

Unclassified

Canadian Safety and Security Program (CSSP) Project Charter

Missing Persons

Saskatchewan Police Predictive Analytics
CSSP-TI-2016-2245

Version: 1.0

RECORD OF AMENDMENTS

Record major changes between final Charter versions; commencing at Version 1, initial Charter.

Charter Version No.	Amendment / Section Amended	Entered By	Amendment Date
Version 1.0	Initial Charter	29(1)	17 February 2017

Charter Revision: Project changes that impact scope, budget or schedule require a full Charter revision and sign off by all participants. Charter Amendment: Project changes that are minor and do not impact scope, budget (with no impact to FY Cashflow) or schedule require a Charter Amendment and sign off by the Lead Department and DRDC CSS.

INTRODUCTION

1. Purpose

The Project Charter is established between Defence Research and Development Canada, Centre for Security Science (DRDC CSS) and Project participants to acknowledge the existence of a project. The Charter outlines the parameters and structure of the project and includes project objectives; outcomes; impact; risks; schedule; resources; budget; and project organization. The Charter, itself, is not a contract. A contract or Memorandum of Agreement (MOA) must be issued through Public Services and Procurement Canada (PSPC) to non-federal government partners prior to the commencement of any project activities. In case of conflict, any resultant contract/MOA takes precedence over the Charter.

2. Summary

This Project Charter hereby establishes the Inaugural Project of the Saskatchewan Police Predictive Analytics Lab (SPPAL) on Missing Persons as a Project in accordance with the Canadian Safety and Security Program (CSSP) managed through DRDC CSS. This Targeted Investment project is being conducted primarily for the Police and Law Enforcement Portfolio.

3. CSSP Outcomes

This project contributes to the following CSSP Outcomes:

- Effective Technology Assessment/Transition
- Evidence-based Policy
- Strong Communities

4. Background

In November 2015, the Saskatchewan Police Predictive Analytics Lab (SPPAL) was established through a partnership between the Saskatchewan Ministry of Justice; Corrections and Policing (MOJ), the University of Saskatchewan (U of S), and the Saskatoon Police Service (SPS). Municipal police agencies in Saskatchewan, RCMP "F" Division, and the Saskatchewan Ministry of Social Services, Child and Family Programs have agreed in principle to share information with SPPAL. The Canadian Safety Knowledge Alliance (CSKA) is also a SPPAL collaborator. Potential collaborations with other jurisdictions are being explored and the CSKA is well-positioned to assist with this, as well as with knowledge translation and dissemination.

A primary objective of SPPAL is to develop capacity to integrate and examine large amounts of police and community safety data in order to develop predictive models and applied tools that can assist police and partner agencies to intervene effectively to reduce risk and promote community safety. In other words, SPPAL is intended to inform operations by working with identified data from multiple data sources - which is required in order for police and community safety partners to intervene to reduce risk in high risk cases and situations.

The inaugural project of SPPAL is the "Missing Persons" (MP) Project. Work completed to date includes:

- a literature review on how advanced predictive analytics are currently being used within policing internationally;
- a review of publically available data on missing persons occurrences in Canada and Saskatchewan in particular;
- development of a computer interface with software that applies customized algorithms (as opposed to using commercially available software and algorithms) in order to test and evaluate advanced predictive models;
- development, testing, and evaluation of statistical models and algorithms which could be applied to missing persons data; and
- creation of a multi-disciplinary (e.g., computer science, mathematics and statistics, applied and forensic psychology) advisory group comprised of University of Saskatchewan researchers who are recognized internationally as experts in their field to provide assistance to researchers involved in the MP Project.

These developments provide a foundation from which to begin exploring two important and simultaneous areas of focus comprising the MP Project: 1) Missing Children; and 2) Missing Adults - with special emphasis on vulnerable and/or

and groups who may be at increased risk for harm (e.g., children in care, "habitual runaways," missing persons). Together, these foci not only provide an opportunity to develop innovative tools to assist the Saskatoon Police Service (SPS) in responding to the high volume of calls they currently receive (projected total of 2724 missing person reports in 2016) but also to use this technology to develop integrated and coordinated interventions for MP cases with community safety partners (Social Services).

5. Objective(s)

Broadly speaking, the purpose of the Inaugural SPPAL Project on MP is to develop predictive models and applied tools for end users (police and community safety partners) that can inform real-time investigations, decision-making, and interventions for persons reported missing in order to prevent/reduce time missing and associated negative outcomes.

Funding from DRDC would assist SPPAL in building the human, technical, and business expertise required to examine two interrelated foci described above - Missing Children and Missing Adults - simultaneously, by integrating data from multiple data sources which have yet to be linked (e.g., police and social services data), incorporating new sources of data (e.g., text, social media) which may enrich statistical models and applied tools, as well as support future real-time applications and interventions.

Ultimately, such funding would provide capacity to develop innovative methodologies and technology to: link and integrate large and complex data sets; test and refine advanced analytical models; and create applied tools to prevent and intervene in missing persons cases more quickly.

Completion of this project would assist DRDC in tackling methodological complexities (e.g., data linkage across agencies involving numeric and text data) and critical practice gaps through the development and advancement of innovative technological, methodological, and operational tools for use within the Police and Law Enforcement Portfolio.

6. Impact on the CSSP Outcome(s)

The current proposal is aligned with DRDC/CSSP Science & Technology Challenges.

First the proposal aims to develop technology and best practice approaches that can be used to protect and promote the safety and wellbeing of under-represented emergency management stakeholders (e.g., Indigenous Peoples, women, vulnerable and marginalized populations). This will be accomplished by developing the operational capacity to: integrate, examine, and analyze large data sets; develop and validate predictive models; and create applied tools which could assist police and community safety partners to reduce risk and potentially harmful outcomes associated with time missing.

Advancing development of a "real-time" Lab that can assist police and their community safety partners in evidence-based decision-making and problem solving in regards to Missing Persons cases would be a first in Canada. Moreover, the innovative technology, methodology, and operations required to complete this project is viewed as leading edge (e.g., innovation of big data architecture and community safety analytics) and could be readily applied to future projects which may be of interest to DRDC (i.e., social media analytics, analytical tools that could assist in the detection and mitigation of threats e.g., human trafficking, terrorism).

Together, these support the broader CSSP outcomes of effective technology assessment/transition, evidence-based policy, and safe communities. The development, application, and use of innovative and effective technology/methodologies with Missing Persons data can drive evidence-based interventions and policies and will not only contribute to better outcomes for those at risk for going missing, including vulnerable and marginalized populations, but safer, stronger, communities in general.

PROJECT SCOPE

The overall objectives of this project are to develop **predictive models** and **applied tools** for police and community safety partners to inform decision-making, guide preventative interventions, and assist in reducing time missing and associated negative outcomes for those reported missing.

The project will focus initially on MP in the province of Saskatchewan, beginning with data on MP cases which has already been provided to SPPAL by the SPS. Additional Saskatchewan municipal police data and Saskatchewan child welfare data will be integrated with existing data as key technologies representing project deliverables are advanced (i.e., methodologies for data extraction, secure data transfer, and data linkage).

This work will inform ongoing engagement with police agencies, subject matter experts in the area of missing persons and international experts/highly qualified persons (HQPs) in the areas of policing, mathematics, statistics, computer science, and the human services (e.g., psychology, social work).

7. Included Work

While specific deliverables are included below (section 12.2), key work included in the project scope includes the following:

An **updated systems requirement assessment** to discover requirements in the areas of privacy, security, hardware, software, data sharing/integration, data streaming, "real-time" needs and human resources for SPPAL in order to support MP project deliverables.

Assessment results will be used to create a **data development environment** for the MP project to operate within. A **linked database** containing integrated information from collaborating agencies that can be used to develop and test advanced predictive models for MP cases, with particular emphasis on vulnerable populations, will be created along with requisite support tools (e.g., living data dictionaries)

Assessment of user needs, and the development of an **interface based on these needs and statistical models** created within the project for communicating results to front line community safety partners. (Support tools such as user manuals and repositories for statistical models are also included in the scope of work as well as plans for testing and evaluating the interface developed).

8. Excluded Work

Finalization of predictive models used to develop and inform applied tools that can be used by police and community safety partners represent excluded work. (This may require partnerships with additional collaborators and additional data to calibrate and validate preliminary models.)

Although prototypes will be developed, **fully mature applied tools**, implementation, and evaluation of their effectiveness will also be completed outside the scope of this project.

9. Assumptions

It is assumed that additional collaborators (e.g., Social Services) will finalize information sharing agreements with SPPAL.

It is assumed that data that is currently available to researchers can be used to develop and test predictive models and/or that this data may be enriched for this purpose (e.g., through the use of text analytics).

It is assumed that funding through this proposal can be secured any procurement-related challenges can be resolved in a timely manner.

10. Constraints

It is assumed that resources assigned to the project will be available over the life of the project.

11. Related Projects

CSSP-2015-CP-2102 – *Kingston Interoperability Safety and Security* – A shared environment which will allow radio and Computer-aided Dispatch (CAD) to CAD data sharing for its city and all mutual aid partners by interconnecting the police, paramedics and fire from Brockville, Belleville and Kingston dispatch centres.

CSSP-2015-CP-2107 – National Fire Information Database – A national fire data pilot project that will gather and unify ten years of fire information from across the country and create Canada's first national system for collecting fire statistics

Future projects proposed for SPPAL include the use of integrated datasets to explore opportunities to leverage predictive and dynamic analytics to enhance decision-making regarding suicide and domestic violence as well as the creation and application of advanced predictive analytical tools to a Provincial Child Death Database which may inform interventions to reduce child deaths in the province of Saskatchewan.

PROJECT PLAN

12. Schedule and Work Breakdown Structure

12.1 Schedule: The Project will start on 3 April 2017 and will be completed by 31 March 2019.

For Contract(s) or MOA(s) established under this project, the project activities will start upon issuance of Contract or MOA.

12.2 Work Breakdown Structure (WBS): The schedule shows the planned start and stop dates for each task in the WBS and appropriate milestones and/or delivery dates. The total Project period of performance is indicated in months from the start date through the completion date.

Task Description and Activities	Project Deliverables	Start Date	End Date	Performed By
1. Data Integration Workshop Workshop for SPPAL data integration platform requirements for multiple data sources (e.g., police and social services) including, privacy, security, hardware, software, data sharing and streaming	i)Phased roadmap ii)Architecture design document (data, software, networks, and security) iii)Privacy/security summary documents iv) Creation of an initial Vision, Scope and Requirements summary document which can be updated as the project progressed	April 3, 2017	May 31, 2017	External technology consultant (i-iii) Legal HQPs (iii) PM/MP Project Team (iv)
2. User Interface Needs Assessment User interface assessment for Missing Persons (MP) Project end users (e.g., police officers)	i)Document compiling historical and current policies and practices for responding to MP and Habitual Runaway cases, theoretical and empirical risk factors used, and prioritizing these parameters as well as interface needs	April 3, 2017	June 30, 2017	HQP - Computer Science MP Project Team
3. Missing Persons Workshop Interdisciplinary workshop for MP HQPs from academia, policing, and social services	i)Workshop agenda ii)Participant List iii)Workshop Summary document	April 3, 2017	June 30, 2017	PM/Project Team
4. Data Coding -police data Defining and structuring police data for use in predictive analyses and interface development	i)Creation of living data dictionary ii) Brief report on application of relevant coding standards to police MP data (e.g., National Information Exchange Model; NIEM)	May 1, 2017	August 30, 2017	HQP - Summer Student (i and ii) MP Project Team (ii)

Task Description and Activities	Project Deliverables	Start Date	End Date	Performed By
5. Expansion of Existing SPPAL Development Environment Includes security, hardware, software, staging and testing	i)Hardware and software installed for data integration platform (brief report with relevant test results/outputs and screen shots e.g., TeraSort results, screen shot from Ambari) ii)Creation of comprehensive data integration platform (business problem/case report and overview presentation/demonstration) iii) Security approval documents iv)Iteration review (mini-reports)	May 1, 2017	August 30, 2017	External Technology Consultant (i, ii, iv) HQP - Computer Science Masters Student (i and ii) HQP - IT Installation/Support (i, iii, iv) MP Project Team (Technology Working Group)
6. Police Data Analysis – Part A Identification of potential models and algorithms using police MP/Habitual Runaway data	i)Map theoretical and empirical risk factors to available MP data and conduct descriptive analyses (brief report) ii)Identification of applicable models (brief report)	September 1, 2017	March 31, 2018	HQPs Graduate Students Psychology (x1) Statistics (x1) Computer Science (x1)
7. Police Data Analysis – Part B Execution of potential models and algorithms using police MP/Habitual Runaway data	Model execution, outcome analyses, and adjustments (development of a final report with a user's manual for each model)	April 3, 2018	May 31, 2018	MP Project Team (Advanced Analytics Working Group)
8. Research Network Building Build research network to work towards potential models and algorithms for use with police MP data and community safety analytics more broadly	i)Host conference for HQPs in advanced statistics, mathematical modeling, police, and community safety partners ii)Initiate HQP collaboration network for police and community safety analytics (e.g., creation of HQP working groups with preliminary work plans for each group)	September 1, 2017,	May 31, 2018	PM/Project Team
9. End User Interface	i)Diagrams of physical and	September 1,	January 31,	HQP - Human

Task Description and Activities	Project Deliverables	Start Date	End Date	Performed By
Design and Development Design and develop end user interface prototype for MP Project	i) logical structure ii) Screen shots of developed interface iii) Capability demonstration/presentation	2017	2018	Computer Interface (HCI) Software developers MP Project Team (Technology Working Group)
10. Year 1 Reporting	i) DRDC progress reports ii) Year-end financial report	April 3, 2017	March 15, 2018	HQP – Finance PM/Project Team
11. Test/Evaluate Prototype End User Interface for MP Project – Part A Beta version interface testing using police data by internal reviewer	i) Brief report with screenshots of outcomes of testing/adjusting and calibration of beta version (internal reviewer) ii) Development of Training Manual for Version 1	January 1, 2018	March 1, 2018	Internal reviewer
12. Test/Evaluate Prototype End User Interface for MP Project – Part B Beta version interface testing using police data by external reviewer	i) Brief report with screenshots of outcomes of testing/adjusting and calibration of beta version (external reviewer) ii) Finalization of Training Manual for Version 1	April 1, 2018	May 31, 2018	External reviewer MP Project Team (Technology Working Group)
13. Coding Additional Sources -social services data Defining and structuring social services data for use in predictive analyses and interface development	i) Enhancement of living data dictionary with social services data ii) Brief report on application of relevant coding standards to MP social services data (e.g., National Information Exchange Model)	May 1, 2018	August 31, 2018	HQP(i and ii)MP Project Team (ii)
14. Develop and Implement Linking Methodology Linking police and social services MP data	i) Brief report identifying linking methodology and overlap between two data sources (police and social services)	September 1, 2018	December 31, 2018	HQP - Computer Science MP Project Team
15. Comprehensive Data Analysis Data analysis on integrated police and social services data set (e.g., model design, integration, execution, and evaluation)	i) Model repository/ model management system with documentation of model outcome analyses and model adjustments etc. for each model ii) Creation of user manual for each model	October 1, 2018	February 28, 2019	HQP - Statistics MP Project Team (Advanced Analytics Working Group)
16. User Interface Update Update user interface	i) Training manual for Version 2	January 1, 2019	March 1, 2019	HQP-- HCI

Task Description and Activities	Project Deliverables	Start Date	End Date	Performed By
with integrated data set	ii)Develop plan for testing and evaluation of Version 2			MP Project Team (Technology Working Group)
17. Evaluation Framework Develop plan for evaluating combined statistical model and user interface in achieving MP project goals and benchmarks	i)Detailed Logic Models	November 1, 2018	February 1, 2019	External Consultant
18. Knowledge Transfer and Dissemination Develop ways to share knowledge with partners, stakeholders, and end users	i)Short project video ii)Presentation materials for conferences etc.	April 1, 2018	February 28, 2019	PM/Project Team
19. Updated Assessment of SPPAL Systems Requirements Planning for continued SPPAL and MP Project development (e.g., real-time communication, unstructured data, social media)	i)Phased roadmap ii)Design document iii)Updated work breakdown structure iv) Updated Vision, Scope and Requirements summary document	April 1, 2018	February 28, 2019	External Technology Consultant
20. Year 2 Reporting	i)DRDC progress reports ii)Year-end financial report iii) DRDC Scientific Report iv) DRDC Project Completion Report	April 1, 2018	March 31, 2019	HQP – Finance PM/Project Team

The Project will provide DRDC CSS with the following outputs:

- Signed Project Charter
- Quad Chart
- Progress Reports (per schedule provided by DRDC CSS)
- YE Financial Report (for other government departments)
- Project Completion Report
- Record of Decision of Project Review Committee (PRC) meeting, if/when a PRC is held.

12.3 Project Plan at a Glance

The following graphic reflects the Project Plan in terms of key tasks. The project plan is designed to facilitate the completion of major tasks concurrently to optimize project resources and schedule.

13(2), 19(1)(c)(iii)

13. Budget

13.1 CSSP Funds – as provided to the project by DRDC CSS

Organization funds will be distributed to	General Ledger	CSSP Funds FY 17/18	CSSP Funds FY 18/19	CSSP Funds TOTAL
Saskatoon Police Service	4915	\$629,400	\$308,500	\$937,900
Total		\$629,400	\$308,500	\$937,900

13.2 In-Kind Co-Investment

Organization Providing	General Ledger	FY 17/18	FY 18/19	TOTAL
Saskatoon Police Service	4915	\$250,000	\$250,000	\$500,000
SK Ministry of Justice; Corrections and Policing	4915	\$200,000	\$200,000	\$400,000
Total		\$450,000	\$450,000	\$900,000

13.3 Cash Co-Investment

Organization Providing	General Ledger	FY 17/18	FY 18/19	TOTAL
N/A				\$0
Total				\$0

14. Resource Requirements

14.1 Personnel (DRDC CSS and Lead)

	Name/Role	FY 17/18	FY 18/19	Total
29(1)	Project Director, DRDC	.05	.05	.10
29(1)	Scientific Advisor, DRDC	.05	.05	.10
29(1)	Project Manager, SPS	.50	.50	1
	Delphine Gossner, Project Manager, MOJ			

14.2 Facilities and Equipment

The following equipment and facilities will be required for the Project:

- Existing lab facilities at SPS (Saskatchewan Police Predictive Analytics Lab or SPPAL)
- Existing SPPAL hardware and software
- Saskatoon Police Service meeting rooms and conferencing equipment (subject to availability)

15. Risks

Risk	Probability (H/M/L)	Impact (H/M/L)	Type	Mitigation Strategy
Delays in data sharing and transfer	M	H	Technical	Replicate process used by CCJS and police agencies for secure data sharing and transfer
Appropriate and timely HQP recruitment	L	H	Schedule	Communication with experts in the field to increase awareness of potential opportunities and identify possible recruits.
Data storage capacity	L	M	Technical	Agencies contributing data in the future may be required to provide financial contributions for increased hard drive/data storage capacity. Continue to explore options to increase data storage capacity.
Unanticipated IT related costs	M	M	Financial	Inclusion of a data integration workshop with external technology consultant early on in the project (as well as reassessment in Year 2) which will include formal requirements analysis and supporting documents
Solution does not meet user requirements	L	L	Scope	Project includes user needs assessments (e.g., for user interface), stakeholder engagement, consultation, and network building (e.g., workshop, conference), and will progress through multiple stages where testing and feedback can be provided by internal and external parties. Multiple solutions will also be generated and advanced.

Note 1: (H/M/L) = high, medium or low

Note 2: Examples of 'Risk Type' include: financial, schedule, scope, technical

16. Evaluation of Project Success

Collaborators that have agreed to share data via signed data sharing agreements for purposes of the Missing Persons project have worked with SPPAL to extract and transfer data in a safe and secure manner, ways to manage and integrate large and diverse data sets have been developed, data dictionaries to assist in understanding this data have been developed, exploratory analyses have been conducted, and preliminary models to inform prevention and intervention in missing persons cases, including for vulnerable and marginalized populations, have been developed and added to a model repository. These models have been incorporated in a preliminary interface which has been tested for effectiveness using a small number of end users (e.g., police officers) and user manuals have been developed. Broader dissemination of project progress and products (e.g., collaborations with CSKA, presentations, and draft publications) should also occur and additional collaborators and professional networks will have been developed.

17. Procurement Strategy

DRDC CSS funds will be transferred to the Saskatoon Police Service (SPS) via Memorandum of Agreement (MOA) administered by Public Services and Procurement Canada. Saskatoon Police Service will assume primary responsibility for receipt, billing, and tracking of funds. Decisions regarding the disbursement of funds to: secure contracted resources; increase the technological operating capacity of the Lab; and engage university partners (e.g., funding of Ph.D. students) will be made in partnership with the Ministry of Justice, Corrections and Policing.

18. Transition Strategy

Once applied tools have been developed and tested, a transition plan will be developed to finalize models and interfaces and integrate these tools in police and community safety operations. Current collaborators will be supported in using applied tools by SPPAL (e.g., integrating applied tools into standard police operations) and new collaborators are welcome to identify their own sources of funding to mobilize the project solutions in other operational and research settings.

PROJECT SUPPORT

19. Project Organization

Project partners include the founding partners of SPPAL: the Saskatoon Police Service (SPS); the Saskatchewan Ministry of Justice, Corrections, and Policing (MOJ); and the University of Saskatchewan (U of S). These partners comprise the Steering Committee for SPPAL.

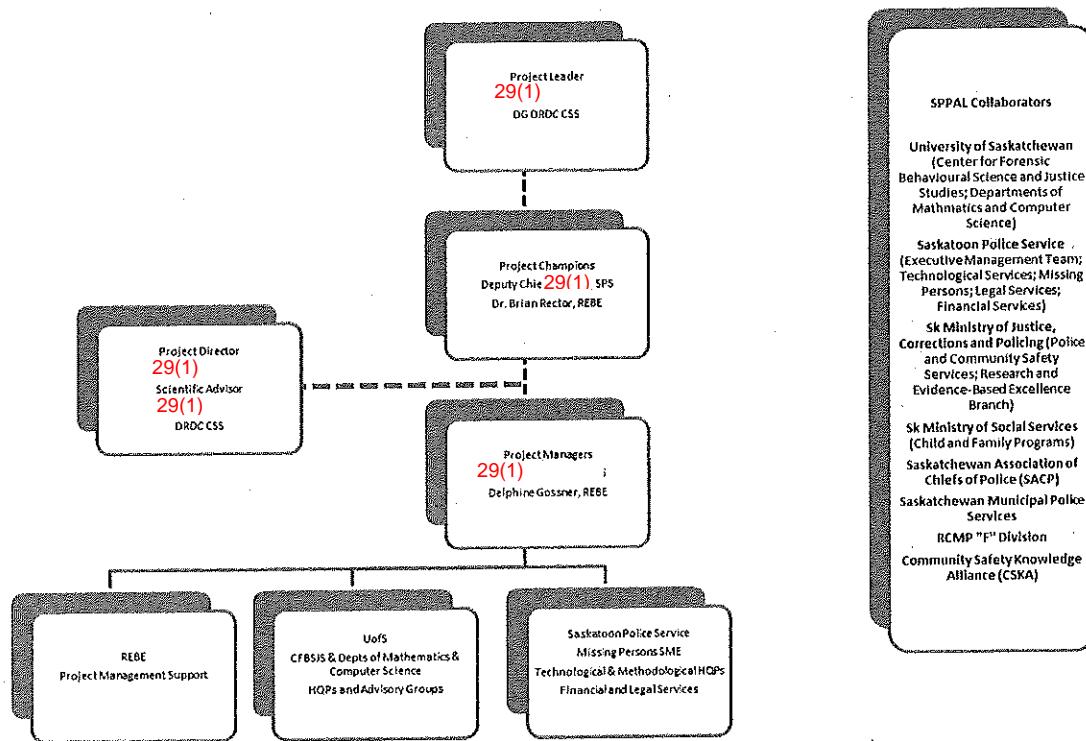
The physical Lab is based at Saskatoon Police Service and SPS is the designated co-Lead Agency for the current DRDC proposal with the Deputy Chief, Support Services, Saskatoon Police Service or designate identified as Project Champion.

The Saskatchewan (SK) Ministry of Justice, Corrections, and Policing, is a co-Lead Agency. The Executive Director of Research and Evidence-based Excellence Branch (REBE), also reports within the SK Ministry of Social Services and is a joint Project Champion.

A project team has been created for the current project and is comprised of two working groups (Advanced Analytics and Technology) with individuals from SPS, REBE, and HQPs from the U of S as well as external consulting agencies (e.g., technology consultants). In addition to the lead academic researchers, there is a network of support for this project. This includes an advisory committee comprised of U of S faculty from the departments of mathematics/statistics, computer science, and psychology, as well as legal and operational advisory groups. Additional collaborators include municipal police agencies in Saskatchewan, the Saskatchewan Ministry of Social Services, and the Community Safety Knowledge Alliance (CSKA).

Role	Name	Organization	Phone Number	Email Address
Project Leader	29(1)	DRDC CSS	29(1)	
Project Director		DRDC CSS		

Role	Name	Organization	Phone Number	Email Address
Project Champions	29(1) Deputy Chief, Support Services	Saskatoon Police Service	29(1)	
	Dr. Brian Rector, Executive Director, REBE	SK Ministry of Justice/Ministry of Social Services	306-787-3892	Brian.Rector@gov.sk.ca
Project Manager	29(1) Clinical Psychologist of Policing	Saskatoon Police Service	29(1)	
	Delphine Gossner Director, Research and Excellence in Policing, REBE	SK Ministry of Justice	306-933-7383	Delphine.Gossner@gov.sk.ca
Contracting Authority	29(1)	Public Services and Procurement Canada	29(1)	



20. Relevant Agreements/Arrangements

Intellectual Property (IP) will be managed in accordance with the General Conditions – Research & Development 2040 and specific clauses. These will be outlined in the Contract General Conditions.

Relevant to the terms and conditions set out in the Memorandum of Agreement (MOA) to be agreed upon.

21. Other Information

Lead Federal Department Internal Settlement (IS) codes:

Department Code : NA

Organisation Code: NA

Reference Code: NA

22. Communications

DRDC CSS reserves the right to disclose and/or use information from projects for which it provides funding, including the publication of a short project description on science.gc.ca/cssp. Should you have any concerns about project information being posted on the website, please discuss them with your DRDC CSS Project Director during the charter development stage. Additionally, the use and publication of information related to this Project will require review by DRDC CSS to ensure proper acknowledgement of DRDC CSS/CSSP support/contribution. In order to achieve this, Project participants will provide copies of any reports, articles, or publications to DRDC CSS at least 30 days, where possible, prior to any release, distribution or planned publication. No public announcements concerning this Project will be made without providing advance notification to DRDC CSS. Project Managers and Directors should ensure that communications are executed through a coordinated approach that favours the development of joint products and activities. DRDC CSS must receive a copy of all reports generated under the Project.

23. Publication/Security/Controlled Goods/Distribution

The highest level of security to be applied to information generated or exchanged by or in this Project will be Unclassified; a Security Requirements Check List (SRCL) will not be required.

The information and/or material(s) from this Project will be subject to the following Controlled Goods (CG) category: Non-CG - DMC A.

24. The distribution of information resulting from this Project is Unlimited. Project/Charter Amendments

Any revision to or extension of this Project will be made through a formal amendment to this Project Charter, as concurred in writing by the participants.

25. Project Termination

DRDC CSS, in consultation with the Lead Department, will make recommendations regarding the termination of a Project, whose decision will be final.

Some conditions that may lead to termination could include:

- Charter has not been signed by project participants within three (3) months of project award.
- Deliverables / Milestones not met (non-performance).
- Forecast inability to deliver (for example, key personnel have left the department or Project).
- Failure of a participant to meet contractual obligations or PSTP MOU reporting requirements.
- Change in CSSP strategic priorities or science and technology requirements.
- Lead Department no longer leading the research study

SIGNATURES

This Project Charter will enter into effect on the date of the last signature, and will remain in effect until the completion of the project as outlined in Section 12.1, Schedule.

29(1)

29(1) Deputy Chief, Support Services, Saskatoon Police Service



Brian Rector, Executive Director, Research and Evidence-based Excellence

Date

Ministry of Justice

A handwritten signature in black ink, appearing to read "Brian Rector" followed by a date or initials.

29(1)

Director General, DRDC CSS

Date

Centre for Forensic Behavioural Sciences & Justice Studies
University of Saskatchewan

Memorandum of Agreement

Project Participants:

Agency: Saskatchewan Ministry of Justice, Corrections, and Policing

Agency Lead: Dr. Brian Rector, Executive Director, Research and Evidence-based Excellence (REBE)

Centre Lead: 29(1) Director, Centre for Forensic Behavioural Sciences & Justice Studies (CFBSJS) and Professor, Department of Psychology, U of S

Project Title: Development of a Validated Remand Risk Assessment Tool

Student Assistants: -

Agency/Partner Staff: Delphine Gossner, Director, Research and Excellence in Policing, REBE
29(1) Clinical Psychologist of Policing, Saskatoon Police Service

Centre Staff: 29(1) CFBSJS Research Officer
29(1) CFBSJS Research Officer
29(1) CFBSJS Postdoctoral Fellow
CFBSJS Coordinator

Duration: September 2016 to August 2017

Background:

A systematic increase in Remand has been observed in Canada over the past three decades (e.g., Doob, 2012). Consistent with this national trend, the total custody count for the province of Saskatchewan increased approximately 25% between 1998 and 2012, and 97% of this increase has been attributed to increasing Remand (Rector & Simon, 2015).

Increased use of Remand is not associated with decreased crime rate (Sagynbekov, 2014). In the absence of any positive impact on crime rate and increasing costs associated with administrative processes pertaining to Remand, millions of dollars may be spent without necessarily impacting community safety. For instance, in Saskatchewan, the daily cost of Remand is reportedly 1.8 times higher than the daily cost of sentenced offenders (which has been attributed to significant overtime costs owing to the highly variable nature of Remand; Sagynbekov, 2014).

Saskatchewan data further suggests that the majority of individuals who are Remanded remain in Remand for less than 30 days, with the majority being released within 1 to 14 days. Roughly 50% of these individuals are released on Bail with little formal community supervision.

As such, there is a simultaneous need to ensure that appropriate individuals (e.g., high risk and/or violent offenders) are being detained and Remanded within the context of the *Criminal Code* test, (i.e., is the individual likely to reoffend prior to scheduled court appearance and/or not attend the scheduled court appearance) in order to promote community safety and the administration of justice, while those individuals who can be safely managed in the community are processed and released as early on in the administrative process as is possible..

The Ministry of Justice, as represented by Corrections and Policing and the Attorney General, has been working in a collaborative manner regarding the use of administrative procedures pertaining to Remand. This provincial Remand Initiative is guided by a Steering Committee and the following common principles and objectives:

Common Principles:

1. Initiative informed by data: descriptive data, predictive analytics, and outcome data.
2. Focus on practical solutions.
3. A multi-sector ownership to the initiative involving partners such as, but not limited to, prosecutions, legal aid, courts, police and corrections.
4. To start, initiatives will involve specific communities. In Saskatchewan this will be Saskatoon and Prince Albert.

Objectives:

1. Reduce needless time on Remand.
2. Develop effective community alternatives.

To achieve these objectives, the Steering Committee has identified several priority areas - one of which is the development of a validated risk assessment tool to be used by police with accused in detention. The tool would be designed to inform the decision made by the Officer in Charge (OIC) regarding releasing adult accused with a summons/promise to appear before the court or to refer the accused to a Justice of the Peace for a release/remand decision.

A recent review of risk assessments and factors predicting pretrial release failure conducted by the Centre for Forensic Behavioural Sciences & Justice Studies (Myburgh, Camman, & Wormith, 2015) recommended that further attention should be paid to the role of police discretion and exploration of the utility of employing detention screening tools (p. iv).

While individuals charged with serious crimes are legally required to be held in police detention cells, discretion can be used to release individuals charged with less serious crimes. Although key

discretionary factors are currently being used by police and justice partners across Saskatchewan, these tend to be informal, inconsistent, and this information is not formally recorded or tracked.

For instance, it is not known, how many of the individuals who are released go on to commit additional status, criminal, or violent offenses and how soon these may occur (e.g., prior to the next court appearance). Little is also known about the predictive power of the discretionary factors which may be contributing to detention. In the absence of empirically driven and validated decision making tools, it may be simply easier to “err on the side of caution” i.e. detention to protect the public, but this may not in fact be safer and could contribute to increasing societal and justice costs.

Development of a practical, evidence-based risk assessment tool for police, and validation of such a tool, may assist in collecting and tracking information pertaining to a broader range of factors associated with detention and subsequent Remand, facilitate communication among stakeholders (Police, Justice of the Peace, Public Prosecutions), support evidence-based decision-making by stakeholders, facilitating detention when appropriate, decreasing unnecessary detention, and ultimately increasing community safety.

It is recognized that development of such a tool is likely to be a multi-phase project. Use of more readily accessible provincial and historical data to test empirically supported risk factors (e.g., the potentially applicability of pretrial risk factors identified by VanNostrand and others), may constitute an initial phase. Additional phases may involve testing the strongest risk factors and/or preliminary tools, prospectively, potentially incorporating additional data (e.g., police data, discretionary factors), and possibly examining jurisdictional subgroups (e.g., urban, rural, northern settings within the province).

References:

- Doob, A.N. (2012, January). *Bail and remand: One problem or two?* [Discussion Paper]. Toronto, ON: University of Toronto.
- Myburgh, J., Camman, C., & Wormith, J.S. (2015, November). *Review of Pretrial Risk Assessment and Factors Predicting Pretrial Release Failure*. Centre for Forensic Behavioural Science and Justice Studies, University of Saskatchewan.
- Rector, B., & Simon, T. (2015, August). *Remand Practices in Saskatchewan*. Presentation to SK Provincial Remand Steering Committee. Regina, SK.
- Sagynbekov, K. (2014, November). *Cost functions for Saskatchewan adult correctional institutions* [Technical Report]. Regina, SK: University of Regina.
- VanNostrand, M. (2003). *Assessing risk among pretrial defendants in Virginia: The Virginia Pretrial Risk Assessment Instrument*. Richmond, VA: Virginia Department of Criminal Justice Services.

Project:

The purpose of the project is to develop and validate a practical, evidence-based risk assessment tool to be used by police with adult accused at the detention phase.

Data sources will include:

- Historical data on adult provincial offenders provided by the Ministry of Justice - Corrections and Policing and Attorney General (2008-2014 inclusive)

Activities will include:

- Consultation with stakeholders (e.g., members of the Steering Committee, Agency/Partner and Centre Leads, identified subject matter and data experts from stakeholder agencies i.e., an ad-hoc working committee);
- Coding, linking, and integration of historical data related to empirically supported predictive factors and special circumstances associated with release and release outcomes;
- Coding, linking, and integration of historical data related to release outcomes (e.g., fail to appear, new criminal offense, violence);
- Exploration of statistical relationships between empirically supported factors and release outcomes
- Evaluation of the data for potential application of advanced statistical modelling techniques (e.g., need for data enrichment, what additional data may be required etc.) and exploratory analyses if possible;
- Development of an initial prototype of a practical risk assessment tool for adults on the basis of above results; and
- Finalization of products in preparation for piloting tool (implementation and collection of real-time, prospective data).

Activities/Projected Timeline:

Activity	Responsible Person(s)	Timeline
Arrange introductory meeting with stakeholders and development of an ad hoc committee for risk assessment tool project	Brian Rector 29(1)	September 2016
Evaluation of ethics approval/waiver		September 2016
Obtain ethics approval/waiver		September 2016
Develop and finalize an agreement pertaining to data extraction, storage, and access and arrange for data collection and extraction	Brian Rector Terri Simon and REBE Ad-hoc working committee	September 2016
Coding, linking, and integration of data	29(1) Terri Simon and REBE	October 2017
Conduct data analysis	29(1) and CFBSJS	March 2017
Review preliminary results with REBE and Committee members (Steering and ad-hoc)	29(1) REBE	June 2017
Conduct any additional analyses, prepare and submit draft report/risk assessment tool to REBE and Steering Committee	29(1)	June 2017
Review and provide feedback on draft report/risk assessment tool	Brian Rector REBE	July 2017
Prepare and submit final report/risk assessment tool to REBE and Steering Committee	29(1)	August 2017

Project Deliverables:

- Provision of updates to Steering and Ad-hoc Committees
- Refinement of study design
- Creation and preparation of an integrated “Remand Data Set” for analysis
- Determination of rates of noncompliance (systems generated and criminal offending) after release to the community in Saskatchewan
- Examination of statistical relationships between identified risk variables and outcomes
- Explore potential for advanced statistical modelling and if possible, conduct exploratory analyses
- Draft report and initial prototype of remand risk assessment tool for adults for review
- Final report and prototype of remand risk assessment tool for adults

Supervision/Accountability:

CFBSJS Staff and any Student Assistants will be supervised by Dr. Wormith and are accountable to the Centre to complete work in a diligent and timely manner. The Agency and Centre Leads are jointly responsible for project design and technical matters pertaining to the project.

Agency Support:

The Agency will facilitate access to necessary data required by the CFBSJS for analyses. It has been agreed data going back 5 years 2008 to 2012, with 2 years of follow-up (2013-2014) will be provided by the Agency. The Agency will collaborate with CFBSJS to merge the data. Centre staff and any student assistants having access to this data will be identified and will perform the work consistent with existing MOUs between the Agency and the University of Saskatchewan, dated October 29, 2010.

Confidentiality:

All information obtained over the course of this project will be kept strictly confidential. CFBSJS Faculty, Staff, and Student Assistants will not release personal and/or identifying information and results will be presented in aggregate form only in the final report, and in any subsequent presentations or reports. Data will be transferred and housed at CFBSJS in a safe and secure manner agreed upon by all involved parties and documented. Only a small number of approved project personnel from CFBSJS and REBE will have access to identified data for purposes of linking Corrections and Policing data with Attorney General data. The Agency will ensure those who have access to identifiable and linked data are authorized to do so. Access to this data must be tracked and recorded. Identified data used to link cases will be deleted post linking. All data will be returned to the Agency upon project completion.

Utilization and Ownership of Products:

Upon project completion, the Agency will store the fully integrated “Remand Data Set” and the final report will become the property of the Agency. However, the Centre must be acknowledged and CFBSJS Faculty, Staff, and Student Assistants must be cited as authors whenever the document or any

components of the report are reproduced or released by the Agency. Moreover, CFBSJS Faculty, Staff, Student Assistants, and Agency members and Partners who have made a substantive contribution to the project retain the right to present and/or publish information obtained as a result of this project. The Agency will be consulted before the presentation and/or publication of any such information. The Agency and anyone involved in the project will be appropriately acknowledged in any such publications, which will also include the commonly accepted Agency disclaimer. The Agency and Partners (e.g., members of the Steering Committee and Ad-hoc working Committee) may access and utilize any products developed (i.e., screening tool) without cost. Once validated, government and police agencies in Saskatchewan are able to use any instruments/tools developed without cost.

Renegotiation of the Agreement:

Specific elements of the agreement are subject to renegotiation at the request of any of the involved parties in light of changing circumstances or inaccurate projections.

Signatures:

Agency Lead:



Date: Aug. 31, 2016

Dr. Brian Rector, Executive Director, Research and Evidence-based Excellence,
Saskatchewan Ministry of Justice, Corrections, and Policing

29(1)

Centre Lead:



Date: Aug 30/2016

Dr. J. Stephen Wormith, Director, Centre for Forensic Behavioural Science and Justice
Studies, University of Saskatchewan

Addendum to Memorandum of Agreement
Development of a Validated Remand Risk Assessment Tool
August 01, 2017

A Memorandum of Agreement (MOA) for the project titled “Development of a Validated Remand Risk Assessment Tool” was signed on August 31, 2016. At the time of signing, the duration of the project was projected to be September 2016 to August 2017.

A provision of the MOA allows for “specific elements of the agreement are subject to renegotiation … in light of changing circumstances or inaccurate projections.” Due a delay in transferring data from MOJ to CFBSJS, the end date of the project has been extended to August 2018. Activities for the project remain the same with adjusted timelines noted below.

Update and revision to Activities/Projected Timeline

Activity	Responsible Person(s)	Timeline	Status/Adjusted Timelines
Arrange introductory meeting with stakeholders and development of an ad hoc committee for risk assessment tool project	Brian Rector <small>29(1)</small>	September 2016	Completed September 28, 2016
Evaluation of ethics approval/waiver	<small>29(1)</small>	September 2016	Completed
Obtain ethics approval/waiver		September 2016	In progress
Develop and finalize an agreement pertaining to data extraction, storage, and access and arrange for data collection and extraction.	Brian Rector Terri Simon and REBE Ad-hoc working committee	September 2016	Data Sharing Agreement signed July, 2017 Court data extracted June, 2017 Corrections data extraction projected for September, 2017
Coding, linking, and integration of data	<small>29(1)</small> Terri Simon and REBE	October 2016	December 2017
Conduct data analysis	<small>29(1)</small> and CFBSJS	March 2017	March 2018
Review preliminary results with REBE and Committee members and submit preliminary risk assessment tool (Steering and ad-hoc)	<small>29(1)</small> REBE	June 2017	May 2018

Addendum to Memorandum of Agreement
 Development of a Validated Remand Risk Assessment Tool
 August 01, 2017

Activity	Responsible Person(s)	Timeline	Status/Adjusted Timelines
Conduct any additional analyses, prepare and submit draft report/ risk assessment tool to REBE and Steering Committee	29(1)	June 2017	June 2018
Review and provide feedback on draft report/risk assessment tool	Brian Rector REBE	July 2017	July 2018
Prepare and submit final report/risk assessment tool to REBE and Steering Committee	29(1)	August 2017	August 2018

Signatures:

Agency Lead:

Date: Aug. 29/2017

Dr. Brian Rector, Executive Director, Research and Evidence-based Excellence,
 Saskatchewan Ministry of Justice, Corrections, and Policing
 29(1)

Centre Lead:

 29(1) _____ Date: Aug 29/2017
 Director, Centre for Forensic Behavioural Science and Justice
 Studies, University of Saskatchewan



Government
— of —
Saskatchewan

Minister of Corrections
and Policing
Legislative Building
Regina, Canada S4S 0B3

APPOINTMENT OF SPECIAL CONSTABLES

THE POLICE ACT, 1990

WHEREAS Part V of *The Police Act, 1990*, provides that the Minister may appoint any individual as a Special Constable, or a class of individuals as Special Constables, that the Minister considers necessary, on any terms and conditions that the Minister considers advisable;

WHEREAS the Saskatoon Police Service, the Ministry of Corrections and Policing, and the University of Saskatchewan have partnered to establish a Saskatchewan Police Predictive Analytics Lab (SPPAL), housed at the Saskatoon Police Service,

WHEREAS to be effective in achieving its purposes, SPPAL requires advanced skill sets in highly specialized domains of computer science, mathematics and statistics, forensic behavioral science and justice studies, and other specialty areas external to police services,

AND WHEREAS the Assistant Deputy Minister of Policing and Community Safety Services, Ministry of Corrections and Policing, has requested the appointment of certain persons as Special Constables for the purposes set out in this appointment;

THEREFORE I do hereby appoint:

The Executive Director Research and Evidence-Based Excellence, the Director Research & Excellence in Policing, the Director Research and Excellence in Data Innovation, and the Program Effectiveness Consultant, Corrections and Policing along with those class of persons as defined in "Schedule A" attached to this appointment as Special Constables pursuant to *The Police Act, 1990*, subject to the following conditions:

1. The purpose of this appointment is to provide the appointees authority to access and view all Saskatchewan/First Nations Police data and conduct analyses on any aspect of that data, for purposes of mitigating risk to individuals and/or improve public safety.

2. Appointees will access and view that data and conduct their analyses only within the secure environment of the Saskatchewan Police Predictive Analytics Lab situated at the Saskatoon Police Service. Enhanced security clearance is required to access the Lab and the data.
3. Appointees are required to keep records/logs of data processing activities and to provide updates to Municipal Chiefs of Police.
4. Appointees are required to use adequate and appropriate safeguards to protect personal information during data processing.
5. All potential breaches of security and/or privacy must be documented and reported to the Saskatoon Police Service in accordance with Section 6.7 of the Lab Memorandum of Understanding (MOU) to allow for investigation and follow-up including prevention of future recurrence(s).
6. The appointees are not subject to Part IV of *The Police Act, 1990*, however, any public complaint against the appointees must be forwarded to the Assistant Deputy Minister, Policing and Community Safety Services, Ministry of Corrections and Policing within five days of receipt of the complaint.
7. This appointment does not provide authority for the appointees to carry firearms, prohibited or restricted weapons, oleoresin capsicum spray, or batons.
8. The territorial jurisdiction is the Province of Saskatchewan.
9. This appointment expires in regard to individual members of the class of appointees defined herein when they no longer require direct access to the Saskatchewan Police Predictive Analytics Lab.

Dated at Regina, Saskatchewan, this 3rd day of October, 2018.



Deputy Minister of Corrections and Policing

Schedule A

Individuals selected for the purposes of conducting applied research, intended to mitigate risk to individuals and promote public safety, within the Saskatchewan Police Predictive Analytics Lab, all of whom shall meet the following criteria:

- i) Formal affiliation with an accredited academic institution associated with the provision of services within the Lab (e.g., the Universities of Saskatchewan and Regina) and in good standing with the associated institution and relevant professional governing bodies; and
- ii) Identified as faculty; supervised students; and/or supervised research officers on project-based descriptions and university research ethics applications and approvals as required; or
- iii) An employee of the Government of Saskatchewan selected for the purposes of conducting applied research intended to mitigate risk to individuals and promote public safety within the Saskatchewan Police Predictive Analytics Lab; and
- iv) Obtain an enhanced security clearance, which includes in part a criminal record check, for purposes of accessing the Saskatchewan Police Predictive Analytics Lab and Lab data.

Schedule "B"

The list below identifies the names of the individuals and positions for which Special Constable status has been requested for the Saskatchewan Provincial Police Predictive Analytics Lab.

Position Title	Name
Research & Evidence-based Excellence (REBE), Corrections and Policing	
Executive Director, REBE	Dr. Brian Rector
Director, Research and Excellence in Policing	Delphine Gossner
Director, Research and Excellence in Data Innovation	Terri Simon
Program Effectiveness Consultant	Dr. Mehdi Ghasemi
Saskatoon Police Service	
Director of Information Technology	29(1)
Support and Operations Manager	
Information Technology Security Administrator	
Clinical Psychologist of Policing	
University of Saskatchewan	
Faculty	
Research Officer	
Graduate Student	

Agenda

Saskatchewan Police Predictive Analytics Lab (SPPAL) Initiatives
September 6, 2018 - 0800 to 1000 hours
18th Floor Boardroom – 1881 Scarth Street
Regina, SK

Teleconference information - 1-866-296-5646 - Participant code # 813536

1) Welcome/Introductions

2) Missing Person Initiative

- Dr. Brian Rector, RPS and RCMP
- Special Constable Appointments
- Data requirements

3) Overview - SK Drug Force Opioid Initiative

- Review of Executive Summary
- Presentation - ²⁹⁽¹⁾ (30 minutes)
- Opioid Initiative: Next Steps - confirmation of Opioid Initiative as a SPPAL project
- Project Charter development
- Confirmation of resources required for the project
- Planning for data requirements/communication (SACP, Health)

Minutes

Saskatchewan Police Predictive Analytics Lab (SPPAL) Initiatives
September 6, 2018 - 0800 to 1000 hours
18th Floor Boardroom – 1881 Scarth Street
Regina, SK

Welcome/Introductions

ACTION ITEMS from meeting

- FOIP Subject Matter – Aaron Orban
- Level of Security Clearance - Special Constables
- MOU requirements

Missing Person Initiative

- Dr. Brian Rector, RPS and RCMP
 - Trends and Extreme Cases – i.e. Historical Missing Persons cases
 - Advanced analytics - in addition to what we do now the possibility of what might be done
 - Data merging concept – All Police Services (RCMP and Municipal) information together and possibly child welfare data
 - Different ideas on how this might happen
 - Provincial lab – critical that all initiatives must have direct application to community safety. This would include Missing Persons as it is a police function
- Special Constable Appointments
 - Identify anyone who completes security system/clearance will be identified as a Special Constable
 - Speaks to what it is and what it is not – ability to see all police data
 - Chiefs decide what data goes in lab
 - Purpose of intent needs to be clear – why do you need to access the data
 - Not second guess what is or is not valuable information
 - Need to see scope of data to determine importance
 - FOIP concerns – under legislation data can be shared
 - How does the legislation interpret?
 - Would a small test case be appropriate?
 - Legality is okay when a Special Constable is hired by a Police Service

- Data requirements
 - Audits for noncompliance
 - Technology for connecting
 - MOU – agreement to share
 - FOIP compliant
 - Legislation to allow for this
 - Data to mitigate community safety
 - Methology explores all data
 - What does data mean
 - Social media/web data
 - No silos
 - Small enough to make connections
 - Big enough to make a difference

Overview - SK Drug Force Opioid Initiative

- Review of Executive Summary
- Presentation - ²⁹⁽¹⁾
- Key Points
 - The opioid crisis is complex
 - The opioid crisis has big uncertainties
 - The opioid crisis is fast-changing
 - The opioid crisis will probably be much harder to deal with if we don't take active action to understand and confront it
 - Predictive analytics come in many flavors
 - Predictive analytics help us learn more quickly and reliably about complex systems
 - Modeling is a human activity that offers far more value than the models
 - If we are resource tight, we probably don't have the luxury of not using predictive analytics
- Hack-a-thons
 - Groups of 3 – 5 in each group
 - Testing out what was found – building set of learning/insights/tools/methods
 - Ideas come out that did not exist and can be built upon before next hack-a-thon
- Opioid Initiative: Next Steps - confirmation of Opioid Initiative as a SPPAL project
 - MOU (SPS/Brian)
- Project Charter development
 - Show charter – break down silos
- Confirmation of resources required for the project
- Planning for data requirements/communication (SACP, Health)
 - Health needs to be onboard



Saskatchewan
Justice; Corrections
and Policing



UNIVERSITY OF
SASKATCHEWAN

MEMORANDUM OF UNDERSTANDING

BETWEEN

UNIVERSITY OF SASKATCHEWAN, a body corporate continued under *The University of Saskatchewan Act, 1995*, S.S. 1995, c. U-6.1
(the “University”)

AND

**HER MAJESTY THE QUEEN IN THE RIGHT OF THE PROVINCE OF
SASKATCHEWAN**,
as represented by the Minister of Corrections and Policing
(hereinafter called “Corrections and Policing”)

AND

SASKATOON POLICE SERVICE,
A municipal police service created in accordance
with the provisions of *The Police Act, 1990*

The University, Corrections and Policing, and Saskatoon Police Service may be collectively referred to hereinafter as the “Parties” or individually as a “Party”.

WHEREAS, the University has created a centre of excellence for forensic behavioural science and justice studies at the University of Saskatchewan for the purposes of providing training and research;

WHEREAS, the Saskatoon Police Service is committed to promoting all aspects of community safety as it pertains to policing;

WHEREAS, Corrections and Policing is committed to promoting community safety through research and practical applications that produce results.

WHEREAS, members of the University community including, but not limited to, the Colleges of Arts & Science, Medicine, Nursing, Law and Commerce have extensive experience in conducting research and development in the Areas of Cooperation (Section 1.1), and are recognized internationally as experts in their fields;

WHEREAS, members of the University are recognized internationally as experts in data analytics and predictive analytic modelling;

WHEREAS, the Saskatoon Police Service has police data that if analyzed by modelling experts may improve community safety and diminish harm to victims;

WHEREAS, the Saskatoon Police Service have experts involved in all aspects of police data, security, data development, storage, and retrieval, and police officers and staff at all levels of the organization with subject matter experience and expertise,

WHEREAS, Corrections and Policing have subject matter expertise in policing and research, and can facilitate actions and interventions informed by predictive analytics across government,

AND WHEREAS, the purpose of this Memorandum of Understanding (the MOU) is to set out the understanding of the Parties regarding the creation and operation of a Provincial Police Predictive Analytics Lab located at the Saskatoon Police Service, and to provide a framework to enable and encourage the Parties to strengthen their collaborations.

NOW THEREFORE in consideration of the premises and the mutual covenants contained herein, the Parties agree as follows:

1: AREAS OF COOPERATION

- 1.1 The Parties agree to collaborate in research, training and professional development regarding data analytics that advance and promote community safety by assisting the Parties in developing strategies to reduce recidivism and/or risk in the areas of: missing persons, violent offenders, and offenders with mental health issues;
- 1.2 As part of that collaboration, the Parties intend to undertake discussions, reviews and research on specific and defined topics, which will be described herein as “Projects”.
- 1.3 In order to facilitate the administration and operation of this MOU, there shall be a Committee created, consisting of one representative from the Saskatoon Police Service, one representative from the University, and one from Corrections and Policing. The Committee shall meet from time to time and in such a manner as it determines for the purpose of granting Project approvals, monitoring progress of Projects which are undertaken, exchanging information, resolving issues and discussing any matter or issue that arises out of this MOU.
- 1.4 Project approvals shall require the unanimous agreement of the Committee members.
- 1.5 The Committee shall provide a year-end report, due by May 31st each year, to each of the Parties detailing the progress and status of all approved Projects, as well as standard financial reports for the predictive analytics lab.

- 1.6 Until further notice, the representatives on the Committee are:

Corrections and Policing

Dr. Brian Rector
Executive Director, Research and Evidence-Based Excellence
Ministry of Justice, Corrections and Policing
1200-1874 Scarth Street, Regina, Saskatchewan, S4P 4B3

University of Saskatchewan

29(1)

Centre for Forensic Behavioural Science & Justice Studies
University of Saskatchewan
110B - 9 Campus Drive, Saskatoon, SK S7N 5A5

Saskatoon Police Service

Deputy Chief of Operations

2: MODES OF COLLABORATION

- 2.1 The above collaboration will be undertaken by the following modes:
- (a) The development of an interdisciplinary Police Predictive Analytics Lab located at the Saskatoon Police Service headquarters, 76 – 25th Street East, Saskatoon, that promotes community safety in Saskatoon, Saskatchewan, and potentially both nationally, and internationally.
 - (b) The development of Project teams that can include: police officers, police analysts, Saskatoon Police Service experts, statisticians, predictive modelling experts, forensic behavioural experts, Corrections and Policing experts.
 - (c) a research agenda that advances community safety;
 - (d) supervised postdocs, internships, and practicum opportunities for students of the University, police officers and analysts, and ministry staff.
- 2.2 The execution of any specific Project approved by the Committee and decided upon by the Parties shall be undertaken through a separate written agreement between Saskatoon Police Service, University, and Corrections and Policing.
- 2.3 The Parties agree that each Project agreement shall be bound by all terms and conditions of this MOU, and shall reflect the commitment of the Parties to share de-identified data for research or statistical purposes wherever permitted by law.

- 2.4 The agreement for each Project shall, without limitation, address all significant issues relevant to the execution of the Project concerned; shall include a work plan and a schedule of performance outcomes; and shall be signed by authorized representatives of each Party and approved by the lead Project investigators.
- 2.5 The Project work plans shall include:
- a brief background of the Project, its origin, and its objectives;
 - a description of the technical contents of the Project;
 - identified advantages of using the collaborative model to achieve the research objectives of the Project (including a schedule of performance outcomes);
 - a timeline of the Project;
 - provisions regarding the division of labour and budgetary allocations for the Project, if required; and
 - a determination as to whether or not the data for the Project can be de-identified and research conducted off site, away from the Predictive Analytics Lab, and possibly in combination with other de-identified data.
- 2.6 In addition, each Project agreement shall be separately negotiated and address, as may be applicable, issues relating to warranty and liability, ownership and licensing of intellectual property, confidentiality, publication rights/academic freedom, and such other matters as may be identified by the Parties. It is possible that due to the confidentiality of the subject matter and/or security issues, some results involving specific Projects may not be publishable.
- 2.7 All data provided by the Saskatoon Police Service - including data from other police services, office equipment, hardware and software pertaining to the Police Analytics Lab, shall be the sole property of the Saskatoon Police Service. All matters of security and access to data provided by the Saskatoon Police Service are the prerogative of the Saskatoon Police Service. At their sole discretion, access to data by any individual not an employee of the Saskatoon Police Service is granted by the Police Service and may be immediately withdrawn at the discretion of the Police Service.
- 2.8 The Parties will assign a “lead Project investigator” for each Project. This individual or these individuals will be responsible for working within the assigned parameters and meeting Project goals.

3: ARRANGEMENTS AND FUNDING

- 3.1 In implementing the envisaged Projects, the Parties shall seek financial support through their respective, or shared, sources of funding. Representatives of the Parties may meet occasionally to negotiate specific Project-related agreements, including aspects relating to Project financing, but it is understood and agreed neither the Parties nor the Committee shall have the authority to bind the other Parties to financial commitments without the official, signed agreement in advance from the other Party or Parties.

- 3.2 The Parties will collaborate on proposals for the purpose of obtaining external funds that would support any aspect of the Police Analytics Lab and its research agenda. In this circumstance, distribution of the funds to the Parties will depend upon the specifics of each proposal and the requirements of the funding agency. Each Party that is the recipient of funding is responsible for tracking how these specific funds are used over time. Subject to the requirements and guidelines of the agency providing funding, any unused funding portions within a fiscal year will carry over into the subsequent fiscal year, used for the purposes of the Lab, and be tracked accordingly.
- 3.3 Any financial arrangement resulting from, or related to, individual Projects will be articulated clearly in the aforementioned Project agreements. The Parties agree that in the absence of any specific agreement to the contrary, all expenses, including but not limited to, salary, travel, living and ancillary costs relating to each specific Project, shall be borne by the Party incurring such expenses.
- 3.4 The Parties acknowledge that all data shared by the Parties for analysis shall be securely stored in the premises supplied by the Saskatoon Police Service, and may only be accessed in accordance with the terms of an executed Project agreement that has been unanimously approved by the Committee. The Saskatoon Police Service shall be responsible for all matters relating to the security of the data, and the access thereto.
- 3.5 Any payment by Corrections and Policing under or pursuant to this Agreement is subject to an appropriation to which the payment can be charged being made available by the Legislature of the Province of Saskatchewan in the fiscal year of Corrections and Policing in which a payment provided under this Agreement becomes due, as required under section 33(2) of *The Financial Administration Act, 1993* of the Province of Saskatchewan.

4: RELATIONSHIP OF THE PARTIES

- 4.1 Nothing in this MOU shall be construed as establishing an agency, partnership, joint venture, or employment relationship between the Parties and this MOU will not bind a Party to any contract, arrangement, undertaking, or understanding except as specifically stated herein or within joint Project agreements. No Party shall have any authority to act for or to assume any obligations or responsibility on behalf of any other Party.

5: TERM OF THIS MOU

- 5.1 Subject to section 5.2, this MOU shall commence from the date this Agreement is executed by all Parties and shall remain in force until March 31, 2020. This MOU may be amended or extended by mutual agreement signed by the Parties.
- 5.2 A Party may terminate this MOU effective March 31 of any year by providing at least Twelve (12) months written notice of termination to the other Parties.

- 5.3 The termination or expiration of the MOU shall not affect the completion of the specific Projects, activities and/or agreements approved and entered into prior to such termination.

6: CONFIDENTIALITY

- 6.1 For the purposes of this MOU “**Confidential Information**” means information whether in electronic, written, graphic or other tangible form and any such oral information disclosed by a Party (the “**Discloser**”) to the other Parties (the “**Recipients**”) that is directly or indirectly connected to an object or purpose of this MOU.
- 6.2 Confidential Information shall not include:
- (a) information which is or becomes publicly known through no fault of the Recipient;
 - (b) information learned by the Recipient from a third party entitled to disclose it;
 - (c) information that can be proven through documentary evidence to have been independently developed by the Recipient without reference to or use of information disclosed by the Discloser hereunder;
 - (d) information disclosed by the Recipient after its receipt of the Discloser’s written consent to such disclosure; or
 - (e) information that is required to be disclosed pursuant to a governmental, administrative or judicial process provided that, if disclosure is so required, the Recipient shall notify the Discloser and provide the Discloser assistance with any reasonable effort to obtain confidential treatment for such disclosure.
- 6.3 Each Party acknowledges and agrees that:
- (a) it shall not use any Confidential Information of the other Parties for any purpose other than furthering the objectives of this MOU;
 - (b) it shall take all reasonable precautions against unauthorized disclosure or misuse of another Party’s Confidential Information and at least the same or similar precautions as it would take to preserve the confidentiality of its own confidential information of a similar nature.
- 6.4 No Party shall originate any publicity, news release, public statement or public announcement, whether written or oral, relating to this MOU or its activities pursuant to this MOU without the prior consent of all Parties, which consent will not be unreasonably withheld or delayed.
- 6.5 The Parties acknowledge and agree that personal information in the possession or under the control of any government institution or local authority may be shared with one or more of the Parties through the Predictive Analytics Lab where the public interest in sharing the information clearly outweighs any invasion of privacy that could result, where sharing the information is necessary to protect the mental or physical health or safety of any individual, or where sharing the information is otherwise permitted by law. The Parties therefore agree that an appropriate protocol agreement, unanimously

approved of by the Parties, is required before the Predictive Analytics Lab can accept the transfer of any personal information from any government institution or local authority.

- 6.6 The provisions of this Article 6 shall not prevent a Party from disclosing any Confidential Information as necessary to comply with any applicable statute or other law requiring such disclosure, or as required for the provision of legal services.
- 6.7 The Parties agree to report to the Saskatoon Police Service all cases where they suspect or determine that there may be unauthorized access, use or disclosure of confidential information obtained from the Predictive Analytics Lab. The Parties each agree that they shall investigate any suspected breaches and if any unauthorized access or use is found which may jeopardize the confidentiality of data, or the security of the computer system or network used to store or access the confidential information at the Predictive Analytics Lab, the Parties each agree to immediately advise the Saskatoon Police Service; provide the Saskatoon Police Service with a full and complete copy of any and all reports and details of the circumstances of any such unauthorized access or use and any remedial and disciplinary actions taken or proposed to be taken; and to cooperate fully with any remedial action taken or proposed to be taken by the Saskatoon Police Service as a result of any such unauthorized access, use or disclosure of confidential information.
- 6.8 Whenever a Party receives a notice of application for a court order, subpoena for disclosure of confidential information, or an access to information request for confidential information from the Predictive Analytics Lab, that Party shall immediately notify and consult with the other Parties before disclosing any such confidential information.
- 6.9 The provisions of this Article 6 shall survive the expiration or termination of this MOU.

7: PUBLICATION

- 7.1 Saskatoon Police Service and Corrections and Policing acknowledge that a primary function of the University is to add to the general knowledge of society and increase its use for scholarship. Saskatoon Police Service and Corrections and Policing also support publication for the purposes of advancing knowledge as it pertains to public safety. The Parties agree that any specific Project agreements developed pursuant to Section 2.2 will provide for the rights of University employees and students to publish the results of research performed under such Project agreements, but also consistent within the limits identified in Section 2.6 and confidentiality provisions of Article 6. The author will retain copyright in such publications and specifically any graduate student will hold copyright in a thesis resulting from such research. Where collaboration exists, authors identified for a publication may involve a number of individuals across the Parties depending upon involvement. Multiple partner authorship should be guided by standard professional practice and appropriate recognition.

8: INDEMNIFICATION

- 8.1 Each Party (the “Indemnitor”) shall indemnify, defend and hold harmless the other Parties and their directors, governors, officers, employees, agents and other representatives from and against any and all suits, actions, legal or administrative proceedings, claims, demands, damages, liabilities, interest, legal fees, costs and expenses of whatsoever kind or nature and in any manner directly or indirectly caused, occasioned or contributed to in whole or in part by the Indemnitor or anyone acting under the Indemnitor’s direction or control or on the Indemnitor’s behalf resulting from their (i) improper use or disclosure of Confidential Information, (ii) violation of any law during the performance of this MOU, (iii) material breach of this MOU, or (iv) negligence or willful misconduct. Notwithstanding the foregoing, in no event shall a Party to this MOU bear liability to another Party for punitive damages, lost profits or other indirect or consequential damages. This section shall survive the expiration or termination of this MOU.

9: GENERAL

- 9.1 No amendment to any of the terms or conditions of this MOU shall be deemed valid unless by written instrument signed by all Parties.
- 9.2 No Party shall assign or transfer in any manner its interest in any part of this MOU without obtaining prior written approval of the other Parties.
- 9.3 This MOU shall be governed by, construed and interpreted in accordance with the laws of the Province of Saskatchewan and the laws of Canada applicable therein and the Parties shall attorn to the exclusive jurisdiction of the courts of the Province of Saskatchewan and all courts competent to hear appeals there from. This section shall survive the expiration or termination of this MOU.
- 9.4 In the event that any provision of this MOU, as amended from time to time, is deemed invalid, void or unenforceable, in whole or in part, by any court of competent jurisdiction, the remaining terms and provisions of this MOU remain in full force and effect.
- 9.5 This MOU and all schedules hereto, and any subsequent joint Project agreements, constitute the entire agreement between the Parties with respect to the subject matter of this MOU and supersede all previous negotiations, communications, and other agreements, whether written or verbal, between the Parties.

There are no warranties, representations or conditions between the Parties except as specially set forth in this MOU. The singular shall include the plural and vice versa, and words importing gender shall include all genders.

- 9.6 This MOU may be executed in counterparts and may be signed and delivered by facsimile or other means of electronic communication producing a printed copy, each of

which so signed and delivered shall be deemed to be an original and such counterparts together shall constitute one and the same instrument and, notwithstanding the date of execution, shall be deemed to bear the date first written above.

IN WITNESS WHEREOF the Parties hereto have caused this MOU to be duly executed on the day and year first written above.

UNIVERSITY OF SASKATCHEWAN

SASKATOON POLICE SERVICE

29(1)

For Chair, Board of Governors

29(1) Chief of Police

Date: 29 July 2015
29(1)

Date: July 16, 2015

For Secretary, Board of Governors

Date: 30 Jul 2015

MINISTRY OF JUSTICE; CORRECTIONS AND POLICING

Minister, Corrections and Policing

Acknowledged by:

Mr. Dale McFee, Deputy Minister
Ministry of Justice; Corrections and Policing

Date:

Aug 26/15



Saskatchewan
Justice; Corrections
and Policing



UNIVERSITY OF
SASKATCHEWAN

SASKATCHEWAN POLICE PREDICTIVE ANALYTICS LAB

What is predictive analytics?

Predictive analytics can be used by policing agencies to inform decision making and improve community safety. For example, predictive analytics could help officers to locate missing children more quickly, prevent people from getting hurt, and reduce violence and victimization.

Predictive analytics is the process of extracting information from existing data sets and using statistical tools in order to determine patterns and predict future outcomes and trends. Predictive analytics does not tell you what will happen in the future! Predictive analytics is currently being used in multiple sectors such as, marketing, finance, healthcare, and law enforcement.

How can predictive analytics be used to assist police and their community safety partners?

The application of analytical techniques to identify promising areas for intervention can offer several advantages to law enforcement agencies and their community safety partners. To be effective operational interventions based on analytical findings must be developed, implemented, and evaluated. Successful interventions could prevent crime, reduce violence and victimization, assist police in solving crimes, and/or make better use of limited resources.

How can predictive analytics be used to increase public safety in Saskatchewan?

A partnership has been created between the Saskatchewan Ministry of Justice; Corrections and Policing, the Saskatoon Police Service, and the University of Saskatchewan for the purpose of conducting police-related predictive analytics. A Memorandum of Understanding was signed by the three parties in August 2015 and the **Saskatchewan Police Predictive Analytics Lab**, located at the Saskatoon Police Service, became operational November 12, 2015.

The Predictive Analytics Lab is unique as it is located in a highly secure setting in order to protect confidentiality. Any information sharing will be in compliance with relevant acts and legislation as well as project-specific information sharing agreements. Results will be shared with the public in a way which will protect the identity and safety of individuals and will not result in harm or interfere with ongoing police investigations.

The Predictive Analytics Lab involves partners with diverse skill sets and specialized expertise. This includes: (1) experienced police personnel (from Chiefs to frontline members and civilian staff), as well as executive and practice leaders from both government and the public, who can ask important questions to be examined; (2) individuals with specialized knowledge in data systems, storage, and security; and (3) experts from the fields of mathematics, computer sciences, forensic behavioral sciences, justice studies, and policing.

The Predictive Analytics Lab is Provincial in scope with the ability to examine large data bases with the objective to improve the safety and security of all Saskatchewan residents. At the spring 2015 meeting of the Saskatchewan Association of Chiefs of Police, the municipal police chiefs and the commanding officer for RCMP "F" Division, agreed in principle to share their data with the Predictive Analytics Lab for the inaugural project on **Missing Persons**. Work on data-sharing agreements is currently underway. The Analytics Lab will also partner with Police Services outside of Saskatchewan should they agree to provide the secure Lab with their data.

What is the cost of the Predictive Analytics Lab?

No additional costs are associated with the Saskatchewan Police Predictive Analytics Lab. Existing funds and resources provided by the three partners were pooled to develop the Lab. Committed operational funds will continue from year to year.

In early 2015, MITACS - an important mathematics foundation in Canada, approved multi-year funding for the "Missing Children" initiative. The intent of the Lab is to pursue additional external funding when required. Information regarding external funding sources will be publically available.

MISSING PERSONS INITIATIVE

The Missing Persons Initiative will involve all children, youth, and adults reported missing. Phase 1 of the initiative will focus on missing children and youth. Phase 2 will involve missing adults.

Often, youth reported as missing appear to have run away from family or other care providers. Youth who run away are at high risk for multiple negative outcomes (e.g., personal injury, substance use, mental health concerns, and criminal activity). Finding these youth more quickly can help to keep them safe and protect them from negative outcomes. As such, youth reported missing will be the first group explored using predictive analytic techniques as part of a larger project on all Missing Persons being conducted at the newly created Saskatchewan Police Predictive Analytics Lab.

Developing predictive models could assist in identifying youth at risk for "running," risk factors contributing to increased risk, and associated patterns (e.g., geographical locations) to inform interventions by both police and their community partners. Simply locating these youth is not enough. Youth may run for many different reasons (e.g., family conflict, self-protection) and may require police and their community partners to engage with them and intervene within the context of prevention.

Interventions developed from analytical findings are intended to be implemented in "real-world" settings in "real-time". For example, when a child or youth is reported missing the analytics lab will immediately provide information to responding officers via police vehicle computers or information for the purpose of intervention to Child Welfare authorities.

Please contact Alyson Edwards, Public Affairs Office, Saskatoon Police Service at (306) 975-8209 for further information.

Traditional analytics



VS



UNIVERSITY OF
SASKATCHEWAN

SPPAL



**Project Title:Saskatchewan Police Predictive Analytics Lab Missing Persons Project
[CSSP-TI-2017-2245]**

BETWEEN:

HER MAJESTY THE QUEEN IN RIGHT OF CANADA, as represented by the Minister of Public Works and Government Services Canada

("Canada")

AND:

Research and Evidence-based Excellence Branch, Saskatchewan Ministry of Justice, Corrections and Policing ('REBE')

(the REBE will be referred to as the "Contractor")

WHEREAS Defence Research and Development Canada - Centre for Security Science (DRDC CSS) has a requirement for Saskatchewan Police Predictive Analytics Lab Missing Persons Project; and

WHEREAS REBE agrees to perform the work detailed in this Agreement as specified in Annex A in accordance with the terms and conditions detailed hereinafter.

NOW THEREFORE, Canada and the Contractors agree as follows:

In this document, the term "Contract" conveys "Agreement."

All terms and conditions within this document are not legally binding.

This document contains special involving and payment provisions (article 5.3)

1. Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work at Annex A.

2. Standard Clauses and Conditions

All clauses and conditions identified in the Agreement by number, date and title are set out in the Standard Acquisition Clauses and Conditions Manual (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

2.1 General Conditions

2040 (2016-04-04), General Conditions - Research & Development, apply to and form part of the Contract.

2.2 Supplemental General Conditions

4003 (2010-08-16) Licensed Software

4002 (2010-08-16) Software Development or Modification Services

3. Security Requirement

There is no security requirement applicable to this Contract.

4. Term of Contract

4.1 Period of Contract

The period of the Agreement is from date of MOA award until March 31, 2019.

5. Authorities

5.1 Contracting Authority

The Contracting Authority for the Contract is:

29(1)

Public Works and Government Services Canada
Place du Portage III, 11C1, office #103
11 Laurier Street
Gatineau, Québec
K1A 0S5
Canada

Tel: 29(1)
Fax no.: 29(1)
Email 29(1)

The Contracting Authority is responsible for the management of the Agreement and any changes to the Agreement must be authorized in writing by the Contracting Authority. The Contractors must not perform

work in excess of or outside the scope of the Agreement based on verbal or written requests or instructions from anybody other than the Contracting Authority.

5.2 Technical Authority

The Technical Authority for the Contract is:

29(1)

Police and Law Enforcement Portfolio
Knowledge & Technology – Community Safety
Defence Research and Development Canada
101 Colonel By Drive, 17th floor
Ottawa, Ontario
K1A 0K2

Tel: 29(1) (office) 29(1) (cell)
Email: 29(1)
29(1)

The Technical Authority is the representative of the department or agency for whom the Work is being carried out under the Agreement and is responsible for all matters concerning the technical content of the Work under the Agreement. Technical matters may be discussed with the Technical Authority; however, the Technical Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

5.3 Contractor Representatives

Technical Representative

Dr. Brian Rector
Executive Director, Research and Evidence-based Excellence
Saskatchewan Ministry of Justice, Corrections, and Policing
1200-1874 Scarth Street
Regina, Saskatchewan
Tel: 306-787-3892 (office) 306-537-8857 (cell)
Email: Brian.Rector@gov.sk.ca

Financial and Invoicing Representative

29(1), CPA, CMA
Director of Finance
Saskatoon Police Service
P.O. Box 1728
Saskatoon, Saskatchewan
S7K 3R6

Telephone 29(1)
Email: 29(1)

All invoices will be submitted, on behalf of the Contractor, by the Saskatoon Police Service. All payments will be made to the Saskatoon Police Service.

6. Proactive Disclosure of Contracts with Former Public Servants

By providing information on its status, with respect to being a former public servant in receipt of a *Public Service Superannuation Act* (PSSA) pension, the Contractor have agreed that this information will be reported on departmental websites as part of the published proactive disclosure reports, in accordance with [Contracting Policy Notice: 2012-2](#) of the Treasury Board Secretariat of Canada.

7. Payment

7.1 Basis of Payment - Firm Price

In consideration of the Contractor satisfactorily completing all of its obligations under the Agreement, the Contractor will be paid a firm price, as specified in Annex B for a cost of \$ 937,900.00. Customs duties are included and Applicable Taxes are extra, if applicable.

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work.

7.2 Method of Payment

7.2.1 Milestone Payments

Canada will make milestone payments in accordance with the Schedule of Milestones detailed in the payment provisions of the Contract if:

- a. an accurate and complete claim for payment using [PWGSC-TPSGC 1111](#), Claim for Progress Payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- b. all the certificates appearing on form [PWGSC-TPSGC 1111](#) have been signed by the respective authorized representatives;
- c. all work associated with the milestone and as applicable any deliverable required has been completed and accepted by Canada.

1.0 SCHEDULE OF MILESTONE			
Milestone #	Description	Amount \$	Due Date
1	Task 1: Data Integration Workshop	\$95,000.00	31-Aug-17
2	Task 2: User Interface Needs Assessment (\$10 000) Task 3: Missing Persons Workshop (\$5 000) Task 4: Police Data Coding (\$15 000)	\$30 000.00	31-Oct-17
3	Task 5: Expansion of SPPAL Development Environment	\$325,400.00	31-Dec-17
4	Task 9: End User Interface Design and Development	\$80,000.00	28-Feb-18
5	Task 6: Police Data Analysis Part A (\$60 000) Task 11: Test/Evaluate Prototype End User Interface Part A (\$10 000) Task 10: Year 1 Reporting (\$5 000)	\$75 000.00	15-Mar-18

6	Task 7: Police Data Analysis Part B (\$70 000) Task 8: Research Network Building (\$10 000) Task 12: Test/Evaluate Prototype End User Interface Part B (\$10 000)	\$90,000.00	30-Jun-18
7	Task 13: Coding Additional Data Sources (\$15 000) Task 14: Develop and Implement Linking Methodology (\$40 000)	\$55,000.00	31-Dec-18
8	Task 15: Comprehensive Data Analysis (\$50 000) Task 16: User Interface Update (\$15 000) Task 17: Evaluation Framework (\$10 000) Task 18: Knowledge Transfer and Dissemination (\$10 000)	\$85,000.00	28-Feb-19
9	Task 19: Updated Assessment of SPPAL Systems Requirements	\$97,500.00	15-Mar-19
10	Task 20: Year 2 Reporting	\$5,000.00	31-Mar-19

Canada's Total Cost to a Firm Price: \$937,900.00

7.3 SACC Manual Clauses

A9117C (2007-11-30), T1204 - Direct Request by Customer Department
 C0100C (2010-01-11), Discretionary Audit - Commercial Goods and/or Services

8. Invoicing Instructions - Progress Claim

1. The Contractors Financial and Invoicing Representative must submit a claim for payment using form PWGSC-TPSGC 1111, Claim for Progress Payment.
 Each claim must show:
 - a. all information required on form [PWGSC-TPSGC 1111](#);
 - b. all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
 - c. the description and value of the milestone claimed as detailed in the Contract
2. Applicable Taxes, must be calculated on the total amount of the claim before the holdback is applied. At the time the holdback is claimed, there will be no Applicable Taxes payable as it was claimed and payable under the previous claims for progress payments.
3. The Contractors Financial and Invoicing Representative must prepare and certify an original claim on Form PWGSC-TPSGC 1111, and forward it to the Contracting Authority for certification in an electronic format to the electronic mail address identified under section entitled "Authorities" of the Contract. Adobe Reader (.pdf) format is acceptable. The Contracting Authority will then forward the certified claim, in an electronic format, to the Technical Authority for appropriate certification after inspection and acceptance of the Work takes place, and onward submission to the Payment Office for the remaining certification and payment.

4. The Contractors Financial and Invoicing Representative must not submit claims until all work identified in the claim is completed. As specified in Annex A, SPS is responsible for managing project funds and REBE is responsible for substantiating deliverables and advising SPS that a claim can be submitted.

9. Certifications

Compliance with the certifications provided by the Contractor in its offer/bid is a condition of the Contract and subject to verification by Canada during the entire contract period. If the Contractor does not comply with any certification or it is determined that any certification made by the Contractor in its offer/bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

10. Applicable Laws

The Agreement must be interpreted and governed, and the relations between the parties determined, by the laws in force in Saskatchewan.

11. Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- a) the Articles of Agreement;
- b) the general conditions 2040, (2016-04-04), General Conditions - Research & Development,
- c) Supplemental general conditions:
 - a. 4003 (2010-08-16) Licensed Software
 - b. 4002 (2010-08-16) Software Development or Modification Services
- d) Annex A, Statement of Work;
- e) Annex B, Basis of Payment

12. Defence Contract

SACC Manual clause A9006C (2012-07-16), Defence Contract

13. Insurance

SACC Manual clause G1005C (2008-05-12), Insurance

14. Government Site Regulations

The Contractor must comply with all regulations, instructions and directives in force on the site where the Work is performed.

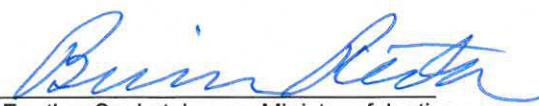
15. Signatories

In witness where of this Agreement has been executed by the parties by their duly authorized representatives this 26 day of July 2017.

29(1)

Digitally signed by 29(1)
DN: c=CA, o=GC, ou=PWGSC-
TPSGC, cn=29(1)
Date: 2017.07.26 12:03:56 -04'00'

For the Minister of Public Works and
Government Services Canada


For the Saskatchewan Ministry of Justice

Canada

Page 6 of - de 15

ANNEX A
STATEMENT OF WORK

Saskatchewan Police Predictive Analytics Lab Inaugural Project on Missing Persons

Abbreviations and Definitions

CSKA - Community Safety Knowledge Alliance - *government-supported non-profit that mobilizes, integrates and facilitates research and new knowledge development*

DRDC - Defence Research and Development Canada

HQPs - Highly Qualified People/Persons - *individuals with advanced education (e.g., university degrees at the bachelors' level and above) and/or specialized skill sets (e.g., technical expertise, cross-disciplinary expertise)*

MOJ - Saskatchewan Ministry of Justice, Corrections, and Policing

MP - Missing Persons

PM - Project Manager(s)

REBE - Research and Evidence-based Excellence Branch, Saskatchewan Ministry of Justice, Corrections, and Policing - *Executive Director of REBE is Project Co-champion*

SACP - Saskatchewan Association of Chiefs of Police - *association which includes all Saskatchewan Chiefs of Police and Commanding Officer of the RCMP in Saskatchewan to provide leadership in the policing community and work closely with all levels of government on policing and public safety concerns*

SK - Saskatchewan

SMEs - Subject Matter Experts - *authorities in a particular area, topic, or domain who can provide knowledge and expertise in a specific subject or technical area for a particular project*

SOW - Statement of Work

SPPAL - Saskatchewan Police Predictive Analytics Lab – *partnership between the Saskatoon Police Service, Saskatchewan Ministry of Justice, Corrections, and Policing, and the University of Saskatchewan to increase capacity to integrate and examine large amounts of community safety data in order to develop predictive models and applied tools that can assist police and partner agencies to reduce risk and promote community safety*

SPS - Saskatoon Police Service - *Deputy Chief of SPS is Project Co-champion*

U of S - University of Saskatchewan

WBS - Work Breakdown Structure - *deliverable-oriented breakdown of a project into smaller components intended to organize the work of a project team into manageable sections*

1. Objective

The purpose of the Saskatchewan Police Predictive Analytics Lab (SPPAL) Inaugural Project on Missing Persons (MP) is to develop methodological and technological capacity to apply advanced predictive analytic techniques to complex data from multiple sources that have yet to be linked (e.g., police and social service data) for purposes of developing applied tools that can be used by police and community safety partners to inform real-time investigations, decision making, and interventions for persons reported missing; and ultimately to prevent/reduce time missing and associated negative outcomes.

Completion of this project would assist Defense Research and Development Canada (DRDC) in tackling methodological complexities (e.g., data sharing and linkage across agencies involving diverse data) and addressing critical practice gaps through development and advancement of innovative technological, analytical, and operational tools for use within the Police and Law Enforcement Portfolio, including development of a cutting-edge data environment to support real-time applications and interventions.

2. Background

In November 2015, the Saskatchewan Police Predictive Analytics Lab (SPPAL) was established through a partnership between the Saskatchewan Ministry of Justice; Corrections and Policing (MOJ), the University of Saskatchewan (U of S), and the Saskatoon Police Service (SPS). Municipal police agencies in Saskatchewan, RCMP "F" Division, and the Saskatchewan Ministry of Social Services, Child and Family Programs have all agreed in principle to share information with SPPAL. The Canadian Safety Knowledge Alliance (CSKA) is also a SPPAL collaborator. Potential collaborations with other jurisdictions are being explored and the CSKA is well-positioned to assist with this, as well as with knowledge translation and dissemination.

A primary objective of SPPAL is to increase capacity to integrate and examine large amounts of police and community safety data in order to develop predictive models and applied tools that can assist police and partner agencies to intervene effectively to reduce risk and promote community safety. In other words, SPPAL is intended to be an operational lab working with identified data from multiple data sources which is required for police and partner agencies to intervene to reduce risk in high risk cases and situations.

The inaugural project of SPPAL is the Missing Persons (MP) Project. Work completed to date includes:

- a literature review on the use of advanced predictive analytics within policing;
- review of publically available data on missing persons in Canada and Saskatchewan in particular;
- development of a computer interface with software that applies customized algorithms (as opposed to those that are commercially available) to test advanced predictive models;
- development, testing, and evaluation of advanced statistical models and algorithms which could be applied to missing persons data; and
- creation of a multi-disciplinary (e.g., computer science, mathematics and statistics, applied and forensic psychology) advisory group comprised of University of Saskatchewan faculty and researchers to provide expert consultation to the MP Project Team.

These developments provide the foundation to explore Saskatoon Police Service (SPS) missing persons data with special emphasis on vulnerable and/or marginalized groups who may be at increased risk for harm including, children in care, "habitual runaways," and Indigenous persons reported missing. Advanced predictive analyses and development of computer interfaces may assist SPS in responding to a high volume call for service and this technology may also assist in the development of coordinated interventions with community partners providing additional data (e.g., Social Services).

3. Scope

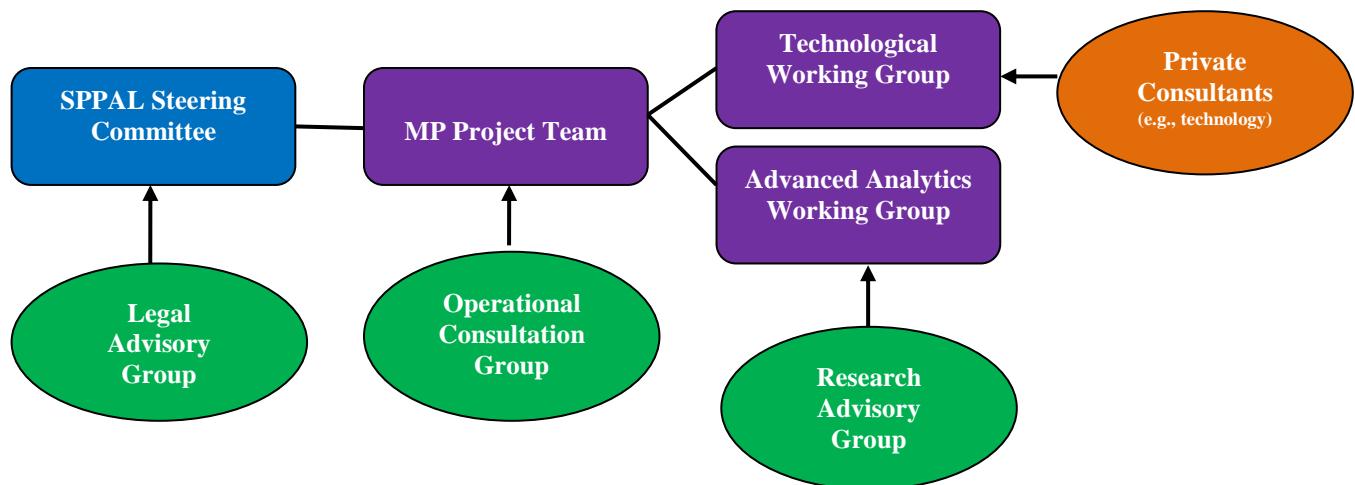
The overall objective of this project is to work towards developing **predictive models** and **applied tools** for police and community safety partners to inform decision-making, guide preventative interventions, and assist in reducing time missing and associated negative outcomes for persons reported missing.

The project will focus on missing persons in the province of Saskatchewan (SK), beginning with data on MP cases which has already been provided to SPPAL by the SPS. Additional SK municipal police data and SK child welfare data will be integrated with existing data as key technologies representing project deliverables are advanced (e.g., methodologies to support secure data transfer and linkage). This work will involve ongoing engagement with police agencies, subject matter experts in the area of missing persons, and highly qualified persons (HQP) in the areas of policing, mathematics, statistics, computer science, and the human services (e.g., psychology, social work).

Finalization of predictive models used to develop prototypes of applied tools, as well as fully mature applied tools and evaluations of their effectiveness, will be completed outside the scope of this project.

4. Roles and Responsibilities

The overall MP Project Governance Model is depicted below and will include oversight from the SPPAL Steering Committee, an MP Project Team comprised of specialized working groups for advanced analytics and technology, and supported by consultation groups from legal services, frontline operations, academia, and the private sector (e.g., technology, legal, and project management services).



The Co-lead agencies, their legal representatives, and external consultants are responsible for developing agreements with collaborating agencies (e.g., municipal police, social services) regarding the sharing of data with SPPAL for purposes of the MP Project.

SPPAL MP Project Partner Stakeholders, listed in the table below, will ensure representatives from their respective agencies will be identified to serve on MP Project working and consultation groups to complete the tasks identified in the Work Breakdown Structure (WBS) detailed above (Section 6). Specifics will be determined by each group (e.g., role, tasks, meeting schedules) - these may change over time in order to best meet project needs and time and work commitments will be detailed and tracked.

Specific roles and responsibilities of stakeholder agencies are detailed in the table below:

MP Project Stakeholder	MP Project Role / Title	Responsibilities
DRDC - Centre for Security Science (CSS)	The Technical Authority	As per Article 5.2 of the Contract.
SPS - Deputy Chief Support Services	Financial and Invoicing Representative for the Contractor / MP Project partner / stakeholder	<p>As one of three founding partners of SPPAL, the contractor will be responsible for managing DRDC MP Project funds, purchasing equipment and services required for the MP Project in partnership with the MOJ, and financial reporting to the technical authority.</p> <p>Provide leadership and project management support for MP Project.</p> <p>Support MP Project team leads and team members in execution of MP Project.</p> <p>Contribute in kind resources to the MP Project including SPS representatives for project working and consultation groups.</p> <p>Support members of the MP Project Team to complete project plan in a timely manner.</p> <p>Submission of claims to the TA, receiving payment from the TA, and distributing the funds to the Contractor and other project partners.</p>
MOJ - Executive Director, Research and Evidence-based Excellence (REBE)	The Contractor	<p>Leads SPPAL MP Project Team. Responsible to complete MP project plan in a timely manner, substantiate project deliverables, and advise SPS that a claim can be submitted.</p> <p>Accountable for ensuring SPPAL investment funds are available (which would be reimbursed later upon achieving specified deliverables) and for working in partnership with SPS to purchase resources required for the MP Project.</p> <p>Provide leadership and project management support for MP Project.</p> <p>Support MP project team leads and project team members in execution of MP Project.</p> <p>Contribute in kind resources to the MP Project including MOJ representatives for project working and consultation groups.</p> <p>Is responsible for all deliverables to the TA and Is responsible for project inputs from all project partners and sub-contractors.</p>

MP Project Stakeholder	MP Project Role / Title	Responsibilities
SPPAL Steering Committee Members include: -SPS -MOJ -U of S	Lab development and oversight	Responsible to Lab and Project stakeholders to monitor and address operational, resourcing, and policy related issues associated with the implementation, management and sustainment of the Lab and MP Project capabilities.
U of S -Faculty -Research officers -Students/HQPs	MP Project partner/stakeholder Sub-Contractor to the Contractors	Support MP project team leads and project team members in execution of MP Project. Contribute in kind resources to the MP Project including participation in project working, advisory groups, and the identification, selection, and supervision of students/HQPs. As Sub-Contractor, ensure tasks are completed as directed by the contractor in a timely manner. Provide regular reports and updates to MP Project Team. Obtain and maintain required research ethics approvals for MP Project.
Saskatchewan Association of Chiefs of Police (SACP)/SK Policing Agencies	MP Project collaborator/stakeholder	SACP meetings have been identified as one mechanism to provide updates regarding SPPAL and identify potential collaborators which may include in kind resources for the MP Project including participation in project working and consultation groups.
SK Ministry of Social Services	MP Project collaborator/stakeholder	Contribute in kind resources to the MP Project including participation in project working and consultation groups. Identify agency representatives for technological working group; to implement secure data sharing with SPPAL for purposes of the MP Project; assist with data systems alignment, data coding, and data integration; and resolve associated technical issues.
Private Technology Consultants	Sub-Contractor to the Contractor	Complete tasks as directed by the Contractor and support MP Project Team in developing technological capacity to execute the MP project plan.

5. Approach and Methodologies

The MP project begins with an updated systems requirement assessment to discover requirements in the areas of privacy, security, data sharing, hardware, software, data integration, data streaming, human resources/HQPs, and future “real-time” needs for SPPAL in order to support the MP project plan and achieve project deliverables.

These results will be used to create a data development environment for the MP project that can support analyses with municipal police data in order to develop and test advanced predictive models for MP cases and build an integrated database containing information from collaborating agencies (e.g., social services) along with requisite support tools (e.g., standardized methods for data coding/living data dictionaries) on which identified models can be tested and evaluated.

Creation of applied tools for end users (e.g., police and community safety partners) will occur alongside the system development and advanced modeling described above. This will include an assessment of user needs to inform the development of computer interfaces incorporating analytical models for purposes of communicating results to frontline community safety partners.

Testing, evaluation, and updating the user interface using models developed on enriched data sources (e.g., social services data) will also be part of the methodology. A proposed framework for evaluating applied tools/prototypes and updated requirements analyses will also be completed.

The image below represents major tasks to be completed within the scope of the SPPAL MP Project:

13(2), 19(1)(c)(iii)

6. Tasks and Deliverables – Work Breakdown Structure (WBS)

The table below reflects key tasks, deliverables, and timeframes associated with the MP Project. All deliverables are subject to review and approval by the technical authority:

Task Description and Activities	Project Deliverables	Delivery Date
1. Data Integration Workshop Workshop for SPPAL data integration platform requirements for multiple data sources (e.g., police and social services)	i)Phased roadmap ii)Architecture design document (data, software, networks, and security) iii)Privacy/security summary documents	August 31, 2017

Task Description and Activities	Project Deliverables	Delivery Date
including, privacy, security, hardware, software, data sharing and streaming	iv) Creation of an initial Vision, Scope and Requirements summary document which can be updated as the project progressed	
2. User Interface Needs Assessment User interface assessment for Missing Persons (MP) Project end users (e.g., police officers)	i) Document compiling historical and current policies and practices for responding to MP and Habitual Runaway cases, theoretical and empirical risk factors used, and prioritizing these parameters as well as interface needs	October 31, 2017
3. Missing Persons Workshop Interdisciplinary workshop for MP HQPs from academia, policing, and social services	i) Workshop agenda ii) Participant List iii) Workshop Summary document	October 31, 2017
4. Data Coding -police data Defining and structuring police data for use in predictive analyses and interface development	i) Creation of living data dictionary ii) Brief report on application of relevant coding standards to police MP data (e.g., National Information Exchange Model; NIEM)	October 31, 2017
5. Expansion of Existing SPPAL Development Environment Includes security, hardware, software, staging and testing	i) Hardware and software installed for data integration platform (brief report with relevant test results/outputs and screen shots) ii) Creation of comprehensive data integration platform (business problem/case report and overview presentation/ demonstration) iii) Security approval documents iv) Iteration review (mini-reports)	December 31, 2017
6. Police Data Analysis – Part A Identification of potential models and algorithms using police MP/Habitual Runaway data	i) Map theoretical and empirical risk factors to available MP data and conduct descriptive analyses (brief report) ii) Identification of applicable models (brief report)	March 15, 2018
7. Police Data Analysis – Part B Execution of potential models and algorithms using police MP/Habitual Runaway data	Model execution, outcome analyses, and adjustments (development of a final report with a user's manual for each model)	June 30, 2018

Task Description and Activities	Project Deliverables	Delivery Date
8. Research Network Building Build research network to work towards potential models and algorithms for use with police MP data and community safety analytics more broadly	i)Host conference for HQPs in advanced statistics, mathematical modeling, police, and community safety partners ii)Initiate HQP collaboration network for police and community safety analytics (e.g., creation of HQP working groups with preliminary work plans for each group)	June 30, 2018
9. End User Interface Design and Development Design and develop end user interface prototype for MP Project	i)Diagrams of physical and logical structure ii)Screen shots of developed interface iii) Capability demonstration/presentation	February 28, 2018
10. Year 1 Reporting	i)DRDC progress reports ii)Year-end financial report	March 15, 2018
11. Test/Evaluate Prototype End User Interface for MP Project – Part A Beta version interface testing using police data by internal reviewer	i)Brief report with screenshots of outcomes of testing/adjusting and calibration of beta version (internal reviewer) ii)Development of Training Manual for Version 1	March 15, 2018
12. Test/Evaluate Prototype End User Interface for MP Project – Part B Beta version interface testing using police data by external reviewer	i)Brief report with screenshots of outcomes of testing/adjusting and calibration of beta version (external reviewer) ii)Finalization of Training Manual for Version 1	June 30, 2018
13. Coding Additional Sources -social services data Defining and structuring social services data for use in predictive analyses and interface development	i)Enhancement of living data dictionary with social services data ii) Brief report on application of relevant coding standards to MP social services data (e.g., National Information Exchange Model)	Dec 31, 2018
14. Develop and Implement Linking Methodology Linking police and social services MP data	i)Brief report identifying linking methodology and overlap between two data sources (police and social services)	Dec 31, 2018
15. Comprehensive Data Analysis Data analysis on integrated police and social services data set (e.g., model design, integration, execution, and evaluation)	i)Model repository/ model management system with documentation of model outcome analyses and model adjustments etc. for each model ii)Creation of user manual for each model	Feb 28, 2019
16. User Interface Update Update user interface with integrated data set	i)Training manual for Version 2 ii)Develop plan for testing and evaluation of Version 2	Feb 28, 2019

Task Description and Activities	Project Deliverables	Delivery Date
17. Evaluation Framework Develop plan for evaluating combined statistical model and user interface in achieving MP project goals and benchmarks	i)Detailed Logic Models	Feb 28, 2019
18. Knowledge Transfer and Dissemination Develop ways to share knowledge with partners, stakeholders, and end users	i)Short project video ii)Presentation materials for conferences etc.	Feb 28, 2019
19. Updated Assessment of SPPAL Systems Requirements Planning for continued SPPAL and MP Project development (e.g., real-time communication, unstructured data, social media)	i)Phased roadmap ii)Design document iii)Updated work breakdown structure iv) Updated Vision, Scope and Requirements summary document	March 15, 2019
20. Year 2 Reporting	i)DRDC progress reports ii)Year-end financial report iii) DRDC Scientific Report iv) DRDC Project Completion Report	March 31, 2019

Project Name: Saskatchewan Police Predictive Analytics Lab Missing Persons Project

[CSSP-TI-2017-2245]

Project Progress Report (PR2) – Year 1 Reporting

Reporting Period: July 25, 2017 to March 31, 2018

Date of Report: March 29, 2018

Project Status:

Since the date of MOA award (July 25, 2017), the Saskatchewan Police Predictive Analytics Lab (SPPAL) Missing Persons Project Team has made significant progress towards deliverables outlined in the Defence Research and Development Canada (DRDC) Project Charter.

First, a project team complete with Project Leads from the Saskatchewan Ministry of Justice (MOJ) and Saskatoon Police Service (SPS), as well as three Principal Investigators (PIs) from the University of Saskatchewan (U of S), and project supports (finance, legal, and project management) was created.

A project governance model for this project/team was also finalized by the joint Project Champions, Dr. Rector, MOJ and Deputy Chief Bent, SPS. All identified project personnel have successfully completed SPPAL security clearance procedures and supporting project agreements (e.g., data sharing) are currently being finalized.

Given the delayed project start date and interconnected nature of project deliverables, the Missing Persons (MP) Project Team commenced work on both immediate and intermediate project deliverables simultaneously (e.g., expansion of the SPPAL development environment and MP user interface development). ^{15(1)(e)}

A Contactor Report highlighting work completed to date was also submitted to DRDC on February 28, 2018. This report is included in Appendix A.

The majority of tasks comprising Milestones 1 through 5 inclusive as identified on page 4 of the MOA with Public Works and Government Services Canada (PWGSC) have now been completed. A Missing Persons Workshop (Task 3) has been planned and will take place on April 6, 2018. Otherwise, tasks comprising the fifth and final Milestone for Year 1 (Task 6 and 11) have been completed and are currently under review by the joint Project Champions. There are plans to submit these by the end of the day today (March 28, 2018) or immediately following the holiday weekend (April 3, 2018). The CSSP Progress Report (PR3) will be submitted by April 6, 2018.

In conclusion, the SPPAL Missing Persons Project has generated considerable interest and excitement among police and community safety partners in Saskatchewan. Principal Investigators from the U of S and HQPs, including leads from SPS Technology Services, are exploring innovative and cutting edge security technology for the Lab development environment. Members of the Missing Persons Project

Team have also provided several invited talks in this reporting period (e.g., Prevention Matters Conference, Provincial Child Death Review Research Sub-committee).

Finally, the MOJ and SPPAL, including members of the Missing Persons Project Team, have also partnered with Mr. N. Taylor and the Canadian Association of Chiefs of Police - Information and Communications Technology Committee (CACP-ICT) to host an Open Analytics for Community Safety and Wellbeing Conference. This conference will take place on April 23-25, 2018 in Toronto, Ontario. Conference goals and objectives include establishing a network for community safety analytics research and practice in Canada consistent with Year 2 project goals.

Appendix A: Contactor Report

2018-02-28

CSSP-TI-2017-2245

Produced for: DRDC CSS Executive

Contractor Report

Saskatchewan Police Predictive Analytics Lab Missing Persons Project

Background

In November 2015, the Saskatchewan Police Predictive Analytics Lab (SPPAL) was established through a partnership between the Saskatchewan Ministry of Justice; Corrections and Policing (MOJ), the University of Saskatchewan (U of S), and the Saskatoon Police Service (SPS). Municipal police agencies in Saskatchewan, RCMP “F” Division, and the Saskatchewan Ministry of Social Services, Child and Family Programs have all agreed in principle to share information with SPPAL. The Canadian Safety Knowledge Alliance (CSKA) is also a SPPAL collaborator. Potential collaborations with other jurisdictions are also being explored.

A primary objective of SPPAL is to increase capacity to integrate and examine large amounts of police and community safety data in order to develop predictive models and applied tools that can assist police and partner agencies to intervene effectively to reduce risk and promote community safety. In other words, SPPAL is intended to be an operational lab working with identified data from multiple data sources which is required for police and partner agencies to intervene to reduce risk in high risk cases and situations.

These developments provided the foundation to explore SPS missing persons data with special emphasis on vulnerable and/or marginalized groups who may be at increased risk for harm including, children in care, “habitual runaways,” and Indigenous persons reported missing in the province of Saskatchewan (SK). Additional SK municipal police data and SK child welfare data will be integrated with existing data as key technologies representing project deliverables are further advanced (e.g., methodologies to support secure data transfer and linkage). Ultimately, advanced predictive analyses and development of computer interfaces will assist SPS and other public safety and social service agencies in responding to a high volume of calls for service and developing coordinated interventions for persons reported missing.

Approach and Methodologies

Applied community safety analytics requires ongoing engagement with police agencies, subject matter experts and highly qualified persons (HQPs) in the areas of policing, mathematics, statistics, computer science, and the human services (e.g., psychology, social work). A SPPAL Missing Persons (MP) Project Team complete with Project Leads from the MOJ and SPS, as well as three Principal Investigators (PIs) from the University of Saskatchewan (U of S), and project supports (e.g., financial and legal services) was created.

Major tasks to be completed by the MP Project Team over the 2-year funding cycle for this project are depicted in *Figure 1* on the following page.

An important first task was to complete an updated assessment of systems requirements in the areas of privacy, security, data sharing, hardware, software, data integration, data streaming, human resources/HQPs, and potential future needs for SPPAL in order to support the MP Project Plan and achieve project deliverables. These results are currently being used to create a data development environment for the MP project that can support analyses with municipal police data in order to develop and test advanced predictive models for MP cases and also build an integrated database containing information from collaborating agencies complete with requisite support tools and structures.

The creation of applied tools for end users (e.g., police and community safety partners) has been simultaneously occurring alongside the development of the data environment described above. This has included an initial assessment of user needs (e.g., municipal police) to inform the development of computer interfaces incorporating analytical models for purposes of communicating results to frontline community safety partners. A follow-up workshop has also been planned with representatives from police, social services, non-government community-based organizations, and academia. This will further assist the MP Project Team in understanding the processes and practices currently used by community safety partners to prioritize and respond to missing persons cases and considering relevant risk factors to be considered for use in advanced modeling from a multidisciplinary perspective. Members of the Project Team will also be invited to share work completed to date (e.g., preliminary computer interfaces) and obtain feedback.

Testing, evaluation, and updating the user interface using models developed on police and enriched data sources (e.g., social services data) will occur in Year 2. A proposed framework for evaluating applied tools/prototypes and updated requirements analyses will also be completed.

Preliminary Results

Work completed thus far on the SPPAL MP Project provides a solid foundation for developing predictive models and applied tools for police and community safety partners to inform decision-making, guide preventative interventions, and assist in reducing time missing and associated negative outcomes for persons reported missing.

Initial projects tasks have been completed or are nearing completion (see Tasks 1, 2, and 3 as depicted in *Figure 1*) and include the following key deliverables: development of a phased roadmap for further development of the SPPAL data environment, architecture design documents, proposed privacy and security mechanisms, preliminary user interface needs assessment and development, planning for multidisciplinary stakeholder workshop, development of living data dictionary, consideration of relevant data coding standards, exploratory data analysis, and expansion of the SPPAL environment. Key findings are presented below.

Phased Roadmap for SPPAL Development

The proposed roadmap for laboratory infrastructure and evolution is as follows:

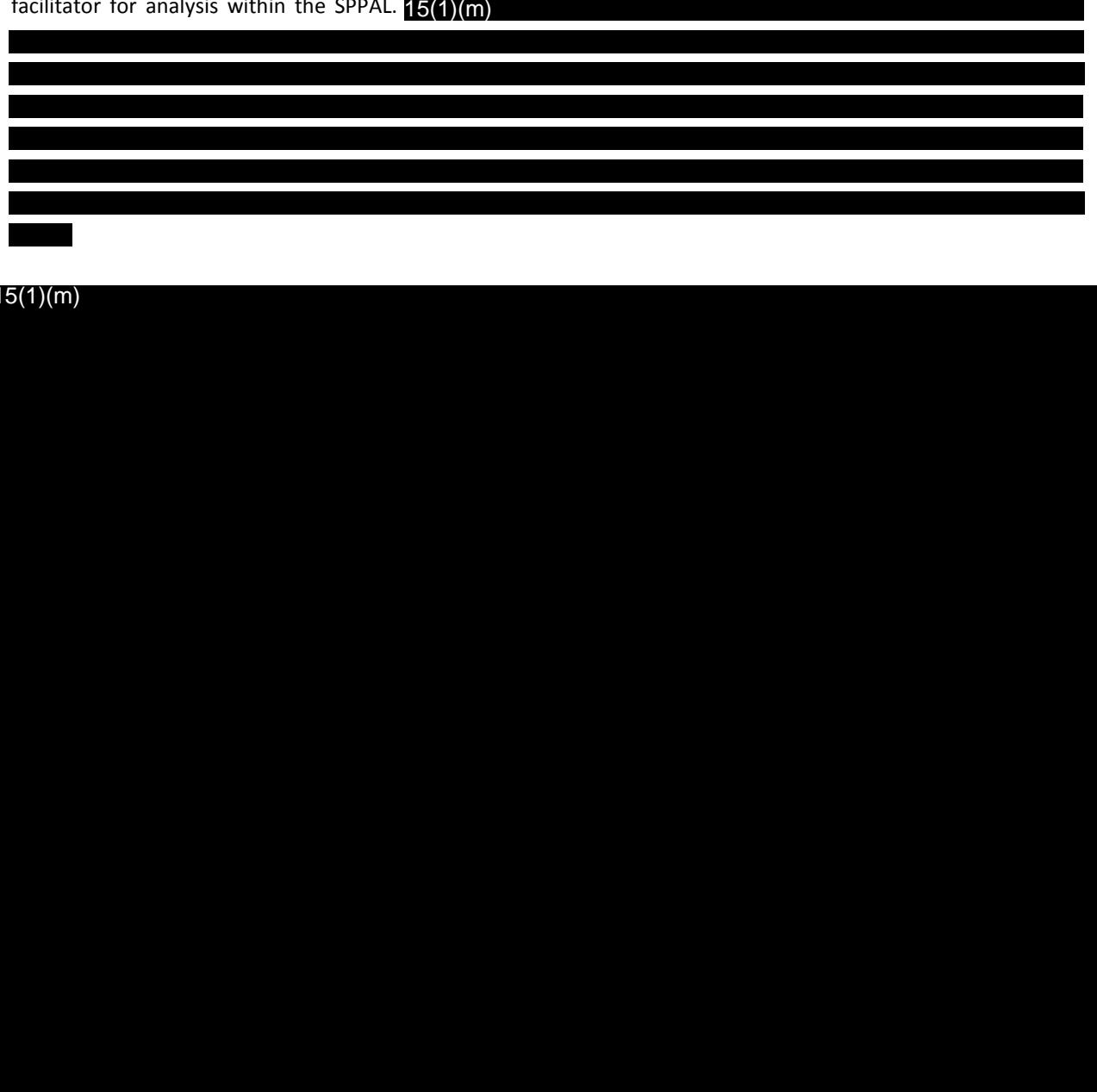
1. Initial laboratory establishment with no external access or access to external data stores. **15(1)(m)**
[REDACTED]
[REDACTED]
2. Expansion of SPPAL to include **15(1)(m)**
[REDACTED]
[REDACTED]
[REDACTED]
3. Creation synthetic datasets adhering to schemas of underlying data sources but which avoid privacy and confidentiality concerns by use of artificial data. Larger investments in this area will support capturing key statistical and structural patterns within the data.
4. Creation of mechanisms for automatically validating data structures proposed for export, thus easing manual verification.
5. With an eye towards further security and support cross-linking databases, further investigation of the following:
 - a. Programmatic separation of (identifiable) master-list from rigorous de-identified data for analysis.
 - b. **15(1)(m)**
[REDACTED]
[REDACTED]
 - c. In context of non-encrypted data, implementation of privacy-preserving data mining infrastructure.

Proposed Architecture/Design

Consistent with the roadmap described above, the design and development of the SPPAL data environment has involved investments in technologies focusing on secure efficiency, scalability, performance, and robustness. These investments will permit the lab to perform interactive and exploratory analyses of large volume, flexible, independent, robust and systematic analyses in a more timely fashion. These expansions also support a more secure and autonomous environment by lessening vulnerability to outside attack. Critically given the nature of the data being analyzed, such advantages are being secured in an environment which provides strict and rigorous guarantees concerning the confidentiality and privacy of the underlying data.

Metadata curation and updates

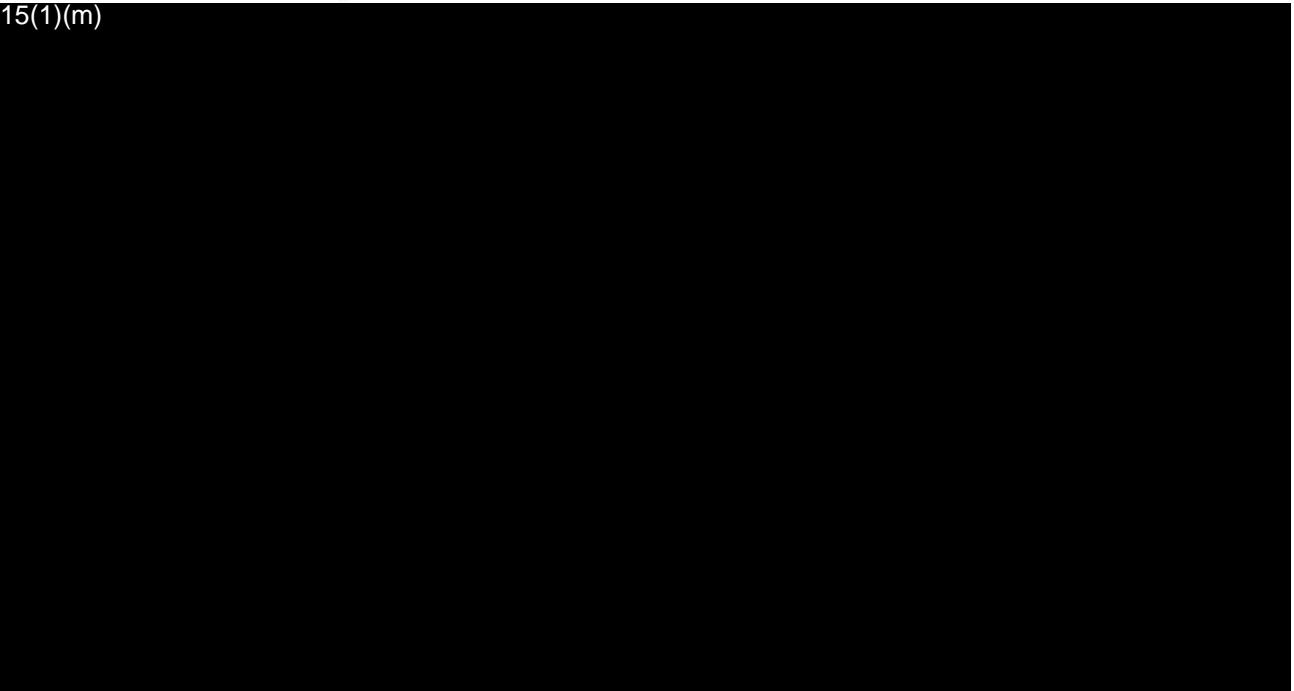
Maintenance of accessible, informative and up-to-date sustainable documentation will serve as an important facilitator for analysis within the SPPAL. 15(1)(m)



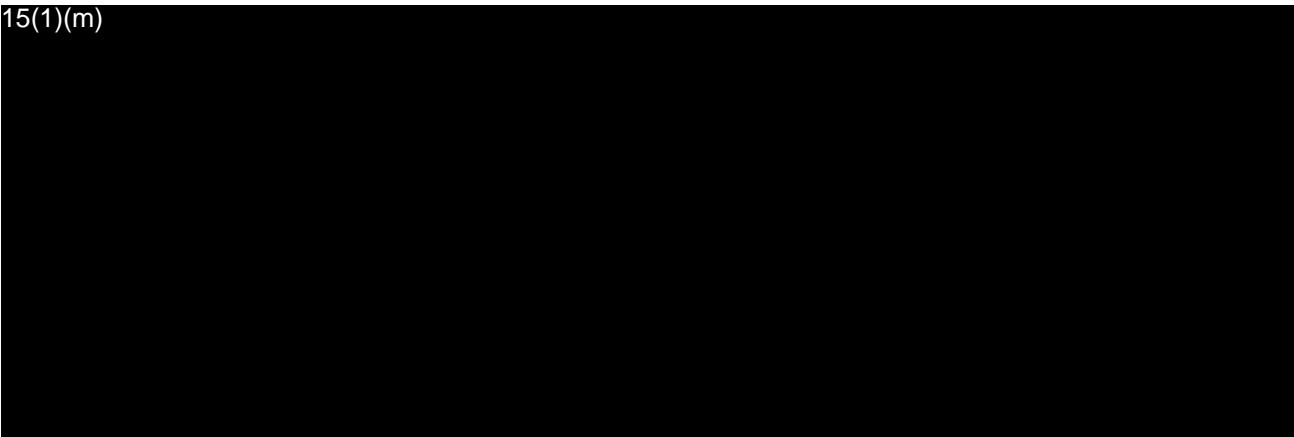
15(1)(m)

Resources-Service Map

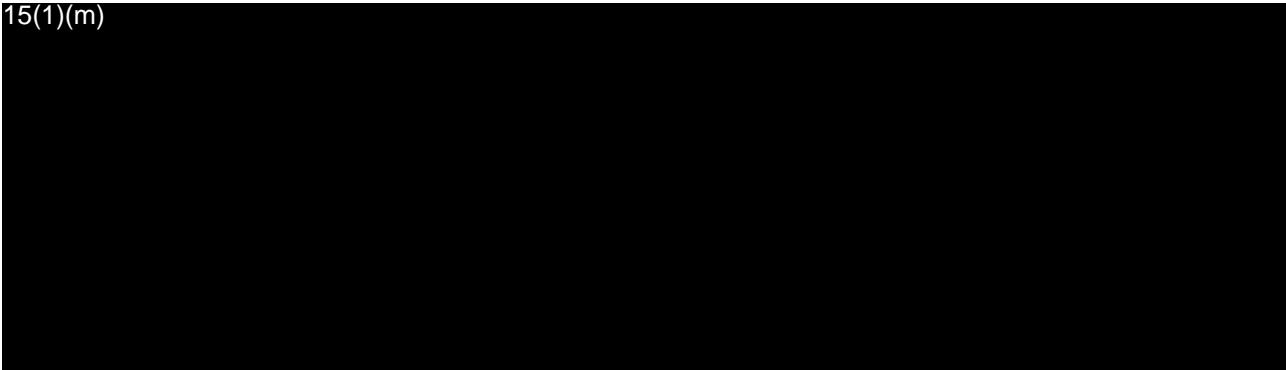
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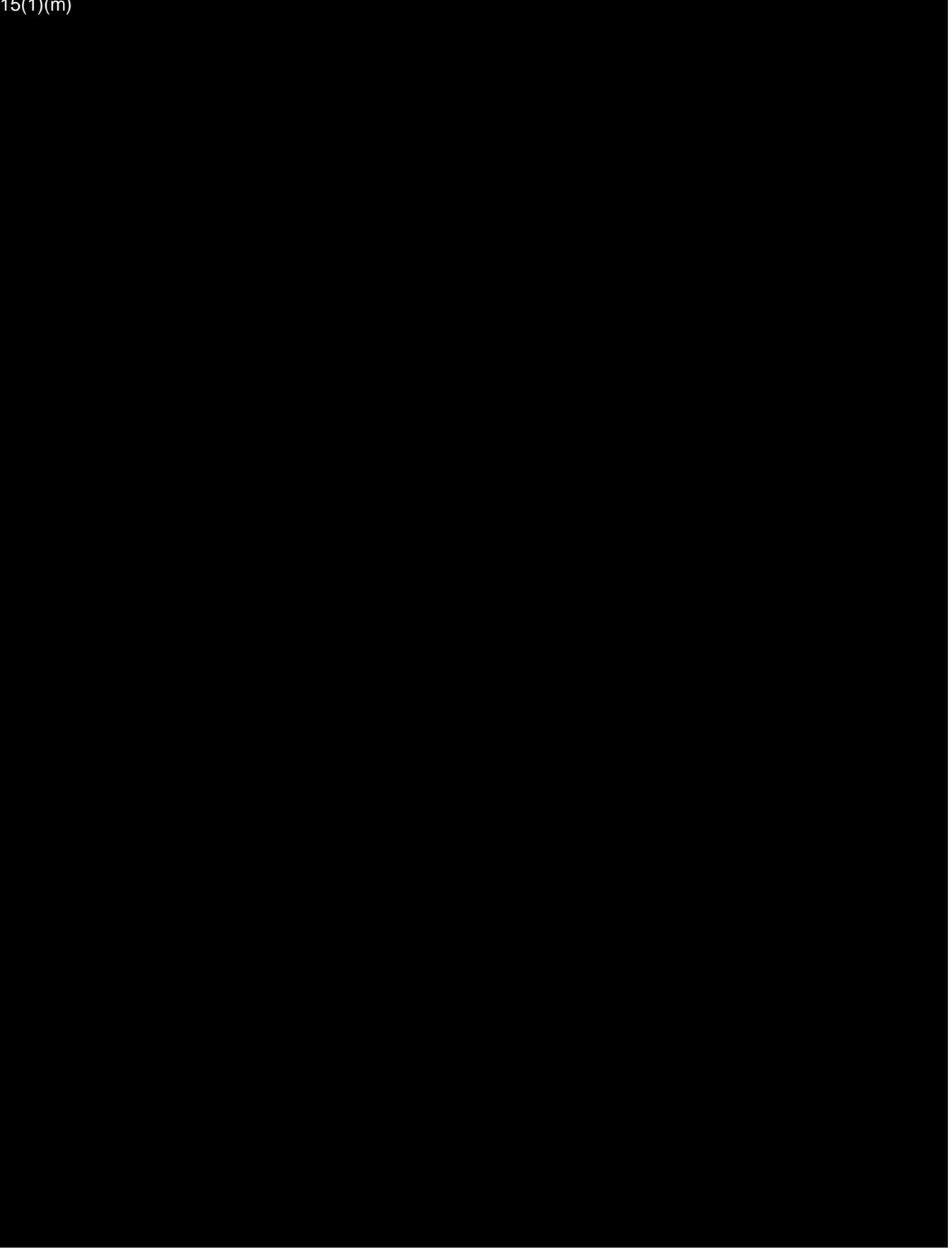
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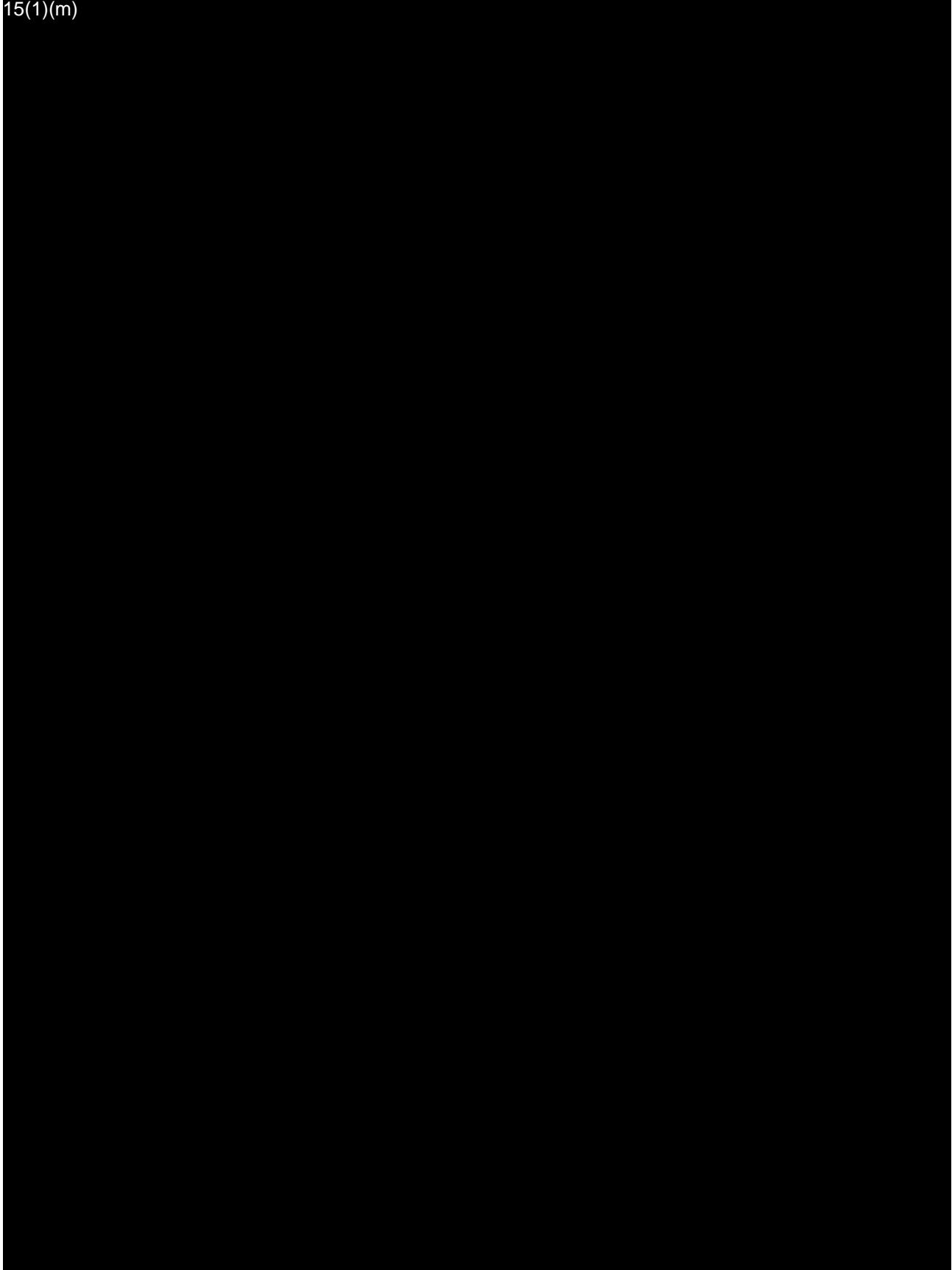
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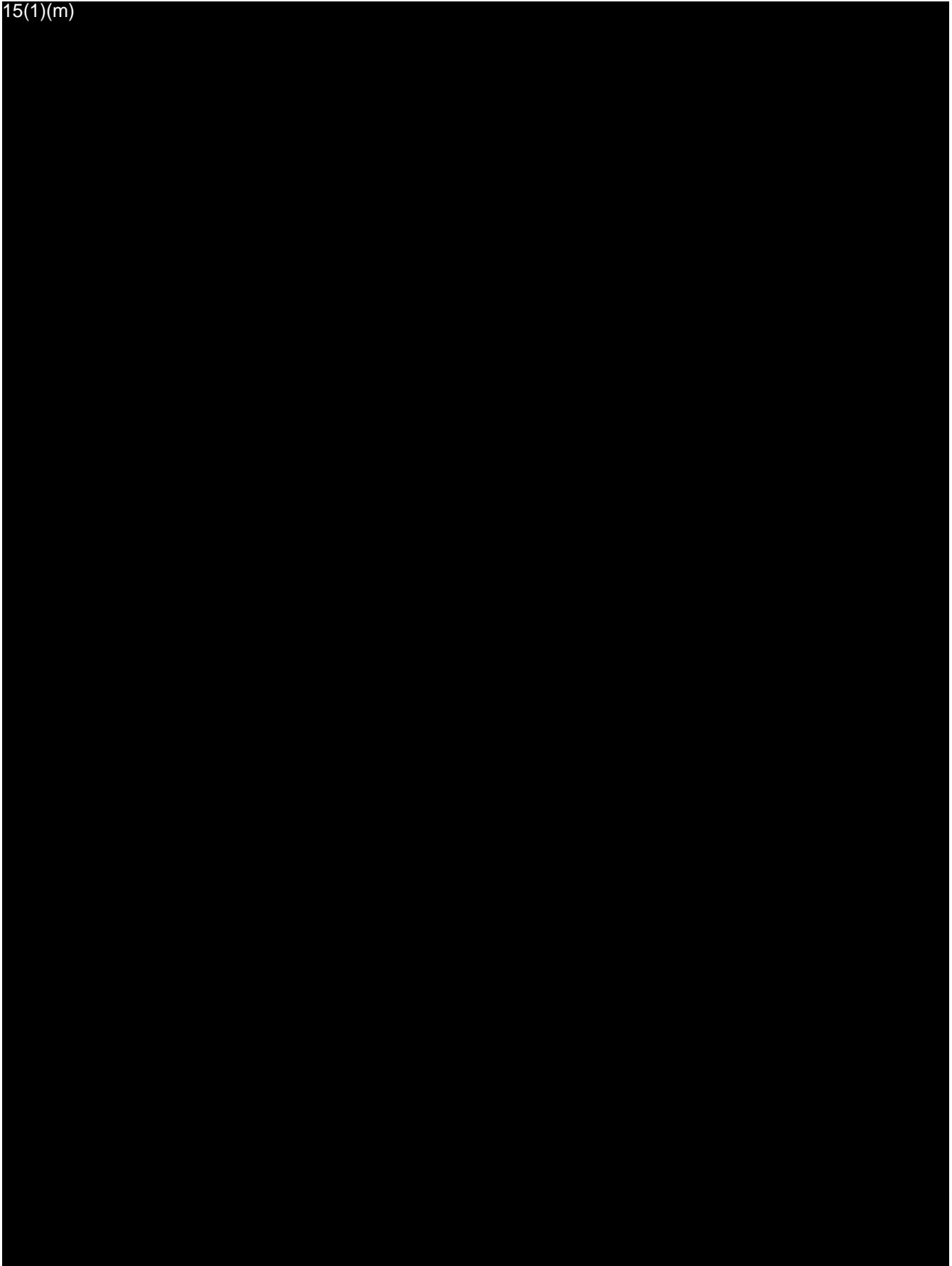
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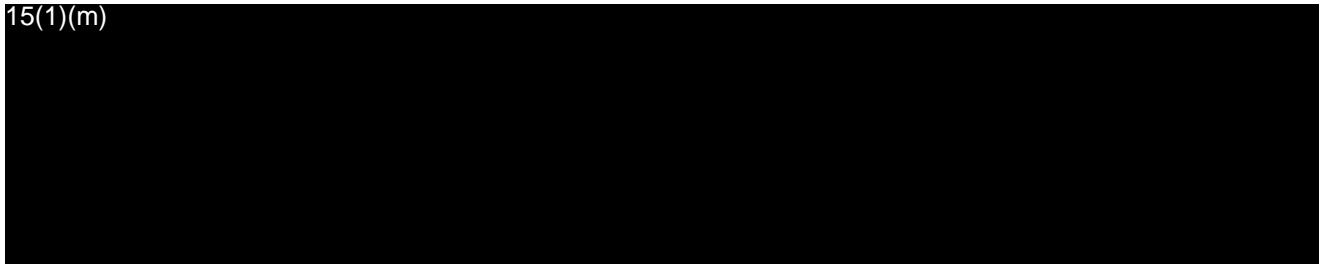
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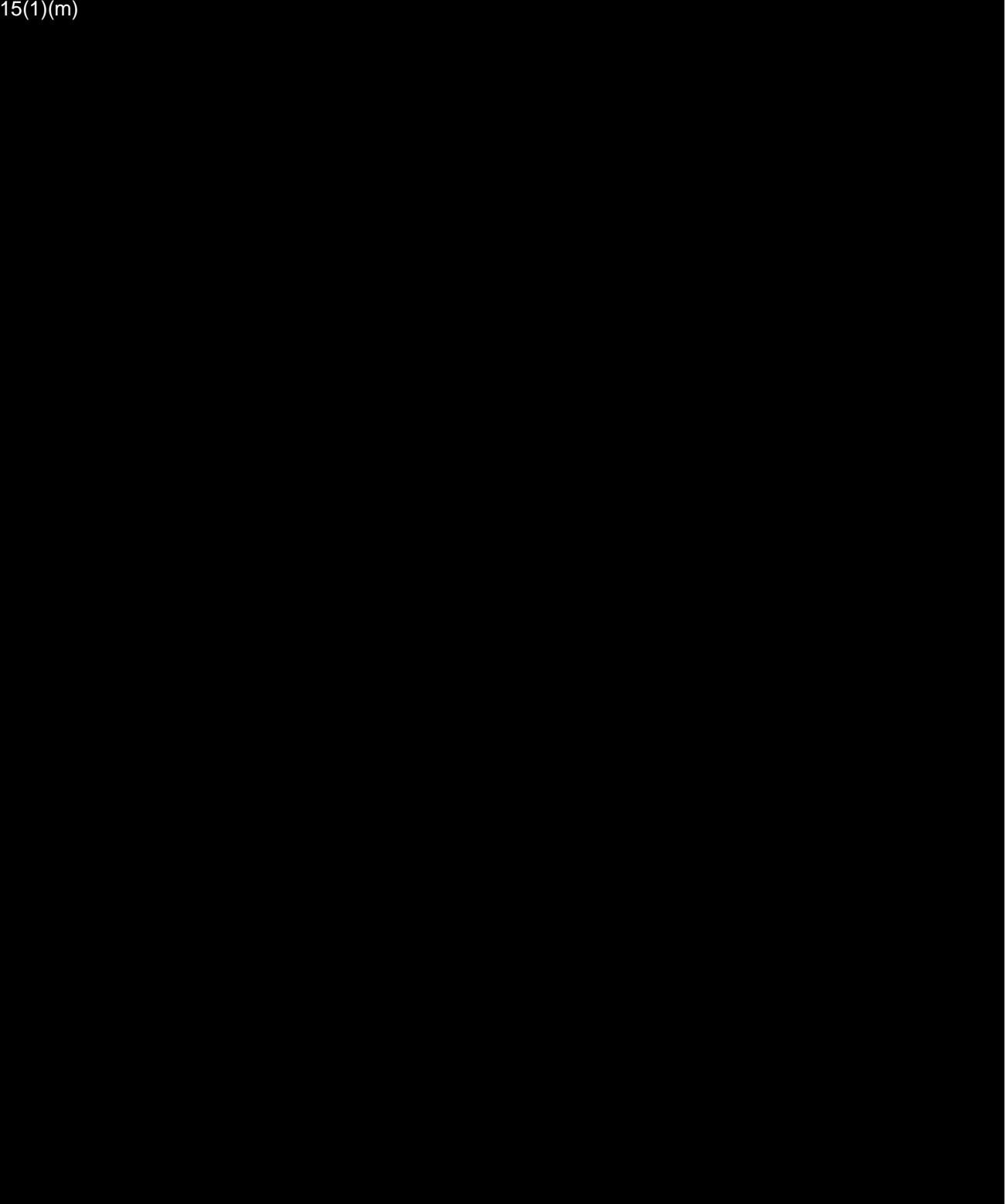
Privacy/Security

Many elements relating to privacy and security are discussed elsewhere in this summary document however, a primary focus of initial deliverables involved working to “making SPPAL safe.” These processes have been well articulated by the Project Team and approved by Project Champions and several key mechanisms will be highlighted here.

15(1)(m)



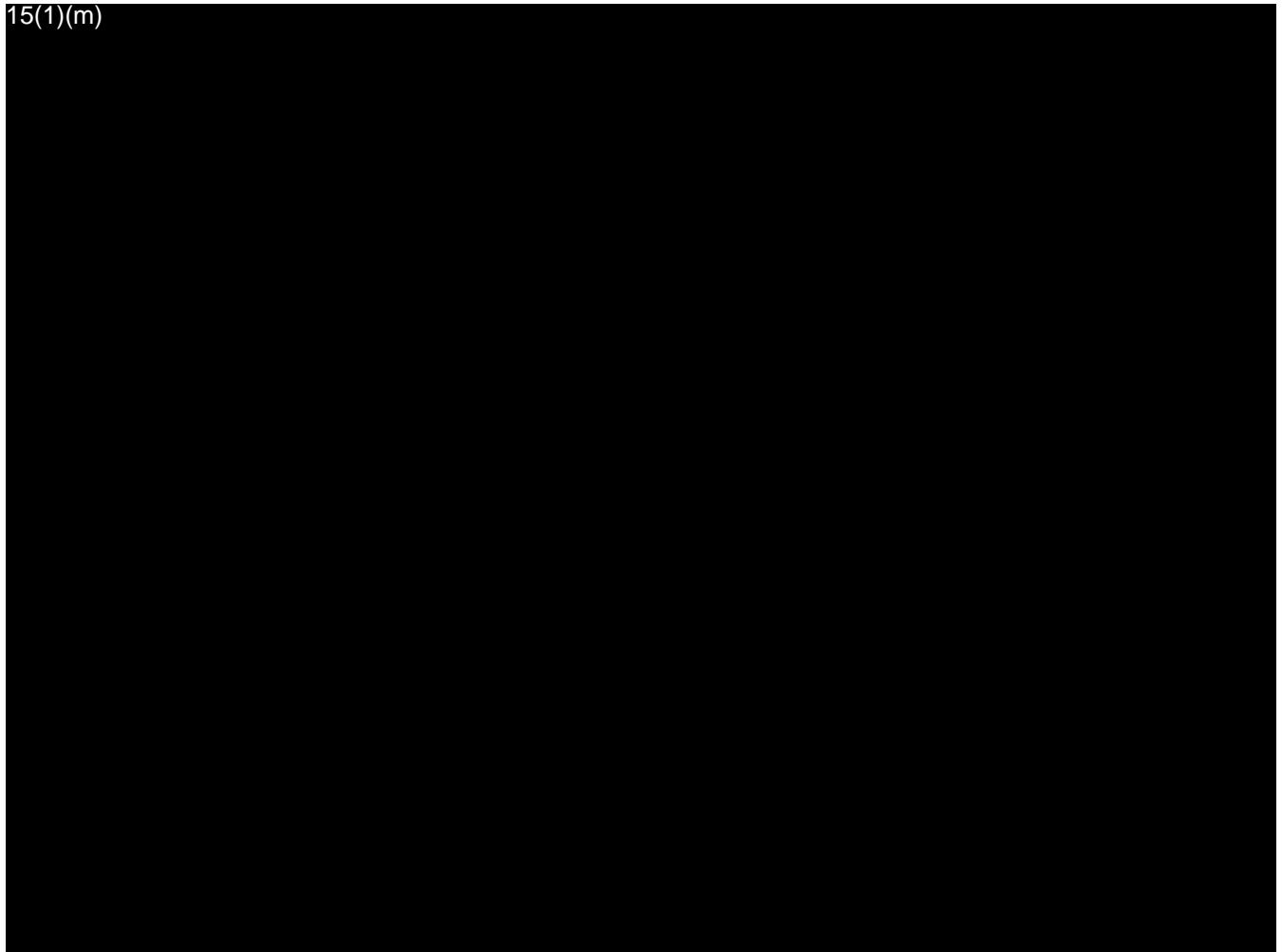
15(1)(m)



User Interface Needs Assessment and Development

A preliminary needs assessment was informed through consultation with end users (e.g., police officers in the Missing Persons Unit, Targeted Enforcement Section, SPS). This document concludes with a list of User Interface needs which will be further refined as additional consultation occurs, including information collected from additional stakeholders (e.g., Social Services) at the upcoming Missing Persons Workshop.

15(1)(m)



Data Coding - Police Data

A living data dictionary for SPS missing person data has now been created so as to define and structure police data for use in predictive analyses and interface development. Potential applicability of relevant standards and guidelines for the sharing of information (e.g., the National Information Exchange Model or NIEM) are currently being considered.

Conclusions and Future Directions

The SPPAL Missing Persons Project has generated considerable interest and excitement among police and community safety partners in SK. In addition to the work described above, members of the Missing Persons Project Team have also provided several invited talks in this reporting period (e.g., Prevention Matters Conference, Provincial Child Death Review Research Sub-committee). 15(1)(e)

[REDACTED]

[REDACTED]

The SK MOJ and SPS have also partnered with Mr. N. Taylor and the Canadian Association of Chiefs of Police - Information and Communications Technology Committee (CACP-ICT) to host an Open Analytics for Community Safety and Wellbeing Conference. The conference will take place in April 2018 in Toronto, Ontario. MP Project Team Members will be presenting at this conference. In addition to knowledge dissemination, conference objectives include working to establish a network for community safety analytics research and practice in Canada in keeping with project deliverables for in Year 2.



Figure 5: Open Analytics Conference

Delphine Gossner, Director, Research and Excellence in Policing (REBE)
29(1) , *Clinical Psychologist of Policing (SPS/REBE)*
29(1) , *Clinical Psychologist of Policing (RPS/REBE)*

I. Introduction

In January 2017, the Ministries of Corrections and Policing and Health created the Saskatchewan Drug Task Force, with representation from health, mental health and addictions, corrections, policing, social services and education, for the purpose of coordinating a response to the increasing public safety threat from illicit opioids and prescription opioid misuse. While the Task Force recognized that other community safety problems such as crystal methamphetamine have a higher prevalence in the province, it was agreed the risk of fatality due to opioid overdose increased the priority of this work.

The issue has also been identified as important from a national law enforcement perspective. The Canadian Police Executive Research Agenda identified seven priority research areas through a survey of 1,298 members of the Canadian Association of Chiefs of Police (CACP). *Opioid overdoses* was identified as being number four (with *Policing persons with mental illness* identified as being number two).

One of the stated aims of the Saskatchewan Drug Task Force is to use data to guide decision-making when developing strategies and responses to this public health and safety issue. However, it was recognized that there is currently no process for collecting and sharing data and research findings between ministries and human services. The lack of data surveillance in the area of opioids has been identified by other provinces (British Columbia) and is also recognized as a gap at the national level by Health Canada.

The Saskatchewan Police Predictive Analytics Lab (SPPAL) is well positioned to assist the Task Force in achieving its goals. Established by the three founding partners (University of Saskatchewan, Saskatoon Police Service and Ministry of Corrections and Policing) in 2015, SPPAL provides a secure and innovative data environment capable of linking opioid data from diverse sources including police and partner agencies (e.g., health, social services, corrections) as well as novel data sources (e.g., social media data). Internationally recognized experts from the University of Saskatchewan can develop and apply leading edge analytic techniques (e.g., machine learning techniques, simulation models) specific to Saskatchewan opioid data to increase understanding of current risks, trends, and intervention points, guide decision making and resource allocation across systems, and evaluate interventions. A SPPAL project focusing on opioid misuse could increase police and community partners understanding of the systemic nature of the problem in Saskatchewan and plan for the future. Methodologies and collaborative structures developed as part of this work could also be generalized to other public safety issues.

II. Objectives

The Task Force has identified that in order to be successful in reducing the negative outcomes related to opioid use across the broad community safety and well-being spectrum, activities and strategies need to be developed, applied and evaluated across the three pillars of Prevention/Education,

Intervention/Treatment and Suppression/Enforcement strategies. Work conducted in SPPAL could assist in informing these areas in the following ways:

Suppression/Enforcement. With the use of advanced predictive analytics, complex data received from partner agencies can be explored to identify patterns in opioid use, such as the geographic patterns of buyers and users. This type of information may aid in identifying and ultimately convicting drug traffickers and those in possession of opioids, contributing to a reduction in crime.

Intervention/Treatment. Identification of risk factors can assist in determining which individuals are at risk for negative outcomes such as opioid overdose in order to target and allocate interventions and treatment resources to reduce this risk. This would result in fewer emergency calls to both police and EMS in relation to overdose, fewer emergency room visits in relation to drug use, and lower the number of opioid related overdoses and fatalities.

Prevention/Education. With multiple data sources and advanced predictive analytics, identification of early indicators of potential negative outcomes could assist in identifying individuals, or groups of individuals, for early intervention and prevention programs contributing to a reduction of substance use disorders.

III. Data Sources and Security Considerations

Multiple data sources are seen as being valuable to informing the Opioid Initiative as the diversity contributes to a clearer picture of the problem. Data from a variety of sources also provides important information about intervention points which may not be discovered when considering information from an individual agency/source.

Possible data sources to inform the Opioid Initiative could include, but are not limited to, the following: criminal justice data such as police and corrections; emergency services including 911 calls and emergency medical services; health related data such as prescriptions, emergency room data, narcotic lab results; coroner investigations; and data from social services. All data sharing would comply with legislative requirements governing the data. In addition to these administrative data sources, data from open/public sources such as online searches and social media applications as well as information gleaned from the dark web are also seen as valuable.

Accessing, storing, integrating and analyzing these diverse data sources requires cutting edge physical, human, and technological security mechanisms. These security measures are necessary for storing identified data (required for data linkage between discrete data sets as well as for intervention at an individual level) and to protect against internal and external threats to both data and personnel involved with the initiative. SPPAL has been specifically designed by subject matter experts in computer science, police information technology, and human services research with these requirements in mind in order to accommodate projects like the Opioid Initiative.

IV. Next Steps

1. Agreement by SPPAL founding partners. SPPAL projects requires the agreement of the three founding partners to proceed. The purpose of this paper is to provide an overview of the Opioid Initiative for the founding partners to consider in making this decision. If there is agreement among the three partners to proceed, a Project Charter which includes a more detailed description of the initiative, including background, specific research questions and objectives; data sharing considerations; and sources of funding will be required as per the Memorandum of Understanding for the SPPAL.
2. Simultaneously determine the financial requirements for the initiative and develop a plan to meet these. This includes an assessment of the resources required for the initiative and exploration of external sources of funding to complement existing internal financial arrangements. This may include federal funding agencies (e.g., the Canadian Institutes of Health Research, Defence Research and Development Canada) and partnership opportunities (e.g., Smart Cities Challenge, research partnership with the University of Cincinnati).
3. Data Sharing Agreements. Members of the Saskatchewan Association of Chiefs of Police (SACP) have already agreed in principle to share police data with SPPAL and a Municipal Police Data Sharing Agreement is in the final stages. Additional agreements could be pursued for additional priority data sources.
4. Communication.²⁹⁽¹⁾ University of Saskatchewan, has been scheduled to attend the Saskatchewan Association of Chiefs of Police Fall Meeting (October 3, 2018) to speak to the role of advanced analytics in addressing the issue of opioids in Saskatchewan. As the initiative advances, further communication to additional partner agencies and related associations could be considered.

AGREEMENT

THIS AGREEMENT made effective as of the 29th day of March, 2018.

BETWEEN:

**HER MAJESTY THE QUEEN IN RIGHT OF
THE PROVNCE OF SASKATCHEWAN**
as represented by the Minister of Corrections and Policing
(the "Government")

- and -

UNIVERSITY OF SASKATCHEWAN
a body corporate continued pursuant to *The University of Saskatchewan Act*
(the "University")

WHEREAS the Government and the University intend to initiate and to promote joint research in all areas relevant to the Ministry;

AND WHEREAS the University has the capacity to carry out the research;

NOW THEREFORE, in consideration of the premises and mutual covenants contained herein and for other good and valuable consideration, the receipt and sufficiency of which is hereby expressly acknowledged, the parties agree as follows:

1.0 Definitions

1.1 In this Agreement the following words shall have the following meanings:

- (a) "**Agreement**" means this Agreement entered into between the Government and the University and all schedules and attachments to this Agreement and any instrument amending this Agreement;
- (b) "**Fund(s)(ing)**" means the funds provided to the University by the Government pursuant to this Agreement;
- (c) "**Funding Period**", pursuant to 4.1 of this Agreement, means from April 1 to March 31 in any year during which Funds are provided to the University;
- (d) "**Research Result(s)**" means graphics, promotional materials, databases, data, research, work in progress, technology, prototypes, inventions, working papers, reports and/or confidentiality agreements in any form whatsoever including any electronic storage device, tape or print;

- (c) “**Research Project**” means a specific research activity which has been mutually agreed upon by the parties for funding under this Agreement; and
- (f) “**Personal Information**” means personal information as defined in *The Local Authority Freedom of Information and Protection of Privacy Act, The Freedom of Information and Protection of Privacy Act (Saskatchewan)* or any similar applicable provincial or federal legislation in force.

2.0 Term of Agreement

- 2.1 This Agreement shall commence on March 1, 2018 and shall expire on March 31, 2019 unless terminated earlier pursuant to this Agreement.

3.0 Research

- 3.1 The parties shall by agreement determine specific areas and subjects of research to be undertaken under the direction of a University principal investigator (the “Principal Investigator”). If for any reason the then designated Principal Investigator is unable to complete the research and a successor proposed by the University is not accepted by the Government, acting reasonably, the parties will take all reasonable steps to wind down any Research Projects with a minimum of costs. The initial Principal Investigator is ²⁹⁽¹⁾ of the Department of Computer Science.
- 3.2 In order to facilitate the administration and operation of this Agreement, there shall be a Committee consisting of at least one representative from the University and one from the Government. The Committee shall meet from time to time and in such a manner as it determines for the purpose of approving specific Research Projects, monitoring progress, exchanging information, ensuring compliance with the terms herein, resolving issues and discussing any matter that arises out of the Agreement.
- 3.3 Until further notice, the representatives on the Committee are:

Ministry of Corrections and Policing:

Dr. Brian Rector Executive Director, Research and Evidence-Based Excellence 1200 – 1874 Scarth Street REGINA SK S4P 4B3 Bus: 306-787-3892 Cell: 306-537-8857	Alternative representative: Terri Simon, Director, Research and Excellence in Data Innovation 1200 – 1874 Scarth Street REGINA SK S4P 4B3 Bus: 306-787-0933 Cell: 306-530-6709
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University of Saskatchewan:
29(1)

Professor
Department of Computer Science
110 Science Place
SASKATOON SK S7N 5C9

- 3.4 Both parties agree to fulfill the obligations of the research collaboration by providing the necessary funding, personnel, facilities, services, equipment, and supplies. The funding commitment by the Government is set out in section 4.0; the services commitment by the University is set out in Schedule A.
- 3.5 The execution of any specific Research Project must be approved by the Committee.
- 3.6 The parties agree that each Research Project shall be bound by all terms and conditions of this Agreement. If there is a conflict or inconsistency between an attached schedule and this Agreement, this Agreement shall prevail.
- 3.7 Research Projects that are approved by the Committee shall be fully described in a written proposal, and will, without limitation, address all significant issues relevant to the execution of the project concerned. The schedule shall include a work plan, schedule of performance outcomes, and shall be signed by authorized representatives of each party. Each work plan shall include:
 - A brief background of the project, its origin, and its objectives;
 - A description of the technical contents of the project;
 - Responsibilities of both parties in order to complete the project e.g., submission of particular data by the Government to the University, engagement of a student researcher, etc.;
 - Identification of a Government lead for a particular project;
 - Date or timetable by which the research is to be completed;
 - Identification of any deliverable beyond the final report;
 - Background intellectual property to be utilized, if any; and
 - If project will be used toward a graduate student thesis.
- 3.8 Other Research Projects may be approved by the Committee without written proposals or schedules. These Other Research Projects may include short-term or limited scope projects.

4.0 Funding

- 4.1 The Government shall provide Funds to the University in an amount not to exceed \$55,000. \$45,000 will be payable upon signing of the Agreement. The remaining \$10,000 will be payable upon satisfactory completion of the deliverables (Schedule A) and a supporting invoice. This payment is inclusive of University overhead.

- 4.2 The University shall use the Funds only for the purpose of supporting the research activities under this Agreement. Specifically, the University will use \$40,000 to hire a person or persons to be actively involved in the research program. \$10,000 will be used to support other research expenses (such as, but not limited to, services, software, travel expenses) and \$5,000 will be allocated as University overhead. See Schedule A.
- 4.3 At the end of each Funding Period, any of the Funds provided pursuant to section 4.1 which have not been committed to specific projects ("Residual Funds") will be carried over to be used for the purposes of this Agreement in subsequent Funding Periods, unless the Government requests in writing that the Residual Funds be returned to Government. The Residual Funds will not cause any reduction in the Funding pursuant to section 4.1 in any subsequent Funding Period during the term of this Agreement.
- 4.4 Payment by the Government under or pursuant to this Agreement is subject to an appropriation to which the payment can be charged being made available by the Legislature of the Province of Saskatchewan in the fiscal year of the Government in which a payment provided under this Agreement becomes due, as required under section 33(2) of *The Financial Administration Act, 1993* (Saskatchewan).

5.0 Confidential Information

- 5.1 Pursuant to any applicable legislation, each party may disclose information it considers confidential to the other to facilitate the research. Each party will use all reasonable efforts to treat and keep confidential, and cause its officers, employees and agents, and in the case of the University also its students, to treat and keep confidential, any such information received by it from the other marked "Confidential". Any such information will be disclosed within the receiving party only on a "need to know" basis.
- 5.2 The obligation to keep confidential will however not apply to information which:
 - (a) was in recipient's possession before receipt from discloser;
 - (b) is or becomes part a matter of public knowledge through no fault of recipient;
 - (c) is rightfully received by recipient from a third party without a duty of confidentiality; and
 - (d) is disclosed by discloser to a third party without a duty of confidentiality on the third party.

Notwithstanding the provisions of Section 5.1, a recipient may disclose information if such disclosure:

- (e) is made in accordance with a lawful order of a court or administrative tribunal requiring recipient to disclose any or all of the information, provided recipient shall promptly notify discloser allowing some reasonable time to oppose such process, before disclosure occurs; or

(f) is made by recipient with discloser's prior written approval.

6.0 Ownership and Use of Research Results

6.1 Unless otherwise agreed to by the parties in a Research Agreement, the parties intend the following provision to apply to Research Projects undertaken pursuant to this Agreement.

(a) Subject to the use rights granted in clause (b), all Research Results produced in Research Projects by the University researchers and staff, and all copyright and other intellectual property rights arising from those projects shall belong to the University in accordance with the University's applicable policies. Although the Research Projects are to be undertaken by the University as an independent contractor, it is assumed that the Research Results will be created solely by the University's researchers. If in the conduct of any Research Project, University personnel and Government personnel interact and jointly create Research Results, the University and the Government agree that they will jointly own such results and any intellectual property arising from such results.

(b) The University hereby grants to the Government irrevocable right to use, for non-commercial purposes, without cost, any and all Research Results of any kind produced by the University pursuant to this Agreement, including the right to copy and distribute such Research Results and the right to grant other parties the right to use Research Results in compliance with this Agreement for non-commercial purposes in Saskatchewan. The Government shall submit to the University Principal Investigator, any distribution, publication or presentation of Research Results prior to distribution, presentation or publication, for review at least thirty (30) days in advance of such proposed distribution, presentation or publication. The University's Principal Investigator shall complete the review within thirty (30) days from its receipt of the proposed distribution, publication or presentation. If the University's Principal Investigator does not object in writing to such distribution, publication or presentation within thirty (30) days of receipt thereof, the University's Principal Investigator shall be deemed to have agreed to the disclosure and the Government shall be free to proceed.

During the review period, the University's Principal Investigator may object to such proposed distribution, publication or presentation either because:

- (i) there is an inadvertent disclosure of confidential information contained in the proposed distribution, publication or presentation; or
- (ii) there is an inadvertent disclosure of commercializable information which might require appropriate legal protection.

If the University's Principal Investigator objects because there would be an inadvertent disclosure of confidential information, the Government agrees to remove the confidential information.

If the University objects because there would be an inadvertent disclosure of commercializable information, the Government agrees – in consultation with the

University Principal Investigator – to either remove the commercializable information, or delay distribution, publication or presentation for up to a maximum of six (6) months for the purposes of obtaining patent or other intellectual property protection.

- (c) If the Government has provided information essential to the research that is clearly marked “Confidential”, the University will observe such confidentiality and may publish the results of the research without identifiable reference to the confidential information. No other limitations are placed on the publication of results.
- (d) The parties agree to use the following process for publication review:
 - (i) The Principal Investigator will provide the Government with a written copy of proposed publication or presentation of any Research Results, at least sixty (60) days before submission for publication or presentation.
 - (ii) The Government shall have thirty (30) days to review the proposed publication or representation for any inadvertent disclosure of its confidential information or Personal Information. If due to extenuating circumstances the initial thirty (30) day review period is insufficient, the Government will notify the University in writing as soon as reasonably possible and identify an extension not to exceed an additional thirty (30) days. The Government must advise the University in writing of any confidential information or Personal Information that it requests be removed, and the University will remove such information.
 - (iii) The University may publish once it has written acknowledgement from the Government that all confidential information or Personal information has been removed.
 - (iv) Notwithstanding the above, the Government may review and provide comments on any aspect of a proposed publication or presentation. The University authors may, in their sole discretion, incorporate any such review or comments as they see fit.
- (e) Notwithstanding anything else in this Agreement, the Committee may approve a Research Project in which a graduate student of the University participates. Graduate students will not be given access to Personal or Confidential Information provided by the Government, unless the student i) is participating in an approved Research Project, ii) has signed a confidentiality agreement, and iii) provides a recent criminal record check that has been reviewed and found satisfactory by the Public Service Commission.

All limitations and requirements as specified in this section apply to a research report, including any thesis or education report, relating to the research and prepared by a graduate student.

If a graduate student who is participating in an approved Research Project completes a thesis or academic report relating to the Research Project, the student will own the copyright in that thesis or report notwithstanding section 6.1(a). Publication or defence of a thesis or education report may be delayed only in accordance with the applicable policies of the University.

- (f) The parties may work on joint papers and presentations arising from the Research Projects. The parties agree that each such paper or presentation will include appropriate attribution of authorship, based upon contribution to the intellectual content and in accordance with accepted academic standards.

7.0 Research

7.1 The University warrants that:

- (a) the research conducted pursuant to this Agreement will be carried out in compliance with all federal, provincial or municipal laws or regulations, or any orders, rules or by-laws and all applicable professional standards, rules and guidelines related to the research;
- (b) any aspect of the research that involves research using human subjects shall be reviewed and monitored by the University of Saskatchewan research ethics board to ensure compliance with prevailing ethical standards for research; and
- (c) if the research involves human subjects, the University has the capacity to and will maintain, for the period during which the Agreement and any relevant Funding Agreements are in effect, the confidentiality of any Personal Information relating to those human subjects in accordance with applicable law, including *The Local Authority Freedom of Information and Protection of Privacy Act, The Freedom of Information and Protection of Privacy Act (Saskatchewan)*.

7.2 The University will carry out the research in accordance with appropriate scientific and professional standards but does not promise success in achieving any desired result. The University makes no representations or warranties, either express or implied, as to any matter, including without limitation, the fitness of the Research Results for any particular purpose.

8.0 Indemnification

- 8.1 Subject to any express provision to the contrary and any limitation of liability contained in this Agreement, each party will defend, indemnify and hold harmless the other party, its officers, cabinet ministers, employees, students and agents from any and all claims, demands, actions and cost whatsoever that may arise, directly or indirectly, out of such indemnifying party's performance of this Agreement or that of the indemnifying party's officers, cabinet ministers, employees, students or agents.
- 8.2 The Government will defend, indemnify and hold harmless the University from all liabilities, demands, damages, expenses and losses arising out of the use by the Government or by any party acting on behalf of or under authorization from the Government of the Research Results.

9.0 Acknowledgement

- 9.1 Unless otherwise requested by the Government, the University will acknowledge the financial contribution and support of the Government in all publications and presentations and in all advertising and publicity relating to the research, in a format approved by the Government.
- 9.2 The University will ensure the acknowledgement in any publication or presentation indicates that the views expressed in the publication or presentation do not necessarily reflect those of the Government of Saskatchewan.

10.0 Reports

- 10.1 By agreement between the parties, the Principal Investigator or other researchers under this Agreement may present research findings and results to Government stakeholders and at meetings and/or conferences of interest to the Government.
- 10.2 The University shall provide to the Government a report of progress on all research activities, with expenditure details and outputs, for each Funding Period. This report is required each year by June 30, with the first such report due by June 30, 2019.

11.0 Termination

- 11.1 Either party may terminate this Agreement for any reason by giving reasonable written notice to the other party.
- 11.2 The expiry or termination of this Agreement will not affect the funding of specific Research Projects and other activities that were approved and authorized under this Agreement prior to such expiry or termination and for which Funding Agreements are in place, and such Research Projects will be completed as approved. Notwithstanding the foregoing, all Research Project obligations pursuant to this Agreement will be completed on or before March 31, 2019.

12.0 Unused Funding

- 12.1 Any Funds provided by the Government that have not been used or accounted for by the University within a period of twelve months following the date of expiry or termination of this Agreement will be returned to the Government.

13.0 Notices

- 13.1 Any notice or communication to be given under this Agreement shall be in writing and shall be served personally, delivered by courier or sent by registered mail, or sent by facsimile addressed to the other party at the address provided below or at such other address as either party shall later advise in writing. All notices shall be addressed as follows:

To the Government:

Dr. Brian Rector
Executive Director
Research & Evidence-Based Excellence
Ministry of Corrections and Policing
1200 – 1874 Scarth Street
REGINA SK S4P 4B3
Bus: 306-787-3892
Cell: 306-537-8857
Fax: (306) 798-0270
E-mail: brian.rector@gov.sk.ca

To the University:

For contractual matters: Research Services and Ethics Office, U of S
Attn: Contracts Specialist
Room 223 Thorvaldson Building
110 Science Place
SASKATOON SK S7N 5C9
Phone: 306-966-8576
Email: research.services@usask.ca

For financial matters: Controller's Office, U of S
230 – 54 Innovation Boulevard
SASKATOON SK S7N 2V3
Phone: 306-966-8303
fsd_research_accounting@usask.ca

- 13.2 All notices shall be effective:

- (a) at the time the delivery is made when the notice is delivered personally, by courier or by fax; and
- (b) seventy-two (72) hours after deposit in the mail when the notice is sent by registered or postage prepaid mail.

14.0 Relationship of the Parties

- 14.1 Nothing in this Agreement shall be construed as establishing an agency, partnership, joint venture or employment relationship between the parties, and this Agreement shall not bind a party to any contract, arrangement, undertaking or understanding, except as specifically stated herein. No party shall have any authority to act for or assume any obligations or responsibility on behalf of the other party.

15.0 Assignment and Subcontracting

- 15.1 No part of this Agreement may be assigned or subcontracted by either party without the written consent of the other party.

16.0 Governing Law

- 16.1 This Agreement will be governed by and interpreted in accordance with the laws of the Province of Saskatchewan.

17.0 *Freedom of Information and Protection of Privacy Act*

- 17.1 The Government acknowledges that all records prepared by the University in the performance of this Agreement are in the custody and control of the University. The University is or will be subject to the access and privacy provisions of *The Local Authority Freedom of Information and Protection of Privacy Act* (Saskatchewan) which creates a right of access to records under the custody and control of public bodies subject to specific, limited exceptions. The Government also agrees to comply with all applicable privacy legislation.

18.0 Survival of Articles

- 18.1 The provisions in sections 5.0 (Confidential Information), 6.0 (Ownership and Use of Research Results), 8.0 (Indemnification), 9.0 (Acknowledgement), 10.0 (Reports), 12.0 (Unused Funding), and 17 (*The Local Authority Freedom of Information and Protection of Privacy Act*), shall survive the expiry or termination of this Agreement.

19.0 Entire Agreement

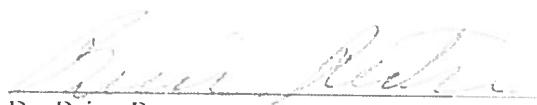
- 19.1 This Agreement and all schedules hereto, constitute the entire agreement between the parties with respect to the subject matter of this Agreement, and supersede all previous

agreements, understandings, negotiations and discussions, whether written or oral, between the parties.

- 19.2 No amendment to any of the terms and conditions of this Agreement shall be deemed valid unless by written instrument signed by both parties.
- 19.3 In the event that any provision of this Agreement, as amended from time to time, is deemed invalid, void or unenforceable, in whole or in part, by any court of competent jurisdiction, the remaining terms and conditions of this Agreement shall remain in full force and effect.
- 19.4 This Agreement may be executed in counterparts and may be signed and delivered by facsimile or other means of electronic communication producing a printed copy, each of which so signed and delivered shall be deemed an original and such counterparts together shall constitute one and the same instrument and, notwithstanding the date of execution, shall be effective as of the date first written above.

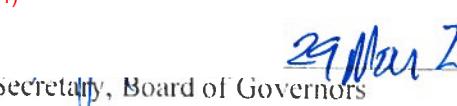
IN WITNESS WHEREOF the authorized officers of the parties have executed this Agreement as of the date first written above.

**HER MAJESTY THE QUEEN IN
RIGHT OF SASKATCHEWAN**


Dr. Brian Rector
Executive Director
Ministry of Corrections and Policing

UNIVERSITY OF SASKATCHEWAN
29(1)


For Chair, Board of Governors


For Secretary, Board of Governors

SCHEDULE A

Services

Deliverable 1

For purpose of development of a Remand Risk Assessment instrument, the University agrees to clean, validate and organize data files that will be provided by the Ministry, and create a linked dataset. The linked dataset will be in a format that will be useable by the Ministry of Corrections and Policing for other projects. The specific format will be determined by the committee members as identified in section 3.3.

Deliverable 2

Using data from the linked dataset from Deliverable 1, basic statistical analyses, including calculation of a number of reoffending base rates (e.g., any new offences while awaiting trial, specific types of reoffending such as fail to attend court, violence, property crime, etc.) will be provided to the Ministry.

Additional services as deemed necessary by both parties.

Role of Predictive Analytics in Addressing SK's Incipient Opioid Crisis

29(1)



Computer Science
Community Health & Epidemiology
University of Saskatchewan

Key Points

- The opioid crisis is complex
- The opioid crisis has big uncertainties
- The opioid crisis is fast-changing
- The opioid crisis will probably be much harder to deal with if we don't take active action to understand and confront it
- Predictive analytics come in many flavours
- Predictive analytics help us learn more quickly and reliably about complex systems
- Modeling is a human activity that offers far more value than the models
- If we are resource tight, we probably don't have the luxury of not using predictive analytics

Systemic Nature of Opioid Problem

- Entry routes
 - *Chronic pain management*
 - *Prescription diversion*
 - *Novelty seeking*
 - *Dysphoria escape*
- Dealer networks
- Social embedding of opioid abuse&pain mg
- Personal intervention
- Policing
 - *Delivery of naloxone*
 - *Risk of exposure*
 - *Removal of dealers*
- Social disruption as contributor & effect
- Corrections
 - *Sharing, limited detox mgt.*
- Interactions w/other narcotics & drug policy
 - *Cannabis: pain mgt, withdraw. symptom mgt, gateway*
- IT
 - *Internet as conduit*
 - *Gaps in provincial PIP*
- Drug industry efforts
- Uncertainty

Key Points

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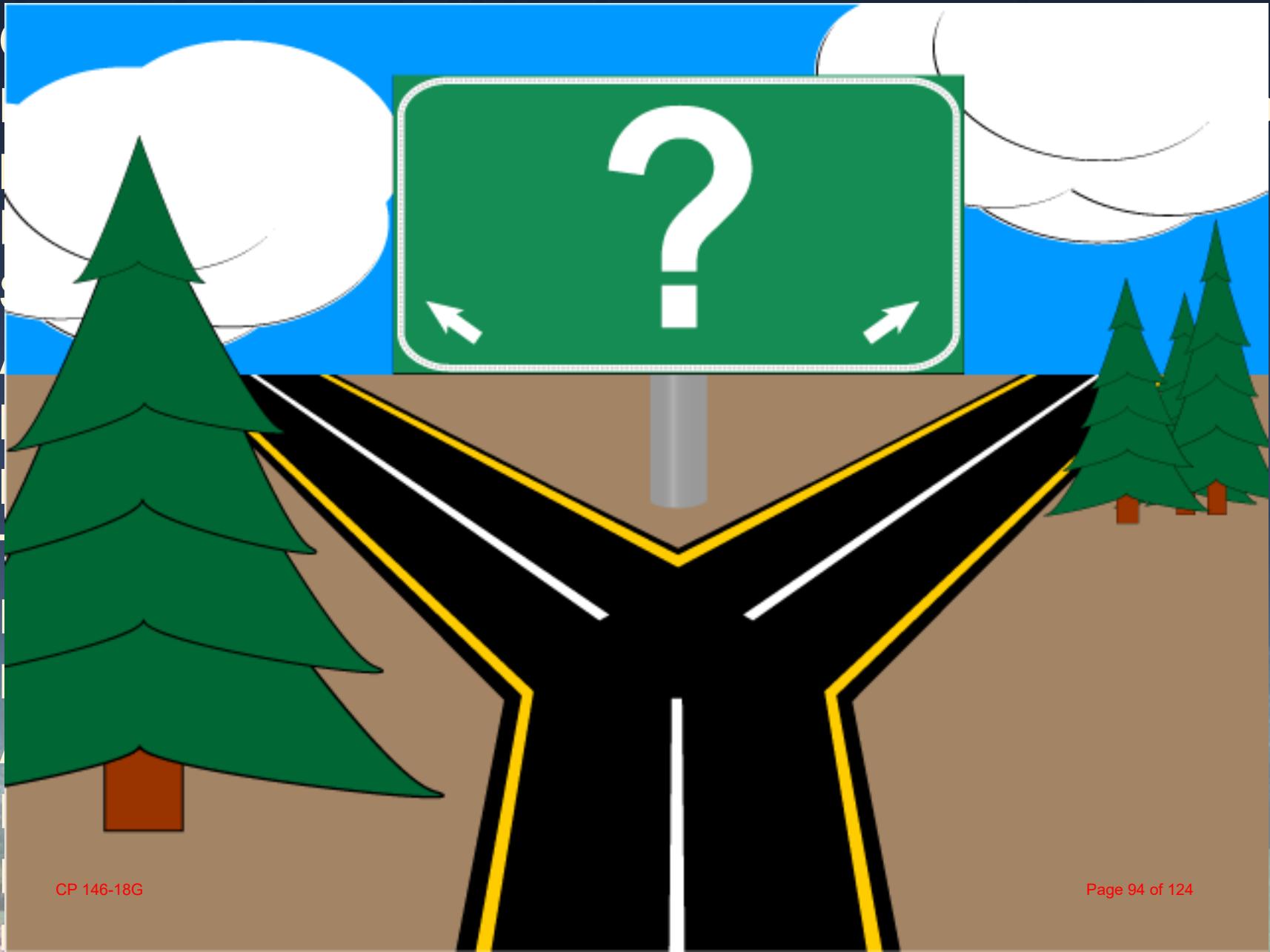
Rapid Evolution of Crisis

- Background of disordered population
- Prescribing practices
- Prescription agents
- Risk of addiction
- Distribution networks
- Procurement options
- Drug combination
- Antagonist agents
- Management agents

Key Points

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Challenge



Where and How to Intervene?

- **Identifying individuals and groups of individuals for**
 - *Treatment*
 - *Closer case management*
 - *Prevention resources*
 - *Closer monitoring on parole*
 - *Clinical advisory*
- **Enforcement priorities in different regions**
- **Detailed arrangements for emergency response**

Where to Invest Resources for Action?

- **Creation of integrated chronic pain clinic**
- **Promotion of alternative analgesic interventions for chronic pain amongst GPs**
- **Expanded treatment programs in corrections**
- **Stricter prescribing standards & enforcement**
- **Added investment to identify and pursue dealers**
- **Improved compliance monitoring in PIP**
- **Interprovincial monitoring compliance**
- **Tamper-proof dispenser designs**
- **Reform towards “recovery oriented” system of care**
- **Harm reduction: Supervised injection site**
- **Added police training for seizures**
- **Promotion of detox option for intoxicated individuals**
- **Efforts to use pharmacologic and non-pharmacologic means to wean off of prescriptions**

Consequences of Challenges

- Misperceptions
- Surprising behavior
- Policy resistance
- Gaps in understanding pose problems for
 - *Learning from experience: Painful & slow; unclear what generalizes*
 - *Coordinating: Actors in 1 area of the system often have poor sense as to how actions of actors in other areas of the system affect them ⇒ risk of working at cross purposes*
 - *Planning & Deciding: Unclear tradeoffs between choices*
 - *Designing: Not clear how to best structure the roles/responsibilities of the actors, reporting, etc.*
- *Too busy bailing to plug the hole: Policy resistant efforts shortchange funding for things that can really make difference*
CP 146-18G

Risks

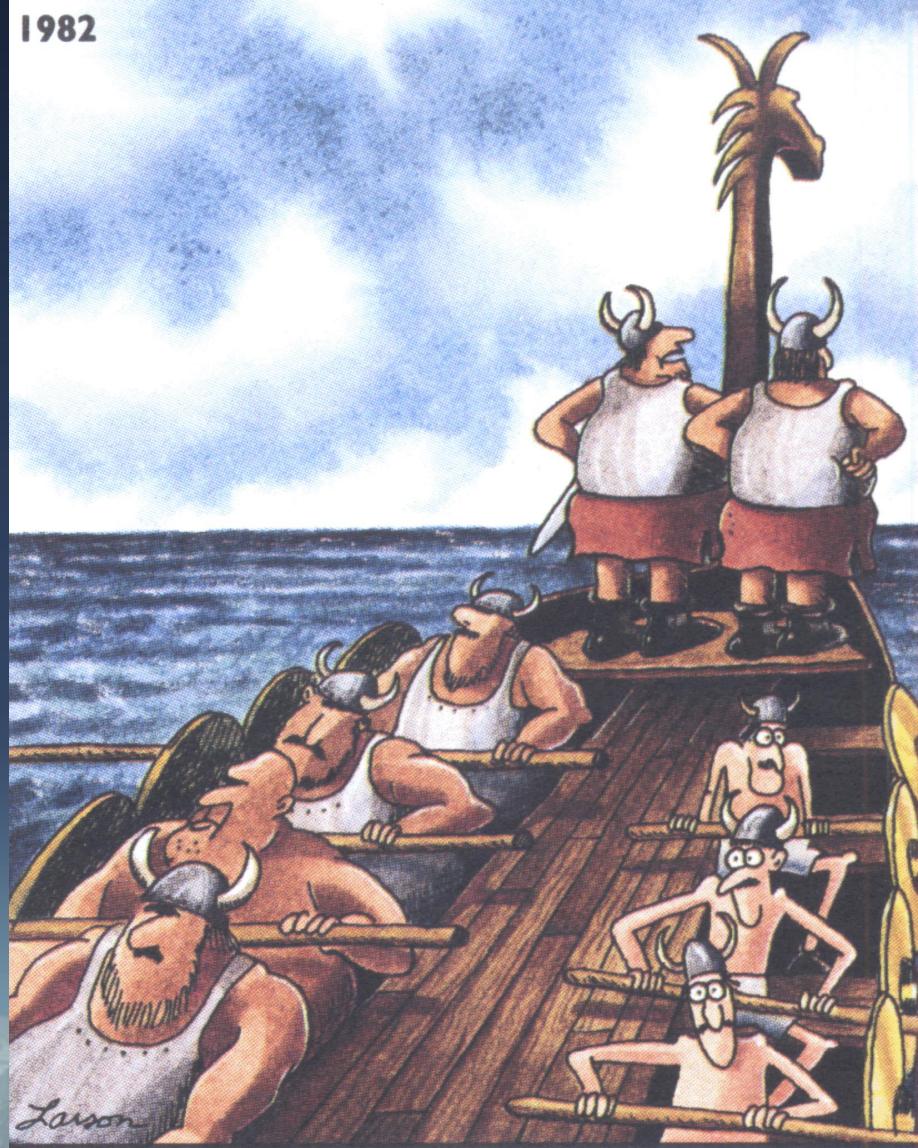
Larson, The Far Side

Ineffectual management will lead to...

- Lost lives
- Broken families
- Wasted resources (“Too busy bailing to plug the hole”)
- **Worsening situation**

Inter-sectoral discoordination can lead to ineffectual management

1982



“I've got it, too, Omar ... a strange feeling like we've just been going in circles.”

Key Points

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Predictive Analytics: Many Uses

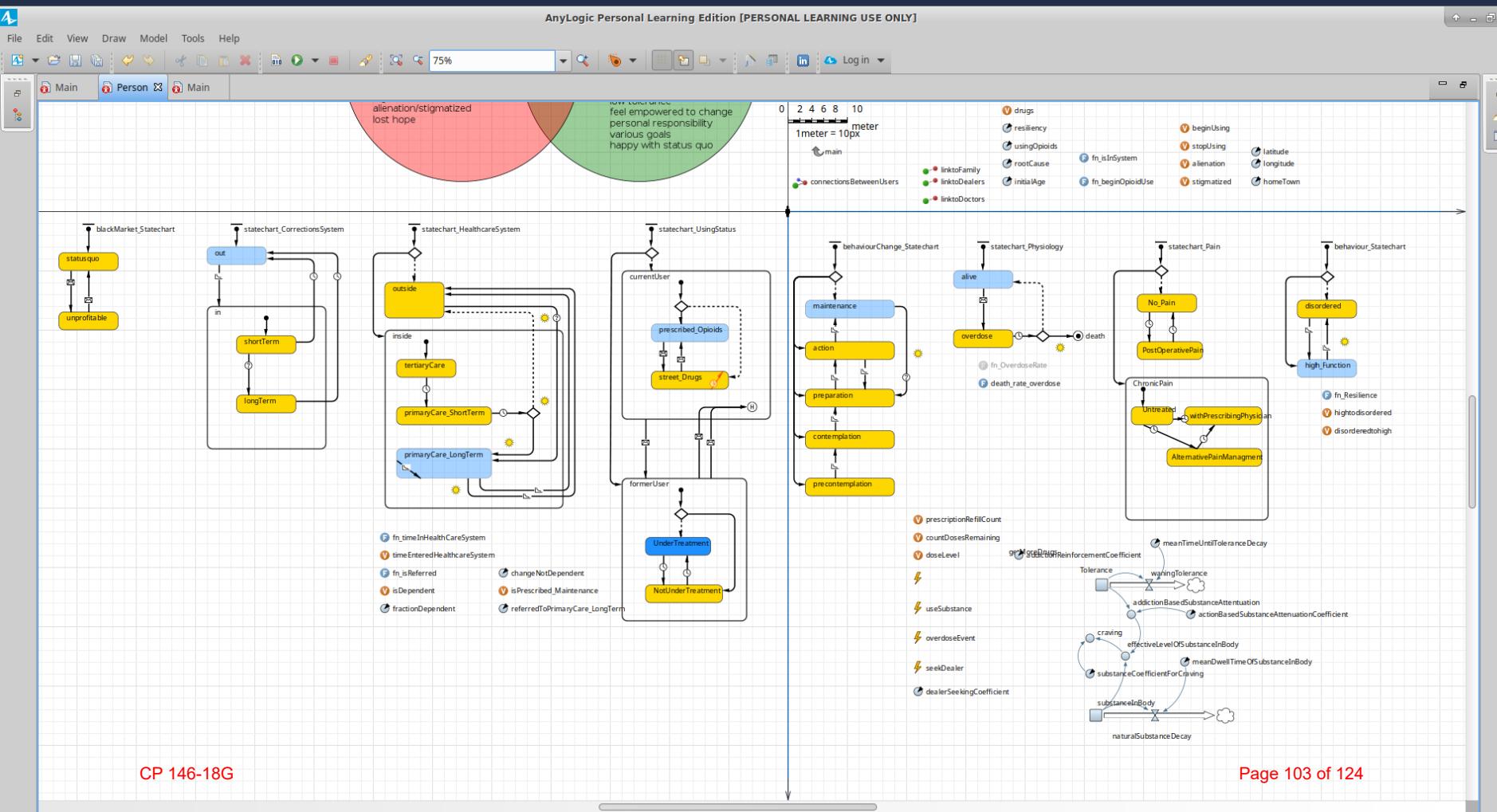
- Classification
- Inference
- Spotting hidden patterns
- Catalyzing cross-boundary discussion
- Dynamic insights (simulation models)

Uses of Dynamic Models

- Ability to test out possible intervention studies
 - *Test in virtual world before in external world*
 - *Estimate cost-effectiveness*
- Coming trends and risks
- Leverage points for intervening in the system
- Ways of fruitfully changing system structure
- Ways of better coordinating system actors
- System vulnerabilities

Key Points

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Dynamic Model

Not



But



Models as Learning Prostheses

Simulation models help us *learn more quickly* by helping us think through implications of our assumptions more

Consistently, reliably & rigorously

Quickly

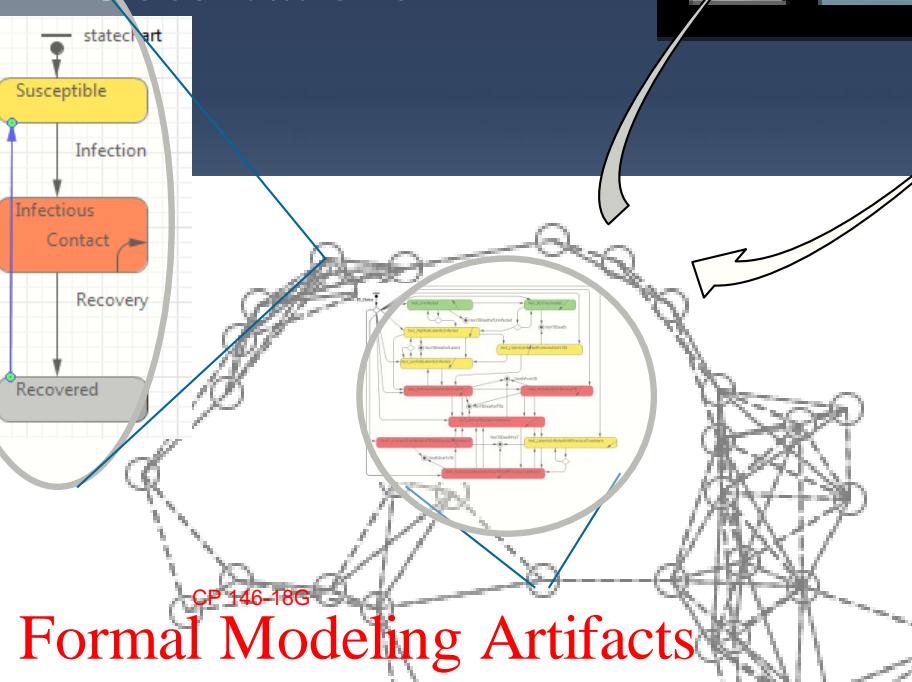
Thoroughly

and thereby allow us to put whatever empirical evidence we have to better, more complete & effective use in

Informing our choices

Advancing our understanding (including by refining our models & our choice of data to collect)

Coevolution



Simulated Pathway Dynamics

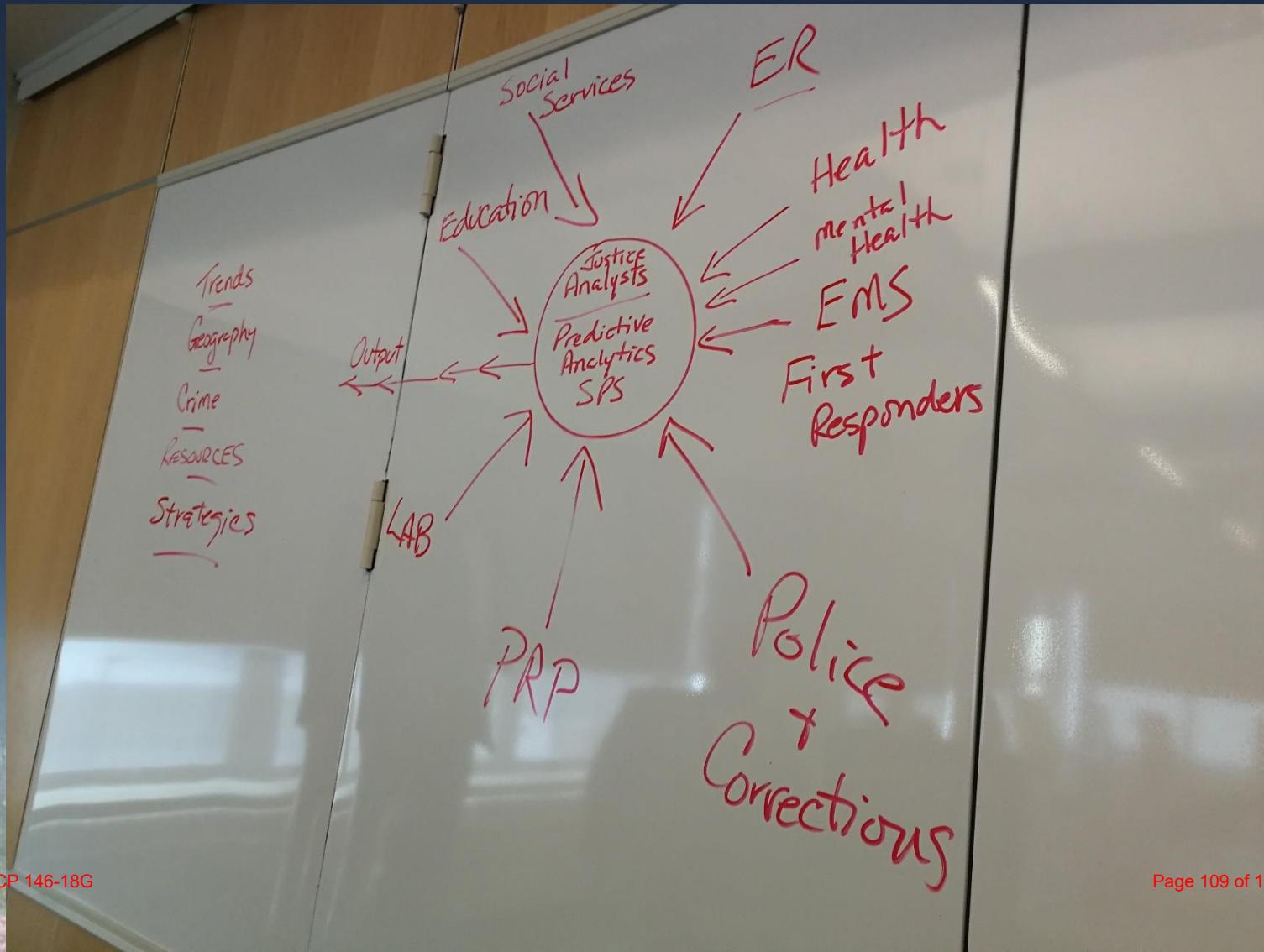
Simulation Models: Assistance in management of complex situations

- Serve as “What if” tool to identify desirable policies
 - *Cost-effective/High-leverage/Robust*
- Anticipate emerging challenges and risks
- Evaluate benefits of restructuring system
- Understand trends & help make sense of interaction of diverse information, processes
- Prioritize research/data collection & identifying inconsistencies
- Understand classes of contexts in which certain strategies are best applied

Response to Uncertainty

- **Use of model as a learning tool: Eliciting critique**
 - *Inability to match observed data*
 - *Cross-team use*
 - *Periodically: from wide variety of stakeholders (incl. patients)*
- **Conduct contingency planning with model**
- **Sensitivity analysis**
- **Draw on diverse sets of evidence**
- **Use of machine-learning techniques to automatically update model when new data is available**

A Motivating Vision



Solution Element: Quickly Formulated, Frequently Regrounded Dynamic Models

- Rough & ready models quickly available to support decision-making, *automatically* regrounded & sharpened may be both more valuable and accurate than a far more detailed model that takes longer to create
- Rely not just on model predictions of where we're at, but also empirical observations
- Model state is kept “current” with the latest evidence, but can be used to project forward & study anticipated intervention tradeoffs
- Regrounding the model illuminates latent areas of the system



Key Points

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Models: Only Part of Value of Modeling

- Process of learning
- Stimulating inter-sectoral and intra-sectoral learning
- Regular reflection
- Enhanced clarity in goals
- Capacity to address other analytic challenges

Key Points

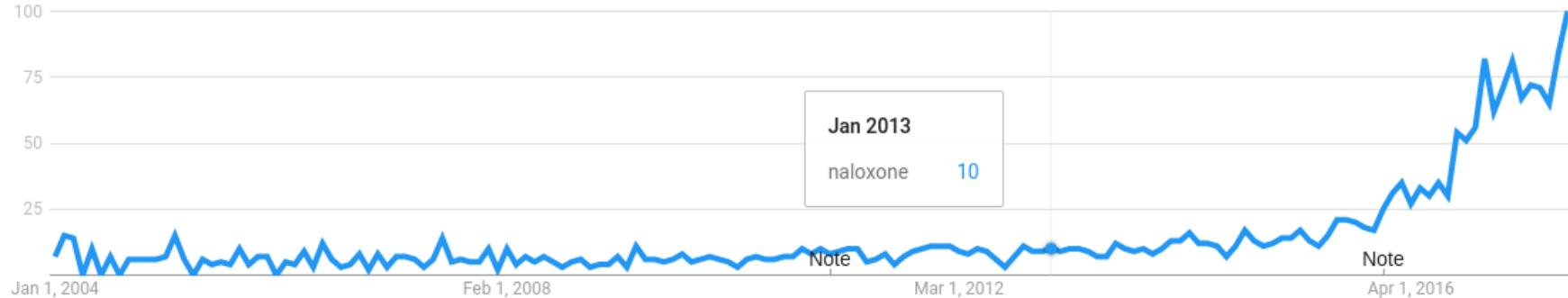
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A Few Key Questions

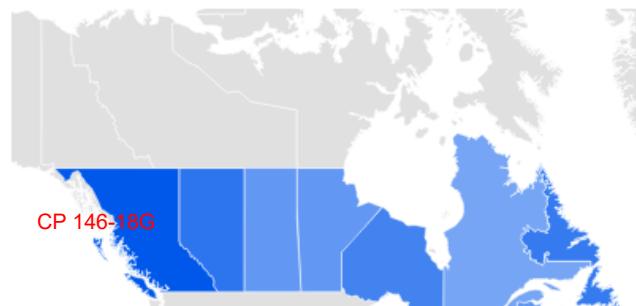
- Can we afford not to learn more quickly?: What is the cost of not being able to anticipate and position with respect to the fast evolving character of the crisis?
- If resources are too tight to invest to do it right, will they cover the cost of doing it wrong?
- Without an investment in analytics, are we ready to handle the challenges of the situation? (e.g., Mail order availability for pill presses, dark web use by consumers)
- Is there an effective alternative?

Canadian searches for “Naloxone”

Interest over time 



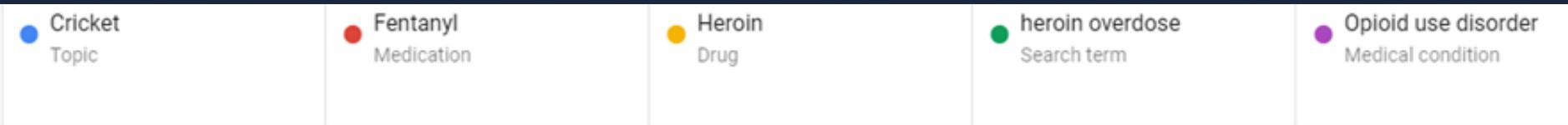
Interest by subregion 



Subregion 

1	British Columbia	100
2	Alberta	75
3	Newfoundland and Labrador	70
4	Nova Scotia	64

Page 116 of 124



Cincinnati OH ▾

4/9/15 - 5/9/18 ▾

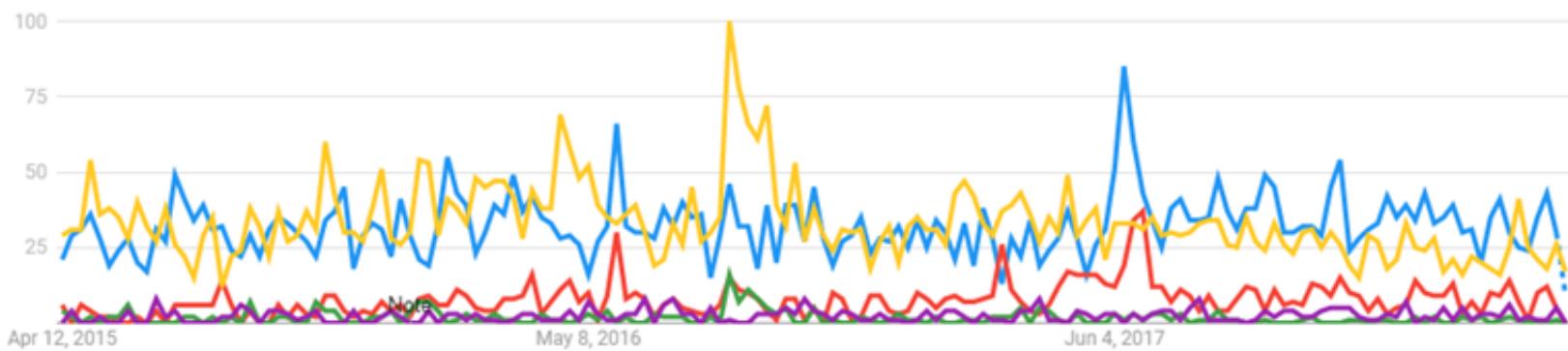
All categories ▾

Web Search ▾

! Note: This comparison contains both Search terms and Topics, which are measured differently.

[LEARN MORE](#)

Interest over time ?



Saskatchewan: Poised to Lead

- **Capacity to express and refine understanding:** Sask as a worldwide centre for dynamic modeling in health
- **Robust conclusions meshing theory & data:** Sask as a worldwide centre for big data and machine learning in health
- **Linked, diverse evidence:** Sask as having critical mass of ministerial support and approval
- **Links to other analytics leaders: Cincinnati, U. Pitt, RTI**
- **Ongoing asset:** We specialize in techniques so that models are learning tools and so new data will update models
- **Secure data & privacy guarantees:** SK benefits from secure lab infrastructure for predictive analytics (SPPAL)
- **Local talent:** Sask as a worldwide centre for training in predictive analytics in health
- **Economy of scale:** We already have much infrastructure, trainees, modeling mechanisms, related models in place

General Benefits to Policing & Justice

- More judicious policy selection
- Far longer lead time to deal with emerging problems
- Enhance justice/policing efficiency and resource use
- Lower need for enforcement action
- Prioritization of data collection efforts
- Faster perception of response to interventions
- Identifying gaps in understanding/thinking
- Clearer, more coherent picture from ongoing evidence
- Tool to educate public, stakeholder & community outreach
- Reduced risk to officers
- Fast, minimally risky way to test possible intervention studies

General Benefits: Societal gains

- Fewer overdoses
- Fewer individuals with opioid disorder
- Fewer broken families
- Concentration of care resources for those with conditions that require it
- Greater efficiency in delivery of Emergency Department care
- Reduced absenteeism

A Few Key Questions

- Given the big uncertainties, Can we afford not to learn more quickly?
- What is the cost of not being able to anticipate and position with respect to the fast evolving character of the crisis?
- If resources are too tight to invest to do it right, will they cover the cost of doing it wrong?
- Without an investment in analytics, are we ready to handle the challenges of the situation? (e.g., Mail order availability for pill presses, Dark web use by consumers)

What is the Alternative?

- Most policies – and many day-to-day choices – are made on the basis of internal “mental models”
- Such mental models are quite
 - Opaque
 - *Difficult to share*
 - *Incompletely reasoned through*
 - *Challenging to collectively refine*
 - *Hard to use for*
 - *Understanding logical implications of choices*
 - *Testing consistency with empirical evidence*
- It is often risky to rely on such mental models

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Acknowledgements

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[Western Sydney University]

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[Public Health Agency of Canada]

– CEPHIL Students