

Infectious diseases in Luxembourg Prisons

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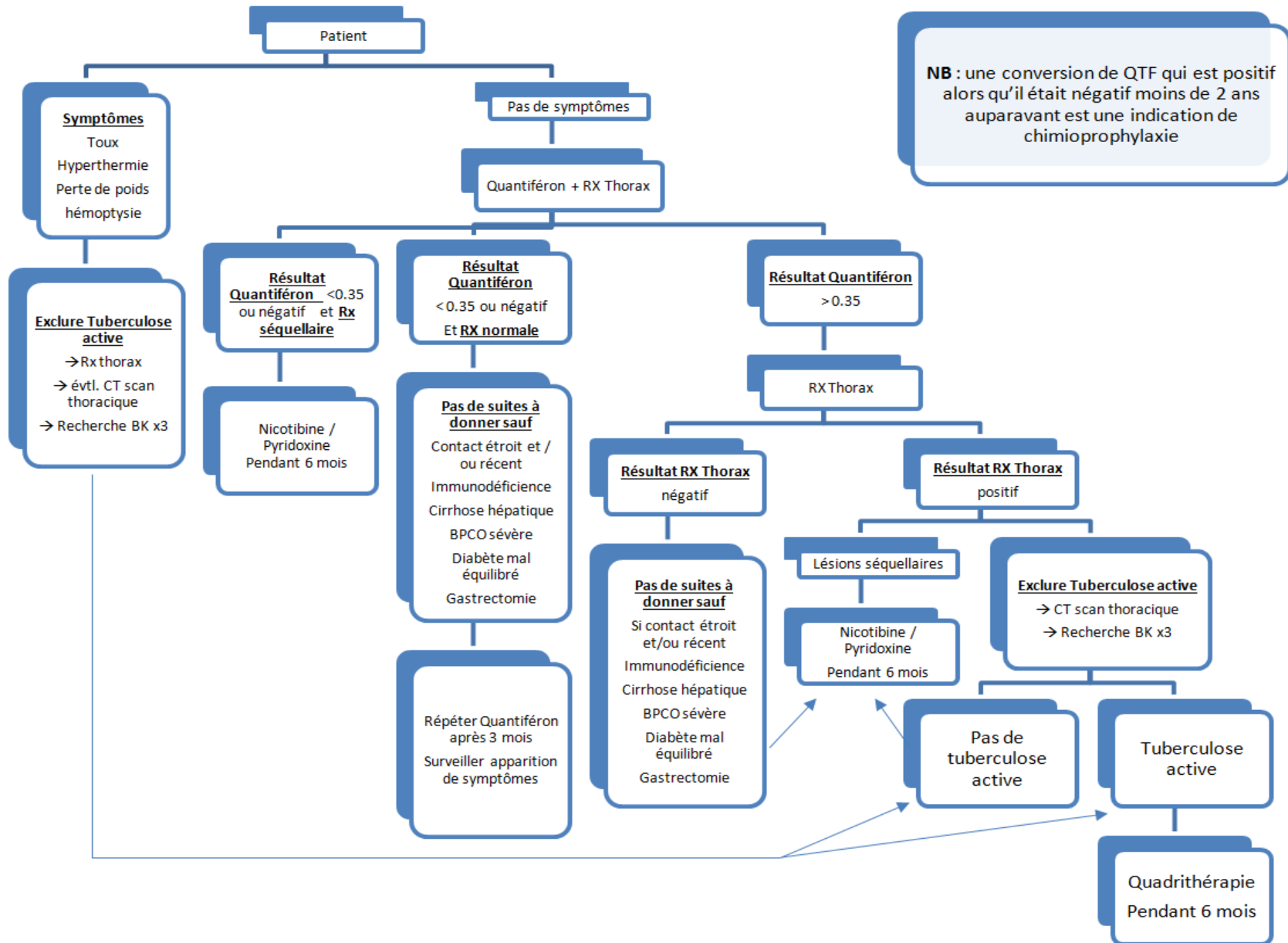
- Consultation de Maladies Transmissibles en Prison
- Nurse practitioner coordinated Clinic for infectious diseases in prison
- High number of inmates due to drug-related offenses
- High prevalence of hiv, viral hepatitis and other infectious complications related to illicit drug use
- Required a standardised approach

Work of the nurse in charge of infectious diseases

- Verification if every admission got his blood test
- Registration for medical consultation if the blood test is positive
- Organization of the consultations of the ID physician
- Preparation of requests for laboratory analysis and ultrasounds
- Realisation of Fibroscans and questionnaire for the hepatitis C study in prison
- Nurse consultation
- Organization of specific apointments from: f. ex. HIV-Berodung, ...
- Preparation of the release: medical reports, medication, ...

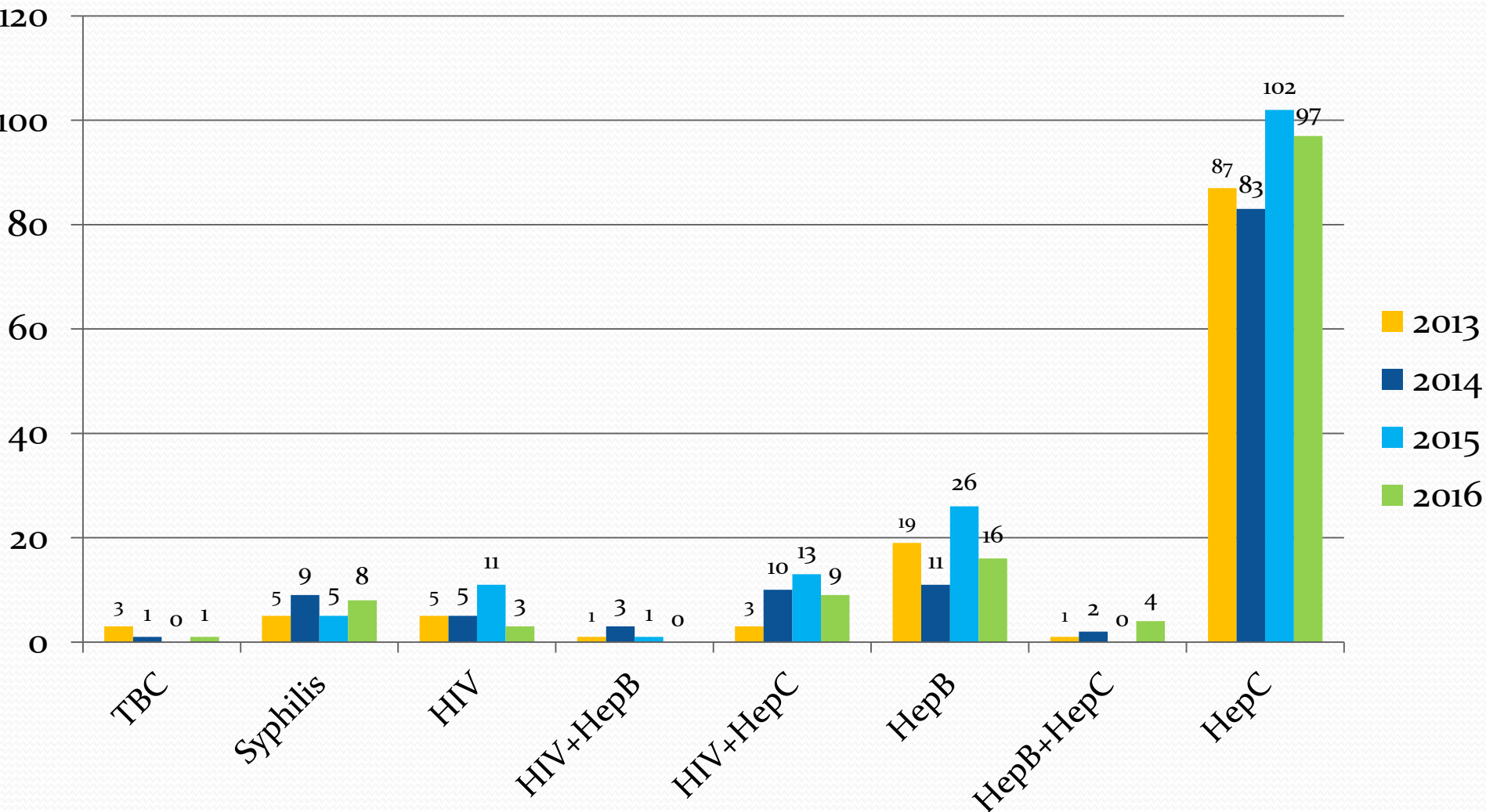
Procedure

- During the first days every inmate will be proposed a blood test
- Compliance rate: >95 %
 - Hepatitis A,B,C
 - HIV
 - Syphilis
 - TBC / QTF
- Results are given to the inmates by the doctor
- Vaccination against hepatitis A & B are proposed
- Monitoring in case of an infectious disease



Statistics of screening outcomes

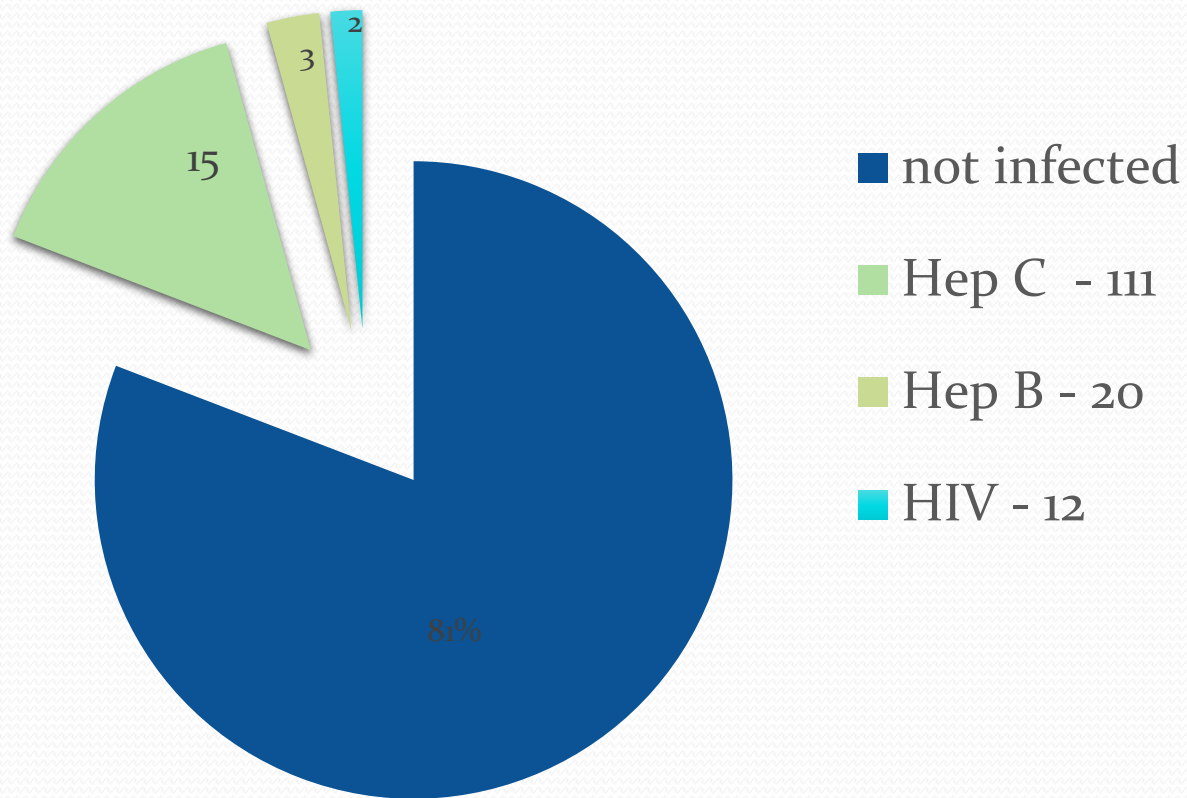
2013-2016



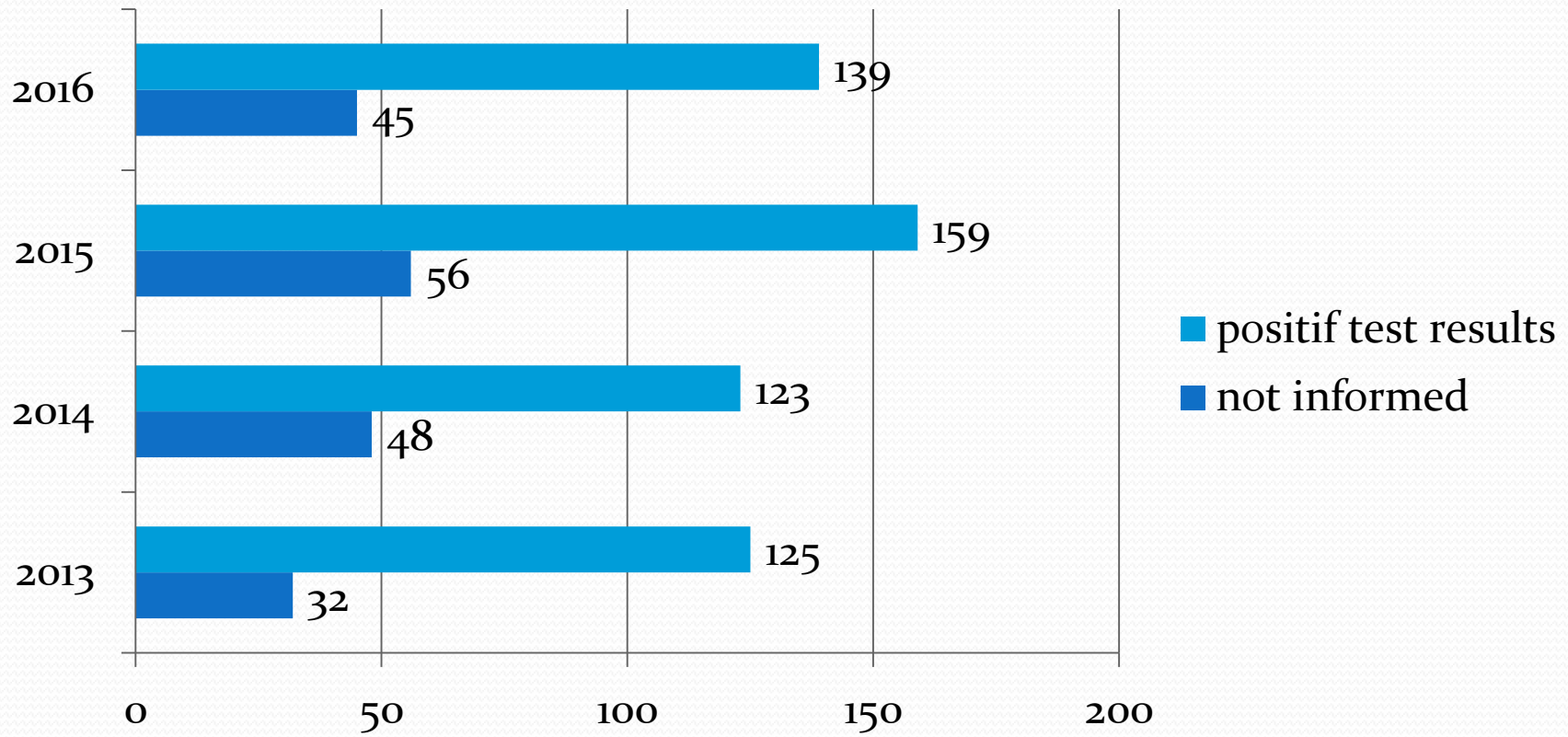
Blood test results 2016

(HCV 15%; HBV 3%, HIV 2%)

Total input serology - 748



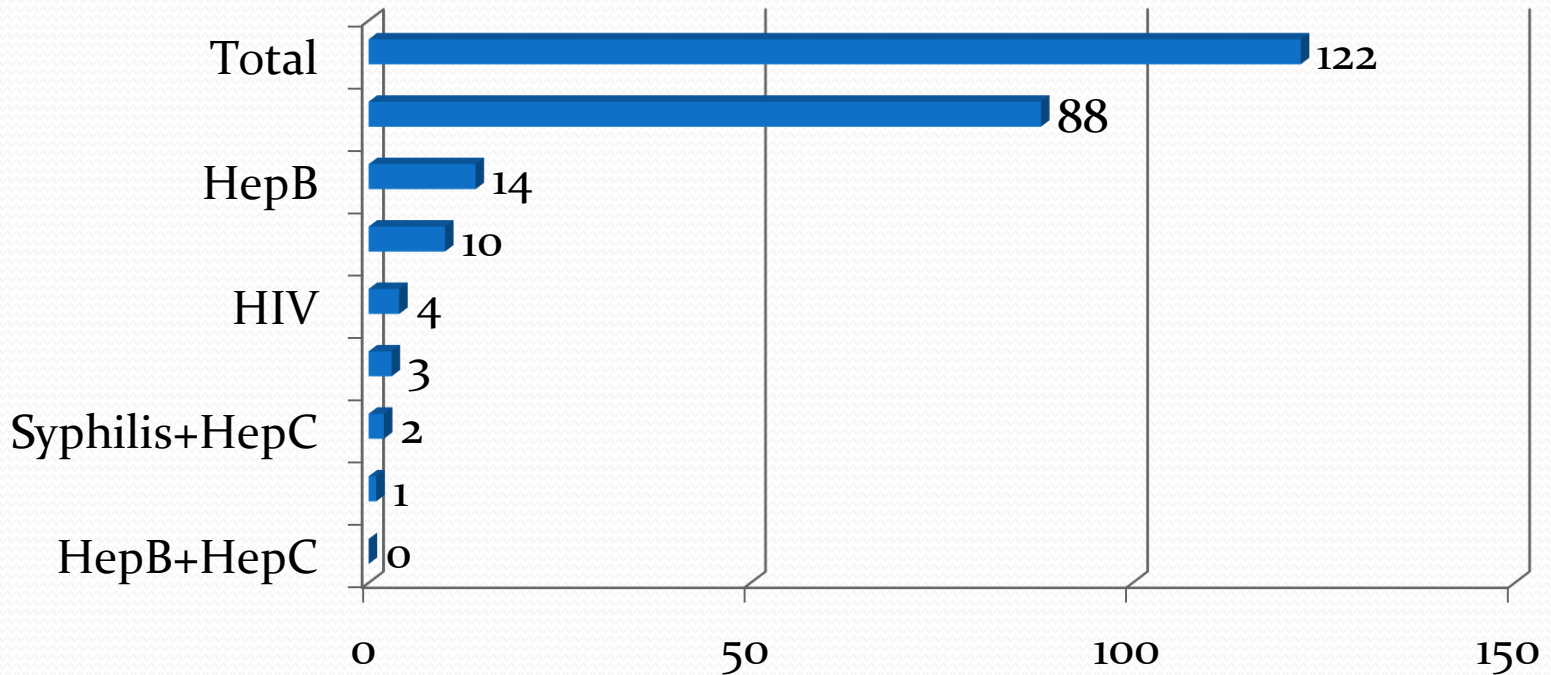
Rate of people who are not aware of their infection



27.05.2017

CPL 637/CPG 78

Total 715



Treatments : 2011-2017

Year	Hep.C	Hep.B	HIV	Syphilis	TBC	TBC CP
2011	16	2	3	3	2	46
2012	14	1	4	3	3	20
2013	13	2	3	1	3	24
2014	12	4	7	4	1	5
2015	11	3	11	3	0	7
2016	23	2	9	5	1	4
05/2017	9	2	8	1	0	1

Hepatitis C treatment results

	TOTAL	GT ₁	GT ₃	GT ₄	SVR	NVR	REC	LTF U	REF
2011	16	6	10	0	10	1	1	4	5
2012	23	15	8	0	15	2	2	4	6
2013	13	7	6	0	9	0	0	4	6
2014	12	4	5	1	6	0	2	4	1
2015	10	17	3	0	4	0	0	6	0
2016	23	13	9	1					

Rate of medical consultation and particular exams

Year	Medical consultation	patients	Echo abdo	Fibroscan
2013	31	457	194	171
2014	26	346	141	198
2015	24	364	120	202
2016	26	328	86	182

Vaccinations 2013-2016

	Engerix	Twinrix	Epaxal	Boostrix	Pneumo 23 Prevenar	Total par an
2013	362	186	72	113	4	737
2014	318	193	56	135	3	705
2015	290	168	49	128	23	658
2016	311	153	47	162	6	679



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HIGH RECURRENCE RATE OF HEPATITIS C INFECTION AFTER TREATMENT IN PRISON INMATES IN LUXEMBOURG

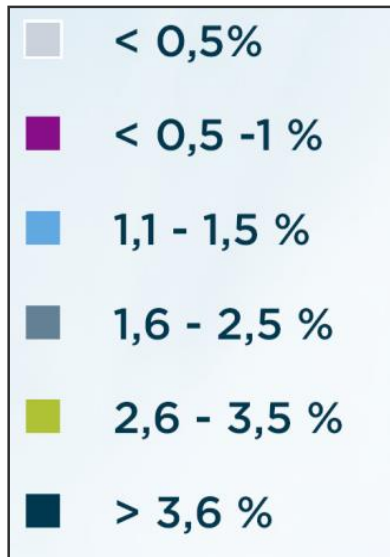
Carole Devaux, Aurélie Fischer

Infectious Diseases Research Unit

Department of Infection and immunity

Vic Arendt, SNMI, CHL

Estimated prevalence of hepatitis C in Europe



Luxembourg: 1%
3500-4000 HCV+ patients
Saraswat V. et al.
J Viral Hepat. 2015

Esteban J, et al. *Journal of Hepatology* 2008;48:148-162

<http://polarisobservatory.org>

Seroprevalence for blood-borne viruses in IDUs in 2006 and 2016 in Luxembourg

2006:

		OTC N/Ntotal	ITC N/Ntotal	PC N/Ntotal	IDUs N/Ntotal	nIDUs % N/Ntotal
HBV (cured or active infection)	Active HBV (HBs ag+)	1.5 2/130	0 0/54	7.0 8/115	3.9 10/254	0 0/45
	Cured HBV (HBs ab+, HBc ab+)	13.1 17/130	14.8 8/54	23.5 27/115	19.3 49/254	6.7 3/45
	Total HBVab *	22.3 29/130	16.7 9/54	34.8 40/115	29.1 74/254	8.9 4/45
HBV vaccination (HBs ab+)		39.2 51/130	57.4 31/54	45.2 52/115	46.1 117/254	37.8 17/45
HBV seropositivity (all types)		61.5 80/130	74.1 40/54	80.0 92/115	75.2 191/254	46.7 21/45
HCV (Elisa +, RIBA +) HCVab		57.3 75/131	75.4 46/61	86.3 107/124	81.3 218/268	19.1 9/47
HAV (IgG+) HAVab		54.7 70/128	57.1 24/42	68.3 41/60	57.1 108/189	65.9 27/41
HIV-1 HIVab		1.5 2/130	0 0/49	7.7 5/65	2.5 5/202	4.8 2/42

*Including 18 cases with HBc antibody only.

2016: 73.5 % of HCV Ab + (175/238 IDUs) and 9.2 % infected with HIV (22/238 IDU) at the national drug consumption room.

IDU is the main transmission risk factor in the general population and in prison

Risk factor	Overall	CPL	General
<i>n</i> (%)	437 (100)	104 (23.8)	333 (76.2)
IVDU	312 (71.4)	98 (94.2)	214 (64.3)
Medical-related	77 (17.6)	4 (3.8)	73 (21.9)
Sexual	35 (8)	0	35 (10.5)
Other	13 (3)	2 (2)	11 (3.3)

Roman F et al, World Journal of Gastroenterology 2007

2012: 2500 active IDU were estimated in Luxembourg, corresponding to 43.75% of the global HCV population (Hatzakis A. et al, J Viral Hepat. 2015)

2016: between 3.063 et 3.585 IDU were registered in 2 different harm reduction programs (duplicates, RELIS report 2016).

Challenges and opportunities in treating hepatitis C patients in prison

- ✓ Substance misuse is common and ongoing in prison
 - Needle exchange program effective in prison to avoid new infections (1612 syringes in 2016)
 - Opioid substitution therapy effective in prison (205 inmates in 2016)
 - A relapse of IDU is not a reason to stop HCV treatment
 - Alcohol dependence is stopped in prison

- ✓ Mental health issues common among HCV+ prison inmates: personality disorders, depression, psychosis
 - Systematic psychiatric evaluation is the rule (Interferon therapy), however rarely contraindication for treatment
 - Need for psychologic follow-up during treatment.

Monitoring hepatitis C patients in prison

✓ Access to diagnostic workup:

- Screening is proposed on admission: >95% accept
- Viral load, HCV genotype (difficulties of venous access)
- Abdominal ultrasound performed in prison by a radiologist (1x/month)
- Fibrosis staging: Fibroscan done by nurses and physicians

✓ Specialist consultation:

- ID physician: 2-3x/month in the prison, sees all HCV+ patients annually (if VL undetectable) or biannually (VL detectable) or monthly (if under treatment)
- Dedicated nurses (transmissible diseases): 2 nurses take part in the follow-up of HCV patients, supervision of treatment, taking questionnaires, data management

✓ Access to treatment: 23 inmates received Direct Acting Antivirals in 2016.

Prospective study:

- All prisoners were offered screening for hepatitis, STIs and tuberculosis between January 2003 and December 2014
- 665 patients were tested positive for HCV, of which 79 were not aware of their infection before prison
- During the study period, the standard of care treatment was daily distribution of Ribavirin and weekly injection of Peg-Interferon

Main Objectives:

- Analyse access to and effectiveness of treatment for hepatitis C in prison in Luxembourg before the Direct Acting Antivirals era
- Determine reinfection rate after discharge from prison (detectable VL after SVR12).

Baseline characteristics

Variables	Mean \pm SD	Percentage (%)	Percentage's 95% CI (epitools z-test, wilson interval)	Total (n)
Age (year)	41.8 \pm 8.17			
Treatment period (month)	7.32 \pm 4.32			
Follow-up period (Years)	6.08 \pm 4.26			
Gender				209
Female		4.3	[2.3 - 8.0]	9
Male		95.7	[92.0 - 97.7]	200
Contamination mode				
IVDU		90.4	[85.7 - 93.7]	189
Tattoo		2.9	[1.3 - 6.1]	6
Sexual		0.9	[0.3-3.4]	2
Coinfections all		7.7	[4.8-12.1]	16
Coinfection HIV		6.2	[3.7-10.3]	13
Coinfection HIV + HBV		0.5	[0.1-2.7]	1
Coinfection HBV		1	[0.3-3.4]	2

LTFU: 17 patients (8.1%) had an undetectable viral load 3 months after the end of the therapy but no 6 months post-treatment sample was available

Only 13/31 reinfections were confirmed by a change of genotype

Variables	Mean ± SD	Percentage (%)	Percentage's 95% CI (epitools z-test, wilson interval)	Total (n)
SVR12		64.6	[57.9 - 70.8]	135
Reinfection all		23.0	[16.7 - 30.7]	31
Reinfection and SVR		4.4	[2.1 - 9.4]	6
Reinfection and ongoing		18.5	[12.9 - 25.9]	25
Treatment failure		19.1	[14.4 - 25.0]	40
Lost to follow-up all		16.3	[11.9 - 21.9]	34
Genotype all		91.4	[86.8 - 94.5]	191
Genotype 1		51.8	[44.8 - 58.8]	99
Genotype 2		1.0	[0.3 - 3.7]	2
Genotype 3		41.9	[35.1 - 49.0]	80
Genotype 4		6.3	[3.6 - 10.7]	12
Genotype Unknown		7.7	[4.8 - 12.1]	16
IL28 all				92
IL28 CC		38.0	[28.8 - 48.3]	35
IL28 CT		51.1	[41. - 61.1]	47
IL28 TT		10.9	[6.0 - 18.9]	10
IL28 Unknown		56.0	[49.2 - 62.5]	117

Associations with risk of reinfection

- ✓ HIV co-infection was significantly associated to treatment failure ($p = 0.0165$) but not to reinfection ($p > 0.05$)
- ✓ No significant association between HCV or IL-28 genotype and reinfection ($p > 0.05$)
- ✓ Logistic regression did not show any significant association between the risk of reinfection and genotype, age, sex or drug usage (OR = 1.02, 1.33, 1.16 respectively, $p > 0.05$).

In prison « all is well », but what thereafter..?

Reinfection rate : 5.1 per 100 person-years of follow-up

Among 6 studies on reinfection: 0.8-4.7 per 100 person years of observation Esther J. Aspinall (CID 2013;57:Supplement 2)

Among those with IDU post-treatment: 6.4 per 100 PY (2.5-16.7)

From prison to community:

- ✓ Frequent relapse into drug consumption (national drug consumption room) and risk of rapid reinfection
- ✓ Housing
- ✓ Social security
- ✓ Methadone substitution

➡ Prevention in prison to avoid reinfection (HIV-berodung for hepatitis, STIs and HIV)

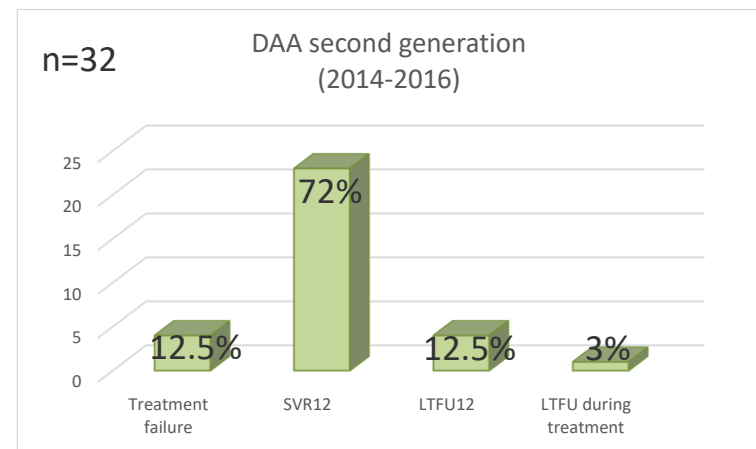
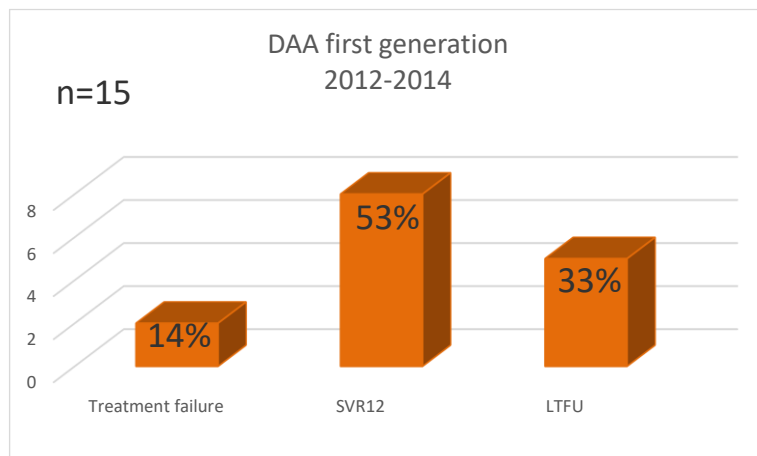
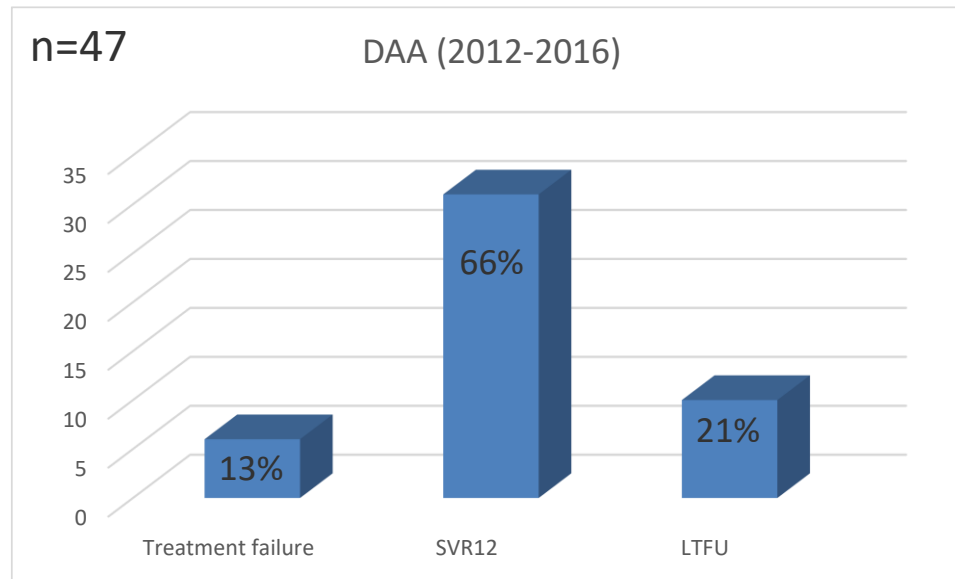
➡ Effective Link to OST prescribers at discharge.

Where do the re-infections occur?

- For 34 réinfections, 29 occurred **out of prison** and were frequently diagnosed at re-admission in prison
- 4 certainly occurred **in prison**; 1 unknown
- From 2013-2017, we are aware of 7 HCV infections that occurred in prison; this is probably an underestimate
- Within a project started 2016, we are now also screening yearly for blood-borne pathogens in those inmates in prison for drug-related offenses who are not infected or previously cured of HCV, as well as at discharge from prison, to find out how frequent new HCV infections in Luxembourg prisons are (we hope low...)
- Some inmates start drug use only in prison, more difficult to reach

- ✓ A stay in prison is an effective opportunity to treat a group of HCV-infected patients which have otherwise very limited access to therapy
- ✓ Although a good success rate of HCV therapy was observed, the rate of reinfection after discharge from prison was high
- ✓ The arrival of DAA in prison since 2015 should improve therapy outcome. However, a high reinfection risk could compromise its cost-effectiveness (current assessment of reinfection in prison and at discharge)
- ✓ Prevention during treatment while patients are in prison as well as link to OST prescribers after discharge of prison should be strengthened.

Treatment effectiveness with DAA in prison



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HIV Berodung

ABRIGADO

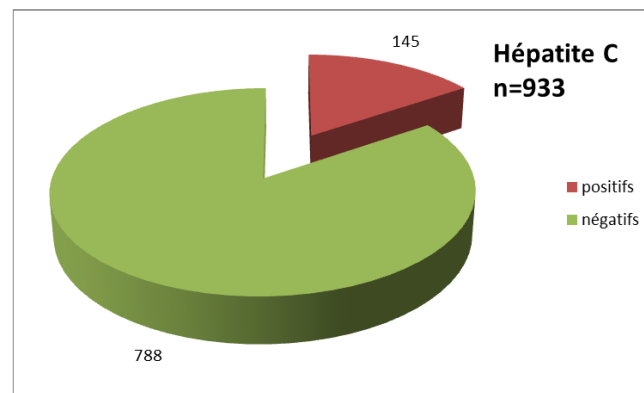
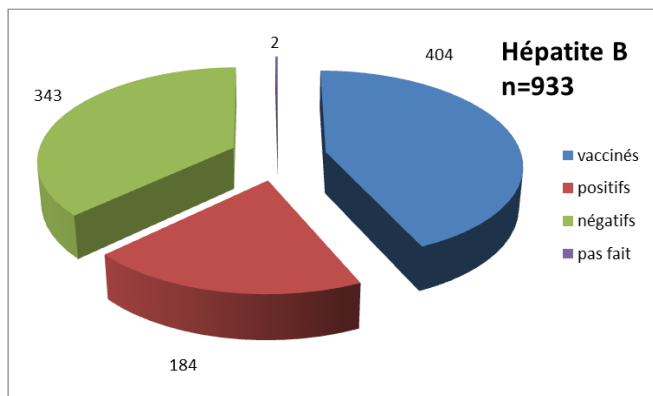


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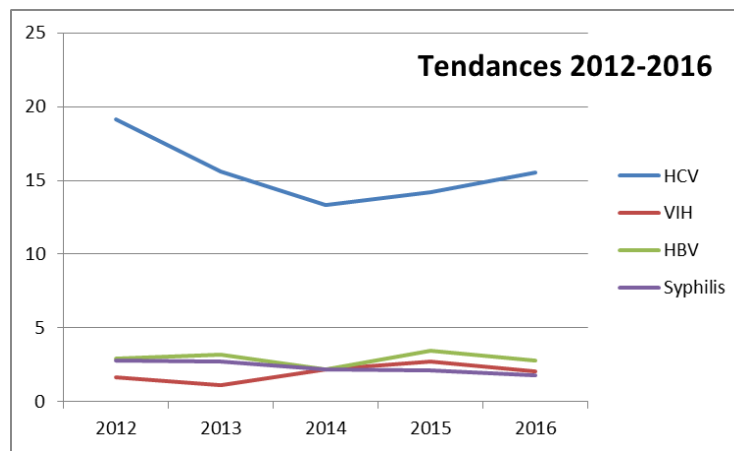
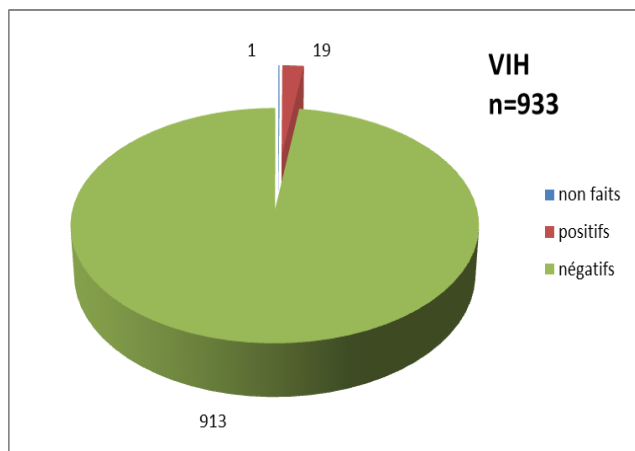


Thank you

Prevalence of transmissible diseases in the 2 prisons of Luxembourg



78 %
with
HCV Ab



In 2016, 933 serology tests for HIV, HBV and HCV were performed at entrance (4 coinfecté with HCV and HBV, 13 coinfecté with HCV/HIV)