Some insights and ideas about creating supply indicators and studying markets

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About RAND Europe

• Non-partisan, non-profit research organization

• Headquartered in the US, two European offices
  – Cambridge and Brussels

• 60+ researchers on both sides of the Atlantic conducting research on substance use, markets, and drug policy
Insights based on recent collaborations

• Recently completed projects
  – Report on global illicit drugs markets (with Trimbos)
  – Understanding drug markets and supply-reduction

• Current projects
  – Further analysis of the EU illicit drugs market (with ICPR and Trimbos)
  – What America’s users spend on illicit drugs and trends in the supply of illicit drugs (with Carnegie Mellon University)
Outline

• Discrepancies in conventional supply indicators

• Fully exploiting seizure data

• Learning more from heavy users

• Estimating time from harvest to seizure
Net Mexican marijuana production allegedly tripled from 2001 to 2008.

Source: Kilmer, Caulkins, Pacula, & Reuter, 2011
... but marijuana use in U.S. was flat

Source: Kilmer, Caulkins, Pacula, & Reuter, 2011
Important differences closer to home: Arrests for drug supply offenses

- **EUROSTAT**
  - “Drug trafficking includes illegal possession, cultivation, production, supplying, transportation, importing, exporting, financing etc., of drug operations which are not solely in connection with personal use”

- **EMCDDA**
  - The term ‘reports for drug law offences’ covers different concepts, varying between countries.
  - Based on data from REITOX National Focal Points
For Spain, REITOX > EUROSTAT

REITOX: “Arrests made in case of dealing/trafficking (criminal offences).”
EUROSTAT reported break in 2005 because of penal code change, no definition
For Netherlands, REITOX < EUROSTAT

REITOX: “Offences against the Opium Act considered in need of Prosecution Department.”
EUROSTAT: Only present data going back to 2005, no definition given
For Netherlands, REITOX < EUROSTAT

REITOX: “Offences against the Opium Act considered in need of Prosecution Department.”
EUROSTAT: Only present data going back to 2005, no definition given.
For Belgium, no longer a discrepancy

REITOX: “Police reports of offences related to illicit drugs.”
EUROSTAT: “Includes unauthorised production, import, export and trading of drugs.”
These discrepancies can matter and some are being addressed

• Activities of other countries can have obvious implications for drug supply and indicators in BE

• Fortunately, institutions are currently working together to address these disparities
  – EMCDDA, EUROSTAT
  – EC working to harmonize criminal justice databases

• All of these examples serve as a reminder to be careful when using official administrative data
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Total seizures useful, not a great indicator

• Quantity seized is a function of at least three factors (Reuter, 1995)
  – The quantity shipped
  – The care taken by smugglers
  – The relative skill of the interdictors

• Thus, seizures may decrease because law enforcement becomes more effective or less ineffective

• Suggests collecting more info than just total seizures and total weight
Beyond total and average weight

- Would like information about the distribution of weights
  - Minimum, maximum, median, average, mode, variance

- Even better to have statistics by “weight bin”
  - Example of 4 bins: <1g, 1g-10g, 11g-200g, 200g+
  - Will likely differ by drug
  - Would allow us to better understand whether and how law enforcement is influencing the different levels of the markets

- And of course, purity information is of critical importance for understanding market dynamics
There is a wealth of purity information waiting to be analyzed by researchers

- European Network of Forensic Science Institutes (ENSFI)
  - Has a working group on illicit drugs

- We surveyed 56 ENSFI members, received responses from 21 labs in 16 countries

- Focus on 16 labs (one from each country)
  - 15 publicly owned, mostly by law enforcement
Survey insights from 16 labs

• More than half of these labs reported testing at least 1,000 samples in a typical month.
  – Less than 25% reported <250 samples per month

• Asked whether they collected information about the type of drug, quantity analysed, and purity in a computer database
  – 15 of the 16 said yes

• Asked when the institute began entering this information into a computer database
  – Mean and median were both close to 1999
  – Minimum = Before 1980; Maximum = 2005
<table>
<thead>
<tr>
<th>Country</th>
<th>Would you share purity data with select researchers for statistical analysis?</th>
<th>Approximately how may institutes in your country assess the purity of illicit substances?</th>
<th>Approximately how many samples of illicit drugs are tested in a typical year for the entire country?</th>
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<tr>
<td>Belgium</td>
<td>Yes</td>
<td>5–10</td>
<td>&gt;=1,000 &amp; &lt;10,000 samples</td>
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<td>5–10</td>
<td>&gt;=25,000 samples</td>
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<tr>
<td>France</td>
<td>Yes</td>
<td>11–20</td>
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<tr>
<td>Germany</td>
<td>*</td>
<td>21+</td>
<td>*</td>
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<td>2–4</td>
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<td>&gt;=25,000 samples</td>
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<td>21+</td>
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<td>Do not know</td>
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<td>&lt;1,000 samples</td>
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<td>&gt;=1,000 &amp; &lt;10,000 samples</td>
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<tr>
<td>Ukraine</td>
<td>No</td>
<td>11–20</td>
<td>&gt;=25,000 samples</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Yes</td>
<td>1</td>
<td>&gt;=10,000 &amp; &lt;25,000 samples</td>
</tr>
</tbody>
</table>

* Not reported

Source: Kilmer & Hoorens, 2010
Beyond purity: More can be learned from seizures sent to labs

- Identification and quantification of adulterants
- Identification of source country
- UK SOCA’s Project ENDORSE receives a lot of attention
  - Database includes results from a battery of tests for all seizures of powdered Class A drugs and amphetamines > 25g
  - Images of the drugs, wrappings, containers loaded and tagged
Must consider cost of extra analyses

• Originally cost £70,000/month to pay forensic service providers to conduct the additional analysis
  – Cut back to £50,000/mo (P. McGee, Retired SOCA)
  – This was in addition to the cost of receiving, storing, and analysis covered in existing contracts

• Unclear whether ENDORSE will be cut

• “ENDORSE Light” for UK and others?
  – Could consider developing a sampling frame to preserve many of the insights while reducing costs (J. Caulkins)
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Heavy users can provide useful insights about supply changes and market activity

- Information about market transactions
  - Expenditures, purchase characteristics
- New drugs entering the market
- Perceived risk of arrest
- Information about quantities consumed
  - Has very important consequences for market estimates and assessing the seizure rate
  - Important to distinguish between most recent vs. typical use days
Tremendous variation in estimates of annual heroin consumption

Pure grams consumed by regular users in EU

- UNODC (2005): 58 grams
- Paoli et al. (2009): 30 grams
Number of ways to regularly talk with heavy drug users

• Could obtain from treatment participants or interviews with a sample of heavy users
  – E.g., Australia’s Illicit Drug Reporting System (IDRS)

• Could obtain this information from arrestees/inmates
  – E.g., ADAM program in New Zealand, U.S.

• Preferable to obtain on a quarterly basis, but still useful if only done annually
  – Idea is to make it systematic so changes can be documented
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How long does it take to get plant-based drugs from the farm to the street?

• Basic information about the supply chain is critical for truly understanding supply

• Traffickers may stockpile drugs and sell when price rises, or risk of seizure/theft is perceived to be low

• Storage and lags pose problems for assessing supply trends and supply-side interventions

• Analysts in the U.S. used to assume the lag for cocaine was 6-12 months
Insights from a very “un”natural experiment

- In advance of 1963 Nuclear Test Ban Treaty, there was a $^{14}\text{C}$ (Carbon-14) “bomb spike” in 1962
- Allegedly doubled $^{14}\text{C}$ in the atmosphere
- $^{14}\text{C}$ content determines age of modern biological samples
  - E.g., plants, humans, wine
New research demonstrates $^{14}C$ testing can be used to date cocaine

- Ehleringer et al., 2012. *Forensic Science Intl*

- Analyzed 539 cocaine specimens from the U.S. Drug Enforcement Administration

- Measurements made on an accelerator mass spectrometer (AMS)
  - With AMS only need 20-500 milligrams to test
  - Web searches suggest there are 5-10 AMS labs in Europe
  - Analysis costs $200-$500 per sample (via author email)
    - ~50% cost is analysis, ~50% preparation/interpretation related
Findings from Ehleringer et al., 2012

• “Age”
  – Time period between when a coca leaf was harvested in South America and seized

• Approximate age of leaf at harvest: 3 m

• Average age of seizures >150kg: 18.2 +/- 1.4 m

• Average age of a U.S. street seizure: 24.6 +/- 1.1 m
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Street “age” circa 2008 was 2-4 times older than assumed
Opportunities for $^{14}$C testing in Europe?

- If validated, could be useful for evaluating the effectiveness of supply reduction efforts.

- Could look at “age” at typical entry points in Europe compared to street “age” in various cities.

- Could build in a longitudinal component.

- Other substances?
  - Found a paper which used $^{14}$C testing for opium.