USED SYRINGES ANALYSIS: A NEW APPROACH TO BETTER KNOW THE INJECTED DRUG USES AND USERS

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Introduction

• 280 000 problem drug users
  – 70 000 of them are low threshold structures’ clients¹

→ Those who answer to surveys
  ○ Declarative bias

What about the hidden users?

→ Little is known about the substances injected by drug users

¹OFDT, Drugs, key data. 6th edition, Saint-Denis, OFDT, 2015, 8 p.
Substances

**Opiates**
heroin, monoacetylmorphine (6-MAM)

**Cocaine, metabolites and cutting agents**
cocaine, benzoylecgonine (BZE), ecgonine methylester (EME), levamisole

**Non NPS synthetic stimulants**
amphetamine, MDMA

**Cathinones**
methedrone (4-MMC), methylethylcathinone (4-MEC), 3-MMC, MDPV, methylone

**Others NPS**
2-AI, 4-FA, 4-MeOPCP, 5-APB, 6-APB, chloroamphetamine, methiopropamine, etizolam
Substances

**Opioids**
- morphine
- dextropropoxyphen
- fentanyl

**Opiates substitutes**
- buprenorphine
- methadone

**Benzodiazepine**
- alprazolam
- clonazepam
- diazepam
- flunitrazepam
- zolpidem

**Synthetic stimulant**
- methylphenidate

**Others**
- ketamine
- trihexylphenidyle
Samples preparation for chemical analysis

Recovering drug residues from used syringe

methanol

methanol + residues
Samples preparation for chemical analysis

1. Used syringe

2. Clean syringe

3. Methanol

4. Methanol + Residues

5. Recovering drug residues from used syringe

6. Sample filtration
Analytical method

HPLC  Tandem mass spectrometry

TO SUM UP

32 sites
5562 samples
Results - example

Kennedy station

Date 25/03/2014
Syringes analyzed 30

<table>
<thead>
<tr>
<th>Substances</th>
<th>Syringes</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>4-MEC</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>4-MEC / COC</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>4-MEC / MePHEN</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>4-MEC / x-MMC / COC</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>4-MEC / x-MMC / COC / METHOX</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>4-MEC / x-MMC / MePHEN / METHYLONE / MOR</td>
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Syringes with blood 6
Syringes with broken needle 0
Syringes with graduations erased 3
Syringes with particular signs 0
Results - 2014
### Results - example

**Kennedy station**

**Date**: 25/03/2014  
**Syringes analyzed**: 30

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- **Syringes with blood**: 6  
- **Syringes with broken needle**: 0  
- **Syringes with graduations erased**: 3  
- **Syringes with particular signs**: 0
Results - reuse

- 1 Substance 46.50%
- 2 Substances or more 46.13%
- Speed-ball (Heroin + Cocaine) 7.37%
Results - trends
Results - trends

[Diagram showing trends in drug usage in different areas, including Aulnay s/s-Bois and Kennedy.]

- Cocaine
- Heroin
- Buprenorphine
- Morphine
- NPS
- Medical drugs
Results - trends

Aulnay s/s-Bois

Kennedy

Javel

2014       2012       2010

2014       2012       2010

2010

2012

2014

cocaine  heroin  buprenorphine  morphine  NPS
medical drugs
Results - trends
VIROLOGICAL ANALYSIS

Virology Laboratory, Hôpital Pitié-Salpêtrière, Assistance Publique, and Pierre et Marie Curie University
Samples preparation for virological analysis

Viral RNA was extracted using the Abbott M2000sp (sample preparation) system. The purified RNA was analyzed using consecutively by:

- Real time HIV reagents for HIV,
- Real time HCV reagents for HCV RNA

The limit of detection for HIV was 50 copies/mL and for HCV 12 IU/mL.

HBsAg was detected on the residual volume of collected rinsing water using the Abbott Architect system (HBsAg reagent).

The lower limit of detection for HBsAg was 0.05 IU/mL.

Liquid was stored frozen at -20°C until further use.
### Results - virology

<table>
<thead>
<tr>
<th>Location</th>
<th>HCV (RNA)</th>
<th>HIV (Ag-Ab)</th>
<th>HBV (AgHBs)</th>
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<tbody>
<tr>
<td>Budapest street (n=75)</td>
<td>4</td>
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<td>3</td>
</tr>
<tr>
<td>Gare de Lyon (n=70)</td>
<td>12</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
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<td>4</td>
<td>1.5</td>
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HBV seems to be a minor concern
### Results - virology

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HIV was observed in a very small proportion of analyzed syringes.
## Results - virology

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HCV seems to be more problematic:
- contaminated syringes were found in all sites
- not a surprise given the estimated prevalence

The site with the highest number of contaminated syringes is located far away from any harm reduction facilities.
Conclusion

• Limits:
  – Different ways to get rid of syringes (collect in structure, pharmacy…)
  – A person can throw away 20 syringes while 10 people can throw away 2 each
  – The syringes may have been disposed of several weeks after use
    • Degradation of molecules and viruses

• New tools to assess the drug consumptions and to estimate a HIV/HCV prevalence of a particular population of drug users

• Objective observations
  – Analytical chemistry
  – Virology tests
Thank you for your attention


Hepatitis C transmission in injection drug users: could swabs be the main culprit? J Infect Dis. 2011 Dec 15;204(12):1839-42.

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