TESTING THE WATERS

Monitoring illicit drugs in waste water
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Why Monitor Illicit Drug Use?

- Illegality of drug use makes it difficult to
  - Monitor drug use in the population
  - Evaluate the effectiveness of:
    - preventive interventions e.g. media campaigns
    - law enforcement efforts to reduce supply
    - Increasing access to treatment
- Household and school surveys
  - Response rate under 50%; sampling & response biases
  - Requires large N; expensive; and done 3 yearly
Wastewater Analysis

• Illicit drugs can be detected using LC-MS in ng/L
• These levels can be used to back-calculate
  • Total quantity of drug consumed in WW catchment
  • Potentially rates of illicit drug use in catchment population
• Provides estimates of drug use:
  • that do not depend on self-report
  • cover drug use in the population of WW catchment
  • in principle, near real time and continuous
  • probably cheaper than population surveys
  • provide a useful adjunct to survey methods
Technical Challenges

• Waste water sampling needed to estimate daily excretion
• What chemicals should be measured
  – residues, metabolites, or both?
• Analytical issues
  – Average rates of excretion of drug (CF)
  – Rate of degradation of drugs in WW systems
• Back-calculation of per capita consumption
  – N and catchment population: age, sex, drug users
  – What is the average dose used?
Support for Utility

- Rank ordering of metabolites in WW:
  - Cannabis > MDMA > cocaine
- Temporal variations in levels:
  - Over weekends vs other days of week:
    - cannabis & heroin stable; > cocaine & MDMA weekends
    - Reduction between 2007 and 2009 in Milan (GFC)
- Geographic variations within countries:
  - Usually higher levels in large cities
- Rank order concordance with survey prevalence:
  - Sometimes higher in WW estimates
Conclusions

• WWA is a promising method for monitoring
  • population illicit drug use
  • Emerging new psychoactive substances
  • Alcohol use in population
  • Possibly drug use in prisons

• Technical challenges to be solved
  • Likely to be a very useful addition to current survey methods
  • A potentially important public health innovation

• Ethical issues:
  • Privacy and consent not major issues
  • May be much less intrusive than some current methods
  • Use in some settings requires more debate
    • prisons, schools, workplaces
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