Wastewater based epidemiology

Introduction

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In this presentation…

- Wastewater based epidemiology - a new tool to rapidly report on new trends

- WBE:
  - Its potential for monitoring drug use
  - Challenges for and limitations of WBE

- EMCDDA publications on WBE
WBE — how does it work?
WBE — a new tool in the epidemiological toolkit
WBE – a new tool to rapidly report on new trends

Tracking new drugs and emerging trends

- Hospital emergencies
- Forensic & pill testing
- Internet monitoring
- Wastewater analysis
- User, KI, trendspotter
- Local/city networks

Routine monitoring: surveys, seizures, overdoses etc.
Wastewater analysis — its potential for drug use monitoring

- Not subject to response and non-response bias
- It can better identify the true spectrum of drugs being consumed
- Timely information
- Information on geographical and temporal trends
- Relatively inexpensive

- Independent estimate of total consumption
Wastewater analysis — challenges and limitations

- No information on prevalence of use
- Recreational versus heavy drug users – complexity in patterns of use
  - Frequency of use
  - Which users
  - Routes of administration
  - Purity
- City data versus national data
- Wide range of uncertainties: sampling of wastewater, different back-calculation methods, behaviour of biomarkers in the sewer, etc.
- Ethical issues?
Since 2011 when we started with monitoring drugs in wastewater the amount of participants and countries has been growing rapidly.

<table>
<thead>
<tr>
<th>Year</th>
<th>Countries</th>
<th>Cities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 (h)</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>2012 (h)</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>2013 (h)</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td>2014</td>
<td>19</td>
<td>50</td>
</tr>
<tr>
<td>2015</td>
<td>27</td>
<td>67</td>
</tr>
<tr>
<td>2016 (&gt;28)</td>
<td>&gt;28</td>
<td>&gt;70</td>
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</tbody>
</table>

*2016: More information about the 2016 campaign can be found here*

*2015: The results of the 2015 monitoring campaign will be available 31st May 2016, here on the EMDDA website together with the release of the European Drug Report (EDR) 2016.*

*2014: The results of the 2014 monitoring campaign can be found here*
EMCDDA publication of wastewater findings

http://home.emcdda.europa.eu/topics/pods/waste-water-analysis
An overview of key results – geographical variation
An overview of key results – temporal variation

Comparison with other monitoring tools?

Predominant stimulant drug by last year prevalence among young adults (15–34)

EDR 2015

EDR 2016:

Most frequent stimulant seized in Europe, 2014 or most recent data

- Cocaine
- Amphetamine
- Methamphetamine
- MDMA
- No data

Cocaine

Amphetamines
Comparison with other monitoring tools?

Methamphetamine changes
Select a year: 2011 2012 2013 2014 2015

MDMA changes

Legend:
- 300 mg/1000/day
- 100 mg/1000/day
- 75 mg/1000/day
- 7.5 mg/1000/day and lower

Below quantification level

Graph showing changes in methamphetamine and MDMA usage over time.
Where do we go next?

- WBE as a new tool in the epidemiological toolkit – integration in EDR and Statistical Bulletin
- Further comparisons are needed between wastewater and other data sets
- WBE can provide information on illicit drugs, tobacco, misuse of medicines, health and illness indicators
- WBE as an outcome measurement tool?
- Total consumption estimates?
Find out more?

Wastewater analysis and drugs — a European multi-city study

Introduction

Last update: 31.05.2016

The findings of the largest European project to date in the emerging science of wastewater analysis are taken up in this Perspective on drugs. The project in question analysed wastewater in over 60 European cities and towns (hereinafter referred to as ‘cities’) to explore the drug-taking habits of those who live in them. The results provide a valuable snapshot of the drug flow through the cities involved, revealing marked geographical variations.

Part of the Perspectives on drugs (POD) series, launched as part of the European Drug Report package, these designed-for-the-web interactive analyses provide deeper insights into a selection of important issues.

In total, 67 cities in 27 countries worldwide participated in the 2015 SCORE wastewater monitoring campaign. For the purpose of this analysis, data was analysed from 44 cities in 18 countries (EU and Norway). Additional data from other countries and cities can be found in the POD interactive element.

Activities in the area of wastewater analysis

Analyzing communal wastewaters for drugs and their metabolites in order to estimate their consumption in the community is a developing field, involving scientists working in different research areas, including analytical chemistry, physiology and biochemistry, sewage engineering, spatial epidemiology and statistics, and conventional drug epidemiology.
Thank you!

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