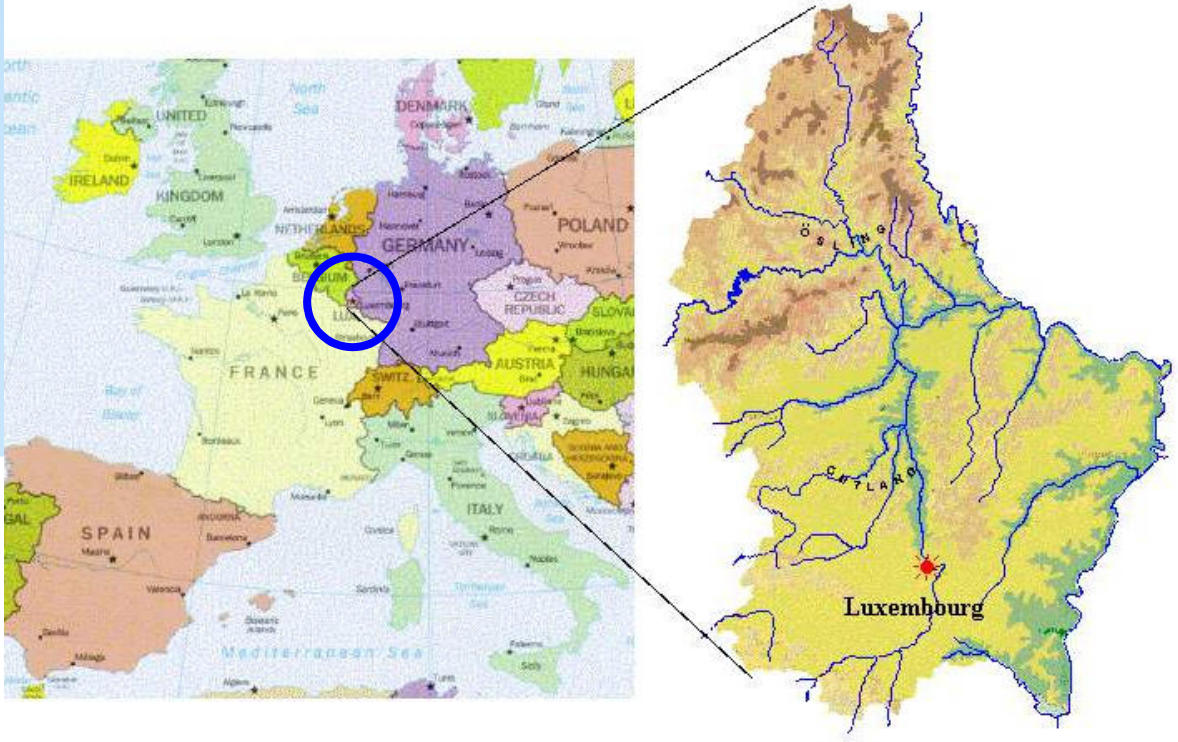
Listeria monocytogenes surveillance in the Grand Duchy of Luxembourg

National Health Laboratory (LNS)

LABORATOIRE NATIONAL DE SANTÉ
GRAND-DUCHÉ DE LUXEMBOURG

State Veterinary Laboratory (LMVE-DAV)



surface: 2586 km²

Population: 515 000 residents
44% foreigners
+150 000 F,B,D at daytime

National language: **Luxembourgish**

Administrative languages:
1. French
2. German
3. Luxembourgish

Ministry of Agriculture and consumer protection

Ministry of Health

LMVE

Food control unit (DAV)

Samples from food mainly of animal origin

Pathological unit:

Rarely clinical samples

LNS

Food control unit (surveillance alimentaire)

Samples: pastry, milk and catering products

Molecular typing unit (SEMI)

isolates from private clinical and public hospital laboratories, as well as food isolates from veterinary and food labs

Sampling on food:

official vets (Ministry of Agriculture and Consumer Protection)

Food controlers (M. of Health)

(Private people)

Food controlers (Ministry of Health)

Private people

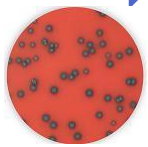
Overview of the workflow

Detection and enumeration of foodborne pathogens in veterinary/food samples

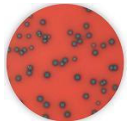
Laboratory-based surveillance of infectious diseases outbreak detection, response & prevention

Hospitals, clinical lab.

Isolation of strains confirmation of species



Molecular characterization
molecular-serotyping
PFGE – ApaI + AscI
Whole genome sequencing
Biobank -80°C



Food lab.

European Surveillance

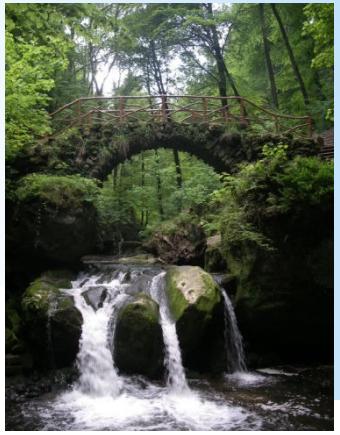
ecdc EPIS

Ministry of Health
Ministère de la Santé
DIRECTION DE LA SANTÉ
GRAND-DUCHÉ DE LUXEMBOURG
Division de l'Inspection Sanitaire

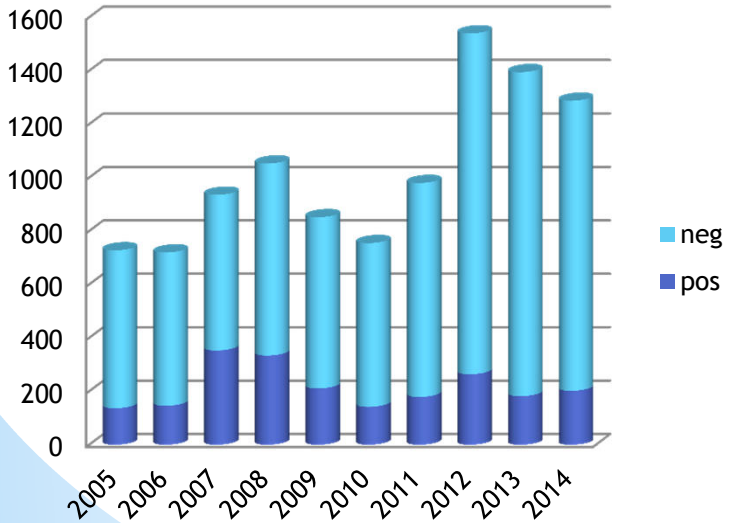
National Surveillance

One Database of typing profiles
Human/non-human

Listeria monocytogenes



L. mono analyses 2005-2014



Food of animal origin

Detection in 25 g of food

Methods: (ELFA (VIDAS ®) up to 2008)
ISO 11290
BRD 07/04-09/98
BRD 07/05-09/01

Typing of food strains at LNS in case of human cases; >2015 ± all possible

	2007	2008	2009	2010	2011	2012	2013	2014
Listeriosis*	6	1	3	0	2	2	2	5

* case-based report

Ministry of Agriculture and consumer protection

Ministry of Health

ASV = Administration of Veterinary Services

Director (CVO) — Quality manager

logistics

Inspection

Coordinators

Animal Health

BIP

Public Health

Slaughterhouses' OV

SANITEL

LMVE = State Laboratory of Veterinary Medicine

(Chief vet.)

logistics

Med. Vet.

Animal health

- Microbiology
- Parasitology
- Serology
- Virology

Public health

Microbiology
(Food and emergency Slaughter);

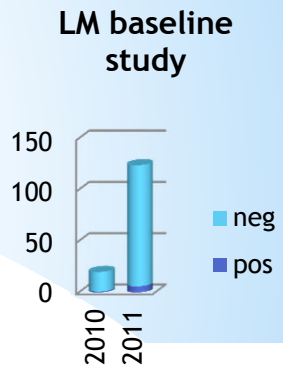
antimicrobial residue testing

rue verte, Gasperech

Av. Gast Diderich Belair

The 2010-2011 Listeria monocytogenes baseline study

	matrix	*detection*		*quantification*	
		positive	*negative*	*>10 cfu/g*	*<10 cfu/g*
BSLM	Semi-soft cheese	0	32	0	32
	Smoked fish*	5 // 2	25 // 28	2 // 1	28//29
	heat treated meat products	1	31	0	32



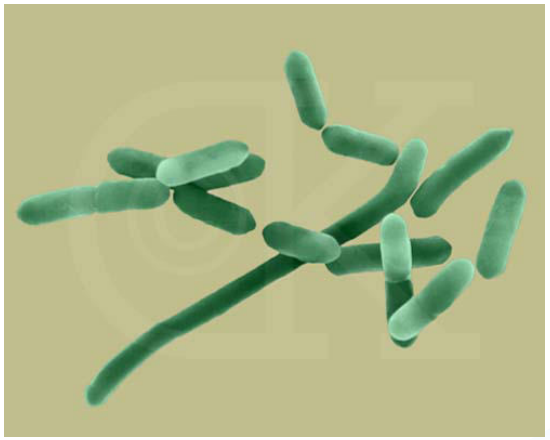
routine	**Fresh meat & fresh meat products 437+577 =1014 samples**	**128+164 = 292**	**309+413 = 722**	**6+13 = 19**	**431+563 = 995**
	Heat treated meat prod. 279+276 = 555 samples	**11+9 = 20**	**268+267 = 535**	**0+0**	**279+276 = 555**
	Smoked fish 15+0 = 15	**2+0 =2**	**13+0 =13**	**2+0 =2**	**13+0 =13**
	Other products 3+3 = 6	**0+0**	**3+3 =6**	**0+0**	**3+3 = 6**
	cheese 1+0 = 1	**0+0**	**1+0= 1**	**0+0**	**1+0 = 1**

* a // b: a = result for analysis at arrival, b = result for analysis at end of shelf life

10 Years of *Listeria monocytopgenes* Monitoring (1.2002-12.2011)

Summary:

* 8391 samples (mainly of animal origin) out of 9991 (84%) analyzed for *L. monocytogenes*
* 25.5% positives
* 0.57% > detection limit (of total analyzed)
* 0.36%* > criteria EU Reg.2073/2005 (of total analyzed)
* not all yet typed ((2012))
* costs: ~ 170 000 € only in material

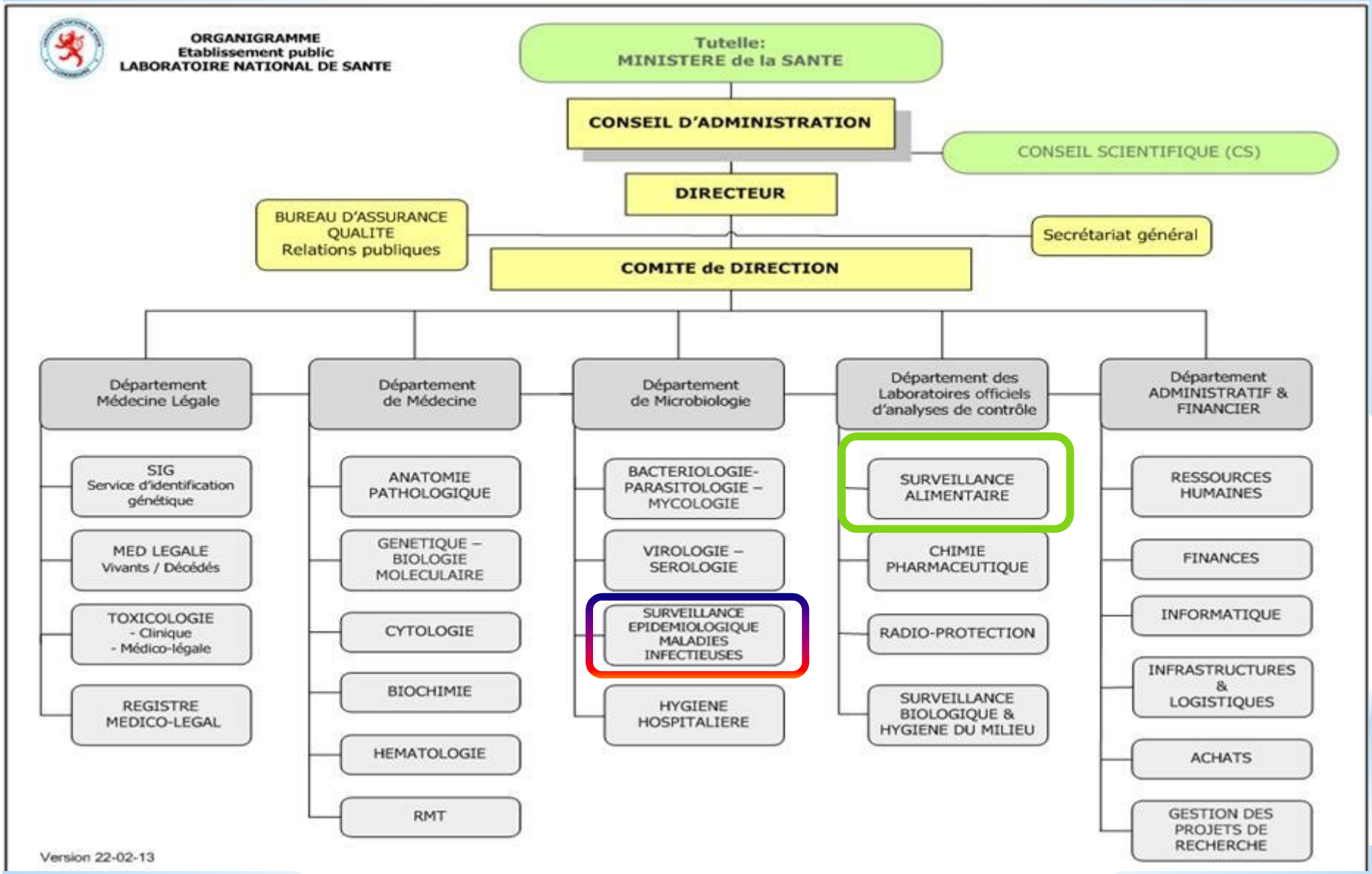


* 1.5 % for Salmonella

Laboratoire National de Santé (LNS)

new law in 2012:
independent institute
with research mission;

New building in
2013 with P3 facility

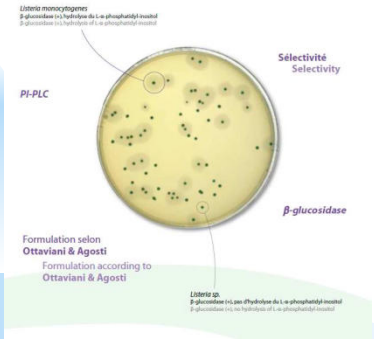

ORGANIGRAMME
Etablissement public
LABORATOIRE NATIONAL DE SANTE
Tutelle:
MINISTERE de la SANTE
CONSEIL D'ADMINISTRATION
CONSEIL SCIENTIFIQUE (CS)
DIRECTEUR
BUREAU D'ASSURANCE QUALITE
Relations publiques
Secrétariat général
COMITE de DIRECTION
Département Médecine Légale
Département de Médecine
Département de Microbiologie
Département des Laboratoires officiels d'analyses de contrôle
Département ADMINISTRATIF & FINANCIER
SIG
Service d'identification génétique
MED LEGALE
Vivants / Décédés
TOXICOLOGIE
- Clinique
- Médico-légale
REGISTRE MEDICO-LEGAL
ANATOMIE PATHOLOGIQUE
GENETIQUE – BIOLOGIE MOLECULAIRE
CYTOLOGIE
BIOCHIMIE
HEMATOLOGIE
RMT
BACTERIOLOGIE-PARASITOLOGIE – MYCOLOGIE
VIROLOGIE – SEROLOGIE
SURVEILLANCE EPIDEMIOLOGIQUE MALADIES INFECTIEUSES
HYGIENE HOSPITALIERE
SURVEILLANCE ALIMENTAIRE
CHIMIE PHARMACEUTIQUE
RADIO-PROTECTION
SURVEILLANCE BIOLOGIQUE & HYGIENE DU MILIEU
RESSOURCES HUMAINES
FINANCES
INFORMATIQUE
INFRASTRUCTURES & LOGISTIQUES
ACHATS
GESTION DES PROJETS DE RECHERCHE
Version 22-02-13

LNS – food control unit

* mainly chemical analysis
* GMO analysis
* microbiological analysis, amongst other *Listeria monocytogenes*:
  * methods:

    BRD 07/04-09/98 and BRD 07/05-09/01 and PCR
  * ~1300-1400 analysis (L.mono) per year

    very few positives (~0,4%)



Molecular investigation in case of listeriosis

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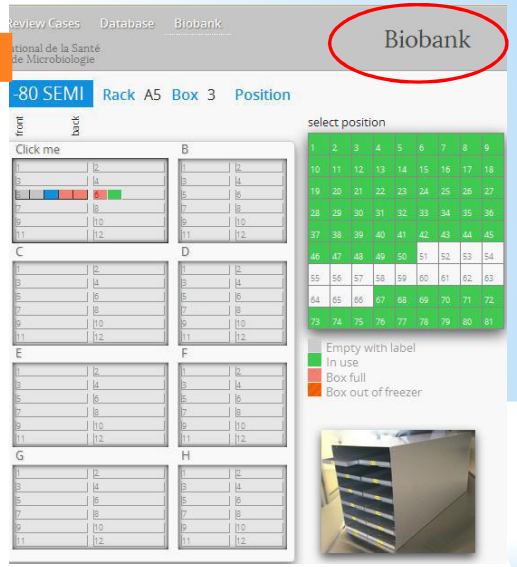
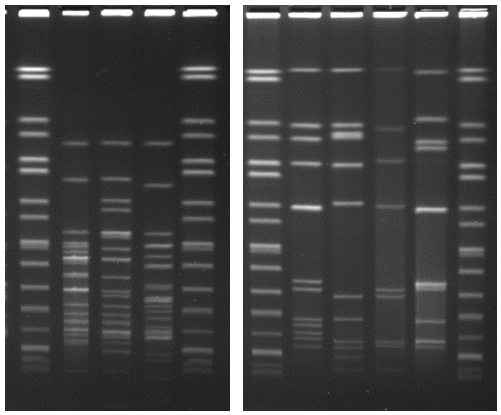
molecular-serotyping

DNA extraction
all non-human strains isolated till 50 days before the case



Screening by serotype
selection of the non-human strains with the same serotype

Comparison of PFGE profiles



ApaI ***AscI***

The notification of listeriosis in humans is mandatory in Luxembourg

	2007	2008	2009	2010	2011	2012	2013	2014
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* case-based report

General overview of SEMI*

*Epidemiological surveillance of infectuous dieseases

Main mission:

- laboratory-based surveillance of infectious diseases
- outbreak detection, response & prevention

3 major foci of interests:

- Food-borne pathogens
  - Campylobacter, Salmonella, VTEC, Listeria, enterotoxigenic S. aureus, norovirus
- Vaccine-preventable pathogens
  - influenza, HPV
- Antibiotic resistance
  - MRSA, carbapenemase-producing enterobacteriaceae

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GRAND-DUCHÉ DE LUXEMBOURG
Surveillance et Epidemiologie des Maladies Infectieuses

Methods & expertise

- National reference lab for gastro-intestinal pathogens
  - Longstanding collaboration with **ALL** hospital & private clinical labs and veterinary/food labs
  - Receive ~ 1000 bacterial isolates per year
  - Biobank of human, food, veterinary, and environmental pathogens (>10000 isolates)
- State of the art bacterial typing for surveillance
  - Whole genome sequencing, MLST, MLVA, PFGE
  - Real-time sharing with ECDC (European Center for Disease Control)
  - Miseq & bioinformatics tools (whole genome MLST, antibiotic resist.)
- Sentinel surveillance of influenza
  - 12 generalists & 3 pediatricians collecting ~1000 throat swabs per year

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GRAND-DUCHÉ DE LUXEMBOURG
Surveillance et Epidemiologie des Maladies Infectieuses

A long way to an NRL

Listeria baseline study = alarm clock

Political decision and financial considerations:
let's do it ourselves

Get the strains from all labs – better epidiological surveillance
Contact with EURL ☺

There is still a lot of construction work in progress

Acknowledgements

To all those envolved in sampling and Analyzing and

To the audience for their attention

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GRAND-DUCHÉ DE LUXEMBOURG