Laboratory-Acquired Infections in Belgium (2007-2012)

An online Survey

Scientific Institute of Public Health

Biosafety & Biotechnology Unit (SBB)

Nicolas Willemarck, PhD

Rue Juliette Wytsmanstraat 14 | 1050 Brussels | Belgium

T +32 2 642 52 93 | F +32 2 642 52 92 | email: contained.use@wiv-isp.be | www.wiv-isp..be

Introduction
Aim of the survey

▶ Gathering information on **bio-incidents** and **LAIs** in Belgian micro-biological laboratories to gain insight into possible underlying causes so as to provide the biosafety officer with tools which can enhance biological safety.

▸ **L**aboratory-**A**cquired **I**nfections (LAIs)

« All direct or indirect human infections with or without the onset of symptoms following exposure to pathogenic organisms in a micro-biological laboratory »

▸ Bio-incidents

« All irregularities that occur while handling GMOs or pathogenic organisms »

▸ **2012:** Online LAI survey in Flanders organized by SBB at the request of the Flemish Agency for Care and Health, Department Public health and Surveillance.

▸ **2013:** Extended over whole Belgium (Flemish, Walloon and Brussels-capital region)

Survey 1. Biosafety officer, prevention officer, occupational health practitioner
>> 213 institutions invited

>> Two types of questionnaires:

Survey 2. Personnel (survey 2)
>> 26 institutions invited (873 employees)

Introduction
Belgian LAI Survey 2007-2012

▸ **Tool:** **Limesurvey 2.0**, free online web survey tool with an automatic invitation, reminder and confirmation e-mail system

LimeSurvey
www.limesurvey.org

  ▸ **Anonymous**
    Invitation addressed to the biosafety officer provided a web link (URL) and a unique token which granted access to the survey
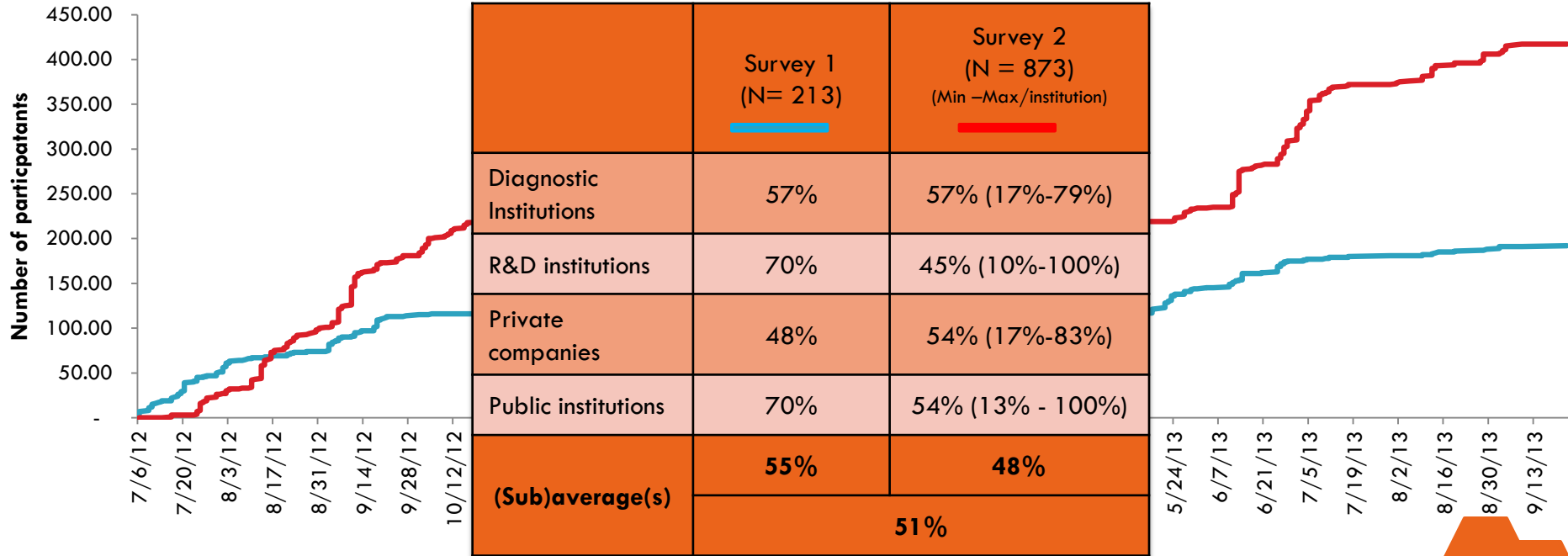 ▸ **In Dutch, French and English**
  ▸ **~50 questions and sub questions**
    Single-answer questions, multiple question and open questions
    Most of the question were mandatory

Laboratory-Acquired Infections in Belgium (2007-2012)
An online Survey
please peruse the LAI reports at your convenience online www.biosafety.be

ISP
WIV

Participation
Belgian LAI Survey 2007-2012

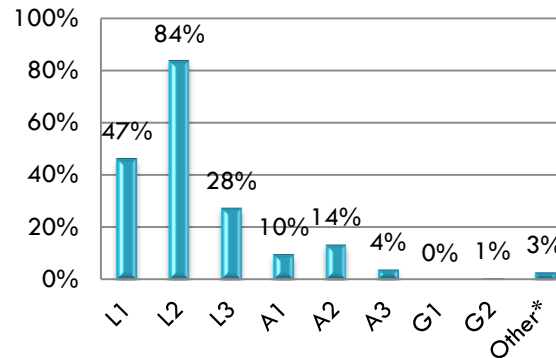|	Survey 1 (N= 213)	Survey 2 (N = 873) (Min –Max/institution)
Diagnostic Institutions	57%	57% (17%-79%)
R&D institutions	70%	45% (10%-100%)
Private companies	48%	54% (17%-83%)
Public institutions	70%	54% (13% - 100%)
(Sub)average(s)	55%	48%
	51%	

Participation
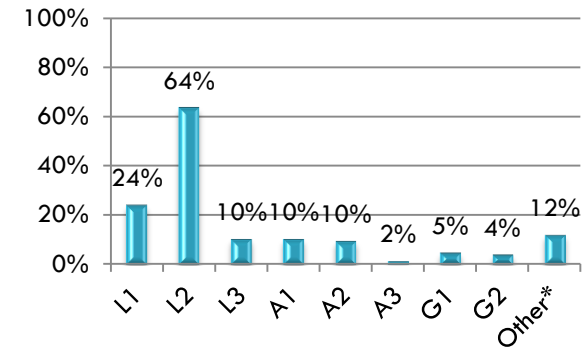# Belgian LAI Survey 2007-2012

Containment levels available in the institutions survey 1
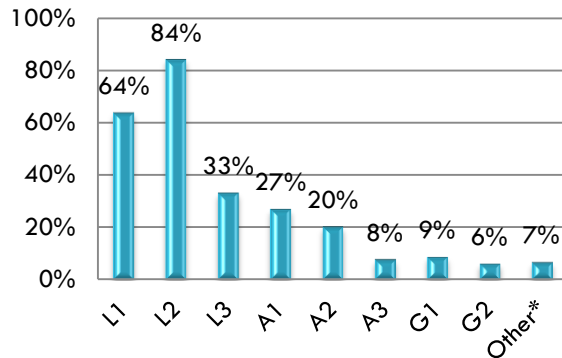
Containment levels available in the institutions survey 2

Containment levels in recent authorizations (n=559)

* **Other:** HR1 , LS1 , L2/BK, L2/Q, L3/BSE , G1-2/Q

LEGENDS: L = laboratory ; A = Animal facility; G = Green houses; HR = hospital room ; LS = large scale

Laboratory-Acquired Infections in Belgium (2007-2012)
An online Survey
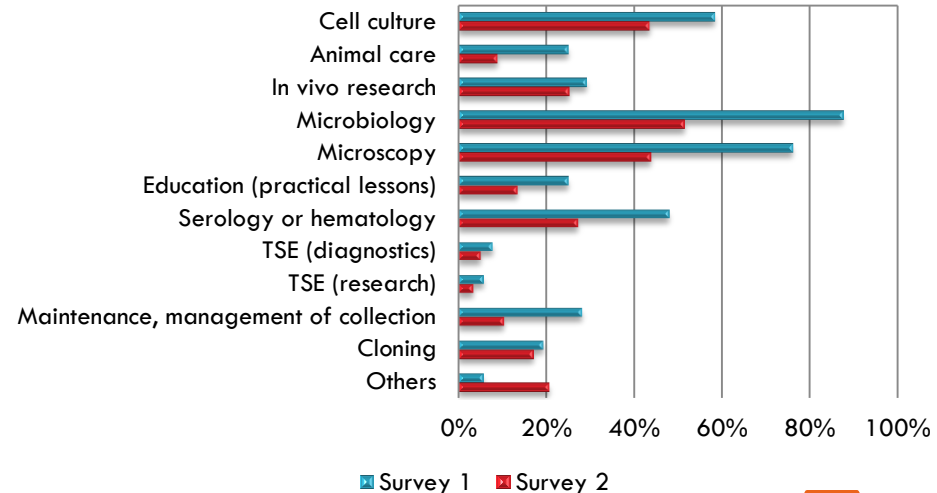*please peruse the LAI reports at your convenience online* www.biosafety.be

 isp wiv

Participation
Belgian LAI Survey 2007-2012

▶ **Participation rate in different sectors**

	Survey 1 (N= 213)	Survey 2 (N = 873)
(Bio)medical (Human)	75%	60%
Veterinary (Animals)	9%	39%
Plant research	15%	1%

▶ **Different types of activities**

▸ **Conclusion:**

- - The distribution pattern of the type of installations in survey 1 is similar to the requested containment levels in recent authorizations

- - Similar patterns are observed in survey 2 for the types of activities and installations

- - All types of sectors (except plant research) and activities are represented

  >>> REPRESENTATIVE GROUP of participants in both surveys

Results_LAI
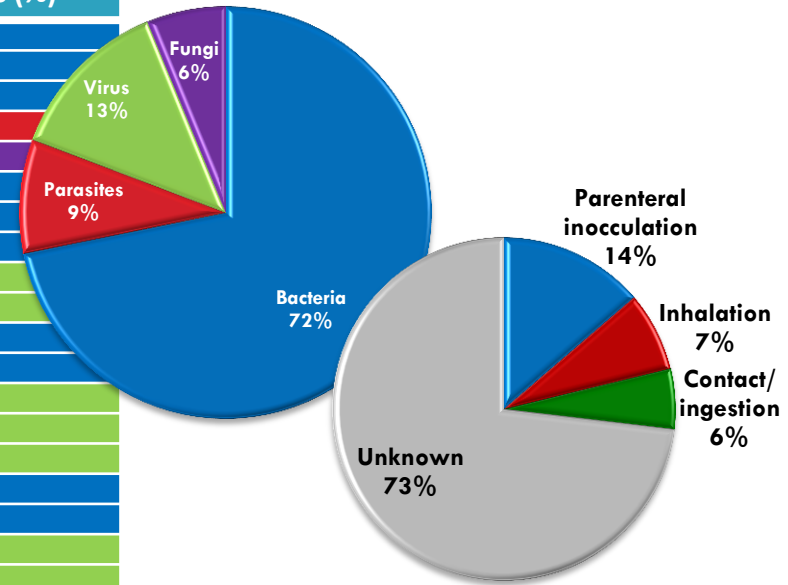# Belgian LAI Survey 2007-2012

Organism [max. number of cases _ %]	Risk class[1]	\multicolumn{5}{c}{Where did the infection happen?}	\multicolumn{4}{c}{Possible transmission route}
		L1	L2	L3	A2	Unknown	Inhalation	Parenteral inocculation	Ingestion / contact	Unknown
Salmonella bacteria (*) [N =20_25%]	2-3	5%	45%	5%		45%	8%		8%	85%
Mycobacterium turberculosis complex (*) [N = 15_19%]	3		33%	20%		47%			3%	97%
Brucella bacteria (*) [N = 10_13%]	3	10%	30%	40%		20%	30%	10%	10%	50%
Trypanosoma brucei gambiense [N = 6_8%]	2		67%		33%			100%		
Dermatophyte (Microsporuim canis & Trichophyton verrucosum) [N = 5_6%]	2		20%		40%	40%				100%
Shigella bacteria ($) [N =4_5%]	2-3		100%							100%
Coxiella burnetii (*) [N = 3_4%]	2					100%				100%
Mycoplasma [N = 2_2%]	2		100%				25%		25%	50%
Herpes virus [N =2_2%]	2		100%				50%		50%	
Hepatitis B virus [N =2_2%]	3					100%		100%		
Campylobacter ($) [N =1_1%]	2		100%							100%
BCG (Bacillus Calmette Guérin) [N =1_1%]	2			100%						100%
Parvovirus B19 [N =1_1%]	2		100%							100%
Avian Influenza (*) [N =1_1%]	2		100%							100%
HIV [N =1_1%]	3		100%					100%		
Toxoplasma gondii [N =1_1%]	2			100%				100%		
Bartonella bacteria [N =1_1%]	2-3			100%						100%
Rabies virus (*) [N =1_1%]	3					100%		100%		
Recombinant viral vector [N =1_1%]	2-3					100%				100%
Rubella virus [N =1_1%]	2		100%							100%
Listeria bacteria [N =1_1%]	2					100%				100%

[1] Risk classes for human as based on the Belgian risk classifications of micro-organisms, http://www.biosafety.be/RA/Class/ClassBEL.html; * notifiable infectious disease (; [S] only in case of collective outbreak)

isp wiv

Results_LAI
Belgian LAI Survey 2007-2012

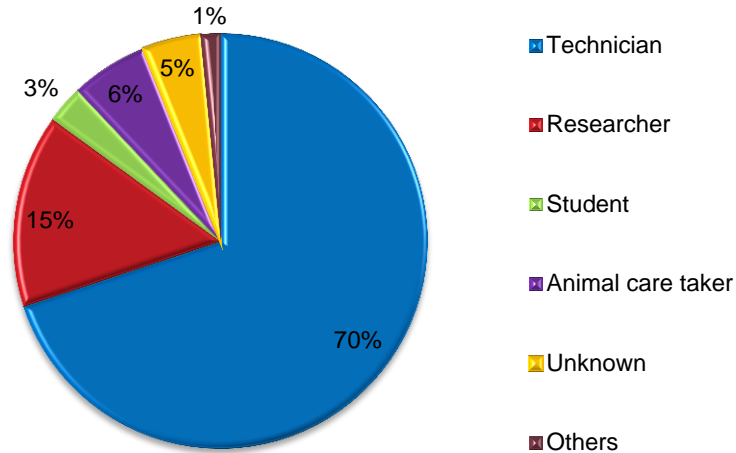| Organism	Risk class[1]	Max number of cases (%)
Salmonella bacteria (*)	2-3	20 (25%)
Mycobacterium turberculosis complex (*)	3	15 (19%)
Brucella bacteria (*)	3	10 (13%)
Trypanosoma brucei gambiense	2	6 (8%)
Dermatophyte	2	5 (6%)
Shigella bacteria ([S])	2-3	4 (5%)
Coxiella burnetii (*)	2	3 (4%)
Mycoplasma	2	2 (2%)
Herpes virus	2	2 (2%)
Hepatitis B virus	3	2 (2%)
Campylobacter ([S])	2	1 (1%)
BCG (Bacillus Calmette Guérin)	2	1 (1%)
Parvovirus B19	2	1 (1%)
Avian Influenza (*)	2	1 (1%)
HIV	3	1 (1%)
Toxoplasma gondii	2	1 (1%)
Bartonella bacteria	2-3	1 (1%)
Rabies virus (*)	3	1 (1%)
Recombinant viral vector	2-3	1 (1%)
Rubella virus	2	1 (1%)
Listeria bacteria	2	1 (1%)

[1] Risk classes for human as based on the Belgian risk classifications of micro-organisms; * notifiable infectious disease ([S] only in case of collective outbreak / >2 cases)
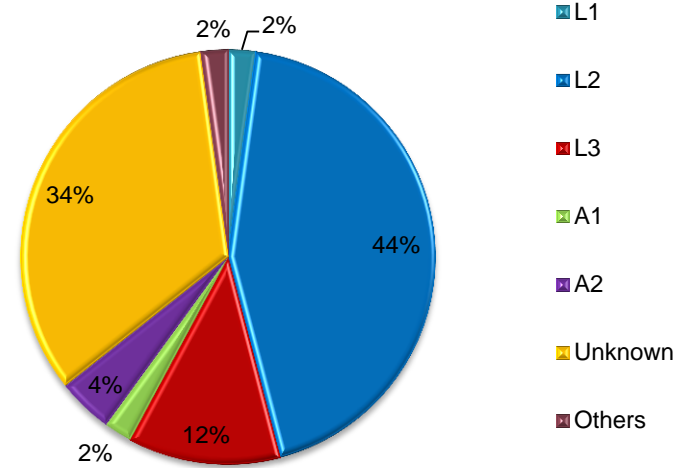

Identified transmission routes

Results_LAI
Belgian LAI Survey 2007-2012

Who was infected?

- Technician
- Researcher
- Student
- Animal care taker
- Unknown
- Others

70%, 15%, 3%, 6%, 5%, 1%

Where did the infection happen?

- L1
- L2
- L3
- A1
- A2
- Unknown
- Others

44%, 12%, 2%, 4%, 34%, 2%, 2%

Laboratory-Acquired Infections in Belgium (2007-2012)
An online Survey

please peruse the LAI reports at your convenience online www.biosafety.be

isp
WIV

Results_LAI
Belgian LAI Survey 2007-2012

In which context did the infection happen?

- ■ Cell culture
- ■ Animal care
- ■ In vivo research(small and large animals)
- ■ Microbiology
- ■ Microscopy
- ■ TSE (diagnostics)
- ■ TSE (research)
- ■ Maintenance, management of collection
- ■ Cloning
- ■ Autopsy
- ■ Unknown
- ■ Others
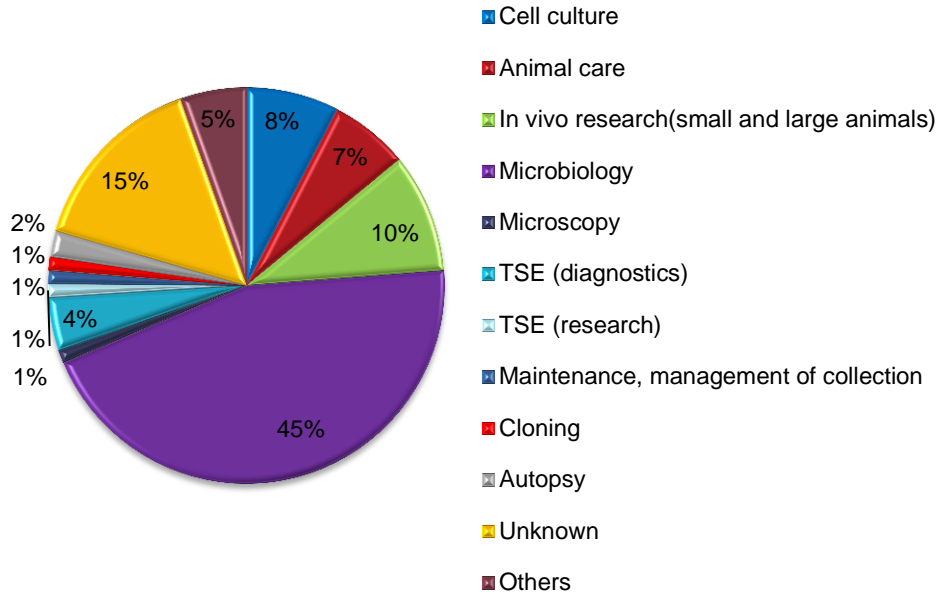
Type of incident involved in the infection?

- ■ Spills
- ■ Cutting / needle stick accident
- ■ Bites and scratches (animals)
- ■ Splashes
- ■ Falling of recipient
- ■ Technical failure of infrastructure
- ■ No compliance with the biosafety measures
- ■ Unknown

Laboratory-Acquired Infections in Belgium (2007-2012)
An online Survey

please peruse the LAI reports at your convenience online www.biosafety.be

isp
WIV

Results_LAI
Belgian LAI Survey 2007-2012
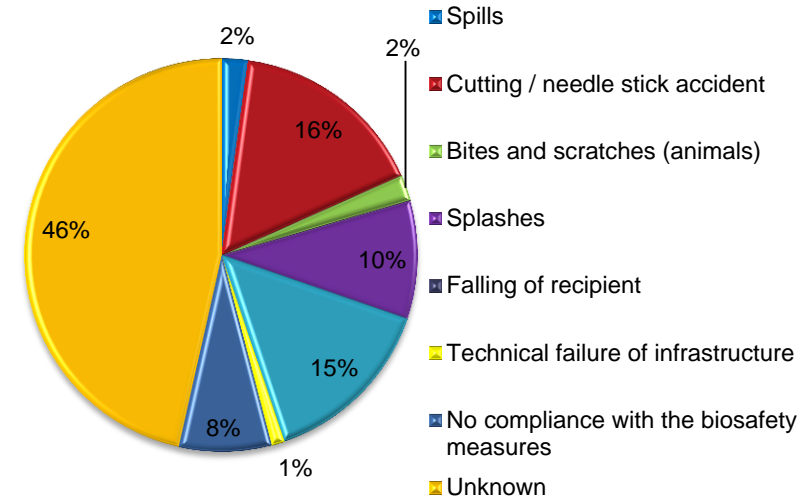
Was it transmitted to another person?

- 2% — Yes
- 73% — No
- 25% — Unknown
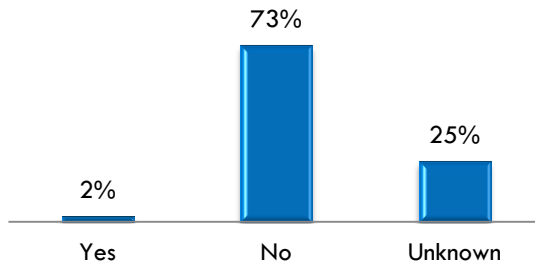
Is it proven that the infection is work related?

- 44% — Yes
- 31% — No
- 25% — Unknown

Days of disability (n=16)

6.7 +/- 2 days

on average

Laboratory-Acquired Infections in Belgium (2007-2012)
An online Survey
please peruse the LAI reports at your convenience online www.biosafety.be

ispWIV