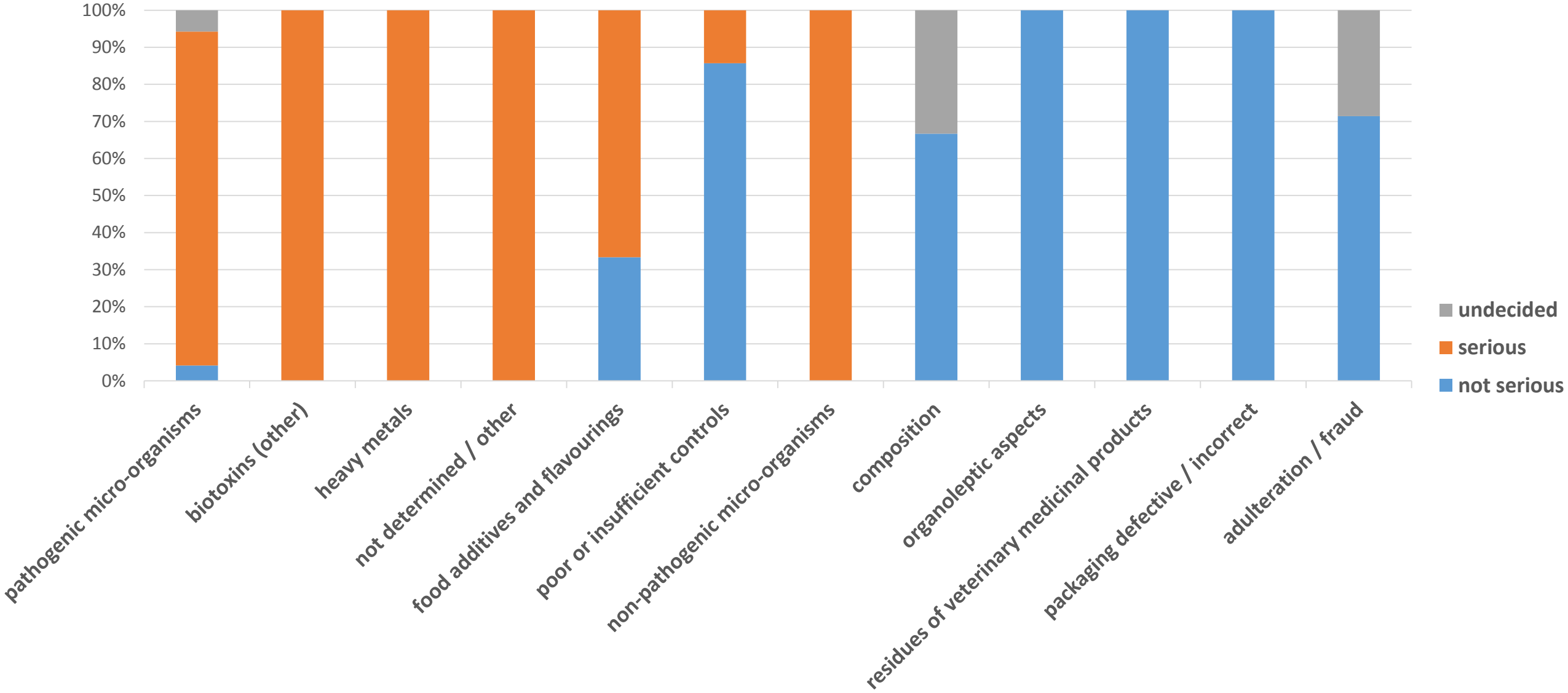
- Radiation
- TSEs
- Parasitic Infestation
- GMO/Novel Food
- Organoleptic Aspects

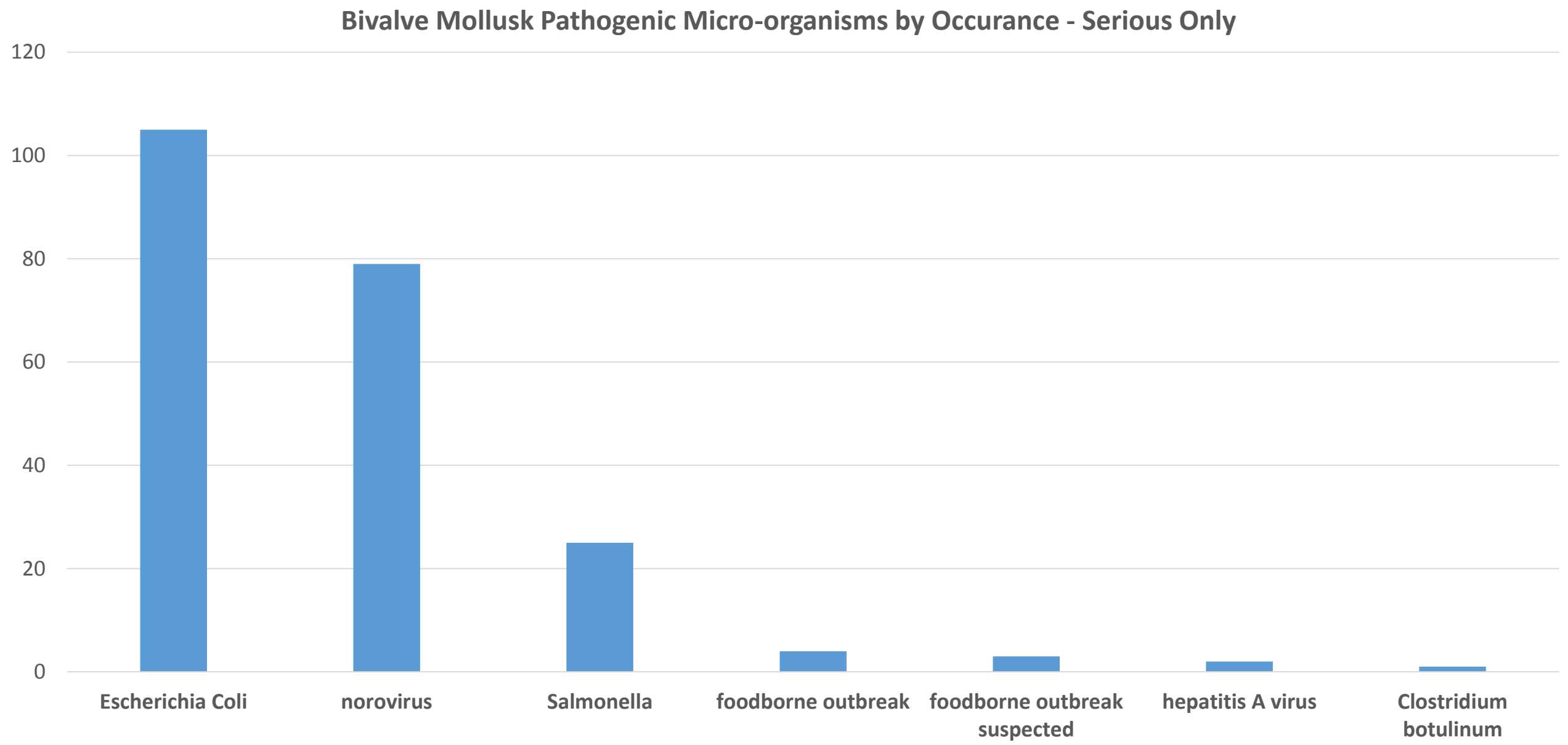
My Food Group

- Feed and Feed Materials
- Food Contact Materials
- Cocoa, Coffee and Tea
- Crustaceans
- Food Supplements
- Cephalopods

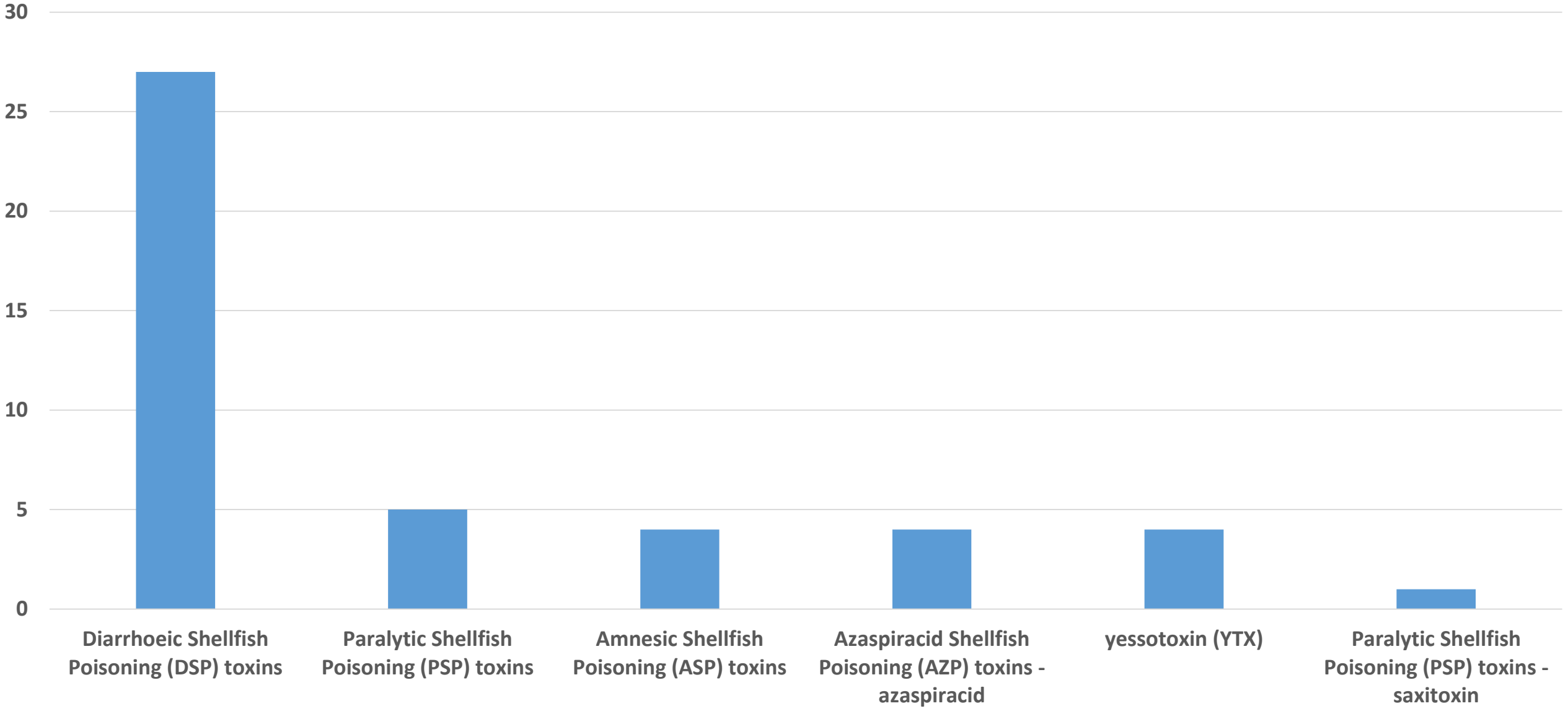
Example: Bivalve Mollusks

Bivalve Mollusks Hazard Breakdown



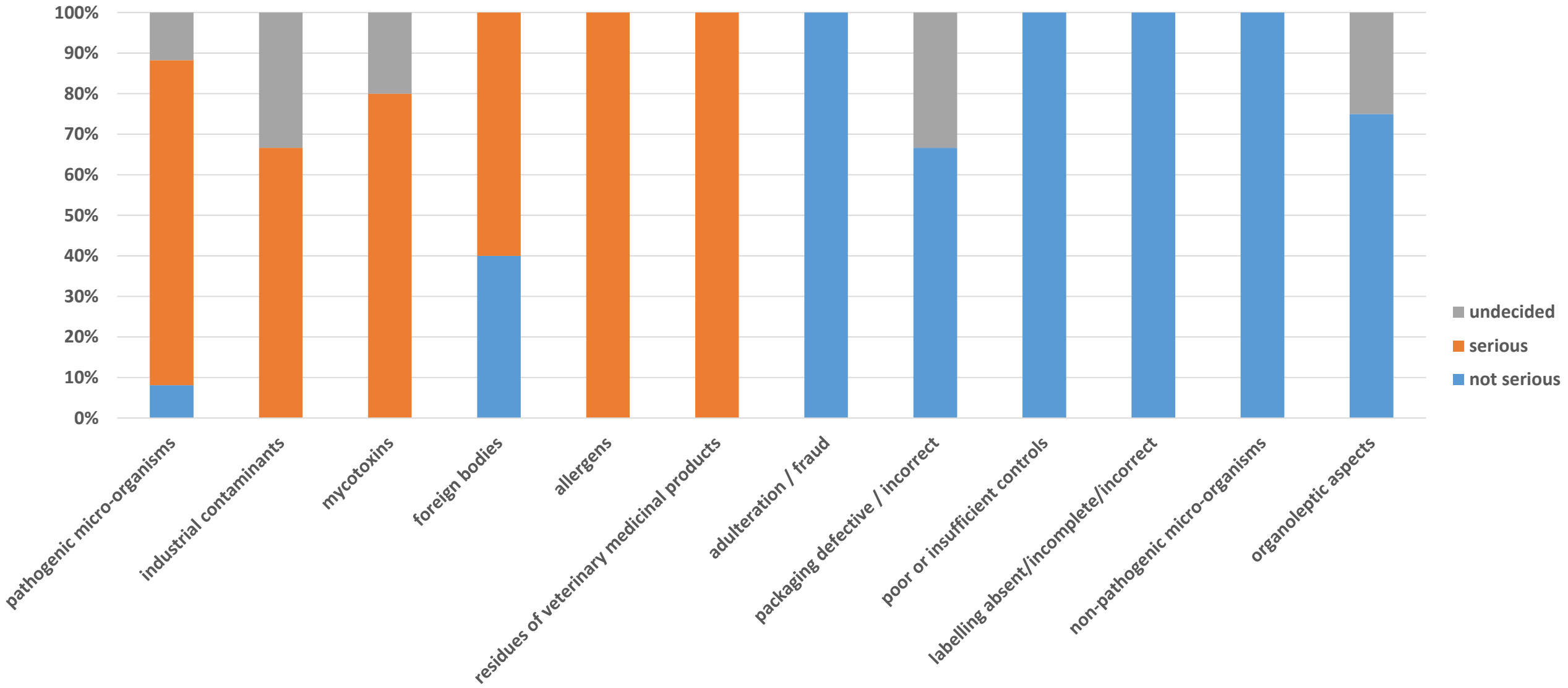

Bivalve Mollusk Pathogenic Micro-organisms by Occurance - Serious Only
120
100
80
60
40
20
0
Escherichia Coli
norovirus
Salmonella
foodborne outbreak
foodborne outbreak suspected
hepatitis A virus
Clostridium botulinum

Bivalve Mollusk Biotixins by Occurance - Serious Only

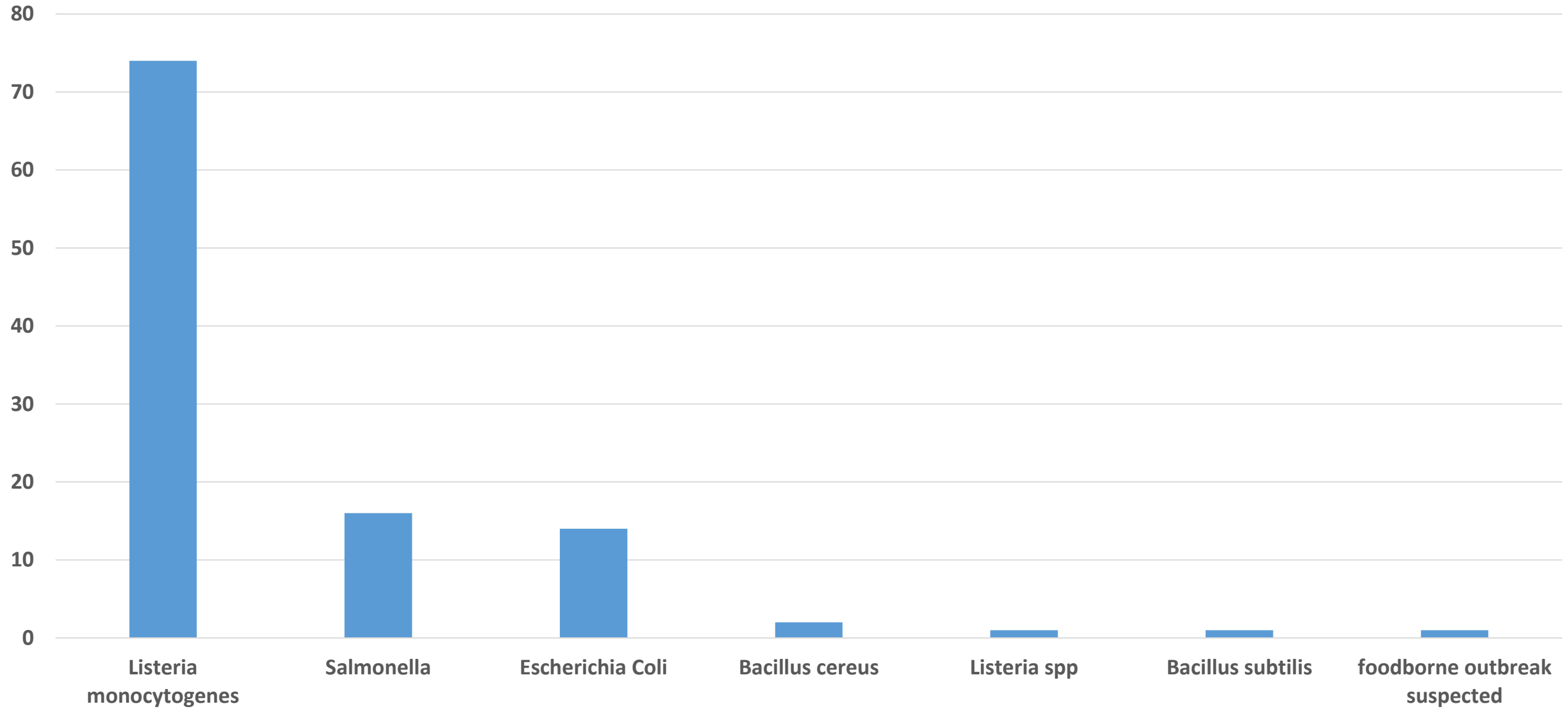


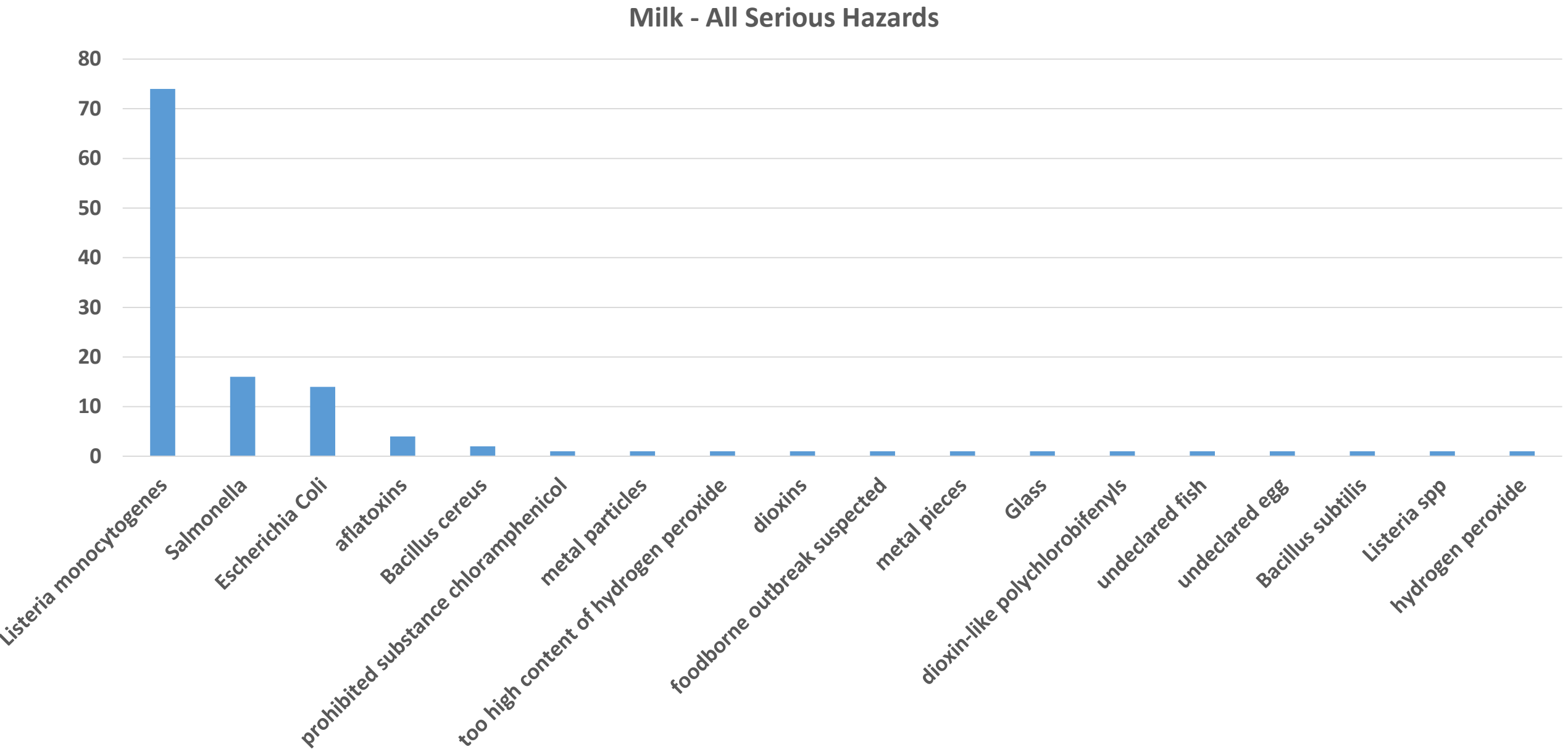
Example: Milk and Milk Products

Milk and Milk Products Hazard Breakdown



Milk and Products Pathogenic Micro-organisms by Occurance - Serious Only




Milk - All Serious Hazards
80
70
60
50
40
30
20
10
0
Listeria monocytogenes
Salmonella
Escherichia Coli
aflatoxins
Bacillus cereus
prohibited substance chloramphenicol
metal particles
too high content of hydrogen peroxide
dioxins
foodborne outbreak suspected
metal pieces
Glass
dioxin-like polychlorobifenyls
undeclared fish
undeclared egg
Bacillus subtilis
Listeria spp
hydrogen peroxide

Why is this information useful?

- Clearer picture of hazards
- Specific by food category
- Real world examples as a determination of risk

High Risk, Low Freq:

Metal, glass, industrial contaminants

High Risk, High Freq:

Listeria, Salmonella, E. Coli

Low Risk, Low Freq:

Tampering, incorrect dates, penicillium,

spoilage

Low Risk, High Freq:

Molds, Defective Packaging

Safefood 360 and Hazard Data

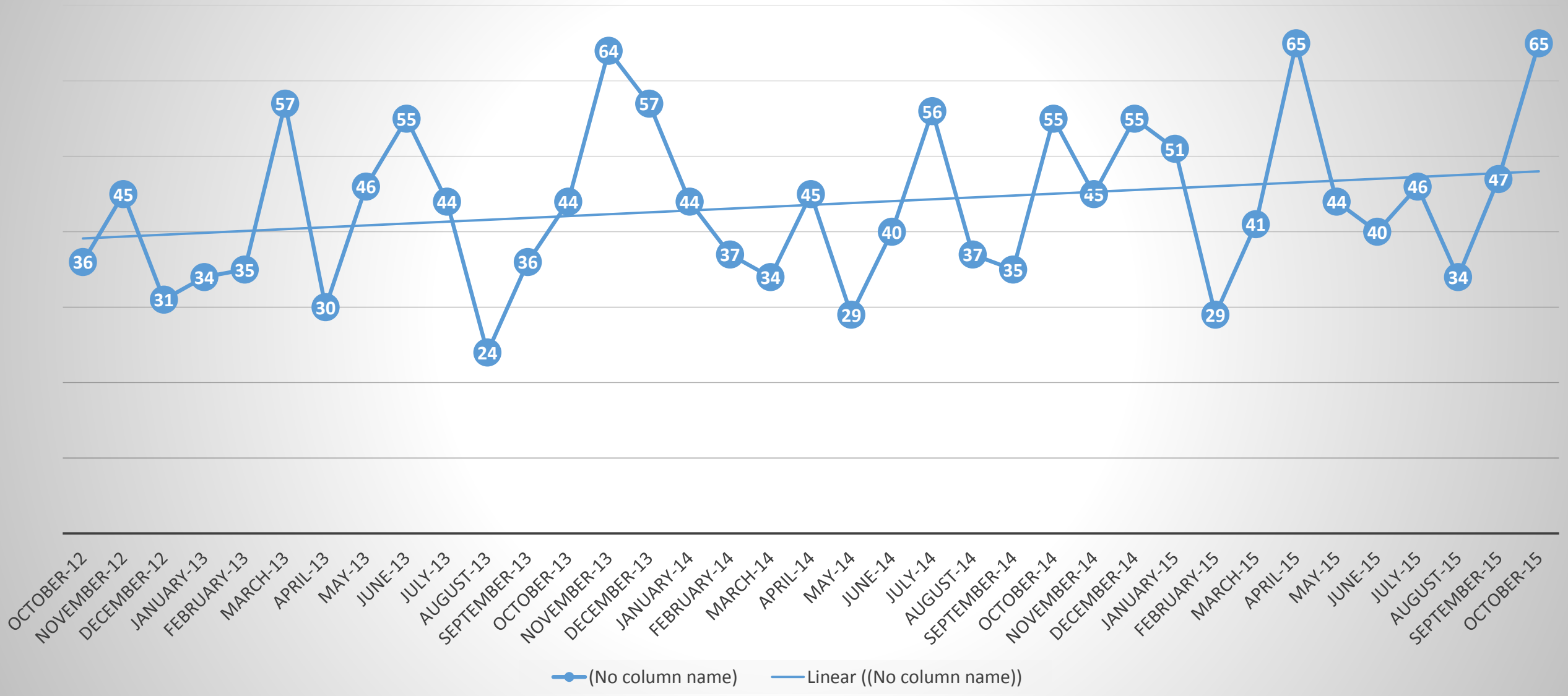
What this means for Safefood 360 in the Future

- Pre-Built Hazard Lists
- Recommended Risk Assessments
- Automated guidance

For the Food Industry

- Standard Hazard Database?
  - Increased accuracy
  - Easier Hazard identification
  - Food Sector trending and prediction

Salmonella Trending over last 3 years



Big Data

- **Activity-generated data**—Computer and mobile device log files, aka “The Internet of Things.”
- Publically available data
- Network Monitoring

So How Can Big Data be Used in Food Safety?

Live Webinar

Date: Thursday, January 28, 2016

Time: 12 pm ET | 11 am CT | 10 am MT | 09 am PT

Length: 90 minutes

Presented By: Dr. Keith Warriner