The Classification and Modification of A.I. Generated Drug Diversion Signals in a Hospital System Setting

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Background

- Drug Diversion – illegal distribution or abuse of prescription drugs for purposes not intended by the prescriber
- High presence of drug diversion related events in North America
- Push for diversion related mitigation strategies
- Use of custom computer logic to flag possible diversion related events
- Previous study on computer logic mediated drug diversion:

Ministry-wide Scorecard

Scatterplot to Determine Program Accuracy

Results

- Over 6 months, 120,263 total events were created.
- Of those, 14,489 events were reviewed by an end user.
- Most fired signals: Administration Delay (27,677 events), Waste Delay (27,677 events), Reconciliation Discrepancy (22,354 events), Dispense Amount (21,229 events), and Dispense Count (7,269 events)
- Most under processed signals(%): Administration Delay (94.44%), Waste Delay (99.18%), Dispense Amount (99.27%), and Dispense Count (99.32%)
- Hospital with most events: (A) 43,890 events (36.7% of ministry events).
- Of the 9,311 events reviewed, 7,325 events (21.2%) labeled as False Positive

Conclusions

Scorecard

- Top five signals that fired ministry wide were also the top five most under-reviewed
- Uneven event distribution between hospitals
- Uneven utilization of signals between hospitals
- Scatterplot
  - Most signals require some form of adjustment to mitigate false positive percentage
  - Possible Signal Improvements based on quadrant
    - Class I: functioning signal, ideal
    - Class II: High utilization, High False Positive Rate
    - Class III: Low utilization, High False Positive Rate
    - Class IV: Low utilization, Low False Positive Rate
  - Use developed tools to postulate improvements to Diversion App

Scatterplot Quadrant Definitions:

- Class I: functioning signal, ideal
- Class II: High utilization, High False Positive Rate
- Class III: Low utilization, High False Positive Rate
- Class IV: Low utilization, Low False Positive Rate

Confounding Variables/Limitations:

- Low signal utilization overall
- End user bias towards reviewing certain signals
- Short term time, financial and personnel restrictions
- Unbalanced usage of program between hospitals

Implications

- Continued research in the application of custom computer programs into healthcare systems and data mining.
- Established baseline scoring tools to assess and improve the Drug Diversion app’s accuracy at detecting possible diversion events
- Eventual reduction in costs associated with drug diversion inpatient.
- Further study and refinement of scoring tool warranted.

Methods

- Using drug diversion software from LogicStream™ Health
- Six months of computer-generated data taken from healthcare ministry headquartered in Springfield, IL.
- 15 total facilities ranging from acute care to Level 1 trauma centers across Illinois, Missouri and Wisconsin (January 1 – July 31 2022)
- Data was analyzed and sorted in Microsoft Excel® in order to create end-user friendly deliverables and determine accuracy of current iteration of drug diversion program
- Two primary deliverables: Modular scorecard detailing ministry-wide trend data, and additional modular scatterplot to determine program accuracy versus overall signal utilization
- Scatterplot Quadrant Definitions:
  - Class I: functioning signal, ideal
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