BIG DATA FOR SMALL PLACES WORKBOOK

A Guide for Small Area Data Utilization
Second Edition 2021

Developed By:

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BD4SP
Big Data for Small Places

CTA INC
Community Transformation Associates Inc.

ABOUT THE AUTHORS

Nelson Rogers and Robert Leitch have been professional collaborators since 1996 when they worked together on the Lanark Communications Network project, Canada's first rural broadband initiative. At the time, Nelson was the Dean of Algonquin College Perth campus and Robert was Coordinator of Information Technology, Library and AV Services with the Lanark County Board of Education. Over the years, they have worked together on a variety of unique projects including: The Creative Rural Economy, Lanark North Leeds Training Needs Analysis, Rural Transportation Issues & Options for Lanark County, County of Frontenac In-Field Communications Gap Study & Options Analysis, the Standards Council of Canada Rural Data initiative, the Big Data for Small Places program, and the Data Access for Rural Transformation product.

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1 INTRODUCTION

This Big Data for Small Places workbook is intended to be used by individuals or groups who are looking for user-friendly starting points in accessing and using data for evidence-based decision-making in rural community development. The workbook was developed and field-tested with groups that were tackling specific challenges in rural communities, and the lessons from these experiences are included throughout the workbook. While the workbook was developed primarily for use with a series of Big Data for Small Places workshops, it may also be useful for individual or group self-study. In addition, experience with the Big Data for Small Places approach indicates that the workbook could be applied to a wide variety of community development initiatives, whether in a rural context or not.

This workbook is a companion to the Small Area Data Guide, which was also developed under the umbrella of the Measuring Rural Community Vitality Initiative of the Rural Ontario Institute, with financial assistance from the Government of Ontario. The workbook and the guide are intended to facilitate the advancement of data literacy - the effective acquisition and utilization of data for the benefit of rural communities and organizations.

The Big Data for Small Places program builds capacity in rural municipalities and organizations to access, analyse and utilize relevant and reliable data in support of rural community development. The availability and complexity of huge volumes of data have resulted in challenges and opportunities in the use of data in support of evidence-based decision making, planning, priority setting, and accountability measures relevant to rural community development. The Big Data for Small Places approach enables participants to access and use data and analytics to clarify community needs and concerns, to identify significant trends, to select appropriate indicators of success, and to communicate evidence-based recommendations to community members, decision-makers and funding partners.

The Big Data for Small Places program is essentially about turning data into understanding and understanding into action for rural community development.

Symbols used throughout this workbook include:

For More Information…

BD4SP Case Study

Worksheet – Think and reflect

1.1 About This Workbook

The Big Data for Small Places workbook is designed to guide the user through easy-to-follow steps in the process of building capacity to find, analyze, interpret, and communicate data in support of evidence-based decision-making, planning, priority setting, and accountability measures for rural community development.

The Big Data for Small Places program is a capacity-building program for people who already have experience in or a connection to rural community development. It is not a conventional training program with a fixed curriculum. The philosophy behind the Big Data for Small Places approach is based on principles of adult education, including assumptions that adult learners bring considerable knowledge and skills to the table, and that they are goal-oriented - they want to use learning opportunities to help them achieve specific outcomes.

The Big Data for Small Places group workshops that normally accompany the utilization of this workbook, begin with the identification of specific problems or issues in rural communities, and the existence or formation of working groups who want to tackle these challenges. The workshops are not designed to deliver a comprehensive curriculum about data and analytics, but rather to facilitate the progress of the working groups as they grapple with questions like "What do we know?", "What do we need to know?", and "What will we do with what we learn?". The general directions of the workshops are based on extensive research around effective rural community development, and a broad menu of learning options are presented to the participants.

A key component of the workshops is the inclusion of guest speakers and facilitators who are able and willing to bring a user-experience perspective to the concerns of the working groups. The Big Data for Small Places workshops do not result in a graduation or a credential but provide significant contributions to the process of moving from concern about an issue to developing and evidence-based course of action in rural community development. It is anticipated that each future series of Big Data for Small Places workshops will result in adaptations of this workbook. It is very much a work-in-progress.

For a more in-depth examination of adult learning and capacity-building, as well as some insightful case studies in this field, see: G. Foley. (1999) *Learning in Social Action; A contribution to understanding informal education.* (Zed Books).

1.2 Lessons from the BD4SP Pilot and related workshops

A few recurring themes emerged from the groups that have participated in the Big Data for Small Places pilot project and the related workshops involved in the development of this workbook.

Rural municipalities and community-based organizations typically:

- Prioritize community attractiveness and community wellbeing, and recognize the interconnectedness of economic, environmental, health and social issues, although government programs typically require focus on a narrow aspect of one issue
- Usually have some business analytics expertise available but use it for administration not strategic planning for community development
- Are unaware of many relevant data sources and indicator systems
- Have access to a library or post-secondary institution but rarely those it to find data sources, indicators, and related research
- Are being pushed into data access and analytics by requirements of grant applications and accountability measures which are sometimes not directly related to community concerns
- Tend to dive into the data (get the numbers) with little preparation on the fundamentals of analytics.

Common challenges faced in rural community development projects include:

- Redefining/reframing issues to determine what can or cannot be answered by data
- The mismatch of municipal boundaries and functional community areas, resulting in problems with data access and relevance
- The wide variation among organizations regarding how data is collected, stored, and shared
- Determining how to answer, “What does our community need?”
- The burden of “accountability” in project administration, often not relevant to the overall goal of the project, and related arbitrary rules of funding agencies that are not easily adapted to the local context.

1.3 Key Concepts

The core concepts of the Big Data for Small Places approach are based on an understanding of widely accepted definitions of a few key terms.

What is community development?

Community development is a process to increase a community’s assets, attributes, or abilities in order to improve the lives of people in the community.

For more information on definitions and applications of community development, see: J.D.Brown & D.Hannis (2012) *Community Development in Canada*, Second Edition. (Toronto ON, Pearson Canada). And: D. J. A. Douglas (2010) *Rural Planning and Development in Canada*. (Toronto ON, Nelson Education).

What do we mean by small places? What is rural?

Small places are rural communities characterized by small population in a large geographical area – generally areas with no town centre over 10,000 people - and not adjacent to urban areas. Depending on the specific definition of "rural" that is used for a particular purpose, about 20% to 30% of Canada's population lives in rural areas and small towns.

For more information on definitions of rural, see: V. du Plessis, R Beshiri, R. D. Bollman, & H. Clemenson. (2001) "Definitions of Rural". *Rural and Small Town Canada Analysis Bulletin* V.3, N.3 (Ottawa, Statistics Canada. Cat. No. 21-006-XIE).

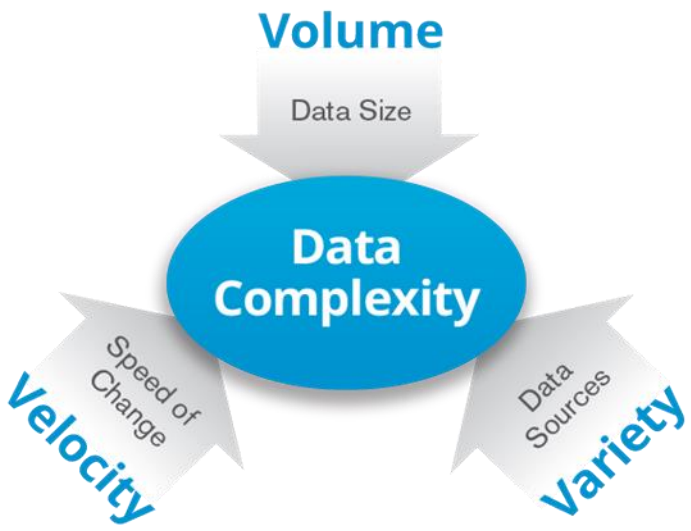
For information about Statistics Canada's approach to rural area and population centre classifications, see: https://www.statcan.gc.ca/eng/subjects/standard/pcrac/2016/introduction

For a comprehensive overview of challenges and opportunities currently facing rural communities in Canada, see: *The State of Rural Canada 2019*, Canadian Rural Revitalization Foundation. http://sorc.crrf.ca/sorc3/

What is data? What is Big Data?

- **Data** in its simplest form is simply information, but the term is most often associated with information that can be expressed in numbers.
- **Big Data** refers to the compilation of complex information, where the complexity is largely due to a combination of velocity (speed of change), volume (large quantities of data), and variety (data in many forms and/or from various sources).
- **Data Analytics** is a broad term that refers to the science of analyzing raw data to transform that data into useful information. Data analytics includes descriptive analytics (analysis of current conditions), predictive analytics (using historical data to determine the likelihood of future outcomes), and prescriptive analytics (a combination of descriptive analytics processes to recommend a course of action).
- **Business Analytics** involves the application of data analytics to business decision support and is useful in not-for-profit organizations as well as commercial enterprises.

For a more detailed list of relevant concepts, definitions and terminology, see **Appendix A**



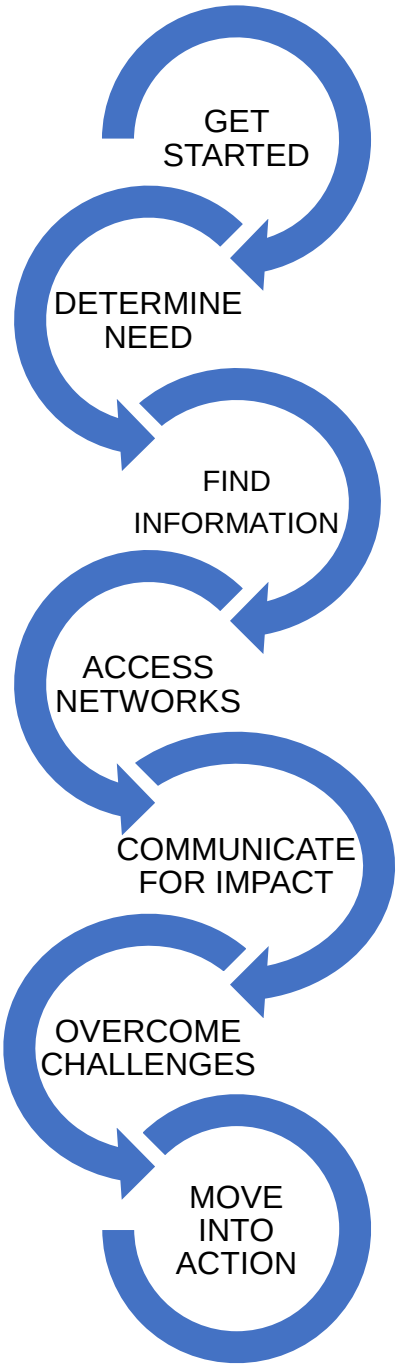
For a brief overview of the concept of big data, and its relationship to analytics, see: T. H. Davenport (2010) *The New World of Business Analytics*. International Institute for Analytics. http://www.sas.com/resources/asset/IIA_NewWorldofBusinessAnalytics_March2010.pdf

For a brief overview of data analytics, business analytics, and related concepts see: https://www.omnisci.com/technical-glossary/business-analytics

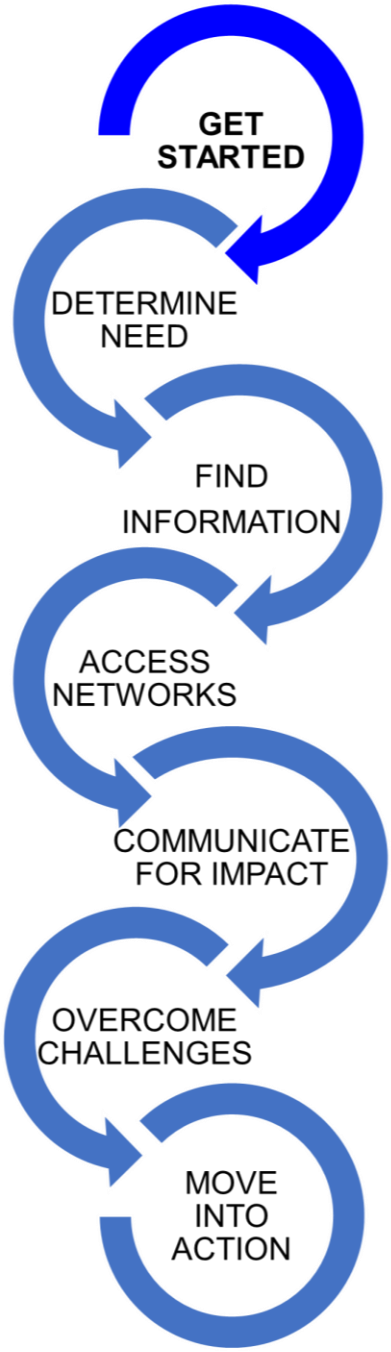
To see a collection of short articles on issues and trends related to big data, see: Harvard Business Review Insight Center. *The Promise and Challenge of Big Data*. http://www.sas.com/en_us/whitepapers/promise-challenge-bigdata-106222.html

For more detailed information on the uses and impacts of big data, see: V. Mayer-Schonberger & K. Cukier. (2013). *Big Data; A revolution that will transform how we live, work, and think.* (New York NY. Houghton Mifflin Harcourt).

2 BD4SP PROCESS



2.1 Module 1: Get Started



Step 1: Identify a problem, question or issue and clarify why to get involved. Typical approaches to community research include:

- Curiosity/ Investigation (What are the current conditions in the community?)
- Problem-solving (What can be done about X?)
- Evaluation (What evidence indicates that program X is achieving its goals?)
- Aspiration (How can the community become better/best in relation to X?)

At the end of the Get Started process, participants should be able to clearly articulate:

- their key question or issue
- why it is important, and
- who is likely to be interested in working on it.

A common motivation for getting involved in a community issue is curiosity – often resulting from widely varying opinions about the local situation. As Ipsos, the global market research company, has repeatedly shown with their "Perils of Perception" surveys, commonly held public opinions about community characteristics and issues are often extremely far off when compared with the facts as revealed by actual data analysis.

For more information on the Ipsos surveys, the "Perils of Perception" analysis, and the "Index of Ignorance" (ranking of various country's public opinion accuracy), see: http://perils.ipsos.com/

People frequently become involved in an issue because they would like to help solve a community problem. Common types of community problems include lack of services, community disagreements or fragmentation, lack of (or questionable use of) local decision-making authority, or demographic or economic change (growth, decline, or transition).

Community groups may become interested in analysis of a local issue in order to evaluate the effectiveness of a policy or program. This interest is often driven by concerns of people who receive services or have been denied service from a particular program and would like to see an evidence-based assessment of the actual results of the program.

In addition, people may be motivated to launch a new initiative by a vision or aspiration to make the community better in some respect. Frequently this includes such items as: building or improving some physical asset (community centre, park, main street, etc.), promoting a new identity or reputation of the community, or achieving a goal that is championed by a voluntary or charitable organization.

Typically, there is some incident, event, or announcement that acts as a catalyst to inspire action among community members, and bring together those motivated by curiosity, problem-solving, evaluation, and/or aspiration. As the group of concerned community members come together around a common issue, there may be considerable debate about the nature and extent of the problem or opportunity and the conceptualization of the desired outcome.

In the Big Data for Small Places approach, at this stage the concerned citizens are encouraged to form a working group and come to an agreement on a brief statement of their issue or concern and their vision or goal. It should be understood that this initial statement is likely to be revised many times as the process evolves, but without initial agreement on the general focus and direction it is unlikely that the working group will stay together and stick to the task long enough to see any significant results.

Early in the process (either during the Get Started phase or soon after) the working group is encouraged to identify the strengths of each group member and begin to take on specific roles. Based on experience with previous versions of the BD4SP program, the working groups that are most likely to be successful will designate roles that include: a champion or spokesperson, a researcher or investigator, and a subject matter specialist relevant to the task at hand. In many cases two or three people may share a role. In some situations, the role may be filled by an alliance with someone outside the working group, for example the designated researcher might be a librarian or a graduate student who is able and willing to provide research services to the working group without formally joining it. As the project evolves, the roles are also likely to change, but attention should be paid to the dangers of placing too much emphasis on one role and losing depth in another.

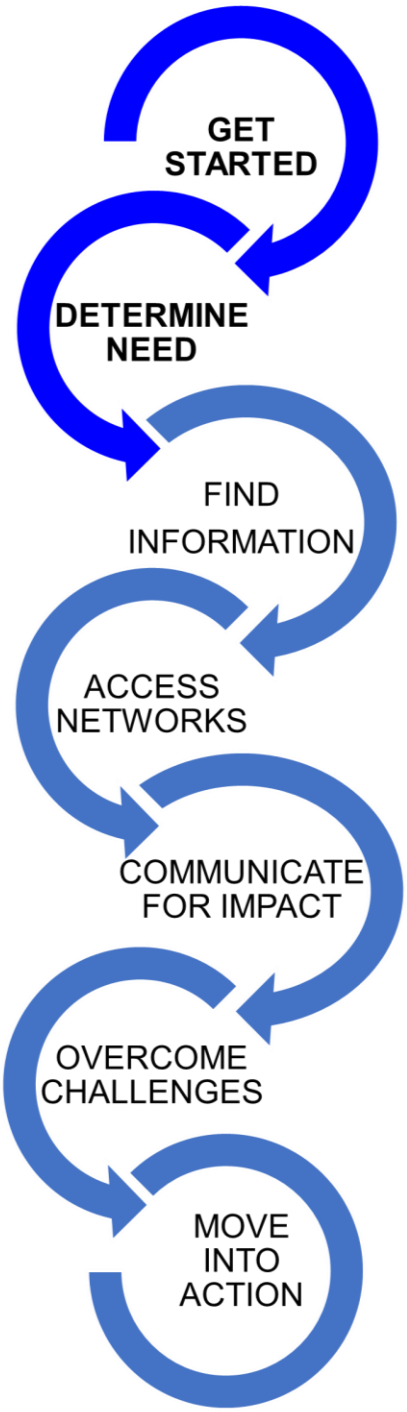
For a more detailed discussion of the issues around getting started in community development, see: J.D.Brown & D.Hannis (2012) *Community Development in Canada*, Second Edition. (Pearson Canada).

There are some excellent workbooks available to assist with the process of the formation and operation of an effective working group, such as: S. Pokras (2010) *Problem Solving for Teams; Make Consensus More Achievable*, Third Edition. (Axzo Press).

2.1.1 Get Started Worksheet

Get Started 	**Objective:** Identify a problem, question or issue and clarify why to get involved: • Curiosity (What's happening in the community?) • Problem-solving (What can be done about X?) • Aspiration (How can the community become better in relation to X?)
	Outcome: At the end of the Get Started process, you should be able to clearly articulate the key question or issue, why it is important, and who is likely to be interested in working on it.
Clearly articulate the key question or issue	
Why is it important?	
Who is likely to be interested in working on it?	
Who should be contacted about joining the working group or helping with the project? Who will follow up on this?	

2.2 Module 2: Determine Need



How do you know what the community needs?

There may be many opinions about what the community needs, so it is particularly useful to see the various approaches to need within a framework that clarifies the how the nature and extent of community need can be verified. Generally, the case for action to address a need is stronger when more than one method of verifying need has been used. The most common approaches to determining need are:

- Expert Opinion
- Public Demand (expressed need)
- Group Opinion (felt need)
- Comparison with Others
- Resources (best use of assets available)

At the end of the Determine Need process, participants should be able to:

- select the most relevant approach(es) for determining the nature and extent of the need.
- articulate the major need upon which they will focus.

Frameworks for understanding "need"

What does a framework do?

A framework does not provide a definition but using a framework can help to clarify and understand different assumptions, or different approaches to a common issue. Often the source of disagreements about "What this community really needs is…" can be traced back to different perspectives on defining and determining need. A framework that incorporates several approaches can assist in developing coalitions among groups with different perspectives but a common goal.

In the Big Data for Small Places approach, it is important for each working group to come to some agreement about the priority of various determinations of community need in order to focus on the research and data collection that will be most relevant.

Type of Need	Definition/ Determination	Example
Normative Need	Expert Opinion	Canada Food Guide
Felt Need	Personal feeling or opinion	Physical: stomach ache Preference: likes/dislikes
Expressed Need	Requests, demands	More speed bumps
Comparative Need	Difference between comparable groups	Low Income Cut Off
Supplied Need	Supplier of product or service	Foreign Aid (where giver determines what is given)

Implications for Data

Type of Need	Definition/ Determination	Implications for Data, Some Examples
Normative Need	Expert Opinion	Research to confirm expert opinion. Compare population to expert standard
Felt Need	Personal feeling or opinion	Opinion polls, surveys
Expressed Need	Requests, demands	Tracking requests, Counting petition signatures
Comparative Need	Difference between comparable groups	Measurement of resources available to different population segments
Supplied Need	Supplier of product or service	Inventory of supply, Measurement of capacity

For more information on frameworks for understanding need, see:
J. Bradshaw (1972) “A taxonomy of social need.” In McLachlan G (ed.) *Problems and progress in medical care*. Seventh series. (NPHT/Open University Press).

For additional insight into social policy implications of social need, see:
L. Mitton & M. Liddiard (2011) “Chapter 4: Social need and patterns of inequality.” In *Social Policy*. Fourth Edition. Edited by John Baldock, Nick Manning, Sarah Vickerstaff, and Lavinia Mitton. (Oxford University Press).

For an example of how frameworks for understanding need are used in public health policy discussions in the United Kingdom, see the UK Public Health Action Support Team (PHAST), Health Education initiative:
http://www.healthknowledge.org.uk/public-health-textbook/medical-sociology-policy-economics/4c-equality-equity-policy/concepts-need-sjustice

BD4SP Case Study – Determining Need
The Municipality of North Grenville, Ontario was in the process of developing a Parks, Recreation and Culture Master Plan.
Some of the Parks and Recreation staff participated in the Big Data for Small Places program to work toward an evidence-based perspective on community need. Fragmented and competing opinions about community need were more readily placed in context by using a framework for understanding need. The requests from new residents for additional services could be seen as “Felt Need”; the internal data on actual usage of facilities like soccer fields and hockey rinks were measures of “Expressed Need”; the limitations on the number of available usage hours for specific facilities fell under the category of “Supplied Need”. Through the Big Data for Small Places approach, the staff were also able to access information from the association, Parks and Recreation Ontario, including expert opinion on impacts of user fees on low-income usage of recreation (Normative Need), and analysis of provincial trends in participation in municipal recreation programs (Comparative Need). Although some consulting services were still required to assist with parks and recreation planning, the budget for these services could be substantially reduced due to the capacity-building of staff and the access to free data and analysis which resulted from participation in the Big Data for Small Places program.

2.2.1 Determine Need Worksheet

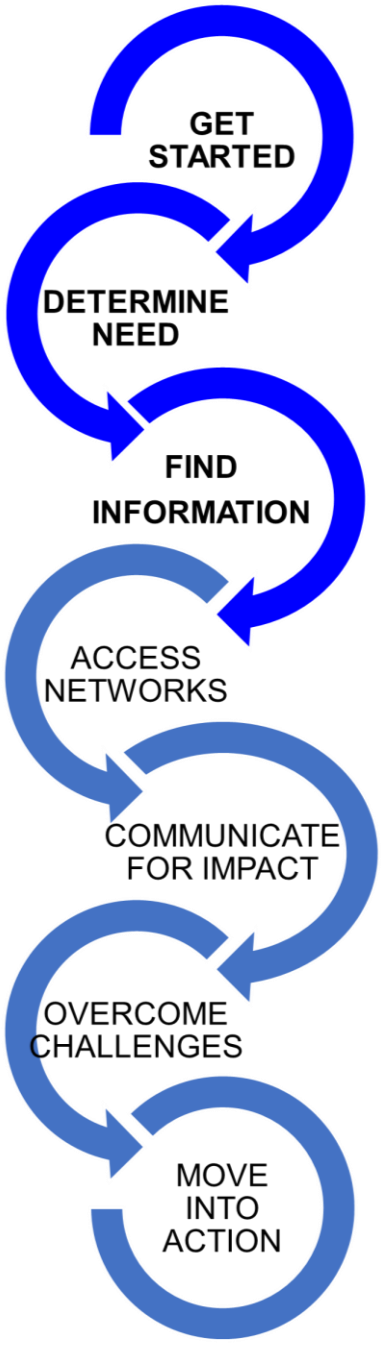
Determine Need: Why Does It Matter? 	**Objective:** Understand frameworks for determining need and focus on one or more as appropriate: • Expert Opinion • Public Demand (expressed need) • Group Opinion (felt need) • Comparison with Others • Resources (best use of assets available)
	Outcome: At the end of the Determine Need process, you should be able to: articulate the major need upon which you will focus and select the most relevant approach for determining the nature and extent of the need.
Articulate the major need upon which you will focus	
Select the most relevant approach(es) for determining the nature and extent of the need	

BD4SP Case Study – Narrowing the Focus

The “Funnel” – Start with the big picture but refine the focus to a component that is small enough to be manageable without losing sight of the big picture.

***The Municipality of Mississippi Mills*, Ontario** had recently gone through a process of updating the Community Official Plan, Economic Development Plan, and Recreation Master Plan as well as developing a Transportation Master Plan. Simultaneously implementing all of these plans was a formidable task. While several municipal departments worked on various aspects of the plans, the Big Data for Small Places working group looked for evidence to support achievement of an immediate goal with visible results. Active transportation (walking, running, cycling) emerged as a theme that fit many of the planning objectives related to community attractiveness and wellbeing. Under the umbrella of the Transportation Master Plan, the Big Data for Small Places approach revealed that active transportation issues impacted many areas, including commuting to work, infrastructure improvements (sidewalks, bike lanes, etc.), accessibility for the physically challenged, and more. The Big Data for Small Places process facilitated access to data in a number of these areas, as well as leading to the selection of the goal of attaining Bronze Status for Mississippi Mills in The Bicycle Friendly Community Award (BFC) Program of the Share the Road Cycling Coalition in Canada. Although the specific data access, analysis, and reporting requirements of the BFC program eventually necessitated the hiring of a consultant, the Big Data for Small Places approach enabled the municipality to make more effective use of the consultant’s work.

2.3 Module 3: Find Information



During this stage of the project, you should be able to establish some goals for finding information that is relevant to the need that the group is focusing on and the approach(es) to determining need that the group has prioritized. Refer to Type of Need and Implications for Data in previous Determine Need section.

At the end of the Information-Finding process, you should be able to:

- identify potential data sources.
- explain the relevance of the data source to the need and approach.
- select indicators that are related to the data and the approach to community need and the desired outcome.

What is an "**indicator**"?

- a thing, especially a trend or fact, that indicates the state or level of something. For example, "Car ownership is frequently used as an indicator of affluence" or "The test is used as an indicator of performance"; a device providing specific information on the state or condition of something in particular.
- synonyms: measure, gauge, barometer, guide, index, mark, sign, signal, symptom; standard, touchstone, yardstick, benchmark, criterion, point of reference, guideline, test.

(Adapted from Google Dictionary)

The differences between outcomes, indicators, and measures are not widely understood, but it is important to clarify the relationship between these concepts, especially in the field of community capacity-building.

An **outcome** is a major change - in the lives of people, their organizations and/or their community - which demonstrates that something is happening. For example, to evaluate quality of life, one possible outcome would be good health.

An **indicator** is an actual activity or capacity that can be measured or assessed in some way that shows that an outcome is being achieved. For example, an indicator of good health could be weight.

A **measure** is the actual bean-counting, or some kind of analysis that must be done in order to gauge an indicator. For example, number of pounds, or percent gain in pounds in the last 12 months.
(Adapted from Aspen Institute, *Measuring Community Capacity Building*).

2.3.1 Selecting Indicators and Measures

In the Big Data for Small Places approach, there are a few key questions that can facilitate the selection of indicators and measures that are most useful to the particular focus that the group has agreed upon. Ask yourselves:

- What do we need to know? It is important to focus on the items that are most important for understanding the issue at hand. There is a great temptation to add many more indicators and measures to the list because they are interesting or because the data is readily available, whether or not they are particularly useful.
- Why do we want to know it? Ensure that there is a good fit of the selection of indicators with the vision and mission of any sponsoring or affiliated organization as well as with the goals of the working group.
- What will we do with what we find? At this stage, there should be a preliminary plan for how to use the selected indicators and measures, and how to communicate the findings from this process. The plan may evolve over time, but it is very helpful to come to some agreement on the general outline of a plan at this stage in the process.

A good indicator should have these characteristics:

- Reflects the well-being of the population.
- Has relevance and interest to the public or target audience.
- Is well-defined, measurable, and quantifiable.
- Is based on current, available data.
- Provides comparison or context that is easy to understand.

(Adapted from Victoria Foundation, Vital Signs Methodology: http://www.victoriafoundation.bc.ca/vital-signs/victoria/2012/methodology)

For more information on developing appropriate indicators and measures related to community capacity-building, see the workbook on this topic from the Aspen Institute, a nonpartisan organization promoting values-based leadership and the exchange of ideas: https://assets.aspeninstitute.org/content/uploads/files/content/docs/csg/Measuring_Community_Capactiy_Building.pdf

2.3.2 Popular Indicator Systems

There are several well-researched indicator systems that have been developed to bring some consistency to the assessment of aspects of community well-being. The Canadian Index of Wellbeing, the Vital Signs reports, and Canada's Best Communities are three established systems that have proven to be particularly useful in many contexts.

Canadian Index of Wellbeing

The Canadian Index of Wellbeing (CIW) is composed of eight domains that focus on key aspects of life and uses them to measure what surveys have shown to be the priority concerns of Canadians. The CIW was designed to improve the understanding the interconnectedness of many aspects of well-being, and to facilitate the use of this understanding to support evidence-based and community-focused decision-making. The CIW regularly reports on the quality of life of Canadians – nationally, provincially, and locally – and advocates for social change that reflects Canadian values and places well-being at the heart of policy development.

The Canadian Index of Wellbeing measures what Canadians say they care about: their health, living standards, leisure time, their kids' education, even the air they breathe. GDP does not. It just measures how much money is circulating in the economy. Using the CIW, regular national reports are produced, based on analysis of two decades of data, drawing from almost 200 data sources and tracking 64 indicators representing eight domains of vital importance to Canadian's quality of life. The framework is the result of Canadian and international experts consulting with Canadians to ensure the domains reflect their values.

The Canadian Index of Wellbeing is a project of the University of Waterloo, Faculty of Applied Health Sciences. In addition to national research, many communities collaborate with the University of Waterloo to produce customized reports on local wellbeing. Several of the indicators in the CIW rely on survey data from sources such as the Canadian General Social Survey conducted by Statistics Canada. Although these surveys produce reliable data in a consistent format, concerns about response rates and protection of privacy in small communities result in the data rarely being reported for an area smaller than a Census Division (typically a county or district).

The 8 Domains (categories) of indicators examined by the Canadian Index of Wellbeing are:

- Community Vitality
- Democratic Engagement
- Education
- Environment
- Healthy Population
- Leisure and Culture
- Living Standards
- Time Use

For more information on the CIW, see: https://uwaterloo.ca/canadian-index-wellbeing/

To see how the CIW has been used to improve understanding of well-being in rural Ontario, see the report prepared for Rural Ontario Institute in 2020, *A Profile of Wellbeing in Rural Ontario*. https://www.ruralontarioinstitute.ca/uploads/userfiles/files/RuralOntarioReport-CIW-ACCESSIBLE_FINAL.pdf

Vital Signs

Vital Signs is a national program, led by community foundations and coordinated by Community Foundations of Canada, that leverages local knowledge to measure the vitality of communities and support action towards improving the quality of life. Vital Signs aims to inspire civic engagement and provide focus for public debate in Canadian communities. Vital Signs reports and Vital Conversations are used by residents, businesses, community organizations, universities and colleges, and government leaders to take action and direct resources where they will have the greatest impact.

Vital Signs reports use community knowledge to measure the vitality of communities – gathering data and sparking conversation about significant social and economic trends to tell the story of how Canadian communities are faring in key quality-of-life areas. Vital Conversation is a facilitated discussion with community members to learn more about the social and economic trends impacting local quality of life. The conversations are often used as a starting point to identify local priorities and mobilize a community into action. Vital Conversations can serve as a springboard to strengthen local relationships, develop new partnerships and begin to engage in the Vital Signs program. The Vital Signs program provides general guidelines, not rigid specifications for the production of local Vital Signs reports. While this approach enables communities to tailor the reports to their local situation, can make it challenging to compare communities to each other.

The 10 Domains (categories) of indicators examined by the Vital Signs program are:

- Arts & Culture
- Belonging & Engagement
- Economy
- Environmental Sustainability
- Getting Started
- Health & Wellness
- Housing
- Learning
- Safety
- Sports & Recreation
- Standard of Living
- Transportation

For more information on the Vital Signs program, see:
http://communityfoundations.ca/vitalsigns/

The Victoria Foundation, which is based in the city of Victoria BC, has a particularly informative website with examples of various Vital Signs reports they have produced, a good description of their methodology, and related information. See:
http://www.victoriafoundation.bc.ca/vital-signs/victoria

For an overview of the domains and indicators of Canadian Index of Wellbeing and Vital Signs, see **Appendix B"**

Canada's Best Communities

Many intangible things that determine quality of life cannot be quantified and measured, but a lot of tangible things can be. Maclean's magazine picks the best communities in Canada by gathering data on more than 400 towns and cities across the country and comparing them in the following categories: Wealth and economy, affordability, population growth, taxes, commute, crime, weather, access to health care, amenities, and culture. Environics Analytics was a partner in this research, providing a significant amount of data about each community that cannot easily be found elsewhere. The Maclean's reports include rankings by sub-category, for example "best" communities for weather, for families, for affordable housing, etc.

The Maclean's analysis of Canada's Best Communities is based on "census subdivisions" in Statistics Canada's terminology. Census subdivision boundaries are usually the same as municipal boundaries. Maclean's reports use the official Statistics Canada names for these communities, which might sometimes be different from what locals call them. Points are awarded to the 415 communities in the study by: ranking how each community did compared to its peers, and by assigning points on a curve. For example, the median household income subcategory is worth four points, so the community with the lowest median household income will receive 0 points and the community with the highest median household income will receive four points. The rest of the communities will receive somewhere between zero and four points, depending on where they ranked. If data is not available for all 415 communities in a given subcategory, the missing number is filled in with one that is reasonably close. For example, for communities in health regions where data was not available about knee replacement wait times, the average wait time among health regions Statistics Canada considers part of the same peer group was substituted.

Communities in Ontario and B.C. dominated the 2019 top 50 list. Those two provinces have an advantage because of their strong economies and good weather compared to the rest of the country. Ontario also has Canada's lowest health care wait times and its small towns have the least crime in the country, while B.C. benefits from low taxes. Another notable trend in 2019 is how many of the top spots went to towns with populations under 40,000. These small towns are all either within driving distance of a larger population

centre or hubs of local economic activity in their own right, and beat out the big cities in affordability, low crime and community engagement.

For an overview of the 2019 report on Canada's Best Communities, see: https://www.macleans.ca/economy/canadas-best-communities-to-live-2019/

For more information on the methodology of assessing Canada's Best Communities, see: https://www.macleans.ca/economy/best-communities-in-canada-2019-methodology/

National Standard for Indicators of Rural Community Prosperity, Services, and Quality of Life. (Note: At the time of publication of this workbook, this standard was under development. Review copies of the draft standard may be available from CSA Group.)

Climate change, global economic trends, aging demographics, population migration, and the adoption of new disruptive technologies are affecting all regions in Canada. However, their impacts in rural areas are often quite different than in urban ones. While advances in open data and e-government initiatives have resulted in rural municipalities and community organizations having potential access to an increasing amount of data, small communities typically lack the capacity to access, analyze, and utilize data effectively. For data to be used effectively to understand and address rural challenges and opportunities, a consistent approach to a set of key indicators can be extremely helpful. Although standards exist for indicators of quality of life in urban centres, many of these are not readily transferable to rural contexts. Particular rural community characteristics such as sparse population and distance from the comprehensive services available in urban centres require a rural-oriented approach to indicators of community well-being and sustainability.

A preliminary standardization landscape review revealed that although there are some indexes and various types of reports on national or urban well-being and sustainability, there are currently no Canadian standards to guide rural and small-town communities in the reporting and use of economic, environmental, and social data in a consistent manner. International, regional, or national standards in other countries were examined during consideration of the development of this standard. On the international scene, there are *ISO 37101*, Sustainable development in communities — Management system for sustainable development, and *ISO 37120*, Sustainable cities and communities – Indicators for city services and quality of life, along with some related standards for smart cities and resilient cities, but no equivalent standard for rural communities.

While there are some frequently used indicators of quality of life that are common to rural and urban populations, such as in the area of public health, rural and small-town communities have different demographic, economic, and environmental concerns compared with urban. For example, access to basic services such as reliable electricity, safe drinking water, and fire protection are frequently identified as high priorities in rural

and small-town communities but rarely mentioned in urban studies, so the assessment of conditions in rural communities often requires rural-specific indicators, or rural-appropriate data collection for common indicators. The wide variety of specialized or ad hoc approaches to rural data have not generally been helpful for understanding common issues across rural Canada, nor for accurately tracking change in similar rural communities. Using concepts and indicators that are insensitive to the rural/urban differences often leave important challenges, assets, and opportunities invisible to rural decision-makers.

For data to be useful in support of evidence-based decision-making, rural and small-town municipalities and related organizations need the ability to derive relevant data-driven insights in a consistent manner with limited resources. A standardized approach to a core set of rural community indicators is a key component that can facilitate turning data into understanding and understanding into action – to support well-being, prosperity, and sustainability in rural and small-town communities across Canada.

2.3.3 Selection of indicator systems and/or indicators

In the Big Data for Small Places approach, participants are encouraged to use an existing indicator system to examine the context of their issue of concern. Using an established system usually simplifies the process of selecting relevant indicators, finding useful data, and accessing comparable data that can provide insight into the condition of the local community. In most cases, there will be only one or two domains (categories) of indicators that will be particularly relevant to the task at hand.

At this point in the process, each working group should:

- Determine whether a local organization (such as a social planning council or community foundation) has recently done a Canadian Index of Wellbeing, Vital Signs, Canada's Best Communities, or similar study that includes the community of interest.
- Select the indicator system that is likely to be most useful for the current issue of concern, based on the availability of information and the fit of the indicators with the goals of the working group.
- Identify the priority domains (categories) of indicators. Focusing on the most relevant one or two domains is likely to be a more effective use of time and effort than attempting to examine several domains with dozens of indicators.
- Identify the priority indicators from selected indicator system and domain. Typically, about six or eight key indicators will provide considerable insight into the issue. Reliance on too few indicators may skew the perspective in a particular direction (not necessarily helpful), while researching a great many indicators may be beyond the capacity of the working group.
- Add additional indicators if necessary. The unique nature of some projects may require the development or identification of a few indicators that are not components of any of the popular indicator systems. Refer to the relevant sections in this workbook: "What is an indicator?" and "Selecting Indicators and Measures".

Again, it is important to be aware that this process may require considerable time and effort, so the working group should carefully assess this commitment against the anticipated benefit that could be attained.

- Identify data sources for each indicator. Although each working group should have a member who has taken on the role of researcher, or have an affiliation with a suitable researcher, it will be of great benefit to the capacity-building of the group if each member researches some data sources and reports the findings for at least one indicator. Sharing the results of this research frequently among the group will facilitate the process of identifying useful data sources as well as dead ends.
- Based on the results of the research on data sources, it may be necessary to revise, delete, or substitute indicators at this stage.

A common problem that is likely to be encountered at this stage is the absence of data at the local community level relevant to the issue of concern. Typically, Canadian Index of Wellbeing and Vital Signs reports are produced for a region and are based on data for a Census Division (a group of neighbouring municipalities, typically a county or regional municipality) or a Census Metropolitan Area (with an urban core of over 50,000 and a regional population of 100,000 or more). In many cases the organization that conducted or sponsored the regional study is likely to possess the data at a much more local level than what is published in the main report. The organization may be willing to share the local data in their possession with a group that is working on a rural community development project.

In some cases, although the data for a particular indicator may be unavailable for the local community, there may be related data for the Census Division (county, or equivalent) and for the Census Subdivision (municipality) that is the major centre in the area. Taking the relevant numbers for a particular indicator and subtracting the centre (town or city) from the county, results in the data for the rural portion of the region. This may provide some insight into local conditions, although the regional average may not reveal the extent of an issue in a specific rural community. The relevance of regional data needs to be evaluated through the lens of local knowledge.

Using a shared reporting format such as the Find Information Worksheet below can help the working group keep track of what has been agreed upon, what tasks need to be completed, and who is responsible for completion.

BD4SP Case Study – Selecting Indicators
Local Immigration Partnership of Lanark Renfrew (LIP) is funded by Citizenship and Immigration Canada (CIC), in cooperation with the Ontario Ministry of Citizenship and Immigration (MCI).
The Local Immigration Partnership of Lanark Renfrew (LIP-LR) works to strengthen the role of local communities in integrating and serving the newcomer population. LIP-LR participated in the Big Data for Small Places program in order to enhance their effectiveness in situating immigration services in the context of community attractiveness, and to use immigration funding to build community wellbeing. Participation in the Big Data for Small Places program built the capacity of staff to access and utilize relevant data and facilitated access to OMAFRA's custom data services for data reports by functional community areas instead of by municipal boundaries. In addition, several specific indicators within the Newcomer and Youth Community Indicators system provided highly useful information about the inter-relationship of welcoming communities, community attractiveness, and community prosperity. However, many NYCI indicators proved not to be useful since they were calculated on the basis of the location of geographic centres rather than the population centres – a large difference in many rural municipalities. Extensive knowledge of the local context enabled the LIP-LR staff to select and use only those indicators that were likely to be most useful.

2.3.4 Other data sources

Data Access Tips and Techniques

In the field of rural community development, there are many organizations that facilitate access and analysis of relevant data. In some cases, specific local data may be available from Statistics Canada by means of a special request, and for a fee, but there are often organizations that have obtained local data and are willing to share it. It is usually more efficient and effective to address data access and analysis issues in collaboration with an organization or coalition that has a focus on issues similar to the project under consideration, rather than attempting this work in isolation.

Many of the organizations that have a mandate to facilitate rural data access and analysis have a provincial or regional focus. A few examples of these types of organizations are described here, but your local community may have connections to other similar resources.

Rural Ontario Institute – Focus on Rural Ontario

Focus on Rural Ontario is a series of two-page fact sheets providing socio-economic data and trends for rural Ontario geographies. While data is available on a community basis directly from Statistics Canada, analysis across Ontario geographies requires a significant investment of time to differentiate any rural versus urban trends. Organizations or municipalities in rural and small-town Ontario may not have the resources to compare local happenings with broader trends. ROI has commissioned Ray Bollman, former Chief of Statistics Canada Rural Research Group, to fill this gap by analyzing data and producing these resources. Focus on Rural Ontario fact sheets are available on a range of topics including: rural population, economic trends, demographic issues, philanthropy, and others. While the fact sheets are available in print or pdf formats, in many cases the data that informed the production of the fact sheet may be available by contacting ROI. The Rural Ontario Institute also publishes research and analysis on several topics from a rural perspective, including health, employment, and transportation.
https://www.ruralontarioinstitute.ca/knowledge-centre/focus-on-rural-ontario

Community Accounts – Newfoundland and Labrador

Community Accounts is an innovative information system providing users at all levels with a reliable source of community, regional, and provincial data. A public-wide, online data retrieval system for locating, sharing and exchanging information related to the province and its people, Community Accounts provides users with a single comprehensive source of community, regional, and provincial data that would normally not be readily available, too costly to obtain, or too time consuming to retrieve and compile.

This innovative system allows users to custom generate a limitless number of tables and illustrative graphics on key social and economic indicators organized by geography and data topic within a system of distinct accounts, while the Well-Being account allows users to compile indicators from each of the above domains to develop a better understanding of the factors that determine the status and progress of their communities and regions. Under this structure, information can be retrieved according to 400 communities, 80 census consolidated subdivisions (local areas), 20 economic development zones, and the province. Information can also be retrieved at the level of Rural Secretariat Regions, Health Authorities, School Districts, and Economic Zones and other types of regions.
https://nl.communityaccounts.ca/default.asp

The Northern Policy Institute has a similar Community Accounts set of resources for northern Ontario.
https://www.northernpolicy.ca/communityaccounts#:~:text=Community%20Accounts%20is%20an%20innovative,key%20economic%20and%20social%20indicators.

Ontario Ministry of Agriculture and Rural Affairs (OMAFRA) – Statistics

OMAFRA offers an extensive collection of Open Data products. Although many of these are focused on the agriculture and agri-food sectors, other data sets are provided for broader rural application. County Profiles include data from Statistics Canada's Census Profiles, but in a format that many people find easier to access and utilize. Some of the rural data made available through OMAFRA's Open Data products are complicated or expensive to access through other sources such as Statistics Canada or the Municipal Property Assessment Corporation (MPAC), for example, business counts, or land values. http://www.omafra.gov.on.ca/english/stats/welcome.html

Small Area Data Guide

The Small Area Data Guide has been prepared for those who want to better understand what data is readily available about their community and about the regions where they live. This publication is one component of the Rural Ontario Institute's project on Measuring Rural Community Vitality and this Guide supplements the Focus on Rural Ontario Fact Sheet series that draw on the data described in this guide. The objective of this "Guide" is to show the data from federal agencies that are available for geographic areas within a province – some of these are relatively small lower tier municipal geographies and others are large economic regions. The guide is organized by data source. Some users would likely have benefitted from a list of data sources organized by topic, such as all databases with data on the employment rate of youth. Unfortunately, there are too many possible topics or topic combinations to create a concise and understandable document. As a compromise, this guide provides a (summarized) list of the socio-economic characteristics (or "variables") that are available from each data source. The Small Area Data Guide is available from the Rural Ontario Institute. https://www.ruralontarioinstitute.ca/uploads/userfiles/files/Fact-finder%E2%80%99s%20guide%20to%20local%20and%20regional%20data.pdf

Community Data Program

The Community Data Program (CDP) is a membership-based community development initiative open to any Canadian public, non-profit or community sector organization with a local service delivery or public policy mandate. The program facilitates access to the evidence needed to tell our stories and inform effective and responsive policy and program design and implementation. The CDP makes data accessible and useful for all members with training and capacity building resources. Through its vibrant network, the CDP facilitates and supports dialogue and the sharing of best practices in the use of community data. The CDP has emerged as a unique Canada-wide platform for generating information, convening and collaborating.

Created in the mid-1990s by the Canadian Council on Social Development (CCSD) to track poverty at the local level, the CDP now offers data products, analytical tools, and services that are unique in Canada and exclusive to CDP members. The CDP was transitioned from CCSD to the Canadian Community Economic Development Network

(CCEDNet) in September 2019. The Canadian Community Economic Development Network (CCEDNet) is a national association of organizations and people throughout Canada committed to strengthening communities by creating economic opportunities that enhance social and environmental conditions. https://communitydata.ca/

Canadian Rural Revitalization Foundation

The Canadian Rural Revitalization Foundation (CRRF) was established in 1989 to contribute to the revitalization and sustainability of rural Canada through collaborative research for rural leaders in the community, private sector, and in all levels of government. CRRF works to create credible insights and to improve our understanding of issues and opportunities that are of common interest to rural residents across Canada. Knowledge and better understanding are the fundamental pillars for the welfare of rural communities and environments.

CRRF is an organization comprised of members from across Canada, with diverse international links, representing rural leaders, rural organizations, development practitioners, government policy makers, researchers, students, and other stakeholders interested in the future of rural Canada. CRRF explores a diversity of issues, including rural health and social provision, local and regional economies, local government and community governance, education, organization development, environmental management and stewardship, and many others facets of life and livelihood in rural Canada. Each year CRRF co-hosts a national conference to share lessons learned, research findings, and discuss key rural issues.

CRRF helps communities find relevant research on rural issues and facilitates access to a network of researchers and rural research centres. CRRF also publishes a series of research reports under the title: The State of Rural Canada. Volume 3 in this series focused on bridging rural data gaps. http://crrf.ca/

2.3.5 Finding and Using Data from Statistics Canada

Statistics Canada publishes an extensive collection of data sets and analytical reports which can be useful in rural community analysis. Generally, the recommended place to begin is with a review of the relevant Census Profiles. The most recent Census Profiles present information from the 2016 Census of Population for various levels of geography, including provinces and territories, census metropolitan areas, communities, and census tracts. By using the search or browse options, users can search for an area of interest by typing its place name, postal code or geographic code or by browsing a list. Note that a new census will be conducted in the spring of 2021, and updated Census Profiles will be available later in the year.

The default format for viewing Census Profiles displays two profiles side by side. It is often useful to begin the community analysis by looking at the local community (Census Subdivision – CSD – typically a municipality) along side the area that contains the

community (Census Division – CD – typically a county or district). By comparing the same elements for the community and the area, key features of the community can quickly be revealed. For example, if there is a significant difference in population change in the last census period between the community and the area, that may reflect a local issue which needs attention. Other community characteristics that can reveal important issues include: the percentage distribution of the population by age groups, average household size, mother tongue, average income of individuals and households, prevalence of low-income status, households spending more than 30% of income on shelter, educational attainment, labour force status, and so on. For specific projects there may be a few data elements that are particularly relevant to the project objectives.

Census Profile data is also available at a very local level – Dissemination Area – which typically corresponds to the six-digit postal code. Note that for small communities much of the data for the Dissemination Area is likely to be suppressed to protect the privacy of individuals.

For more information on accessing and using data from Statistics Canada and related sources, see: R. Bollman. (2017). *Small Area Data Guide; How to find national statistics at sub-provincial levels*. Rural Ontario Institute. https://www.ruralontarioinstitute.ca/uploads/userfiles/files/Small%20Area%20Data%20Guide_FINAL2(1).pdf

BD4SP Case Study – Local Indicators and Data

Frontenac Communal Services Working Group was composed of County of Frontenac and Frontenac Islands Township management and staff who were interested in issues around small, very local (village or subdivision scale) water and wastewater systems.

The goal of the Communal Services Working Group was to use the Big Data for Small Places approach to access data and analysis of various approaches to these systems, in order to inform changes to Official Plan policies. The overall goal involved the encouragement of environmentally responsible residential development in village and waterfront areas, and ultimately to improve community attractiveness and viability, and lead to revitalization and economic growth. The Big Data for Small Places approach facilitated access to some demographic and economic data for the area, but in many instances recent local (township) data was not available due to issues with design of and response to the 2011 National Household Survey. In addition, there was interest among working group members in the development of unique local indicators that could be used to monitor future success of policy changes related to communal services. Since no such services were currently in operation in the county, there were no examples of current indicators and no baseline data. Although research was available on communal services in somewhat comparable communities, due to the wide variation in local policies, system design, and system operation, it was apparent that the selection or development of unique local indicators would need to wait until policies and systems were further along in the process.

2.3.6 Functional Communities

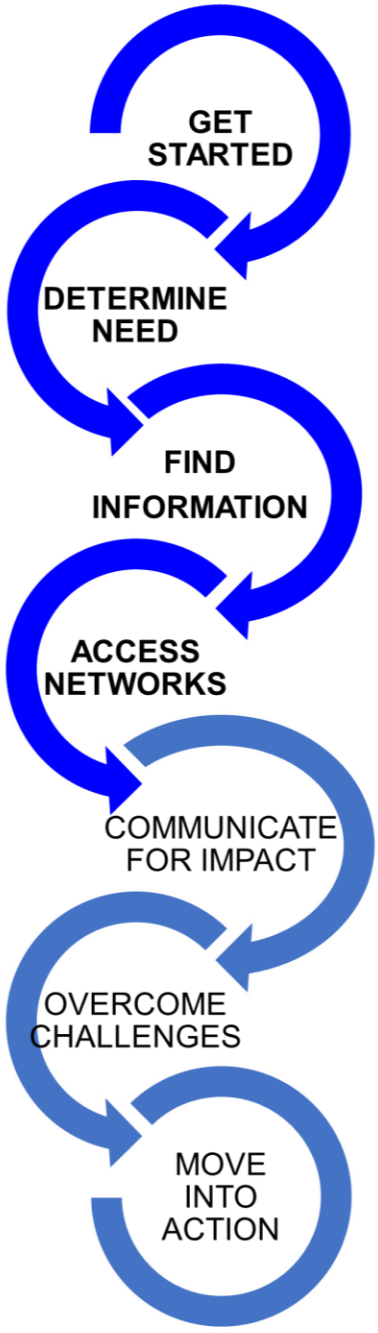
There are a variety of perspectives on the nature of “community” which may be relevant to initiatives in rural community development. Although administrative responsibility for a community usually conforms to legislated boundaries of a municipality, county, or district, the local community includes many aspects that cross boundaries. “Functional communities” are areas in which a significant proportion of the population shares an interest in a particular community function, such as a labour market area, the catchment area for a high school or hospital, or a watershed region. Local newspapers typically produce maps for the purpose of advertising distribution, based on surveys of patterns of use of retail and service businesses in the area. In many cases the catchment area of local businesses closely reflects the functional community in relation to labour markets as well as health and social services.

Obtaining data for a functional community that does not match legislated boundaries may require additional research. Statistics Canada produces Census Profiles for economic regions, public health districts, federal electoral ridings, and several other categories. In some cases, it may be relatively simple to compile the data elements of interest for a group of Census Subdivisions or Dissemination Areas to create a profile of a particular functional community. There are often government departments or agencies or other organizations that can assist with customized data access for a particular purpose. For example, Ontario Ministry of Agriculture and Rural Affairs (OMAFRA) offers some custom data services in conjunction with their rural business retention and expansion program.

2.3.7 Find Information Worksheet

Finding Information 	**Objective:** Assess the current state of the working group's access to relevant data, and preliminary list of indicators and measures that are related to the project.
	Outcome: At the end of the Information-Finding process, you should be able to: • select indicators that are related to available data, the approach to community need, and the desired outcome • identify potential data sources • explain the relevance of the data source to the need and approach.
Based on the selected approach(es) for determining the nature and extent of community need, list potential indicators, measures, and data sources.	Approach(es) to determining need:
	Potential indicators and measures:
	Potential data sources:

2.4 Module 4: Access Networks



Access formal and informal networks to assess the relevance of available data to the project at hand.

At this stage in the process, it is important to assess the data and related background material that has been collected so far to confirm that it is relevant and useful for the project, and that there are no significant gaps in the available information. An approach that has been proven to be effective for this type of information analysis is to strategically use formal and informal networks to assess the most useful formal and informal sources of knowledge.

At the end of the "Access Networks" step in the process, participants should be able to:

- articulate the method and rationale for confirming the relevance and adequacy of current data, indicators, and other information
- prioritize indicators, data sources, and other information based on feedback received
- address gaps in data or analysis

A framework for understanding the operation of community resources (or "capital") can be useful for selecting the most useful approaches to confirming the relevance of information, interpreting information in relation to the local context, selecting directions, and developing action plans, as well as many other aspects of a rural community development project. In this process, the functions of social capital and cultural capital are particularly important. Social capital refers to resources (usually intangible) that can be accessed through networks and connections – who you know – whether the relationships are formal or informal. Cultural capital (knowledge and skills) – what you know – also has formal and informal aspects, often recognized in the differences between education and experiential learning.

Although access to social and cultural capital can bring many advantages, the potential negative aspects of these resources need to be recognized. Some networks and connections may include groups and individuals with goals or values that are not

compatible with those of a specific functional group. Likewise, some knowledge that may technically be cultural capital, whether formal or informal, could include information that is irrelevant or even counter-productive to the goals of the group. The key to effective use of social and cultural capital, is to strategically access the resources that are most likely to further the goals of the group. In addition, reaching beyond a reliance on local social and cultural capital to access resources outside the community is often a pathway to increased probability of success. Excessive reliance on only one type or one source of capital can lead to misguided efforts, whereas a good balance of various sources of social and cultural capital can ensure that the project is on a secure foundation.

In the Big Data for Small Places approach, each group is encouraged to locate one or two resources in each category (formal and informal social and cultural capital). These should be carefully selected based on the level of confidence that they will be compatible with the values and goals of the group. In some cases, this may be as simple as talking to a friend who has experience with a similar project. In other cases, it may require officially joining an association, or doing in-depth research to find relevant publications, or contacting a research centre to consult an expert in the field. The working group discussions around this step in the process should include an assessment of whether some groups or viewpoints are dominating the prioritization of data and information, while others are excluded.

Some of the organizations discussed previously may be very useful for accessing formal networks and knowledge, while providing a balance of multiple viewpoints on an issue, for example, the Community Data Program, or the Canadian Rural Revitalization Foundation.

For a more in-depth examination of the operation of formal and informal social and cultural capital in rural economic development, see: N. P. Rogers (2012). “Campus in the Country: Community college involvement in rural community development.” *Journal of Rural and Community Development.* V. 7, N. 3, p. 164-183. http://journals.brandonu.ca/jrcd/index

A Framework for Understanding the Operation of Formal and Informal Social and Cultural Capital in Rural Economic Development		
Forms of Capital	**Social**	**Cultural**
Informal	Friends, Acquaintances	Know-how, Experience
Formal	Associations, Organizations	Professionals, Publications

BD4SP Case Study – Access Networks

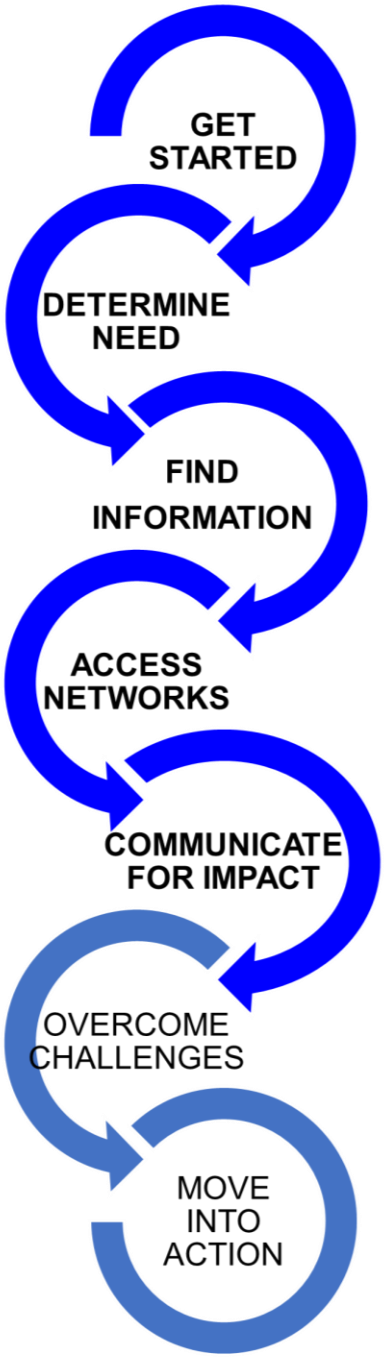
Frontenac Trails Hub Community Working Group participated in the Big Data for Small Places program to facilitate access to research on other successful trail hub communities, information on what initiatives other trail hub communities have undertaken, and evaluations of the economic impact of becoming a trail hub community.

The working group included representatives from the County of Frontenac, Township of Central Frontenac, and Tay Valley Township (Lanark County), but the focus was on the intersections of trails in the Sharbot Lake area, especially the K&P Trail (former Kingston and Pembroke Railway line). The BD4SP approach facilitated access of the working group to data on the local demographics and economy, as well as to related research on community benefits of trails such as promotion of healthy lifestyles and environmental protection, from organizations like Parks and Recreation Ontario. In addition, one of the BD4SP facilitators contacted an acquaintance who had been involved in research on the economic impact of trails in a similar context. The result of the inquiry was access to a recent and detailed report on this very topic for a nearby municipality (Highlands East, Haliburton County), as well as some feedback of the usefulness of the report in prioritizing local activities. The process that resulted in obtaining this research report illustrates the operation of informal social capital (acquaintances), formal social capital (connections with staff in associations and municipalities), formal cultural capital (research reports) and informal cultural capital (user's perspectives on the research).

2.4.1 Access Networks Worksheet

Confirm Relevance: Assess the Information 	**Objective:** Confirm Relevance of information (indicators and data) to the question/task/need at hand, and address gaps in information: • Use formal and informal networks • Use formal and informal sources of knowledge
	Outcome: At the end of the Access Networks process, you should be able to: • articulate the method and rationale for confirming relevance and adequacy of current indicators and data • prioritize indicators and data sources based on feedback received • address gaps in data or analysis
Articulate the method and rationale for confirming relevance	
Prioritize indicators and data sources based on feedback received	
Address gaps in relevant information	Specify who will do this, how, and when.

2.5 Module 5: Communicate for Impact



Potential goals for communicating information about a particular community need include:

- Inform the community/general public
- Inform decision-makers (councils, representatives, government agents, etc.)
- Request assistance (policy change, service availability, funding, etc.)
- Develop or improve program or service

At the end of the Communicate for Impact process, you should be able to:

- identify the intended use(s) of the information that has been collected on need and indicators
- articulate the anticipated results from the communication of this information.

At this stage in the process your working group has collected and evaluated a wide range of data, analysis, and related information that are pertinent to understanding a particular community need and how to access resources to address that need. The next stage involves communicating the most relevant information about your project to those who need to know.

Probably, at the beginning of the project a target audience had been identified, but it is likely to be helpful to reconsider the original focus in light of the information that has been obtained so far. At this stage, each working group should be evaluating potential uses for the information that has been gathered. Generally, these uses involve informing a target audience in order to make a change in opinions, actions, policies, or programs.

Following a few key principles of effective communication can greatly enhance the impact of the message. Some tried-and-tested principles for communicating about community development include:

- Focus on the specific action are you taking or requesting
- Briefly explain why your plan for impact is viable
- Tell stories that link strongly to key outcomes
- Confirm the validity of the stories with reference to evidence (data and analysis)
- Demonstrate willingness to collaborate and learn
- Build focused and consistent messages on the desired outcome
- Build messages that connect with your audience

Communicating for impact is most likely to be successful when it answers the questions "What?", "So what?" and "Why should I care?"
Key things to remember include:

- Focus – Talk consistently about key outcomes
- Listen – Use local data, know your niche and show how your outcomes will enhance what others are doing
- Share – Show commitment to ongoing feedback
- Engage – Seek opportunities to talk about impact

At this point, each working group should have a key message statement and/or an impact statement, that may follow a pattern like one or more of these:

- Our work is focusing on helping … which will have an impact on …
- Our program/project helps people with … and supports … which will have an impact on …
- Here's information about the impact we've been able achieve to date … with your support we'd be able to additionally …

Adapted from *6 Simple Tips for Communicating about Impact.* Ontario Nonprofit Network. http://theonn.ca/simple-tips-for-communicating-about-impact-part-1/

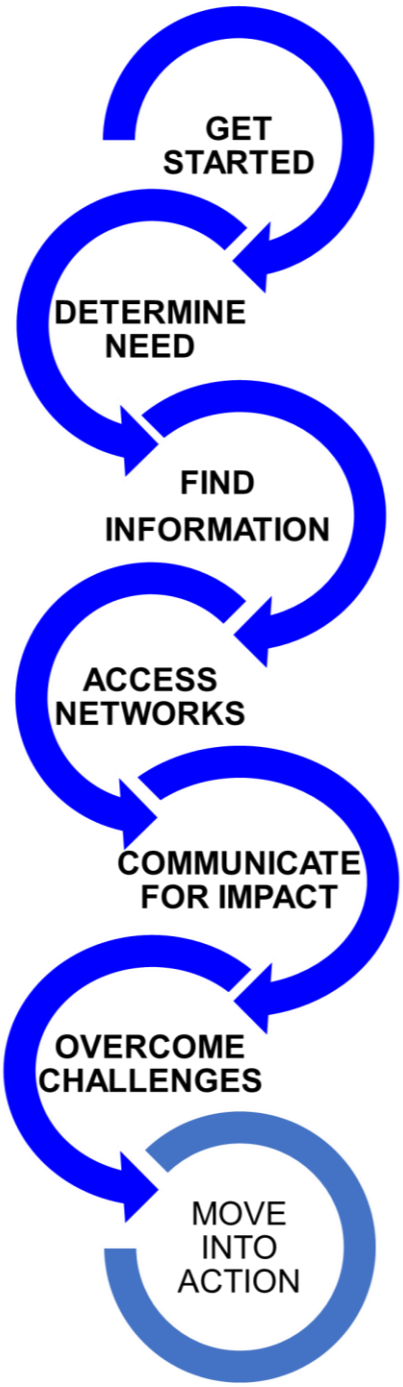
Here are some resources to help you visualize and present your data effectively:

- Presenting Data Visually http://bit.ly/2kgmKeG
- Prezi http://bit.ly/2kwttDl
- 38 Best Tools for Data Visualization http://bit.ly/1aZmoSV
- Edraw Visualization Solutions https://www.edrawsoft.com/

2.5.1 Communicate for Impact Worksheet

Communicate for Impact: Who Needs to Know? 	**Objective:** Select Direction: (focus on one or more as appropriate): • Inform the community/general public • Inform decision-makers (councils, representatives, government agents, etc.) • Request assistance (policy change, service availability, funding, etc.) • Develop or improve program or service • Other …
	Outcome: At the end of the Communicate for Impact process, you should be able to: identify the intended use(s) of the information that has been collected on need and indicators and articulate the anticipated results from the communication of this information.
Identify the intended use(s) of the information that has been collected on need and indicators	
Articulate the anticipated results from the communication of this information	

2.6 Module 6: Overcome Challenges



Be aware of challenges in data access, analysis, and utilization:

- Ethical issues
- Complexity issues (variety, velocity, volume)

At the end of the Challenges process, you should be able to:

- articulate the relevant ethical issues related to the information collection and dissemination
- articulate the measures that have been taken to ensure compliance with ethical standards
- articulate a rationale for the way in which data complexity issues (volume, velocity, variety) have been handled in the process.

Data Ethics

There are a lot of gray areas when it comes to the ethical collection, use, and analysis of data. Although obvious offenses such as fraud are clearly unethical, there is a lot of gray area when it comes to the collection, use, and analysis of data. Ethical guidelines, laws, statutes, and regulations may provide guidelines.

Even so, questionable situations can arise at various stages of the data life cycle that can confound reasonable people and expose their organizations to risks. Ethical data practices are a means of gaining trust, demonstrating organizational integrity, and reducing risks. However, technology is moving fast, enabling finer-grained profiling of individuals and creating new opportunities for ethical breaches (both intentional and accidental). While most people may want to do the right thing, what's "right" may not be completely clear. Throughout the Big Data for Small Places process, participants should comply with the ethics and privacy guidelines of their organizations, but also be aware that situations may arise that will reveal the need to revise or expand these guidelines.

2.6.1 Ethical Issues in Data Collection and Reporting

Data access in rural communities, whether the data is from official sources or locally collected, involves several critical ethical issues. For example, since rural data is typically based on small communities, concerns about protection of privacy tend to be more common than in urban contexts. The major ethical issues in collecting data or conducting related research are informed consent, benevolence (do good, not harm), and respect for privacy.

In many cases municipalities and local organizations possess or collect information about individuals for administrative purposes. Analysis of features and trends in this data can provide insights into effective operation of policies and programs, or reveal evidence of unmet needs. Although though the detailed data may not legally or ethically be released to the public, the analysis of trends or needs or program effectiveness can be very valuable public information if it is produced in compliance with the appropriate ethical and privacy guidelines.

In Canada, research ethics is regulated by the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. The Tri-Council includes the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council of Canada (NSERC), and the Social Sciences and Humanities Research Council (SSHRC). The three core principles of the research ethics policy are: respect for persons, concern for welfare, and justice. The Tri-Council defines research as “an undertaking intended to extend knowledge through a disciplined inquiry or systematic investigation.” Although some local research may not technically fall under the Tri-Council mandate, every reasonable effort should be made to follow ethical principles when collecting or publishing data involving humans. In many cases, local research groups could benefit from working in conjunction with a post-secondary institution that has a research ethics review process.

For more information on the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans see: https://ethics.gc.ca/eng/nr-cp_2019-06-05.html

In addition to ethics regulations and protection of privacy requirements that apply to government departments or agencies, there is the Personal Information Protection and Electronic Documents Act (PIPEDA) which applies to private-sector organizations across Canada that collect, use or disclose personal information in the course of their activities. Organizations covered by PIPEDA must obtain an individual's consent when they collect, use or disclose that individual's personal information, and may only use that information for the purposes for which it was collected. In addition, people have the right to access their personal information held by an organization and have the right to challenge its accuracy. While some non-government organizations and political associations may technically not be required to comply with PIPEDA exactly, the core regulations are still principles of ethical practices which it would be advisable to follow. Organizations should have a designated employee who is capable and authorized to verify compliance with

PIPEDA and related ethical issues, and in many cases the organization may be legally required to designate such a person.

For more information about the Personal Information Protection and Electronic Documents Act (PIPEDA), see: https://www.priv.gc.ca/en/privacy-topics/privacy-laws-in-canada/the-personal- information-protection-and-electronic-documents-act-pipeda/pipeda_brief/

For additional information regarding addressing ethical issues with data and research, see **Appendix C.**

2.6.2 Complexity Issues

Big data involves the compilation of complex information, where the complexity is largely due to a combination of velocity (speed of change), volume (large quantities of data), and variety (data in many forms and/or from various sources). During the processes involved understanding community need, selecting indicators and data sources, and using networks and connections to obtain formal and informal knowledge about an issue, it is likely that a complex collection of information will emerge. At some point this may become overwhelming, or even counter productive.

The types of complexity issues that frequently emerge with data for rural community development include the variety and volume of data available. In most cases, situating the various types of data into the framework for determining need (described in Module 2) and the framework for formal and informal networks and knowledge (described in Module 4) can be helpful in prioritizing the most relevant data within the volume and variety of data available. With regard to the variety of data, it is important to examine whether the prioritization of data has the effect of ignoring some perspectives, such as those from marginalized groups. The velocity issue (the speed of change) of data is also a common complexity issue. This can impact a project in various ways, such as seeing a new data release near the end of the project, or deciding whether to delay some analysis until the next data release is available. In these cases also, the evaluation and prioritization of available data through frameworks for determining need, and for formal and informal networks and knowledge, can be very useful.

Working groups can overcome challenges and move into the communication phase by tapping into the collective resources of the various groups working on similar types of projects. A useful strategy for addressing challenges involves careful consideration of what formal or informal networks and what formal or informal knowledge were particularly useful during this project, and sharing these insights among the groups for mutual benefit.

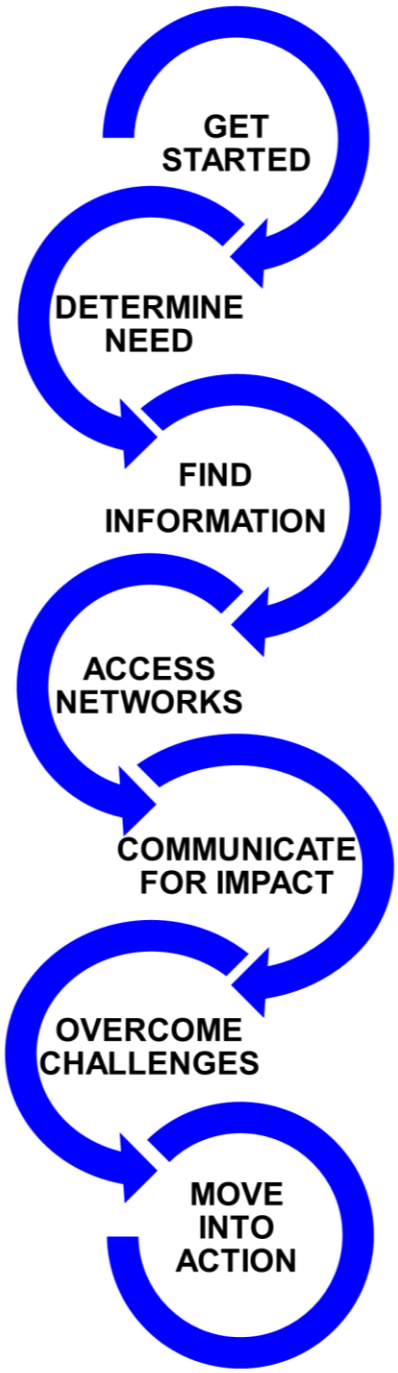
In the Big Data for Small Places approach, each working group is encouraged to revisit their core problem statements and intended direction, for the purpose of confirming or revising these based on the information that is now available. At this stage it is usually helpful to reach out beyond the working groups, utilizing key resources from formal and

informal sources, in order to come to a functional agreement on which information is most useful for the task at hand and what can be set aside for future reference. In some cases, it may be advisable for a group to seek funding to hire specialized help such as a researcher, data analyst, technical expert, or project manager. However, it is important that the group members are aware of, and agree with, the criteria that are used to focus on particular data sources and approaches to analysis while ignoring other options.

2.6.3 Overcome Challenges Worksheet

<table>
<tr><td rowspan="2">Overcoming Challenges: What Could Possibly Go Wrong?
  </td><td>Objectives:
Be Aware of Challenges in data access, analysis and utilization:
• Ethical and privacy issues
• Complexity issues (variety, velocity, volume)
• Prioritization of data - what “counts” as evidence (what perspectives are included or excluded)</td></tr>
<tr><td>Outcomes:
At the end of the Overcome Challenges process, you should be able to describe:
• the relevant ethical and privacy issues related to the information collection and dissemination and how these have been addressed
• the measures that have been taken to deal with data complexity issues
• the rationale for what types of information have been included or not included in the process.</td></tr>
<tr><td>Articulate the challenging issues relevant to the project</td><td></td></tr>
<tr><td>Articulate the measures that have been taken to ensure compliance with ethical standards and address other complexity issues</td><td></td></tr>
</table>

2.7 Follow-up: Move Into Action



Develop an Action Plan based on need, information, direction, and challenges:

- Communicate need, information, direction
- Implement appropriate action
- Monitor progress/success

At the end of the Action Plan process, you should be able to:

- describe the intended actions that will result from the process, including:
- what will be done, by whom, by what date, with what expected result, as well as
- when and how the expected results will be evaluated.

There are many excellent resources available in print and online to help groups evaluate options and agree on a course of action. Working groups are encouraged to select a specific format or method to arrive at consensus about their next steps.

For example, among the "classics" in this field are the writings of Edward de Bono, especially *Six Thinking Hats* and *Six Action Shoes*. The thinking hat approach encourages groups to look at a problem from six perspectives:

- white hat – objectivity, data, information
- red hat – feelings, hunches, intuition
- black hat – negatives, cautions, judgments
- yellow hat – positives, feasibility, benefits
- green hat – new ideas, creativity, innovation
- blue hat – organize the process, prioritize perspectives

The action shoe approach encourages groups to carefully consider several types of actions, and to be aware that often more than one type of action may be necessary. The six action shoes of de Bono are:

- navy formal shoes – routines, formalities, processes
- grey sneakers – investigation, exploration
- brown brogues – practicality, pragmatism
- orange boots – danger, caution, emergency
- pink slippers – compassion, sensitivity
- purple riding boots – leadership, trailblazing

For more information about these decision-making tools, see:
E. de Bono (1985) *Six Thinking Hats*. (Little, Brown and Company)
E. de Bono (1991) *Six Action Shoes.* (Harper Collins Publishers)
http://www.debonogroup.com/

Experience with the Big Data for Small Places approach indicates that the most frequent types of action for rural community development groups are:

- additional research (typically on a much narrower aspect of the original focus),
- additional training (skill development of group members for a specific challenge or opportunity),
- a report or presentation to a target audience (general public, stakeholder group, decision-makers),
- a funding application (fund-raising, or grant, or investment), or
- a concrete project (build or renovate something, improve a local asset).

2.7.1 Action Plan Worksheet

<table>
<tr><td rowspan="2">Action Plan: Where to next?
  </td><td colspan="2">Objective:
Develop an Action Plan based on need, information, direction, and challenges:
• Communicate need, information, direction
• Implement appropriate action
• Monitor progress/success</td></tr>
<tr><td colspan="2">Outcome:
At the end of the Action Plan process, you should be able to: describe the intended actions that will result from the process, including: what will be done, by whom, by what date, with what expected result, as well as when and how the expected results will be evaluated.</td></tr>
<tr><td>Describe the intended actions that will result from the process: What will be done?</td><td colspan="2"></td></tr>
<tr><td></td><td>By Whom</td><td>By When</td></tr>
<tr><td>Expected Result</td><td colspan="2"></td></tr>
<tr><td>Describe when and how the expected results will be evaluated</td><td colspan="2"></td></tr>
</table>

2.8 Conclusion:

The Big Data for Small Places program was developed in response to requests from many people - municipal and NGO staff and leaders, and concerned citizens - with an interest in rural community development, for assistance with data to support evidence-based decision-making. The BD4SP program has been field-tested and confirmed to be an effective approach to bringing diverse perspectives together around a common goal, using data to improve the understanding and verification of community needs, and facilitating effective action. As the BD4SP approach continues to be used in various contexts, some elements of the program and the accompanying workbook may evolve over time, but the essential goal - turning data into understanding and understanding into action for rural community development - will remain the same.

3 APPENDICES

3.1 Appendix A: Concepts, Definitions, Terminology

Adapted from a variety of Internet sources:

Analytics: method of logical analysis

Analysis: a careful study of something to learn about its parts, what they do, and how they are related to each other: an explanation of the nature and meaning of something

Business Analytics: the practice of methodical exploration of an organization's data with emphasis on statistical analysis; the foundation of data-driven decision-making; answers questions like: Why is this happening? What if these trends continue? What will happen next? (that is, predict), What is the best that can happen? (that is, optimize), What is the worst that can happen? (that is, prevent).

Decision Analytics: supports human decisions with visual analytics the user models to reflect reasoning.

Descriptive Analytics: gains insight from historical data with reporting, scorecards, clustering etc.

Predictive Analytics: employs predictive modeling using statistical and machine learning techniques

Prescriptive Analytics: recommends decisions using optimization, simulation, etc.

Business Case: a presentation or a proposal to an authority by an organization seeking funding, approval, or both, for an activity, initiative, or project - justification for a proposed project or undertaking on the basis of its expected commercial benefit

Business Intelligence: a discipline made up of several related activities, including data mining, online analytical processing, querying and reporting - a philosophy which includes the strategies, processes, applications, data, products, technologies and technical architectures used to support the collection, analysis, presentation and dissemination of business information

Correlation: a statistical measure that indicates the extent to which two or more variables fluctuate together. A positive correlation indicates the extent to which those variables increase or decrease in parallel; a negative correlation indicates the extent to which one variable increases as the other decreases

Data: facts or information used usually to calculate, analyze, or plan something; information that is produced or stored by a computer.

Big Data: a term for data sets that are so large or complex that traditional data processing applications are inadequate to deal with them. Challenges include analysis, capture, data curation, search, sharing, storage, transfer, visualization, querying, updating and information privacy.

Data Mining: an interdisciplinary subfield of computer science. It is the computational process of discovering patterns in large data sets involving methods at the intersection of artificial intelligence, machine learning, statistics, and database systems. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use.

Data Visualization: a general term that describes any effort to help people understand the significance of data by placing it in a visual context - patterns, trends and correlations that might go undetected in text-based data can be exposed and recognized easier with data visualization such as infographics, dials and gauges, geographic maps, sparklines, heat maps, and detailed bar, pie and fever charts.

Dashboard: a control panel located in front of the driver of a vehicle. Dashboard may also refer to: Dashboard (business), a web page which collates information about a business. Dashboard (management information systems), a management tool used to get an overview of enterprise health. In real-world terms, "dashboard" is another name for "progress report" or "report." Often, the "dashboard" is displayed on a web page that is linked to a database which allows the report to be constantly updated.

Fever Chart: a graphical representation showing change of a variable over time. Fever charts are used for data that changes continuously, like stock prices. They allow for a clear visual representation of a change in one variable over a set amount of time. Fever charts are sometimes called time-series charts.

Indicator: a thing, especially a trend or fact, that represents the state or level of something; a device providing specific information on the state or condition of something in particular.

Infographic: a visual image such as a chart or diagram used to represent information or data.

Statistics: the study of the collection, analysis, interpretation, presentation, and organization of data; numerical statements of facts in any department of inquiry placed in relation to each other. In applying statistics to a problem, it is common practice to start with a population or process to be studied. Populations can be diverse topics such as "all persons living in a country" or "every atom composing a crystal". Ideally, statisticians compile data about the entire population (an operation called census). When a census is not feasible, a chosen subset of the population called a sample is studied. To still draw meaningful conclusions about the entire population, inferential statistics is needed. It uses patterns in the sample data to draw inferences about the population represented, accounting for randomness.

Sparkline: a very small line chart, typically drawn without axes or coordinates. It presents the general shape of the variation (typically over time) in some measurement, such as temperature or stock market price, in a simple and highly condensed way.

Web Analytics: a generic term meaning the study of the impact of a website on its users, such as how many people visited the site, how many of those visitors were unique visitors, how they came to the site (i.e., if they followed a link to get to the site or came there directly), what keywords they searched with on the site's search engine, how long they stayed on a given page or on the entire site and what links they clicked on and when they left the site.

Data-Related Roles:

Data Scientist: is someone who makes value out of data. Duties typically include creating various Machine Learning-based tools or processes within an organization, such as recommendation engines or automated lead scoring systems. Data Scientists provide expertise on mathematical concepts for the broader applied analytics team and inspire the adoption of advanced analytics and data science across the entire breadth of the organization. People within this role should also be able to perform statistical analysis. Qualifications: Ph.D. or Master's Degree in operations research, applied statistics, data mining, machine learning, physics or a related quantitative discipline.

Data Analyst: is someone who translates numbers into plain language. Most businesses and organizations collect data on activities, research, logistics, or operational costs. A data analyst's job is to take that data and use it to help organizations make more informed decisions. Qualifications: Bachelor's degree is needed for most entry-level jobs, and a master's degree will be needed for many upper-level jobs. Most analysts will have degrees in fields like math, statistics, computer science, or something closely related to their field. Strong math and analysis skills are needed.

Data Entry Clerk: sometimes referred to as a key entry operator, data entry specialist, data entry clerk, database administrator or an information processing worker these are the common core functions and data entry skills of the job. Qualifications: College level diploma. Good organization, typing, and data entry skills, attention to detail, confidentiality, thoroughness, decision-making, independence, analyzing information, results driven, energy level.

Data User: is someone who controls the collection, holding, processing, or the use of data. *Data* by itself or numbers by themselves offer little *meaning* without contexts.

3.2 Appendix B: Domains & Indicators

Canadian Index of Wellbeing - Domains & Indicators

Canadian Index of Wellbeing - Indicator Domains (Categories)	
Community Vitality Democratic Engagement Education Environment	Healthy Population Leisure and Culture Living Standards Time Use
Indicators	
Community Vitality • Percentage reporting participation in organized activities • Percentage with 6+ close friends • Property crime rate per 100,000 • Violent crime rate per 100,000 • Percentage who feel safe walking alone after dark • Percentage disagreeing that they worry less about the needs of others • Percentage who provide unpaid help to others on their own • Percentage reporting very or somewhat strong sense of belonging to community	Democratic Engagement • Percentage voter turnout - federal elections • Percentage that are not interested in politics at all • Percentage strongly agree it is every citizen's duty to vote • Percentage reporting they are satisfied with the way democracy works in Canada • Percentage reporting federal gov't policies made them better off • Ratio of registered to eligible voters • Percentage of women in Parliament • Net official development aid as a percentage of gross national income
Education • Ratio of childcare spaces to children aged 0 to 5 • Percentage of children doing well on five developmental domains • Ratio of students to educators in public schools • Average of 5 social and emotional competence scores for age 12 to 13 • Basic knowledge and skills index for age 13 to 15 • Percentage of PISA scores explained by socio-economic background • Percentage of age 20 to 24 completed high school • Percentage of age 25 to 64 with a university degree	Environment • Ground level ozone (population weighted in parts per billion) • Absolute GHG emissions (megatons of CO2 per year) • Primary energy production (petajoules) • Water yield in Southern Canada • Viable Non-Renewable Energy Reserves Index • Viable Metal Reserves Index • Canadian Living Planet Index • Marine Trophic Index

Canadian Index of Wellbeing	
Indicators	
Healthy Population • Percentage self-rated health as excellent or very good • Percentage with self-reported diabetes • Life expectancy at birth, years • Percentage of daily or occasional smokers among teens aged 12 to 19 • Percentage with probable depression • Percentage rating patient health services as excellent or good • Percentage aged 65 years or more getting influenza immunization • Avg. number of remaining years expected to be lived in good health (avg. HALE 15+)	Leisure and Culture • Average % of time spent on the previous day in social leisure activities • Average % of time spent on the previous day - arts & culture activities • Average number of hours in the past year volunteering for culture and recreation organisations • Average monthly frequency of physical activity lasting over 15 min. • Average attendance per performance in past year at all performing arts • Average visitation per site in past year to all National Parks and National Historic Sites • Average number of nights away per trip in the past year on vacation trips to destinations over 80 km from home • Expenditures in past year on all aspects of culture and recreation as a percentage of total household expenditures
Living Standards • Ratio of top to bottom quintile of economic families, after tax • After tax median income of economic families • Percentage of persons in low income • Scaled value of CSLS economic security • Percentage labour force with long-term unemployment • Percentage of labour force employed • CIBC index of employment quality • RBC housing affordability index	Time Use • Percentage of 20 to 64 year olds working over 50 hours per week • Percentage of 20 to 64 year olds reporting high levels of time pressure • Percentage of 20 to 64 years old giving unpaid care to seniors • Percentage of 65 years and older reporting daily active leisure activities • Percentage of 65 years and older reporting annual formal volunteering • Percentage of 12 to 17 year olds spending two hours or more per day on TV or video games • Percentage of 6 to 9 year olds having weekly or more structured activities • Percentage of 3 to 5 year olds read to daily by parents

Vital Signs - Indicator Domains (Categories)	
Arts & Culture Belonging & Engagement Economy Environmental Sustainability Getting Started (Early Years) Health & Wellness	Housing Learning Safety Sports & Recreation Standard of Living Transportation
Indicators	
Arts & Culture • Public Sector Funding for Arts Groups • Employment Up In Cultural Industries • Public Library Use • Film and Media Production • Creativity Index Ranking	Belonging & Engagement • Volunteer Rate • Charitable Donations • Happiness Index • Sense of Belonging
Economy • Employment Rate • Unemployment Rate • Employment Growth • Employment by Sector • Average Weekly Hours Worked • Entrepreneurial Index • Competitiveness	Environmental Sustainability • Waste Diversion Rate • Greenhouse Gas Emissions • Green Buildings • Locally Grown Options • Ocean-Friendly Seafood Options • Bird Count • Water Consumption
Getting Started (Early Years) • Child Care Spaces • Child Care Fees • Youth Unemployment • New Immigrant Employment • Population Increase (Birth/Death Ratio) • Children in Government Care	Health & Wellness • Low Birth Weight Babies • Access to Doctors • Surgery Wait Time for Children • Hip Surgery Wait Time • Heavy Drinking • Mental Health

Vital Signs	
Indicators	
Housing • Ratio of Residential Prices and Median Family Income • Rental Vacancy Rate • Average Rent for a Private Apartment • Rental Supply • Single-Family Home Price	Learning • High School Non-Completion Rate • Aboriginal High School Completion • Post-Sec Education Completion • Tuition Fees • Internet Access • Summer Reading (12 and under)
Safety • Satisfied with Personal Safety • Feel Worried Using Transit After Dark • Police Officers Per Capita • Violent Crime Rate • Property Crime Rate	Sports & Recreation • Sports Tourism • Investment in Sport & Recreation Infrastructure • Athletes in Olympic and Paralympic Teams • Household Spending on Recreation • Physically Active • Youth Screen Time
Standard of Living • Highest 10% Income / Lowest 10% Income Ratio • Living Wage • Median Hourly Earnings • Cost of Food • Food Security • Poverty Rate • Child Poverty Rate • Seniors' Poverty Rate	Transportation • Transit System Passengers Per Capita • Cycling Network (km) • Cycle to Work Rate • Price of Gas • Ferry Traffic • Airport Passengers

3.3 Appendix C: Resources for Ethical Issues in Data and Research

The Data Science Association, American Statistical Association, and Digital Analytics Association guidelines were developed with their target audiences in mind. (Visit the individual industry association websites, to see each organization's guidelines.) There are some commonalities that merit general consideration:

- Protect confidential, personally identifiable, and privileged information.
- Prevent the inadvertent or unauthorized disclosure of confidential, personally identifiable, and privileged information.
- Do not misrepresent the quality of data.
- Do not misrepresent the completeness of data (note that many data collection methods privilege some sources over others – often with ethical implications).
- Do not misuse data or statistics in a way that misrepresents the truth.
- Do not misrepresent the scope of what data science or statistical analysis can do.
- Understand (or if you're the expert, communicate) the options available and their associated risks.
- Use scientific methods if you're a data scientist or statistician. Understand the importance of scientific methods if you have other responsibilities.

Be Considerate

A survey of business professionals about the ethical issues related to data revealed a few themes that were substantially similar. The recommendations included:

- The Golden Rule: Don't collect or use personal data in a manner you wouldn't consider acceptable if it were your personal data.
- Do no harm (inspired by medical ethics).
- Make sure the use of data is consistent with your brand image.
- Make sure your customers or clients -- not just your company or organization -- get value from the data they provide you.

Adapted from “Big Data Ethics: 8 Key Facts To Ponder” by Lisa Morgan
http://www.informationweek.com/big-data/big-data-analytics/big-data-ethics-8-key-facts-to-ponder/d/d-id/1322143

Other resources for addressing ethical issues in data and research include:

Ethics for Big Data and Analytics (IBM)
http://www.ibmbigdatahub.com/sites/default/files/whitepapers_reports_file/TCG%20Study%20Report%20-%20Ethics%20for%20BD%26A.pdf

Data Science Association – Code of Conduct http://www.datascienceassn.org/code-of-conduct.html

For a user-friendly overview of research ethics policies and practices, see Niagara College, Research and Innovation – Research Ethics:
http://www.niagaracollege.ca/research-ethics-board/