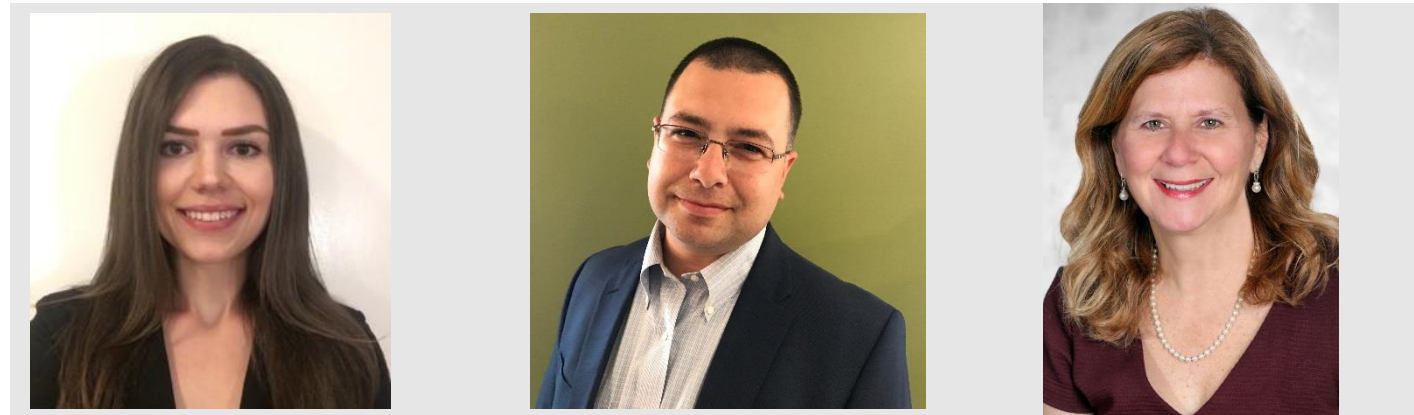


Establishing an Opioid Prescription Stewardship Program Utilizing Education and Machine Learning

Ashley Rimay, PharmD, BCPS; Louis Palmisciano, BIT; Christine Collins, RPh, MBA

Lifespan, Providence, RI



From Left to Right: Ashley Rimay, PharmD, BCPS; Louis Palmisciano, BIT; Christine Collins, RPh, MBA

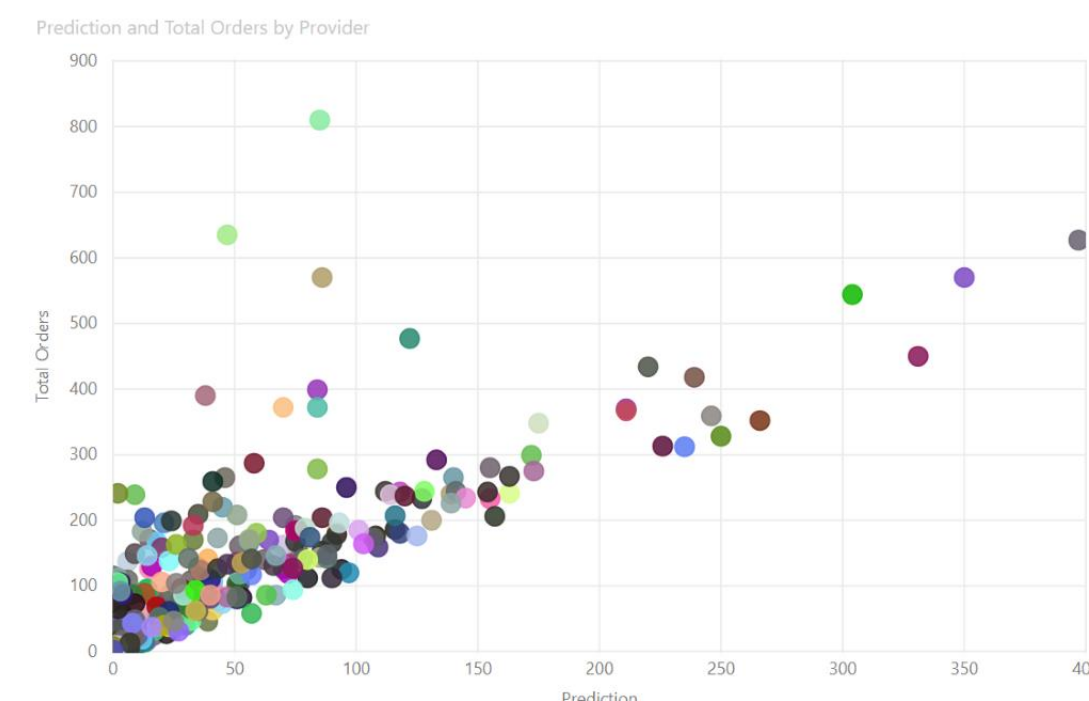


Description of the Program

Assembling the team: hospital and pharmacy leadership representing both inpatient and outpatient pharmacy, a pharmacy data scientist, a controlled substance pharmacist (CSP), a pharmacist informatics coordinator, a senior clinical pharmacist specialist, and physician chief medical officer (CMO)

Creating a model:

- A supervised XgBoost classification model was trained
- Results were grouped by provider to visualize the entire organization for quick identification of uncommon prescribing practices
- Information about the encounter is stored in a data warehouse along with the model's prediction
- A web-based dashboard is refreshed daily as a scatterplot that aggregates patient-level predictions by provider. The scatterplot presents total prescriptions along the y axis and total predicted prescriptions along the x axis.



Implementing the auditing process:

- Monitoring the dashboard for an outlying provider
- Selecting 15 random prescriptions that were not predicted to be written by our model
- Assessing for compliance to controlled substance laws
- Communicating results to appropriate physician leadership
- Physician peer clinical evaluation and follow-up audits

Provider education includes:

- 1) Background on national incidences related to opioid prescribing
- 2) Implications of diversion for organizations and physicians
- 3) Data from the Rhode Island (RI) Medical Board on license reprimands related to opioid prescribing
- 4) RI Controlled Substance Law on prescribing acute vs. chronic pain
- 5) Proper electronic prescribing in the electronic medical record

Experience with the Program

Measurement	Result
Number of Providers Educated	Over 240 attending physicians and over 900 residents/fellows
Number of Outlying Physicians	25 initially identified
Number of Provider Audits	50 In-depth audits
Number of Prescriptions Reviewed	750 prescriptions

January 1, 2019 to December 31, 2019

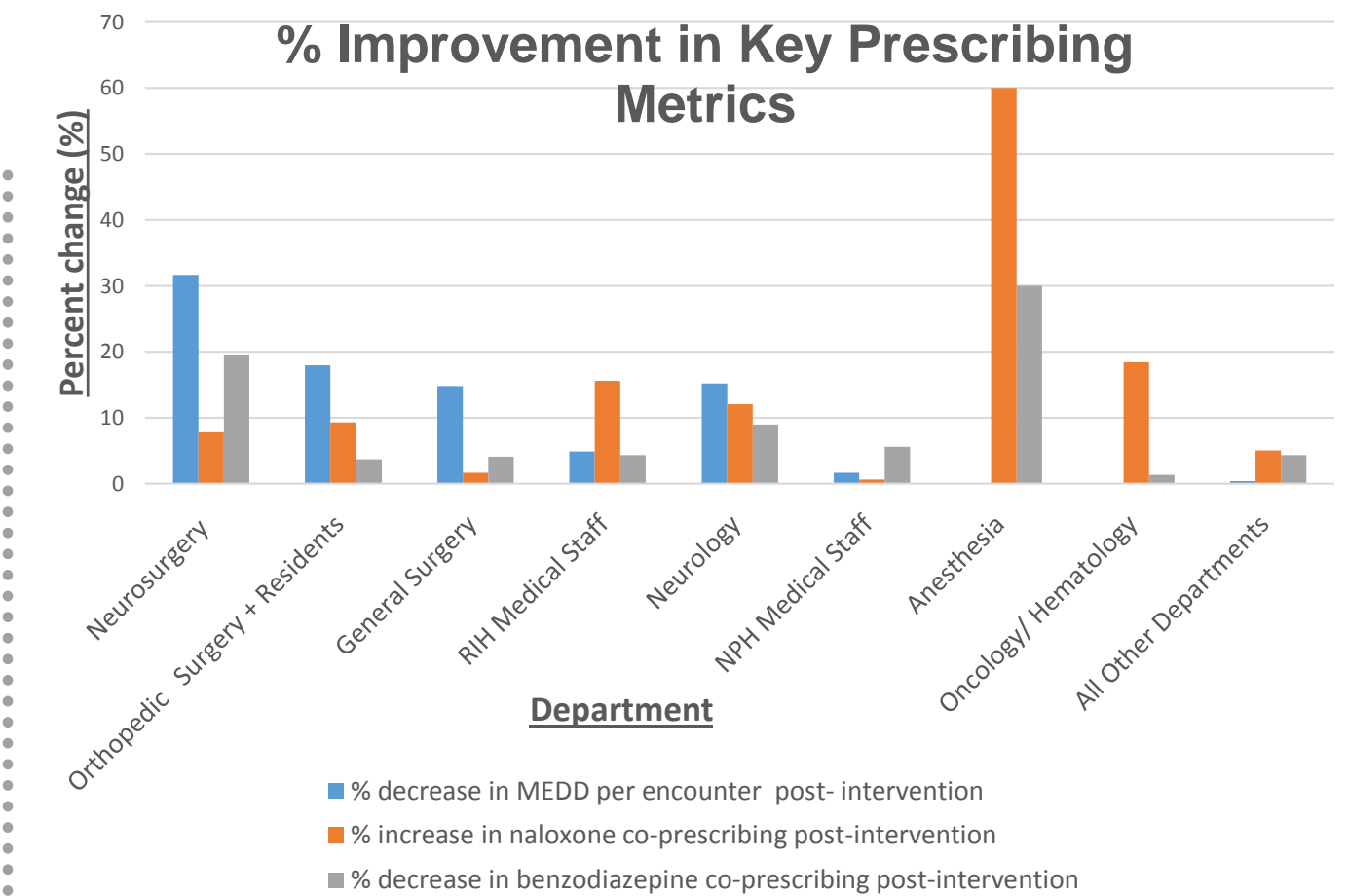
Metrics to determine prescribing improvements:

- Reductions in morphine equivalent daily doses (MEDD)
- Increased naloxone and opioid co-prescribing
- Decreased co-prescribing of opioids and benzodiazepines

Results of audits and targeted education:

- No overtly inappropriate prescribing was detected.

Metric	Departments Educated	Departments Not Yet Educated
Average change in MEDD per encounter	-14.4%	+0.39%
Average change in benzodiazepine co-prescriptions	-9.7%	-4.35%
Average change in naloxone co-prescriptions	+15.7%	+5.07%



Conclusion

- The implementation of a CS prescription stewardship program based on education and machine learning was effective at reducing inappropriate opioid prescribing in a large academic health system, based on metrics of decreased MEDD, increased Narcan prescribing and decreased opioid and benzodiazepine co-prescribing.
- Health systems should foster collaboration between pharmacists, data scientists, physicians and leadership to develop a controlled substance prescription stewardship program

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Acknowledgements

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