A surveillance system was developed to measure product-specific and geo-specific trends of misuse by using complementary data streams. This system utilizes a mosaic approach to measure rates of misuse, abuse, and diversion of prescription and illicit drugs in Canada.

### Program Descriptions (Figure 1)

- **Opioid Dependence Treatment (1Q16-3Q16, Ontario):** Patients entering treatment for opioid addiction voluntarily complete a questionnaire about use of prescription or illicit opioids “to get high” in the past 30 days.
- **Drug Diversion (1Q14-3Q16, Ontario):** Law enforcement agencies report on new cases of prescription drug diversion quarterly.
- **StreetRx (1Q12-3Q16, pan-Canada):** Street price information is voluntarily submitted to the open access website StreetRx.com/Canada.
- **Web Monitoring (1Q15-4Q15, pan-Canada):** Posts from publicly available blogs, news articles, forums, and public social media accounts are monitored for mentions of prescription drugs in Canada and analyzed for themes of abuse/misuse.
- **Survey of Non-Medical Use of Prescription Drugs (3Q16, pan-Canada):** 10,000 youth and adults in the general population (age 15+) voluntarily complete an online survey on lifetime non-medical use (NMU) of prescription medications. Results are weighted to provide a national estimate of NMU in Canada.
  - NMU: without a doctor’s prescription or for any reason other than what was recommended by one’s doctor.

### Analysis (Table 1)

- **Buprenorphine, fentanyl, hydromorphone, morphine, and oxycodeone** were studied across programs.
- For Web Monitoring, the proportion for each opioid was calculated by dividing the number of abuse/misuse mentions for the opioid by the total number of mentions analyzed for the opioid.
- For all other programs, proportions for each opioid were calculated by dividing the primary measure by the total number of responses for the five opioids within the program.

### Methods

**Background & Objective**

- Describe misuse, abuse, and diversion of prescription drugs in Canada.

**Objective**

- Describe misuse, abuse, and diversion of prescription drugs in Canada.

### Table 1. Primary Measures of Misuse-Related Behavior by Program

<table>
<thead>
<tr>
<th>Treatment Center</th>
<th>Law Enforcement</th>
<th>Crowd-Sourced</th>
<th>Online Abuse/Misuse</th>
<th>Online Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abuse Endorsements</td>
<td>Diversion Cases</td>
<td>Purchase Reports</td>
<td>Mentions</td>
<td>National Estimates</td>
</tr>
<tr>
<td>1Q16-3Q16</td>
<td>1Q14-3Q16</td>
<td>1Q12-3Q16</td>
<td>1Q15-4Q15</td>
<td>3Q16</td>
</tr>
<tr>
<td><strong>Ontario</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>14 (3.3%)</td>
<td>23 (2.7%)</td>
<td>25 (1.3%)</td>
<td>9.5%</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>71 (16.7%)</td>
<td>181 (21.2%)</td>
<td>57 (3.0%)</td>
<td>3.0%</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>114 (26.9%)</td>
<td>318 (37.3%)</td>
<td>1,175 (61.3%)</td>
<td>7.9%</td>
</tr>
<tr>
<td>Morphine</td>
<td>84 (19.8%)</td>
<td>69 (8.1%)</td>
<td>122 (6.4%)</td>
<td>4.5%</td>
</tr>
<tr>
<td>Oxycodeone</td>
<td>141 (33.3%)</td>
<td>262 (30.7%)</td>
<td>537 (28.0%)</td>
<td>9.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>424</td>
<td>853</td>
<td>1,916</td>
<td>n/a¹</td>
</tr>
</tbody>
</table>

¹For Web Monitoring, the proportion for each opioid was calculated by dividing the number of abuse/misuse mentions for the opioid by the total number of mentions for the opioid.

²NMURx estimates the weighted number of Canadian adults who have non-medically used one of the presented drug substances.

### Results

- In Ontario, hydromorphone (37.3%) and oxycodeone (30.7%) were the most commonly diverted opioids. Oxycodeone (33.2%) and hydromorphone (26.9%) also led endorsements for recent abuse by persons entering substance abuse treatment.
- Across Canada, fentanyl (32.4%) received the most NMU endorsements followed by oxycodone (28.3%). Hydromorphone (61.3%) and oxycodone (28.0%) had the highest proportion of reports to StreetRx. Misuse/abuse was discussed in 9.9% of oxycodeone posts, 9.5% of buprenorphine posts, and 7.9% of hydromorphone posts online.

### Conclusions

- Of the opioids examined, oxycodone, hydromorphone, and fentanyl emerge as primary prescription drugs of misuse in Ontario and across Canada.
- Studying multiple behaviors and sub-populations across data sources offers insight into the opioid crisis in Canada. Our results are supported by convergent validity from diverse program data.
- A mosaic approach to surveillance of opioid misuse is recommended for this complex public health challenge.

The System is supported by subscriptions from pharmaceutical manufacturers for surveillance, research and reporting services. The System is the property of Canadian Consumer Product and Pharmaceutical Safety Inc., which retains exclusive ownership of all data, databases and systems. Subscribers do not participate in data collection or analysis, nor do they have access to the raw data. The RADARS System is supported by subscriptions from pharmaceutical manufacturers, government and non-government agencies for surveillance, research and reporting services. RADARS System is the property of Denver Health and Hospital Authority, a political subdivision of the State of Colorado. Denver Health retains exclusive ownership of all data, databases and systems. Subscribers do not participate in data collection nor do they have access to the raw data.