C5 Collaborative
Data Linkage Project

FINAL REPORT, JUNE 2020

PolicyWise for Children & Families

the Stollery charitable foundation

EDMONTON COMMUNITY FOUNDATION

EMCN

Norwood

BOYLEstreet COMMUNITY SERVICES

terra centre

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Project Funders

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Summary & Key Messages

The C5 Collaborative Data Linkage Project is an initiative between the agencies of the formal C5 collaborative, and PolicyWise for Children & Families (PolicyWise). Within the C5 collaborative are: Bent Arrow Traditional Healing Society (Bent Arrow), Boyle Street Community Services (Boyle Street), Edmonton Mennonite Centre for Newcomers (EMCN), Norwood Child & Family Resource Centre (Norwood) and Terra Centre (Terra). The collaborative works toward stronger outcomes for individuals, families, and communities, and aims to help shape policy, legislation and regulations to advocate for their clients' realities, hopes and dreams. PolicyWise and the C5 have been working together and developing new ways of knowing and working with data that serve communities and nonprofits.

Data can inform the work of the C5 at several levels: the program level, the agency level, and at the collaborative level. Agencies may collect data at the program level to report back to funders, to manage service delivery, to evaluate the effectiveness of programs, and to better understand the needs of their clients, and in turn improve, and expand programming. At the agency level, data may be used to make a case for funding and for decisions about services and resources. Across the collaborative, data may be particularly helpful for strategic considerations about the collaborative, and to influence policy makers and funders.

In this project, data in the form of anonymized client records and activities was shared with PolicyWise from a number of programs from each of the C5 agencies with the aim of integrating data from across the C5 collaborative. Linking data across agencies is a complex process and includes several steps. The first step is a thorough audit of the data and description of the quality of data collected by the organizations. Second, is an assessment of the legal and ethical requirements needed to integrate data, and; third, an exploration of the **linkage** of the same individuals across different agencies. In this last step, it is important that the **data quality** be high.

Activities throughout the project entailed:

- **Identifying Priorities for Using Data**
- **Examining Data Quality with a Data Audit**
- **Reviewing Data Quality within Agencies**
- **Exploring Data Stories**
- **Engaging C5 Staff on Project Learnings**

Readers of this report may find it useful for:

» **Assessing data quality**
To understand and serve clients better, high quality data is key. Quality data means documenting missing data, having standard ways of collecting data, and robust demographics. Quality data allows higher-order analyses such as anonymous linkage and studying client journeys.

» **Developing a data story**
The power of data was explored to inform programs and practices within the C5 collaborative. Data can be beneficial and serve agencies in many ways – three cases were shown in this report: (a) using postal code and open-source data; (b) measuring and assessing an outcome such as parenting; and (c) linking and integrating data between agencies.

» **Reflecting on data strengths and opportunities**
The lessons learned, and strengths and opportunities learned throughout the project are summarized.

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Introduction

The C5 Collaborative Data Linkage Project is an initiative between the agencies of the formal C5, and PolicyWise for Children & Families (PolicyWise). Working within the C5 collaborative are: Bent Arrow Traditional Healing Society (Bent Arrow), Boyle Street Community Services (Boyle Street), Edmonton Mennonite Centre for Newcomers (EMCN), Norwood Child & Family Resource Centre (Norwood) and Terra Centre (Terra).

The collaborative works toward stronger outcomes for individuals, families, and communities, and aims to help shape policy, legislation and regulations to advocate for their clients' realities, hopes and dreams. PolicyWise and the C5 have been working together and developing new ways of knowing and working with data that serve communities and nonprofits.

How Data Can Inform the C5 Collaborative

The C5 collaborative desires to collectively address issues affecting the lives of their 30,000 clients. One ultimate goal is to provide one-door-access to services to improve client experience and outcomes. To achieve this goal, data integration between the organizations will increase knowledge about client needs, generate evidence to reveal how services complement each other, and identify the strengths of each agency and the C5 Hub.

Data is but one part of PolicyWise' iterative data-to-wisdom cycle[1,2,3] (Figure 1). ***Data*** are distinct pieces of information. Data may be expressed quantitatively such as in numbers, or qualitatively such as in words, images, sounds, or experiences. When data has been processed into a useable and organized form to describe a situation or condition, this meaningfully organized data is ***information***. When information has been derived from a range of sources that have been subjected to testing and is found to be credible, this information becomes ***evidence***. Sources of information can be, but are not limited to, research, experience, evaluation, information from the local context and environment, economics, and politics. ***Knowledge*** is derived from the practical use of evidence. Knowledge involves personal experience to interpret and apply the evidence. Finally, the ability to successfully apply knowledge to make strategic decisions is ***wisdom***. That is, the soundness of an action or decision with regard to the application of experience, knowledge, and good judgment.

Figure 1: Data-to-wisdom cycle, PolicyWise for Children & Families

[1] CHEO, KMb Toolkit http://www.kmbtoolkit.ca/what-is-kmb

[2] Bellinger, G., Castor, D., & Mills, A. (2004). Data, Information Knowledge, and Wisdom. Retrieved from the internet on March 5, 2018 from www.systems-thinking.org/dikw/dikw.htm.

[3] Ackoff, R. L. (1989). From data to wisdom. Journal of Applied Systems Analysis, 15: 3-9.

In the C5 Collaborative Data Linkage Project, data in the form of **anonymized client records** and activities was shared with PolicyWise from a number of programs from each of the C5 agencies with the aim of integrating data from across the C5 collaborative (Table 1). Linking data across agencies is a complex process and includes several steps. The first step is a thorough audit of the data and description of the quality of data collected by the organizations; second, is an assessment of the legal and ethical requirements needed to integrate data: and third, an exploration of the **linkage** of the same individuals across different agencies. In this last step, it is important that the **data quality** be high – especially information used for linkage including first and last name, and date of birth.

Table 1 - Selected programs shared by the C5 agencies

AGENCY	PROGRAMS & DESCRIPTIONS
Bent Arrow Traditional Healing Society	**Kahkiyaw** In partnership with Boyle Street and Edmonton & Area Child & Family Services Authority (CFSA) provides support for urban Aboriginal children, youth, and families through family wellness services.
	Pehonan Seniors/Elders program that offers support for social and community connections, and housing.
	White Cloud Headstart preschool program for children of Aboriginal ancestry.
	Aboriginal Parent Link Place for families seeking information and support on how to assist with their children's learning, development, and health. The Aboriginal Parent Link Centre is based on aboriginal values and culture, but is open to everyone.
	Healthy Families A home visitation program, which provides services to Aboriginal and non-aboriginal pregnant women and first-time parenting families.
BOYLEstreet COMMUNITY SERVICES	**Ubuntu**[a] This is a program focused on families and individuals living in poverty located in Northeast Edmonton that have active files with Region 6 Child and Family Services. (Families)
	Urban Counseling[a] Provides free therapeutic counselling, along with in-home counselling sessions to community members who have persistent mental illness or mental health issues and little or no income. (Community)
	H.E.R. H.E.R. aims to assist street involved pregnant women access health care and social resources.
	Family Program[a] Services for families and children from birth to school age and families who require assistance with children over the age of five, or those who have children in care and are seeking to regain custody of their children. (Families)

Table continued on next page »

[a] Candidate programs for linkage case study.

Table 1 - Selected programs shared by the C5 agencies cont.

AGENCY	PROGRAMS & DESCRIPTIONS
EMCN	**Settlement & Employment** Settlement provides the supports needed for successful settlement and integration into life in Canada. Employment provides support to meet career goals.
	LINC For permanent residents and protected persons. English classes funded by the Government of Canada at no cost to the learner.
Norwood Child and Family Resource Centre	**Early Start[a]** Provides a parent relief service and early childhood development programming for children birth to 6 years old. (Children)
	Head Start[a] A free school readiness program utilizing play-based activities focused on child development for children ages 3 to 5. (Children)
	Parent Relief[a] Provides parents with respite care for their children who are birth to 6 years old to provide social and health related support, respite from parenting, and child enrichment activities. (Families)
	Parent Link Parent Link Centre Groups and Services are offered in the Central and Northeast Communities for parents and children. Services include: parent education, developmental screenings, family support, early childhood development support.
	Relentless Connector This program works from a wraparound approach to support families. Focuses on community based services and existing support to meet the needs of the family.
terra centre	**Starting Point** First point of contact for all young moms and dads looking for support and information.
	Mental Health & Wellness Counselling services for parents and families at Terra.
	Services for Educational Achievement Provides individual counselling, support group, parenting education, referral and advocacy.
	Strengthening Hope Assess financial need and distribute funding for students attending Braemar to complete high school.
	Child and Family Support Centre Early Learning Centre for young parents completing their high school education.

[a] Candidate programs for linkage case study.

Whether linked or unlinked, data can inform the work of the C5 at several levels: the program level, the agency level, and at the collaborative level. Nonprofits use and benefit from data in many ways[4] (Figure 2).

Agencies may collect data at the program level to report back to funders, to manage service delivery, to evaluate the effectiveness of the program, and to better understand the needs of their clients, and in turn improve, and expand programming. At the agency level, data may be used to make a case for funding and for decisions about services and resources. Across the collaborative, data may be particularly helpful for strategic considerations about the collaborative and to influence policy makers and funders.

Figure 2: How data is used in Nonprofits (adapted from Data Orchard[5])

The aim of this project was to develop new ways of knowing and working with data to inform the C5 collaborative, and the nonprofit sector more generally.

This report is: a summary of the project activities, a synthesis of key parts of the data from across the five agencies, a discussion of strengths and opportunities within the data, and reflections on lessons learned.

[4] Zhang, Y. & Barbosa, P. G. (2018). SAGE Not-for-profit data capacity & needs assessment survey: Results report. Edmonton, AB: PolicyWise for Children & Families.

[5] Data Orchard. (2019, September). Data maturity framework for the not-for-profit sector. https://www.dataorchard.org.uk/what-is-data-maturity

Photo Credit: bentarrow.ca/

How to Use this Report

In this report we outline:

(a) the process of co-creating the C5 Collaborative Data Linkage Project,

(b) an inventory of the data agencies collected across the C5,

(c) assessment and description of data quality,

(d) exploration on linking of data across agencies, and

(e) lessons and considerations for future work to further inform data-informed activities within the C5.

Readers of this report may find it useful for:

Assessing data quality:
The quality of data among the C5 collaborative was assessed for each agency. Specific areas for discussion by agencies and across the C5 may include:

- » How to collect demographic and intake client data *(see p. 13)*
- » How to collect data about referral processes *(see p.17)*
- » How to manage data to count clients and record data about services *(see p.18)*

Developing a data story:
The power of data was explored to inform programs and practices within the C5 collaborative. Avenues for exploration illustrated include:

- » Conceptualizing the purpose, uses, and benefits of data *(see p.20)*
- » Using open-source data to complement geographic data *(see p.22)*
- » Measuring and assessing an outcome such as "Parenting" *(see p.25)*
- » Linking and integrating data between the C5 agencies *(see p.27)*

Reflecting on data strengths and opportunities:
The lessons learned, and strengths and opportunities learned throughout the project are summarized:

- » Key lesson #1 – Data is community *(see p.29)*
- » Key lesson #2 – Seek out your why? *(see p.30)*
- » Key lesson #3 – Engage with data continuously *(see p.30)*

In this report, the C5 agencies' data have been synthesized and considered from a particular perspective that has largely focused on assessing and preparing the current data for data integration. This particular lens is specific to a particular use of the data and does not capture all nuances of the work within programs and agencies. The journey of data-to-wisdom is a continuous and iterative one, and this report represents the results of some initial activities within the data and information cycles with the C5 data. Readers are encouraged throughout the report to bring their own experiences, and knowledge, to this report and reflect upon:

What surprises me as I read?

What makes sense and fits with what I already know?

How can I use this information with my team to improve data practices?

What will I continue to do, or do differently?

Photo Credit: emcn.ab.ca

Project Approach

PolicyWise uses a collaborative approach to project delivery that is designed to: engage stakeholders in meaningful, participatory ways throughout projects; create opportunities for creative problem solving; improve the quality of, and access to, information; and, increase the likelihood that the knowledge generated will be applied to create impact for stakeholders. Knowledge mobilization strategies are embedded throughout our projects.

Key Activities

The C5 Collaborative Data Linkage Project took place between November 2018 and June 2020 (Figure 3). A number of factors were integral to working together: the flexibility to adjust timelines, address the data-needs of the C5 agencies, learn how data is already used, and being mindful of the time required by agency staff.

Prioritizing activities focused on understanding what to ask of the data, which resulted in site visits, workshops, and in-depth conversations about each agency's data. Another set of activities focused on examining the quality of, and analyzing, the data. Knowledge sharing activities focused on reviewing and reflecting on the data to gain insights from the agencies, as well as producing a final report and facilitating a "Data Day" with staff from the C5 agencies.

Figure 3: Timeline of activities for the C5 Collaborative Data Linkage Project

Icons made by Vectors Market from **http://www.flaticon.com/**

Photo Credit: terracentre.ca

Throughout the project, stakeholders continually demonstrated how much they valued collaborating to improve and use data in novel and impactful ways. The project activities were designed to reinforce and build on elements of the positive data culture in the C5. Activities throughout the project entailed:

» **Identifying Priorities for Using Data.** Two cross-agency workshops with the C5 agencies were held to: (a) generate a list of priorities as to how data can inform new ways to improve service delivery and operations across agencies, and (b) facilitate discussions as a collaborative about data operations needs across agencies that may not be related to their "on the ground/service-related" priorities (see Appendices A and B).

» **Examining Data Quality with a Data Audit.** After agencies shared their data in accordance with safe file transfer practices stated in the data stewardship agreement, this enabled PolicyWise to audit, or thoroughly review, the data and analyze anonymized data from each agency. The review paid close attention to key indicators for linkage, such as demographics, program outcomes, and referrals.

» **Reviewing Data Quality within Agencies.** PolicyWise documented the strengths and opportunities with data for each agency and reviewed the results with agency staff to further contextualize, verify, and explain the findings from the data audit and analysis (see Appendices C and D). These meetings also helped confirm existing hunches about data and reveal novel findings about the data.

» **Engaging C5 Staff on Project Learnings.** Both a final report (this document) and a C5 Data Day were designed to facilitate discussions. Discussion topics included data quality, insights gained from the project, future directions, and ways to create buy-in for collecting high quality data to use in innovative ways to serve the community going forward.

Key takeaways from these activities revealed:

★ **Time and capacity for data entry limits what can be captured about service delivery.** What an agency documents is not always the same as what happens in practice. As well, time is a factor for digitizing data, especially for case notes. The workshops and conversations with agencies were the sources of these learnings.

★ **Data audits can be used as a tool to discuss data practices within the organization.** The agencies found the information from the data audits useful to discuss with their staff about ways to ensure completeness of data, such as making certain fields required to enter within a form. The review of agency data with staff was the source of these learnings.

★ **The C5 collaborative can build off of the questionnaires that agencies use individually.** For the agencies, all questions on intake serve their needs for reporting and determining the appropriate programs for clients. When examining all of the intake forms collectively, these distinctions were more apparent and sparked conversations about what could be unified across the C5 collaborative, an important step towards unified data for reporting and grant applications. The data audit and analyses were the source of these learnings.

★ **Growth mindsets[6] and leadership support promote data skills!** When staff are encouraged within their agencies to see their skills as always developing rather than fixed, then leadership can help support their ongoing learning by offering solutions such as training in computer literacy, quality checking, and practicing vigilance in recording information during client interactions. The project final report and data day are designed to build on these messages.

[6] Dweck, C. (2006). Mindset: The new psychology of success. Ballantine Books, New York: NY.

Assessing Data Quality

For each agency, PolicyWise undertook a detailed audit of the data that was shared with PolicyWise for the C5 Collaborative Data Linkage Project. The results of each agency's detailed data audit were compiled into an agency-specific Data Profile summarizing the quality of each agency's demographic, referral, service date, and program data. The Data Profile is a useful tool for evaluating **data quality**, exploring and identifying which data is appropriate for analysis including data linkage, and for communicating about data within, and across, agencies.

To prepare each agency's Data Profile, the following steps were taken:

Data Auditing Methods

STEP 1

DATA CLEANING AND VALIDATION

First, the data are examined to see whether the data file has been set up correctly with headers and field formats. In these processes, the data are assessed and issues are identified and resolved. For example, with the C5 data we made sure column names reflected what should be in the data, e.g., columns with dates contained dates, columns with program names contained program names, etc. Columns would sometimes need to be shifted to ensure it reflected the column header. With respect to field formats dates were sometimes stored in a variety of ways. For example, birthdates could be stored as year-month-day and day-month-year within the same data set. In these cases values were extracted and standardized within the entire column. The result of these processes is a dataset that most accurately reflects the information collected about the individuals in that dataset and is referred to as a **masterfile**.

STEP 2

GATHER ALL CLIENT IDS WITHIN AN AGENCY'S DATA

To ensure all unique clients are represented within an agency's dataset a full list of **client IDs** is assembled by scanning all client ID fields from all files. Sometimes an agency might store all of their clients' records in a single demographic file. When this happens there is typically no need to worry about there being multiple records for the same client. Other times, an agency may have multiple files and clients recorded across those several (or more) files. In those cases it is essential to resolve multiple instances of the same client into a single record.
This process is called deduplication.

STEP 3

DEDUPLICATION OF EACH AGENCY'S DATA

Deduplication is the process of removing duplicate or redundant information from a dataset. It also entails resolving any conflicting information about a client. For some agencies, clients' demographic information appeared in multiple records. Every instance of demographic information for clients was gathered. These demographic records could contain multiple dates of birth, addresses, and other demographic information for a single client. Steps were taken to resolve and identify the most likely values for each client (see **within-field consolidation**).
These responses were collated and deduplicated accordingly to become the masterfile for each agency's demographic data.

STEP 4

ANALYSIS

Frequencies and percentages were generated for all demographic data within each agency's master data files. These values became the basis for the data profiles and understanding each agency's client base. **Completeness** or **percent missing** were also calculated and discussed in the data profiles. Referral and program data were also enumerated for each client. Because program data often contain **event-based data**, the nature of each event (e.g., survey, sign in, assessment, attendance, etc.) needed to be accounted for at the client level. With event-based data, it is possible to better understand the programs, referrals, and services each client may have had contact with.

STEP 5

AUDITING THE PROCESSES AND ANALYSES

All of the preceding steps were performed independently by two different analysts. All results were compared to identify differences. Any number that was different, even by a value of 1, was investigated to find the source of the discrepancy. An action plan was made and data was reanalyzed to rectify these differences. This process continued until all values were agreed upon by both analysts.

Each of the C5 agencies received an agency-specific data profile as part of the project. Highlights and synthesized insights from across the agencies are presented next.

Demographic Data

Demographic data collected in social serving agencies typically includes descriptive information about individual clients. These pieces of information are essential to knowing who an agency is helping to serve, and can reveal who may be underserved or not accessing services. To best understand who is being served requires robust, comparable, demographic data to measure and improve equity and impact of services.

Demographic data such as gender, date of birth, and citizenship status, were captured across the agencies (Table 2). Each agency differed in the number of demographic fields provided to PolicyWise. A green '✔' indicates that the agency collects the data. A grey '✖' indicates that the agency does not collect the data. A blue '✱' indicates that the agency collects the data but it was not shared with PolicyWise for this project.

Table 2 shows the variability in the kinds of demographic information that each agency collected. Table 2 demonstrates that when agencies are trying to collaborate to better serve their clients and communities, there can be challenges in harmonizing or reconciling data when different demographic information is collected. Table 2 also includes a measure of completeness of the demographic information collected. The most complete fields were gender and date of birth. For other demographic characteristics, there was a wide range in how much data was missing[7]. Monitoring the completeness of demographic data is important for keeping tabs on the quality of data being collected and having a sense for how representative the data is for reporting.

Table 2 - All agencies collect at least gender, date of birth, postal code, ethnicity, and citizenship status

DEMOGRAPHIC FIELD	BENT ARROW *(% missing)*	BOYLE *(% missing)*	EMCN *(% missing)*	NORWOOD *(% missing)*	TERRA *(% missing)*
Gender	✔ (0%)	✔ (16%)	✔ (0%)	✔ (3%)	✔ (0%)
Date of Birth	✔ (0%)	✔ (6%)	✔ (4%)	✔ (2%)	✔ (31%)
Postal Code	✔ (62%)	✔ (76%)	✔ (47%)	✔ (3%)	✔ (41%)
Ethnicity	✔ (22%)	✔ (32%)	✱ (-)	✔ (8%)	✔ (21%)
Citizenship Status	✖ (-)	✔ (52%)	✱ (-)	✔ (8%)	✔ (21%)
Marital Status	✔ (41%)	✖ (-)	✱ (-)	✔ (8%)	✱ (-)
Primary Language Spoken	✖ (-)	✖ (-)	✱ (-)	✔ (8%)	✱ (-)

Another aspect to consider as part of collaborative data work is how easy it is to harmonize or collapse across demographic fields across different agencies. The demographic fields of ethnicity, and gender had the most variable fields across the five agencies. For example, Table 3 shows the different values that were collected for gender; Table 4 shows the different values collected for ethnicity. The wide variability in how demographic characteristics are collected is important because it makes data harmonization and meaning making across agencies more challenging.

[7] No data quality standards were found specific to the community nonprofit setting. However, the National Data Quality Standard, a common standard in the healthcare sector, suggests the maximum percent missing for critical data elements is between 2-3%. Source: National Program of Cancer Registries (July, 2018). National data quality standard. Retrieved from: **https://www.cdc.gov/cancer/npcr/standards.htm**

Table 3 - Gender is consistently collected across agencies but there is variability in how it is collected

GENDER FIELD	BENT ARROW	BOYLE	EMCN	NORWOOD	TERRA
Female	✔	✔	✔	✔	✔
Male	✔	✔	✔	✔	✔
Transgender	✖	✔	✖	✖	✖
Non-binary	✖	✔	✖	✖	✖
Prefer not to disclose	✖	✔	✖	✖	✖
Other	✖	✖	✔	✖	✖

Table 4 - Agencies collect information on race/ethnicity in varied ways

CATEGORY[8]	RACE/ETHNICITY	BENT ARROW	BOYLE	EMCN[b]	NORWOOD	TERRA
African origins	African	✖	✖	✖	✔	✔
Caribbean origins	Caribbean Descent	✖	✖	✖	✖	✔
Asian origins	Asian	✖	✖	✖	✔	✔
	East Asian Descent	✖	✖	✖	✖	✔
	East Indian	✖	✖	✖	✔	✖
	Middle Eastern	✖	✖	✖	✔	✖
European origins	European	✖	✖	✖	✔	✔
	Spanish Descent	✖	✖	✖	✖	✔
Latin, Central, and South American origins	Central/Latin/South American	✖	✖	✖	✔	✔
Other North American origins	English Canadian	✖	✖	✖	✔	✖
	English/French Canadian	✖	✖	✖	✖	✔
	French Canadian	✖	✖	✖	✔	✖
North American Aboriginal origins	First Nation	✖	✖	✖	✔	✔
	First Nations–non-status	✔	✖	✖	✖	✖
	First Nations	✔	✖	✖	✖	✖
	Indigenous	✖	✔	✖	✖	✖
	Inuit	✔	✖	✖	✔	✖
	Metis	✔	✖	✖	✔	✔
Other categories	Non Aboriginal	✔	✖	✖	✖	✖
	Non-Aboriginal – Immigrant or Refugee	✔	✖	✖	✖	✖
	Person of Colour	✖	✔	✖	✖	✖
	White	✖	✔	✖	✖	✖
	Other	✖	✖	✖	✔	✖
Unknown	Unknown	✖	✖	✖	✖	✔

[b] *EMCN collects "Last Country of Residence" upon intake.*

[8] *Statistics Canada (2017). List of ethnic origins 2016. Last updated October 10, 2017. Retrieved from:* **https://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=402936**

Referrals and Date Data

Event-based data collected in social serving agencies may include referral and service-date data. Referral data can include where and how clients are referred. The service dates indicate when they attended various services (see Figure 4). These dates can shed light on how clients flow within and across agencies. The referral data was of interest for the project as it can be used as one way to demonstrate the connectivity of the agencies and inform whether and how clients navigate across services. Referral data can also be used to gain some insight into parts of a client's journey particularly around how long clients stay at the agency and for what services, and the order in which they access services. Definitions of the referral and date information can be found in the **glossary of terms**.

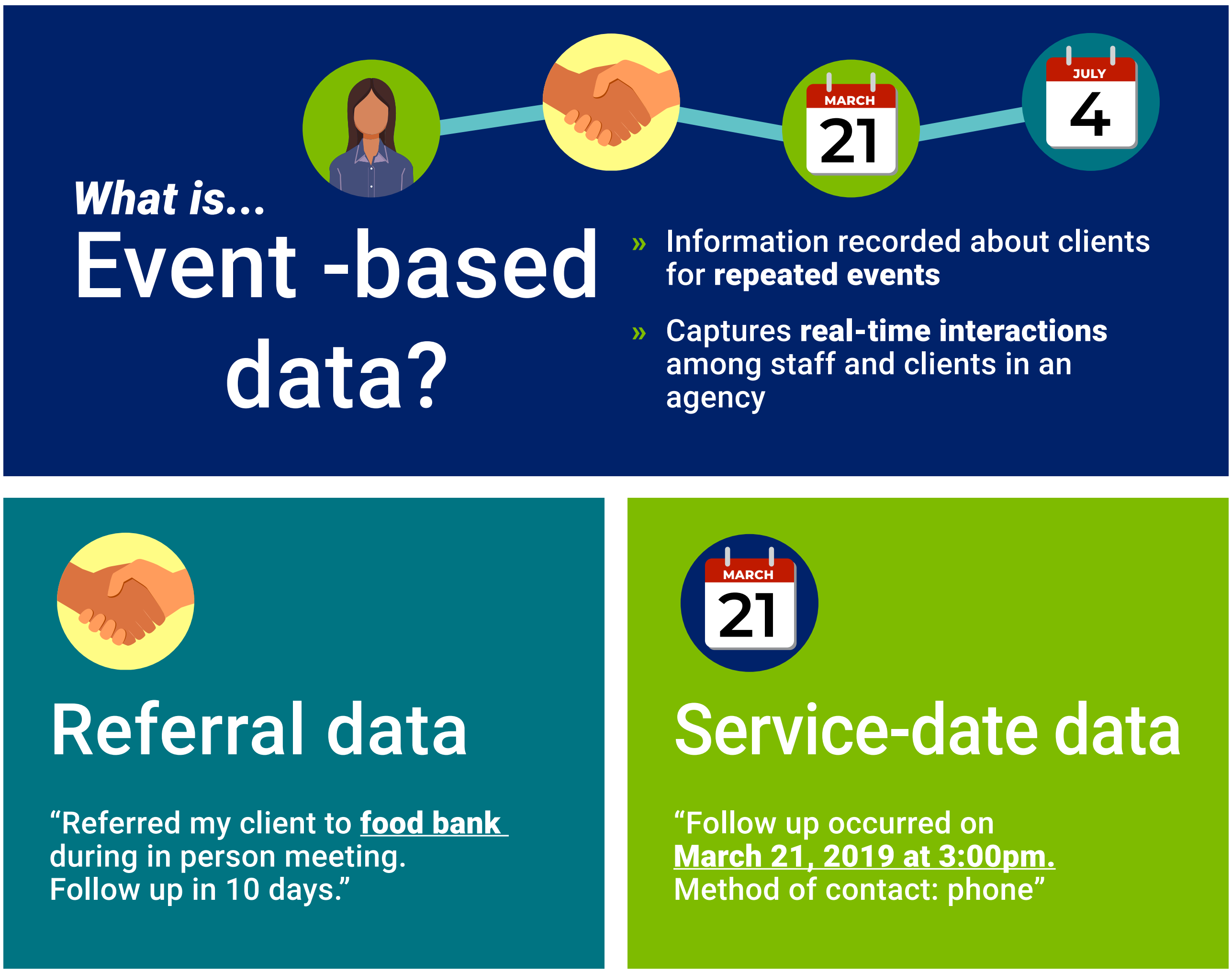


Figure 4: Event-based data includes referral data and service-date data

Photo Credit: bentarrow.ca

Referrals and date data were captured in different forms (e.g., case notes, date fields) across the agencies (Table 5). Each agency differed in the number of fields related to referrals that were provided to PolicyWise. A green '✔' indicates that the agency collects the data. A grey 'T', for 'text', indicates that the agency collects the data but it could not be shared because it is stored in open text fields or in case notes. Table 5 shows that when agencies are trying to track their clients' journeys across different programs and agencies, there can be challenges in harmonizing or reconciling data when the data is difficult to summarize and use easily. If understanding client journeys and referrals as important, it will be important to take a similar approach to capturing this information across programs and agencies.

Table 5 - All agencies collect at least some data on referrals and dates but record it differently

	FIELD	BENT ARROW	BOYLE	EMCN	NORWOOD	TERRA
REFERRAL FIELDS	Incoming Referrals	✔	✔	✔	✔	✔
	Outgoing Referrals	T	✔	T	✔	T
DATE FIELDS	Agency Start Date	✔	T	✔	T	✔
	Program Start Date	T	T	T	✔	✔
	Touchpoint Date	T	✔	T	T	✔
	Survey Date	✔	T	✔	✔	T
	Referral Date	T	T	T	✔	✔
	Program End Date	T	T	T	✔	✔
	Agency End Date	✔	T	T	T	✔

Counting Clients and Their Activities

Client numbers are reported by social serving agencies in reports to funders and the broader community to summarize how many individuals use services. How client numbers are reported can vary. For example, sometimes these numbers may reflect only unique clients that accessed services within a given time frame (i.e., everyone is counted once), or they may represent events about clients participating in services multiple times (i.e., everyone's activities are counted, such as one client visiting four times). These two types of numbers unique vs. events tell different stories about an agency and its services.

In practice, if one was interested in linking clients across different social serving agencies, then one would require unique client IDs as a first step, to determine the total number of clients at the agency overall. To know how clients interact with multiple programs in a given amount of time, then one would require the events that they participated in, which are typically stored as event-based data (Figure 4).

To make use of the different ways agencies count clients and their activities it is important to set up the database that records this information. The data in the agencies were all set up to record clients and events, but sometimes it was necessary to combine or manipulate data files to distinguish between clients and their activities. For some agencies, client IDs were contained within a single demographic file. Other agencies had client IDs and their corresponding demographic information spread across multiple files.

Important considerations when creating a database to record clients and their activities:

Storing unique client IDs

- Each person gets one unique client ID. That ID must not be assigned to other clients!
- Client IDs must link to all other events (see below).

Storing event-based data

- Assign an ID to each event data point e.g., health clinic visit is Clinic Visits ID = 1
- Each event must have a date, with consistent formatting across all programs (e.g., dd/mm/yyyy).
- Link each date and event back to client ID.

Storing referral data

- Assign an ID to each unique referral type e.g., "Food Bank" gets an ID of 30.
- Store these IDs so that all staff can access them.
- Each referral must have a date.
- Link each referral back to client ID.

Figure 5: Database setup tips for recording clients and their activities

Finally, to ensure consistency in recording clients and their events, **only store open text data if absolutely necessary, such as for case notes. Otherwise, create pick lists or other forced-choice fields.**

Developing a Data Story

In an ideal world, organizations that collaborate, such as the C5 collaborative, would be most efficient and have the most impact if their use of data surrounding culture, practices, information, and wisdom were seamlessly shared. However, even organizations that have time-sensitive needs for data (e.g., government ministries) do not have seamless data sharing practices[9].

In this section, we delve into and explore some of the ways that data can be used to inform programs and practices within the C5. Four different avenues for exploring and leveraging C5 data are considered:

» **Conceptualizing the uses and benefits of data**
(see Extracting Value from Data)

» **Using postal code and open-source data**
(see Postal Code Data)

» **Measuring and assessing an outcome such as "Parenting"**
(see Parenting Concept Map)

» **Linking and integrating data between agencies**
(see Linkage Case Study)

Extracting Value from Data

Data needs to be used collaboratively and strategically to create impact; therefore producing high-quality data is only part of the process. How and why agencies leverage their data to generate evidence, knowledge, and wisdom to tell their stories is equally important. Stories about data can fulfill many different needs (Table 6[10]).

Data is currently used in many ways across the C5 agencies but we also heard examples of other ways agencies would like to use their data (Table 6). Understanding why data are being collected is an essential step in ensuring that the right data is collected at the right time on the right people.

From Table 6, it is clear that the agencies are using and benefitting from data in multiple ways. There are also opportunities to extract even more value from data, if it fits the strategic priorities of the collaborative and agencies.

[9] Knowledge Exchange. (2014). Sowing the seed: Incentives and motivations for sharing research data, a researcher's perspective. Retrieved from: **https://www.knowledge-exchange.info/projects/project/research-data/sowing-the-seed**
[10] Data Orchard. (2019, September). Data maturity framework for the not-for-profit sector. **https://www.dataorchard.org.uk/what-is-data-maturity**

Table 6 - How the C5 agencies use data and how they want to use data

DATA USES	HOW DATA IS USED BY C5 AGENCIES	HOW DATA COULD BE USED
Legal Contract Funder Reports	» Reporting to funders	» To produce reports that go beyond what is asked, telling a more accurate story about the agency and how it serves a community
Recording Activities with Clients	» Following up with clients after their visits	» Centralizing intake forms » Extracting text-data from case notes to categorize clients' needs
Predicting Client Needs & Services	» Reviewing evaluations and using this information to apply for future services	» To know more specifically and predict: which services impact clients, how they impact clients, and who it impacts most
Measuring Outcomes and Impact	» Evaluation, funder-driven	» Evaluation, client- and issues-driven
Learning and Evaluating	» As part of performance appraisal of staff which are embedded in monthly supervision meetings	» Learning from implementation differences within programs (e.g., efforts to increase attendance, counting clients)
Improving Efficiencies, Services and Resources	» Program development	» To coordinate referrals within the C5 collaborative » Knowing where services overlap/do not overlap
Raising Funding & Revenue	» Promotion, marketing	» To engage with funders and donors in more specific data-driven asks and outcomes » To advocate for more capacity to "do data"
Strategy and Planning	» As part of understanding community connections and identifying where to nurture strategic partnerships » For mapping out where clients live to facilitate future program development	» Planning out services for clients based on need rather than a one size fits all approach » Further understanding how to help clients connect to their community
Influencing Policy makers, Funders and partners	» Applying for grants that serve needs that are common to the C5 agencies, such as the family and child services	» Applying for grants that serve data integration to argue for certain models of care; systematically documenting successes of the collaborative

Data Use Cases

Three specific examples of using the C5 collaborative data are demonstrated and discussed next:

Using postal code and open-source data

Measuring and assessing an outcome such as "Parenting"

Linking and integrating data between agencies

Postal Code Data

Postal code data can inform agencies on the geographic spread of their services and as well as help plan for service delivery. For example, some questions that may be answered by mapping postal code data:

- From which areas or neighbourhoods are most clients coming?
- Is there a significant distance between where clients live and the agency?
- What areas could service delivery expand to? What areas may require more focused efforts or appear to be underserved based on what we already know?
- What other services are available in the area for potential collaboration?

Postal code data can also help track the geographic impact of their services and encourage increased funding from sponsors. For example, an agency can showcase their impact through indicators of improved well-being in areas where their services are provided while demonstrating the need to expand services to other areas in need.

Postal codes can be visualized using heat maps and animated time-series maps for showing changes over time. For example, the Ubuntu program was mapped using a heat map in Figure 6. The map was developed by using the first three characters of postal code, such as T5A, known as the forward sortation area[11]. The postal codes for Ubuntu were used to calculate the number of unique clients within a particular forward sortation area divided by the total number of valid postal codes in the program resulting in the percent of postal codes used to create Figure 6. The calculated percentages for postal codes for each forward sortation area were then mapped using boundaries defined by Statistics Canada's 2016 Boundary File for Forward Sortation Areas[12]. Valid postal codes were defined as having complete first three characters with correct formatting (e.g., T#A) and resided in Alberta (i.e. started with T). Invalid postal codes are those with incorrect formatting (e.g., AB, 587, T56, ABT), are incomplete (e.g., T5) and outside Alberta. These invalid postal codes were excluded from calculating the percent of valid postal codes. The total number of unique client IDs in the Ubuntu program was 2,091. Of those, 19% (n=401) had a valid Alberta postal code, 81% (n=1,689) had missing postal code, and <1% had an invalid postal code.

[11] Statistics Canada (2016). Dictionary, census of population, 2016. Last updated January 1, 2019. Retrieved from: **https://www12.statcan.gc.ca/census-recensement/2016/ref/dict/geo036-eng.cfm**

[12] Statistics Canada (2016). 2016 Census - Boundary files. Last updated November 13, 2019. Retrieved from: **https://www12.statcan.gc.ca/census-recensement/2011/geo/bound-limit/bound-limit-2016-eng.cfm**

Based on the distribution of percent postal codes, the map's colour gradient increased by increments of two percent. Percentages outside this distribution (e.g., 15%, 18% and 36% in Boyle's Ubuntu map below) were individually displayed.

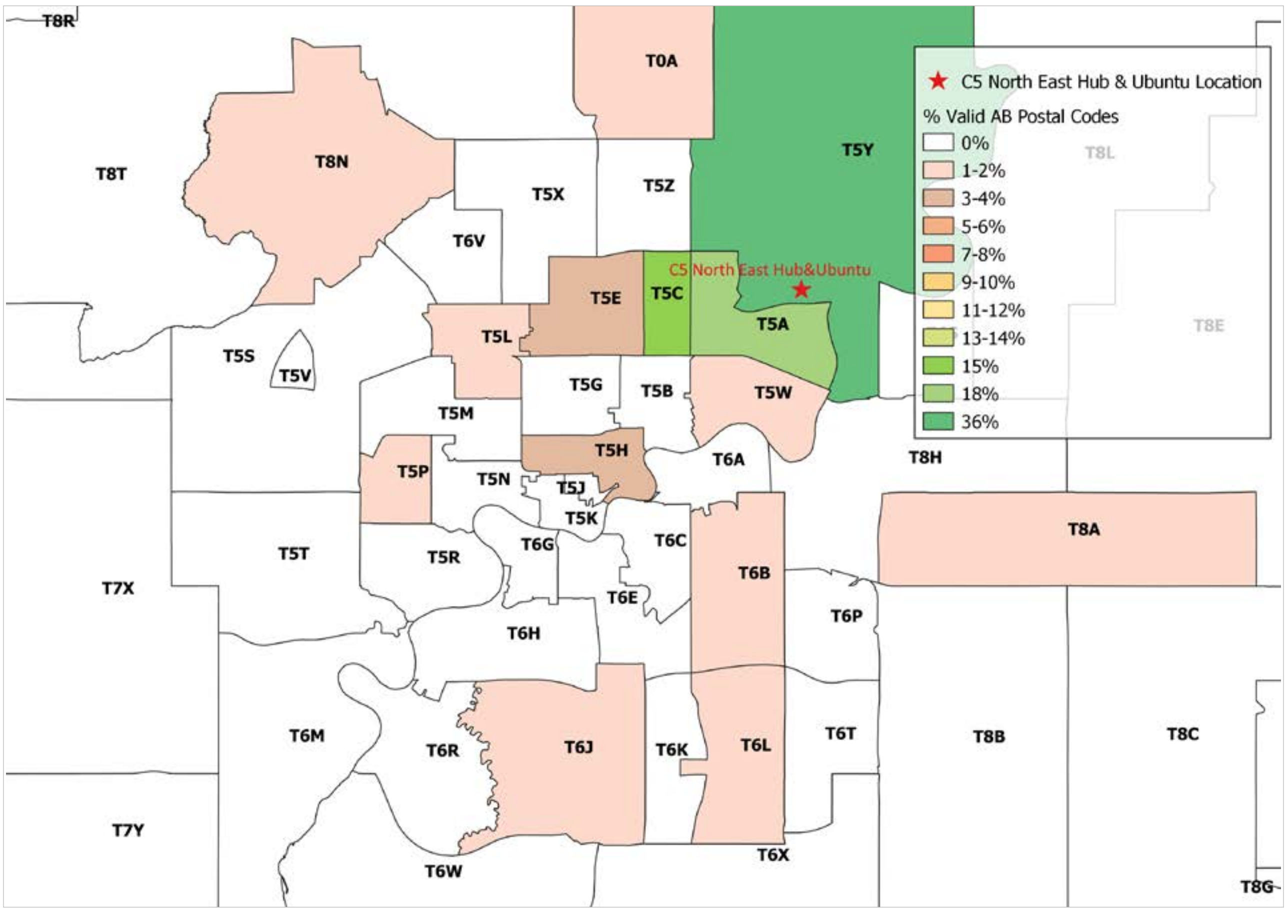


Figure 6: Geographical representation of Ubuntu clients by FSA.
Note: This map represents 19% (401) of the total postal codes available (2,091). Only valid postal codes were included.

What this map tells us: Most clients reside in the North East area as Ubuntu serves this region of Edmonton. Note that this data reflects a client's neighbourhood information at one time point and does not reflect changes over time. For example, this data does not reflect a client's mobility within an area nor does it account for the overall neighbourhood population.

Open-Source Data

Open data can complement the use of postal code data; all that is needed is a geographic area field to link the data. Some examples of open data available are: Alberta Environmental Public Health Information Network (AEPHIN), Alberta's Interactive Health Data Application (IHDA), and the City of Edmonton's Open Data.

Open data can typically be accessed through a website that the user is able to explore and view various dashboards on. For example, Figure 7 is a screenshot from the website **http://aephin.alberta.ca/risk/** and is an example of a neighbourhood profile[13] for an area, Eastwood.

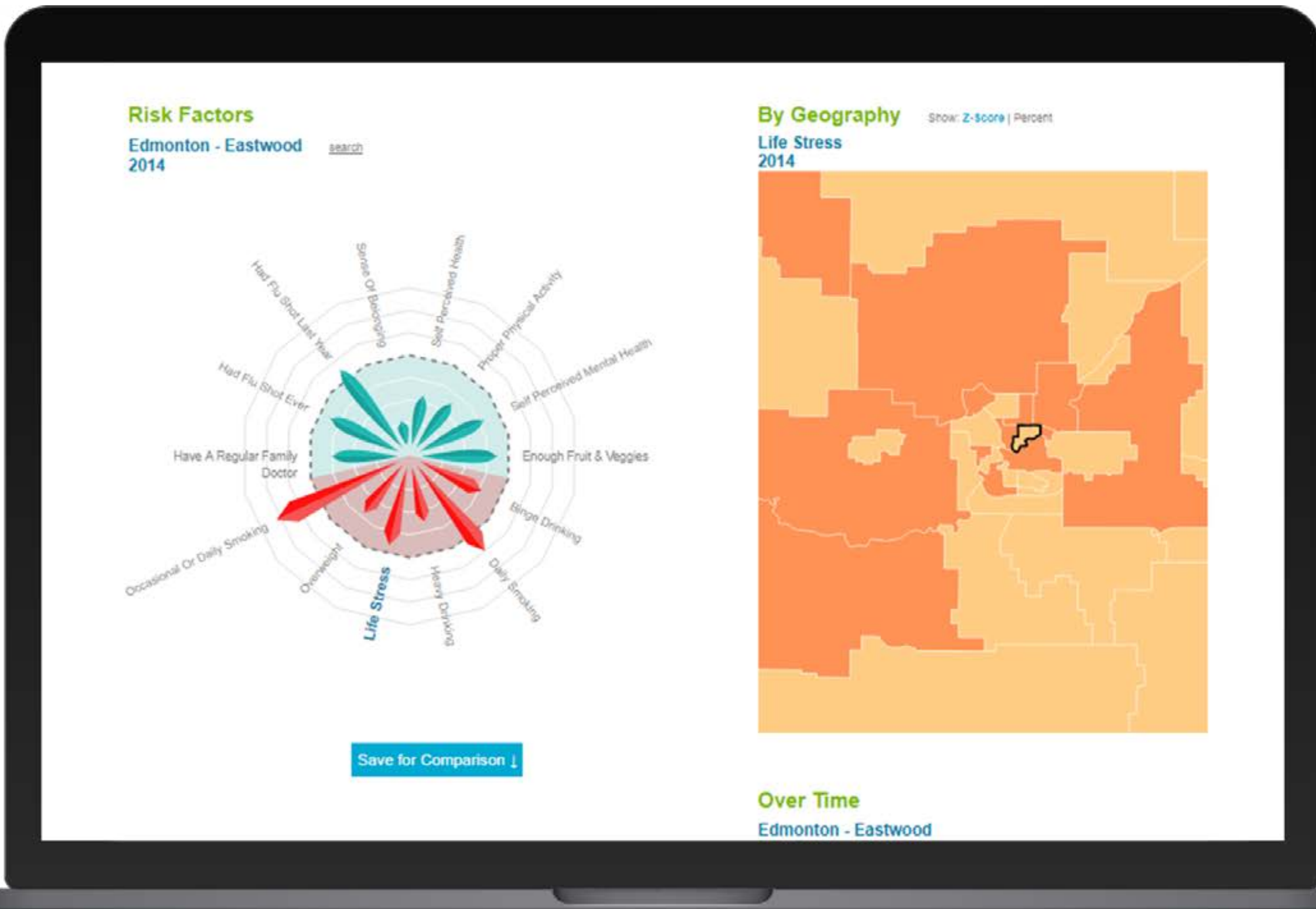


Figure 7: Geographical representation of life stress in Eastwood compared to other areas in Edmonton in 2014.
Note: Life stress is considered "the proportion of the population reporting life stress as extremely or quite a bit stressful. Data was collected as part of the Canadian Community Health Survey (2003-2014)[14]. The tool uses Local Geographic Areas[15] to compare neighbourhoods across Alberta.

What this map tells us: The average proportion of the Eastwood population who self-reported life stress as 'extremely or quite a bit stressful' is similar to the Alberta average (21% and 22%, respectively). The trend over time in this neighbourhood showed that the local average reached its highest in 2012 (23%) and then decreased by 3% from 2013 onwards.

Combining open data with postal code data allows agencies to understand how their services impacts neighbourhoods beyond their individual clientele. Open data allows agencies to learn what targets or indicators they should focus their programming on, and where programs may be most beneficial. For instance, using open-data sources like AEPHIN, may inform an agency's program planning wherein they may see the need to add elements to program to reduce risk factors (e.g., life stress) while strengthening protective factors (e.g., sense of belonging). When temporal data are available, the agency may even be able to gain a better sense of whether their program might have helped shaped what happened before and after a program was implemented in a neighbourhood. Moreover, when combined, open data and postal code data can help agencies determine whether their clients have accessible transportation (e.g., bus stops, train stations, walking/cycling paths) from their neighbourhood to the agency's location or whether there are readily available resources for children and families (e.g., daycares, parks, libraries).

[13] Alberta Health. (2015) AEPHIN Public health risk factors. Retrieved from: **http://aephin.alberta.ca/risk/?cf=life stress&rt=bad&gc=Z4.2.C.03&crit=standardScoreArray&year=2014**

[14] Statistics Canada. (2019). Canadian Community Health Survey: Public Use Microdata File. Last updated: March 24, 2020. Retrieved from: **https://www150.statcan.gc.ca/n1/en/catalogue/82M0013X.**

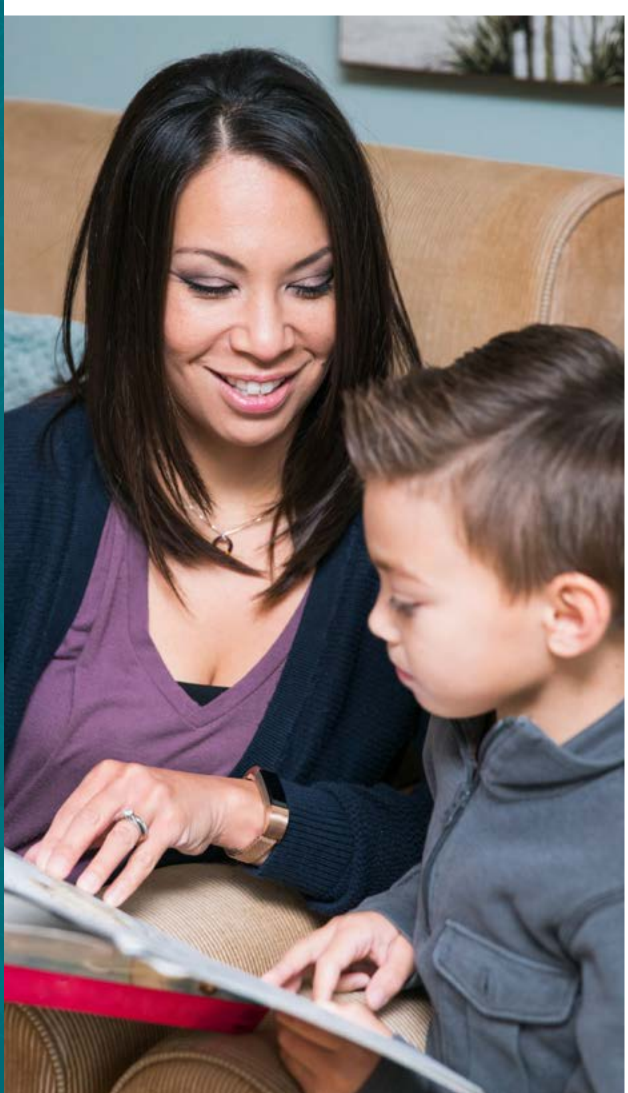
[15] Alberta Health Services. (2018). Local geographic area boundaries Alberta Health. Retrieved from: **https://open.alberta.ca/opendata/a4117ba9-6d05-49c0-a455-70a6ddfc5c26**

Parenting Data Concept Map

Concept maps are used in both quantitative and qualitative research to visually represent information regarding an outcome or concept (e.g., parenting skills) and its internal structures or items (e.g., questions such as, *"Are you able to manage the needs of your child better?"*)[16,17]. The information in a concept map can be developed based on preexisting theories or frameworks of parenting, or using a bottom-up approach and based on data that is collected through surveys or interviews.

The concept map in Figure 8 was created for the C5 agencies using a bottom-up approach to represent the data currently collected through programs that offer parenting support. Parenting support programs are those that help build skills and increase knowledge to increase parents' confidence and support their children's development[18]. The parenting concept map addresses the agencies' curiosity about how coordinated their services are in terms of the data they collect on parenting.

All of the agencies (represented by their logos) offer support for parents through programming (represented by the dark gray boxes). The questions on the surveys were grouped according to the need that is being addressed within the programming, such as parenting skills, knowledge of child development, and parent efficacy (represented by the coloured bars). Each question on the survey was coded according to these three categories (see Appendix F for all questions included). For example, to code survey items for parenting skills, words like "strategies" and behaviours related to attending to children's needs were used. The parenting skills questions alone could be used for planning surveys to be timed after concepts or skills are taught within programs. This way, it would allow parents to answer questions related to their most recent activities rather than answering on different activities at the end of a program. As well, programs can complement each other in terms of skills building by separating out concepts across programs.



Concept maps are useful for:

1) Understanding and predicting client needs.

Evaluation often requires tools such as surveys to understand the needs and benefits of programs for clients. A concept map can help frame and plan an evaluation to ensure that the survey questions are addressing the goals of the evaluation. It also reduces the amount of data needed. Instead of using three different surveys for an evaluation, existing research can be used to inform the connections and concepts to design one robust survey or interview.

2) Measuring outcomes and impact.

One benefit of a concept map is that it be tested for its effectiveness to measure an outcome. This would be beneficial for any type of reporting to funders or applications to grants. Using advanced statistical analysis, the relationship between a concept and its respective items could be explored and tested. For example, for parenting efficacy, if there were three items that were selected to represent parenting efficacy, an analysis could determine how much each item contributes to the overall concept of parenting efficacy. If all items meet a certain threshold, then this increases the likelihood that the items are useful for measuring parenting efficacy. If some items do not meet the threshold criteria, then it is possible that they may be connected to other concepts as well. Finally, if just one item meets the threshold, then it could be that item is not an item, but a concept itself. Knowing how well these items measure a concept could help streamline measurement and analysis of outcomes.

The take home message is that when planning evaluations using concept maps, it is important to "get it right" or at least try to do this the first time as best as possible because the concepts and items selected can be used in multiple ways within the agency and for collaborations with other agencies.

[16] Wheeldon, J. & Ahlberg, M. (2013) Mind maps in qualitative research. Handbook of research methods in social sciences. Pp 1113 – 1129.

[17] Byrne, B. M. (2005) Factor analytic models: Viewing the structure of an assessment instrument from three perspectives. Journal of Personality Assessments, 85(1), 17-32. **https://doi.org/10.1207/s15327752jpa8501_02**

[18] Norwood Child and Family Resource Centre. (2018). Family support and parent education. Retrieved from: **https://www.norwoodcentre.com/parent-family-education**

Parenting Efficacy:
Confidence in ability to raise children, persistence in spite of obstacles.

Knowledge of Child Development (CD):
Awareness and understanding of aspects of young children's development, e.g., numeracy, language, social, emotional, physical development.

Parenting Skills:
Behaviours that assist in attending to children's needs, managing behaviour, and resolving conflict.

Agency	Program	Questions Asked: Parenting Efficacy	Questions Asked: Knowledge of CD	Questions Asked: Parenting Skills
Norwood Child and Family Resource Centre	Parent Link (n=920)	2	6	9
	Relentless Connector (n=246)	2	6	9
	Head Start (n=4608)	2	6	9
	Early Start (n=307)	2	6	0
	Healthy Families (n=321)	2	6	9
	Parent Relief (n=653)	2	6	9
terra centre	Child & Family Support Centre (n=100)	2	8	3
	Healthy Families (n=56)	2	8	3
	Services for Young Dads (n = 31)	2	8	3
BOYLE street COMMUNITY SERVICES	Family Program (n=334)	3	3	4
	Ubuntu (n=2091)	0	0	1
Bent Arrow Traditional Healing Society	Whitecloud (n=70)	0	4	4
	Healthy Families (n=98)	1	3	2
	APLC (n=83)	0	3	2

Figure 8: Parenting concept map based on C5 agencies' data.
Note: Survey questions from EMCN were not shared and are not represented in the concept map.

Linkage Case Study

A key goal for the C5 Collaborative Data Linkage Project was to link data so that participant journeys could be used to inform how the C5 agencies are integrated in the social support pathway. This type of linkage, especially doing so anonymously, requires highly structured and clean data. Through audit and analysis of the agency data, it was found that this type of linkage could not be conducted across the entire service population of all agencies due to variation of data quality across programs and agencies.

A targeted approach was adopted as a case-study for data linkage. Programs were analyzed as to the completeness and quality of necessary identifiers and likelihood of linkage to focus the analyses. Only programs with enough data anonymized to support linkage (at least 100 unique clients with complete first name, last name, and date of birth), and with overlapping eligibility were considered for the case-study linkage. As a result the case-study linkage focused on the Family Program (Boyle Street), Ubuntu (Boyle Street), Early Start (Norwood), Head Start (Norwood), and Parent Relief Services (Norwood). Within these programs, only the subset of data with necessary identifiers (first name, last name, and birthdate)[19] was used for linkage. It is possible that the presence of identifiers is related to specific client profiles, such as those with stable residences. Therefore, there is a limit to what interpretations can be made with this case-study linkage.

A matrix of linkage rates (Table 7) is shown below between the five programs. This matrix displays the linkage percentages for all possible combinations. Reciprocal linkage rates are displayed to express how many people are linked as a percentage of either program. In this case-study, the highest linkage was observed between the Early Start and Parent Relief Services. Of the 394 clients in Early Start, 73%, or 287, were also clients of Parent Relief Services. Reciprocally, of the 647 clients in Parent Relief Services, those same 287 clients in Early Start represented 44% linkage.

[19] While we could assess the presence of identifiers, we did not have the identifiers to protect client **privacy**.

Table 7 - Matrix of linkage rates between two programs from Boyle and Norwood

PROGRAM LINKING FROM		PROGRAM LINKING TO: Boyle Street – 1. Ubuntu	Boyle Street – 2. Family Program	Norwood – 3. Early Start	Norwood – 4. Head Start	Norwood – 5. Parent Relief Services
Boyle Street	1. Ubuntu	•	0.67% (14/2084)	**0.91% (19/2084)**	**-**	**1.6% (34/2084)**
Boyle Street	2. Family Program	5.5% (14/254)	•	**-**	**-**	**6.7% (17/254)**
Norwood	3. Early Start	**4.8% (19 /394)**	**-**	•	22.6% (89/394)	72.8% (287/394)
Norwood	4. Head Start	**-**	**-**	20.9% (89/426)	•	28.2% (120/426)
Norwood	5. Parent Relief Services	**5.3% (34/645)**	**2.6% (17/645)**	44.5% (287/645)	18.7% (120/645)	•

	1. Ubuntu	2. Family Program	3. Early Start	4. Head Start	5. Parent Relief Services
Total Non-Linked Clients	2032	221	74	271	269
Total Linked Clients	**52**	**33**	**320**	**155**	**376**
Total Clients in Sample	**2084**	**254**	**394**	**426**	**645**

Overall, results indicate the level of flow between programs. As expected, programs within an agency (Norwood) shared more clients than program between agencies. However, the same was not observed between the Boyle Street programs. This may be due to the overall larger population of Boyle Street clients, but caution must be used in interpretation, as this case-study could only leverage a subset of data.

The key learning from this case-study is the potential for such linkage. With more comprehensive data from more programs consistently collected over time a more complete picture of client experience through the social service pathways can be constructed. An example of this was a linkage between Government of Alberta programs as part of the Child and Youth Data Laboratory[20]. With such linkage, there is a potential to have quantitative evidence to support a story of how clients transition from one program to another over time, how agencies can respond to these patterns, and how a sector can measure how support is delivered in an integrated manner.

[20] https://visualization.policywise.com/P2matrix/

Reflecting on Data Strengths and Opportunities

Documentation and reflection of lessons learned, strengths and opportunities occurred throughout the project. Here we highlight the key lessons learned and strengths and opportunities within the data.

Lessons Learned

The C5 Collaborative Data Linkage Project generated many lessons learned that can help inform future discussions on the integrated use of data across the agencies (Figure 5). The lessons learned were gathered from interviews and discussions among project staff. Throughout the project we heard many pieces of wisdom and insights that are important to capture and woven into the lessons learned.

Data is community

Data is integral to the community it supports and describes. The C5 agencies emphasized how data is gathered through a relational process. When data is shared with members outside of the community, it is important to understand where the data comes from, why the data is being used, and who will benefit most from sharing the data. We also heard:

- It can take multiple interactions to gather essential information from clients, and that is why something like a "start date" can sometimes mean the start of a service rather than the start of an interaction with the agency. Both may be important and are not necessarily interchangeable.
- Some agencies struggle with buy-in to capture any interactions with clients, and the consequences are less accurate reporting, more cleaning of the data on the back end, less "outcomes" and more demographics.

Being sensitive to these nuances, and recognizing that data is not separate from, but part of, the ecosystem and community of social-serving agencies is essential to building capacity for data. Key learnings include:

- Nurture and embrace the entire community that data lives within.
- Spend time building relationships with partners to understand their programs and how data complements these programs.
- Find ways to make data feel empowering instead of intimidating or irritating.
- Explore what makes data relevant and meaningful to a specific program, within an agency, as well as at the C5 collaborative table, and for the community at the heart of the collaborative.
- Put data into context. When data is just "data" it can be a black hole – intimidating to work with, seem technologically dependent, or insignificant to some. In context, data can be empowering and impactful.

Seek out your "Why?"

When working with complex data from agencies serving many different populations, many uses for data were mentioned and the value of data was generally felt – but sometimes difficult to articulate. We also heard:

- The amount of "wants and needs" in terms of what data to collect greatly exceeds what is currently collected by the agencies.
- Expectations about what data are collected are primarily driven by funders while the needs and desires of the agencies come second.
- While agencies collaborate as part of the C5, they still have distinct information needs specific to their mandate.

Throughout the project, many questions were generated, with some that could be feasibly addressed, and some that could not be feasibly addressed. Key lessons learned include:

» What agencies really want to know and the methods used to answer the "why?" are often not in alignment.

» "The Why?" looks different depending on who is asking – frontline staff, managers, EDs, and funders all have different information needs. Content of data collection is often driven by funder-information needs first and therefore data is usually "good enough" for reporting back to funders.

Engage with data continuously

Working with data is part of a continuous cycle of data to wisdom. The start of the project was about listening to the wisdom and knowledge gained by the agencies, which was key to understanding the data before seeing it in its raw form. After we shared the results from the data audits with agencies, we also heard:

- Training staff in computer literacy may be an important building block for data capacity.
- Engaging staff more to collect good quality data is of interest to many.
- Unifying data collection fields across programs within the agency as well as across the C5 is of interest, e.g., how to capture referrals in the same way.
- Agencies are looking for "models" of data collection practices, policies, etc. so that they can build their own – they don't have time to create something from scratch.

The process of exploring the data led to the insights and information generated about the importance of data quality. Finally the workshops and sharing of this information will inform the evidence needed to improve data related capacity at all levels within the agencies.

Strengths and Opportunities

The data and conversations with the agencies revealed insights about strengths and opportunities to build capacity and improve data practices (Table 8). 'Strengths' indicate activities that the agencies already engage in. 'Opportunities' indicate ways that these strengths may be leveraged or scaled up to create more impact. One of the goals of the C5 Collaborative Data Linkage Project was to examine data and how it can be used in new and impactful ways.

The C5 agencies have a strong culture of learning and improving the use of data through their practices. Their willingness to collaborate on this data project is further evidence of that commitment. The C5 data assets are already being used in innovative ways, and as partners it was imperative that we not only suggest ways to analyze and consolidate their data, but also suggest ways to build on their already existing data practices.

Table 8 - Strengths and opportunities for future impact

STRENGTHS	OPPORTUNITIES
Reviewing data on an ongoing basis is likely to yield more complete data For example, Norwood managers review data quality with their staff on a monthly basis and provide suggestions for improvement	✔Have monthly working lunches that help staff understand what they are doing well and what can be improved in terms of their required data entry tasks
Linking clients to their family members opens up opportunities for family-based planning For example, Terra links parents to their children using an ID. If the family is seen by multiple staff, then they can be informed of each family member's progress	✔Think of ways to categorize the families, or caregiving units, that stay the longest within the agency » Are they always seen as individuals or do they stay together? » Is there a way of centralizing their information (see **family ID**)?
Making clients the focus, especially when data is being collected For example, EMCN allows their clients to explain their needs on multiple occasions before entering them into the system as a client	✔Find ways to make collection of intake and demographic data more relational and not distracting to case workers » Can clients and staff be part of the recording process together? » How can we explore ways for clients to feel empowered by sharing their data?
Taking frequent inventory of client-staff interactions through touchpoints For example, Boyle Street requires staff to "clock in" every interaction they have with a client, whether it be at intake or a follow-up. These data points are recorded as touchpoints, which are dates and times of interactions	✔Set up programs such that within programs there are touchpoints labeled uniquely within each program (e.g., Ubuntu – follow up)
Avoiding labels while providing cultural support For example, Bent Arrow serves a largely Indigenous community but a client's "cultural background" on intake does not factor into their service delivery	✔Keep clients' demographic categories separate from practice, as they may not want these labels acknowledged. This is an important aspect of both data collection and service delivery practice recommendations

As noted earlier, the project has taken a particular perspective that has largely focused on assessing and preparing the current data for data integration. The lessons learned and strengths and opportunities are therefore predominantly informed by considering data for linkage. Consequently the work done within programs, agencies, and from day-to-day activities is not fully considered here but would certainly yield valuable insights in the future. Other limitations or caveats to keep in mind are:

- Some organizations have already begun to work on sustained efforts to improve their data collection and resolution of duplicate records in the last 6 months.
- Some agencies experienced significant changes in the management of their data for example, by adopting and transitioning to new database systems.
- The data do not represent all of the work agencies may have done prior to, or since the data were pulled.

Conclusion and Future Directions

This collaborative data integration project yielded several important insights. There are many important learnings from this work to continue build on in the future. Four highlights:

- **High-quality data is key:**
    - To link within and across agency data, key demographic variables to collect accurately and consistently are first and last name and date of birth.
    - It is better to document data as missing or unknown than to fill in a field with a system default or a "best guess".
    - To further understand and serve clients, working towards standardization in some parts of client intake and data harmonization would be beneficial.
    - To explore client journeys, a systematic, consistent, standardized way of capturing referrals, activities and dates is recommended.
- **Data can be beneficial and serve agencies in many ways** – three cases were shown in this report. It's worth considering why the data are being collected and being intentional about what use/benefits are sought and working from there to align data collection, management, analysis and sharing activities.
- **Data do not live in a vacuum** but are part of the larger community in which they live. People and data culture shape the way data can be used and translated into stories.
- **Working with data leads to new and continuous insights**. As stated in the data to wisdom cycle, the process of working with data is iterative and every project yields new insights and things to do. Many strengths have been identified to build upon and several opportunities for greater impact also are described.

This report raises important questions concerning how to use data, monitoring the quality of data, and sharing data across the C5 collaborative. Use the following section to reflect on these important considerations.

Reflect on the observations and conclusions about data from the C5 agencies

What surprises me about data quality and extracting stories from data?

Which findings from the report make sense to me and fit with what I already know from my experiences?

How can I use the information in this report with my team to improve data practices?

What will I continue to do, or do differently based on the information provided?

Glossary of Terms

TERM	DEFINITION	EXAMPLE
Database Setup		
Client ID	A field whose purpose is to uniquely assign each client to a record. This field must contain unique records only and it cannot be left blank. Setting up the database to track client IDs enforces good quality data	» Molly Ringwald, a new client to the agency, was assigned 819 as their Client ID
Event-based data	Data that contains information pertaining to individual events, or instances, about clients (e.g., a check-in date between client and staff, attendance within a program, a critical incident that occurred and must be reported, a referral)	» See Figure 4 for examples
Family ID	A field in the database whose purpose is to assign each family to a unique record. This field must only be assigned to a group of clients who belong to the same family. Each person assigned to a Family ID must already be assigned a Participant ID. The Family ID is a useful way of tracking families as they complete their services at the agency	» See Terra for details as they are the only agency that contains this type of ID
Data Cleaning		
Completeness / Percent missing	The extent to which the data represent the entire desired phenomenon	» See Table 2 for examples of completeness of data
Deduplication	The process of removing duplicates from a dataset	» See Data Auditing Methods for examples
Validity	The extent to which data fields capture information that corresponds to expected outcomes[21]	» See Data Auditing Methods for examples
Within-field consolidation	Cleaning values within a field to represent a uniform set of responses	» Female, Fem, F, and XX were used to indicate female in a question asking about gender. The evaluation specialist would then use Female to replace all other values that were entered under a different variation of female
Masterfile	A file that has been cleaned, de-duplicated, and is analysis ready	» See Data Auditing Methods for a description
Data Quality	A measure of the usefulness of data. Some examples of attributes of good quality data are: accuracy, completeness, consistency in naming of items, methods established for handling missing data, data collected that is directly machine-readable[22]	» See Data Auditing Methods for examples
Data Collection		
Incoming referrals	The agency or resource that connected the client to the current agency. There can be more than one agency listed in this type of field	» A client was referred to Norwood by Alberta Health Services
Outgoing referrals	The agency or resource that the agency wants to connect the client to. There can be more than one agency listed in this type of field	» A client was referred to one of Boyle Street's programs from Bent Arrow

[21] https://www.statcan.gc.ca/eng/data-quality-toolkit
[22] https://opendatahandbook.org/glossary/en/terms/data-quality/

Glossary of Terms

TERM	DEFINITION	EXAMPLE
Agency start date	The date a file is created for client	» The client stopped by and asked to fill out an intake form for a service
Program start date	The date a client begins a program	» The client attended their first day of language class at EMCN on June 5, 2019
Touchpoint date	A date that captures: staff member contact with a client, referrals, service delivery	» The client met with program staff to do an evaluation on May 30, 2017
Survey date	The date a client fills out a survey	» The client filled out an end of program survey
Referral date	The date a client is referred to another agency or resource by staff	» The client was referred to Boyle on March 1, 2018
Agency end date	The date a file is closed for a client	» The client no longer needed services as of January 3, 2019
Program end date	The date indicating which programs the client no longer attends	» The client ended the program and started another program at the agency on February 17, 2018
Ethics/Privacy & Linkage		
Anonymization	Processing data that has personal information so that individuals can no longer be identified in the resulting data. Anonymization enables data to be shared without breaching data privacy laws and regulations	» Client names Joe Gautam and Laura Gonzalez were hashed, with one of the names resulting in record 389et03p28
Privacy preservation of sensitive information	Sensitive information includes, but is not limited to, identifiers that would associate identifiable data to a person, household or business, or sufficient detail in aggregate data such that one could deduce attributes of a person, household or business. Methods for protecting data against disclosure of sensitive information, depending on the nature and granularity of the data include suppression of sensitive information[23,24]	
Data linkage	Linking individuals across datasets anonymously or through clear-text	» See Statistics Canada[25] for the processes involved in data linkage

[23] https://www.priv.gc.ca/en/privacy-topics/privacy-laws-in-canada/02_05_d_15/
[24] https://www150.statcan.gc.ca/n1/pub/12-539-x/12-539-x2019001-eng.htm
[25] https://www150.statcan.gc.ca/n1/pub/12-605-x/12-605-x2017001-eng.htm

Appendix A – Site Visit Interview Questions

Organization mission, programming, and clients (purpose)

1. Can you tell me about your organization's mission and purpose?
2. Can you tell me about the clients you serve? What issues do your clients face?
3. Can you tell me about the programming provided at the organization?
   - » What programming is provided? Which are most accessed?
   - » Which programs connected to programming and services at other organizations (e.g., C5)?
     - » Can you sketch a map of these connections? Who makes these connections (staff, clients, both?)

C5 Collaborative

1. What is your role with C5, and from your perspective what is the main goal of C5?
2. What does this organization want to achieve from involvement with C5?
   - » What are some challenges you hope this project will address/ inform?
3. We know integrated service us an important piece of C5. Has any client mapping been done to support/ develop integrated services?
   - » If yes, what were the findings, and can you share any of this information with me?
4. Who else in the organization is involved in the C5 initiative, how does C5 work come back to the organization?
   - » How are/will other staff (be) drawn into C5 work?

Organization structure, processes, infrastructure

***Note: try to understand how staff are distributed by programs, functions, etc.**

1. Is there an organizational chart you can share with me?
2. How are staff distributed in the organization?
   - » What number or percentage front-line (program) vs managerial/ administrative/ information support/ etc.?
3. Can you give me an overview of who collects and uses 'data' in the organization today? We will of course be delving into this in detail as the project progresses, but for today it would be helpful to get an overview.
4. What organization-wide activities, meetings, learning opportunities take place in this organization?
   - » How often are these held, and for what purpose? Could we use these to support C5 initiative work?

Is there anything else you think I need to know about the organization, that we have not already covered? Can I reconnect if (when) other questions come up?

Appendix B – Workshop Summaries and Activities

Collaborative Data Linkage Project
Workshop #1: Prioritizing and Data Exploration
November 21st, 2018, Meeting Summary

Workshop Objectives

The workshop objectives were to engage with the C5 agencies (Bent Arrow, Boyle Street, EMCN, Norwood, and Terra Centre) through discussion of the priorities of the organizations and the relevant data to explore these priorities and to provide an opportunity for relationship building within the C5 agencies and with PolicyWise. Findings from this workshop serve as an important foundation to the Collaborative Data Linkage Project by identifying the topic areas to address during the project.

Project Overview

The Collaborative Data Linkage Project aims to link and integrate data between the C5 agencies to enable closer integration of decision making, service evaluation, and planning. PolicyWise and C5 agencies will investigate the type of data collected by the agencies to assess how data can be anonymously linked and shared. To investigate the potential of linking and integrating data we will conduct analysis on the clients' journey across agencies to support a more holistic perspective of clients, make recommendations for a shared intake process that encompasses the needs of the five agencies, and build capacity in C5 agencies to not only understand, but also keep linking, sharing, and using data.

Identifying Priorities Together

The first part of the meeting consisted of a brainstorming activity about identifying priorities within and across the agencies. The prompts were meant to promote more wishful or big picture ideas. The priorities were grouped by agency and then placed in a basket. The ideas were read out and placed on the walls to begin a voting process. Each member had an opportunity to read the ideas and place a green dot on the ideas that resonated most within and across the C5 agencies. Below are examples of the priorities identified during the discussion across seven broad areas.

Services Integration	"Link the needs assessment to outcomes to determine the impact of services."
Data Collection Practices	"I would have a great database that meets our needs and works well with the federal and provincial databases."
Funding	"Get more money for community based programs and services."
Staffing	"I worry about staff recruitment, retention, training, funding."
Client Outcomes	"I wish I had hard numbers about clients with limited access to food/cooking tools."
Housing and Homelessness	"Housing crisis in Edmonton."
Indigenous Focus	"Reduce the amount of Indigenous children in care."

Collaborative Data Exploration

The second part of the meeting consisted of a facilitated discussion about the types of data each agency collects to be able to address some of the priorities identified in the first half of the meeting. Examples of what was discussed in the group were barriers to collecting the information, differences across programs, and the applications of gathering the proposed information for the Collaborative Data Linkage Project, and the usefulness of client journeys as a source of information on the priorities identified.

Next Steps

It was discussed that the next steps will be to visit each agency to learn more about the history, the clients, the programs, and the staff. It was proposed that a second workshop would be beneficial to continue the conversation on identifying priorities and exploring data within and across the agencies.

PolicyWise-C5 Collaborative Data Linkage Project

Workshop #2: Metadata, Consent, and Funding Agreement Discovery

April 16th, 2019, Meeting Summary

We are grateful to the C5 Hub, executive directors, and agency representatives who participated in the workshop. The following meeting summary provides highlights and learnings from the workshop. We encourage you to engage with this summary and continue to provide your thoughts on how this project will benefit the C5 agencies!

Workshop Objectives

The aims of this workshop were to (1) inform the C5 agencies about what the consent and funding agreement say about data sharing, (2) show how metadata can be organized across the agencies, and (3) to brainstorm questions that would be relevant to answer during the analysis phase of the project. Lots of discussion and reflection happened at the workshop! The key ideas discussed will be used to inform the next phases of the Collaborative Data Linkage Project.

Consent and Funding Agreement Review

The goal of reviewing consent forms and funding agreements across the agencies was to look for barriers that could prevent the linking of data across the agencies. Our interpretation is that most language in consent forms and funding agreements are not in conflict with the intended use of data for the project. In some cases, the language used was vague and can to lead to multiple conclusions, or the sharing of data was restricted to only specified parties. However, this interpretation cannot be used as legal advice. Moving forward, program-specific decisions will need to be made so that we can use data in a way that respects the clients understanding and the desire to use data in more innovative ways. PolicyWise will make recommendations on future improvements to these documents based on reviews.

Metadata Discovery

What is Metadata?
Why is it relevant to this project?

Metadata describe other data. For example, demographics can describe questions such as age, date of birth, and ethnicity that are typically asked on an intake form. Metadata allow us to see the “big picture” of data because we can see all of the data collected from various programs in one place.

The C5 agencies have provided over 1000 questions asked in surveys or intake forms. From these questions, we created metadata to organize the various types of questions asked. After examining the questions, we came up with 14 categories to capture the types of questions asked across the agencies (see table below).

Immigration	Legal	Mental health	Red flags	Outcomes	Physical health	Referral source
E.g., Relocation services	Client has legal issues	Addiction services	Experienced abuse	Resilience factors	Maternal health support	Agency referred from
Basic needs	**Demographics**	**Education**	**Employment**	**Family**	**Financial**	**Housing**
Clothing	Age	High school completion	Referral to employment agency	Seeking child care	Tax clinic access	Seeking accommodation

Speed Data-ing

The goal of this activity was to discuss among agencies how metadata categories could be combined to answer a question that matters to the C5 agencies. This activity provided an opportunity to see how data are collected across the agencies and how the agencies can leverage combined information to better inform their programs and service delivery. The full list of questions generated from the activity can be found below. The discussion also highlighted the potential for questions to be combined, such as mental health, physical health, and financial status upon intake in order to improve an agency’s ability to refer their client to the services they need.

Stories about Clients and Issues Across the C5 Agencies

The goal of sharing stories was to discuss among agencies how subgroups of clients or important issues that clients face could be used to answer a question that matters to the C5 agencies. Combining stories across agencies was both challenging and rewarding. One of the challenges was trying to whittle down a topic on clients or issues common to all of the agencies and the fact that the clients and the programs offered are so diverse. The rewards were that through discussion, common strategic goals emerged which will ultimately help direct the focus of topics to consider for the Collaborative Data Linkage Project.

The full list of questions generated from the activity can be found below. For example, the agencies identified the issue of system navigation for clients as an objective that could be addressed by connecting intake and referrals better across the agencies. As well, there was agreement on the desire to better understand the circumstances and characteristics of individuals who have experienced trauma and domestic violence. Answering this type of question could justify funding and resources for more tailored service delivery among the agencies.

	Question	Source
1.	Do clients accessing education services, family services, and legal supports overlap?	Speed Data-ing
2.	What happens to clients pre- and post- “red flags”?	Speed Data-ing
3.	Do clients with physical health and mental health issues overlap?	Speed Data-ing
4.	If clients experience social isolation, what is the likelihood of seeking any programming?	Speed Data-ing
5.	What is the geographic spread of clients across the agencies?	Speed Data-ing
6.	What percent of clients access federal/provincial benefits?	Speed Data-ing
7.	What are protective factors for clients experiencing financial stress, mental health issues?	Speed Data-ing
8.	What is the association between financial support and client outcomes?	Speed Data-ing
9.	How long does it take clients to complete educational credentials (e.g., diploma, GED)?	Speed Data-ing
10.	For clients experiencing family violence, what are the best ways to monitor progress, measure response strategies, and determine where to allocate resources?	Speed Data-ing
11.	How accessible are our services for: refugees, PR’s, and non-PR’s?	Speed Data-ing
12.	Does legal service use reduce stress?	Speed Data-ing
13.	Are child development outcomes used in Child and Family Services case files? If so, can they be leveraged further to aid these cases?	Speed Data-ing
14.	Do legal supports improve clients’ financial state?	Speed Data-ing
15.	What percent of clients are aware of benefits and what those are?	Speed Data-ing
16.	Are male community members less likely to be asked about their physical health?	Speed Data-ing
17.	Can referrals be linked to outcomes?	Speed Data-ing
18.	Are families receiving all possible benefits from the programs available?	Speed Data-ing
19.	Can referrals indicate newcomer stress?	Speed Data-ing
20.	If clients are involved in the community, does this lead to resilience?	Speed Data-ing
21.	Are clients getting what they need from referrals? What do clients need to improve the referral process?	Speed Data-ing
22.	What is the association between newcomer status and inadequate housing?	Speed Data-ing
23.	Do refugee claimants experience trauma, social isolation, or LGBTQ related issues?	Questions about Clients and Issues
24.	Why are families resistant to services and/or staff?	Questions about Clients and Issues
25.	Why do youth struggle with program attendance?	Questions about Clients and Issues
26.	Why do street involved women lack supports? Would support increase the likelihood of reporting domestic and sexual abuse?	Questions about Clients and Issues
27.	What percent of clients experience social exclusion and limited access to services?	Questions about Clients and Issues
28.	Are programs well suited to a diverse range of clients?	Questions about Clients and Issues
29.	How do clients transition across services? Across agencies?	Questions about Clients and Issues
30.	Who are the most vulnerable clients? Who are the most successful clients?	Questions about Clients and Issues
31.	How can clients be better connected to resources, services, and community?	Questions about Clients and Issues
32.	How can transportation barriers be reduced for specific groups within the community?	Questions about Clients and Issues
33.	How can needs assessments be better tailored to the services offered across the agencies?	Questions about Clients and Issues
34.	How can we make it easier for clients to choose the right services, or to access more than one service?	Questions about Clients and Issues
35.	What can be done about clients who are ineligible for services, programs, and employment?	Questions about Clients and Issues
36.	What are some ways to improve living conditions for newcomers?	Questions about Clients and Issues
37.	How can the intake process be more integrated across the agencies?	Questions about Clients and Issues
38.	What are the characteristics of clients who are linked across the agencies?	Questions about Clients and Issues
39.	How do early years programs support child development? In what ways do they support child development?	Questions about Clients and Issues

Next Steps

The next steps will be to visit each agency to continue discussing the program relevant questions and develop stewardship agreements. We will send out invitations to provide your availability. If you have any questions or comments about the workshop or the project in general, please contact us at **data@policywise.com**.

Collaborative Data Linkage Project
Workshop #2

Tell a story about a group of clients in your agency.
Tell a story about an issue that is common to your clients.
Share a success story from your agency.
Share something you think your agency could improve on.

Appendix C – Data Quality Interview Themes

Theme	Description	Source(s)
Circumstantial/ Contextual Issues *Dependencies due to context*	Look-ups are not always reliable to avoid duplicates – sometimes there isn't a lot of identifiable info there to begin with	Terra, Boyle, EMCN, Norwood, Bent Arrow
	Sometimes clients have similar names	EMCN
	Referrals/outcome measures can be hard to track down – due to system setup, or sheer volume of the program numbers	Norwood
Solutions for Missing Data *Dealing with problems*	Community members who don't have housing tend to use the agency **address**	Boyle, Norwood, Terra
	Community members who are hard to reach or attend drop-in programs tend to be geo-tagged in **name fields**, e.g., "Jimmy-Library Group" or "River valley stairs"	Boyle, Bent Arrow
	Year of birth is estimated for children in certain programs	Bent Arrow
	Postal code is more accurate field than other address field (because you can look up, covers a wider area)	EMCN, Terra
	Sex was not discussed as much – and not required in some agencies	Bent Arrow, Boyle
	System assigned defaults are in place, e.g., **1900** is default when left blank	Boyle, EMCN, Bent Arrow
Preparing Data *Being pro-active about data*	IDs are assigned to one person, regardless of family situation	Boyle, Norwood, Terra, Bent Arrow, EMCN
	Managers and sometimes data point person will train their own staff for data entry	Norwood, Bent Arrow, EMCN, Boyle, Terra
	Data entry is designated to specific individuals	Terra
	Data entered is reviewed on an ongoing basis, or before reports are sent out	EMCN, Norwood, Bent Arrow, Terra
	Reasons for collecting data are made transparent to the clients	Norwood
	Family relations are captured so that in the case one member becomes a client, they are already in the system	Norwood
	Intake is centralized (but what is collected depends on agency)	Norwood, Terra, Boyle, Bent Arrow, EMCN
	Data entry instruction manual is provided to staff and it is tailored to each program	Norwood

Appendix D – Agency Profile Review Interview Questions

Questions
Are the program descriptions correct?
(For Data Producer) How complete are the data you shared with us? » **Context: we received different things from different agencies.**
What does your agency use data for?
Are we missing any more limitations to the data here? What are things you can change vs. not change about your current data management system?
Are graphs on demographics correct?
For “values” how are these options laid out – e.g., multiple choice, text field
Who enters this information?
Would it be helpful to put the tips in each section?
Are proportions for program frequency correct?
Do you keep waitlist information?
Do you collect follow up information?
Is there anything context wise with these data that we missed/didn’t ask about? Only relevant to C5 project.

Appendix E – Parenting Concept Map Questions

	Program	Survey Item	Parenting Concept
BENT ARROW	Whitecloud	Has my child shown a greater interest in crafts motor skill development	Knowledge of CD
		Does my child talk with me more language development	Knowledge of CD
		Does my child show more interest in connecting with others outside of family social skill development	Knowledge of CD
		Am I doing more to support my child's development	Parenting skills
		Am I doing more to keep my child healthy	Parenting skills
		Have I increased my knowledge of child development	Knowledge of CD
		Do I have a better understanding of how to support my child's development	Parenting skills
		Am I better able to parent with the skills I have learned	Parenting skills
	Healthy Families	Participant indicated if program helped increase knowledge of parenting skills	Parenting skills
		Participant indicated if program helped feel more confident about parenting abilities	Parenting efficacy
		Participant indicated if program helped improve relationship with child	Parenting skills
		Participant indicated if program helped identified activities that are appropriate for child's development	Knowledge of CD
		Participant indicated if program helped identified ways to interact with child in a way that matches his her level	Knowledge of CD
		Participant indicated if program helped identify the development stages that can be expected of child in relation	Knowledge of CD
	Parent Link	Parents/Caregivers identify activities that are appropriate for their children	Knowledge of CD
		Parents/Caregivers identify ways they can interact with their children in a way that matches his/her...	Knowledge of CD
		Parents identify the developmental stages that can be expected of their child in relation to community	Knowledge of CD
		Parents identify strategies to apply in one or more of the following areas helping their children development	Parenting skills
		Parents model positive parenting strategies learned during the program	Parenting Skills
NORWOOD	All programs	I am aware of how children change as they learn and grow *Today*	Knowledge of CD
		A.1 I have confidence in my parenting skills *Today*	Parent efficacy
		B.1. I do things with and for my child to help him or her learn *Today*	Knowledge of CD
		I feel positive in my role as a parent *Today*	Parent efficacy
		I know how to set clear limits for my child *Today*	Parenting skills
		E.1. I can get my child to cooperate without yelling *Today*	Parenting skills
		E.1. I have someone to talk to when I need support *Today*	Social support
		F.1. I make time to play or talk with my child *Today*	Parenting skills
		F.1. I am able to manage stress *Today*	Parenting skills
		G.1. I know how to keep my child healthy *Today*	Parenting skills

	Program	Survey Item	Parenting Concept
NORWOOD	All programs	G.1. I know ways to meet my family's needs with the money and resources that I have *Today*a	Parenting skills
NORWOOD	All programs	H.1. I know how to keep my child safe *Today*	Parenting skills
NORWOOD	All programs	I.1 I know to speak up for what my family and child need *Today*	Parenting skills
NORWOOD	All programs	I.1. I know why it is important to read to my child everyday *Today*	Knowledge of CD
NORWOOD	All programs	J.1. I know how to handle the everyday challenges of things like sleep toileting food dislikes etc. *Today*	Parenting skills
NORWOOD	All programs	K.1. I know how my relationship with my child impacts his or her development *Today*	Knowledge of CD
NORWOOD	All programs	1. I have seen an improvement in my child's development since she/he has been in the program	Knowledge of CD
NORWOOD	All programs	2. My child is better at playing cooperatively with other children.	Knowledge of CD
BOYLE	Family Program	194_1a. Parents identify strategies they can apply at home to providing a nurturing environment for their child(ren)	Parenting skills
BOYLE	Family Program	197_2a. Parents identify strategies to apply in one or more of the listed areas	Parenting skills
BOYLE	Family Program	198_2b. Parents model positive parenting strategies learned during the program	Parenting skills
BOYLE	Family Program	200_3a. Participants report that they have contacted one or more community resources that address their information or service needs (e.g. could be for parenting relationships mental health basic needs abuse community connections or other issues)	Parenting skills
BOYLE	Family Program	208_6a. Parents identify the developmental stages that can be expected of their child in relation to: Communication, Physical development, Attention Focus	Knowledge of CD
BOYLE	Family Program	209_6b. Parents/caregivers identify activities that are appropriate for their child(ren)'s development (e.g. what activities they would encourage children to do or do with their children at a particular age/stage)	Knowledge of CD
BOYLE	Family Program	210_6c. Parents/caregivers identify ways they can interact with their child(ren) in a way that matches his/her level of development (e.g. read to child(ren) engage in interactive pay in home or community)	Knowledge of CD
BOYLE	Family Program	214_8a. Participants demonstrate skills in one or more of the listed areas	Parenting skills
BOYLE	Family Program	215_8b. Participants report an increased capacity to solve day-to-day programs and challenges	Parent efficacy
BOYLE	Family Program	216_8c. Participants report being able to cope with day-to-day stress	Parent efficacy
BOYLE	Family Program	217_8d. Participants report having personal characteristics that are likely to help them address their identified issues	Parent efficacy
TERRA		15e. Terra staff have helped me understand how my child develops	Knowledge of CD
TERRA		15f. Terra staff have given me parenting tips, ideas, and suggestions about how to parent my child	Parenting skills
TERRA		15g. Terra staff have positively influenced my ability to parent my child	Parenting efficacy
TERRA		18a. Since being involved with Terra I know more about positive parenting practices	Parenting skills
TERRA		18b. Since being involved with Terra I feel more confident as a parent	Parenting efficacy
TERRA		21a. Terra has helped me to be better informed about parenting strategies	Parenting skills

	Program	Survey Item	Parenting Concept
TERRA		22a. My involvement with Terra has helped to increase my knowledge of the importance of reading to my child	Knowledge of CD
		22b. My involvement with Terra has helped to increase my knowledge of how early father involvement affects my child's wellbeing and development	Knowledge of CD
		22c. My involvement with Terra has helped to increase my ability to provide a warm and safe environment for my children	Knowledge of CD
		22d. My involvement with Terra has helped to increase my confidence to provide healthy meals and balanced nutrition for my child(ren)	Knowledge of CD
		22e. My involvement with Terra has helped to increase my knowledge of the importance of reading to my child	Knowledge of CD
		22f. My involvement with Terra has helped to increase my ability to find opportunities for my child(ren) to socialize with other children	Knowledge of CD
		22g. My involvement with Terra has helped to increase my understanding of my child's development	Knowledge of CD

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