

NRL - SALMONELLA IN LATVIA

INSTITUTE OF FOOD SAFETY, ANIMAL HEALTH AND ENVIRONMENT «BIOR»

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Institute of Food Safety, Animal Health and Environment "BIOR"



40-80'ie



90'ie-2004



2004-2006



2006-2009



2010- ...



HISTORY OF THE INSTITUTE “BIOR”

1944 STATE VETERINARY AND BACTERIOLOGICAL LABORATORY

(was founded on 14th of November, 1944)

Diagnostics of animal diseases

1964 VETERINARY LABORATORY OF THE REPUBLIC

Several departments were in the composition of the laboratory - Bacteriology, Serology, Virology, Pathological Anatomy and Morphology, Haematology and Leuko-zoology, Mycology, Parasite Diseases, Radiology, Chemical-Toxicological, Non-Contagious and Gynecological Diseases, Epizootology departments

1992 STATE VETERINARY MEDICINE DIAGNOSTIC CENTRE

Food quality and food safety

Environmental sanitary and hygiene monitoring

2006 NATIONAL DIAGNOSTIC CENTRE

Medical Clinical Microbiology Laboratory

Foundation of the Scientific Institute (as a part of National Diagnostic Centre)

2010 INSTITUTE OF FOOD SAFETY, ANIMAL HEALTH AND ENVIRONMENT “BIOR”

National Diagnostic Centre merged together with Latvian Fish Resources Agency and new Research Institution was founded

Additional 5 fish hatcheries

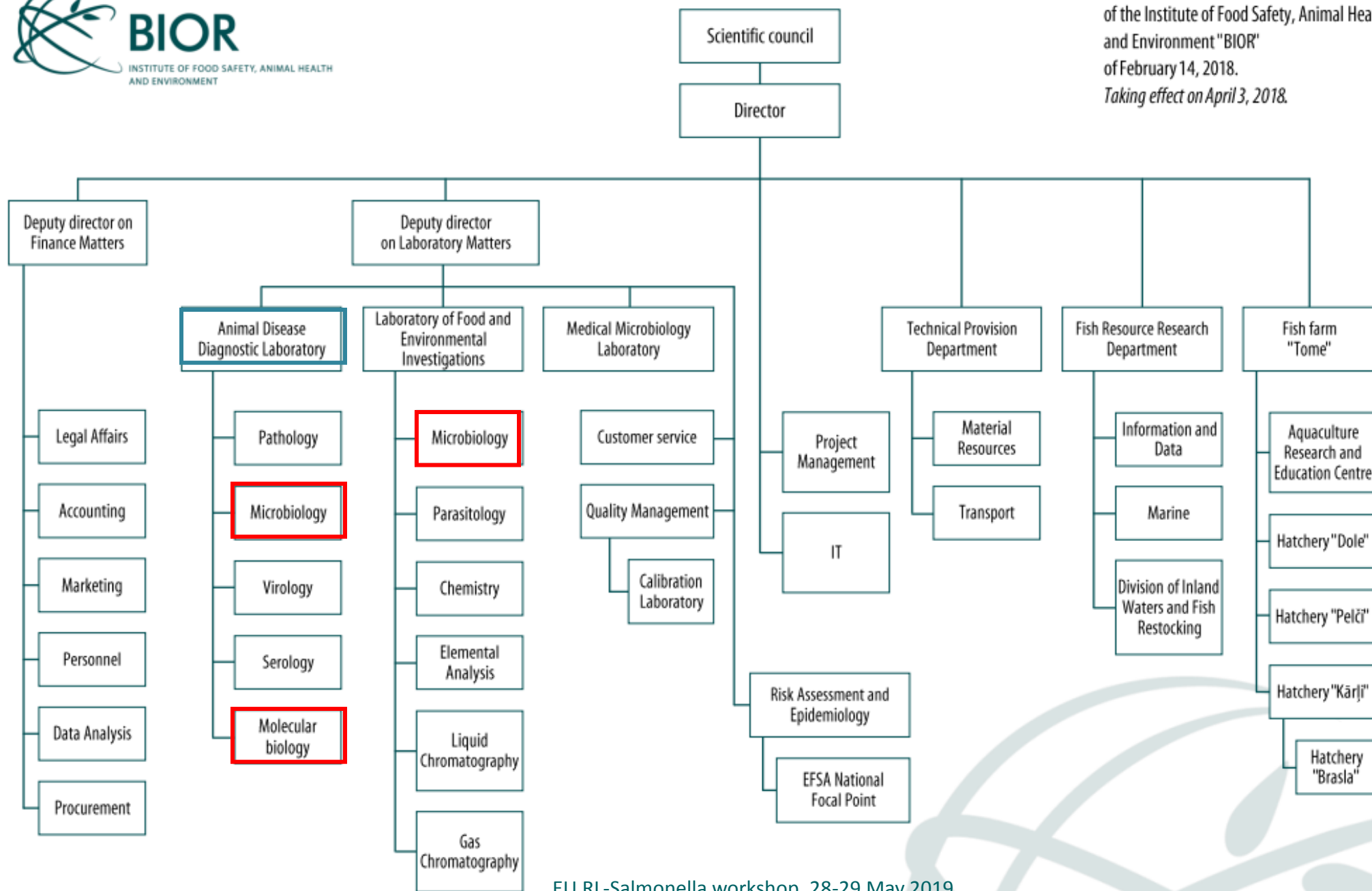
MAIN TASKS



- **carry out research** in the area of food and environmental safety, veterinary medicine, fisheries and other related life sciences
- **provide scientific expertise and risk assessment** in the relevant fields to policy makers
- **carry out laboratory and diagnostic testing** in the frame of national surveillance and control programs in food, feed chain, animal health and protection areas;
- **provide data collecting, analysis and research and scientific advice for fisheries and aquaculture**
- **carry out national reference functions** in the area of food and environmental safety, veterinary medicine

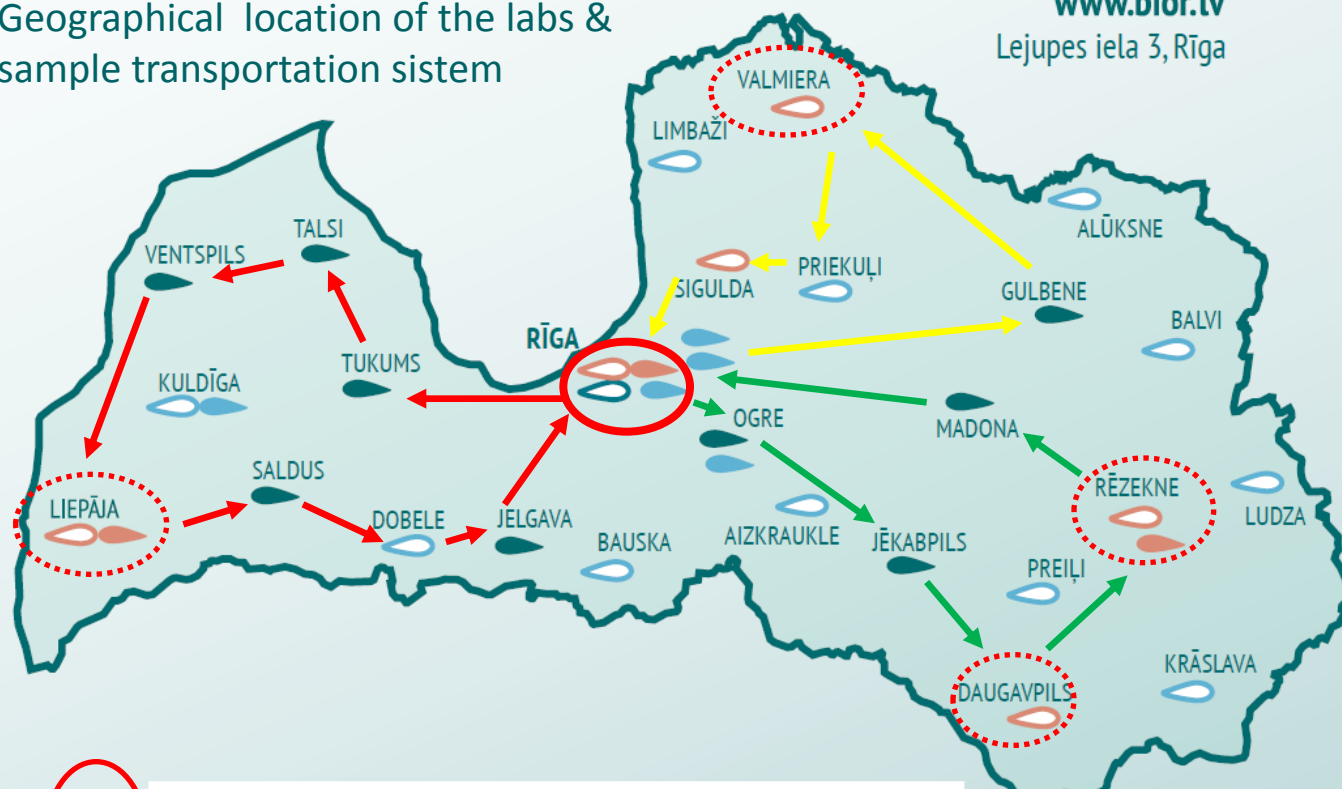
ABOUT «BIOR»...

- ✓ STAFF > **400**, incl. experts, researchers, administrative staff
- ✓ Around **12.000** customers worldwide (services)
- ✓ > **1.000.000** laboratory analysis annually
- ✓ > **6000** h annually spent on data collection and field work in the sea, lakes or rivers
- ✓ > **15.000.000** released fish in the frame of fish restocking programs



Geographical location of the labs & sample transportation sistem

www.bior.lv
Lejupes iela 3, Rīga



- Food and Environmental Investigations, Veterinary Investigations
- Clinical Microbiological Investigations
- Fish Resources Research Department
- Sample Reception Office
- Part Time Sample Reception Office
- Hatcheries
- BIOR reginal laboratories until 2017



Latvia located in north-eastern Europe with a coastline along the Baltic Sea, and has borders with Estonia, Lithuania, Russia and Belarus



Sample transportation minibus (+4°C and -20°C)

ACCREDITATION

- All laboratories of the Institute BIOR are accredited according to EN ISO/IEC 17025 standart at Latvian National Accreditation Bureau (LATAK)
- Accredited Calibration Laboratory has been working in the Institute since 2006
- > 300 different analytical and diagnostic methods



NRL-SALMONELLA FUNCTIONS & ACTIVITIES

- ✓ cooperation with the EURL (participation in PTs, annual workshops, training courses, etc.);
- ✓ organizing of interlaboratory comparative tests between official state laboratory and self-control laboratories;
- ✓ organizing of training course;
- ✓ cooperation with the Latvian competent authority (Ministry of Agriculture, Food and Veterinary Service);
- ✓ surveillance programme`s official samples testing
- ✓ serotyping (aprox. 200-250 salmonella isolates/year) sent to NRL from oficial and self-control labs (from food, feed and animals)
- ✓ AMR monitorings
- ✓ MLST typing (*S.Enteritidis/S.Typhimurium*)
- ✓ WGS (outbreaks/epidemiological investigations)

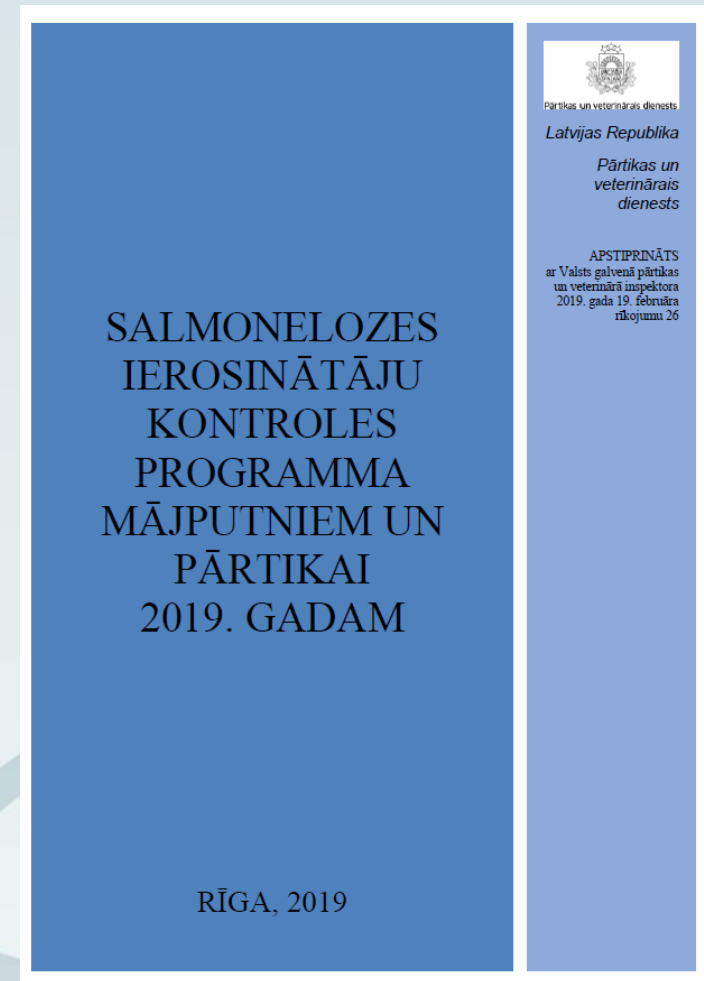
INTERLABORATORY COMPARATIVE TESTS (ILCT)

- 2 ILCTs per year for Salmonella detection
- Frequency and matrix of ILCTs : every year – poultry faeces, every second year – swabs/feed
- Total number of samples per one ILCT = 5
- 3 contamination levels (negative, low, high):
 - low level – 10 cfu of salmonella per test portion
 - high level – 100 cfu of salmonella per test portion
 - negative – blanc or other not target bacteria
- ATCC references cultures: *S.Enteritidis*, *S.Typhimurium*
- ILCTs participants: official labs, self-control and private labs

NATIONAL CONTROL PROGRAMS FOR SALMONELLA

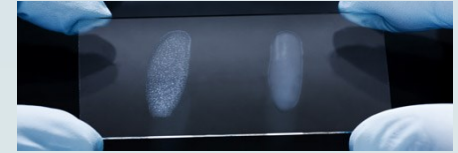
ACTIVE SURVEILLANCE

- Poultry (faeces, dust, swabs);
- Food;
- Feed;
- Environmental samples



METHODS

- **ISO 6579-1: 2017** *Part1: Detection of Salmonella spp.*
- **ISO/TR 6579-3:2014** *Part 3: Guidelines for serotyping of Salmonella spp. Kauffman-White schema Antigenic formulae of the salmonella serovars, 2007, 9th edition*
- **OIE Manual 2016 chapter 3.9.8.** *Animal clinical and pathological samples (Salmonellosis)*
- **OIE Manual 2018 chapter 3.3.11.** *Poultry clinical and pathological samples (S.pullorum/gallinarum)*



Others methods:

- **Real-time PCR;**
- **MLST;**
- **PFGE;**
- **WGS (whole genome sequencing):**

DNA isolation – QIAmp DNA mini kit (Qiagen)

Nextera XT library construction kit

Illumina MiSeq platform, V3 2x300 bp paired reads

Data analysis – Ridom SeqSphere+ 5.0.0 (Velvet for genome assembly, MLST and Ridom cgMLST for strain nomenclature)

Quality control – average coverage (for Salmonella minimum 25x), N50, countig count, good cgMLST targets > 90%



WGS (WHOLE GENOME SEQUENCING) IN BIOR

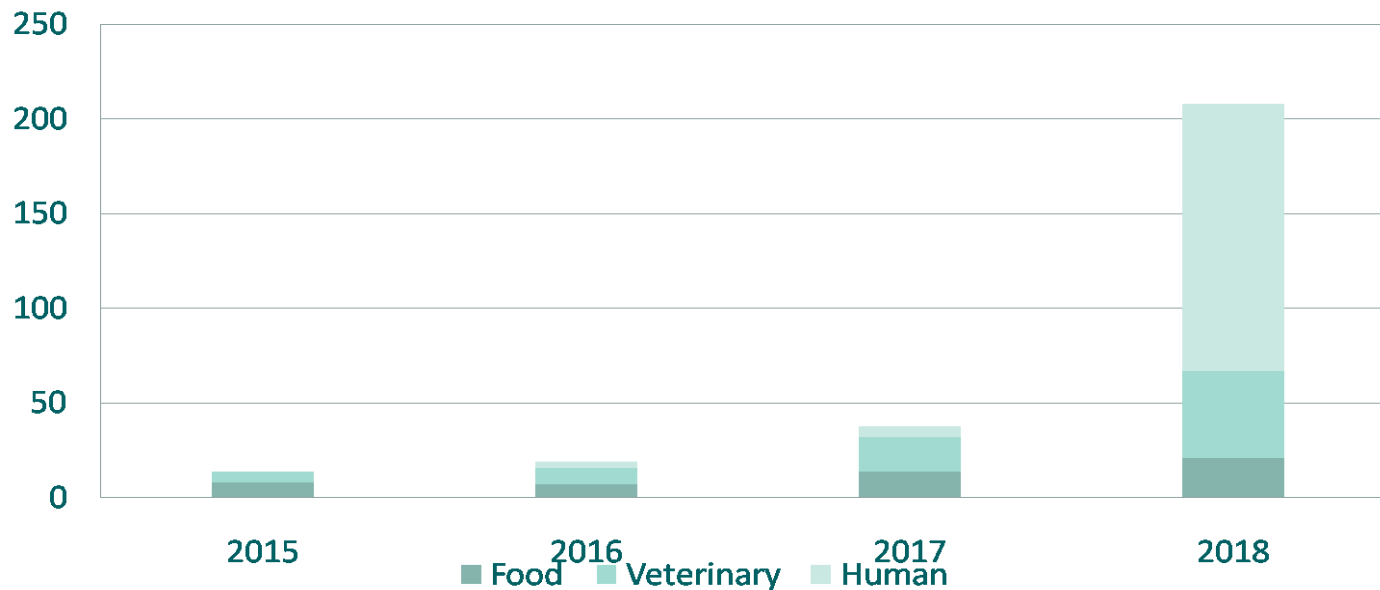
more than 300 salmonella isolates analysed by WGS:

~ 50% are human isolates (outbreaks or sporadic cases)

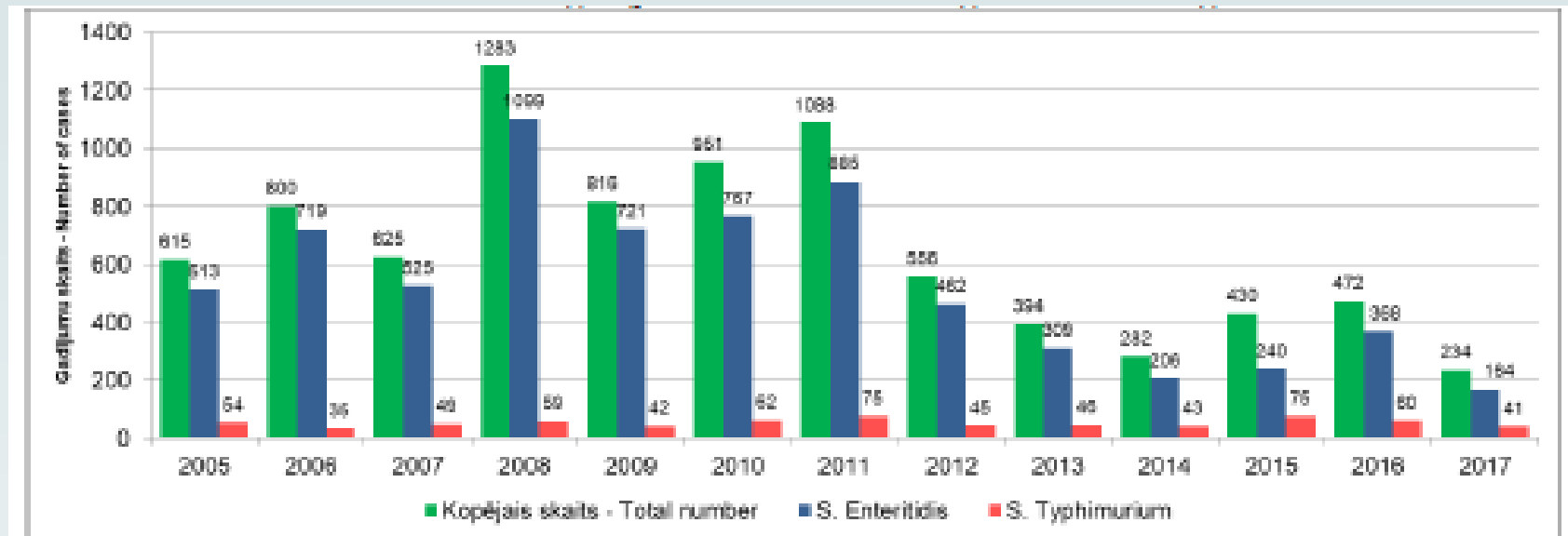
~ 31% are veterinary isolates

~ 16% are food isolates

The oldest isolates in WGS database are from 2015



SALMONELLA CASES IN HUMAN IN LATVIA (2005 – 2017)



Date from Latvian Centre for Disease Prevention and Control (CDPC)

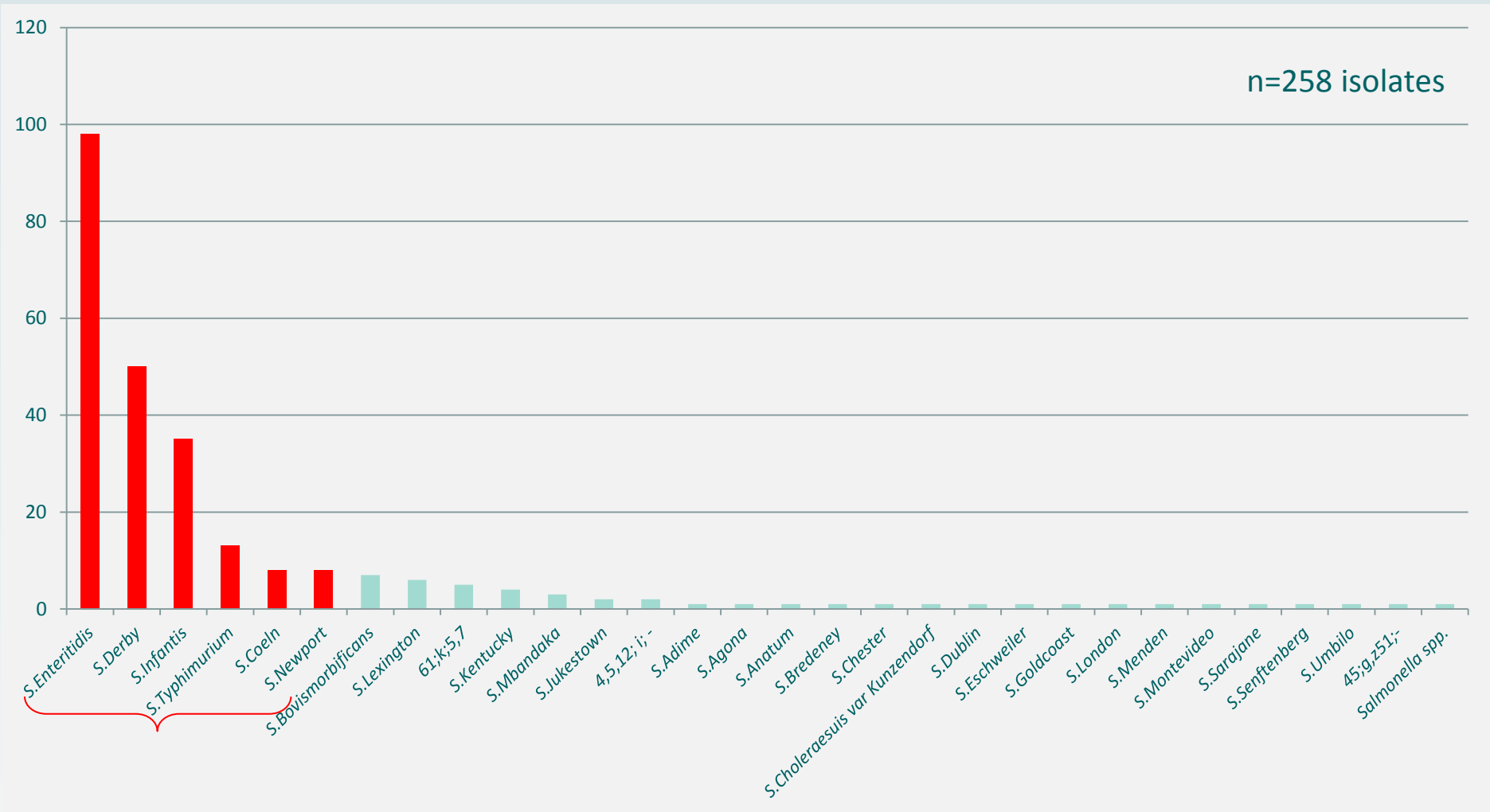
SALMONELLA IN FOOD, 2018

Products of food, others	Number of samples	Number of positive samples
Meat, Meat products	2715	108
Milk, Milk products	807	0
Fish, Fish products	336	0
Products, ready for use	330	1
Swabs from carcasses	1406	8
Other food products	566	0
Samples from environments (hygiene control)	327	0
Total	6487	117

SALMONELLA IN ANIMAL & FEEDSTUFFS, 2018

Animal species, feedstuffs	Number of samples	Number of positive samples
Birds (poultry, broilers & others productive birds)	1023	87
Cattle (calves), sheep,	53	1
Pigs	27	2
Zoo animals	36	3
Pets	65	1
Feedstuffs	926	
Samples from environments (hygiene control)	371	12
Total	2501	106

SALMONELLA SEROTYPES IN ANIMAL, FOOD & FEED, 2018



SALMONELLA WHOLE GENOME SEQUENCING (WGS)

In 2018 – cooperating with Latvian Centre for Disease Prevention and Control, the five salmonellosis outbreak analysed by WGS in BIOR:

- 1x *S. Typhimurium* - no similarity between human and veterinary/food isolates were observed
- 2x *S. Enteritidis* - no similarity between human and veterinary/food isolates were observed
- 1x *S. Enteritidis* - 8 allele distance were observed between human and veterinary sample obtained two weeks before first human case (Cluster alert threshold for *Salmonella* spp. as defined by Ridom SeqSphere is 7)
- Prolonged outbreak of *S. Infantis* - perfect match (0 allele distance) were observed between human isolate sequence, one food isolate and three veterinary isolates
- Relation to the outbreak of *S. Coeln* in several European countries in 2018 - the BIOR performed WGS of 8 *S. Coeln*, isolated from various sources of origin in Latvia: 1 human isolate and 7 non-human isolates (6 poultry & 1 zoo animal).

In the beginning of the 2019 these sequence data was reported to EURL-Salmonella, EFSA & ECDC.

SALMONELLA COELN IN LATVIA

- *S. Coeln* was detected in 2018 and also in previous years- in 2017 & 2016
- *S. Coeln* was found in:
 - ✓ faeces of poultry (quails, chickens, broilers),
 - ✓ food (meat of poultry),
 - ✓ and in faeces of other animal species - dog, marten, kinkajou
- It has been observed, that in Latvia *S. Coeln* was most often isolated from quail faeces

THANKS FOR YOUR ATTENTION!



<http://www.animalspot.net/kinkajou.html>