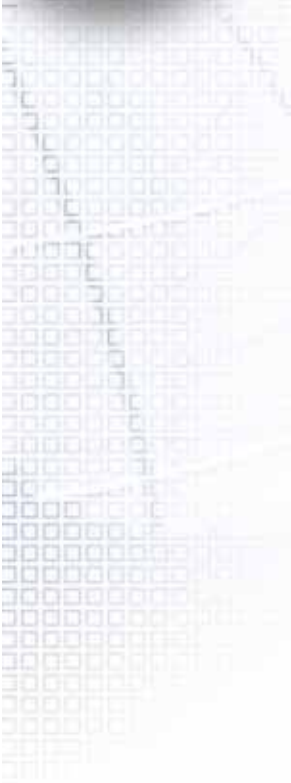




MRSA fra production animals



May. 3-4, 2007
National Food Institute,
Copenhagen, Denmark





Importance of MRSA infections

- Estimated 12-15,000 € per patient
- Increased mortality (approx. 2 times)
- Additional expenses for hygiene and control programmes.



MRSA – history in humans

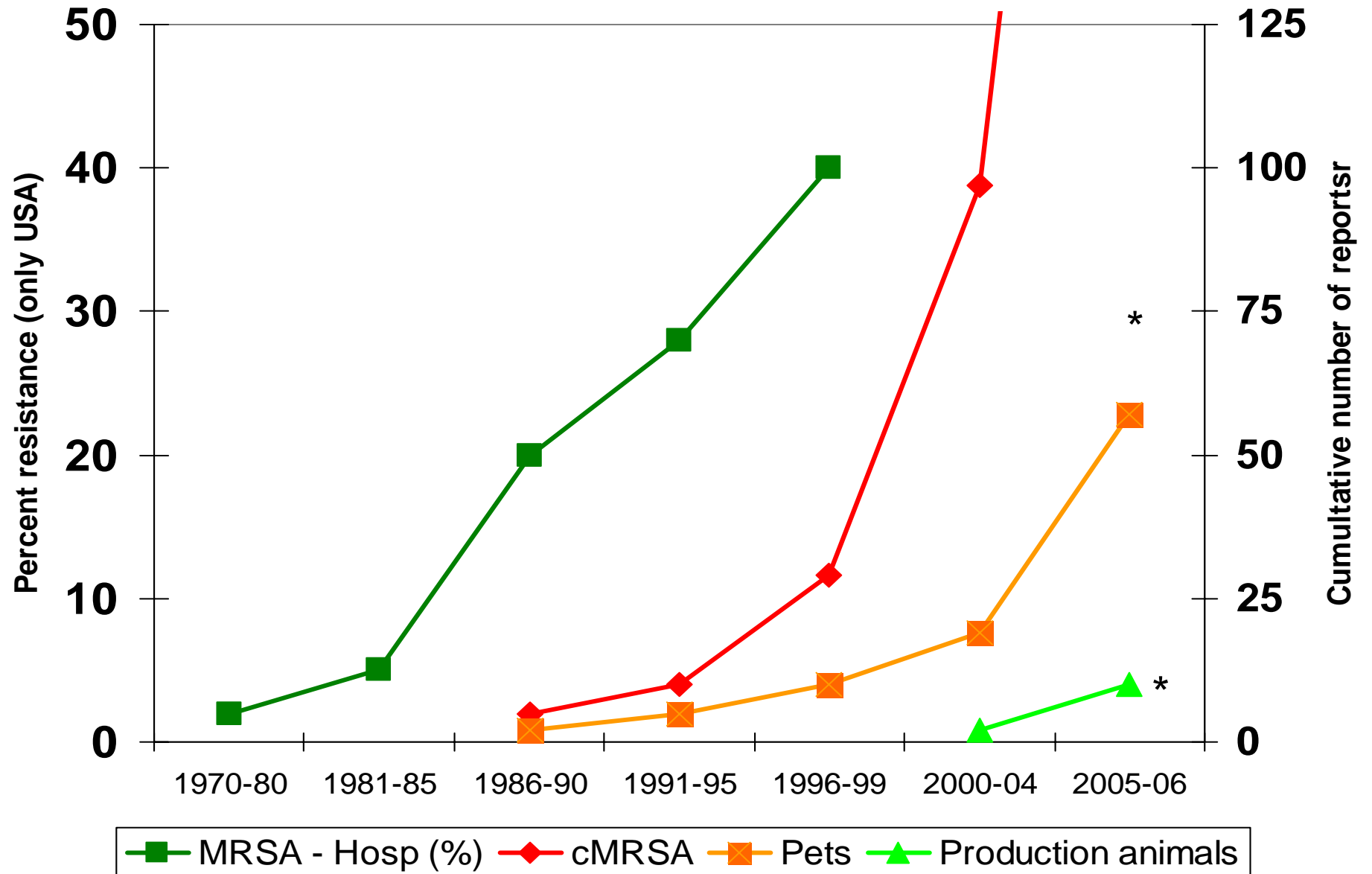
- 1961 in England
- 1970'ties spread in USA and other countries
- Multiple clones (5 lineages)
- 2000 c-MRSA in Australia and USA
- 2002 c-MRSA in Finland, France, Norway, Scotland, Germany, Denmark, etc.



MRSA - animals

- 1972 - Bovine mastitis
- 1986 - Dogs
- 1989 - Horses
- 2003 - Bovine mastitis in South Korea
- 2004 - Bovine mastitis in Hungary (ST398)
- 2005 - Pigs in The Netherlands
- 2006 – Increased number of reports

Emergence of MRSA





MRSA in The Netherlands

- October 2003 – MRSA from a case of mastitis in a mother. The family (husband, baby girl) was also found positive for MRSA. Six months later (July 2004) MRSA was again isolated from the girl prior to operation. The family who lived on a farm was still positive.
- Screening of pigs and farmers initiated in November 2005. af grise fra forældrenes besætning og andre besætninger for MRSA blev iværksat i Nov. 2004.
 - Six farmers found positive
- Feb. 2005 – MRSA from first pig(Voss et al. 2005)
- Screening for MRSA among pigs using selective enrichment reveals 39% positive pigs and 80% positive farms
- All isolates belong to the same sequence type ST398



MRSA

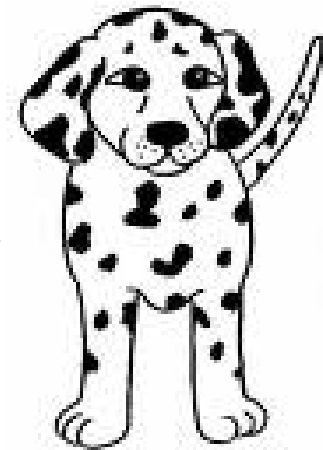
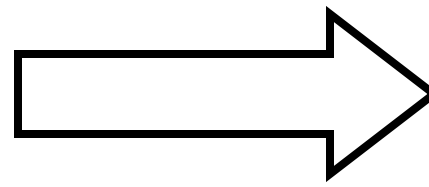
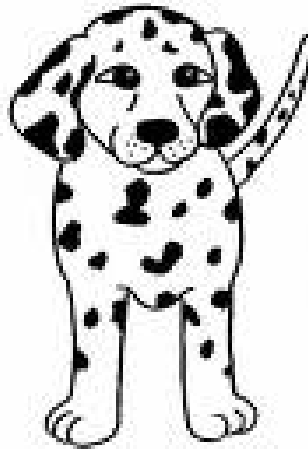
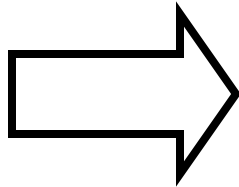
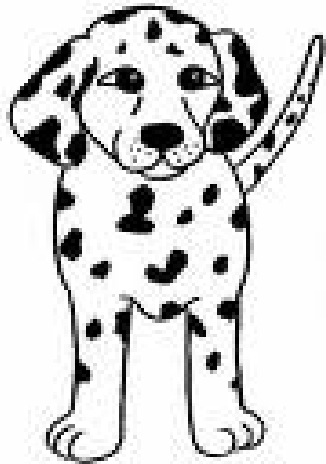
– production animals other countries

- MRSA ST398 found in Austria, Canada, Denmark, Finland, France, Germany, Hungary, Singapore
- MRSA ST398 found in humans, cattle, pigs, horses, dog

MRSA - pets



MRSA

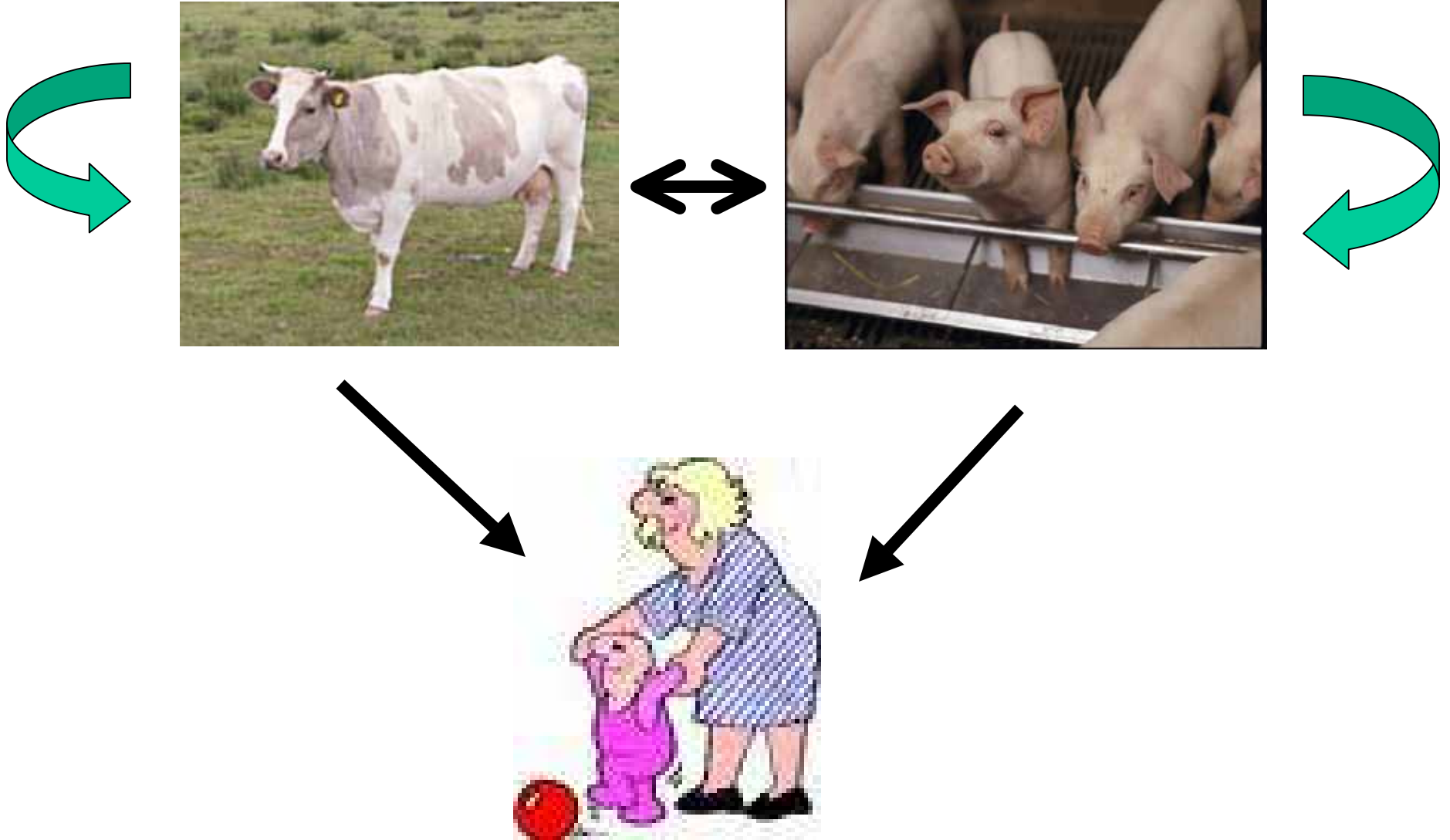


Dog with normal skin flora

Dog without Normal skin flora

Dog with MRSA

MRSA ST398





Risk management The Netherlands

- Letter to all GPs that people with contact to farm animals might carry MRSA
- Screening and isolation of pig farmers when in contact with health care system
- Screening of all cattle farmers



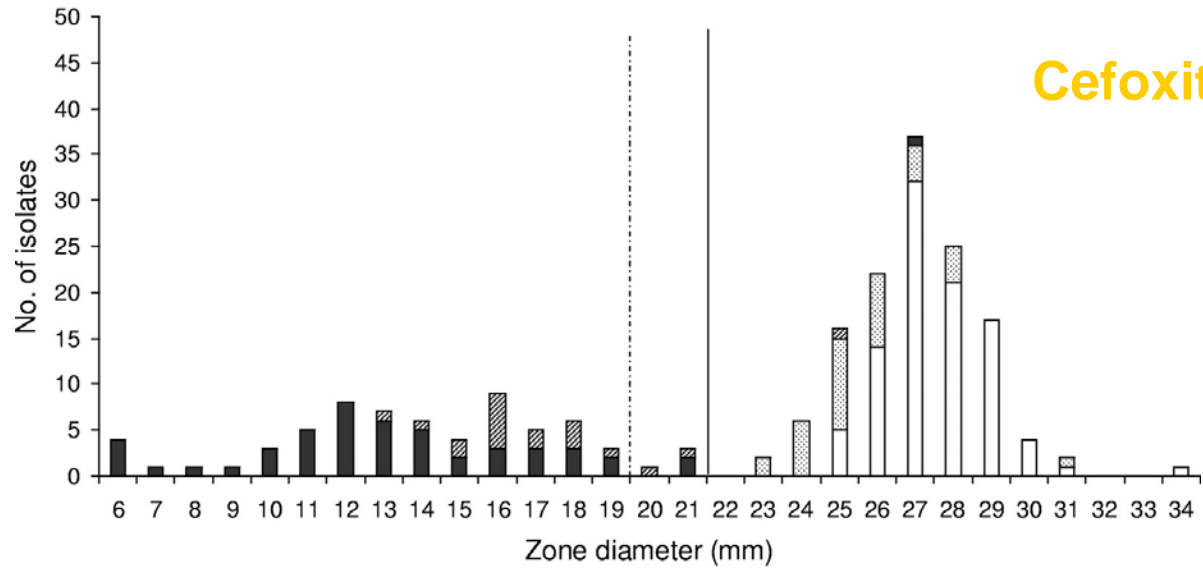
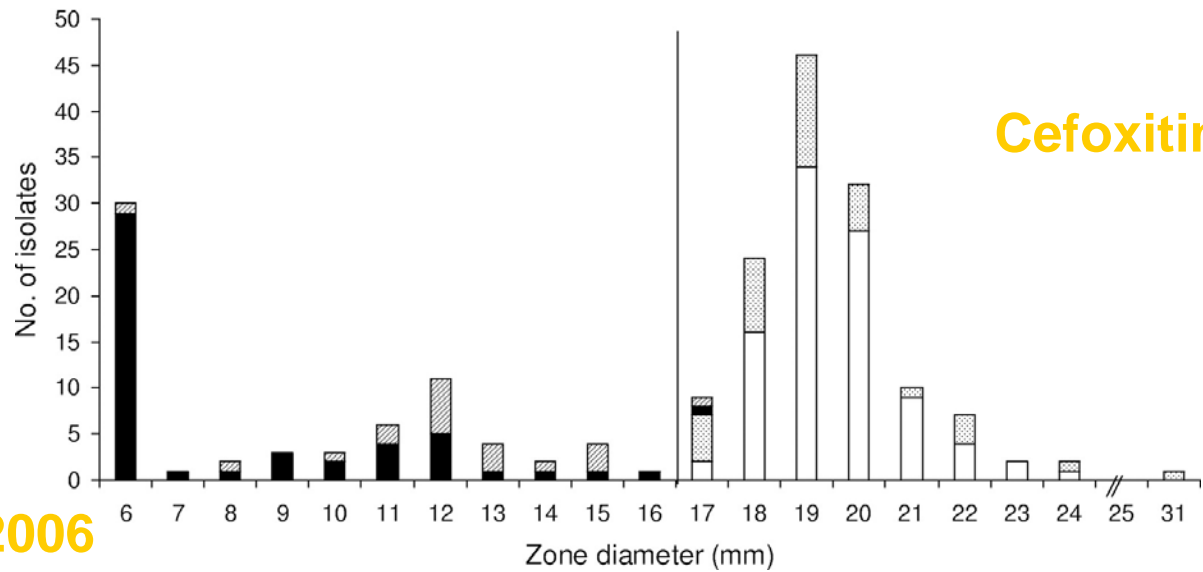
Isolation of MRSA

- Nostril swabs
- Use selective media and preferable enrichment
- CHROM-MRSA (BBL)



Detection of MRSA

- Phenotypically difficult
 - Cefoxitin testing recommended
- Detection of the *pbp2* using antibodies
- Detection of the *mecA* gene using PCR
 - preferred method

A**B**

Skov et al. 2006



Conclusions

- Emergence of MRSA among pet animals (most likely a results of broadspectrum antibiotic usage and spread of MRSA from humans)
- Emergence of MRSA ST398 among production animals
 - Zoonose which spread to and cause infections in humans
 - Importance still not quantified
- Please contact a reference laboratory if in need of advice