

PUBLIC HEALTH RISK ASSOCIATED TO RAW MEAT-BASED DIETS (RMBD) FOR CATS AND DOGS

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RAW MEAT BASED DIETS (RMBDS)

- Raw Meat Based contain raw muscle meat, organ meats, fat, cartilage and bones
- feeding RMBDs to companion animals has become increasingly popular (60%)
- the claimed health benefits attributed to the feeding of RMBDs are mostly anecdotal
- increased risk of exposure to zoonotic bacteria and parasites



THE DRIVERS

- Increased EU household dog population
 - an estimated 90 million European households (46%) own at least one pet animal (24% dog and at least 25% cat).
- Increased RMBD market
 - 10% of the pet food market in Finland, 5% in Germany, around 3% in the UK, and nearly 2% in the US
- growing raw-feeding practices in the UK



ZOONOTIC BACTERIA, AMR AND PARASITES IN RMBD

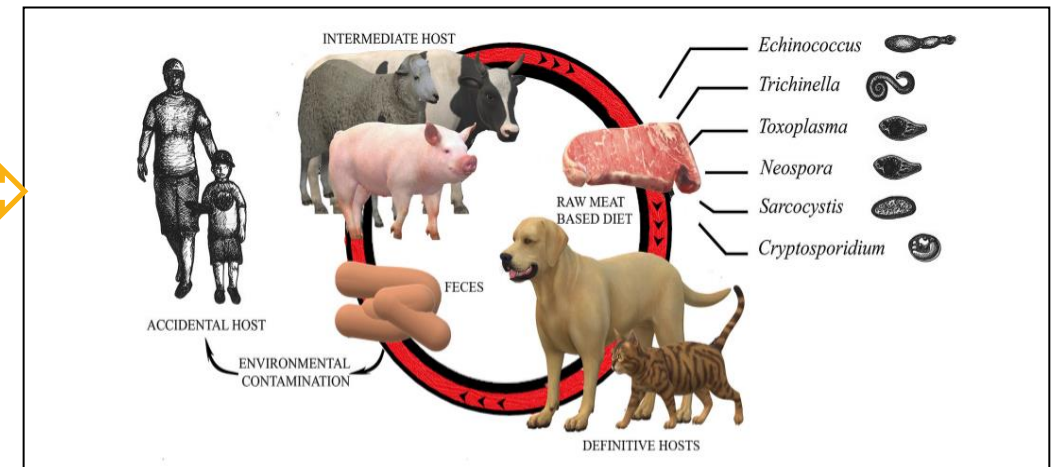
- There are potential zoonotic pathogens associated to RMBD and the exposure to them is multifaceted

Bacteria

- *E. coli* (serotype O157:H7)
- ***Salmonella* (5-80%)**
- *Clostridium*
- *Listeria monocytogenes*
- *Campylobacter*
- *Brucella suis*

Parasites

- *Echinococcus*
- *Trichinella*
- *Sarcocystis*
- *T. gondii*



Potential magnification of parasitic burden in case of consumption of contaminated RMBD by domestic cats and dogs

ONE HEALTH principle

- Healthy dogs and cats fed with raw meat may shed pathogenic bacteria in their faeces at higher rates than animals fed conventional diets
- RMBD may represent a route of exposure to the increased risk of environmental load of parasites



ZOONOTIC BACTERIA, AMR AND PARASITES IN RMBD

- The Netherlands (2018): 35 commercial frozen RMBDs from eight different brands (Freek P J van Bree et al..2018)
 - 80% Extended-spectrum beta-lactamases-producing E coli
 - 23% Escherichia coli serotype O157:H7 (pet asymptomatic carriers)
- Italy: pork and chicken material available for pet food manufacture yielded Salmonella from 12% of samples (Bacci et al. 2019).
- Brasil (2020): dogs given RMBD were almost 30 times more likely to have Salmonella than dogs on a conventional diet
 - majority of Salmonella were resistant to one to seven different classes of antimicrobial



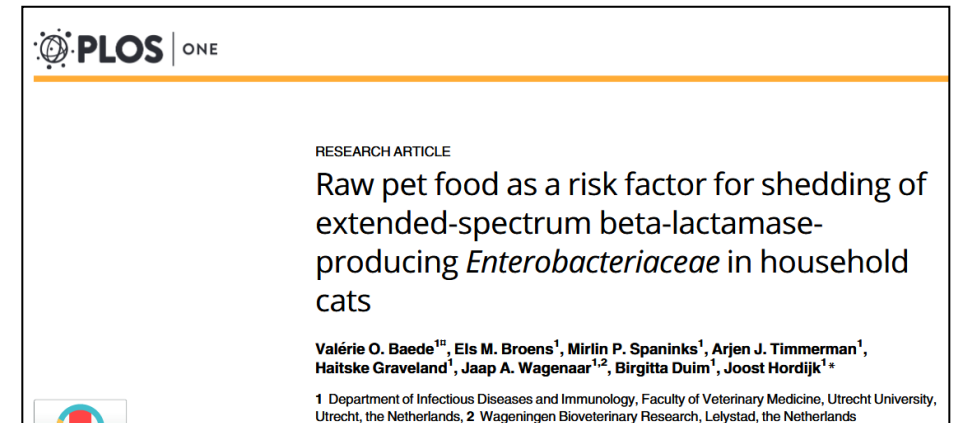
ZOONOTIC BACTERIA AND AMR IN RMBD

- UK is facing an alarming increase in the presence of Salmonella in RMBD.
- most common serovars reported: S. Indiana, S. Infantis, S. Typhimurium, S. Derby, Salmonella 4,12:i.
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- presence of multi-drug-resistant strains, including those resistant to CIAs, in dogs, cats, and raw pet food.
- same strains of Salmonella isolated in pet food and animal feed caused the doubling of human cases compared to 2021 (UK Health Security Agency)



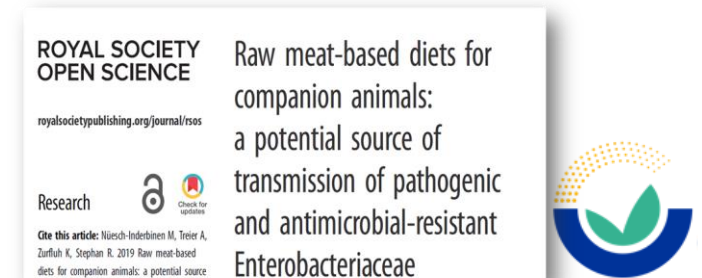
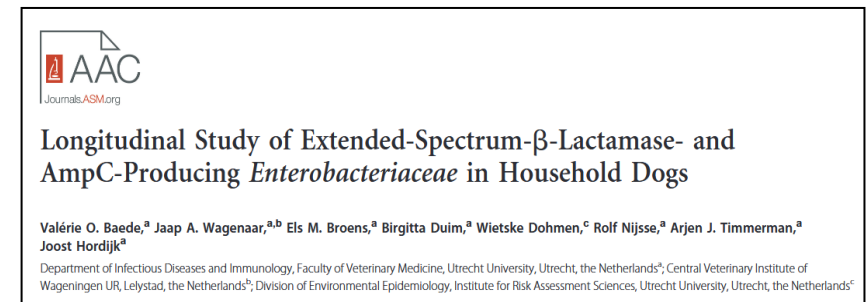
ZOONOTIC BACTERIA AND AMR IN RMBD

- The Netherlands (2021): raw feed a risk factor for household cats to shed ESBL-producing *Enterobacteriaceae*
- significant association was found between ESBL shedding and feeding raw pet food products (OR=31.5)



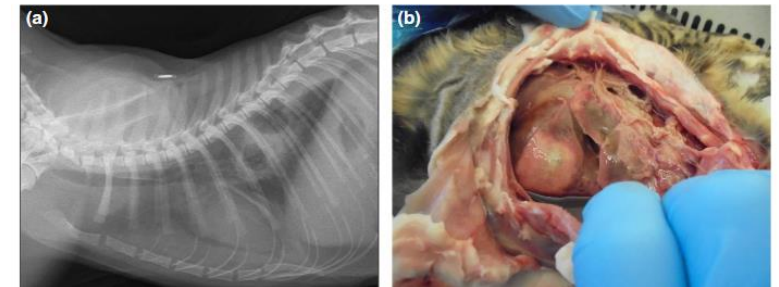
ZOONOTIC BACTERIA AND AMR IN RMBD

- Sweden: 23% of the tested RMBD samples found positive for extended-spectrum cephalosporins-producing E coli
- The Netherlands: shedding of ESBL-producing enterobacteriaceae was more likely in dogs that ate raw meat
- Switzerland: 62.7% of the presented ESBLs bacteria resistant to 3d generation cephalosporins, colistin and aminoglycoside, including CTX-M-1, which is widespread in livestock.
- **pet considered to be a risk factor for infection with ESBL-producing bacteria in human beings**



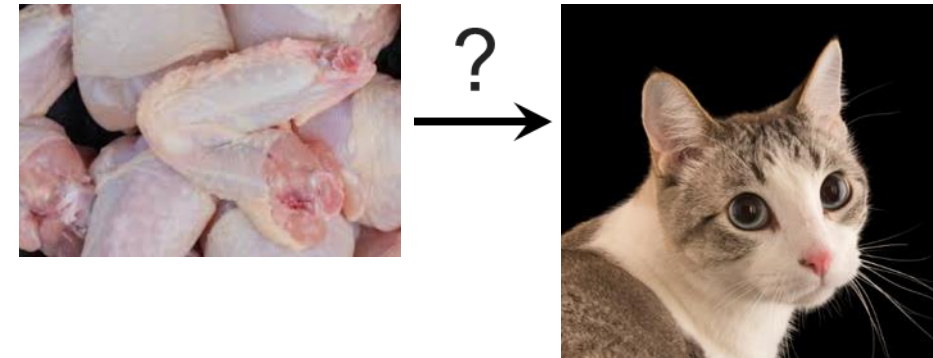
ZOONOTIC BACTERIA IN RMBD

- UK (2020): outbreak of **feline tuberculosis** in England and Scotland was possibly linked to BARF feeding and across areas at low risk of endemic bovine tuberculosis. (O' Halloran et al. 2022 *Transbound Emerg Dis*)
- 47 cats presented clinical tuberculosis
- **M. bovis** genotype 10 infection was suspected or definitively diagnosed (**n = 5**)
- clusters were distributed across areas at low risk of endemic bovine tuberculosis
- cats all consumed the same specific brand of commercial raw venison pet food



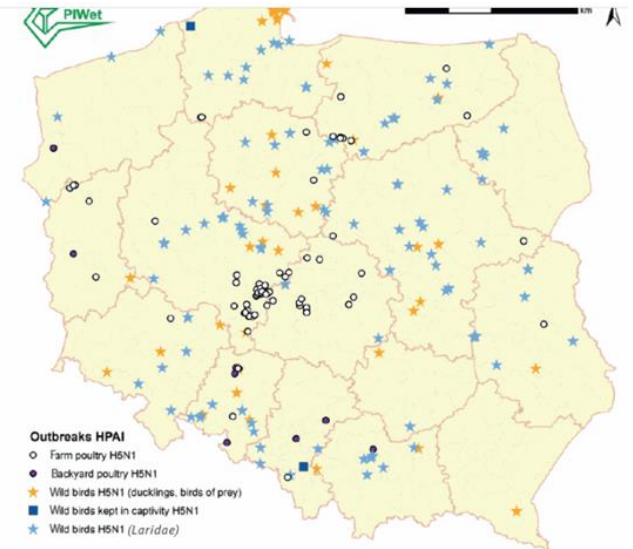
RBDM VIROLOGIC RISK

- Poland: recent outbreak of **HPAI H5N1** virus detected in 25 cats from different regions of Poland (Domanska-Bacharz K. et.al. Eurosurveillance, 2023)
- isolated viruses were very similar to each other, indicating a common source of infection (sources has not yet been identified).
- 12 out 25 cats had fresh, raw poultry meat in their diet, and 2 were fed BARF diet.
- the infection was fatal and cats showed acute respiratory and neurological signs



RBDM VIROLOGIC RISK

- isolated virus genotypes previously circulated in wild birds and poultry in Poland
- two mutations in the PB2 protein, K526R and E627K that may increase adaptation to mammals
- there are no reports of humans being infected with this virus but such a risk exists especially for cat owners.



A(H5N1):
PB2-E627K mutation



RMBDS – HUMAN OUTBREAKS?

- human clinical disease associated with exposure to pet and RMBD occur as sporadic and isolated cases rather than in outbreaks
 - US, 2019: 4 human cases of an outbreak of Salmonella Reading were linked to raw turkey pet food
 - PHA Canada, 2023: Salmonella drug-resistant strain 4,[5],12:i:-. infections in people (=40) traced to raw pet food and possibly contact with cattle.
- human illnesses are probably under-reported (mostly attributed to foodborne outbreak)



THE RMBDS IS AN EMERGING PUBLIC HEALTH RISK?

- **Risk assessment**

- microbiological monitoring of RMBD for bacterial pathogens and AMR bacteria (info from EU limited)
- targeted and systematic monitoring of households to understand the extent of the human exposure and to quantify the human health hazards of raw feeding

- **Risk mitigation**

- to revise regulation and handling instructions : RMBDs often contain ABP that are not subjected to strict microbiological hygiene criteria set by regulations 1069/2009 and 142/2011 as products intended for human consumption (fit but not intended for human consumption,)
- critical nature of veterinary meat inspection to maintain safety of raw pet food for human and animals
- to promote awareness and education campaigns on safe handling RMBDs to avoid animal and human health risk



CONCLUSION

- PH risks data of raw feeding are increasingly forming a compelling body of formal scientific evidence
- concerns about the transmission of pathogens from RMBD to pets and humans with potential spillover to livestock
- veterinary and public health practitioners and organizations must encourage awareness of pet owners of the possible risk associated with feeding RMBDs to pet (personal hygiene and proper handling)
- to regulate RMBD we need One Health approach (animal, human and environment) OH is relevant for mitigating and tackling bacterial and parasitic infections and safeguarding human health and safe feeding of pets.

