



WHO Collaborating Centre
for Antimicrobial Resistance in
Foodborne Pathogens
www.antimicrobialresistance.dk/who

National Food Institute
Technical University of Denmark

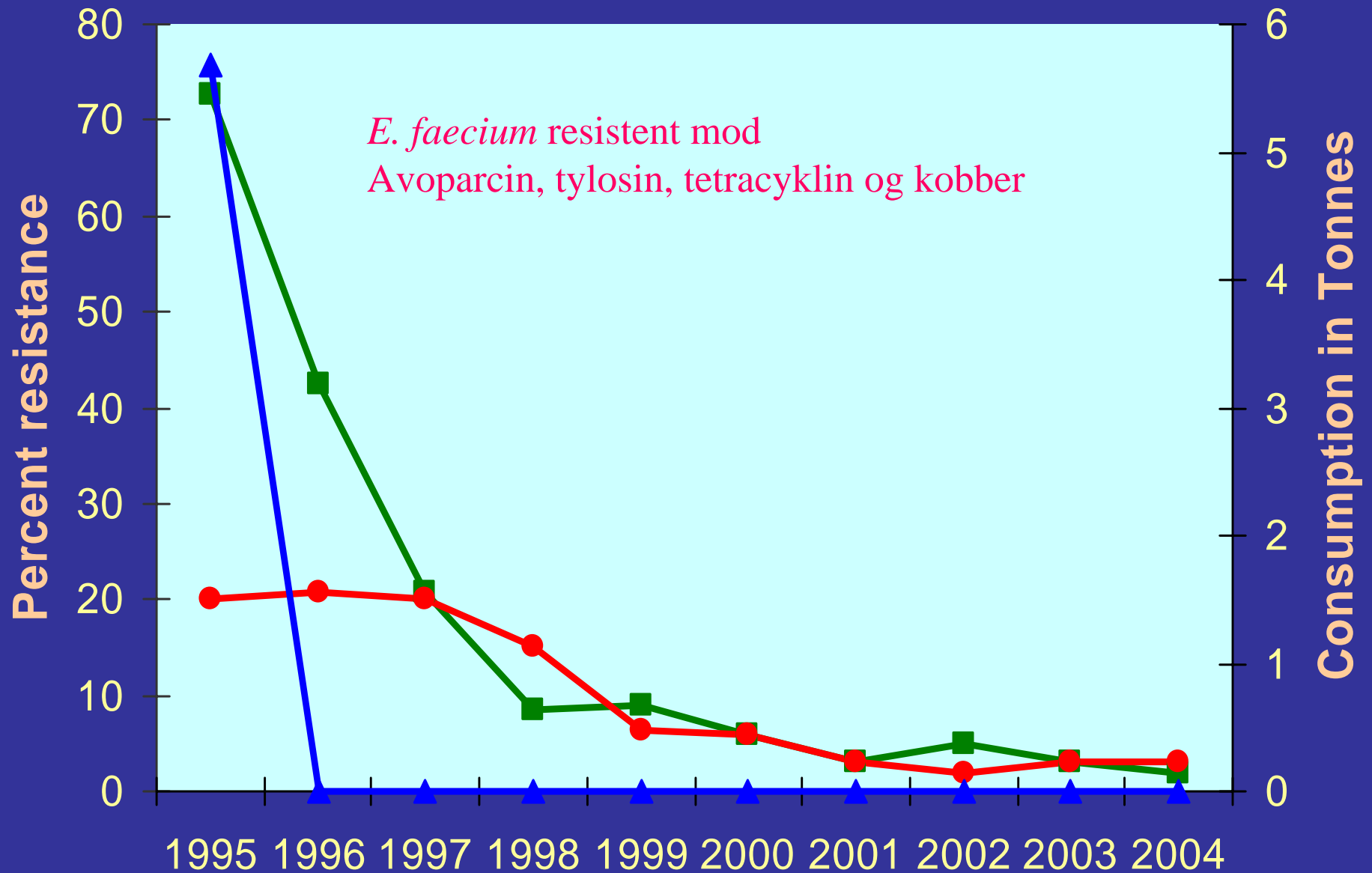


Antimicrobial resistance

Why, how, where and when?

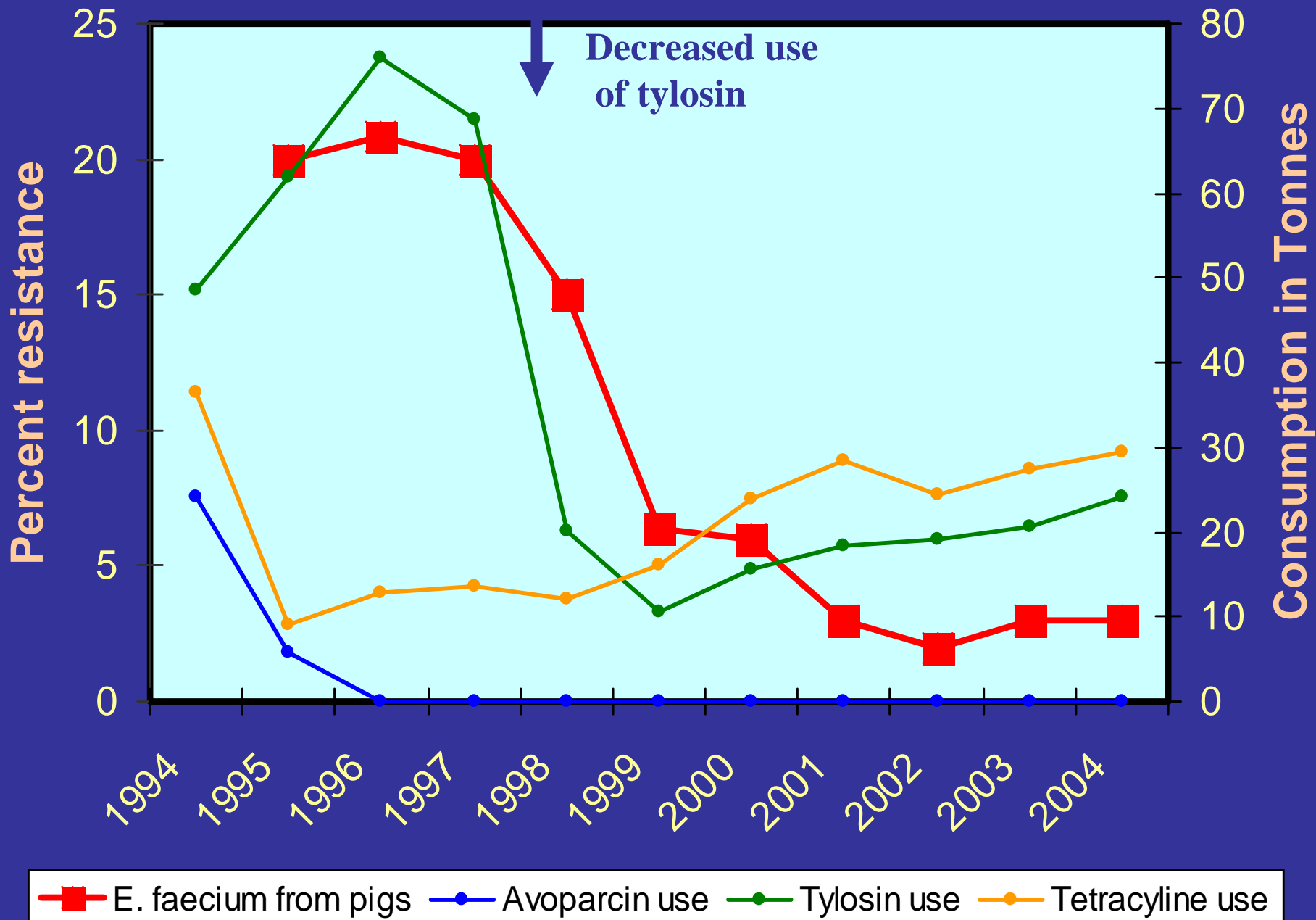
Frank M. Aarestrup, Director
DVM, PhD, Dr. med. vet.

Occurrence of VRE



■ E. faecium from broilers ● E. faecium from pigs ▲ Avoparcin use

Occurrence of VRE



Changes in Danish food safety organization

- Change of political responsibility
 - From Ministry of Agriculture to Ministry of Science, Technology and Innovation
- One authority from farm-to-fork
 - the Danish Veterinary and Food Administration
- Organizational and functional separation of risk assessment and risk management
 - creation of the National Food Institute (NFI)
- Move all government research institutes into existing universities to strengthen research and education (Merged DFVF into two institutes in DTU, NFI and NVI)

Mission

- To promote safe and healthy food
- To promote healthy food habits and to prevent food related diseases in humans
- To maintain laboratory and research preparedness for immediate and effective action on food safety issues



Core Activities

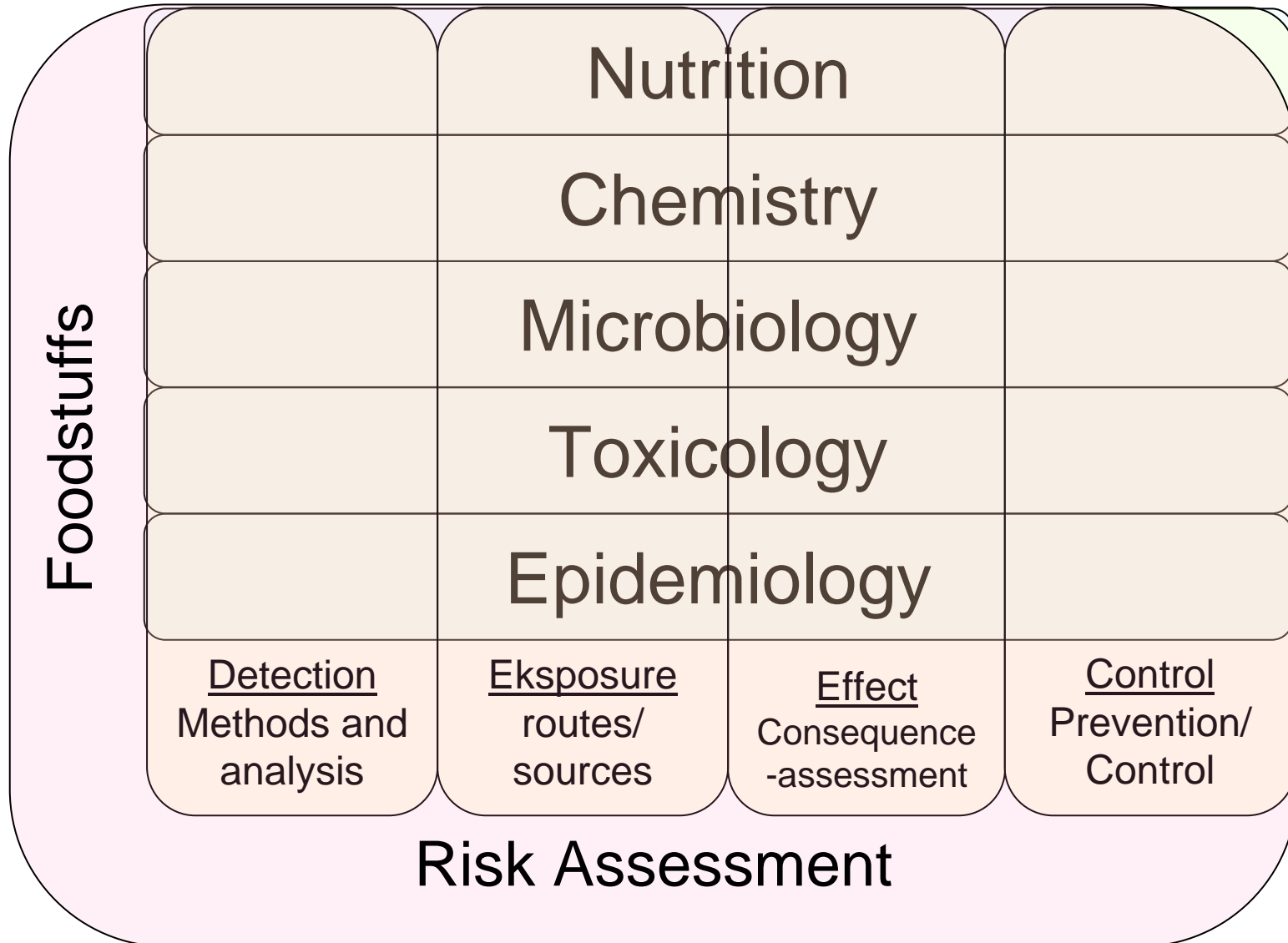
- Research and development
- Surveillance and control
- Advisory services incl. risk assessment
- Diagnostic and analytical laboratory services



Main areas of research in infectious diseases

- Rapid detection methods
- “Lab on a chip” technology
- Epidemiology of foodborne diseases
- Antimicrobial resistance in FBP’s - evolution, epidemiology and control
- Salmonella and Campylobacter pre- and post harvest control methods
- Pro- and prebiotics, human microbiota, metagenomics
- Foodborne virus

Scientific disciplines



National og International Ref. Labs.

- National reference-laboratory for food microbiology and food chemistry
- EU referencelaboratory for antimicrobial resistance
- EU Referencelaboratory for pesticides in cereals
- Zoonosis Collaboration Centre for European Food Safety Authority (EFSA)
- WHO Collaborating Centre for Antimicrobial Resistance in Foodborne Pathogens
- WHO Collaborating Centre for Monitoring of Food Contaminants

The Antimicrobial Resistance Unit



Organisation

- The unit belongs to Section of Zoonosis Diagnostics and Antimicrobial Resistance
- In Department of Microbiology and Risk Assessment
- At the National Food Institute (NFI)
- NFI is part of the Technical University of Denmark (DTU)

The current staff of the AR. unit

- 10 Scientists
- 6 Ph.d-students
- 7 Technicians
- 3 Master-students

Primary activities of the unit

- Monitor the occurrence of antimicrobial resistance
- Perform targeted research which will limit the occurrence of antimicrobial resistance among bacteria from animals and food
- National and international spread of food borne pathogens



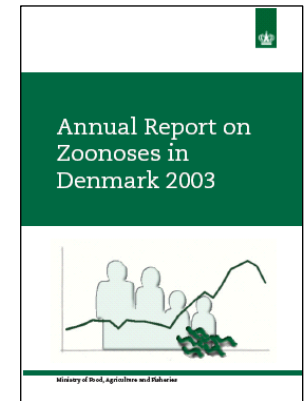
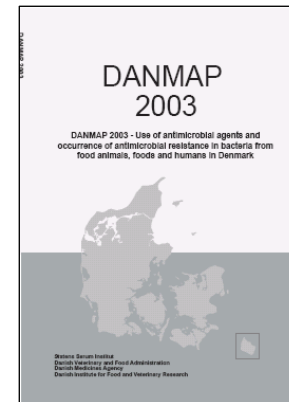
Priorities

- International networks
 - Pulse Net Europe
 - New networks with Eastern Europe / Mediterranean – SEAR / China
- Research
 - ESBL's and *Salmonella*
 - Break points and methods for detection
 - Mechanisms for resistance
 - Quinolone resistance in *Salmonella*
 - Mechanisms of resistance
 - MRSA
 - Methods for isolation and detection

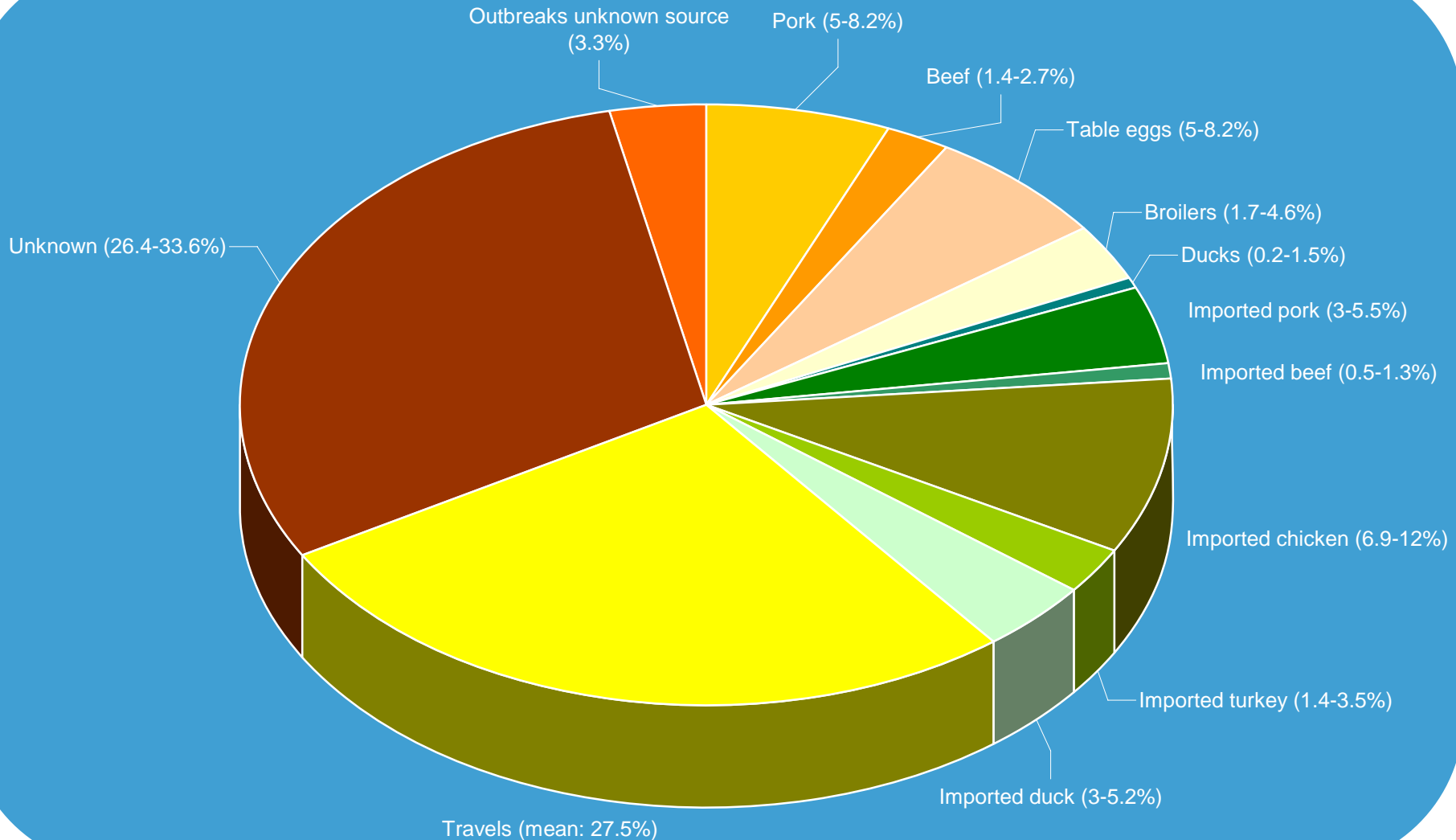


Diagnosics and monitoring

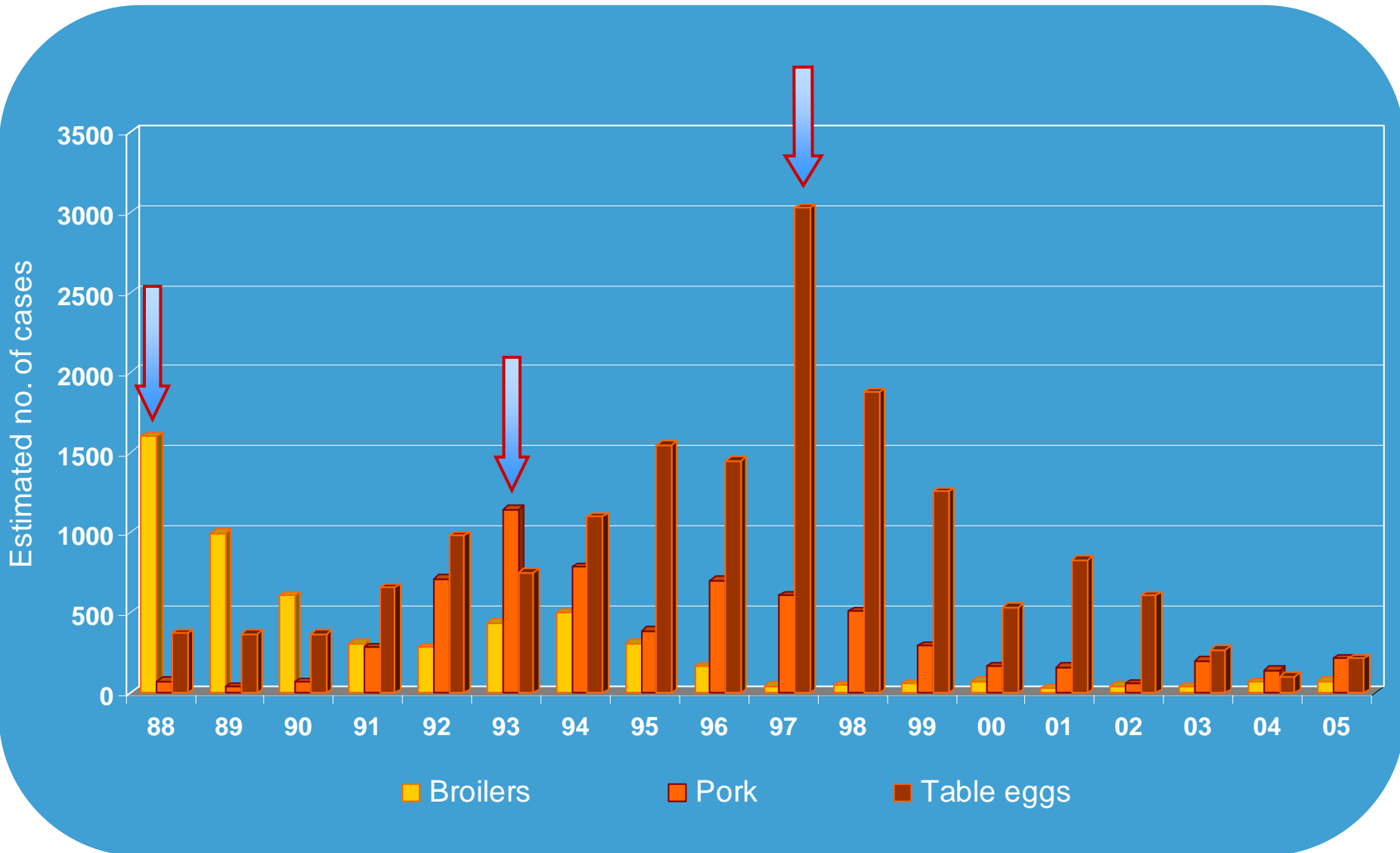
- Routine
 - Diagnostic samples submitted to NFI (8,000 strains in 2005)
- National monitoring (DANMAP)
 - Systematic data collection (approx. 1,000 strains)
- Test for companies
 - Probiotica, MIC, strains, etc. (Income 0.5 mio - 1 mio ddk in 2006)



Estimated major sources of human salmonellosis in Denmark



Trends in sources for human salmonellosis



Core International activities

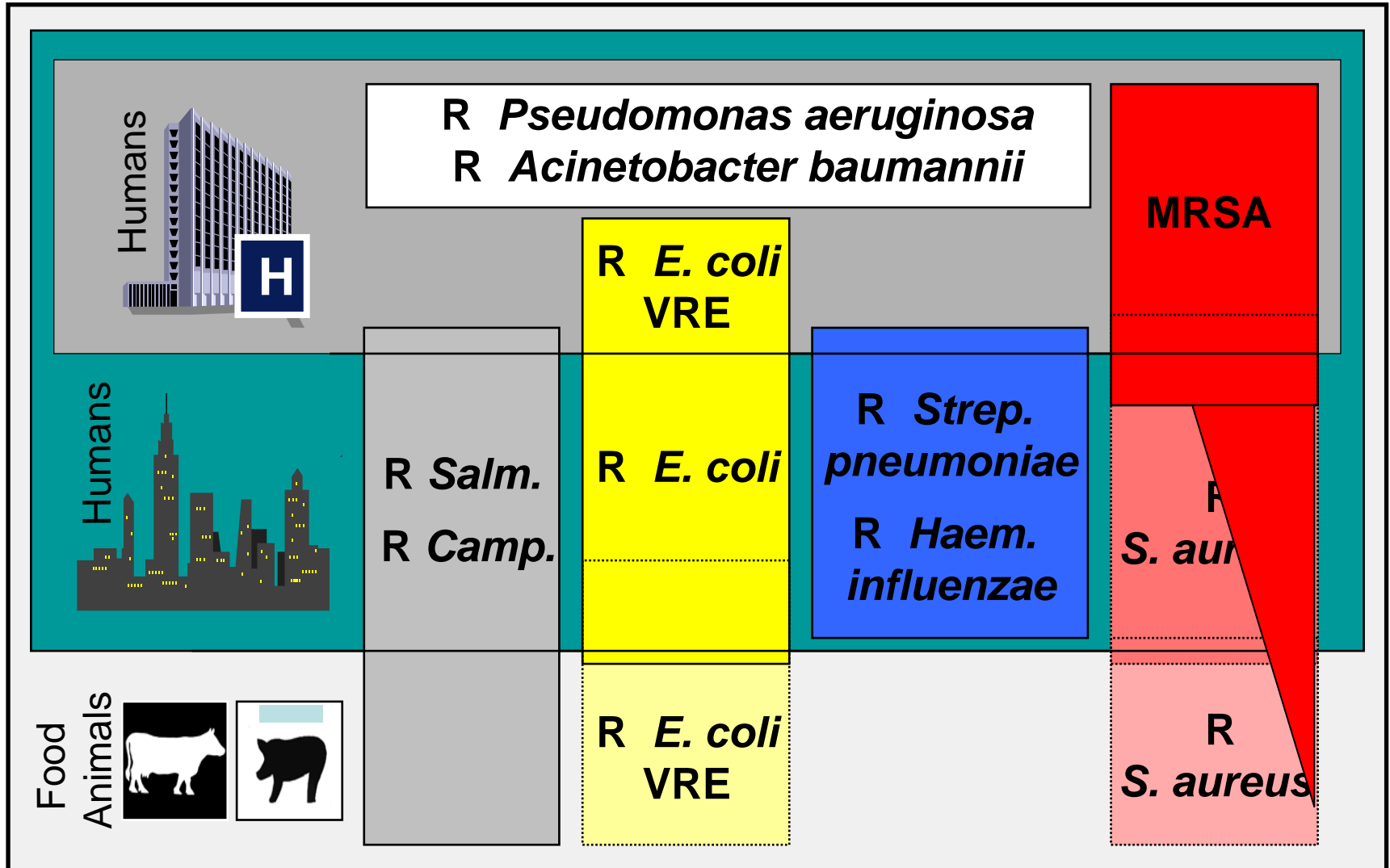
- WHO Collaborating Centre
 - Proficiency test (WHO EQAS)
 - Training courses
 - Country Data Bank (CDB)
 - Reference testing
 - Research

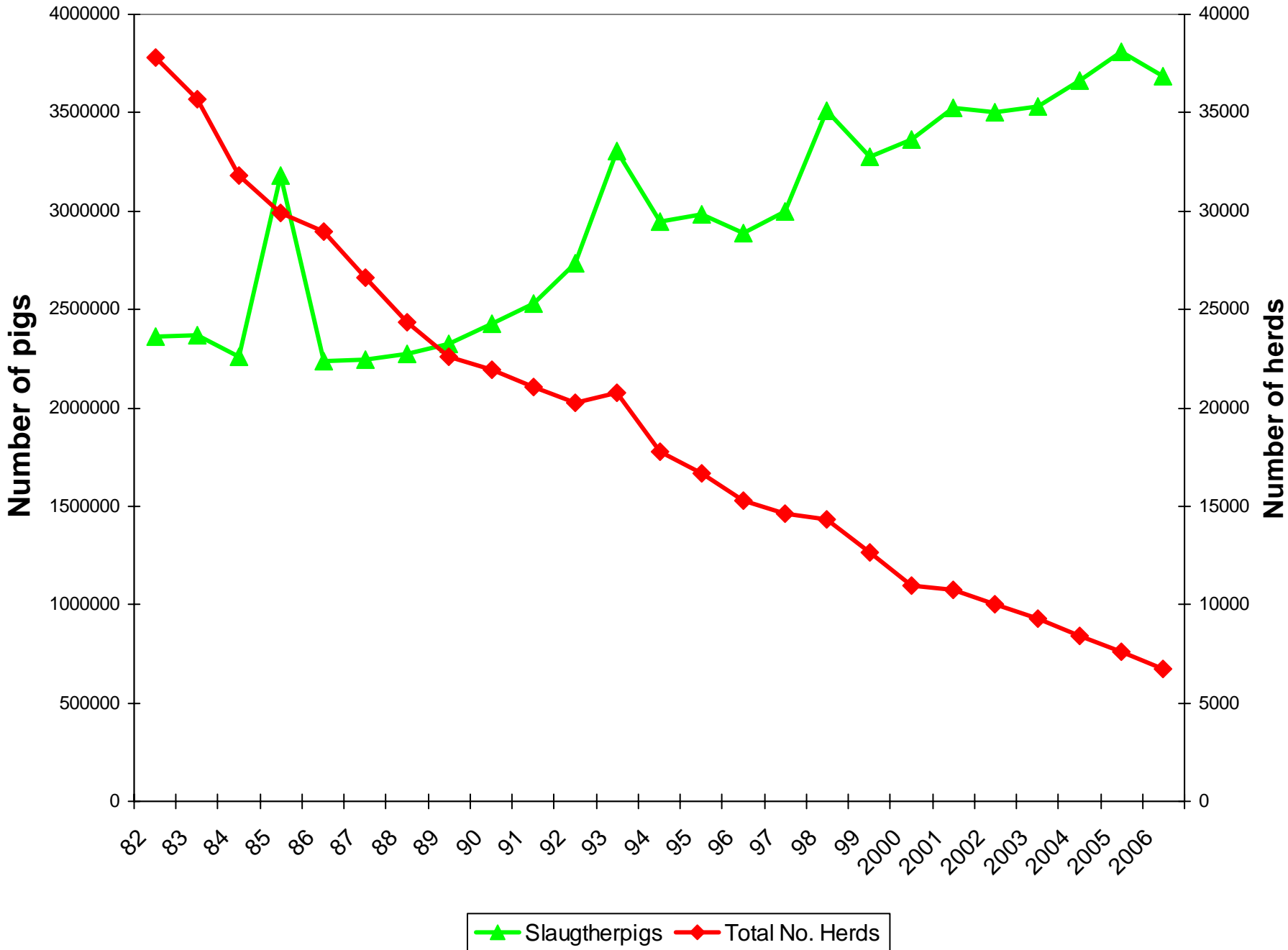


- Community Reference Laboratory (CRL-AR)
 - Proficiency test
 - Collection of data
 - Reference testing
 - Research
 - Meetings and advice

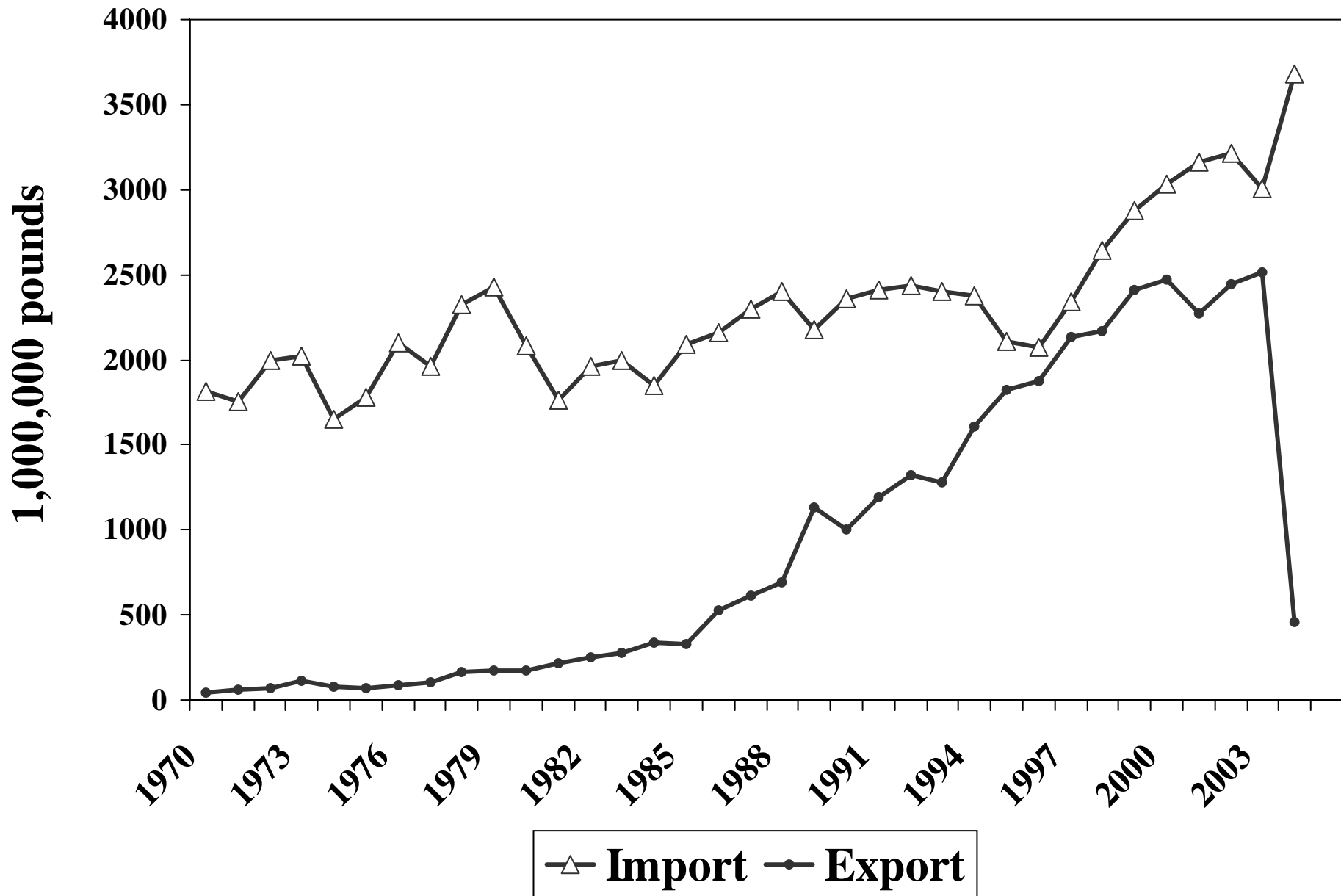


The World (of Antimicrobial Resistance) According to... Human Bacterial Pathogens and Their Habitat

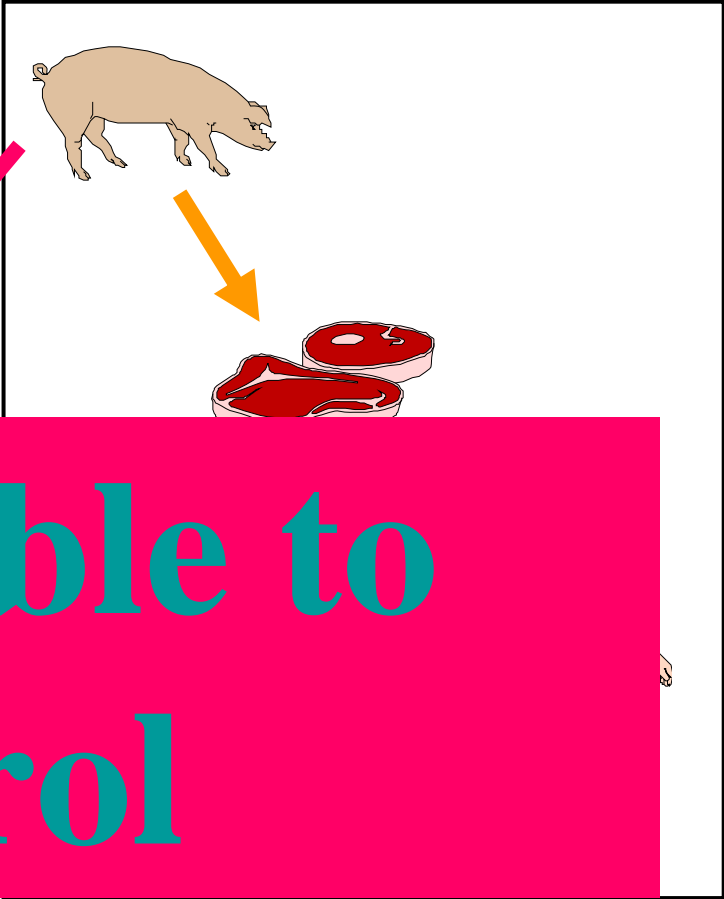




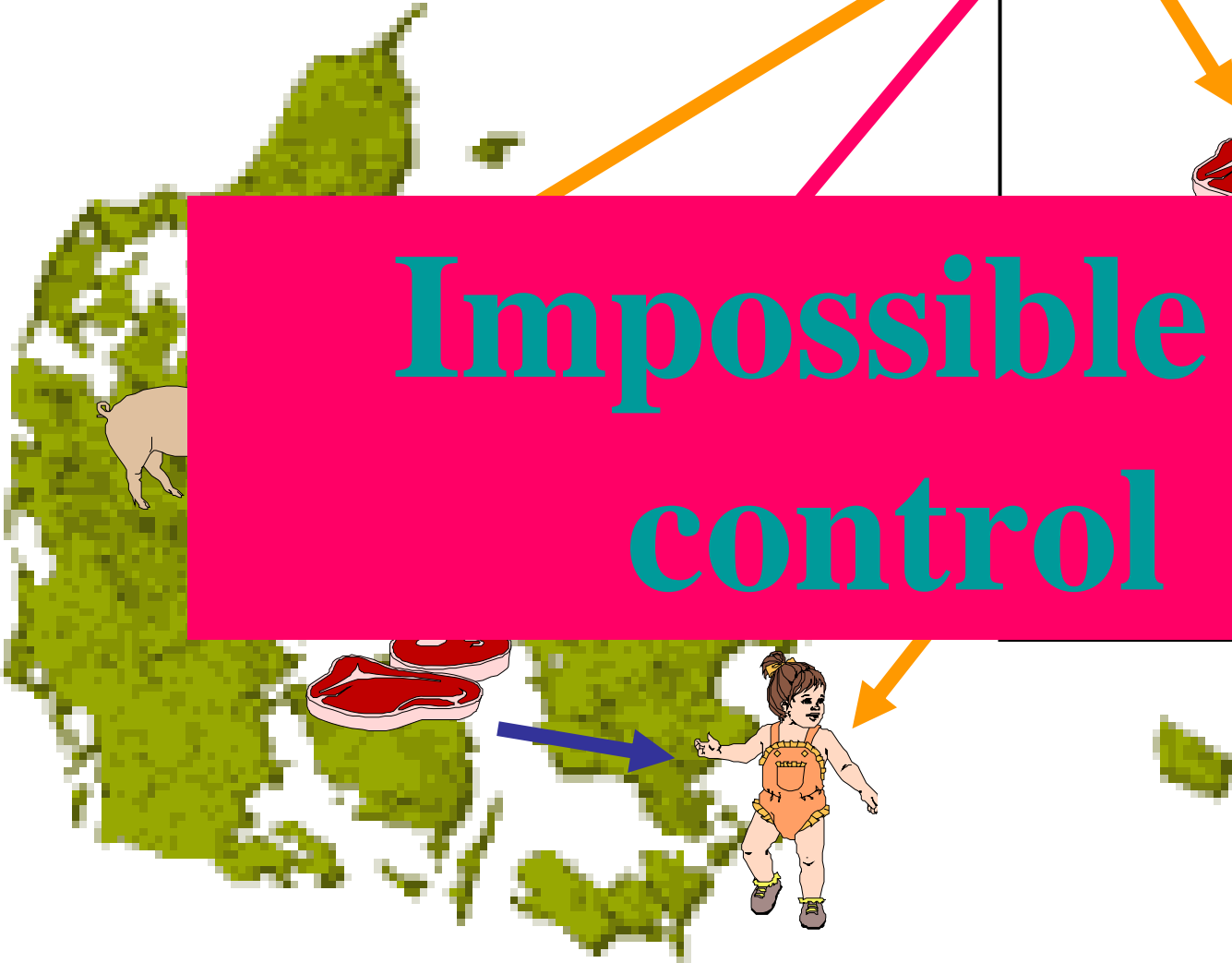
US beef and veal export and import



Other countries



Impossible to control



Globale trends

- Changed farms
 - Larger farms
 - Integreted farms
- New feeding regimes
- Increased international trade
 - Feed
 - Animals
 - Food
- Changed product-types
- New technologies
- "Ready-to-eat" and "out-of-house"
- Special products

Threats

- Increased spread of infections
- New bugs
- More dangerous bugs
- Reduced immunity
- Reduced treatment options
- Diseases spread more rapidly, increased population
- New diseases emerge
- Increased resistance and old diseases
- Older population
- Not any new wonder drugs

What should we do?

- Work globally
- Create networks
- Rapid detection and reporting
- Standardisation of procedures
- By open minded and not selfish

Tasks of a National Reference Laboratory, Antimicrobial Resistance

- The tasks of national reference laboratories ('Regulation (EC) No 882/2004 article 33') includes the following responsibilities:
- The NRL is expected to
 - Coordinate the activities for official laboratories in the member state, and to be available for reference purposes.
 - Ensure the quality of the susceptibility testing performed in all official food and veterinary laboratories in the member state. Especially for data submitted to the Community (eg. EFSA) where it is essential that data are obtained in a standardized way
 - To organize comparative tests for the official laboratories. As means of the responsibility of the NRL to ensure the quality of susceptibility testing in the member state it is expected that the NRL conducts proficiency tests
 - To ensure dissemination of information supplied by the CRL to the official laboratories in the member state
 - To provide scientific support to the member state's competent authority
- Also, it is expected that the NRL collaborates with the CRL, including
 - Taking part in the annually organised proficiency tests for susceptibility testing of *Campylobacter*, *Salmonella*, Enterococci, Staphylococci and *E.coli* arranged by the CRL
 - One annual participation in the workshop arranged by the CRL for the NRL's. At the workshop the participants take part in discussions on matters of relevance for harmonisation of susceptibility testing in the member countries and discuss plans to improve the results of the NRL's in the proficiency tests
- If necessary, taking part in individual meetings or training courses
- The tasks of the NRL's are not limited to the above mentioned (see 'Regulation (EC) No 882/2004 article 33' for a full description).