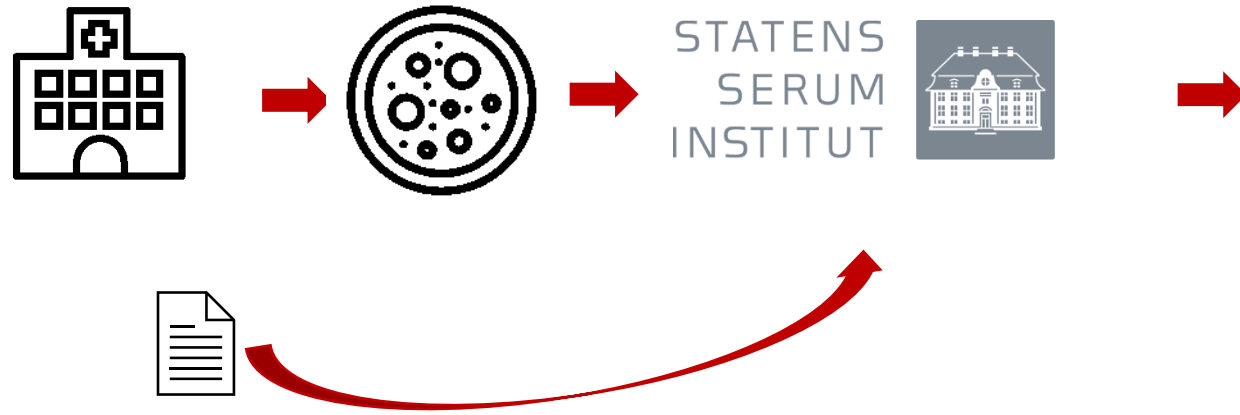


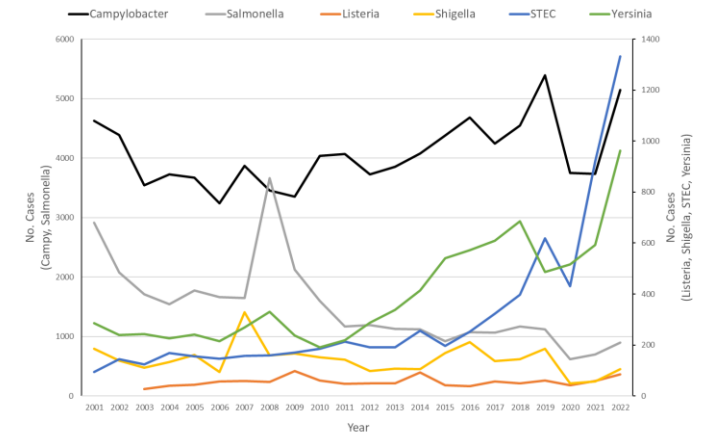
Experience on cross-sector collaboration, Denmark

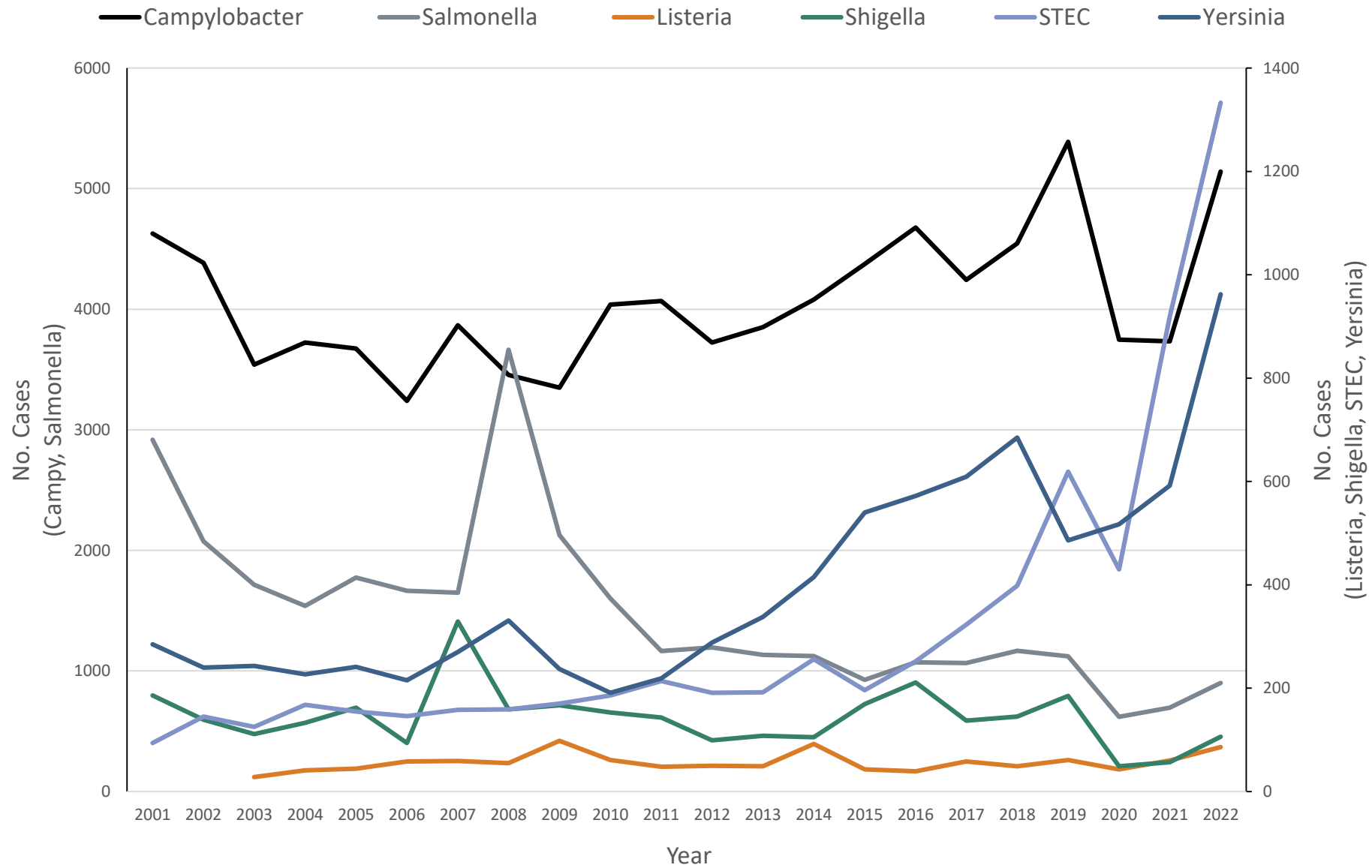
Susanne Schjørring, Public Health Microbiologist, Statens Serum Institut, Denmark

Surveillance of foodborne pathogens

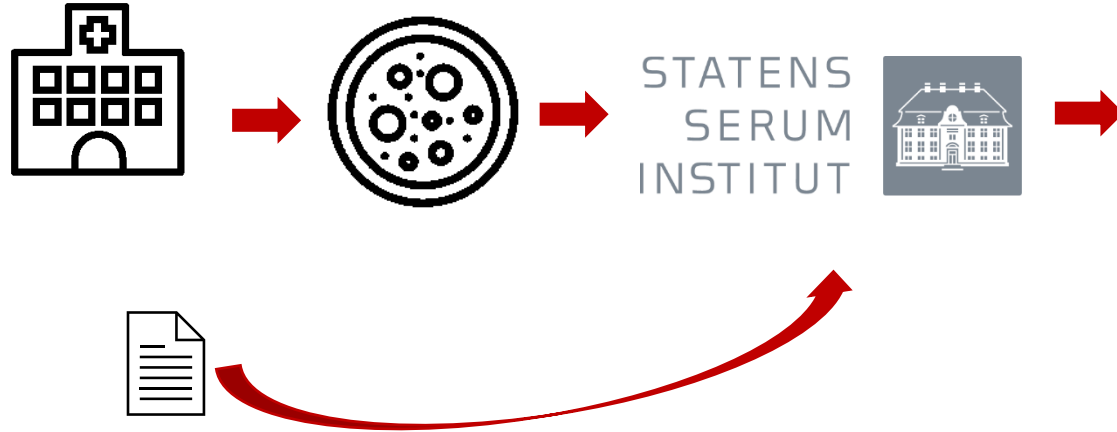


Case-based surveillance / Isolate surveillance

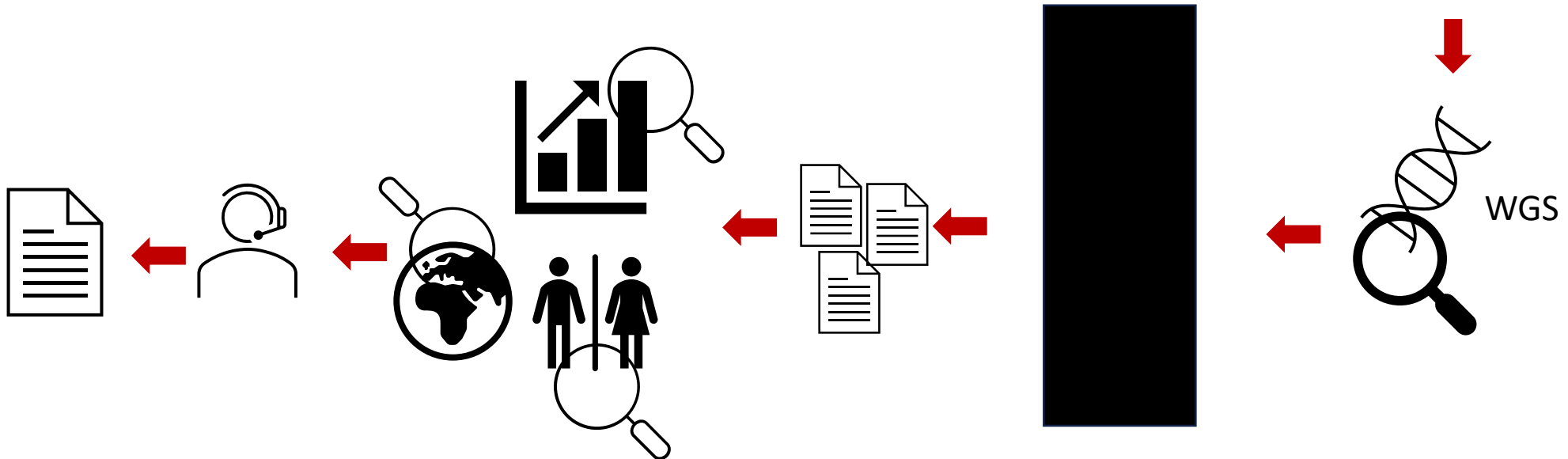
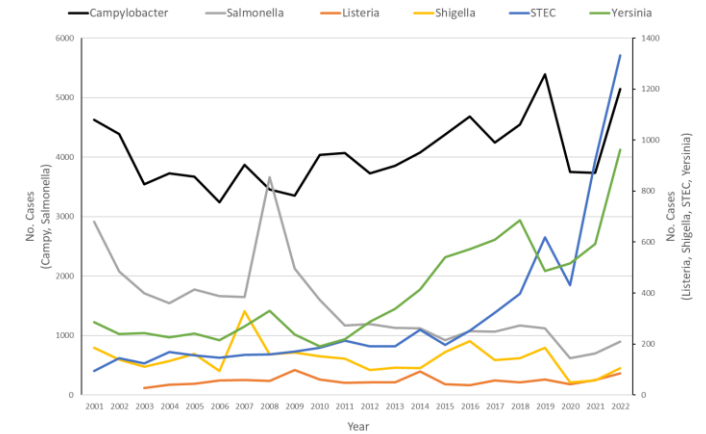




Surveillance of foodborne pathogens



Case-based surveillance / Isolate surveillance



Epidemiologist and Microbiologist at SSI

Weekly physical meetings

- Every cluster/outbreak signal is discussed in detail

Public Health Sector

- Local laboratories at the hospitals (Diagnostics)
- Statens Serum Insitut (National surveillance)
- Danish Patient Safety Authority (STPS)
- Danish Health Authority (SST)
- Danish Medicines Agency (LMST)

The Centrale Outbreak Group (DCUG)

Statens Serum Institut (SSI)

- Microbiologist
- Epidemiologist

Danish Veterinary and Food Administration (DVFA)

- Liaison officer
- Preparedness group
- Zoonosis group
- Microbiologist

National Food Institut (DTU food)

- Epidemiologist
- Secretary

Steering group with representative from all three institutions and Danish Patient Safety Authority (STPS)



DCUG purpose

- Coordinate the investigation
- Stop outbreaks – reduce number of cases
- Prevent new outbreaks
- Enhance information flow about food safety
- Improve surveillance
- Enhance the public belief in the public health sector/food sector
- National collaboration
- Outbreak investigation manual (in Danish)



DCUG meetings

Weekly meetings

- Fixed agenda and summary
- Every outbreak is discussed in detail

Descriptive epidemiology

- Time, place and gender, etc.
- Interview data
- shopping receipt

Control visits

Microbiology

- Use WGS to identify cluster/outbreaks
- Comparison of sequences of isolates from human and food/environmental samples (by use of WGS – cgMLST and SNP)

Traceback of food items



Standing together

”One unit”

- Despite the different areas of expertise
- Despite different Authorities

Coordinated press releases related to the outbreak

- Often identical

During interviews

- DVFA staff can talk about the human cases
- SSI staff can talk about the source identified

"2." DCUG -> KOZO

Myndighedsarbejdet til koordinering af Zoonoser

~ The authority's work for the coordination of zoonoses

- All other zoonoses beside the Foodborne

SOFI

national sequence based Surveillance Of Foodborne Infections

- Joint real time sequence based surveillance
- Owned by SSI and DVFA, DTU is collaborative partner
- Legal issues needed to be resolved (GDPR) (Cooperation agreement, Data processor agreement, Shared data responsibility)

Status:

- Automated import of sequences
- Meta-data is imported automatically
- Quality check (Bifrost)
- Analysis (Species, subspecies, ST, serotype)
- Approved results is transferred back to the “owners” systems
- Next phase:
 - Resistance (ResFinder)
 - Comparisons (cgMLST, ChewBBACA, “nearest neighbor” selection / SNP, CSI Phylogeny)
 - Visualization tool (Microreact)

Front-end SOFI (meta data - human)

SOFI

Analysis results

My approval history

Manual upload



Metadata filter

Date_sample
From To

Institution
Select...

Project_title Project_no
Select... Select...

Date_received
From To

Animal
Select...

Run_ID Isolate_ID
Select... Select...

CPR_no.
Select...

FUD_no. Cluster_ID
Select... Select...

Analysis filter

QC_provided_species
Select...

Serotype_final
Select...

ST_final
Select...

Sequence_ID: 1912T00182_N_WGS_1007_SSI OR 1911W00146_N_WGS_1007_SSI OR 1912F00428_N_WGS_1007_SSI

Select Approve Reject

Sequence_ID	Run_ID	Institution	Date_sample	Primary_isolate	CPR_no.	M/F	Name	Age	Travel	Travel_origin	KMA	KMA_region	Date_received	Date_received_KM.
<input checked="" type="checkbox"/> 1912T00182_N_WGS_1007_SSI	N_WGS_1007	SSI	2019-12-26	true		K	Christensen, Freja	70	Nej	DANMARK	KMA Vejle	SYDDANMARK	2019-12-31	2019-12-27
<input type="checkbox"/> 1912F00428_N_WGS_1007_SSI	N_WGS_1007	SSI	2019-12-13	true		K	Pedersen, Anna	88	Ja	SPANIEN	KMA HEH/HVH/HIL	HOVEDSTADEN	2019-12-18	2019-12-14
<input type="checkbox"/> 1911W00146_N_WGS_1007_SSI	N_WGS_1007	SSI	2019-11-20			K	Johansen, Alma	86	Ukendt	+ UOPLYST	KMA Rigshospitalet	HOVEDSTADEN	2019-11-25	2019-11-21

Date_sample	Primary_isolate	CPR_no.	M/F	Name	Age	Travel	Travel_origin	KMA	KMA_region	Date_received	Date_received_KM.
2019-12-26	true		K	Christensen, Freja	70	Nej	DANMARK	KMA Vejle	SYDDANMARK	2019-12-31	2019-12-27
2019-12-13	true		K	Pedersen, Anna	88	Ja	SPANIEN	KMA HEH/HVH/HIL	HOVEDSTADEN	2019-12-18	2019-12-14
2019-11-20			K	Johansen, Alma	86	Ukendt	+ UOPLYST	KMA Rigshospitalet	HOVEDSTADEN	2019-11-25	2019-11-21

Front-end SOFI (meta data - DVFA)

Sequence_ID	Run_ID	Institution	Date_sample	Project_no	Product_type	Product	Origin	Animal	Info_sample
<input type="checkbox"/> 1911S00249_N_WGS_1007_SSI	N_WGS_1007	SSI	2019-11-23	1					

+
CHR (Crew)
Aut no. (Number of authorized companies)

Front-end SOFI (QC data)

Sequence_ID	QC_final	qc_action	QC_failed_tests	QC_provided_species	QC_DB_ID	QC_genome1x	QC_genome10x	QC_Gsize_diff1x10	QC_avg_coverage	QC_ambiguous_sit	QC_num_reads	QC_main_sp_plus	QC_unclassified_re	QC_u
<input type="checkbox"/> 1912T00182_N_WGS_1007_SSI	A	OK		Salmonella enterica	Salmonella enterica	4801964	4801964	0	80.18386622640236	436	0	0.98911357097266570.058910014453914453		
<input type="checkbox"/> 1912F00428_N_WGS_1007_SSI		supplying lab	Atypical genome size (x1): d	Campylobacter jejuni	Campylobacter jejuni							0.99619161355206160.0238644902492071		
<input type="checkbox"/> 1911W00146_N_WGS_1007_SSI	A	OK		Campylobacter jejuni	Campylobacter jejuni	1713048	1713048	0	572.1356255049479	199	0	0.988238382206337 0.023964794935577257		
<input type="checkbox"/> 2009T00235_N_WGS_1002_SSI	A	OK		Salmonella enterica	Salmonella enterica	4773969	4773969	0	50.78009367048676	5055	0	0.99755813067506640.054785415413646546		

Front-end SOFI (ST ..)

Sequence_ID	ST	<input type="checkbox"/> ST_final	ST_alleles	Species_final	Subspecies	Sero_enterobase	Sero_seqSero	<input type="checkbox"/> Serotype_final	sero_antigen_seqs	Sero_D-tartrate
<input type="checkbox"/> 1911S00249_N_WGS_1007_SSI	16	<input type="checkbox"/> 16	aroC: 6, dnaN: 7, hemD: 10, hisD: 10, purE: 8, sucA: 10, thrA: 14	Salmonella enterica	enterica	Virchow	Virchow	<input type="checkbox"/> Virchow	7:r:1,2	CCCCCCCCCCCCCCCC

And the work continues Next phase (Res & Comparison/ Visualization)

Annual report on Zoonoses in Denmark

DVFA, SSI and DTU



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<https://www.food.dtu.dk/english/publications/disease-causing-microorganisms/zoonosis-annual-reports>

DANMAP (Danish Integrated Antimicrobial Resistance Monitoring and Research Programme)

Use of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from food animals, food and humans in Denmark (DVFA, SSI and DTU)

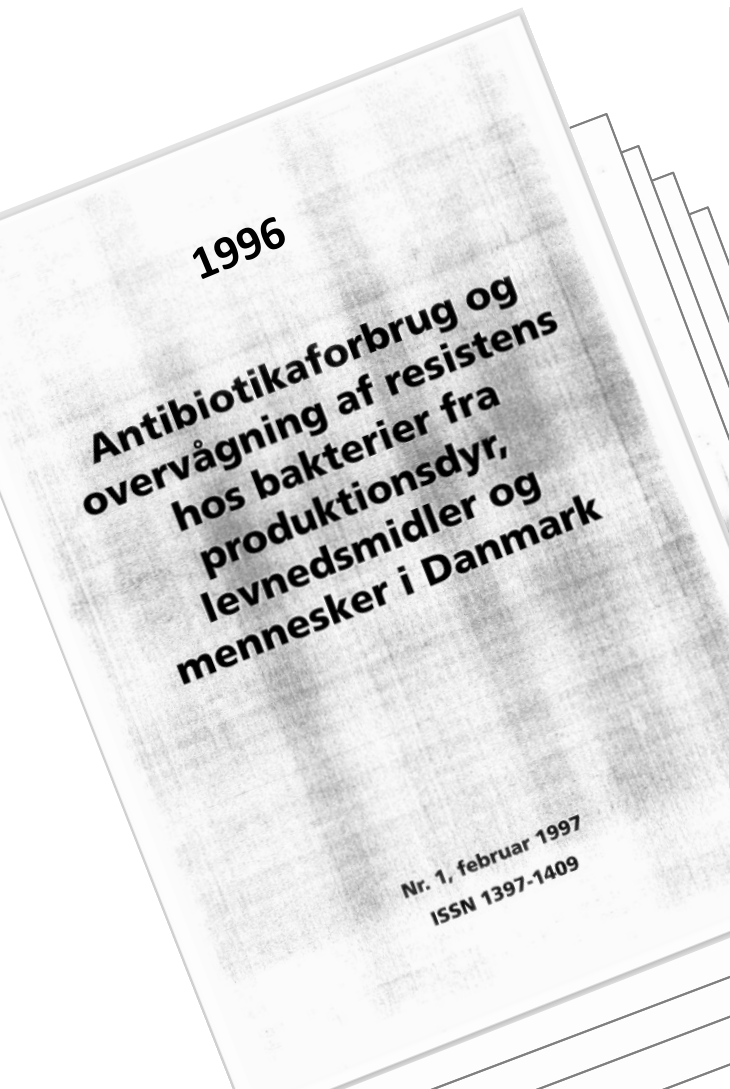


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Thank you

Questions?