Big Data: Big Ideas – Launching a New Data Portal for Municipalities

MNL Municipal Symposium, May 2, 2025

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Presentation outline

1. Welcome and introductions
2. Big Data: Big Ideas project refresh
3. Major project data updates
4. Data portal overview
5. Demonstration + questions

Regional Analytics Lab

RAnLab is a part the Harris Centre at Memorial University that supports evidence-based policies for regional development through capacity building initiatives and regional economic and spatial analytics.

- **Provide practical and helpful tools that build capacity**
  - Prioritize "scenarios" and "projections" over "predictions"
  - Help understand interconnections between indicators
  - Assist in the identification, gathering, and inventorying of data
  - Model the system with geographic flexibility
  - Technical support, but for data and analytics

- **Model development**
  - Demographic projections, Geo-spatial supply chain analysis, Regional delineation, etc.
  - Control and flexibility through custom programming

Regional Analytics Lab

Learn more: www.ranlab.ca

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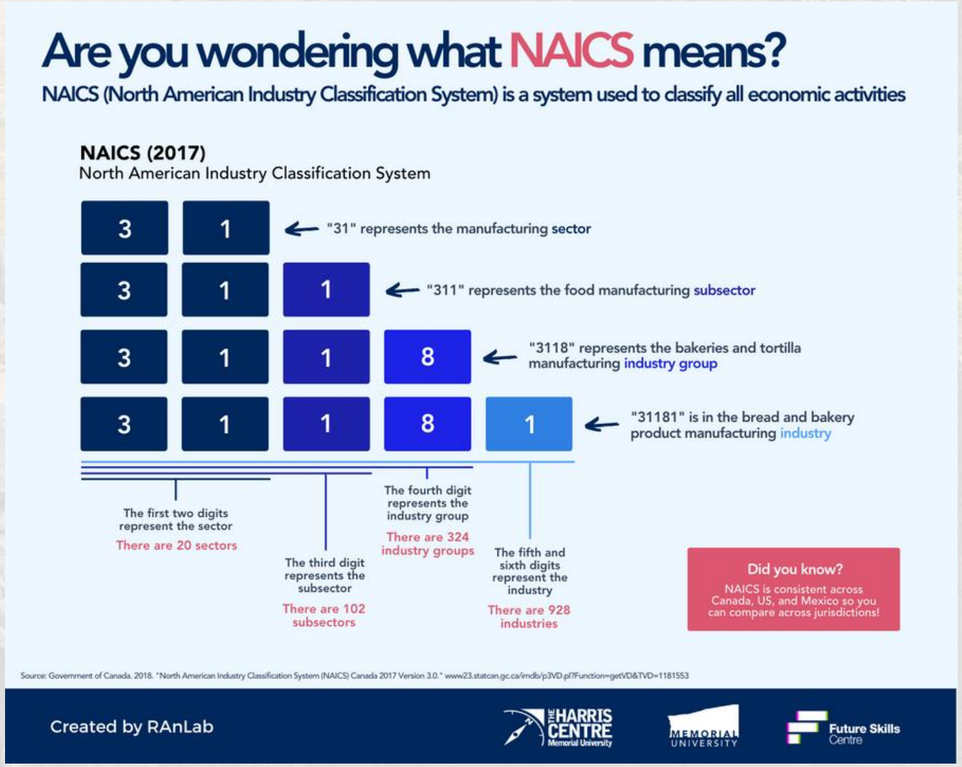

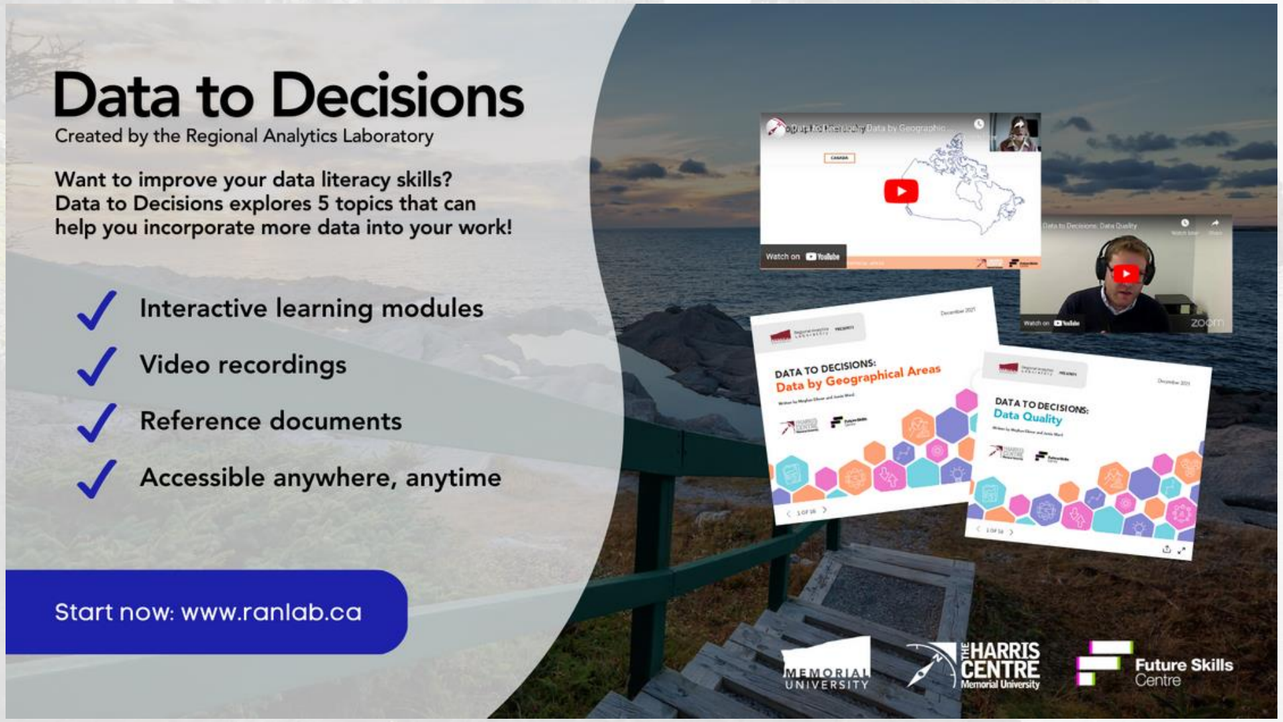

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Big Data: Big Ideas

Initial Project Overview

Objective: Study the implications of changing demographics and associated trends.

- Especially for municipal services and the impacts from an economic development perspective
- Develop framework to identify and fill severe gaps in municipal-level demographic and economic modelling in NL
- Enable municipal staff by providing improved, ‘more useful’ local information
- Create products that municipalities, the business community, and other stakeholders can use for planning and decision making, to make municipalities more sustainable
- ‘Urban Core’ of St. John’s, Mount Pearl, CBS, Paradise, PCSP, and Torbay first in province!

Big Data: Big Ideas

Second Phase Overview

In partnership with MNL, the project expanded to municipalities across the province through a formal application process.

- **Goal: Create a consistent package of analysis which could be applied to each region's most serious data/decision making challenges**
- **Participation and access to analysis required municipalities to collaborate and submit a regional application**
- **Regions self-identified: Baie Verte - Springdale, Central NF, Great Northern Peninsula, Labrador, Western NF**
- **Outputs organized into municipal fact sheets, supported by two rounds of engagement**

Primary concerns identified: demographic challenges, housing, and labour market

Outline of Deliverables

Project Overview

- NE Avalon Urban Core (6 municipalities)
  - Reports: Regional overview + 6 municipal
  - Database Spreadsheet
- Second phase regions (31 municipalities in 5 regions)
  - Regional profiles/fact sheets
- Model development
- Initial development of web-based municipal data tool

Municipal-Level Modelling Frameworks

Project Data Legacy

Demographic Modelling: Change in Population

Supply Chain Analysis: Change in Economy

Both models generate data and indicators important for comprehensive analysis.

Applications

Demographic modelling & supply chain analysis

Demographic Model

Demographic Structure

- Dependency Ratio (Children and Seniors vs. Working Age Population)

Housing

- Tenure (Owners vs. Renters)
- Size (Number of bedrooms)
- Structure Type (Single detached vs. Others)

Income & Consumer Spending

- Source of income

Ageing Workforce

- Identify at risk skills and occupations
- Potential skill mismatches. High skilled new entrants vs. lower skill retirements
  - Sector/tech disruption? Non-traditional workforce participants?

Supply Chain Model

Assess linkages between industries or locations

- Jobs or value to regional economy
- To what degree are regions connected economically within a community and neighboring communities
- What industry/service inputs are available locally, regionally, provincially, or imported?
- To what degree are industry outputs used locally, provincially, nationality, and internationally?
- Estimate indirect employment by location/sector

Gap and opportunity analysis

- Location quotient: Local concentration of industry
- Shift-share analysis: Compare growth at different spatial scales
- Local multipliers
- Direct, indirect and induced impacts

Project Outcomes

Data Model Connections

Fact Sheets

Overview

Combine statistical information with ‘how to’ guides

- Empower local policy development and planning with advanced demographic and economic modelling.
  - Sensitive to local capacity challenges.
- Integrated community-based modelling
  - Relationships are complex, especially on the local level!
- Embedded data = efficient and flexible updating and filtering

Project Outcomes

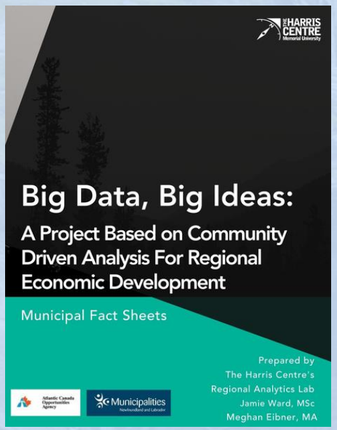
Fact Sheets

31

municipalities

496

fact sheets



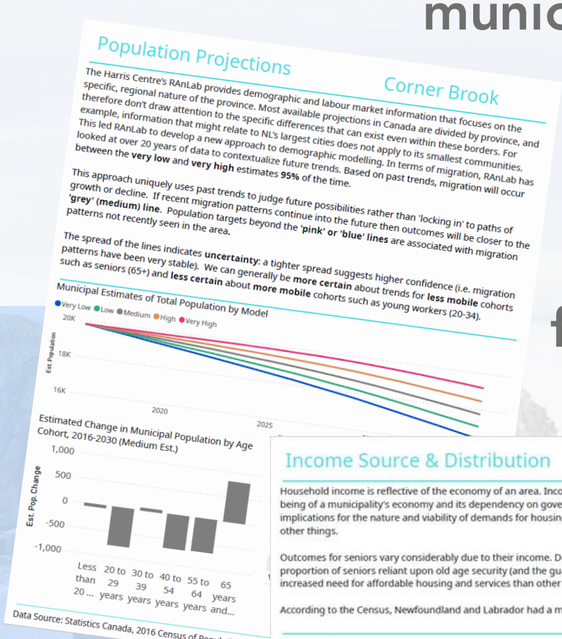
Big Data: Big Ideas

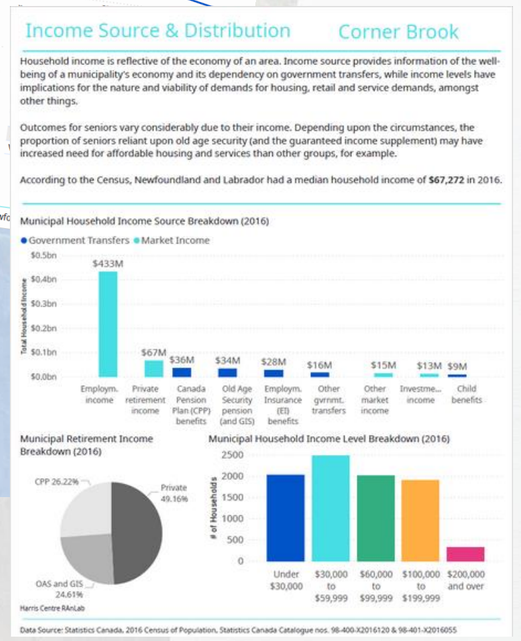
Crafted basic fact sheets with baseline demographic and economic data

Met with community representatives—such as mayors, town clerks, municipal planners, etc.

Determined what issues communities were interested in

Crafted customized fact sheets with data on local housing markets and labour force skills in communities and regions.





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Population Projections

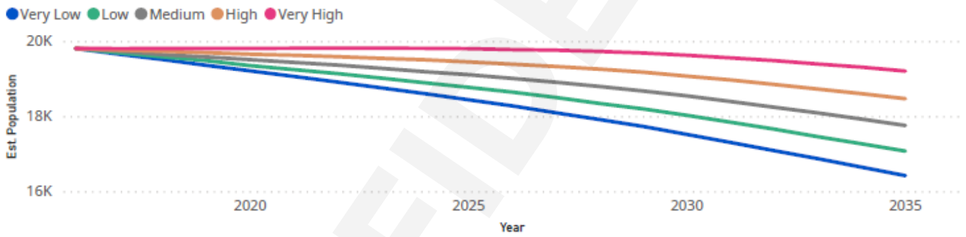
Municipality

The Harris Centre's RAnLab provides demographic and labour market information that focuses on the specific, regional nature of the province. Most available projections in Canada are divided by province, and therefore don't draw attention to the specific differences that can exist even within these borders. For example, information that might relate to NL's largest cities does not apply to its smallest communities. This led RAnLab to develop a new approach to demographic modelling. In terms of migration, RAnLab has looked at over 20 years of data to contextualize future trends. Based on past trends, migration will occur between the **very low** and **very high** estimates **95%** of the time.

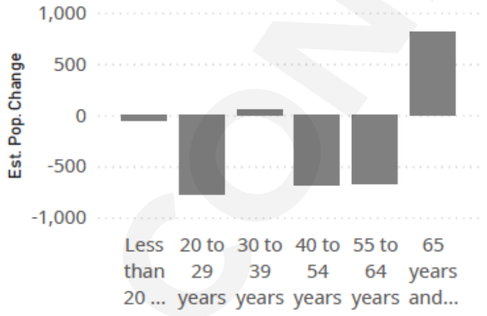
This approach uniquely uses past trends to judge future possibilities rather than 'locking in' to paths of growth or decline. If recent migration patterns continue into the future then outcomes will be closer to the **'grey' (medium) line**. Population targets beyond the **'pink' or 'blue' lines** are associated with migration patterns not recently seen in the area.

The spread of the lines indicates **uncertainty**: a tighter spread suggests higher confidence (i.e. migration patterns have been very stable). We can generally be **more certain** about trends for **less mobile** cohorts such as seniors (65+) and **less certain** about **more mobile** cohorts such as young workers (20-34).

Municipal Estimates of Total Population by Model



Estimated Change in Municipal Population by Age Cohort, 2016-2030 (Medium Est.)



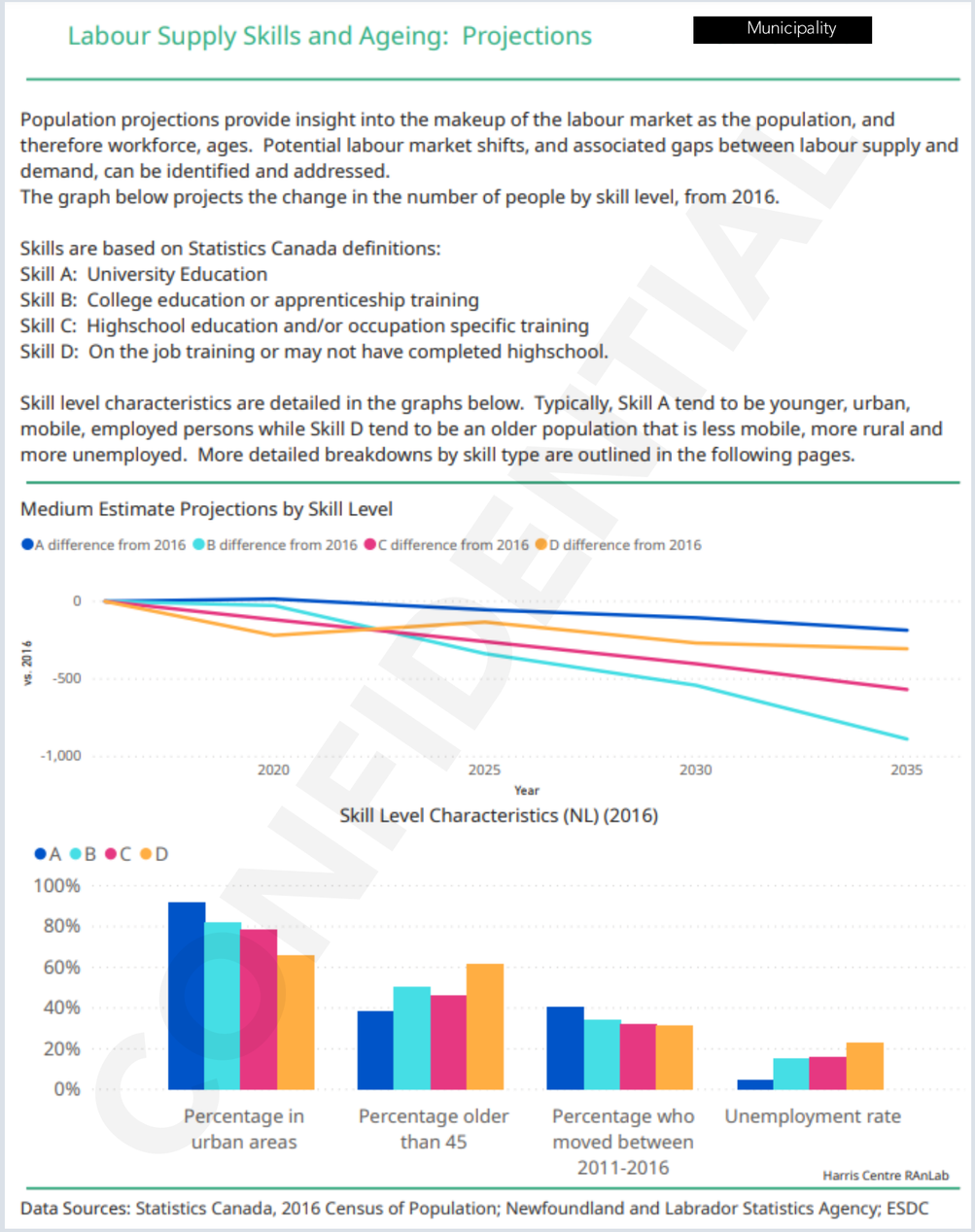
Municipal Estimates of Population by Model and Age Group (Medium Est.)

Pop. Model (2030)	0 to 19	20 to 64	65 plus	**Total**
Very Low	3,181	9,011	5,337	**17,529**
Low	3,290	9,322	5,426	**18,038**
Medium	3,397	9,644	5,515	**18,556**
High	3,505	9,975	5,602	**19,082**
Very High	3,621	10,325	5,693	**19,639**

Harris Centre RAnLab

Data Source: Statistics Canada, 2016 Census of Population; Newfoundland and Labrador Statistics Agency

- Demographics concerns were the most common
  - (Even pre-2020!)
- Project required a new type of demographic model
  - 'Small data' issues associated with rural areas.
  - Expectation of migration volatility.
  - Dramatically unique local experiences.
- Novel "agent-based" approach along with traditional methods
  - Estimates based on long-term local migration data.
    - Can tell if population change is 'a little or a lot'
      - Spread of lines = uncertainty
    - Useful to test recent migration trends!
  - Incorporation of personal attributes including education, skills, occupations



- Workforce Skills and Ageing Modelling
  - Identify at risk skills and occupations
    - By extension, industries!
  - Potential skill mismatches: High skill new entrants vs. lower skill retirements
  - Sector/tech disruption? Non-traditional workforce participants?
  - Devil is in the details!

Labour Supply Skills Overview B: College/Apprenticeship Education

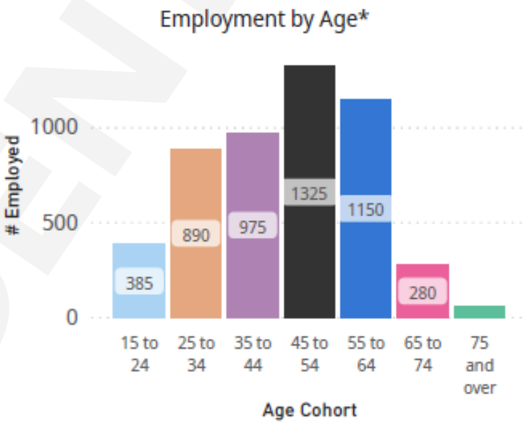
Municipality

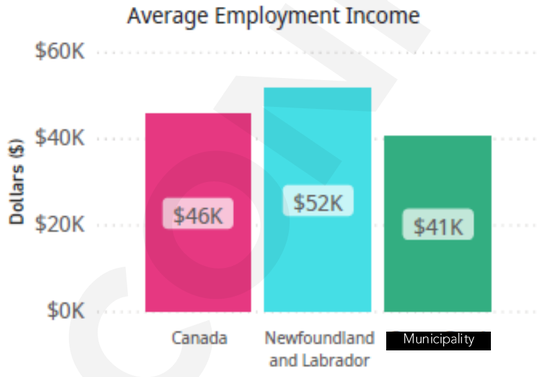
A breakdown of Skill B characteristics can inform what will be needed in the area to attract and retain these skilled workers.

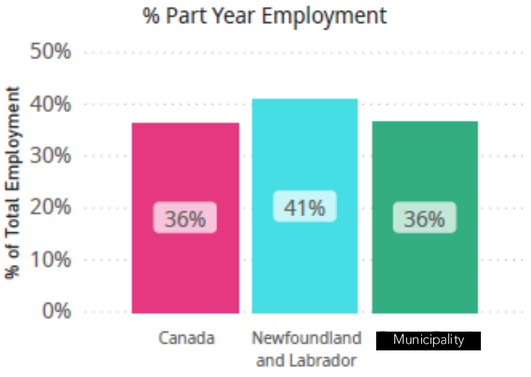
The largest occupations for this skill level, and the percentage of employees over the age of 45, show where replacement will be needed.

Age, Income, and Degree of Seasonal Employment details provide insight into who these skilled workers are and their generalized employment expectations.

Largest Occupations	Employed	%45+
Industrial, electrical and construction trades	975	49%
Administrative and financial supervisors and administrative occupations	900	63%
Technical occupations related to natural and applied sciences	735	47%
Service supervisors and specialized service occupations	710	34%
All Others (Skill B)	2815	42%







* Due to data suppression, employment figures by age may not match those of total employment

Harris Centre RAnLab

Data Sources: Statistics Canada, 2016 Census of Population, Statistics Canada Catalogue nos. 98-400-X2016352, 98-401-X2016055, & 98-401-X2016261

Labour Supply Skills Overview D: No Secondary or Post-Secondary Education

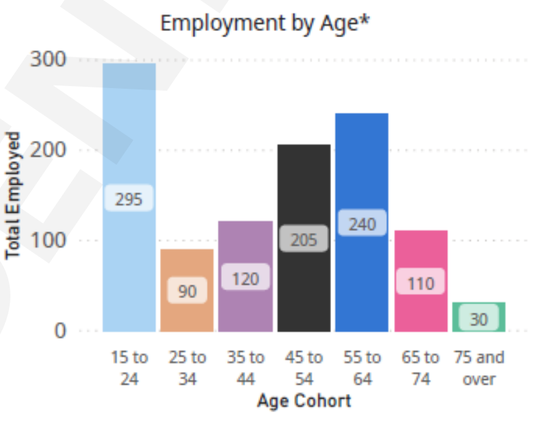
Municipality

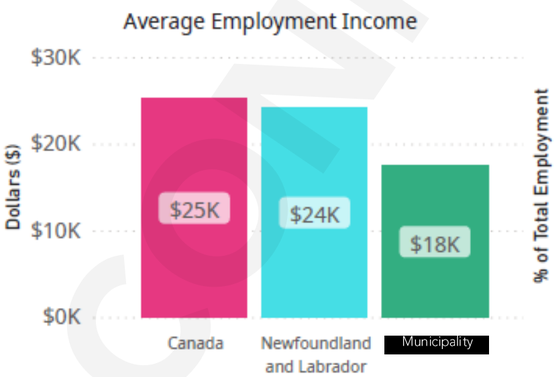
A breakdown of Skill D characteristics can inform what will be needed in the area to attract and retain these skilled workers.

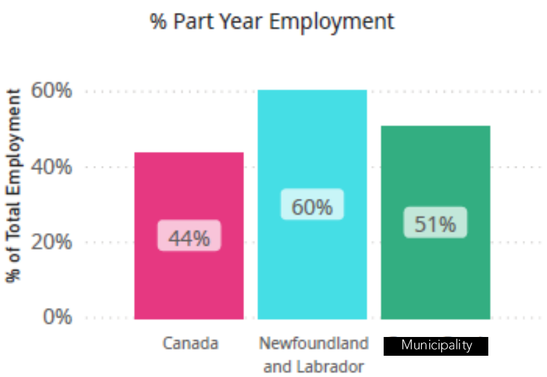
The largest occupations for this skill level, and the percentage of employees over the age of 45, show where replacement will be needed.

Age, Income, and Degree of Seasonal Employment details provide insight into who these skilled workers are and their generalized employment expectations.

Largest Occupations	Employed	%45+
Service support and other service occupations, n.e.c.	1355	46%
Sales support occupations	1115	34%
Trades helpers, construction labourers and related occupations	460	30%
Labourers in processing, manufacturing and utilities	260	54%
All Others (Skill D)	130	72%







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Labour Supply Skills and Ageing: Gaps in the Data and Future Directions

Gaps in the Data

Skills may be transferable not only across geography but across industries. However, the extent to which one occupation or technology can be replaced with another is not well captured by available local data sources. Insight into this will be valuable as policy makers look beyond the local labour market and traditional local industries to address future labour market gaps.

Further Research

As workers age, gaps in the labour market will emerge, highlighting the disconnect between the skills of those retiring and the skills of those entering the work force. Initiatives to attract and retain skilled workers will be critical to not only fill skills gaps but to also evolve with the changing labour market.

When addressing potential skills gaps, two questions need to be asked: 1) where are the gaps and 2) how can they be filled. Further research in the following areas can help provide answers.

Skill specific projections (demand and supply).

Regional/municipal analysis can be used to identify potential areas from which skilled workers can be transferred.

A more detailed breakdown of skills analysis (micro credentials) can provide more information not only on the specific skill needs of the local labour force but also where these skills can be found elsewhere.

Wages are a key factor in attracting and retaining a skilled workforce.

For More Information

Labour statistics (https://www.statcan.gc.ca/eng/subjects-start/labour_)

Older adults and population aging statistics (https://www.statcan.gc.ca/eng/subjects-start/older_adults_and_population_aging)

Population and demography statistics (https://www.statcan.gc.ca/eng/subjects-start/population_and_demography)

Statistical methods portal (https://www.statcan.gc.ca/eng/subjects-start/statistical_methods)

Canadian Occupational Projection System (COPS) (http://occupations.esdc.gc.ca/sppc-cops)

National Occupational Classification (https://noc.esdc.gc.ca/)

There are challenges with aggregate data or only using Statistics Canada data

- What isn't available can be just as important as what is, especially for rural areas
- Local gaps reduce effectiveness and responsiveness of policies, and can make it difficult to define challenges

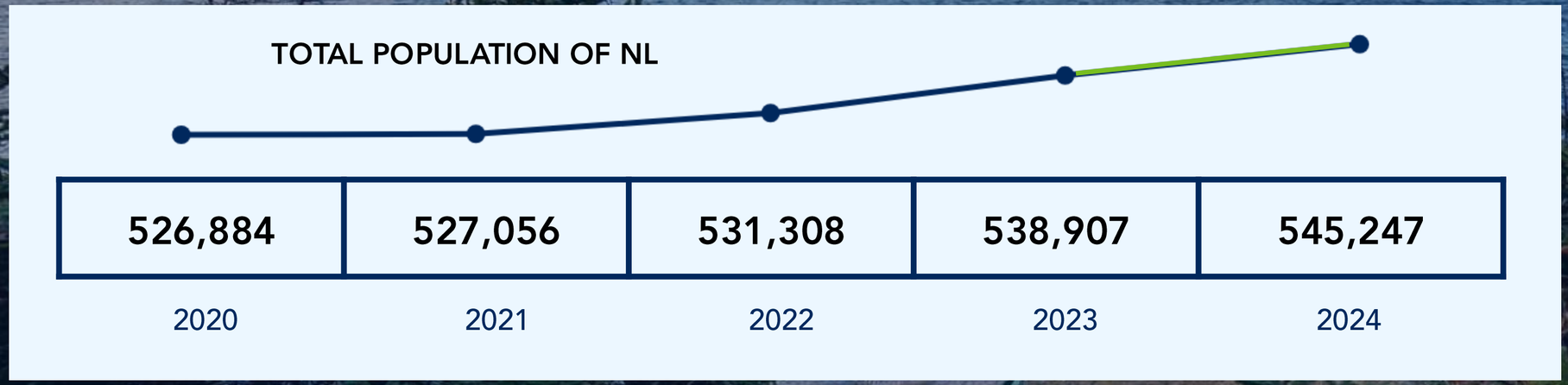
Data Updates: Population Trends

Baseline demographic dynamics since the reports

Rapid population growth provincially due to international migration.

- Age & location patterns of in- and out-migrants vary by source.
  - International migration tends to be younger and more urban.
  - Rates slowing due to Federal policy shifts.
    - 2021-2024 vs. 2025+ ?
- Rural areas continue to age.
- Local forecasts are fundamentally uncertain and scenario-driven.
  - Ideal application for BD:BI population model!

Population Change of Newfoundland and Labrador



18,363

TOTAL CHANGE
Q3 2020 - 2024

Components of Population Change (Full Years 2020-2024)

-13,638

NATURAL CHANGE

9,766

NON PERMANENT RESIDENTS

17,736

INTERNATIONAL MIGRATION

2,319

INTERPROVINCIAL MIGRATION

Sources: Statistics Canada. Tables 17-10-0009-01, 17-10-0020-01, 17-10-0040-01, 17-10-0059-01

Local Population Trends

Recent Demographic Context

Population Change in NL's Rural and Urban Areas, 2020-2024

	Rural	Urban	Total (NL)
Net Natural Change	-8,400	-2,576	-10,976
Net Migratory Change	5,087	23,128	28,215
Net Intraprovincial Migration	-3,475	3,475	0
Net Interprovincial Migration	4,900	-913	3,987
Net International Migration	3,662	20,566	24,228
Permanent	2,504	11,378	13,882
Non-Permanent	1,158	9,188	10,346
Net Population Change	-3,313	20,552	17,239

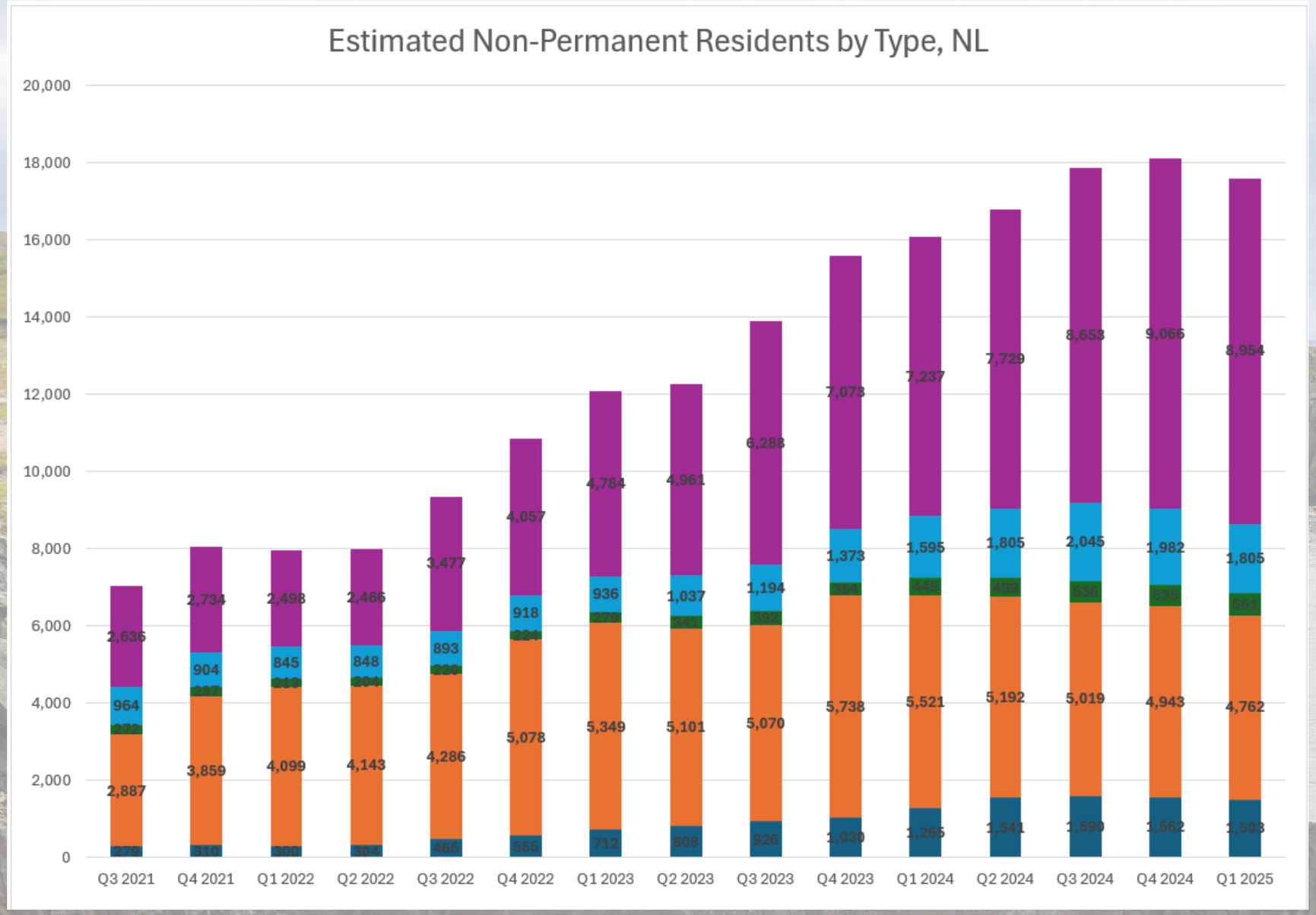
Migration by Age for NL's Urban Areas, 2020-2024

URBAN AREAS	0 to 19 years	20 to 44 years	45 to 64 years	65 years and older	All Ages
Net Migratory Change	7,035	13,171	1,793	1,129	23,128
Net Intraprovincial Migration	360	2,899	-438	654	3,475
Net Interprovincial Migration	-335	-1,652	795	279	-913
Net International Migration	7,010	11,924	1,436	196	20,566
Permanent	3,517	7,107	677	77	11,378
Non-Permanent	3,493	4,817	759	119	9,188

Migration by Age for NL's Rural Areas, 2020-2024

RURAL AREAS	0 to 19 years	20 to 44 years	45 to 64 years	65 years and older	All Ages
Net Migratory Change	1,843	-562	3,638	168	5,087
Net Intraprovincial Migration	-360	-2,899	438	-654	-3,475
Net Interprovincial Migration	1,170	-96	3,009	817	4,900
Net International Migration	1,033	2,433	191	5	3,662
Permanent	749	1,623	122	10	2,504
Non-Permanent	284	810	69	-5	1,158

Source: Statistics Canada. Tables 17-10-00135-01 and 17-10-00139-01 Population estimates, July 1, 2016 boundaries, Annual



Work permit holders only

Work & study permit holders

Total, asylum claimants, protected persons and related groups

Study permit holders only

Other

Statistics Canada. Table 17-10-0121-01 Estimates of the number of non-permanent residents by type, quarterly

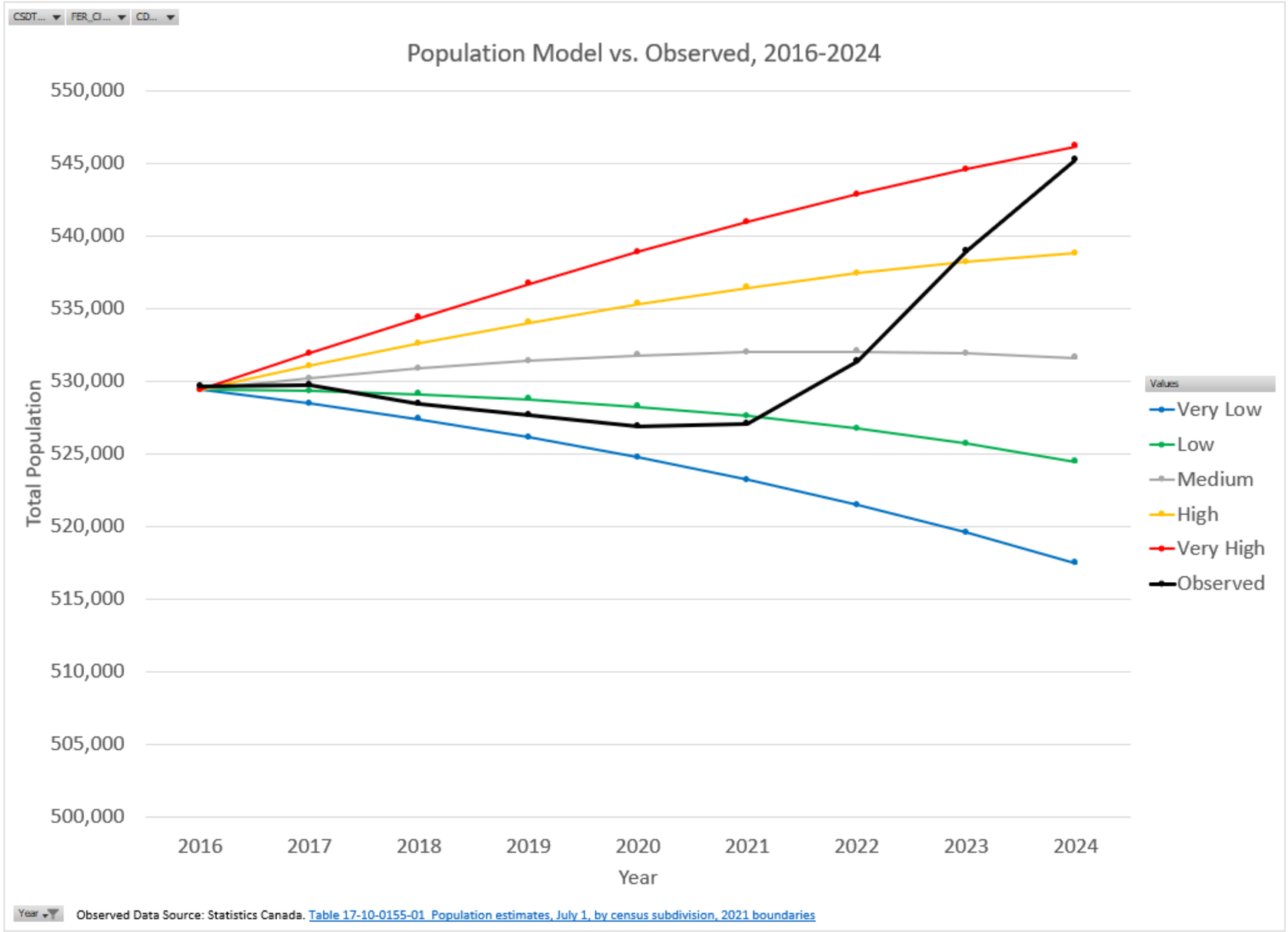
Population Projections

Big Data: Big Ideas custom model

‘Uncertainty-based’ migration model assesses recent change!

Spread of lines = Uncertainty of past migration data

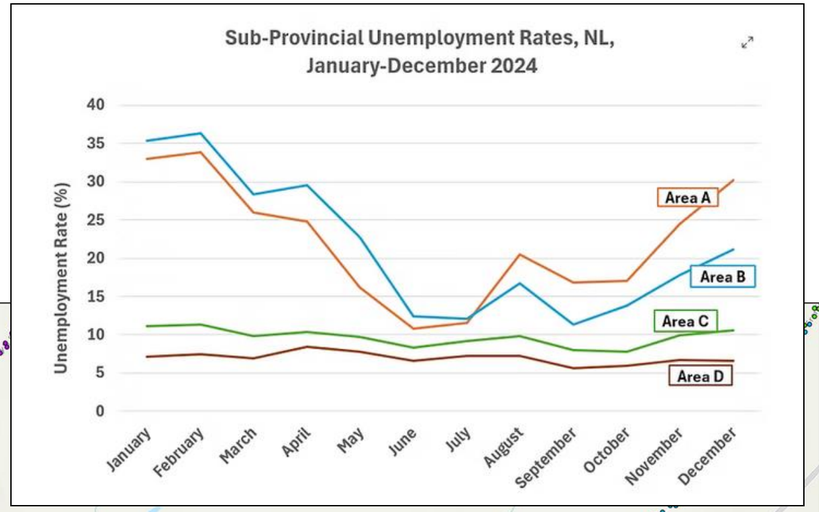
- Test impact of trends vs. local lived experience
- Every municipality and region has a different story

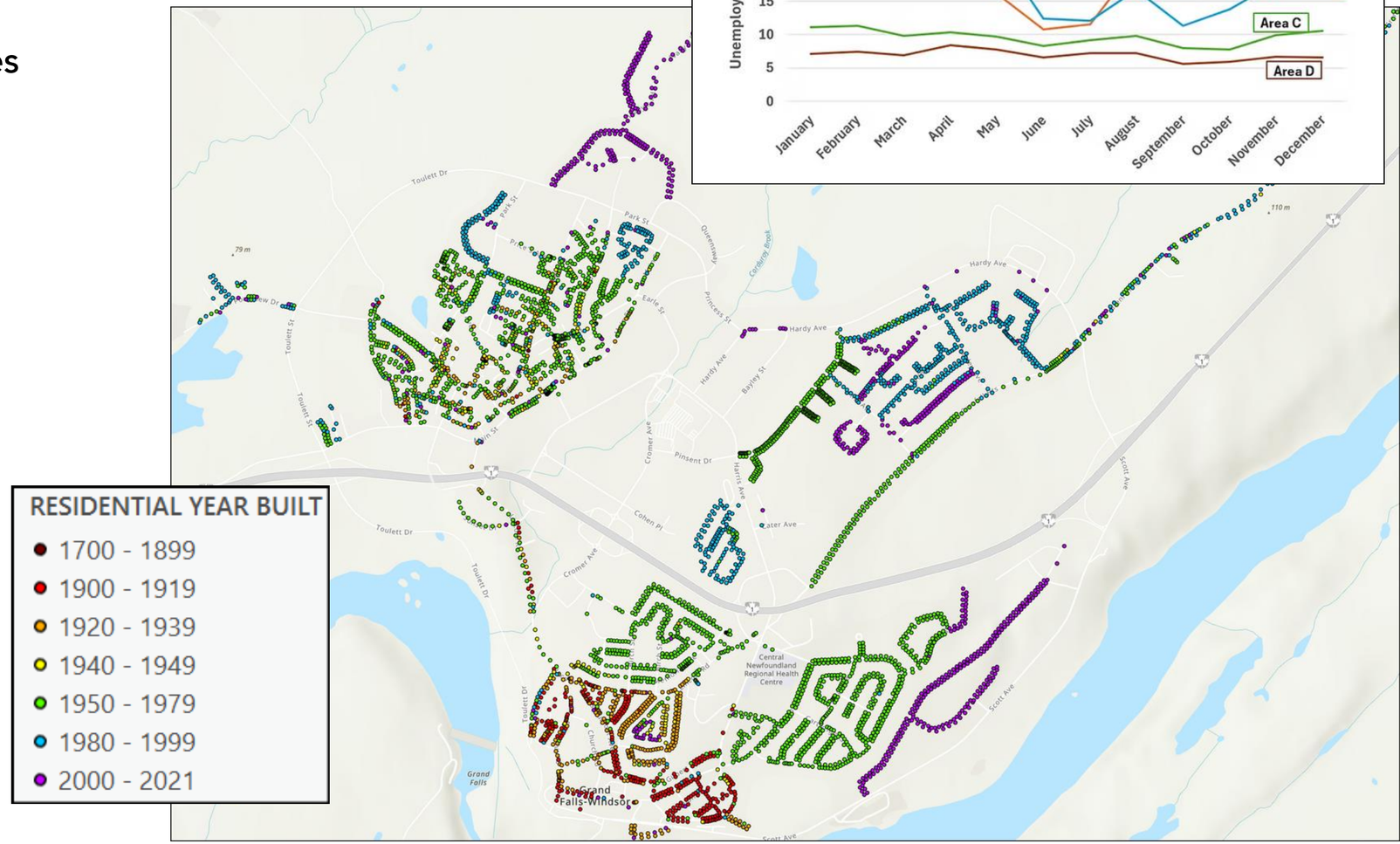


Modernizing Data

Evolving data and analysis landscape in Newfoundland and Labrador

- Beyond the Census: More information sources
  (If you work for it!)
  - Community Accounts, MyStatsCan
  - Labour Force Survey, SEPH, EI
    - Self-Contained Labour Areas
  - Linkable Open Data Environment
  - Department data/Geohubs
- Plus private sources
  - Lightcast
  - AirDNA
  - Townfolio





Data Portal Development

Lessons learned from municipal level projects

Big Data: Big Ideas

Reports on changing demographics and associated trends

Housing Needs Project

Assessments of housing need considering economic and other factors

Need to increase usefulness of PDF reports

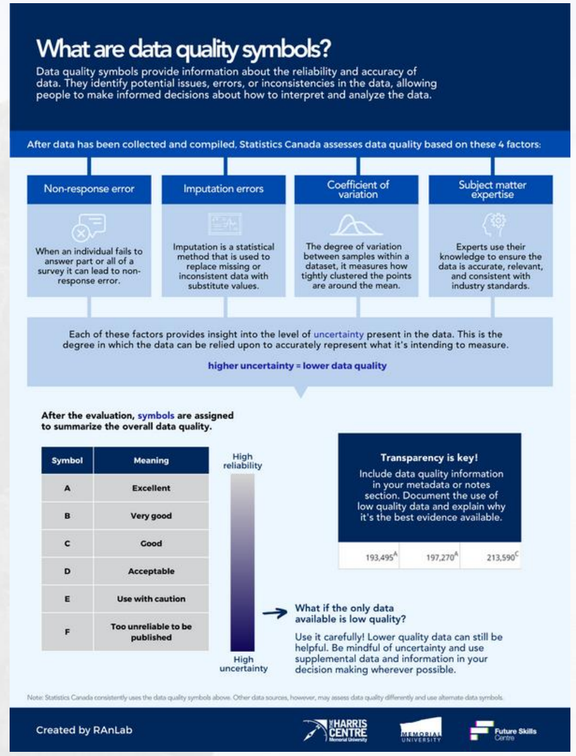
- Data environment is everchanging: volume, velocity, variety
- Cost, complexity, and capacity concerns

Local oversight is necessary

- Gaps in administrative data
- Small sample sizes, suppression, and data quality issues
  - Metadata and flexible sources

Data should increase strength of decisions

- Increasing reliance on data standards
- Data is a strategic asset



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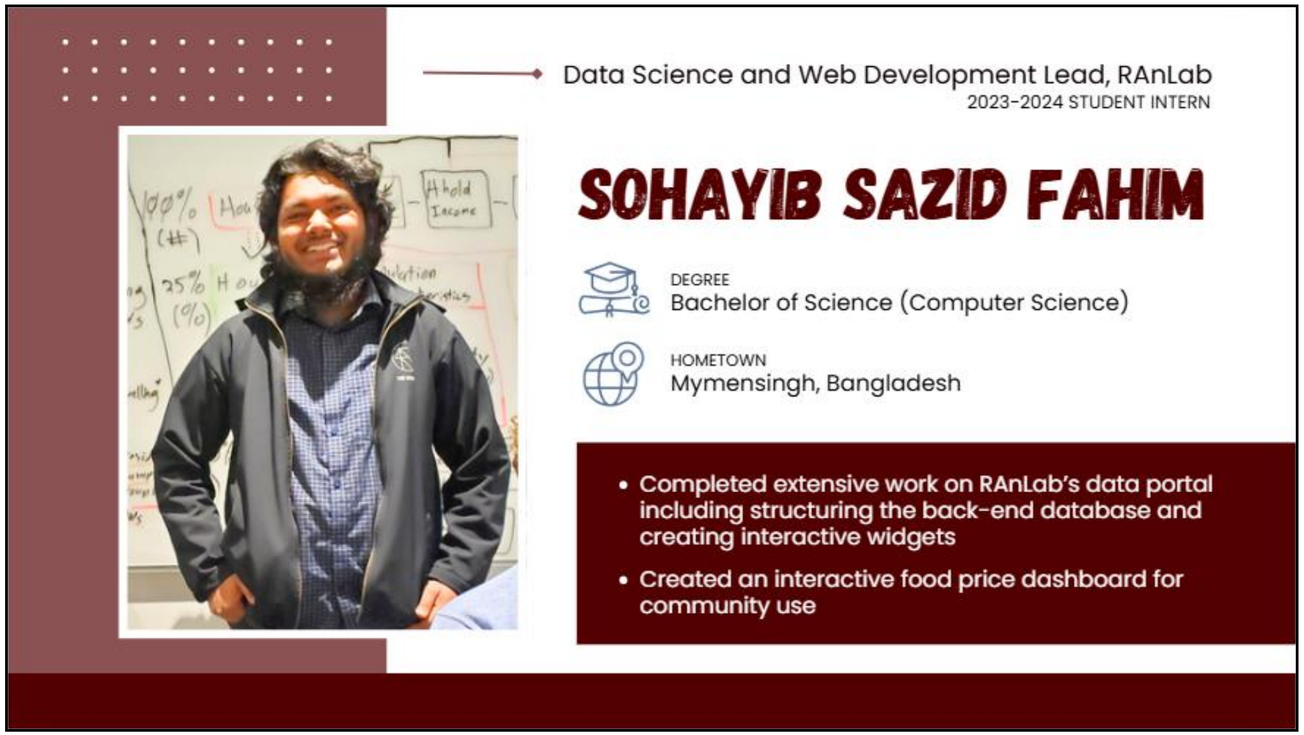
Data Portal Development

Driven by community-focused projects, powered by student programmers



Incredible training opportunity for students

Cost-effective keeping overhead minimal

Lead developer: Sohayib Fahim (Computer Science)
Front-end Support: Al-amin Badhon (Software Engineering)

Data Portal & Housing

Practical information and the importance of data standards

Housing Needs Research Project

- Housing Needs Research Group established by NLHC
  - Members: NL Statistics Agency, Municipal and Provincial Affairs, CMHC, Municipalities NL, etc.
- Identified need for systematic HNA process (cost effective & consistent methodologies)
- RAnLab & NLHC partnership

Newfoundland & Labrador

Housing

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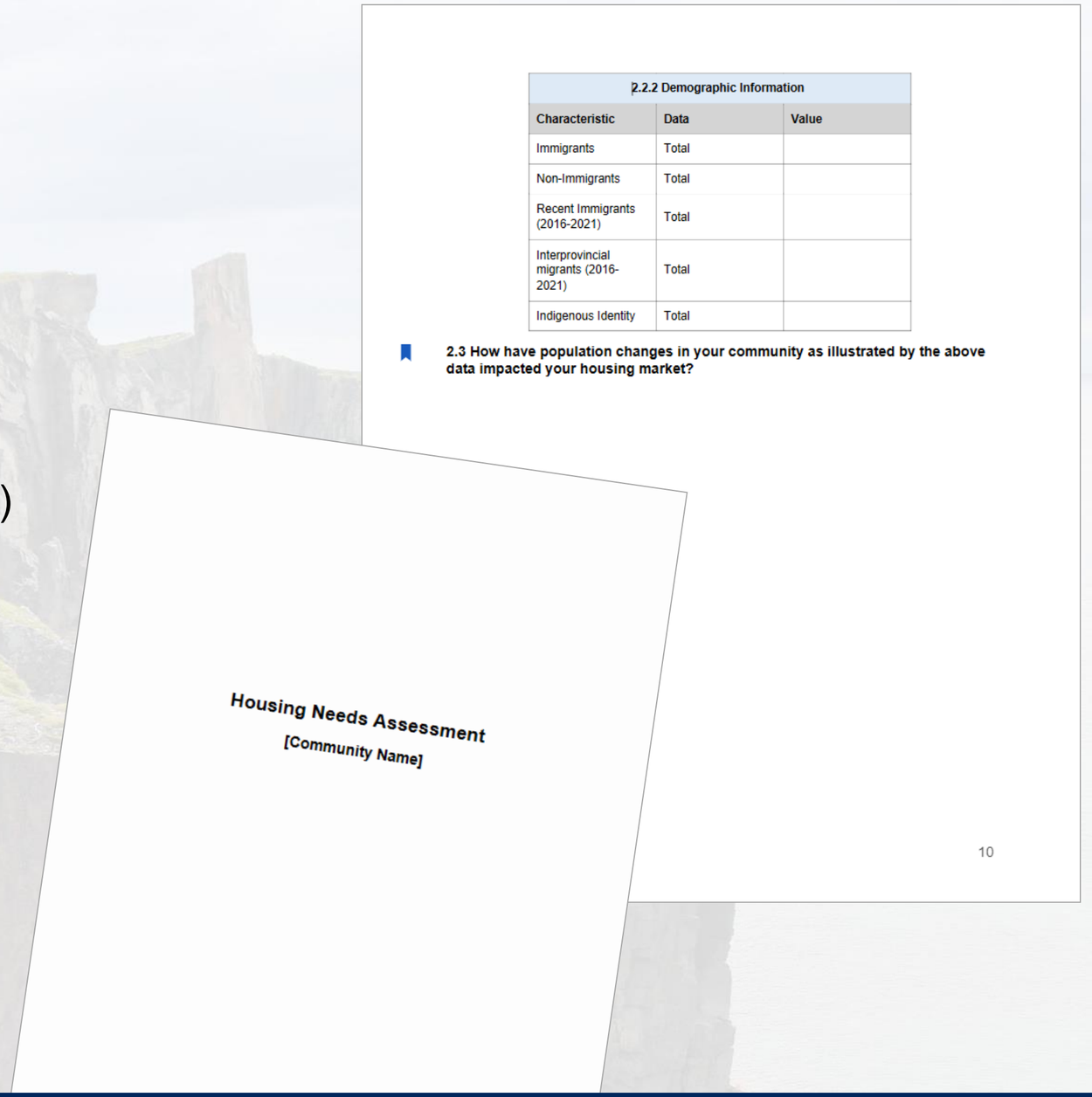
Data Portal & Housing

Practical information and the importance of data standards

- Comprehensive data model
  - Systematic—aligns with federal HNA template
  - Flexible—built for customization (community input)
  - Long-term approach
- Housing needs assessment reports
  - Guided by federal template
  - Data tables, written responses, projections
  - Gaps and issues addressed through engagement sessions



2.2.2 Demographic Information		
Characteristic	Data	Value
Immigrants	Total	
Non-Immigrants	Total	
Recent Immigrants (2016-2021)	Total	
Interprovincial migrants (2016-2021)	Total	
Indigenous Identity	Total	

2.3 How have population changes in your community as illustrated by the above data impacted your housing market?

Housing Needs Assessment

[Community Name]

10

Data Portal & Housing

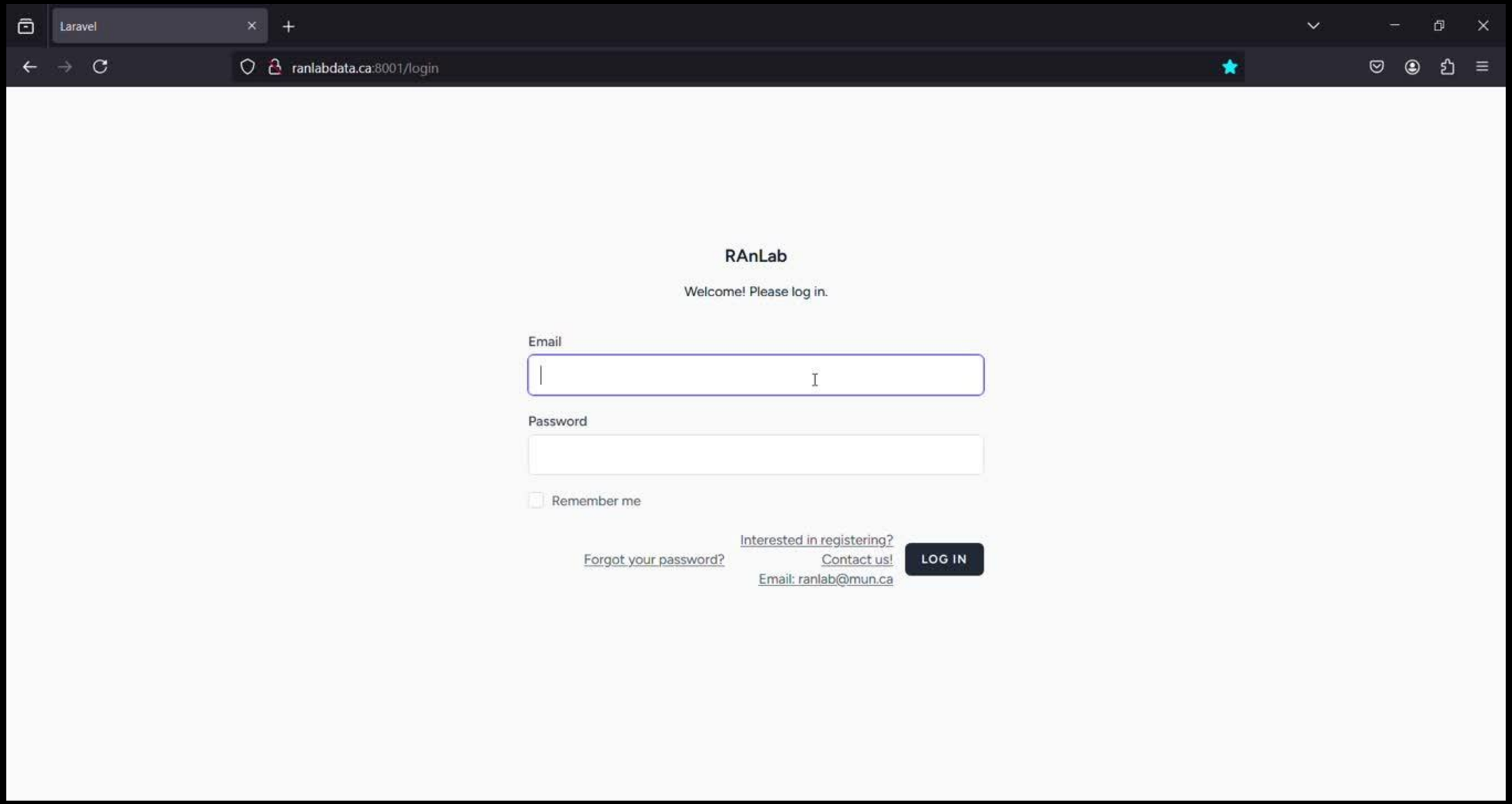
Practical information and the importance of data standards

- Data standards are important
  - Consistent methodologies and datasets enable comparisons of places
  - E.g. CSA R113:22, Indicators for Rural Community Well-being, Services, and Quality of Life
  - Especially challenging in rural areas due to data availability and quality concerns
- Federal HNA template is a standard for housing data
  - Practical and efficient—this standard has policy implications (i.e. funding program requirements)
    - Required for the Housing Accelerator fund, Canada Community-Building Fund, and “Future federal infrastructure funding applicants...”
    - Updates required at least every five years
  - Housing information intertwined with the labour market

Data Portal & Housing

Initial features and getting access

- Up-to-date Statistics Canada data
  - Unlike reports (such as Big Data: Big Ideas and Housing Needs Assessments), the data portal uses current data and will continuously update with new releases
- New user registration open
  - Secure logins are now available by request: www.ranlab.ca/data-portal
- Flexible and ongoing development
  - Roll-out of new features ongoing. Suggestions? Let’s talk!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RAnLab
Welcome! Please log in.
Email
Password
Remember me
Forgot your password?
Interested in registering?
Contact us!
Email: ranlab@mun.ca
LOG IN

Thank You!

Questions?

Jamie Ward (RAnLab Manager)
Email: jward@mun.ca

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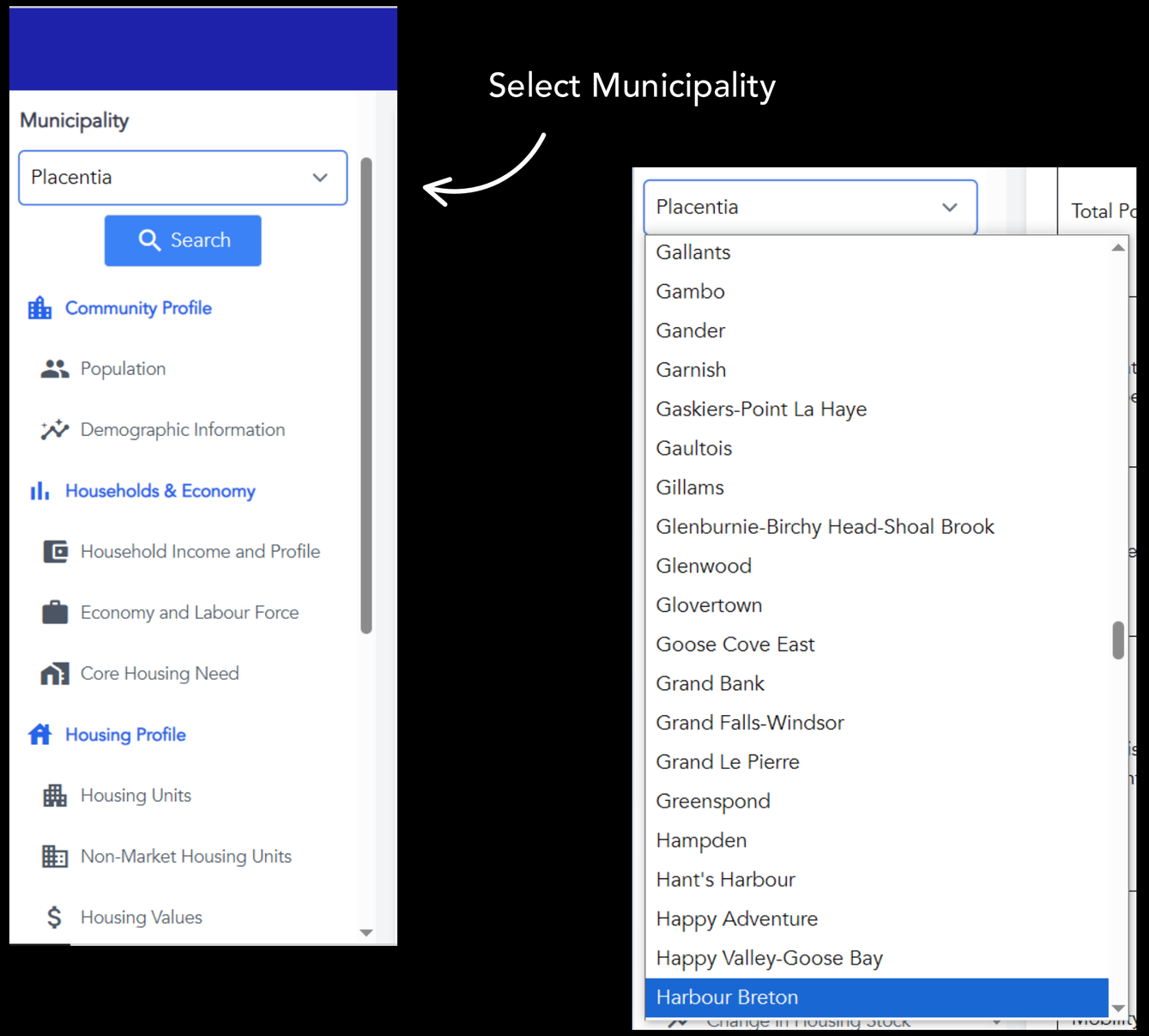
Municipality

Placentia

Search

2.2.1 Population of Placentia

Characteristic	Category	Value	Lower Bound Value	Upper Bound Value	Geography Level	Data Year	Data Source	Source Reference
Total Population (Number)	2016	3496	N/A	N/A	CSD	2021	Statistics Canada	98-401-X2021016
	2021	3289	N/A	N/A	CSD	2021	Statistics Canada	98-401-X2021016
Population Growth (Number)	Total	-207	N/A	N/A	CSD	2016-2021	Statistics Canada	98-316-X2021001
	Percentage	-5.9	N/A	N/A	CSD	2021	Statistics Canada	98-401-X2021016
Age (Years)	Average	50.8	N/A	N/A	CSD	2021	Statistics Canada	98-401-X2021016
	Median	56.4	N/A	N/A	CSD	2021	Statistics Canada	98-401-X2021016
Age Distribution (Percentage)	0 - 14 years	10.9	N/A	N/A	CSD	2021	Statistics Canada	98-401-X2021016
	15 - 64 years	56.2	N/A	N/A	CSD	2021	Statistics Canada	98-401-X2021016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Characteristic	Data	Value	Lower Bound Value	Upper Bound Value	Geography Level	Data Year	Data Source	Source Reference
Number of workers in the Labour Force	Total	1370	1272	1476	CSD	2021	Statistics Canada	98-401-X2021016
Number of workers by industry (Top 10 only)	62 Health care and social assistance	290	235	358	CSD	2021	Statistics Canada	98-316-X2021001
	23 Construction	150	114	197	CSD	2021	Statistics Canada	98-316-X2021001
	44-45 Retail trade	150	94	240	CSD	2021	Statistics Canada	98-316-X2021001
	91 Public administration	110	70	174	CSD	2021	Statistics Canada	98-316-X2021001
	48-49 Transportation and warehousing	100	67	150	CSD	2021	Statistics Canada	98-316-X2021001
	61 Educational services	100	67	150	CSD	2021	Statistics Canada	98-316-X2021001
	11 Agriculture, forestry, fishing and hunting	90	46	175	CSD	2021	Statistics Canada	98-316-X2021001
	72 Accommodation and	70	45	108	CSD	2021	Statistics	98-316-