Introduction

• Since 2000, the death rate from drug overdoses has increased 137%, including a 200% increase of overdose deaths involving opioids1. The concern of opioid overdoses has been rising nationally. Syndromic surveillance (SyS) data is collected by the National Syndromic Surveillance Program (NSSP) and the data provides rapid Chief Complaint information of Emergency Department (ED) visits.
• The goal of this ongoing collaboration is to work together to develop a standard case definition for opioid abuse/poisoning, which would then be applicable nationally.
• The pilot study evaluated the opioid abuse/poisoning case definition by determining the consistency of the reported Chief Complaint and Discharge Diagnosis (CC and DD) in SyS ED data. In addition, the consistency of DD corresponding to the opioid case definition was assessed by comparing the weekly counts of opioid abuse/poisoning cases in SyS ED data to those obtained in Hospital Discharge Data (HDD).

Methods

• The completeness rates of admission date, CC, and DD were investigated in all three jurisdictions in Colorado, Nebraska and Indiana. Between January 2015 to August 2016, two months of data were utilized for creating the case definition. The beginning of March 2016 to the end of April 2016 provided the earliest time period for the best quality SyS data among all jurisdictions.
• The Electronic Surveillance System for the Early Notification of Community Based Epidemic (ESSENCE) was used for identifying and evaluating the case definition and ESSENCE was also used for validating the consistency between SyS and HDD.
• Single generic drug/street names were evaluated and names that picked up true cases were kept. Similarly drugs were also validated in order to capture potential opioid poisoning cases that were using names of combined drugs to report their CC. Percocet and Lortab were included in the final query. The case definition of opioid overdoses excluded cases with the terms “remission”, “withdrawal”, and “denies heroin”.
• The case definition was evaluated by assessing the consistency between patients’ CC and DD for Colorado and Nebraska. In order to also validate if the same criteria captured the same amount of opioid abuse/poisoning cases, opioid abuse/poisoning IC9/ICD10 codes were searched in both of 2015 SyS and HDD. Pearson Correlation was performed in SAS by comparing weekly visit counts in individual MMWR months.

Table 1. Common formats of drugs combined with opioids

<table>
<thead>
<tr>
<th>Format of Drugs</th>
<th>Drug Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>文字</td>
<td>文字</td>
</tr>
<tr>
<td>文字</td>
<td>文字</td>
</tr>
</tbody>
</table>

Table 2. The Opioid Abuse/Poisoning Case Definition and the Final Query

<table>
<thead>
<tr>
<th>Chief Complaint, Triage Notes, and Clinical Impression</th>
<th>Discharge Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Inclusion: heroin, dope, snowball, china white, methadone, fentanyl, opioid, oxycodone, o xo, hydrocodone, narcan, naloxone, Percocet, Lortab,</td>
<td>DD only</td>
</tr>
<tr>
<td>2) Exclusion: withdrawal w/ or w/o oxygen, denial of heroin, possible heroin use, overusing, r/o, quit using, stopped using, denial of heroin</td>
<td></td>
</tr>
</tbody>
</table>

Discharge Diagnosis (ICD-9)

1) Inclusion: 965.0, E850.0-E850.2, E853.0
2) Exclusion: No exclusion for CC/ED

Discharge Diagnosis (ICD-10)

1) Inclusion: T40.031-T40.044 (Extension: Only include A and D), T40.1X1-T40.1X4 (Extension: Only include A and D), T40.2X1-T40.2X4 (Extension: Only include A and D), T40.3X1-T40.3X4 (Extension: Only include A and D), T40.4X1-T40.4X4 (Extension: Only include A and D), F11
2) Exclusion: F11.21, F11.23, F11.93

Table 3. CO-NCR opioid abuse/poisoning defined cases in SyS and HDD

<table>
<thead>
<tr>
<th>State of Nebraska</th>
<th>SyS Detected Only by SY</th>
</tr>
</thead>
<tbody>
<tr>
<td>detected only by</td>
<td>CO-NCR detected only</td>
</tr>
<tr>
<td>CC.</td>
<td>by DD.</td>
</tr>
<tr>
<td>Chief Complaint P</td>
<td>123 (93)</td>
</tr>
<tr>
<td>Chief Complaint N</td>
<td>46 (36)</td>
</tr>
<tr>
<td>Total</td>
<td>170</td>
</tr>
</tbody>
</table>

Conclusion and Discussion

• The final case definition (Table 2) included Naloxone for including opioid overdose cases specifically. Although Narcan and Naloxone are used as an antidote to prevent deaths due to opioid overdoses, these terms will help us to identify patients appropriately.
• While reviewing cases, we found many CCs or DDs included indicators of opioid abuse/poisoning signs and symptoms. Therefore, the final case definition can be applied by different states and help states to monitor the burden of opioid abuse/poisoning at the hospital visits, underlying factors and consequences of opioid abuse/poisoning.
• Additionally, the results of the Pearson Correlation suggest the diagnosis reporting is significantly consistent between HDD and SyS which indicated SyS is a reliable data source for monitoring Opioid abuse/poisoning ED visits.

Future Work

• Expand search time period to increase the power of sampling.
• Develop and validate a query specific to opioid overdose.
• Validate the case definition of opioid overdose by using other best practices, such as hospital discharge data (when data is available) and/or medical chart review (Figure 1).
• Develop the case definition for opioid overdose underlying factors (e.g. mental health indicators) and determine public health burdens (e.g. motor vehicle crash).
• Our future work will also look into patients’ pain control related to prescription opioids.

Figure 1. Workflow for future validation of the opioid overdose case definition

Stage I

• Search generic names, street names for drugs, and prescription names
• Finalize search terms and create queries
• Investigate line level data to evaluate DD
• Create queries for the final case definition

Stage II

• Cross validation between HDD and the SyS data by performing Pearson Correlation
• Assess consistency of CC and DD reporting in SyS

Stage III

• Develop case definition for opioid overdose
• Validate cases by investigating medical charts
• Investigate sensitivity and specificity
• Validate final case definition based on findings during the investigation

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References
3. CSTE Alcohol and Other Drugs Indicator Subcommittee August 2016

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Progress Report: Syndromic Surveillance Case Definition for Monitoring Opioid Abuse/Poisoning ED Visits in the Colorado North Central Region (CO-NCR), State of Nebraska, and Marion County, Indiana

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