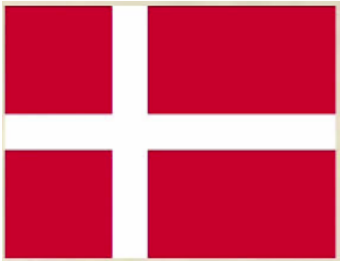


Food industries in their role as key data holders

Experience from a broiler slaughterhouse operation

Susanne Kabell, DVM, PhD



Agenda

- The Danish broiler production
- Databases
- Salmonella
- Campylobacter
 - WGS project
- Experience with WGS results
- Future perspectives for WGS



The Danish broiler production



- Two major slaughterhouses:
 - Rose Poultry, part of the Dutch Plukon Food Group since 2025
 - Danpo, part of Swedish Scandi Standard since 2013
- Approximately 200 Danish poultry producers with 300 farms
- Approximately 110 million broilers are slaughtered per year, and increasing in both companies



Databases in the Danish broiler production



- KIK / ACQP database
 - Databases owned by slaughterhouses, data owned by farmers
 - data from the entire broiler production including productivity and traceability
- Poultry database
 - Database owned by The Veterinary Authorities, administered by The Danish Agriculture and Food Council
 - data from mandatory analyses for salmonella and campylobacter in live animals
- www.virk.dk
 - Database for communication between Authorities and Industry
 - data from slaughter processing on salmonella and campylobacter

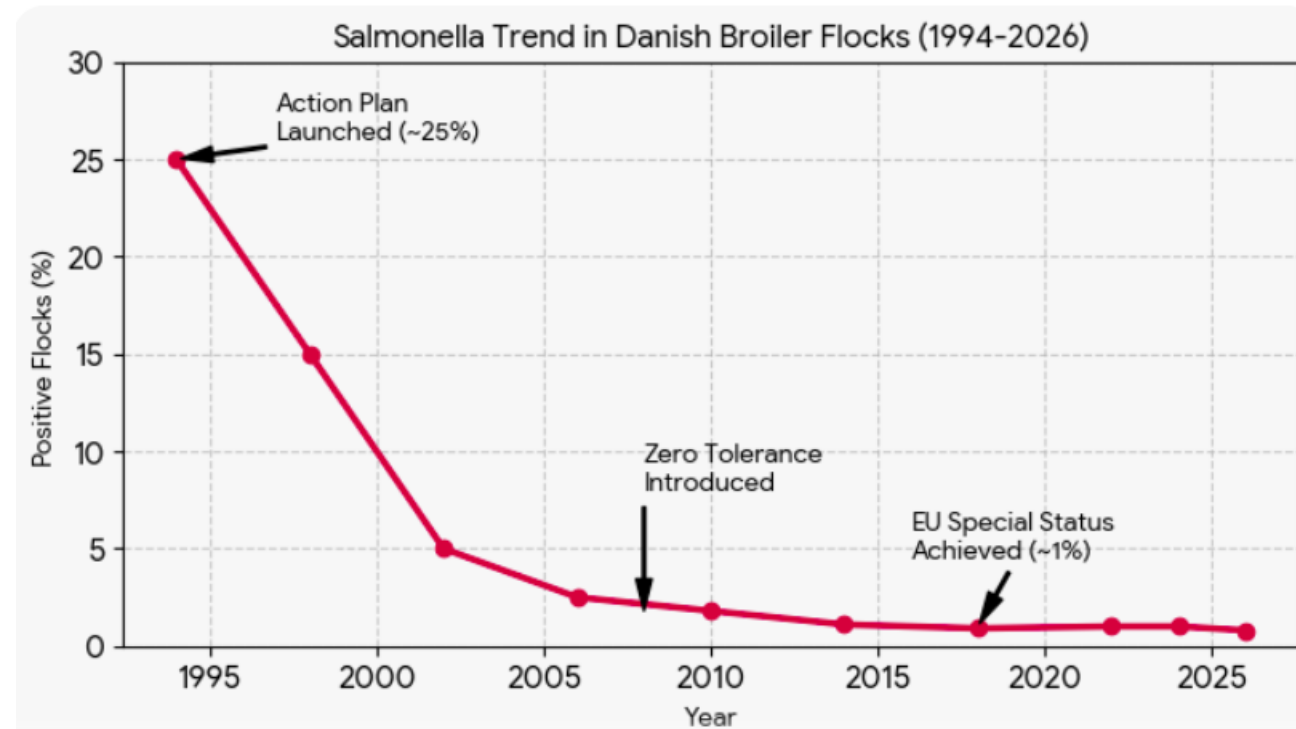
The KIK / ACQP databases - Quality and traceability

- Data generated throughout the entire production chain
 - Hatcheries
 - Broiler farms
 - Feed Companies
 - Cleaning Companies
 - Catching- and transportation
 - Slaughterhouse
 - Meat Inspection
 - Laboratory
 - Veterinarians

	202501	202502	202503	202504	202505	202506	202507	202601	202602	202603	202604
Indsatte m.v.											
Indsættelsesdato	09/12/24	03/02/25	27/03/25	15/05/25	04/07/25	22/08/25	10/10/25	25/11/25	15/01/26	12/03/26	30/04/26
Slagtedato	24/01/25	18/03/25	06/05/25	24/06/25	14/08/25	02/10/25	20/11/25	05/01/26	24/02/26	21/04/26	09/06/26
Indsatte, stk.	36.500	36.500	35.000	33.100	33.100	32.900	33.600	33.100	34.800	34.600	32.800
Indsatte, stk/nettokvm	18,4	18,4	17,6	16,7	16,7	16,6	16,9	16,7	17,5	17,4	16,5
Kg levendevægt/nettokvm	38,8	35,6	38,3	35,6	37,0	37,6	38,0	38,3	38,4	37,8	38,1
Max anslået kg levendevægt/nettokvm	38,8	35,6	38,3	35,7	37,0	37,6	38,0	38,3	38,4	37,8	38,1
Max konstateret kg levendevægt/nettokvm	38,8	35,6	38,3	35,7	37,0	37,6	38,0	38,3	38,4	37,8	38,1
Vægt											
Slagtealder, dage	45,4	43,1	40,1	40,0	41,1	41,1	41,0	41,3	40,1	40,0	40,0
Slutvægt levende, gram	2.173	2.060	2.229	2.202	2.270	2.316	2.289	2.394	2.246	2.242	2.355
Levendevægt ved 34 dage, gram	1.349	1.391	1.721	1.705	1.686	1.724	1.708	1.775	1.736	1.739	1.836
Foderforbrug											
Kg foder/kg levendevægt, kg	1,63	1,59	1,55	1,53	1,58	1,56	1,57	1,55	1,49	1,57	1,51
Kg foder/kg levendevægt ved 34 dage, kg	1,40	1,39	1,43	1,41	1,45	1,43	1,44	1,41	1,36	1,45	1,40
Hvedeprocent	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Foder til 2200 g kylling, kg	1,64	1,61	1,54	1,53	1,57	1,54	1,56	1,51	1,48	1,56	1,48
Døde m.v.											
Vægt 1. uge, gram	175,0	185,0	185,0	188,0	175,0	185,0	185,0	195,0	180,0	190,0	200,0
Døde i 1. uge i % af indsatte	1,1	2,3	0,9	1,1	0,9	0,9	0,7	2,7	1,2	1,8	1,0
Døde i alt i % af indsatte	2,7	6,0	2,4	2,8	2,2	1,9	1,9	4,0	2,3	3,1	2,0
Kasserede i % af kg levende	0,5	0,5	0,6	0,5	0,4	0,4	0,3	0,5	0,2	0,4	0,3
Hønealder, uger	33	42	40	35	39	50	50	49	27	27	42
Supplerende oplysninger											
Kyllingehus nettoareal kvm	1.987	1.987	1.987	1.987	1.987	1.987	1.987	1.987	1.987	1.987	1.987
Trædepudscore, point	1	1	1	0	0	0	0	1	0	0	1
CV tal	17,4	14,3	15,0	15,7	13,2	15,1	0,0	0,0	0,0	0,0	0,0
Brystkødsprocent	28,1	27,3	28,0	27,3	28,6	28,2	0,0	0,0	0,0	0,0	0,0
Hasesvidningsprocent	4,0	2,0	0,0	0,0	2,0	0,0	2,0	1,0	2,0	2,0	1,0
Rugeri	DanHatch Vrå	DanHatch Vrå	DanHatch Vrå	DanHatch Vrå	DanHatch Vrå	DanHatch Vrå	DanHatch Vrå	DanHatch Vrå	DanHatch Vrå	DanHatch Vrå	DanHatch Vrå
Afstamning	Ranger Gold	Ranger Gold	Rustic Gold	Rustic Gold	Rustic Gold	Rustic Gold	Rustic Gold	Rustic Gold	Rustic Gold	Rustic Gold	Rustic Gold
Foderfabrik	Danish Agro a.m.b.	DA NrSundby	Danish Agro a.m.b.	Danish Agro a.m.b.	Danish Agro a.m.b.	Danish Agro a.m.b.	Danish Agro a.m.b.	DA NrSundby	DA NrSundby	DA NrSundby	DA NrSundby
Klimabelastning uden dLUC kg CO2e/kg					1,47	1,46	1,46	1,51	1,57	1,59	1,41
Klimabelastning med dLUC kg CO2e/kg					3,10	3,12	3,15	3,20	3,20	3,31	3,08

Experience with salmonella

- 1996 First national action plan against salmonella in poultry
- A salmonella database was established and maintained by The Poultry Council
- Monitoring all levels from parents and hatchery to primary production and feed production
- Since 2008 zero-tolerance for all types

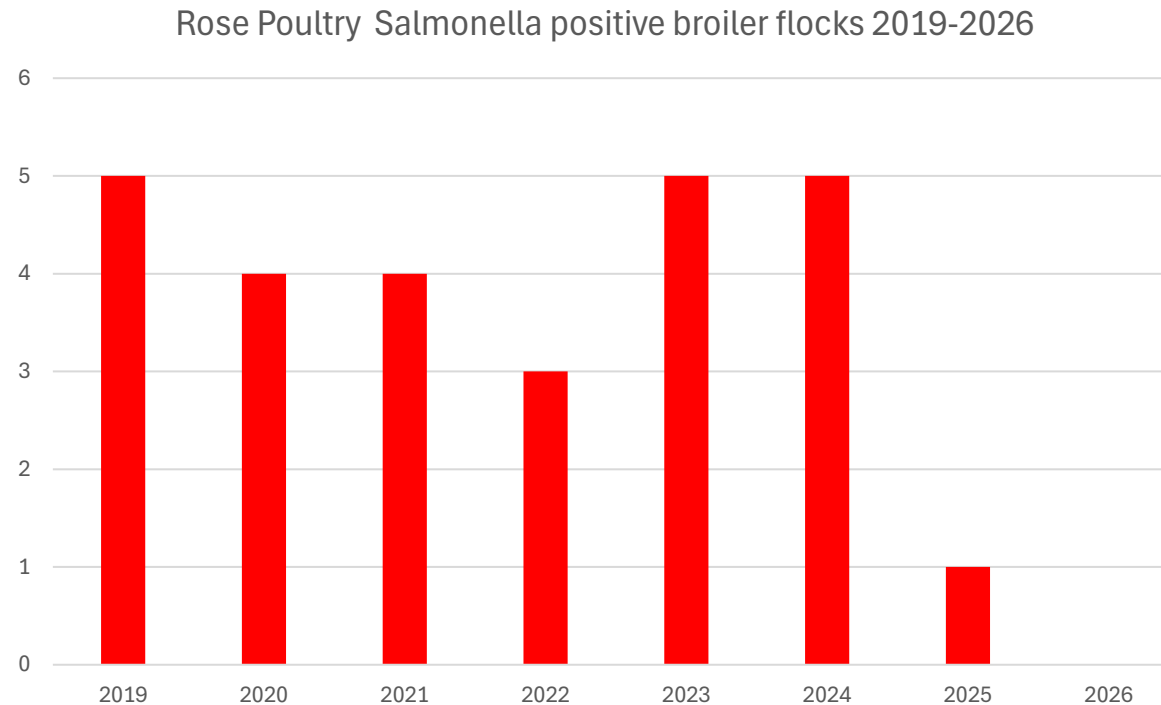


Salmonella, consequences for farmers today

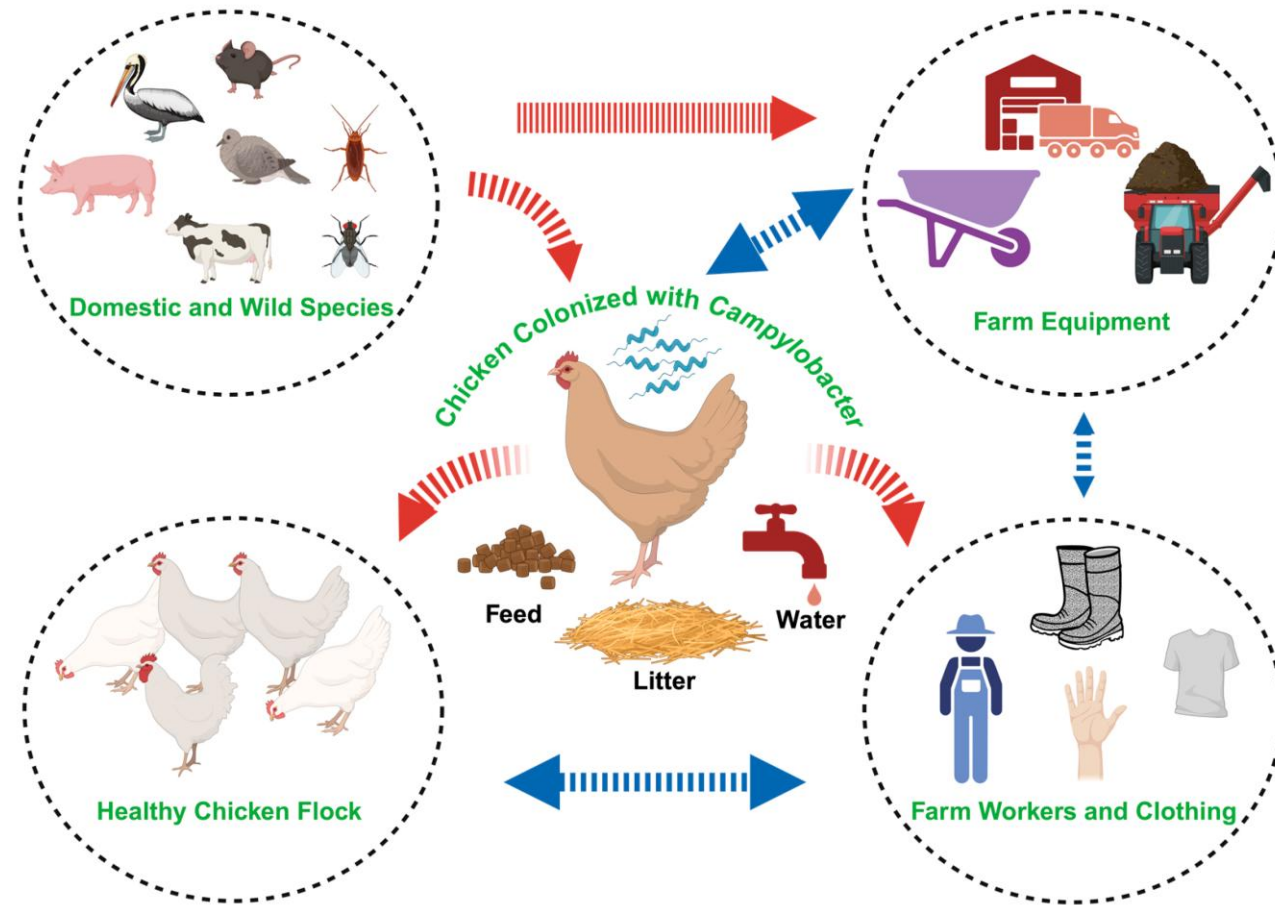
- Any positive result from sock samples leads to immediate culling of the flock
- Time is limited, often only one week before next flock of day-olds arrive
- Slaughterhouse personnel uses KIK-database for fast information about
 - updated number of broilers in the flock
 - weight of the birds
 - contact data to KIK-approved cleaning companies
- Culling, transportation of dead to rendering plant
- Cleaning and disinfection, a cooperation between farmer, cleaning company and slaughterhouse personnel (veterinarian)
- Approval by Veterinary Authorities
- Farmers are compensated from mutual insurance

Prevalence for salmonella remains very low

- Special status in EU for salmonella in layers since 2012 and in broilers since 2018



Multiple potential sources can introduce campylobacter into broiler production



Danish voluntary Campylobacter Action Plans

- Plan I: 2013 – 2016
 - Biosecurity, monitoring, slaughter procedures
- Plan II: 2018 – 2021
 - Slaughterhouse control and outdoor production
- Plan III: 2022 – 2026
 - Tracing sources of contamination and human outbreaks



Campylobacter monitoring

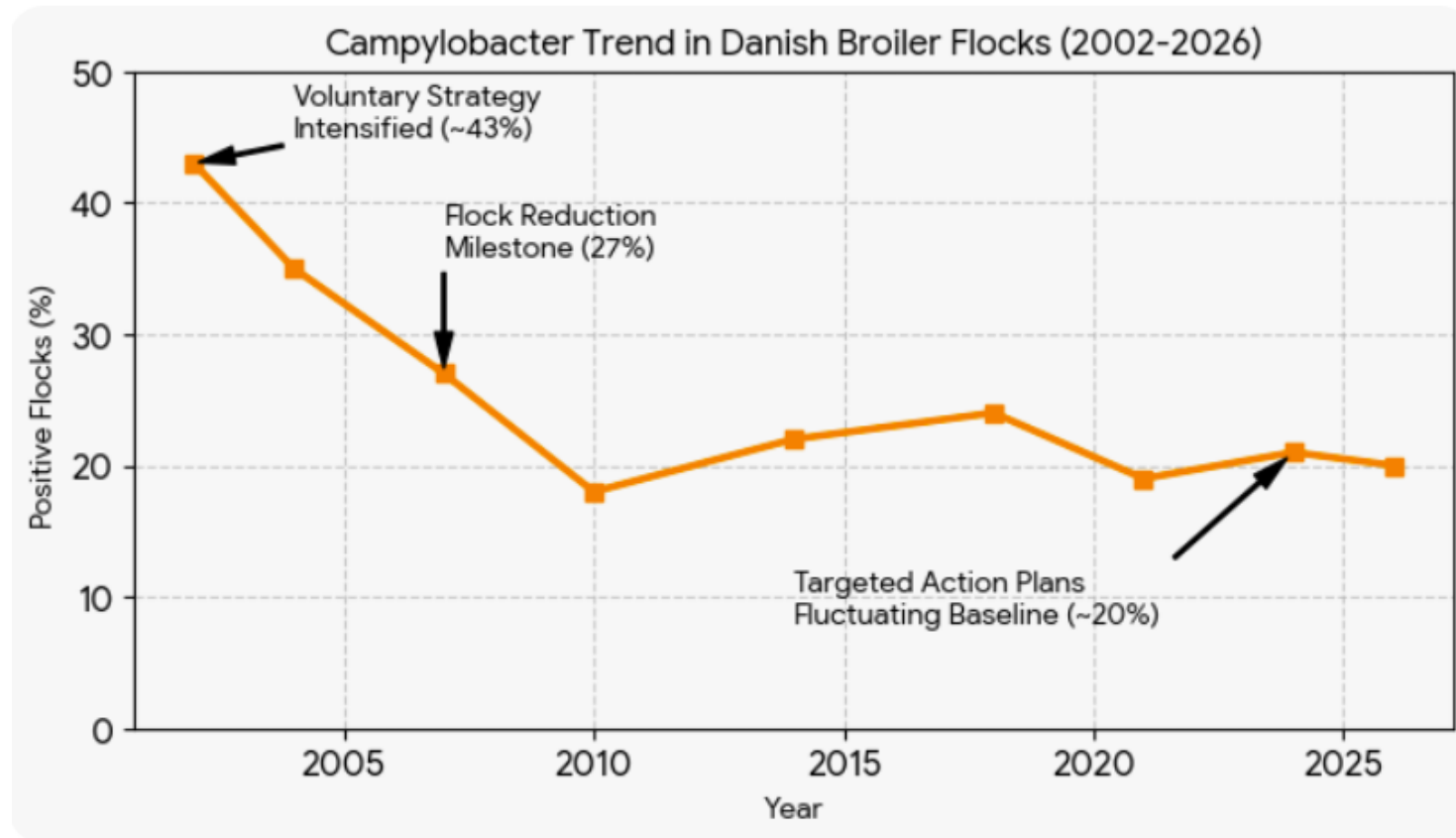
- Farms
 - All flocks: 12 cloacal swabs from 24 birds in 1 pool at slaughter, pcr
- Slaughterhouse
 - Weekly neck-skins from one flock during slaughter, 15 in 5 pools, cfu/g
 - Daily leg-skins under Veterinary Authorities' project, cfu/g

Campylobacter, consequences for farmers

- Positive cloacal swabs: reduced price for the flock
- Two positive rotations in a row: consultant from slaughterhouse discusses biosecurity, cleaning and disinfection with the farmer
- Three positive rotations in a row: consultant from slaughterhouse visits the farm and goes through biosecurity and hygiene procedures
- Four positive rotations in a row: external expert in biosecurity, cleaning and disinfection may be requested to visit the farm and write a plan for future improvements

Experience with campylobacter

Focus on biosecurity reduced the prevalence to a certain level, where it has remained



Campylobacter prevalence shows seasonal variation



Biosecurity is essential for several reasons



ADGANG FORBUDT



UDEN EJERS TILLADELSE

KONTAKT: CHR. NR: HUS NR:



**VED INDGANG
TIL STALDEN**

UDFYLD BESØGS PROTOKOL

**LÆS PROCEDURER
FOR IND- OG UDGANG**



PÅKRÆVET:

HÅNDVASK



TØJSKIFT

SKIFT AF FODTØJ



FØLG ANVISNINGER!





FAF Campylobacter Projects

2020 - 2021

Cloacal swabs, sock samples inside houses and sock
samples outside houses

WGS-analyses for investigation of sources and persistence

Campylobacter project 2020-2021

- 26 broiler farms, 387 broiler flocks, 4388 samples
- 883 WGS analyses of Campylobacter
- 150 genetically distinct cgMLST types

Conclusion:

- Most strains were associated with individual flocks
- Some strains persisted in same house between rotations
- Some strains appeared on several different farms

Reference

➤ [Pathogens](#). 2025 Aug 19;14(8):821. doi: 10.3390/pathogens14080821.

The Clonal Spread and Persistence of *Campylobacter* in Danish Broiler Farms and Its Association with Human Infections

[Katrine Grimstrup Joensen](#)¹, [Gitte Sørensen](#)¹, [Pernille Gymoese](#)¹, [Louise Gade Dahl](#)¹,
[Eva Møller Nielsen](#)¹

Affiliations + expand

PMID: 40872331 PMCID: [PMC12389240](#) DOI: [10.3390/pathogens14080821](#) [↗](#)

Three major outbreaks in 2021

- March – October 19 human cases with *C jejuni* ST21#7
- April 2021 – January 2022 28 human cases with *C jejuni* ST52#4 and *C jejuni* ST52#5
- August – November 16 human cases of *C jejuni* ST50#18
- All traced back to Danish chicken meat
- One farm became the focus of a major interpretation dispute

2021 Project case

C jejuni ST52 was found in June/July, August and September/October flocks

H06	Rotation04 -Maj/juni		Rotation05 -Juni/Juli		Rotation06 -August		Rotation07 -September/Oktober	
	sokker	svaber	sokker	svaber	sokker	svaber	sokker	svaber
Hus 1	neg	neg	Cj50#19	Cj50#19	neg	neg	Cj11151#2	Cj11151#2
Hus 2	neg	Cj19#1	Cj257#14	ikke prøver	Cc1595#3	Cj52#5 og Cc1595#3	neg	Cj52#5
Hus 3	neg	neg	Cj7355#1	Cj7355#1	neg	neg	neg	Cj5#3
Hus 4	neg	neg	Cc1595#3	Cj50#19 og Cc1595#3	Cj52#5	Cj52#5 og Cc860#1	neg	neg
Hus 5	neg	neg	Cj45#26	Cj52#4 og Cc1595#3	neg	Cj52#5 og Cc860#1	neg	neg

WGS-results also show diversity in types in one farm

Case, WGS interpretation

- Veterinary Authorities claimed the farm was a risk for human health on the basis of WGS results
- Difficult discussions between slaughterhouse and Veterinary Authorities
- All meat from one rotation was frozen
- Farmer eventually stopped supplying broilers to the Danish market
 - More than 1 mio broilers per year
- The Industries' motivation for future campylobacter projects is reduced
- Key lesson
- WGS interpretation must be agreed in advance

New Case

- July-September 2025 two major outbreaks in humans
 - *Campylobacter jejuni* ST49, 89 cases
 - *Campylobacter jejuni* ST52, 31 cases
- Traced back to Danish chicken meat
- July 2026 Veterinary Authorities found *Campylobacter jejuni* ST49#3 in leg-skin from farm no 139141 house 1

Farm no 139141 Campylobacter history

- Two houses with Rustic Gold chickens (previously Ross 308)
- 2023, 2024, 2025: House 1 and 2 positive in July only
- 2026: House 1 and 2 positive in July

CHR	Hus	202201	202202	202203	202204	202205	202206	202207	202208	202209	202301	202302	202303	202304	202305	202306	202307	202308	202309	202401	202402	202403	202404	202405	202406	202407	202408	202409	202501	202502	202503	202504	202505	202506	202507	202508	202509	202601	202602	202603	202604		
		1	2																																								
	139141	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	●	●			●	●	●	●	●	●	●					●	●	●	●

- Same seasonal pattern, but was it the same strain ?

Conclusions and future perspectives

- Industry data are essential
 - Data from poultry slaughterhouses can trace pathogens back through the production chain
- WGS requires agreed interpretation
 - Authorities, Science and Industry must agree on interpretation and consequences in advance
- More data are needed
 - Campylobacter diversity requires extensive WGS data and investigation of multiple sources

Industry data are essential
but data require context

Thank you

