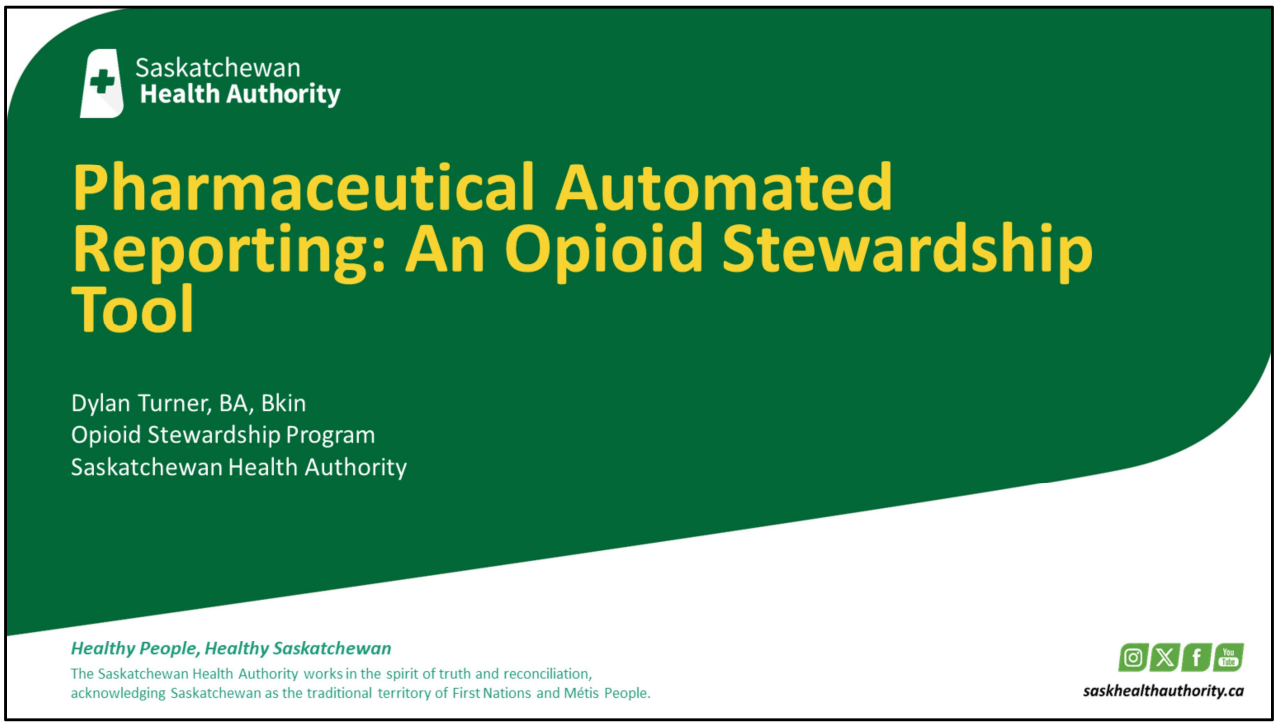
Faculty/Presenter Disclosures

- Presenter: Dylan Turner

- Relationships with financial sponsors:
  - Grants/Research Support: Health Canada's Substance Use and Addictions Program (SUAP)
  - No other disclosures

Saskatchewan Health Authority



My names Dylan Turner and I work with the Saskatchewan health authority's stewardship and clinical appropriateness department out of the General Hospital in Regina, Saskatchewan. Stewardship is a dedicated program for the province of of Saskatchewan consisting of 2.0 opioid stewardship pharmacists, 1.0 nurse practitioners, 2 data analysts, and 1 researcher and we serve a population of around 1.2 million people.

Pharmaceutical Automated Reporting (PAR): An Opioid Stewardship Tool

Goals:

- Increase capacity, reach, and impact of the OSP
- Promote safe and appropriate prescribing of opioids, optimize pain management, prevent adverse events, and reduce opioid usage

Saskatchewan Health Authority

Although Saskatchewan's population is small compared to other provinces in Canada, opioid-related harms are significant. In 2022, Saskatchewan had 21.3 apparent opioid toxicity deaths per 1000 population, compared to Manitoba, which has a similar population size of 1.4 million, had only 3.7 deaths per 1000 population. Saskatchewan, along with British Columbia and Alberta, exhibited the highest rates of opioid-related hospitalizations in 2023.

Within our acute care facilities, ~700 beds combined, there are no inpatient addiction medicine teams, acute, chronic, or transitional pain services available, n

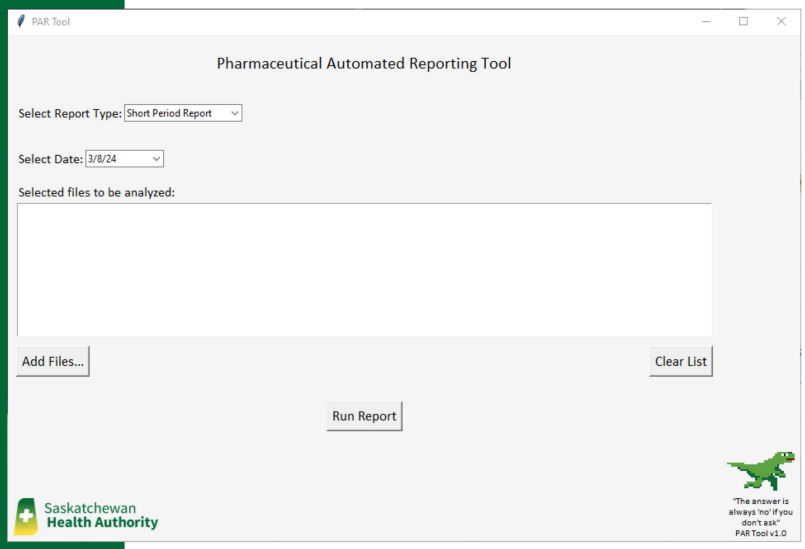
Another challenge has been data collection. Historically, we have relied on pharmacy students and random ward chart audits to collect prescription and ordering data to identify current practice. Manually gathering patient data from paper charts is time-consuming and error prone and this was only possible when a pharmacy student was available to the department, posing an additional constraint on consistency.

Due to the widespread use of opioids in acute care and the high risk for opioid-related harms, we looked to develop our own Clinical decision support system to assist our team in promoting safer opioid prescribing, resource allocation, patient safety, data collection, and improved outcomes.

Development

PAR Tool:

- Pharmacy Drug Utilization Reports
- Python code
- Microsoft Excel



5

Saskatchewan Health Authority

This is why we developed The PAR Tool. The Tool consolidates inpatient prescription information from pharmacy drug utilization reports and organizes patients according to predetermined logic. The tool automatically classifies patients based on risks associated with their opioid prescriptions and the activation of risk factors that may lead to potential opioid-related harm such as overdose or addiction. These reports are based on patient medical record numbers and specific visit numbers.

An open-source Python coding language was used to create the Tool to function in conjunction with Microsoft Excel. When initiated, the code takes these pharmacy reports, combines them, and then reads and applies programmed logic. Black, grey, and white box testing and extensive clinician review were used to test for accuracy.

The risk factors outlined here are what we capture with the tool and were selected based on the pharmacist opioid safety and intervention tool, published op

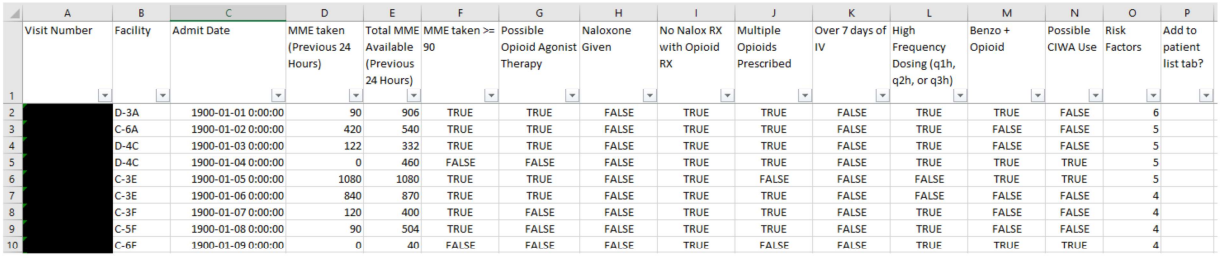
Each metric represents a risk factor for the patient, and an accumulation of these signifies an increased risk for an adverse opioid event.

We Also Capture:
Visit number
Facility
Admission date
MME Taken (Previous 24 hours)
Total MME available (previous 24 hours)
Prescription information such as dose, route, and description

We captured ordered opioids and “as needed” (PRN) in the MME calculation and these are used for risk stratification rather than equipotent dosing.

MMEs were determined to be not calculable for patient-controlled analgesia, parenteral fentanyl, epidural, spinals, intrathecal pumps, or cassettes

PAR Landing Page

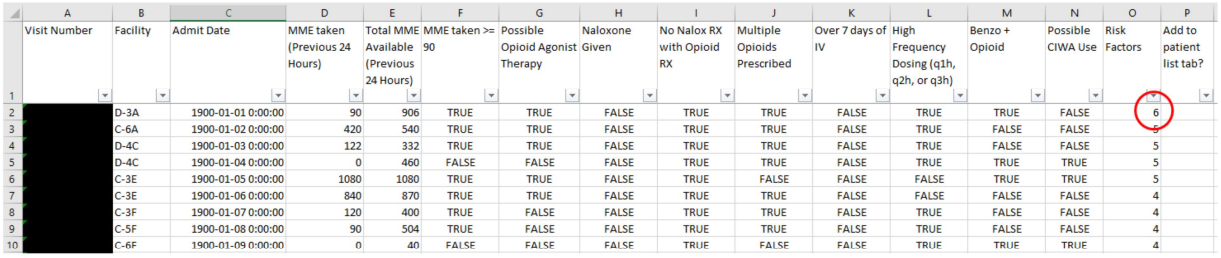


	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Visit Number	Facility	Admit Date	MME taken (Previous 24 Hours)	Total MME Available (Previous 24 Hours)	MME taken >= 90	Possible Opioid Agonist Therapy	Naloxone Given	No Nalox RX with Opioid RX	Multiple Opioids Prescribed	Over 7 days of IV	High Frequency Dosing (q1h, q2h, or q3h)	Benzo + Opioid	Possible CIWA Use	Risk Factors	Add to patient list tab?
2	[redacted]	D-3A	1900-01-01 0:00:00	90	906	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	6	
3		C-6A	1900-01-02 0:00:00	420	540	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	5	
4		D-4C	1900-01-03 0:00:00	122	332	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	5	
5		D-4C	1900-01-04 0:00:00	0	460	FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	TRUE	TRUE	5	
6		C-3E	1900-01-05 0:00:00	1080	1080	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	5	
7		C-3E	1900-01-06 0:00:00	840	870	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	4	
8		C-3F	1900-01-07 0:00:00	120	400	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	4	
9		C-5F	1900-01-08 0:00:00	90	504	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	4	
10		C-6F	1900-01-09 0:00:00	0	40	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	TRUE	4	

Saskatchewan Health Authority

The patient information is aggregated and displayed in one familiar Excel document after running through the coding algorithm. The newly created Excel document acts as the tool's "homepage" with a standard format. Clinicians can easily review the displayed summaries and sort further. Additionally, each specific patient can be reviewed in depth on another tab with the details of all of their current prescriptions. This is where the clinician can review medication appropriateness. They may also reference the patient's physical or electronic chart for further information.

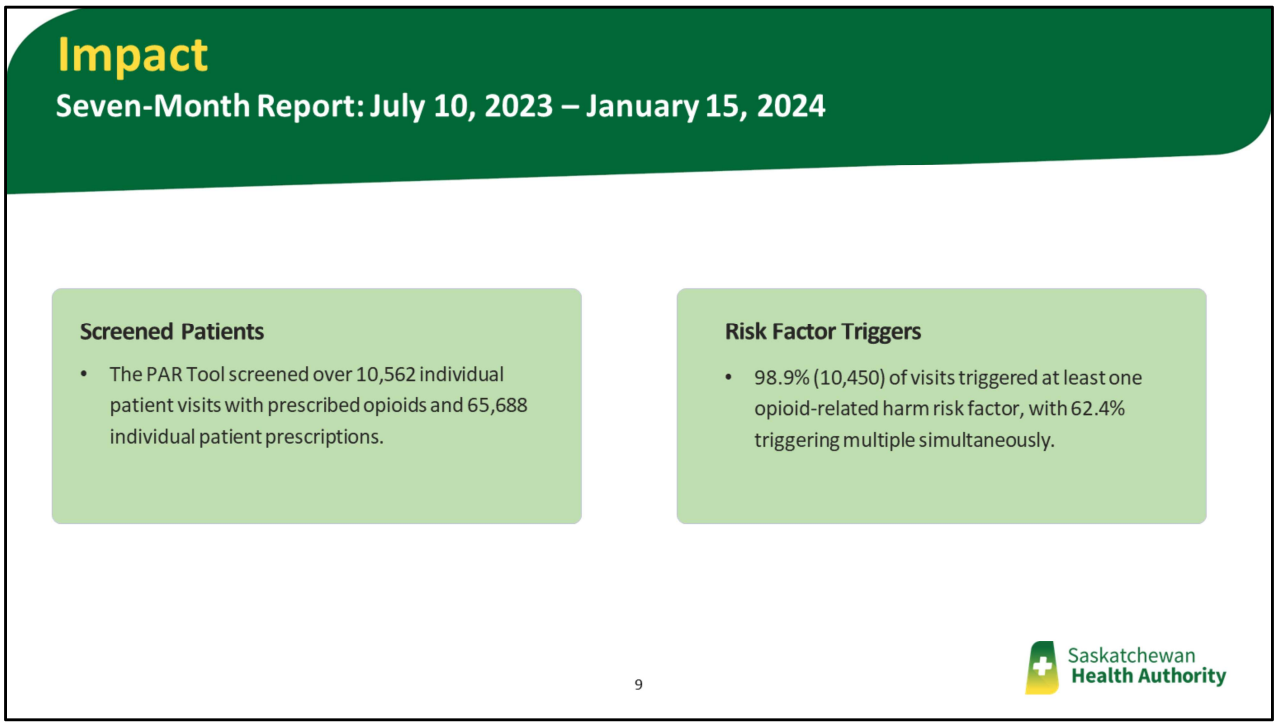
PAR Landing Page



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Visit Number	Facility	Admit Date	MME taken (Previous 24 Hours)	Total MME Available (Previous 24 Hours)	MME taken >= 90	Possible Opioid Agonist Therapy	Naloxone Given	No Nalox RX with Opioid RX	Multiple Opioids Prescribed	Over 7 days of IV	High Frequency Dosing (q1h, q2h, or q3h)	Benzo + Opioid	Possible CIWA Use	Risk Factors	Add to patient list tab?
2	[redacted]	D-3A	1900-01-01 0:00:00	90	906	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	6	
3		C-6A	1900-01-02 0:00:00	420	540	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	5	
4		D-4C	1900-01-03 0:00:00	122	332	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	5	
5		D-4C	1900-01-04 0:00:00	0	460	FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	TRUE	TRUE	5	
6		C-3E	1900-01-05 0:00:00	1080	1080	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	5	
7		C-3E	1900-01-06 0:00:00	840	870	TRUE	TRUE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	4	
8		C-3F	1900-01-07 0:00:00	120	400	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	4	
9		C-5F	1900-01-08 0:00:00	90	504	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	4	
10		C-6F	1900-01-09 0:00:00	0	40	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	TRUE	4	

Saskatchewan Health Authority

The home page is sorted based on risk factor accumulation and as an example here we can see this patient has triggered 6 risk factors. This still requires clinician review for appropriateness and doesn't necessarily mean that all of these prescriptions are inappropriate. For example, high MME on oncology or palliative wards, or due to methadone may be appropriate.



To date, the Tool has successfully screened over 10,500 unique patient visits during its first seven months of testing, resulting in the identification of 10,450 patients exhibiting at least one of our opioid-related risk factors. In addition, the Tool has reviewed 65,688 individual patient prescriptions for potential opioid-related harm risk factors. On average, the Tool has been able to scan roughly 312 individual patient visits per day, which signifies every patient with a prescribed opioid within our facilities.

From these scans, astoundingly 98.9% of patient visits exhibited at least one opioid harm-related risk factor and 62% triggered multiple at once.

Results

Seven-Month Report: July 10, 2023 – January 15, 2024

Seven-Month Report: July 10, 2023 – January 15, 2024	
Average Available MME	389
No Naloxone Prescription with Opioid Prescription	79.2% (8361)
High Frequency Dosing (q1h, q2h, or q3h)	42.8% (4518)
Multiple Opioids Prescribed	37.8% (3992)
Benzodiazepines and Opioid	9.7% (1026)
Over Seven Days of Intravenous Therapy	9.5% (1004)
MME Taken Over or Equal to 90	6.9% (724)
Possible Opioid Agonist Therapy	5.8% (617)
Naloxone Given	1.2% (123)*
Possible CIWA Use	1.2% (125)

*Naloxone usage determined by removal from automated medication cabinet (PYXIS)

Saskatchewan Health Authority

Here we see our data results from our first 7 months of use. The most common risk-factors triggered within our facilities were no naloxone prescriptions available when an opioid is ordered, high frequency dosing, and multiple opioids prescribed at once.

Results

Seven-Month Report: July 10, 2023 – January 15, 2024

Seven-Month Report: July 10, 2023 – January 15, 2024	
Average Available MME	389
No Naloxone Prescription with Opioid Prescription	79.2% (8361)
High Frequency Dosing (q1h, q2h, or q3h)	42.8% (4518)
Multiple Opioids Prescribed	37.8% (3992)
Benzodiazepines and Opioid	9.7% (1026)
Over Seven Days of Intravenous Therapy	9.5% (1004)
MME Taken Over or Equal to 90	6.9% (724)
Possible Opioid Agonist Therapy	5.8% (617)
Naloxone Given	1.2% (123)*
Possible CIWA Use	1.2% (125)

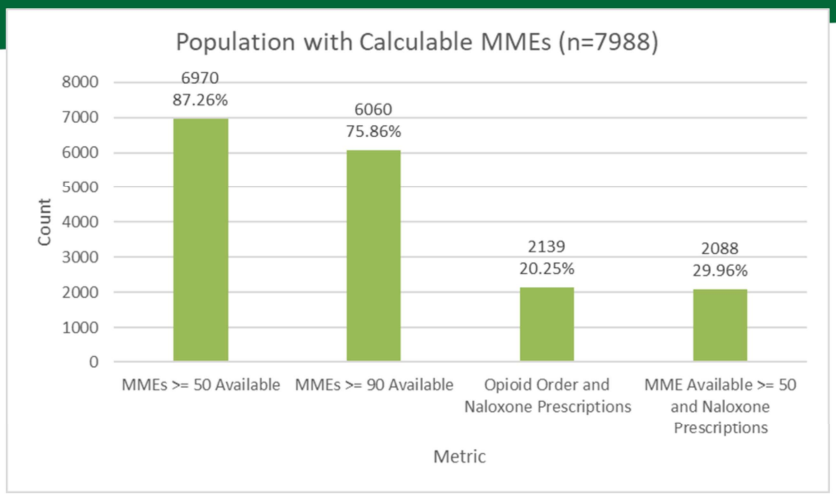
*Naloxone usage determined by removal from automated medication cabinet (PYXIS)

Saskatchewan Health Authority

The big stand outs for us as a Stewardship program were the 389 average MME available on average for each patient. We know the increase of MME's signify a potential danger for an opioid-related adverse event, such as an overdose or addiction risk, therefore these highlight key areas that need further investigation by the stewardship team to understand why this is happening and develop a plan to address these and move towards safer practice.

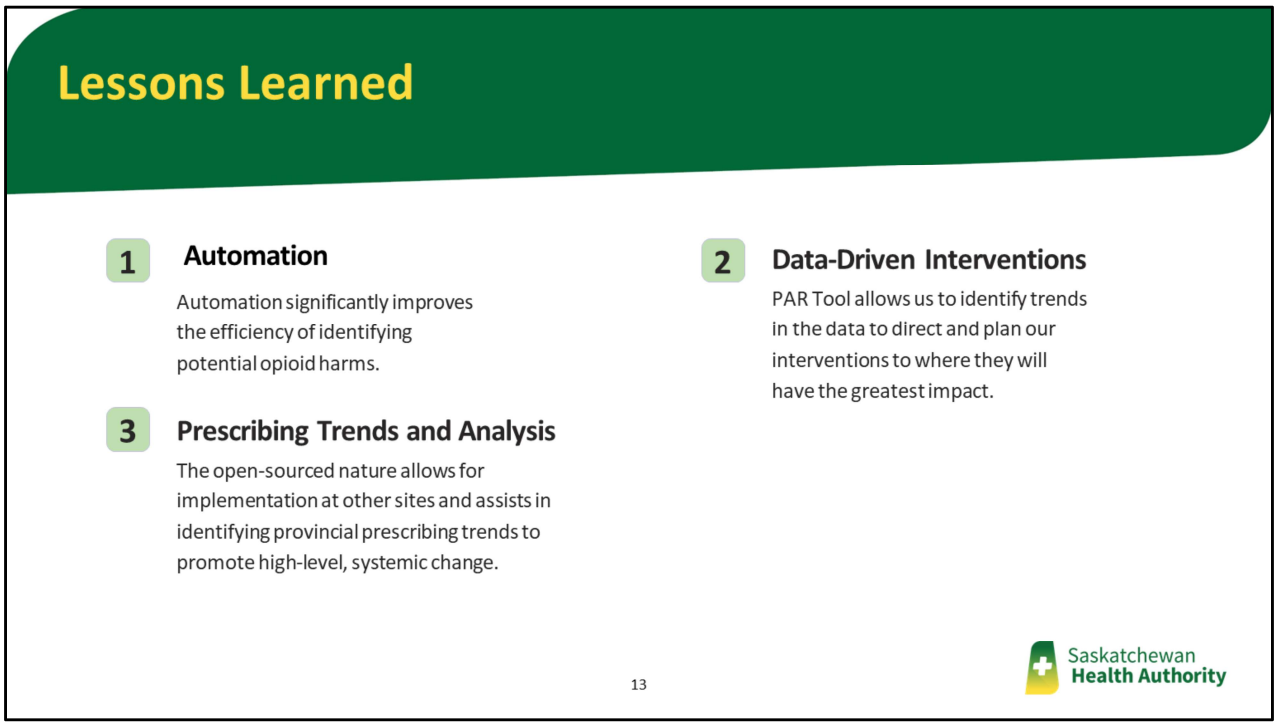
Results

Seven-Month Report: July 10, 2023 – January 15, 2024



Saskatchewan Health Authority

Here we can see the percent of our patients with high MMEs available. Again, we have to investigate this as a team to identify why we are seeing such high availability for patients and begin to work to mitigate this risk. For example, are old or outdated order sets driving this practice?



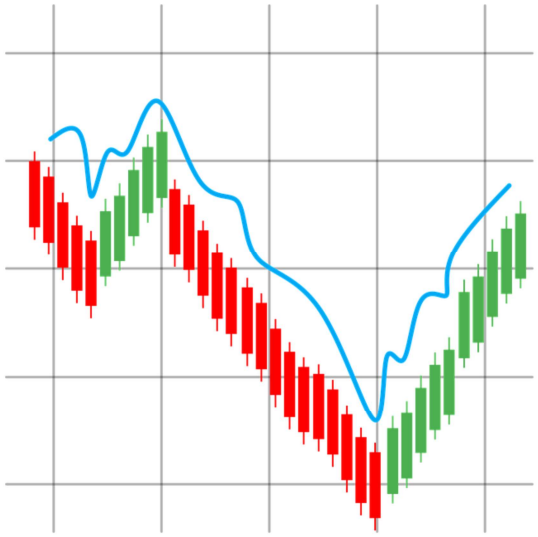
1. The automation significantly increases the speed at which patients can be triaged by the team allowing for more risk factors to be addressed. Additionally, this eliminates any potential bias in identifying which patients need further review.

2. Data-driven decisions mean we can tailor specific interventions to the areas that the data indicates are required. Intervention examples include educational or audit and feedback opportunities, PPO, or policy review.
Of significance from a research and implementation science perspective is that we can use this to identify prescribing trends pre- and post-intervention to measure effectiveness. We can also look at historic data trends without requiring intensive chart reviews simply by inputting older opioid reports.

3. The Tool's open-sourced nature means it can be implemented provincially, expanding stewardship capacities and impact in promoting evidence-based recommendations and appropriate opioid practices among clinicians and patients throughout Saskatchewan. As all of the SHA inpatient facilities utilize the same pharmacy reports, we have already developed a version of the PAR Tool using data from Saskatoon, another large urban center within our health region. We can use this to compare trends at each site and begin to identify if there are local policy differences or any other factors that are influencing the data.

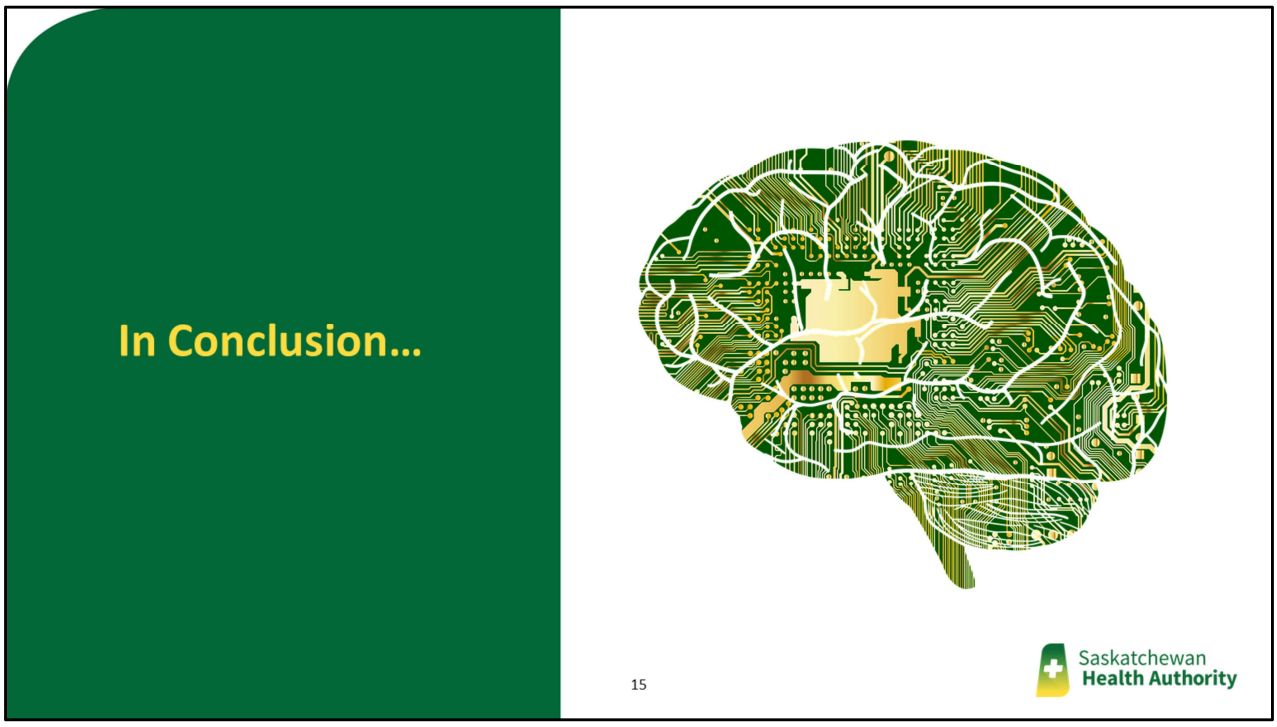
Limitations and Future Research

- Clinical Evaluation
- Passive Evaluation
- Standardized Report Structure



Limitations include the requirement for clinical interpretation and an inability to prevent potentially harmful opioid orders in real time. Also, the code is dependent on the standardized output of the pharmaceutical reports, if there is a change in the report structure the code must be modified.

Future research should investigate the acceptance rate of OSP recommendations, the effectiveness of behavioural change interventions, and the impact on quality indicators.



The PAR Tool has enhanced the efficiency, accuracy, and quantity of patient triage for opioid-harm-related risk factors, identified specific areas where data-driven interventions should be focused to engage in targeted behavioural change initiatives, and opened up access to system-level data that can be used to direct and track interventions and inform systemic policy change.

We are hopeful this tool will serve to increase the understanding and reach of the stewardship team in promoting and driving appropriate evidence-based Opioid Wisely recommendations for opioid use and pain management by clinicians and patients to reduce harms associated with the opioid crisis in Saskatchewan.

In summary, resource-scarce health systems have an opportunity to utilize open-source coding to create an internal CDSS to address potentially harmful opioid prescribing.

Thank You

Saskatchewan Health Authority