Assessing Drug Abuse Potential: Quantifying Social Media Postings

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Internet Monitoring Data

• Unstructured, free-text online forum posts.
  - “I chewed some of my old fent patches n put the gel inside my cheeks, shot up a whole 20 oxy IR n took like 4 bars before all of this... I passed out clothes on n everything haha. I felt good, but felt like a waste...”
  - “recently i acquired one single 5mg hydrocodone pill. after some researching i have concluded that this isnt enough to get me high. im wondering if there are other drugs i could take with the hydrocodone that would amplify the effects”
  - “I guess I am in the minority here..........I haven't ever tried H, BUT I much prefer Opana to OC's, Fent (with the exception of the lollys), methadone, oxyfast, morphine, dilaudid, roxi's, etc....”
Internet Drug Discussion – Data Collection

Data Collection
Webgrabber daily data collection

Quantitative Analysis
- Discussion level
- Trends

Data Storage
7.7 Million posts

Qualitative Analysis
- Discussion topics
- Sentiment
Types of Internet Monitoring Analyses & Measures

• Discussion Level
  – Proportion of posts, threads, and authors for specific drug.

• Topic Analysis
  – Review and coding to determine frequency of mentions of various topics (e.g., ROA, extraction).

• Sentiment Analysis
  – Endorsement Ratio (ERo) measures sentiment/preference regarding abuse of specific drug and comparators.

• Recipe Tracking
  – Unique recipes for tampering/manipulating drug products.
Comparison of Drug Discussion Levels

Drug-Specific Posts per 100,000 posts in data archive

Ultracet®
Talwin®
Roxicet®
AVINZA®
Fentora®
OxyIR®
KADIAN®
Ultram®
Demerol®
Lortab®
Duragesic®
MS Contin®
Subutex®
Oxymorphone
Opana®
Vicodin®
Hydromorphone
Roxicodone®
Percocet®
Dilaudid®
Fentanyl
Tramadol
Suboxone®
Codeine
Methadone
OxyContin®
Buprenorphine
Morphine
Hydrocodone
Oxycodone

0 500 1,000 1,500 2,500 3,000
Sentiment/Content Analysis Overview

• Evaluation of the sentiment expressed regarding the recreational desirability of target drugs.
• Manual review by trained coders.
• 20% overlapping sample to ensure acceptable level of agreement between coders.
Sentiment Analysis Categories

- **Endorsing**: Endorse, promote, or facilitate abuse.
  
  “I love Product A, it has the best buzz!”

- **Discouraging**: Strong negative opinions, experiences, or barriers to recreational use.
  
  “Ugh, that drug is horrible. Totally not worth the effort...”

- **Mixed**: Both positive and negative material.
  
  “Product B gives a great body high, but sometimes I get a bad headache afterwards.”

- **Unclear**: Unclear, neutral, or factual information.
  
  “Product C is the newest oxycodone product from X Pharma.”
The Endorsement Ratio (ERo)

- ERo = probability of endorsing a drug / probability of discouraging that same drug\(^1,2\)

- “the probability of endorsing drug A is \(x\) times the probability of discouraging drug A”.

- ERo is a relative statistic and does not reflect the absolute difference between probability estimates.

- Examine ERo results alongside the predicted probabilities for sentiment categories.

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Endorsement Ratio (ERo): Initial Methods Evaluation

Drug Discussion: Recipe Tracking

What is a ‘Recipe’?

A process (physical, chemical or potentiation) that enables use of a product in a way other than as intended. Fundamental steps used when manipulating a product.

Recipes can be categorized into profiles such as:

- Product → Crush → Dissolve → Filter → Route of Administration (ROA)
- Product → Crush → Dissolve → ROA
- Product → Eat High Fat Meal → ROA
Recipe Example: Cold Water Extraction

Post Count

Year 1 | Year 2 | Year 3

1 2 3 4 5 6 7 8 9 10 11 12 | 1 2 3 4 5 6 7 8 9 10 11 12 | 1 2 3 4 5 6 7 8 9 10 11

Recipe Example: Cold Water Extraction

Vicodin®: Cold Water Extraction

Posts in Archive
Thread: “Defeating the new OC time release”

278 Unique Authors

“when running it across my microplane grinder it feels like it has a combination of paper // plastic as filler.. when snorted it instantly cloggs the nasal passage and when placed in the mouth it turns into a hard piece of plastic..

when i come across a normal OC80 i will update this thread with side by side comparisons including pictures of them being soaked in water and what not..

please post any other tests youd like to see.. “
Drug Discussion Forum Reaction to New OxyContin

79 Days: ~80,000 views
Recipe Tracking for New Products

Recipe Tracking for New OxyContin

• Most discussed feasible recipes
  – 1. Crush/shave
  – 2. Dissolve/soak
  – 3. Chew
  – 4. Crush/shave, heat, and freeze
  – 5. Crush/shave and dissolve/soak

• Among feasible recipes, most discussed ROAs:
  – 52.2% oral use
  – 25.7% snort

Summary – Key Points

• Capable of detecting changes quickly
• Stable communities
• Influence beyond forum participants
• Helps place finding from other data streams in context
• Useful for evaluating the effect of national interventions
• Data can inform development of new technologies in drug formulations
Monitoring Drug Discussion Forums: Advantages for Assessing Abuse Potential

- Online forums provide a sentinel data source for abuse of prescription drugs
- Uncensored, peer-to-peer exchange of opinions and information
- Information can be aggregated from thousands of individuals at a relatively low cost
- Data may present leading edge indicators of new trends in prescription opioid abuse.
- Post-market experience data on many topics of interest for assessment of abuse potential:
  - Perceived desirability
  - Comparisons to other drugs
  - Methods of abuse
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