



CA18105

ESBL *E. coli* in pigs

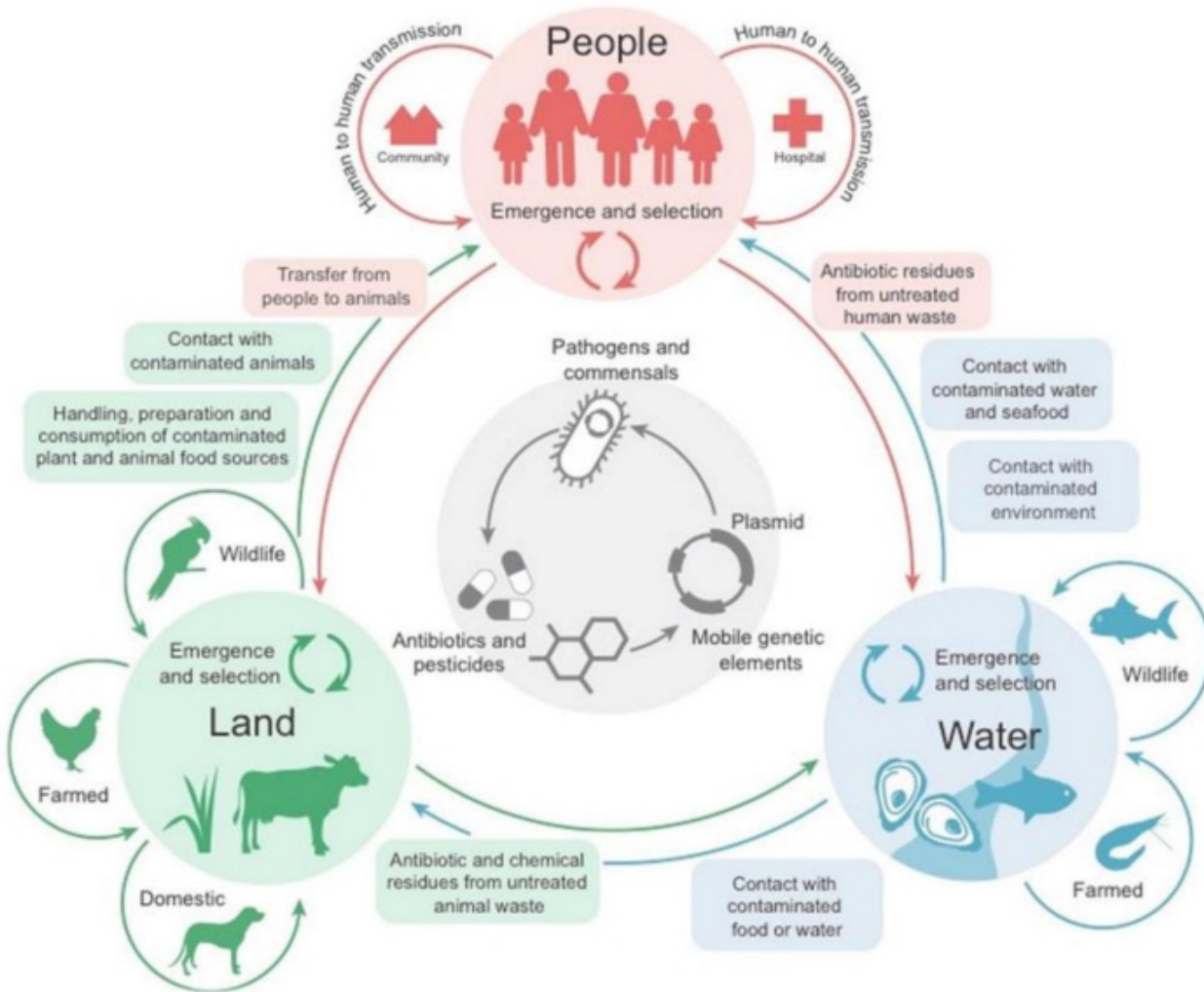
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Hazard overview: ESBL *E. coli*

- Public health issue
- AMR One Health Challenge
- ESBLs = plasmid encoded enzymes
- transferable resistance against beta-lactam antibiotics incl. 2nd/3rd/4th generation cephalosporins
- Frequently found in Enterobacteriaceae, mainly in *E. coli*
- Varying prevalence depending on
 animal species/countries/production stage
- Role of food chain in human cases is still unknown



One Health perspective



Urgent need to reduce reservoirs to avoid transfer of genes to (non-foodborne) pathogens

Various risk factors:

- Farm
- Post-Harvest
- Food handling

What to do to reduce the public health risk ?

- **Main goals: Reduction of**

- occurrence
- emergence
- spread

of ESBL producing bacteria

Possible control options:

1. Selection of resistant bacteria/antimicrobial determinants due to usage of antimicrobials
2. Dissemination occurs within the gut of animals, by cross-contamination with faecal material between animals

Highly contributing risk factors at farm level

1	Farm type
	farrow-to-finishing herds
	finishing herds
	All-In-All-Out
	farm located in highly urbanized areas
2	Livestock housing and facilities
	solid floor
	slatted floor
	access to slurry and manure
	indoor holding with possibility to have access to outdoor
	permanent outdoor holding (free-range farm)
	straw bedding
	field rotation for outdoor holdings
3	Livestock feed and water
	heat treatment of feed
	commercial feed
	use of municipality water for drinking the animals
	microbiological safe water
	protein elements of the diet only obtained from vegetables
	sanitation system for lorries entering the farm
4	Pest control
	pest control system in place
	bird control
	contact with other animals than birds (wildlife)
	access of other animals to the stable (pets, e.g. cats)

5	Livestock sourcing
	high number of pig suppliers
	purchase of Escherichia coli ESBL negative pig (30kg)
	purchase of Salmonella negative pig (30kg)
	purchase of Yersinia negative pig (30kg)
	purchase of Toxoplasma negative pig (30kg)
	positive Salmonella serological status before slaughter (indirect test)
	positive E. coli ESBL before slaughter (direct test, e.g. PCR, culture)
	positive Yersinia serological status before slaughter (indirect test)
	positive Toxoplasma serological status before slaughter (indirect test)
	positive HEV serological status during fattening (indirect test)
	positive Salmonella test results during fattening (direct test, e.g. PCR, culture)
	positive Yersinia test results during fattening (direct test, e.g. PCR, culture)
	positive Toxoplasma test results during fattening (direct test, e.g. PCR, culture)
	positive HEV test results during fattening (direct test, e.g. PCR, culture)
6	Livestock health
	Salmonella vaccination
	deworming of sows
	deworming of finishers
	farm is equipped with suitable facilities to isolate sick or injured pigs
7	Medicines
	antibiotic group treatments
	medicines for treatment used only when necessary and prescribed by a Vet
	use of third generation cephalosporins or B-lactams in the last cycle
8	Management, Quality control
	written procedure for cleaning and disinfection
	controlled access to the stable
	provision of clothing and footwear to visitors
	certified "Antibiotic-Free" Farm
	certified "Global Gap" farm
	certified "Organic" farm
	Overall risk categorization of farm
	High importance
	Medium importance
	Low importance

Highly contributing risk factors

- **Positive *E. coli* ESBL before slaughter**
- **Antibiotic group treatments**
- **Use of third generation cephalosporines and B-lactams** in the last cycle
- Medicines for treatment used only when necessary and prescribed by a vet
- Finishing herds
- All-in all-out
- Access to slurry and manure
- **Purchase of *E. coli* ESBL negative pigs**
- Certified “Antibiotic-Free” farm

Categorisation of 4 farms

- 4 farms categorised by applying farm categorisation template
- Systematic approach of categorisation correlated with 'gut feeling'

Farm Number	Risk categorisation
A	Low risk
B	High risk
C	Medium risk
D	Medium-high risk



Risk factors at abattoir level

- Preselection of herds before slaughter
- Logistic slaughter
- Good Hygiene Practices
- HACCP
- Carcass interventions at slaughter
- Microbiological testing & follow-up
- Inform & follow-up with farms



Risk categorisation abattoirs

Abattoir number	FSMS performance score	Risk-based
1	13,88 (69,4%) – high	2,08 (low)
2	4,96 (24,8%) – low	80,6 (high)
3	8,89 (44,5%) – medium	58,3 (medium)

Which farms to where?

- First gut feeling as a consumer: low risk farm to low risk abattoir
- BUT how do you manage the risk? Where do you send the high risk animals?
- Do you want to introduce the risk to a low risk abattoir?
- As risk manager (governmental perspective): **send high risk animals to low risk abattoir**
 - You have to give economical incentives to low risk abattoir for processing high risk animals: e.g. cheaper price for these animals (for the abattoir) or visible labels for consumers (quality label of abattoir)
 - Look at the intention of the meat in the abattoir: do they produce meat for raw consumption?

Sum up

- There is no simple solution/clear answer (no wright/wrong)
- The perspective matters
 - The Policymaker
 - The Competent Authority (CA)
 - The Food Business Operator (FBO)
 - The Quality Manager of a company
 - The Consumer
- Rarely any legal basis but decisions mainly economically driven
- Due to the complexity of the problem:
- Consideration of several (other) aspects needed (amongst food safety):
 - Animal welfare
 - Increasing consumer awareness
 - .../



Important points of action

- Reduce AMU on farm level: specifically cephalosporins
- Improving hygiene level on abattoir level