

# Food contamination & Fraud?

CIEH Conference

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Hampshire  
County Council

# Subtitle: WYSIWYG

- What you see is what you get
  - Song lyric?
  - Computer speak ...
    - display screen portrays an accurate rendition of the printed page.
  - used by advertisers in the USA since at least the 1940s
    - indicate a straightforward, no-fuss form of trading. Sold as seen!
- What you see is what you get – or is it?



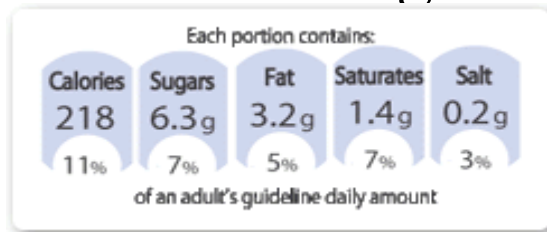
# What shall we cover?

- Introduction
- Fraud and contamination – JSS campaigns
- Then and now – why we are all here
- Contamination or Fraud? – Mishaps and “mistakes” over the years
- The largest fraud of all?
- Is there a future?



# How long does it take to read a label?

- Is a traffic light helpful or % of GD



- Some interesting food facts
  - FSA research on shopping times
  - Ave grocery shop: 60 items selected in 25 minutes - 25secs per purchase

# Interesting facts?

## Sugar and obesity

- 1954 sugar rationing ceased. Spending (sweets etc) leapt from £100M to £250M.
- 1962 prof John Yudkin: obesity the greatest threat to the nation's health, particularly that of children
- Today we spend £5.5B on confectionary etc
- £250million in 1954 equates to £4.8 billion in 2006
- 1954 sugar was 3.4 pence per kilo in 1947 to 74 pence per kilo in 2004 - 3.4 pence equivalent to 74p today
- But earnings have trebled in that time

# Sugar and obesity

- Obesity has overtaken smoking as the country's biggest killer and is responsible for 18 million sick days and 30,000 deaths per year
- Every 17 minutes another person dies as a direct result of obesity, treating obesity and related illness costs the NHS £5billion per year
- 66% of the UK are already overweight or obese (+400% growth in the last 25 years)



# Interesting facts

## Salt *FSA facts and figures*

- Breakfast cereals reduced salt by 38% (1998 – 2006 )
- Snacks by 25% (2005-2007)
- Bread reduced 25% since late 1980s
- Soups (24.8%) and sauces (28.8%) salt reduction
- Reducing salt intake by 6g a day (from the average of 10-12g a day in the UK
- Salt effects blood pressure which could lead to a 24% reduction in deaths from strokes and an 18% reduction in deaths from coronary heart disease. This would prevent approximately 35,000 stroke and heart attack deaths in the UK each year and 2.6 million each year worldwide.
- Raising the profile still needed
  - Campaigns focussed on fraud – intentional or otherwise and most importantly raising the profile of key diet issues



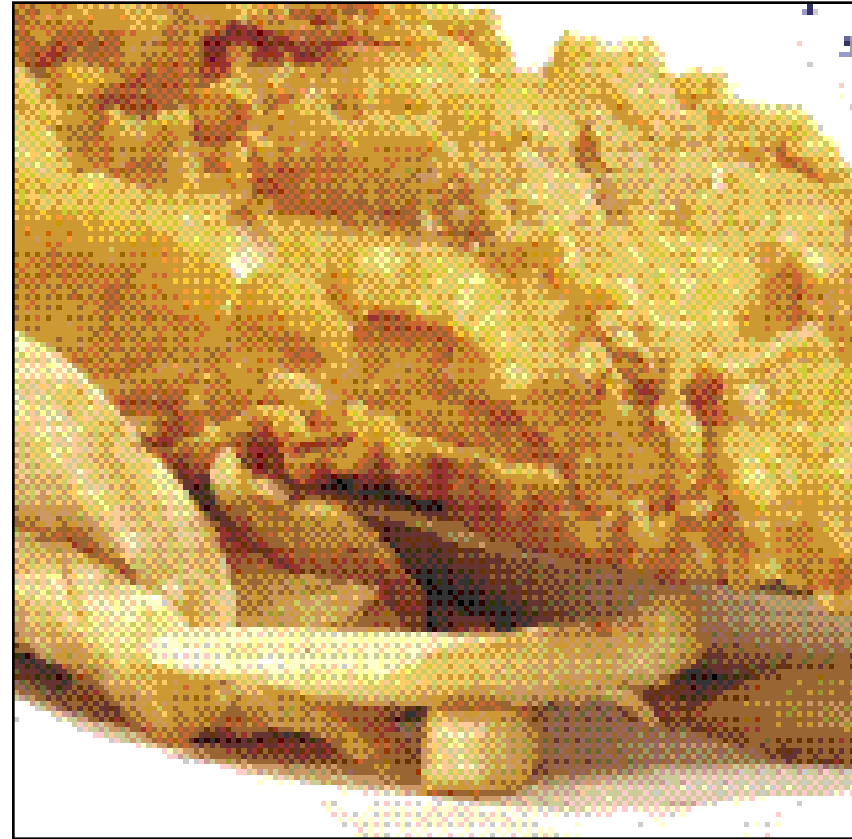
# Nasty Nuts

- *Approx 30% RASFF notifications relate to Mycotoxins*
- **Looked for aflatoxin**
- 75 samples were analysed.
- 47 peanut butters,
- 4 satays and
- 24 other samples, including nut brittle, nut clusters, nut cookies, nougat, muesli bars, nut spread
- *One sample exceeded the limits for aflatoxin* specified in The Contaminants in Food (England) Regulations 2006.
- *Twenty one (47% of peanut butter) samples contained aflatoxin but within acceptable limits*
- *All of the samples containing aflatoxin were peanut butters*



# *Frying to kill you*

- Focus on fish & chips -  
Salt content
- Trans fats ~20% of the samples had manufactured trans fat levels in excess of 2% of the sum of all fats present, which under Danish Law is considered too high in fats.



# Bar or Bowl

- None nutritionally equivalent to bowl of similar cereal.
  - 2 bars for the energy
  - 5 bars for the protein
  - And occasionally.... A lot more sugar!
- Situation has improved dramatically



# Other campaigns

- Cod or Cobblers
  - Wholesale prices: Cod £12/Kg, Vietnamese River Cobbler £5/Kg
  - 3% of samples tested were found not to be cod as described.
- No claims bonus
  - “Lite” but not always correct
  - No added sugar but natural sugars in abundance
  - Swap fat for sugar
- Catered meals
  - 71% of the meals contained more than 40% percent of the GDA for fat per portion.
  - 71% of the meals contained more than 40% of the GDA for salt per portion.
  - Portion size was not directly related to salt content.
  - 57% of the samples contained more than 40% of the GDA for energy.
  - The majority of meals had portion sizes of between 430g to 630g.

# Campaigns cont'd

- A bit on the side (side portions when eating out)
  - 75% of the bread samples contained more than 20% percent of the GDA for salt per portion.
  - 10% of bread samples contained in excess of 50% of the GDA for salt per portion.
  - 31% of the Asian products contained more than half of the GDA for fat and salt in a portion.
  - 2 breaded products contained 75% of the GDA for saturates.
  - All the samples with the high fats and saturates were obtained from restaurants/takeaways.
  - The bread samples which were not just plain bread had a significantly higher salt level than plain bread.
- Credit crunch
  - None of the butchers / farm shop burgers and sausages analysed contained excess connective tissue or excess fat.
  - The value and standard sausages were similar in meat content.
  - None of the value or butchers / farm shop sausages contained soya.
  - Catering sausages had the lowest meat content.
  - Catering burgers were of lower quality than all the other burgers since the other burgers do not contain non-EC meat.
  - Over 60% of the catering sausages contained soya.

# Campaigns cont'd

- Hearty meals
  - 148 samples were submitted from 8 local authorities.
  - 86% of the dishes analysed for fat would be red under the Food Standards Agency (FSA) signposting scheme.
  - 9% provided more fat than the 70g Guideline Daily Amount (GDA) for adults (based on that for women).
  - 62% provided more than half the fat of the GDA for adults.
  - 6 of the samples gave results in excess of 5% trans fat in fat. These were all kebabs.
  - Trans fat were found in all the kebabs submitted, with 60% containing trans fats in excess of the Danish benchmark.
  - 72% of the dishes analysed for salt would be red under the FSA signposting scheme.
  - 18% provided more salt than the 6g GDA for adults.
- Bulge in a bottle
  - Calorie issue
    - 10 teaspoons of sugar and 9 Alcopops binge drinking
  - Oxford Street



# Take-away time bomb

- A meal including prawn crackers, crispy duck, chicken balls and spring rolls includes 2,823 calories and 132.5 grams of fat
- A wine glass full of fat:
  - Denise Thomas: just two of these greasy takeaway meals a week could cause a heart attack within 10 years

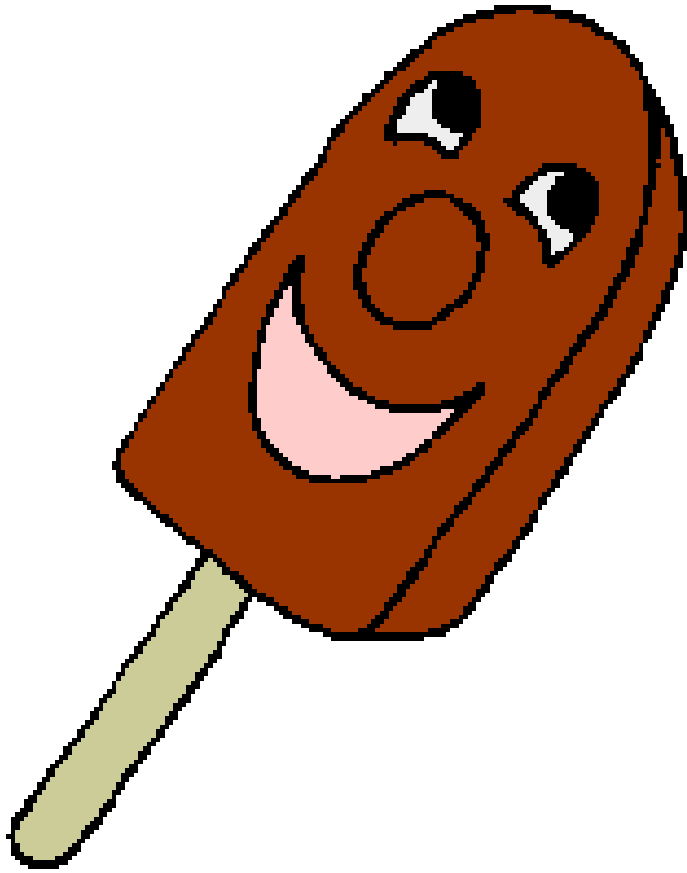


A Poll by Lipobind of 10,000 British adults found:

- 35% eat at least two takeaways in a typical week.
- 11% have a takeaway five times a week,
- 5% admit to eating one every day.
- (19%) ordered a side salad or diet drink to make their takeaway meal healthier.
- However 20% ordered a side of chips with their meal, adding an additional 250 calories and 15 grams of fat.



# Remote Ice cream analysis



- History of low results
- Increasing: enterios coliforms, TVC
- Non-pathogenic bugs
- Continue to use – withdraw
- Vulnerable persons
- UKAS QA lab!

Fraud and other interesting  
“mistakes” over the years

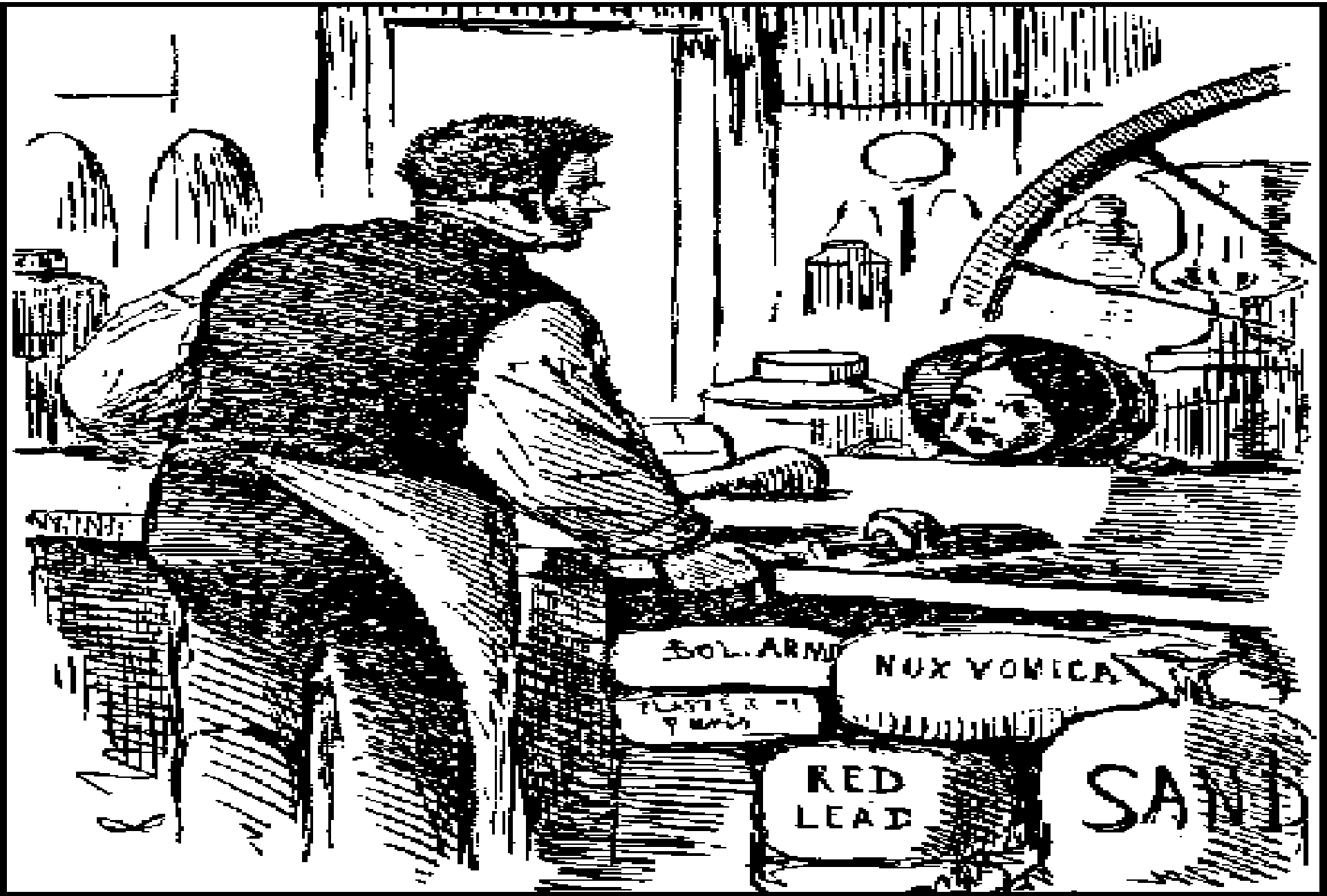
# Fraud or mishap?

- 200 BC Archimedes Eureka moment
- 1364 A British wine merchant
  - An unusual penance!
- Testing of alcoholic strength in Beers  
was Shakespeare's Dad a Conner?
- 1726 Gin craze producers created gin from any grain they could. 6287 places in London selling Gin
  - much of it was laced with sulphuric acid or turpentine.
- 1700s Beer rations
  - Brewers added strychnine to beer to make it taste bitter.

# Fraud or mishap?

- 1810 Coffee adulteration using chicory powder, ground corns, flour, sawdust, carrot, parsnip powder.
- 1820, London. Bakers cut their flour with alum and chalk – whitening agent, and plaster and sawdust to make them heavier.
- 1850s Brightly coloured sweets and jellies
  - lead, copper or mercury salts added to make to attract children

Little girl: "If you please, Sir, Mother says, will you let her have a quarter of a pound of your best tea to kill the rats with, and a ounce of chocolate as would get rid of the black beetles"



# Fraud or mishap?

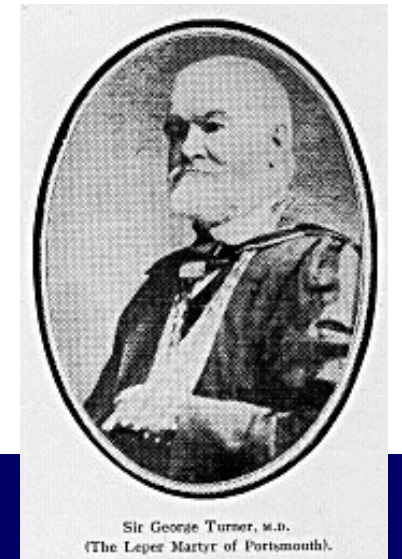
- 1860s Napoleon III demanded a cheaper version of butter
  - spread developed using beef suet, chopped-up-cattle stomachs and bicarbonate of soda,
  - 1869 patented as margarine – but not as we know it today
- 1870s France struck by Vine blight
  - Yield maximised by making wines from second and third presses adding a little something to give the wine more body .....
  - Arsenic

# Fraud or mishap?

- 1870 Lead in Water
- The 'Do Drop inn'
  - Gin and Tonic anyone?
- 2004 The Surrey Curry. Illegal and potentially dangerous food colourings
  - Sally Kinnes Guardian, Sat May 15, 2004
- 2005 Sudan 1 - Chilli powder

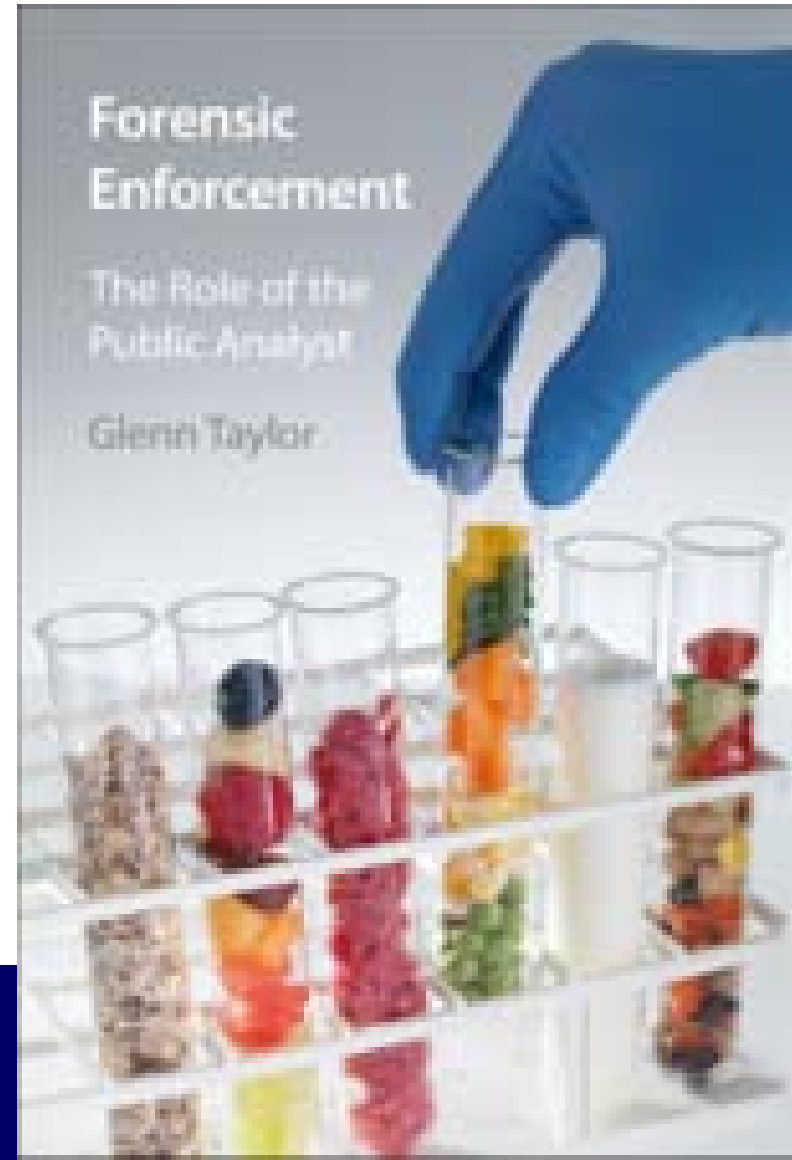
# Why are we all here?

- 1860 Adulteration of food Act – Dr Arthur Hill Hassell
- Sir George Turner
  - 1873 appointed the first Medical Officer of Health for Portsmouth, & served as an Assistant Surgeon at the Royal Portsmouth Hospital, Physician to the Fever Hospital, Public Analyst and Surgeon to the Police. He wanted a continuous water supply
- IOW hospital for TB
  - Treated Tennyson & Marx



# Fraud or contamination

- Blind drunk
- London bottled water
- Healthy food (muesli) with a little extra



# £200M pa Chicken fraud

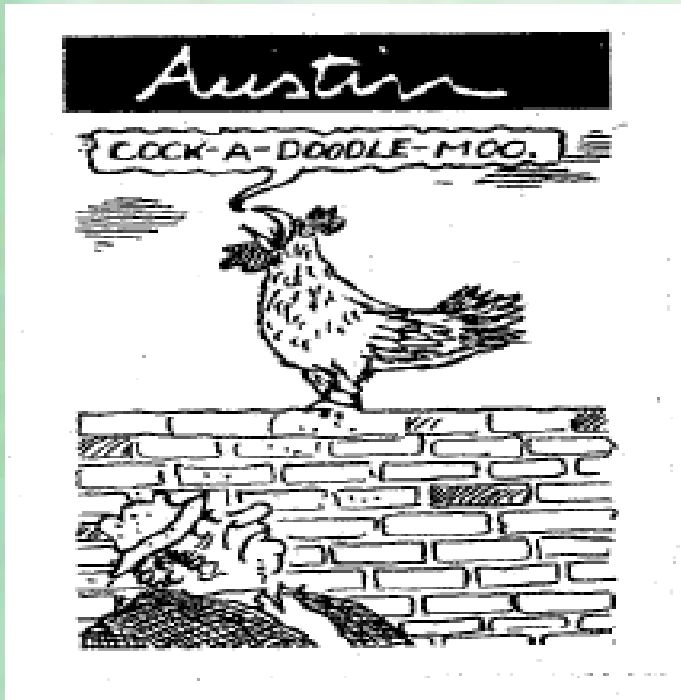


May 03

The plastic chicken that's only 51pc meat - *Daily Mail*

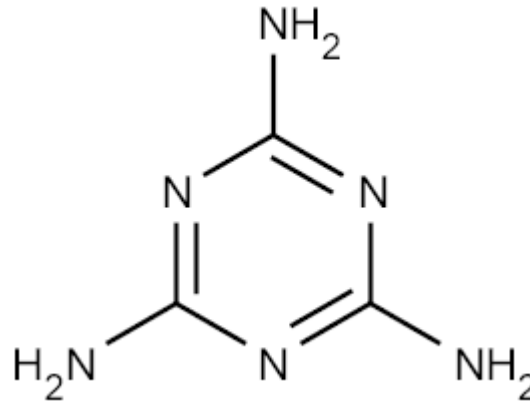
Beef traces found in chicken - *BBC News*

Scandal of beef waste in chicken - *The Guardian*



# Melamine fraud

- What happened
  - 2007 pet food
  - 2008 animal feed
  - 2009 food (70 RASFF)
- Why
- Results to health
- And to the health of the perpetrator



# Prawns on Prozac

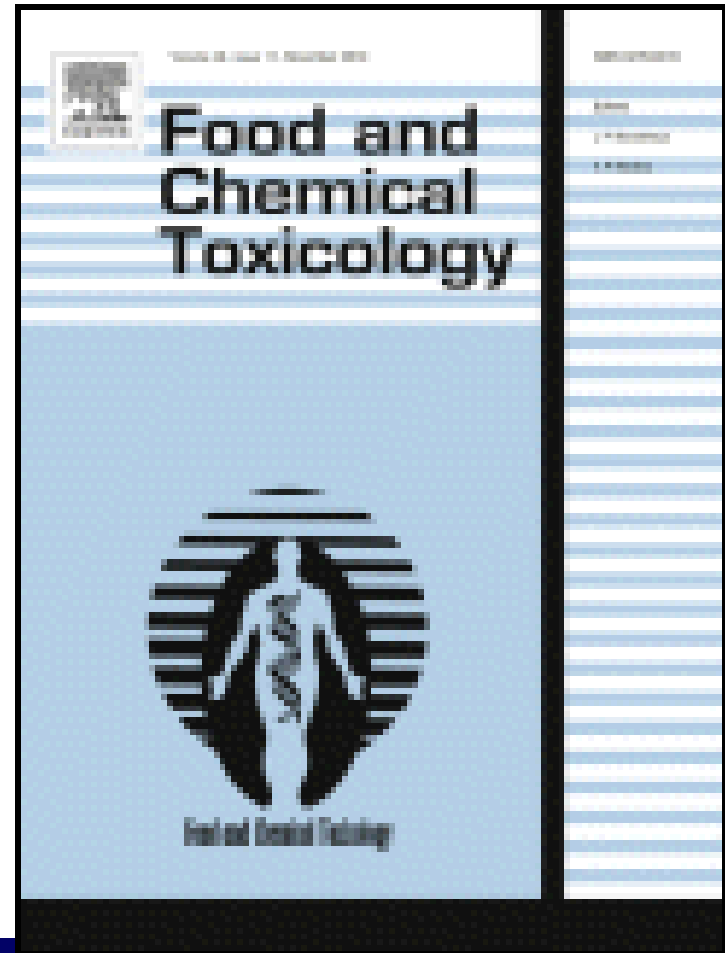


# Mouse in chocolate confectionary

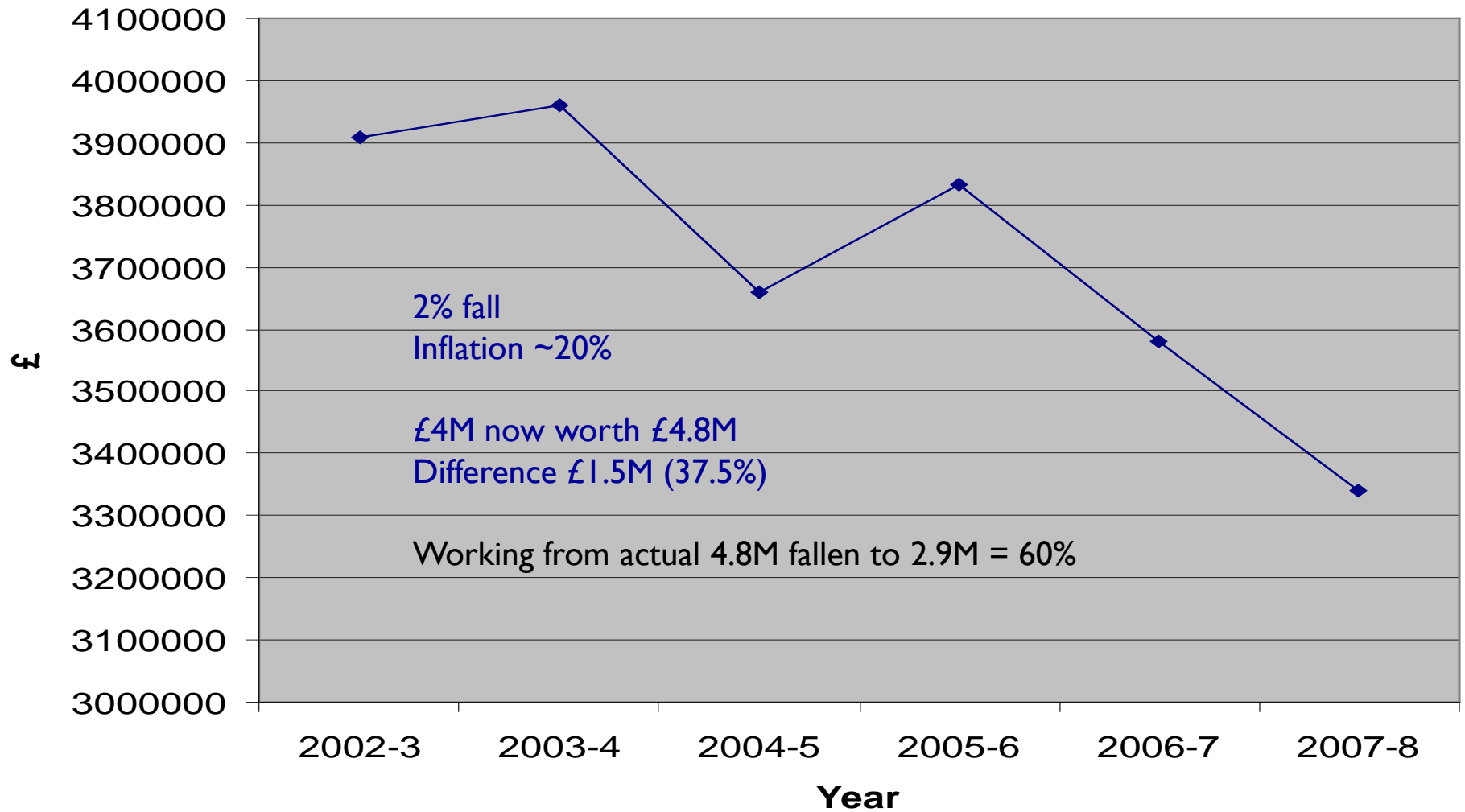
- BBC news:
  - Marie Henriques, 32, bought a chocolate bar as an afternoon snack from a kiosk in Piccadilly in April 1997.
  - **'diligent'**

# The largest fraud of all?

- Background:
  - Gatekeepers of EU food safety
  - Mission Impossible? Food Supplements paper
  
- Austerity and the future of enforcement, perhaps a fraud in the eyes of ill-informed consumers.....



# Total UK spend on food analysis



Actual outturn for 2008 even lower, ~ £2.9M

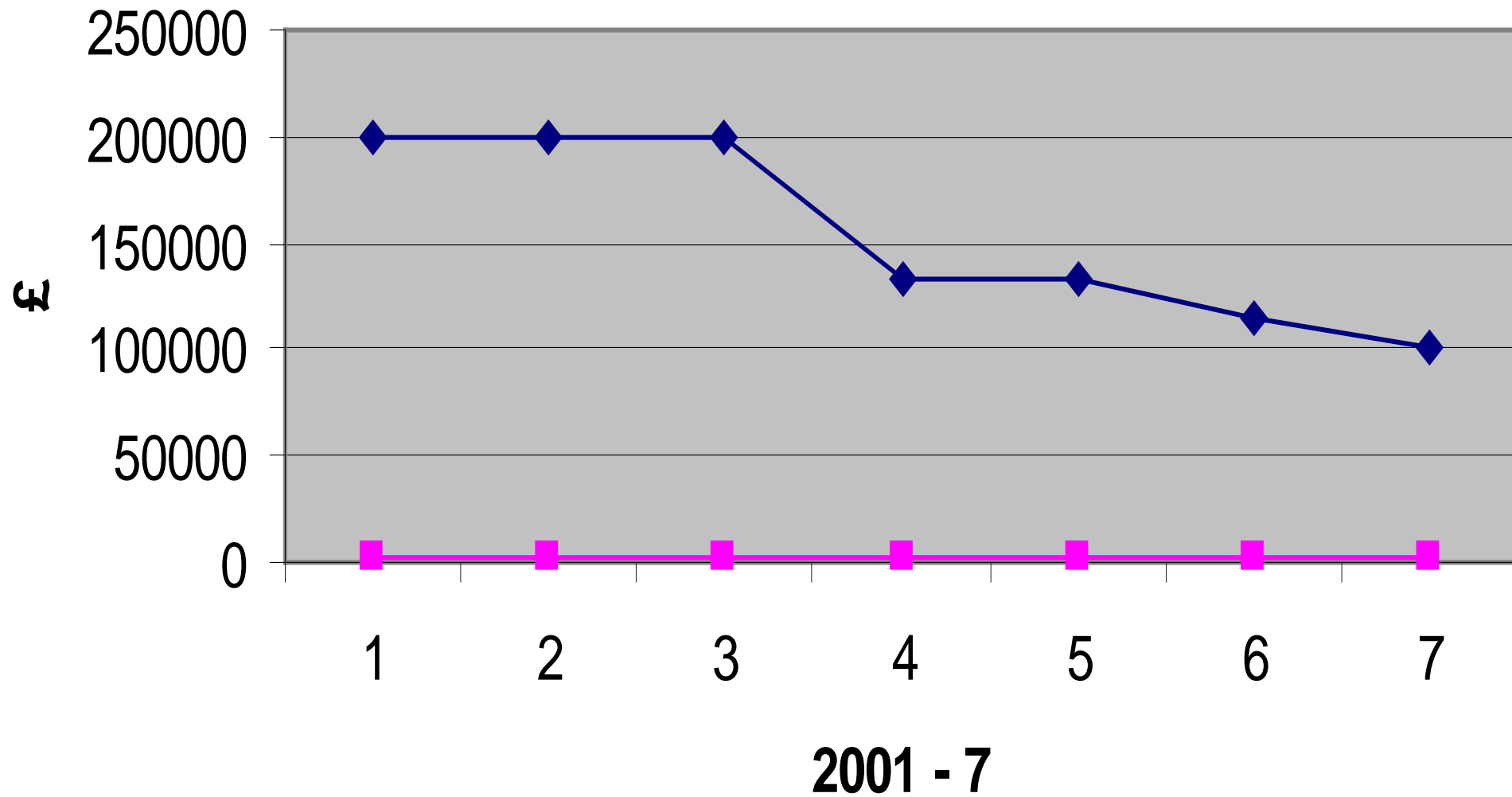
Based on CIPFA returns



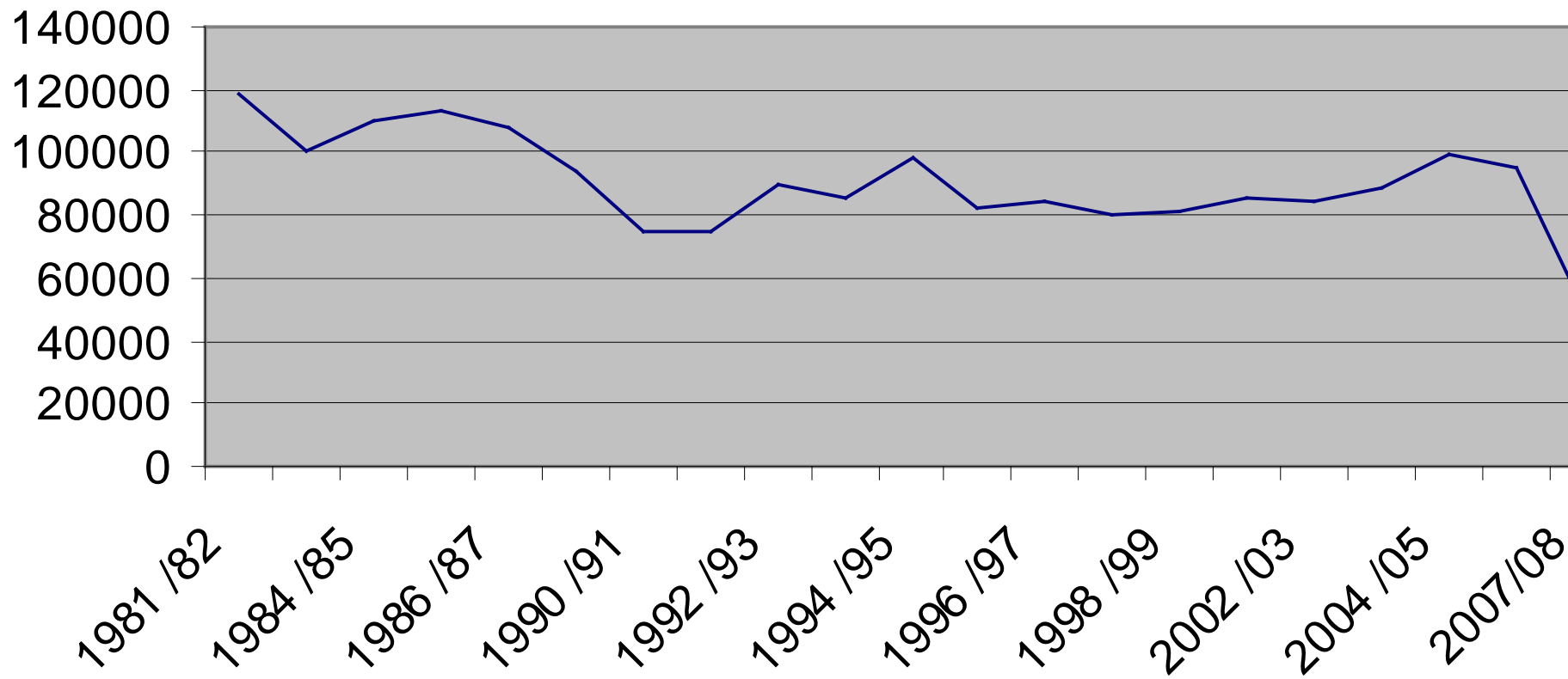
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Health warning not all authorities seems to complete their returns in the same manner

# Tender amounts 2001-7



## Food Samples



# Sample rates 2008 figures

- Composition stats
  - England 2008 stats ~34,000
  - Scotland 2008 stats ~10,000
- Approx. sample rate per population
  - 0.6/1000
  
- Hygiene stats (England HPA)
  - 85,000

# Relative Spend

## Unitary

- population 0.15 million 1p/person
- population 0.25 million immaterial, stopped food work last October

## County

- West half of England 6p/person
- East half of England 28p/person

Translate this level of spend across England

- 1p/head                      less than Hampshire's salaries
- 6p/head                      2 labs size of Hampshire
- 28p/head                     12 labs size of Hampshire

Average spend 5p per head of population



# The UK Food Market

- UK Food market alone worth £70 Billion per year (about £25 per person per week ~ £1300 per person per year)
- So a small fraud could be very lucrative
- 5p per person per year on detecting food fraud (0.004%)
- Given future budgets - Are local Authorities the right people to run science enforcement?



# The largest fraud of all?

- Prof. Lang at City University says
- It is an enormous job and there are several constraints on their work. Unsurprisingly, one problem is money. "Their budgets are squeezed all the time,"
- the real issue isn't about controls, though. "It's about the need for more independent food scientists. In the mid-19th century, modern food chemistry began by acting on people's behalf. What we've got now is chemistry that, by and large, works for the food industry. People in mainstream public health say the problem is not adulterated food, it's heart disease, cancer and diabetes, and they are absolutely right. But the point people like me have been making for years is that the modern legalised adulteration and legalised contamination of food is what enables foods full of hidden fats and sugars to be sold looking like real food. That is the flipside of the coin."



# Caption competition





14 15 22



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**Please don't bolt your food**



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County Council

Double wrapped for freshness



LAB REF. 3203

SIGNATURE J Green

HAMPSHIRE SCIENTIFIC SERVICE



Hampshire  
County Council

The baker has lost his rag

...made from hand-sewn wheat!





Hampshire  
County Council

Extra tangy filling

# Ham and eggs?



Magnification  
shows fly  
eggs



# Ready ssssssssalted



Snake bone found in peanuts



# The future ...

- Isotope ratios

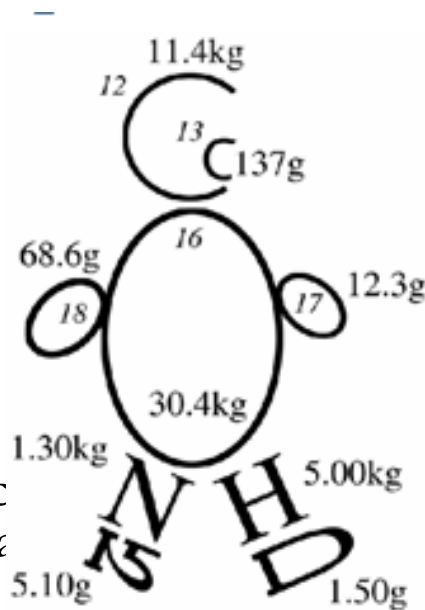
- German Authenticity

- Torso – well travelled

- TIGER

- Triangulation Identific for the Genetic Evaluaz of Risk PCR-MS

- Rapid assessment of Virus



- C & N provide info on plant type and diet

- H, O, S, Pb & Sr provide geographic information

# The future 2

- Nano-particles
  - Size  $<.1 \mu\text{M}$
  - Surface area
  - Surface treatments
  - behaviour

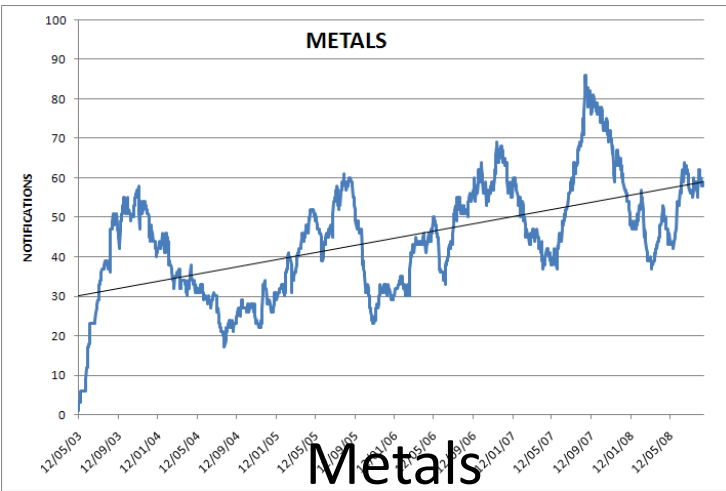
# Emerging risks

- Tools for analysing data from alert systems
  - <http://staffnet.kingston.ac.uk/~ku36087/foodalert/>
    - Declan Naughton, Tamas Nepusz, Andrea Petroczi, Glenn Taylor
- Following slides based on a presentation in Seville Feb 2010
  - <http://www.efsa.europa.eu/en/events/event/corporate100210.htm>

# Tool

- AIMS
  - To analyse trends in global food alerts
  - To provide a user-friendly tool to inform “emerging” nations of patterns in global alerts
  - In the longer term, to develop a tool that analyses data in ‘real’ time to warn of emerging incidents on a weekly basis

# Trends in RASFF notifications - Metals



Metals

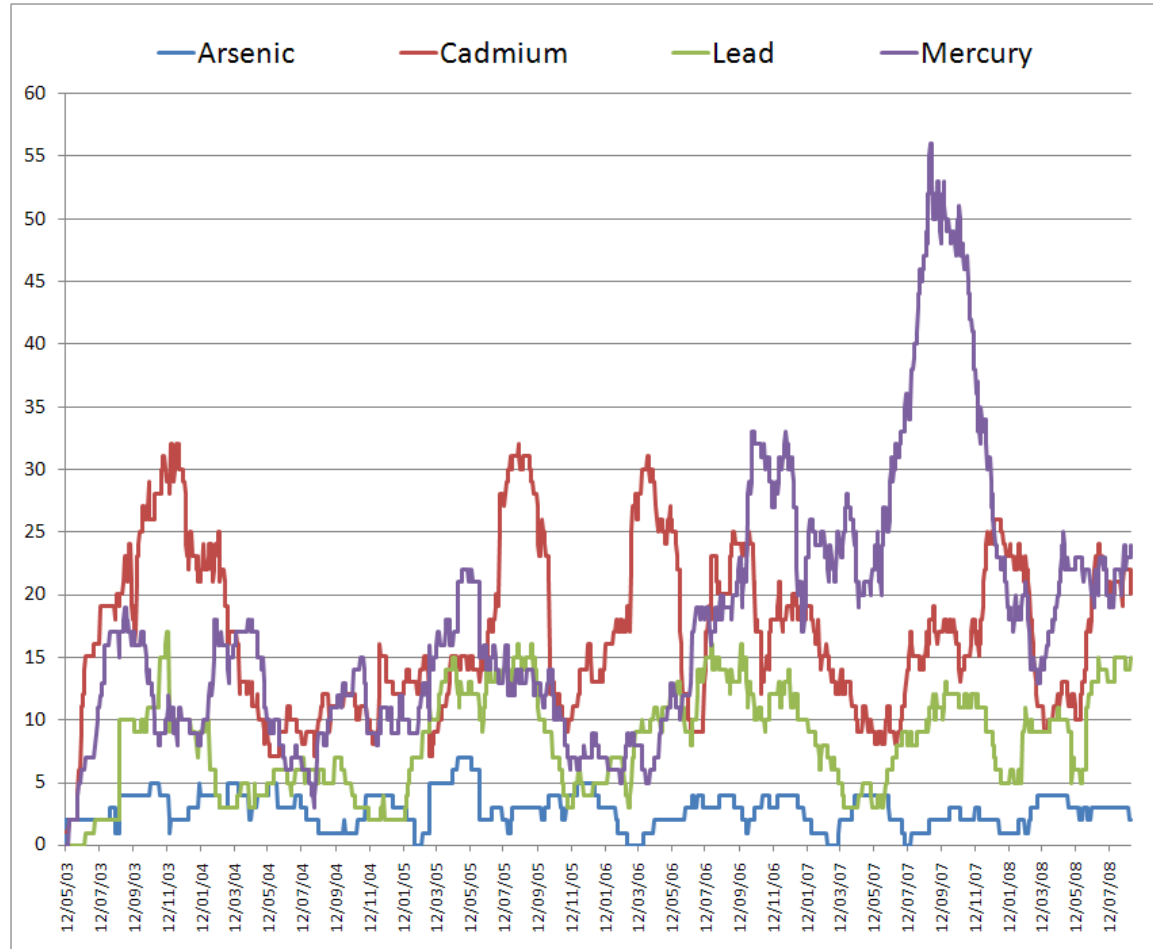
10.9%

RASFF – all

notifications: May '03

– Aug '08

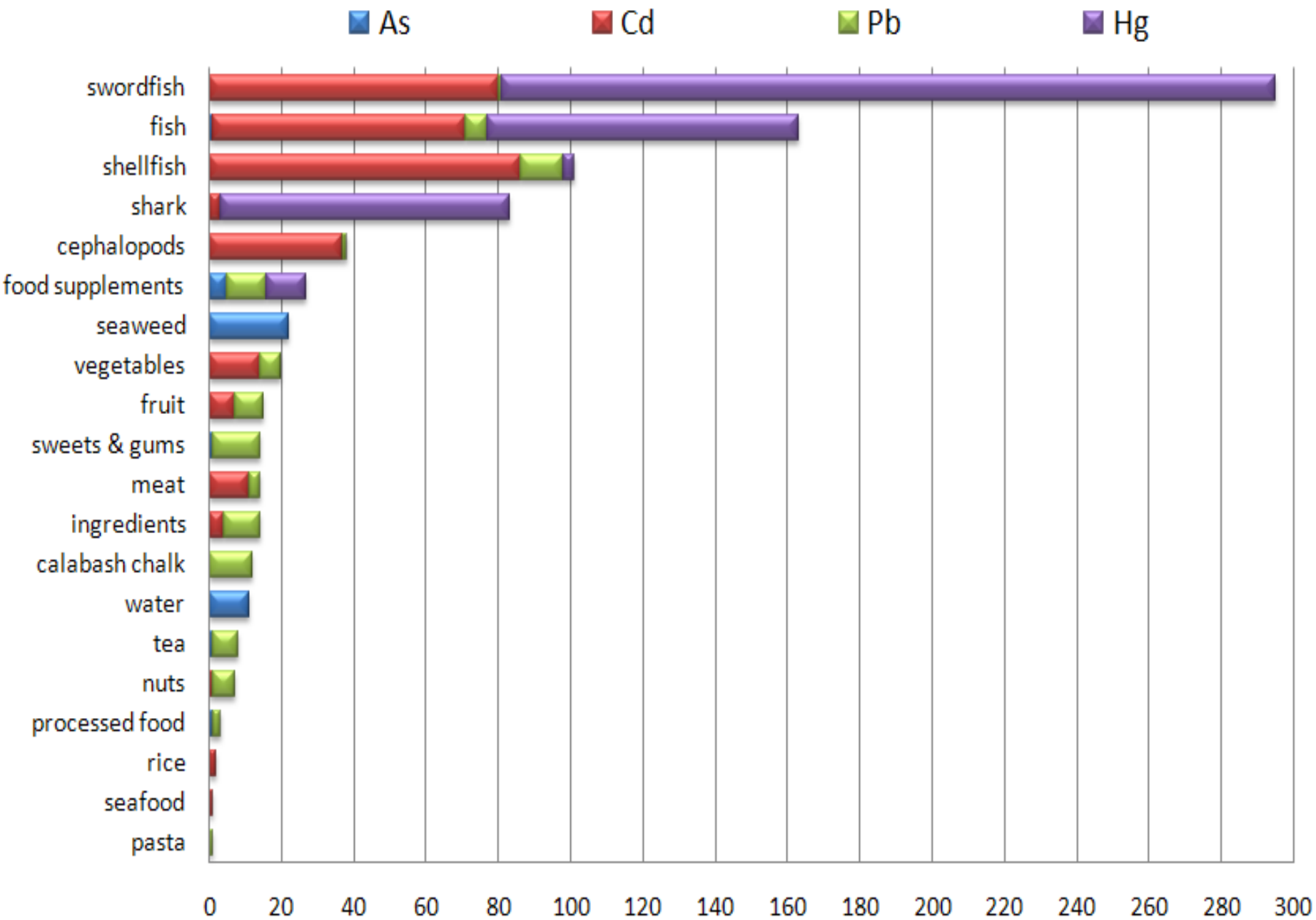
As, Pb, Cd, Hg.



# Ratio of metal notifications in seafood vs. all metal notifications

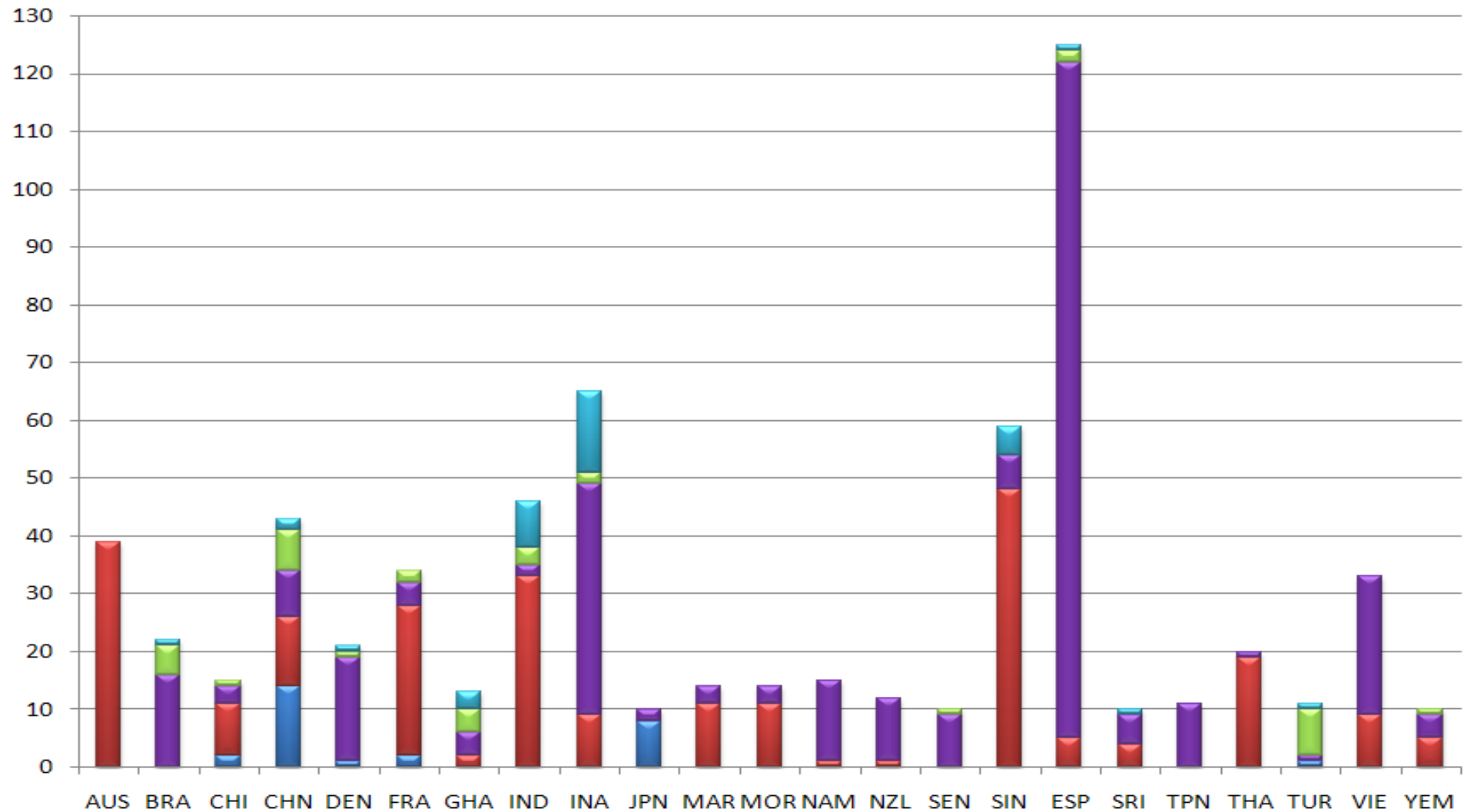


- 80% of metal notifications arise from seafood(2008 = 8 months)

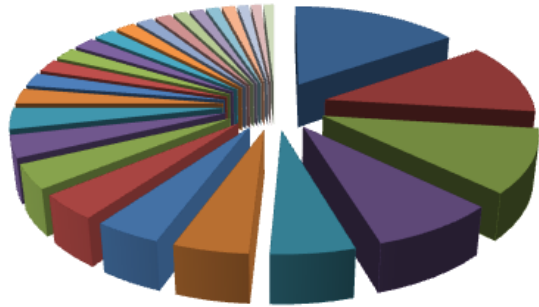


# Metals in foodstuff ( $\geq 10$ reports)

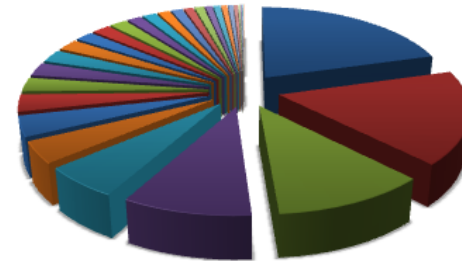
Multiple Pb Hg Cd As



# A need for a more complex analysis?



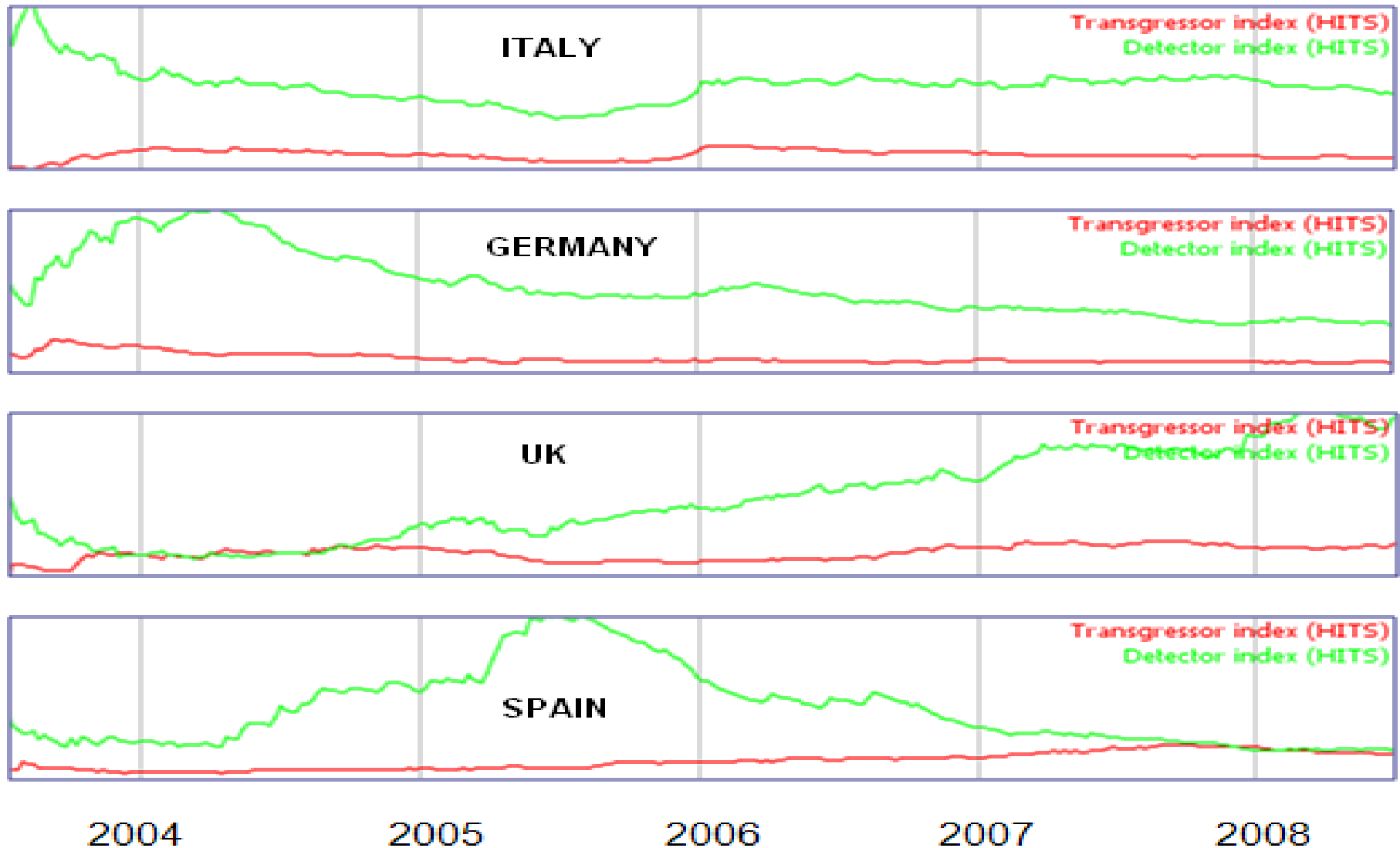
- |             |               |             |                     |          |
|-------------|---------------|-------------|---------------------|----------|
| ■ IRAN      | ■ CHINA       | ■ TURKEY    | ■ THE UNITED STATES | ■ SPAIN  |
| ■ INDIA     | ■ GERMANY     | ■ ITALY     | ■ FRANCE            | ■ BRAZIL |
| ■ THAILAND  | ■ VIETNAM     | ■ ARGENTINA | ■ POLAND            | ■ NETHER |
| ■ GHANA     | ■ INDONES     | ■ DENMARK   | ■ EGYPT             | ■ UNKNO  |
| ■ NIGERIA   | ■ HONG KONG   | ■ BELGIUM   | ■ GREECE            | ■ PAKIST |
| ■ BANGLADES | ■ PHILIPPINES |             |                     |          |



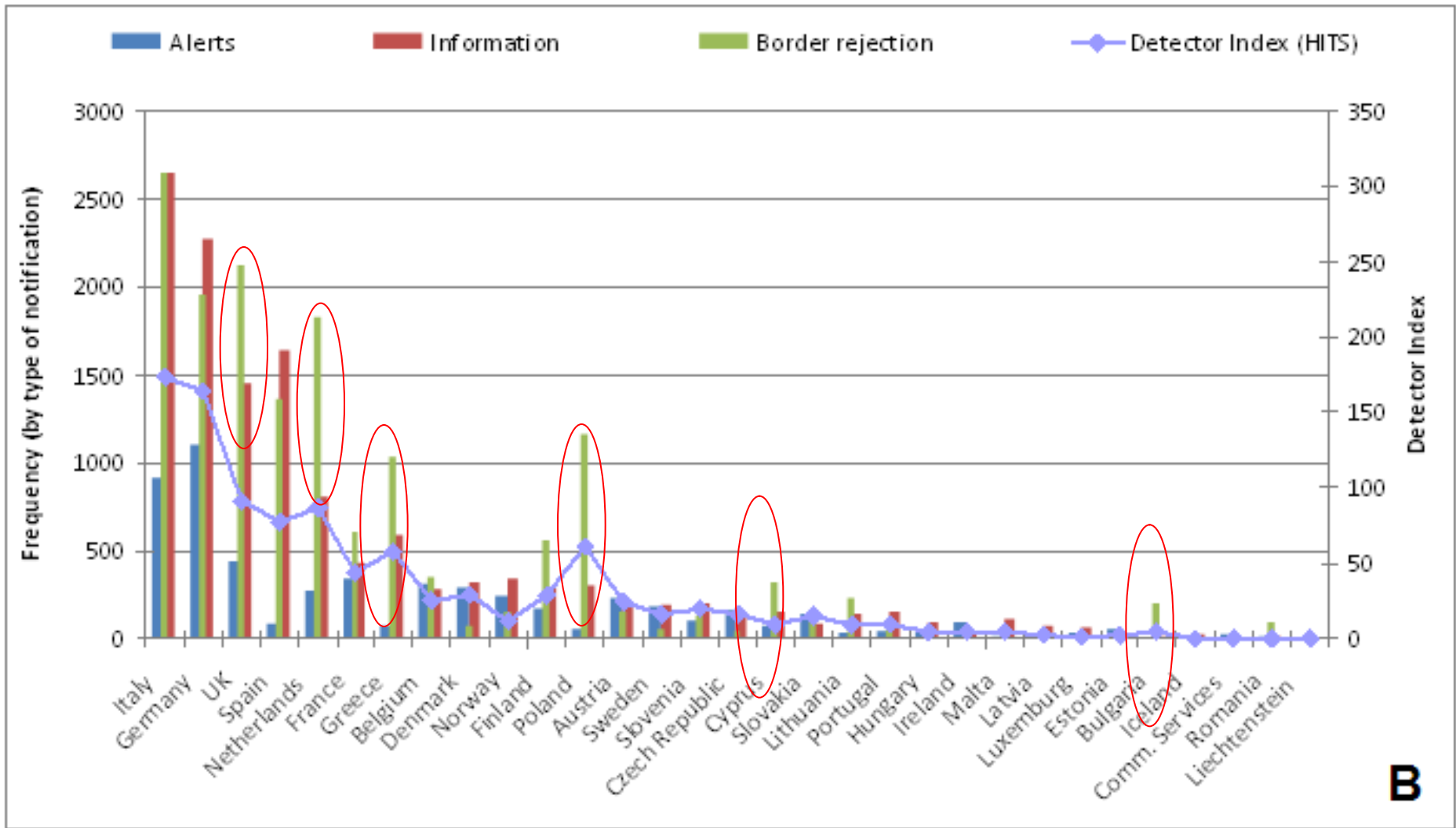
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| ■ FRANCE         | ■ DENMARK    | ■ NORWAY         | ■ BELGIUM  | ■ POLAND     | ■ FINLAND |
| ■ CZECH REPUBLIC | ■ AUSTRIA    | ■ SLOVENIA       | ■ SLOVAKIA | ■ CYPRUS     | ■ SWEDEN  |
| ■ LITHUANIA      | ■ PORTUGAL   | ■ HUNGARY        | ■ MALTA    | ■ IRELAND    | ■ LATVIA  |
| ■ ESTONIA        | ■ LUXEMBOURG | ■ BULGARIA       | ■ ICELAND  | ■ ROMANIA    | ■ C.S.    |
| ■ UNKNOWN        |              |                  |            |              |           |

RASFF notifications  
by country between  
2003-2008.

# Trends in detector and transgressor indices for the top four reporting countries



# Countries identified by detector impact



**B**

- Summary
  - Demonstrate which countries are the major transgressors and detectors
  - Monitor changes over time
  - Demonstrate the **impact** of these countries
- Targets
  - Assist countries ‘new’ to food testing
  - Inform testing to avoid redundancy
  - Prepare for malicious (terrorist) activities
  - Identify major culprit nations
  - Identify major detector nations
  - Highlight trends in a nations’ contribution
- Future aspirations
  - To allow selection by reasons for alert (taxonomy)
  - Include levels of contamination found (where applicable)
  - To extend tool to international alert systems beyond RASFF
  - To promote release of international alerts in ‘live feed’ format for immediate processing
  - To develop an ‘live feed’ response in real time to warn about emerging patterns



# Bibliography

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- <http://www.efsa.europa.eu/en/events/event/corporate100210.htm>

