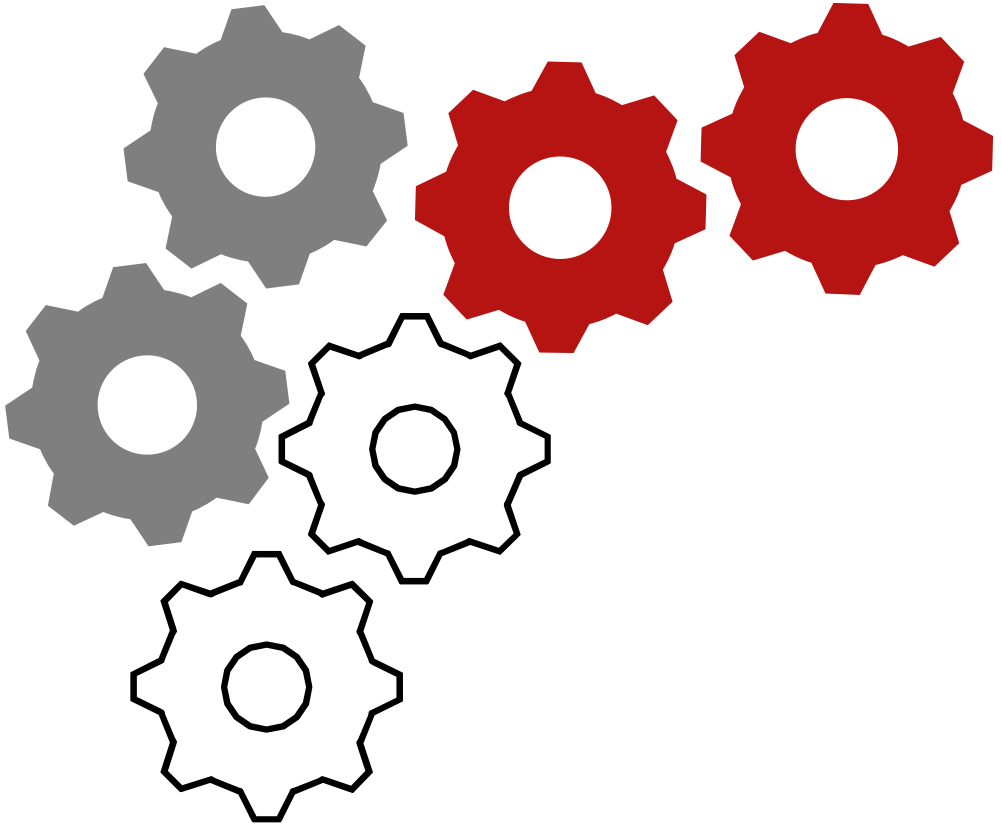
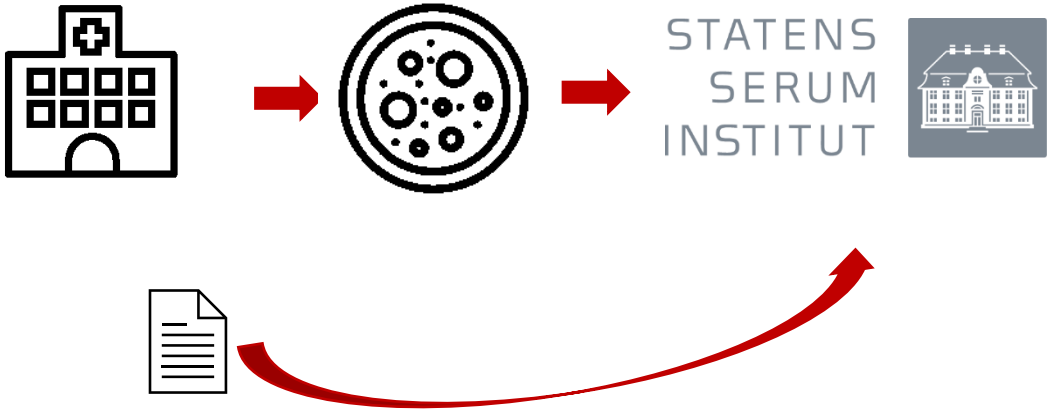
STATENS SERUM INSTITUT



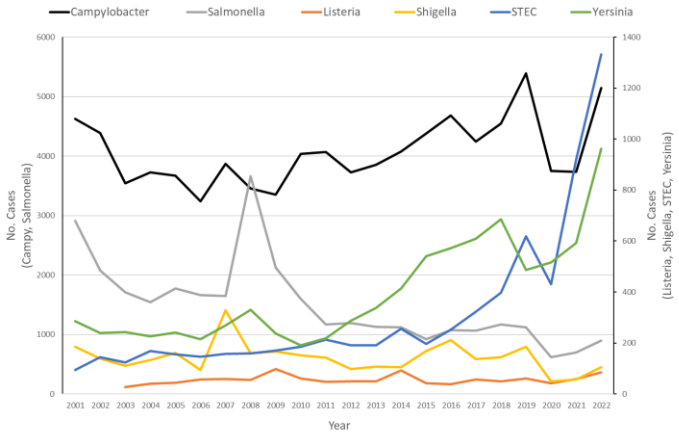
# Experience on cross-sector collaboration, Denmark

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

# Surveillance of foodborne pathogens




Case-based surveillance / Isolate surveillance



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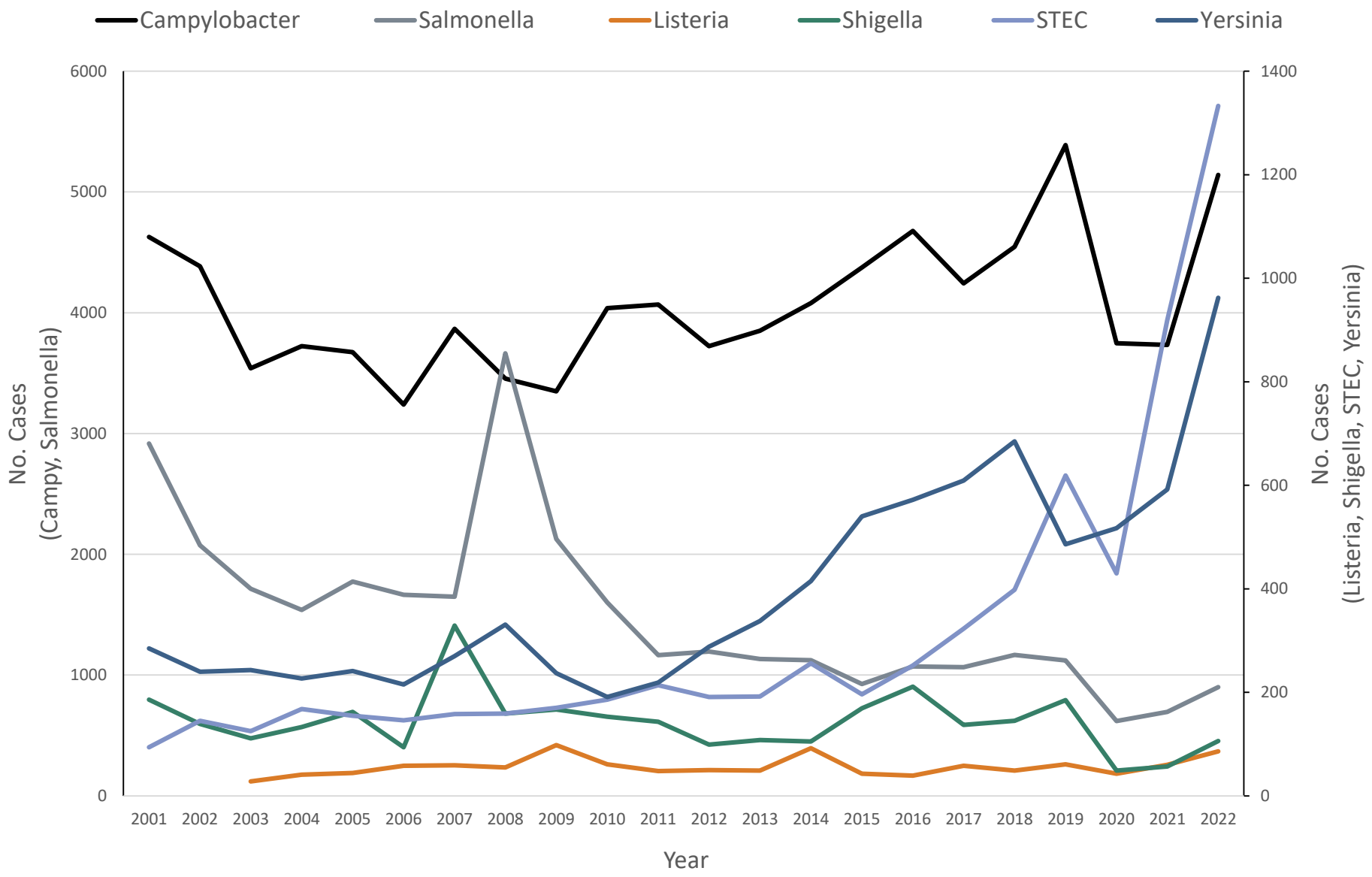

# Surveillance of foodborne pathogens

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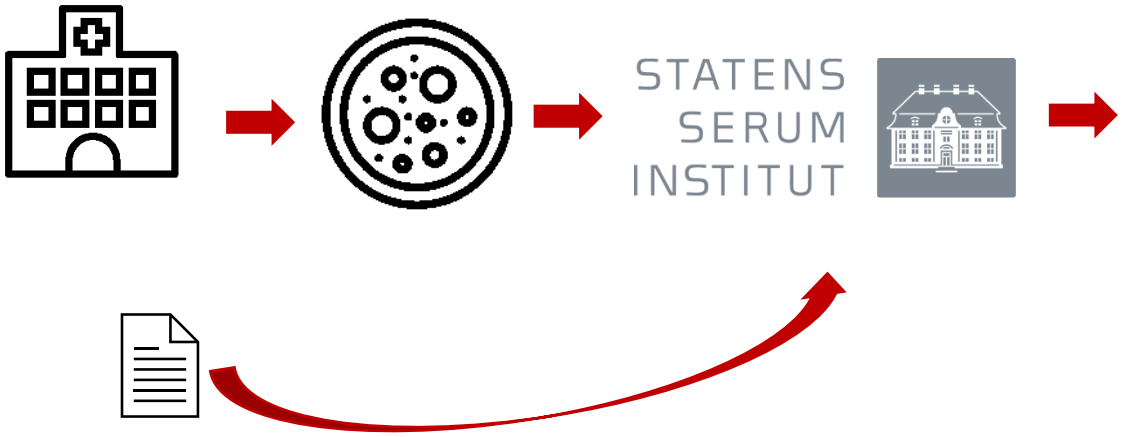
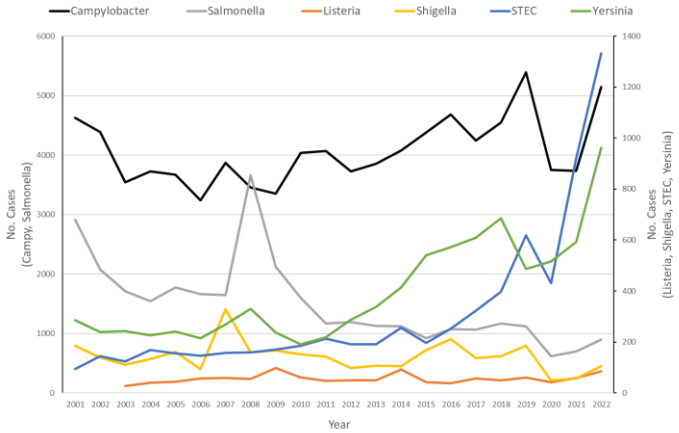
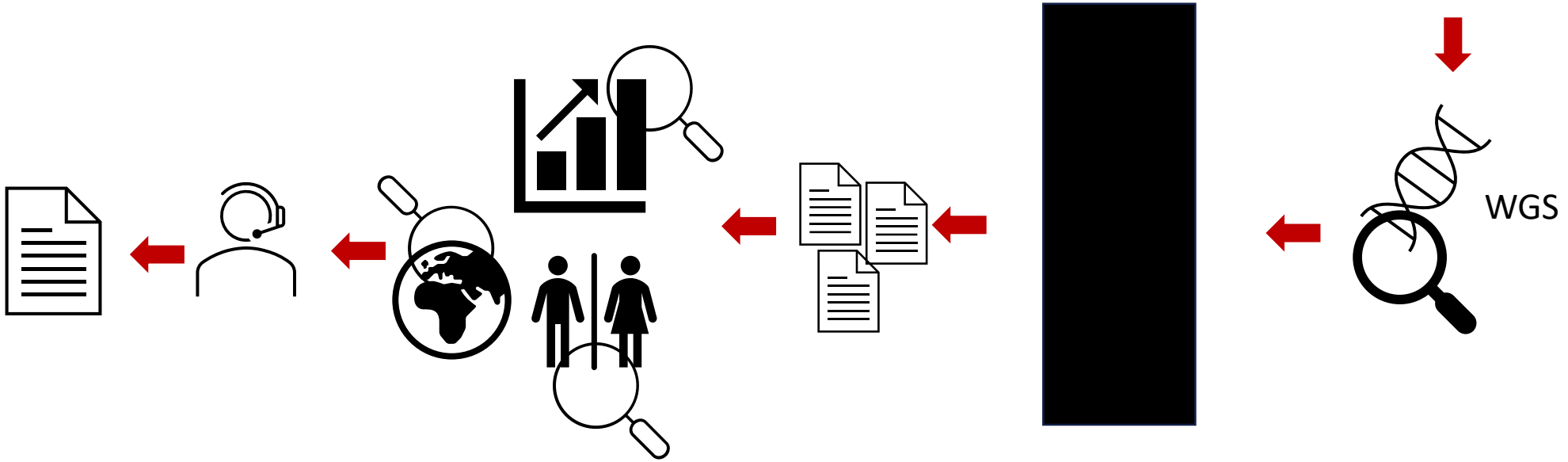



Case-based surveillance / Isolate surveillance



# Epidemiologist and Microbiologist at SSI

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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)

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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

STATENS SERUM INSTITUT

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

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”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

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Myndighedsarbejdet til koordinering af Zoonoser
~ The authority's work for the coordination of zoonoses

- All other zoonoses beside the Foodborne

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# 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 cheek (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)

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**SOFI**

Analysis results | My approval history | Manual upload

**Metadata filter**

Date_sample: From / To

Institution: Select...

Project_title: Select... | Project_no: Select...

Date_received: From / To

Animal: Select...

Run_ID: Select... | Isolate_ID: Select...

CPR_no.: Select...

FUD_no.: Select... | Cluster_ID: 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

test

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. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |
| 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 |
| 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. |
|---|---|---|---|---|---|---|---|---|---|---|---|
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# Front-end SOFI (meta data - DVFA)

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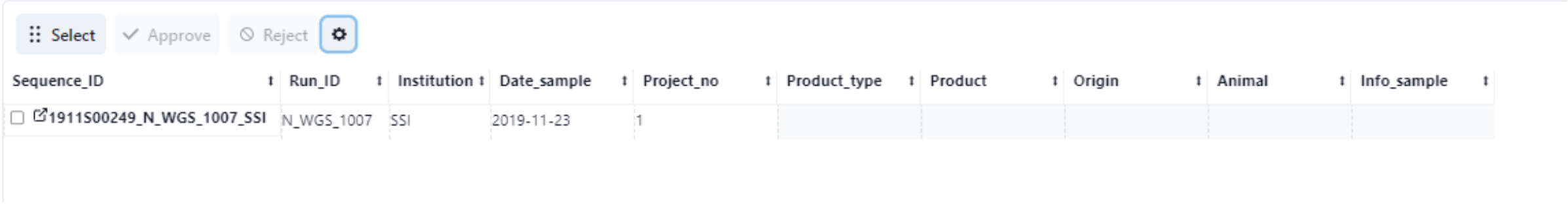


+
CHR (Crew)
Aut no. (Number of authorized companies)

# Front-end SOFI (QC data)

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Select | Approve | Reject

| 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_ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1912T00182_N_WGS_1007_SSI | A | OK | | Salmonella enterica | Salmonella enterica | 4801964 | 4801964 | 0 | 80.18386622640236 | 436 | 0 | 0.9891135709726657 | 0.058910014453914453 | |
| 1912F00428_N_WGS_1007_SSI | | supplying lab | Atypical genome size (x1): d | Campylobacter jejuni | Campylobacter jejuni | | | | | | | 0.9961916135520616 | 0.0238644902492071 | |
| 1911W00146_N_WGS_1007_SSI | A | OK | | Campylobacter jejuni | Campylobacter jejuni | 1713048 | 1713048 | 0 | 572.1356255049479 | 199 | 0 | 0.988238382206337 | 0.023964794935577257 | |
| 2009T00235_N_WGS_1002_SSI | A | OK | | Salmonella enterica | Salmonella enterica | 4773969 | 4773969 | 0 | 50.78009367048676 | 5055 | 0 | 0.9975581306750664 | 0.054785415413646546 | |

# Front-end SOFI (ST ..)

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Select | Approve | Reject

| Sequence_ID | ST | ST_final | ST_alleles | Species_final | Subspecies | Sero_enterobase | Sero_seqSero | Serotype_final | sero_antigen_seqs | Sero_D-tartrate |
|---|---|---|---|---|---|---|---|---|---|---|
| 1911S00249_N_WGS_1007_SSI | 16 | 16 | aroC: 6, dnaN: 7, hemD: 10, hisD: 10, purE: 8, sucA: 10, thrA: 14 | Salmonella enterica | enterica | Virchow | Virchow | Virchow | 7:r:1,2 | CCCCCCCCCCCCCCC |

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

# Annual report on Zoonoses in Denmark

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DVFA, SSI and DTU


## Contents



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

# DANMAP (Danish Integrated Antimicrobial Resistance Monitoring and Research Programme)

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





https://www.danmap.org/

## Table of contents

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# Thank you

Questions?