Views of the Divide:

AN INVESTIGATION INTO CANADA'S WIRELESS DIVIDE, COMMISSIONED BY TELUS COMMUNICATIONS INC.

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VIVICresearch

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Executive Summary

As constant connectivity becomes the norm, policy makers must become more attuned to the barriers faced by individuals to accessing that connectivity. Despite near universal access to wireless service in Canada, we estimate from the 2020 Canadian Internet Use Survey (CIUS) that up to 1.9M people have neither a smartphone and mobile data and 2.3M have a smartphone but no data plan. Taken together, approximately 4.3M people aged 15 and older potentially fall within the wireless divide, which we define as the sub-population of individuals lacking either a smartphone or data plan.

To better understand the wireless divide in Canada, this study combines quantitative data in Statistics Canada's 2020 Canadian Internet Use Survey (CIUS) with qualitative interviews with organizations working with individuals experiencing the wireless divide in Canada, using a framework of access, affordability, and digital skills. Some key findings from the analysis are:

- Just under half of people in the divide (approximately 43 percent) are older adults, and low-income people make up more than a quarter of all people in the wireless divide (approximately 35 percent).

- There is evidence that technology reluctance and affordability are drivers of the divide, specifically for people who lack both a smartphone and data plan. The most common reason for not having a smartphone is a lack of need or interest, making up 5 percent of all people in Canada, and only 2 percent report cost as a barrier to having a smartphone.

- The stakes of the wireless divide are rising for low-income, older adults and disabled individuals as social programs such as social services and health care increasingly centralize and digitize.

Building on these quantitative findings, results from qualitative interviews highlighted avenues for addressing the wireless divide:

- Expanding eligibility of and access to programs that provide subsidized mobile service (like TELUS' Mobility for Good program), which are often tied to eligibility for government programs such as the Guaranteed Income Supplement for older adults, could enable these programs to support more people in need of wireless connectivity.

- Introducing more prepaid and pay-as-you-go options could increase access to wireless services to low-income people, people who are unhoused or have unstable housing, and individuals with no credit history, like some new Canadians.

- There is opportunity to innovate programs aimed at improving digital skills of people in the wireless divide by retooling programs to "pull" rather than "push" skills development. Learning opportunities could be paired with an existing related need that allows participants to organically develop skills, rather than learn skills in the abstract.

Introduction

One of the earliest definitions of the digital divide described it in 1998 as "the growing gap between the underprivileged members of society, especially the poor, rural, elderly, and handicapped portion of the population who do not have access to computers or the Internet; and the wealthy, middle-class, and young Americans living in urban and suburban areas who have access."[1] Much has changed about the nature and ubiquity of communications technology since then, and the importance of connectivity has only intensified, including the now wide-scale use of mobile wireless devices, most notably smartphones. The Covid pandemic and the shift towards more digital service delivery has made the digital divide an even more pressing issue and is an important motivator for this study.

The aim of this study is to build a more detailed picture of the population within Canada that lacks mobile wireless connectivity specifically – the "wireless divide". This wireless divide is understood to be an aspect of the broader digital divide within Canada, which also includes people who lack access to other forms of connectivity, such as access to public Internet or Internet in their home. In addition, the study aims to outline some current proposals for both government and the private sector for addressing the divide and highlight avenues for future research on the issue. The overall purpose of this analysis is to support the development of better targeted policy responses to Canada's wireless divide.

This study blends quantitative data from the 2020 Canadian Internet Use Survey (CIUS) conducted by Statistics Canada (via custom tabulations) with qualitative data generated through semi-structured interviews that build on and identify gaps within the quantitative data. To gather the qualitative data, Vivic reached out to 28 organizations working with populations in Canada most likely to experience the wireless divide (e.g., low-income individuals, older adults, new Canadians), and conducted interviews with five.

This study begins with a brief methodological overview. The second section provides a detailed definition of the wireless divide for the purposes of this study, estimates of the size of Canada's wireless divide, and a discussion of the limitations and challenges in defining the wireless divide. Section three provides a quantitative picture of the different wireless divides in Canada, creating an estimate of their magnitude and identifying demographic characteristics of individuals within those divides.

Next, this study explores the potential drivers (section 4) and consequences (section 5) of the wireless divide through the lens of the CIUS. In the sixth section, we examine select demographic profiles within the wireless divide that, while sometimes overlapping, exhibit noteworthy differences in either the barriers to wireless services they face, the consequences of those barriers, or the potential responses to those barriers. These profiles include low-income individuals, older adults, new Canadians, and individuals with disabilities.

[1] Stanford University, Digital Divide (1998)

We conclude with recommendations for enhancing future iterations of the CIUS and suggesting next steps for policymakers and researchers interested in tackling Canada's wireless divide.

1. Methodology

This study blends quantitative data from the 2020 Canadian Internet Use Survey (CIUS) conducted by Statistics Canada (via custom tabulations) with qualitative data generated through semi-structured interviews to derive a broad understanding and conceptualization of the nation's wireless divide. By leveraging both qualitative and quantitative data, we can address gaps and shortcomings with each data source, developing a richer picture of the wireless divide.

The CIUS surveys people in Canada aged 15 and older on their use of Internet, with the most recent survey undertaken in 2020 at the time this report was developed. To gather the qualitative data, we reached out to 28 organizations working with populations in Canada most likely to experience the wireless divide (e.g., low-income individuals, older adults, new Canadians), and conducted semi-structured interviews with five organizations: the B.C. Poverty Reduction Coalition, MediaSmarts, Ve'ahavta, the Together Against Poverty Society, and the Ontario Municipal Social Services Association. The questionnaire used for the interviews is provided in Annex A.

2. Quantifying the Wireless Divide

For this study, we classify people without either a smartphone or a data plan as falling within the wireless divide. To determine the percentage of individuals aged 15 and older who fall within the wireless divide, we leverage two questions posed in the CIUS:

- Do you have a smartphone that you use for personal use (question SM_Q010)?
- Do you have access to the Internet through a mobile data plan for personal use (question AC_Q030)? [2]

From these two questions, we construct a two-by-two matrix that outlines four distinct subpopulations:

- people with both a smartphone and mobile data plan,
- people with a smartphone but no mobile data plan,
- people with no smartphone but a mobile data plan, and
- people with neither a smartphone nor mobile data plan.

People with a smartphone but no data plan, and those lacking both a smartphone and data plan constitute the wireless divide. The percentage of individuals that fall within these two

[2] This question includes individuals with work-provided smartphones that are available for personal use.

categories, as well as the percentage of individuals outside the wireless divide, are reported in Table 1 below.[3]

Table 1: Sub-populations matrix, 2020 CIUS.

		Do you have access to the Internet through a mobile data plan for personal use?	
		Yes	No or Don't Know
Do you have a smartphone that you use for personal use?	Yes	75.6% (CI 5%: 74.9, 76.4)	7.3% (CI 5%: 6.8, 7.9)
	No or Don't Know	1.5% (CI 5%: 1.4, 1.8)	6.0% (CI 5%: 5.6, 6.4)

In total for the year 2020, the data show that approximately 7.3 percent (CI 5%: 6.8, 7.9) of people in Canada do not have access to a wireless Internet plan but have a smartphone, equating to 2.3M people. Similarly, approximately 6.0 percent (CI 5%: 5.6, 6.4) of people have neither a smartphone nor mobile data access (1.9M people). In total, the results suggest that as many as 4.3M people may fall within the wireless divide.[4]

The two main categories outlined in Table 1 that comprise the wireless divide allow us to consider differences in the depth or level of intensity of the divide; those with a smartphone but no data plan are considered to have partial wireless connectivity, and people without both a smartphone and a data plan are considered fully lacking wireless connectivity. For example, people with a smartphone but no data plan may have greater connectivity than people lacking both a smart phone and data plan, despite still being under-connected, because they may substitute wireless data with either a home or public Internet connection.[5] This group's wireless connectivity may be intermittent and geographically bounded. However, these individuals have a more flexible means of accessing connectivity than those with neither a smartphone nor data plan, who we consider to be deeper within the wireless divide.

Throughout this report, we refer to these two groupings as the *CIUS wireless divide categories*: people with a smartphone but no data plan (partial wireless connectivity) and people without a smartphone or data plan (fully lacking wireless). For the purposes of this study, we further classify people with both a smartphone and a data plan as being outside the

[3] Results do not sum to 100% due to non-responses.

[4] We do not consider the population of individuals reporting no smartphone but access to a data plan given the availability of a "don't know" response and the unlikely nature of this outcome based on qualitative interviews.

[5] Ryerson Leadership Lab, Mapping Toronto's Digital Divide (2021)

wireless divide, recognizing that there are several important limitations to this classification. In the analysis that follows, we examine these categories in more detail.

WIRELESS-CONNECTIVITY RELUCTANCE

Our approach to defining the wireless divide includes people who may lack either a smartphone or data plan because they have no personal interest in being wirelessly connected. Because these individuals have no desire for wireless connectivity, they might not consider themselves within the wireless divide. It follows that a potential critique of including these individuals would be the inflation of wireless divide numbers, and the potential for mistargeted policy interventions.

Our rationale for including wireless-reluctant people in the wireless divide comes from feedback gained in key informant interviews, and recent and anticipated policy developments related to wireless connectivity. Interviewees highlighted the growing need for connectivity as government programs and services continue to shift to digital-first formats. Furthermore, if an individual chooses not to use wireless services, there is an increasing number of barriers to moving seamlessly through life. Current examples of this include the ArriveCan mobile app released by the Canadian government, which for a time was required for individuals traveling or returning to Canada, and the increasing use of smartphones to deliver emergency alerts from government authorities.

The aim of closing the wireless divide, and the digital divide more broadly, is to ensure social and economic inclusion. On this basis, interview results lead us to consider wireless-technology reluctance as a contributing factor to the wireless divide. Furthermore, while it is certainly possible today for individuals to navigate every-day life without a wireless plan and smartphone, including these individuals in the wireless divide ensures that our methodology remains relevant into the future as wireless connectivity becomes increasingly more important.

There are also several data-driven and conceptual reasons for including people who report having no interest in wireless technologies in the wireless divide. We discuss these in more detail in *Annex B*.

LIMITATION – WIRELESS CONNECTIVITY ADEQUACY

An important shortcoming of defining the divide by whether someone lacks either a smartphone or data plan is that we do not capture people who have wireless connectivity that does not fully meet their needs. For example, some people on prepaid plans may only be able to purchase sufficient data access for limited periods of time and accordingly have routine gaps in connectivity. Likewise, some people may have a smartphone and postpaid data plan, but their plans may not provide sufficient data. This theme of adequacy arises in research undertaken by the Ryerson Leadership Lab, which maps the digital divide specific to broadband access in Toronto. The study found that 9 percent of people surveyed reported a home Internet

connection that was "slow" or "very slow". Furthermore, for people who do not have access to the Internet at home, 22 percent reported using a mobile phone data plan instead.[6]

Furthermore, findings from interviews done for this study suggest that wireless connectivity needs may differ between people. Specifically, people with unstable housing may have greater wireless connectivity needs than those with more stable housing because they do not have a home, and thus do not have home Internet.

We are unable to glean from the CIUS how many people have a smartphone and data plan yet their current connection does not meet their needs. Thus, estimates on the size of the wireless divide generated using CIUS should be interpreted with this consideration in mind. Further discussion on the issue of adequacy and its relevance to defining the wireless divide can be found in *Annex B*.

3. Who Is in the Wireless Divide?

The demographic characteristics most strongly associated with the wireless divide are age and income. Populations in both CIUS wireless divide categories – people with a smartphone but no data plan and people without a smartphone or data plan – skew higher in terms of age, relative to people with a smartphone and a data plan. However, results are less stark for those with a smartphone but no data, with only 30 percent (CI 5%: 28, 33) of individuals being above 65 years of age compared to over 60 percent (CI 5%: 59, 65) for individuals with neither. Overall, just under half of people in the divide (approximately 43 percent) are older adults.

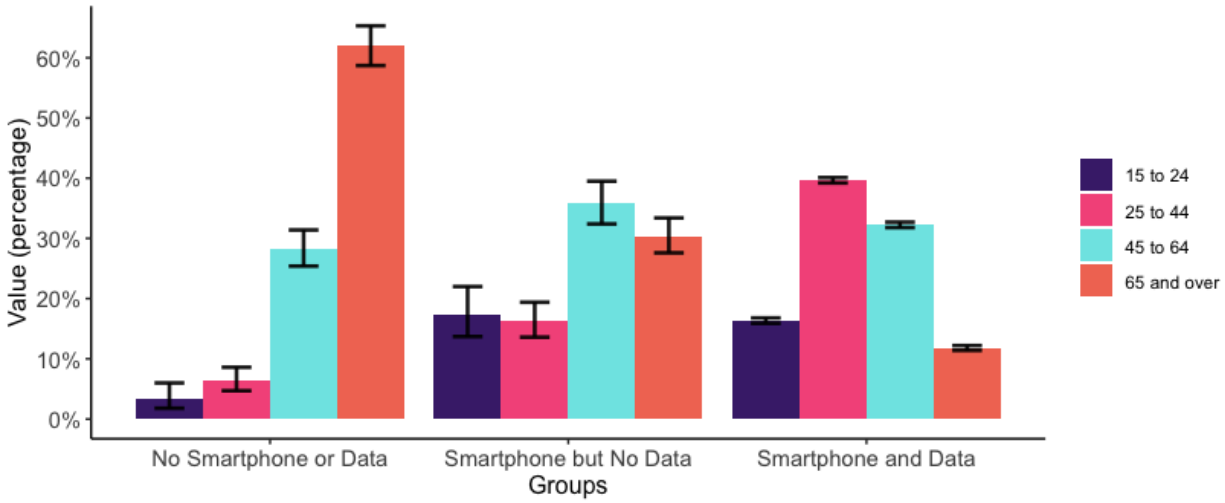

Figure 1: CIUS wireless divide categories by age groups.

The distribution of before-tax census family income for both CIUS wireless divides also skews lower but is less extreme for individuals with a smartphone but no data plan. Only 29 percent (CI 5%: 26, 32) of people with a smartphone but no data plan are in the lowest

[6] Ryerson Leadership Lab, Mapping Toronto's Digital Divide (2021)

quartile, compared to 44 percent (CI 5%: 44, 47) with no smartphone or data plan. All together, people in the first quartile make up more than a quarter of all people in the wireless divide (approximately 35 percent). There is also a larger proportion of people with a smartphone but no data plan with incomes in the highest quartile (20 percent (CI 5%: 17, 24) relative to the no smartphone or data plan category (10 percent (CI 5%: 8, 13)).

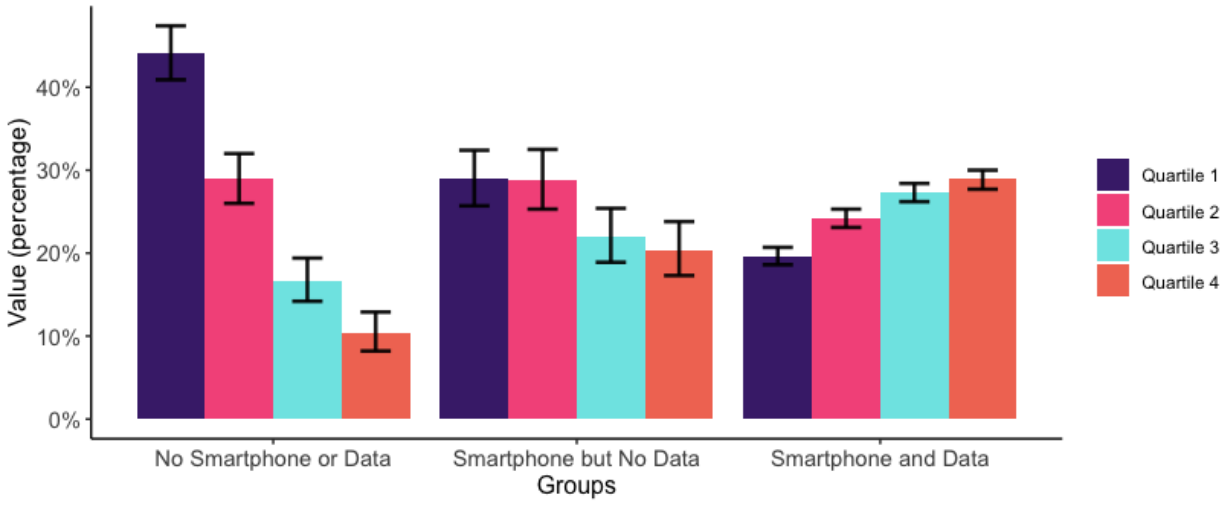

Figure 2: CIUS wireless divide categories by census family income quartile.

People in the digital divide are more likely to have lower levels of education than people outside of the divide. Of people lacking both a smart phone and data plan, 43 percent (CI 5%: 40, 47) have a high school education or less. Similarly, 42 percent (CI 5%: 38, 47) of people with a smart phone but no data plan have a high school education or less. In contrast, only 28 percent (CI 5%: 26, 29) of people with both a smart phone and data plan have a high school education or less. Overall, education status is generally similar between people in the two CIUS wireless divide categories (people with a smart phone but no data plan and people without both a smart phone and data plan). The only statistically significant difference between the two groups is with respect to university education, with 25 percent (CI 5%: 21, 28) of those with only smartphones having a university degree and 18 percent (CI 5%: 16, 21) of people with neither a smartphone nor data plan having university-level education.

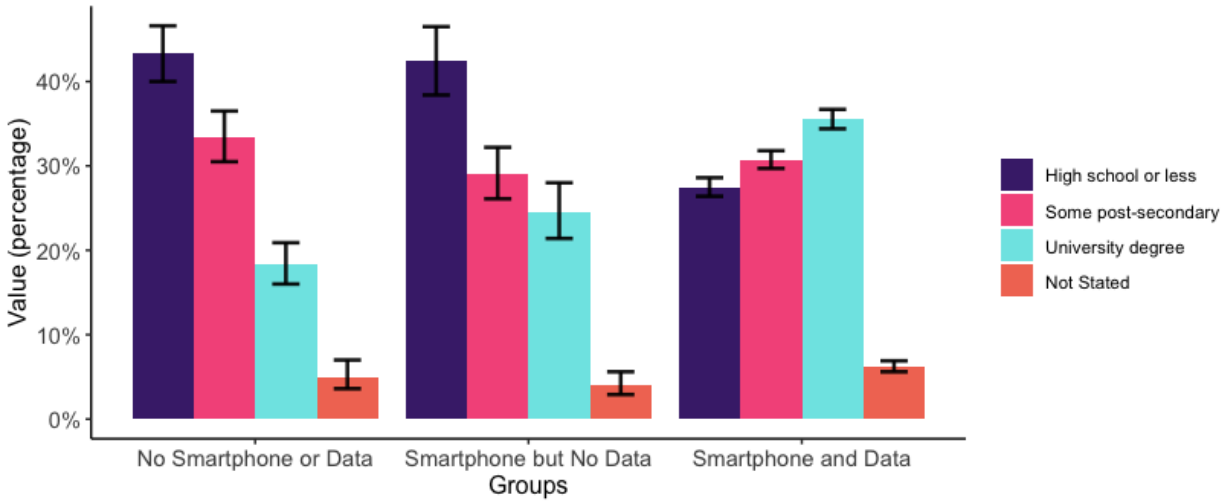

Figure 3: CIUS wireless divide categories by education status.

OTHER DEMOGRAPHIC DIFFERENCES ARE LESS PRONOUNCED

For gender, visible minority status and immigration status, distinctions between digital divide groups are less pronounced, and are reflected primarily in those without either a smartphone or data plan. Women are slightly overrepresented in this category of the wireless divide, making up 55 percent (CI 5%: 52, 58) of individuals without a smart phone or data plan compared to 50 percent (CI 5%: 49, 50) of people outside of the wireless divide.

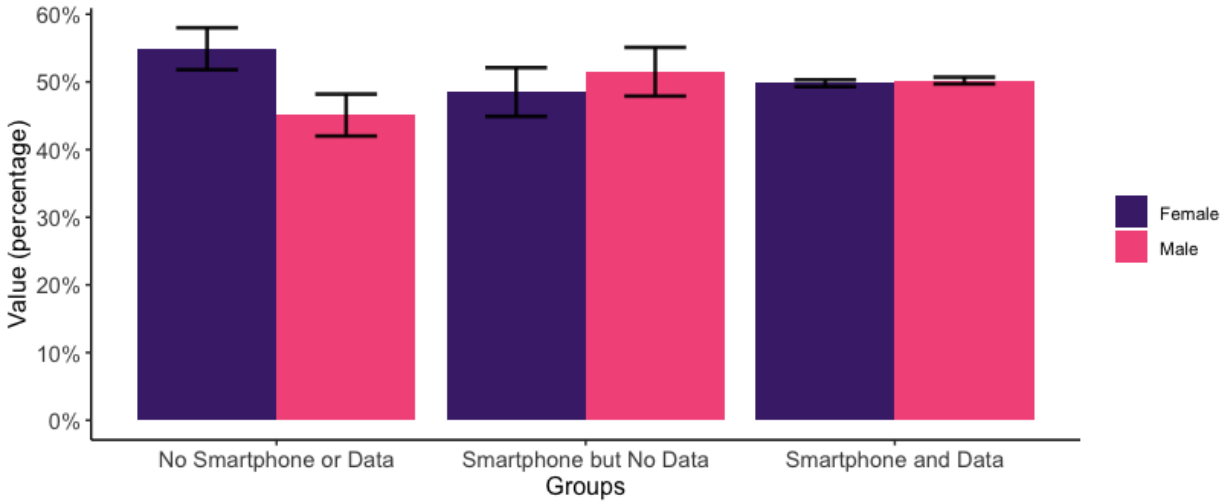

Figure 4: CIUS wireless divide categories by gender.

Within the category of people without both a smart phone and data plan, 10 percent (CI 5%: 8, 13) report being a visible minority. This percentage is significantly smaller at a 5 percent significance level than the percentage of people who report being a visible minority who are outside of the divide, suggesting that people who identify as being a visible minority are under-represented in the population that lacks both a smart phone and data plan. Interestingly, the

percentage of people with a smart phone but no data plan who report being a visible minority is similar to the percentage for people outside the divide, at 27 percent (CI 5%: 23, 31) and 26 percent (CI 5%: 25, 28), respectively. These results point to an important demographic difference between people who lack both a smart phone and data plan and those that have a smart phone but no data plan, suggesting that these two groups within the divide may require different interventions to address connectivity issues.

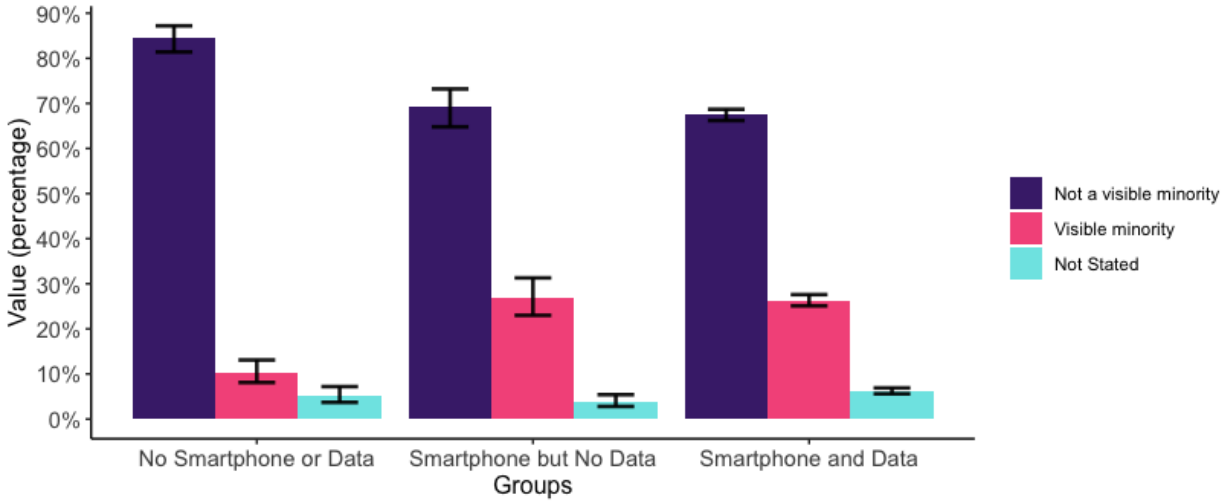

Figure 5: CIUS wireless divide categories by visible minority.

Similarly, the percentage of people with no smart phone or data plan who are landed immigrants is relatively small at 6 percent (CI 55: 5, 9). In contrast, the percentage of people with both a smart phone and data plan who are landed immigrants is 18 percent (CI 5%: 17, 19), and the same proportion of people who a smart phone but no data plan is 17 percent (CI 5%: 15, 21). The data suggest that people who are deepest in the wireless divide are more likely to not be landed immigrants that people with greater degrees of wireless connectivity.

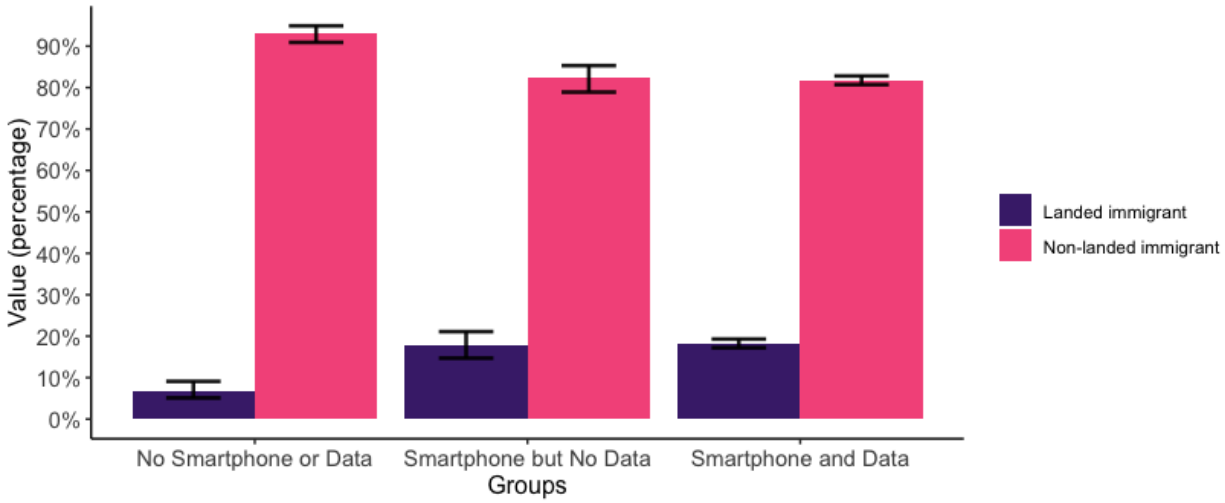

Figure 6: CIUS wireless divide categories by immigration status.

In addition to the characteristics investigated here, we also examined potential differences by Indigenous status, province, and disability status. We found no statistically significant differences in the proportion of individuals with Indigenous identity across the three wireless divide categories. Results with respect to Indigenous and disability status may be driven in part by the relatively small size of these sub-populations, leading to less statistical power.

Likewise, there were few distinctions with respect to province. Although some differences between provinces across different divide categories are statistically significant, they are small and likely to be driven by the demographic factors previously explored.

4. Potential Drivers of the Wireless Divide

To explore the potential drivers of the wireless divide, we build from the concept of the wireless divide articulated in the Australian Digital Inclusion Index (ADII).[7] The ADII uses the Australian Internet Usage Survey administered by the Australian National University to construct a data-driven view of digital inclusion across various types of Internet access. The index examines digital inclusion across three dimensions: access, affordability, and digital ability.[8] Mirroring the three dimensions of digital inclusion put forward by the ADII, we examine the wireless divide in Canada across the dimensions of access, affordability, and digital skills

[7] Australian Digital Inclusion Index

[8] Specific measures across each dimension are as follows:
Access: the presence of the following within a household, daily use and high intensity of use, fixed broadband, fast and unlimited data allowances that are not exceeded, and access via a range of devices.
Affordability: the percentage of household income spent on a representative bundle of Internet services, along with affordability stress scores at up to 2% of household income; up to 5% of household income; up to 10% of household income; and more than 10% of household income.
Digital Ability: the presence of the following digital skills within a household, basic and advanced operational, information navigation, social, creative and automation.
Ibid.

(ability). We also examine how wireless reluctance and lack of interest in these technologies may contribute to the wireless divide, within the limits of the data available through the CIUS.

ACCESS

Data collected by the Canada Radio-television and Telecommunications Commission (CRTC) indicates that as of 2021, nearly all individuals have access to mobile coverage. In that year, LTE services were available for 99.4 percent of Canada's population, and newly launched 5G networks were available to 87.8 percent of individuals.[9]

Yet, despite the broad coverage of wireless networks in Canada, the presence of a wireless digital divide, quantified in this report, indicates that wireless adoption has not kept pace with improvements in access. OECD data shows that in 2021 just over 80 percent of people in Canada have a mobile subscription, aligning with the finding of this report that a wireless divide exists.[10]

Although people in Canada have access to wireless service, a gap persists in adopting these technologies. In the sections that follow, we explore how a lack of perceive need or interest in wireless technology, affordability, and digital skills may contribute to barriers in mobile adoption and the wireless divide.

NO NEED OR INTEREST: A DRIVER OF THE DIVIDE

Currently, we have limited data to fully understand how much a lack or need or interest in wireless connectivity is a driver of the wireless divide. However, the CIUS provides data suggesting that wireless reluctance may play a large role in perpetuating the divide, specifically for people who do not have a smartphone.[11]

In the CIUS, the most common response for not having a smartphone is a lack of need or interest, making up slightly over 5 percent (CI 5%: 5.0, 5.6) of total individuals over the age of 15.[12] The percentage of people who reported no need or interest as the reason for not having a smart phone is approximately the same as the percentage of people who reported all other reasons combined. Table 1 earlier in the report showed that approximately 7.5 percent of the population of Canada over 15 years of age does not have a smartphone. With approximately 5 percent of people in Canada over the age of 15 reporting no need or interest in having a smart phone, the results of Figure 7 highlight the important role that wireless reluctance may play in perpetuating the wireless divide, particularly for those that do not have a smart phone.

[9] CRTC, Current trends - Mobile wireless (2022)

[10] OECD, Mobile broadband – All subscriptions per 100 inhabitants (2022)

[11] The CIUS does not provide any data in this respect for people with a smartphone but no data plan.

[12] Results are a percentage of entire survey population, not limited to those without smartphone access.

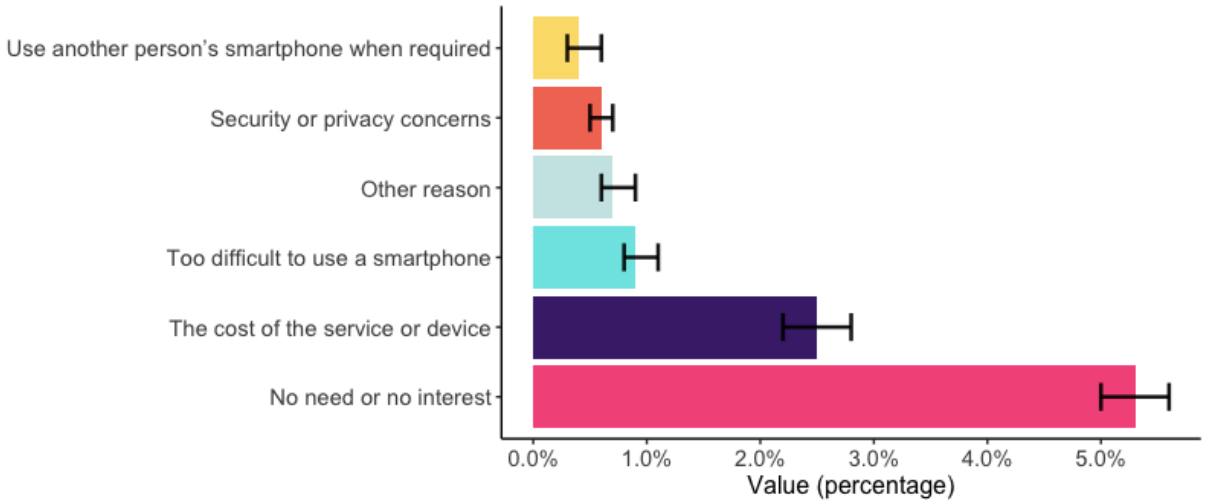

Figure 7: All people in Canada (aged 15+) - reasons for not having a smartphone.

It is important to consider potential limitations to the data reported in Figure 7. Some people may report having no need or interest in wireless connectivity, but in reality face cost barriers in accessing full wireless service. People may respond in this way due to embarrassment or other social or psychological pressures. This challenge is inherent to the self-reported nature of the data and is unlikely to be fully avoided if we rely on self-reported data to ascertain interest in wireless service. This issue is expanded on in *Annex B*.

The assertion by some people of having no need or interest for a smartphone also speaks to the methodological challenges raised earlier in this report. Namely, there is the question of whether these individuals should be considered part of the wireless divide. The approach taken for this report is to include these individuals in the divide given that the need for wireless connectivity is growing and will only continue to grow. The data lends some credence to this approach by demonstrating that the key demographic characteristics of this group (older adults and people with low incomes) aligns with that of the wireless divide overall. The demographic groups most likely to respond with having no need or interest for a smartphone are older adults and lower income individuals. Of older adults without a data plan or smartphone, 67 percent (CI 5%: 63, 70) reported having no need or interest (see Figure 16), and 44 percent (CI 5%: 40, 48) of people in the lowest income quartile report the same.

Rather than excluding these individuals from policy consideration, governments may instead want to consider people's lack of interest or perceived need for wireless connectivity as a potential driver of the divide, and craft interventions to address this perception. More research is required to determine what types of interventions would be most effective for these individuals.

AFFORDABILITY

Previous research on the digital divide suggests that affordability could be a contributor to the divide. However, given the data available we are unable to fully quantify the extent to which affordability contributes to the divide. Data from the CIUS on reasons that people do not

have a smartphone show that cost is a factor for some in the wireless divide, but it is a less commonly reported barrier than lack of need or interest. Insights from the CIUS show a clear correlation between income and being in the wireless divide, suggesting that affordability likely plays some role in the wireless divide. Findings from key informant interviews point to the need for better wireless supports for low-income individuals, particularly people with unstable housing.

Previous Research on Affordability

To date, most research and policy conversation related to the wireless divide in Canada has focused on affordability. The topic of wireless pricing is a contentious one in Canada and the centre of vigorous debate between industry, civil society organizations, academics, and policy makers.

For example, statements from OpenMedia and the Canadian Internet Policy and Public Interest Clinic (CIPPIC) have pointed to the 12 percent decline in mobile subscriptions per 100 population following the onset of the COVID-19 pandemic and survey results stating price as a barrier to adequate cell phone service as indicative of the financial constraints related to wireless service.[13] In 2019, the topic garnered enough attention to be included in federal party platforms, including a commitment by the Liberal government to reduce wireless prices by 25 percent.[14] Recent data from Innovation, Science and Economic Development Canada show that, on average, mobile prices across Canada have declined over time, with average prices declining by 2.6% relative to 2021 across all wireless plan types.[15] Similarly, data from Statistics Canada shows that from 2017 to 2022, the cost of cellular services, measured by the cellular services index, declined by 34.6 percent.[16] Further data from the CRTS shows declines in mobile prices across most plans and provinces from 2017 to 2021.[17]

With respect to affordability and its intersection with social inequities, researchers in Canada have conducted surveys of low-income individuals to gain a sense of the role affordability plays in the wireless divide. One shortcoming of these studies for our purposes is that they are more often focused on access to home rather than wireless Internet. However, the overlap in functionality between wireless and broadband services still allows us to glean some useful insights.

In their report *Mapping Toronto's Digital Divide*, the Ryerson Leadership Lab finds that 34 percent of survey individuals worry about paying either their home Internet or cell phone bills, and with worried responses more likely from low-income families.[18] The same report found that 98 percent of individuals had home Internet connections. Of the 2 percent that did not have an

[13] Open Media and CIPPIC, Telecom Regulatory Policy CRTC 2021-130 Reply Submission (2021)
[14] Liberal Party of Canada, 2019 Liberal Platform – More affordable cell phone bills
[15] ISED, Price Comparisons of Wireline, Wireless and Internet Services in Canada and with Foreign Jurisdictions: 2022 Edition (2022)
[16] Statistics Canada, Telecommunications: Connecting Canadians (n.d.)
[17] CRTC, Current Trends – Mobile wireless (n.d.)
[18] Ryerson Leadership Lab, Mapping Toronto's Digital Divide (2021)

Internet connection, 22 percent reported using a mobile phone data plan instead.[19] This research on the affordability of broadband and other telecommunications services for vulnerable populations that pricing may be a driver of the wireless divide. However, this research could better inform meaningful policy intervention with greater granularity. More work is needed to understand who specifically faces affordability challenges in accessing wireless services. With a detailed profile of these sub-populations, including demographic and income information, policymakers could better design interventions to meet the needs of recipients.

Limited Data Shows Correlation between Self-Reported Affordability and Income

Given the structure of the CIUS, we have limited insight into the role of cost in driving the wireless divide. The CIUS asks individuals their reason for not owning a smartphone, and cost is one of the options individuals can put forward. The CIUS does not ask the same question of people who report not having a data plan but have a smartphone. Of all people in Canada covered in the CIUS, over 2 percent (CI 5%: 2, 3) reported cost as a reason for not having a smart phone. This response option combines both the cost of the service and the device. As a result, we are unable to separate out two sources of cost that may affect an individual's purchase decisions.

Despite not having detailed data on the link between wireless access and cost, the CIUS results and interviews together show a clear correlation between income and wireless connectivity in Canada. Data on the incomes of those who report cost as a reason for not having a smart phone suggest that affordability – specifically the cost of accessing wireless services relative to one's income – may be a contributor to the wireless divide. Of individuals that reported cost as a reason for not having a smartphone, 44 percent (CI 5%: 39, 50) and 30 percent (CI 5%: 25, 36) are from the lowest and second lowest income (before-tax census family) quartiles.

[19] "The monthly cost of Internet service is the most mentioned reason (49%) among Toronto households that do not have access to Internet at home… Other top responses from individuals without home Internet access include "not having a device to connect to the Internet" (25%), followed by "use of a mobile phone data plan instead" (22%) and "access to the Internet elsewhere" (16%)"
Ibid.

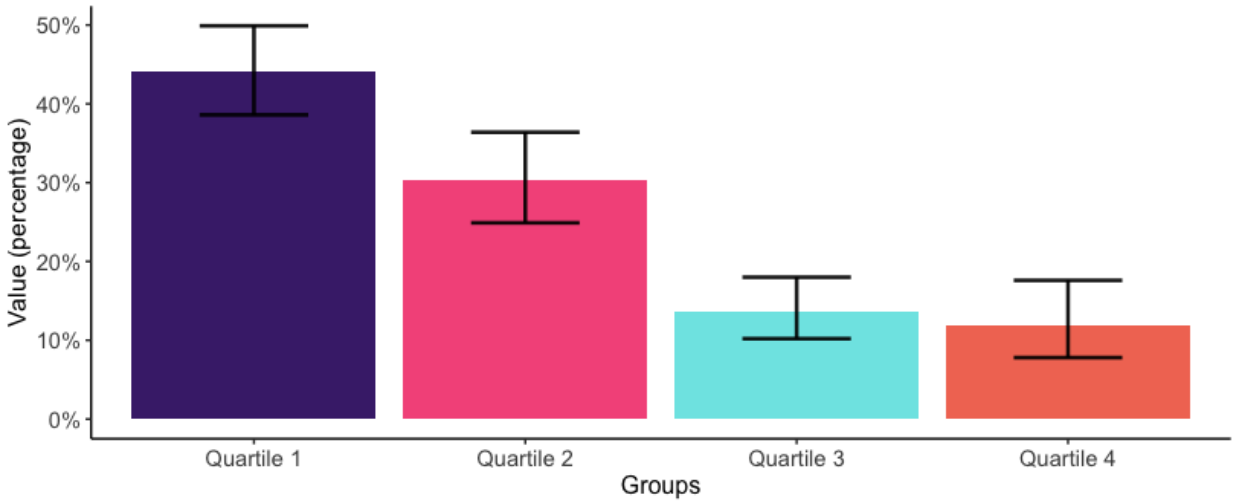

Figure 8: The cost of the service or device by census family income quartile.

Results form the CIUS show a similar relationship for level of education, with individuals with high school or less (40 percent, (CI 5%: 34, 46)) and some post-secondary (37 percent, (CI 5%: 32, 43)) making up over three quarters of individuals reporting cost as a reason for not having a smartphone. Previous research shows a strong relationship between earnings and education, where people with higher levels of education tend to have higher earnings.[20] The finding that lower levels of education is associated with a higher likelihood of cost being a reason for not having a smart phone is consistent with the results of Figure 8, since education correlates with income.

Older adults are the age group most likely to report cost as a factor, comprising 54 percent (CI 5%: 48, 60) of individuals that report not having a smartphone for cost reasons. This finding is likely driven by the fact that older adults are over-represented in the category of people who do not have a smartphone; over 60 percent (CI 5%: 59, 65) of people without a smartphone and data plan are older adults.

More Expansive Connectivity Supports Are Needed That Also Consider Unstable Housing

Both the literature and interviews indicate a clear role for programs that reduce the cost of wireless connectivity for individuals, although sources provide different recommendations. Interview participants praised programs offered by the private sector and in partnership with government, such as the Department of Industry, Science and Economic Development's (ISED) Connecting Families program. However, they noted that some groups experiencing the wireless divide were falling through the cracks of these programs, particularly low-income individuals that do not receive the maximum Canada Child Benefit or Guaranteed Income Supplement for older adults. The benefits and drawbacks of these programs, articulated by interviewees, is

[20] Statistics Canada, Does education pay? A comparison of earnings by level of education in Canada and its provinces and territories (2017)

provided in more detail in section *The Faces of Canada's Wireless Divide* focusing on low-income individuals.

Organizations working with individuals experiencing the wireless divide, particularly low-income individuals and individuals with unstable housing, stressed the role of programs that put devices and service into the hands of more vulnerable individuals with as little administrative complexity as possible. One dimension of this complexity, especially for people with unstable housing, is monthly billing tied to an address. In these contexts, prepaid or one-off options could be highly beneficial. Furthermore, industry-provided programs tied to pre-existing government supports may carry forward many of the administrative barriers imposed by government programs, such as ongoing income verification.

Interviewees highlighted broader criteria, simplicity, and accessibility of application processes so that programs aimed at reducing the cost of connectivity reach as much of the intended target population as possible. The more programs prioritize providing individuals with connectivity quickly and simply, the more likely those programs are to benefit individuals with the greatest barriers to connectivity.

Interviewees also emphasized the need for adapted market outcomes to better suit the needs of low-income individuals, particularly those with unstable housing. An example of the latter was a greater range of prepaid, pay-as-you-go, or other one-off options that allowed individuals who are either unhoused or have unstable housing to maintain connectivity without a stable physical address.

DIGITAL SKILLS

Digital skills are the abilities, competencies, and technical proficiencies needed to use digital technologies, such as the ability to use a digital device or application. These skills are part of a person's broader digital literacy, which encompasses skills as well as one's attitudes towards technology, knowledge of how digital systems work, and ability to embrace creativity and new ways of understanding the world made possible through digital technologies.[21] For this study, our focus is on digital skills because they are measurable using the CIUS and an may serve as an entry point to building broader digital literacy.

Overall, we find that people in the wireless divide demonstrate fewer digital skills than people outside the divide, with those deepest in the divide demonstrating the lowest level of skill. However, from the data we are unable to determine causality. Is a low level of digital skill the reason some people are in the wireless divide, or do people in the wireless divide demonstrate low skill levels because they lack wireless connectivity?

Insights from the CIUS and key informant interviews point to opportunities for innovation in learning programs available to those in the wireless divide. People in the wireless divide are less likely to engage in skill-development opportunities than people outside the divide. When people in the wireless divide do engage in learning, it is often through informal instruction from friends

[21] Belshaw, What is 'digital literacy'? (2011)

and family. Interviewees shared that learning opportunities which "pull" skills development can be effective. These approaches pair learning opportunities with social support programs targeting unconnected people who may require connectivity to access programming. In this way, digital skills development is tied more directly to the needs of the individual, rather than expecting individuals to develop their digital skills in the abstract.

Previous Research on Digital Skills

Relative to other potential drivers of the divide, digital skills receive relatively less attention from researchers and policy makers.[22] One potential reason is the multifaceted and more qualitative nature of skills development relative to issues of access or affordability. Complicating a wireless-focused view, no clear distinction exists between broadband and wireless digital skills.

Reflecting this, research by Statistics Canada on Internet use skills does not distinguish between wireless and broadband skills.[23] Based on results from the 2018 CIUS, more than half of people in Canada are considered either intermediate or advanced Internet users. At the same time, 9 percent of people had not used the Internet in the three months prior to the survey. Furthermore, 16 percent possessed only basic skills, with education level and age being key socioeconomic determinants.[24]

Another Statistics Canada study also using the 2018 CIUS found a strong relationship between household income and digital skill level.[25] This finding is consistent with the results of a 2014 study, using level of online activity as a proxy for digital skill level.[26] As well, research conducted by the Canadian Internet Registration Authority (CIRA) suggests that the groups most likely to be left behind in terms of digital skills include the elderly, Indigenous communities, particularly Indigenous women, and new Canadians, again with the balance skewed against women.[27]

Internationally, Canada scores high in the *Digital Skills Among Active Population* category in the World Economic Forum's competitiveness data, placing 20th out of 141 countries, and

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[22] "Increasingly, federal approaches to Internet regulation have acknowledged a central role for digital literacy as part of a broader digital strategy; for instance, the 2015–2016 Review of basic telecommunications services (CRTC, 2015) by the Canadian Radio-television and Telecommunications Commission (CRTC) included several contributions on the significance of digital literacy, and yet the CRTC found literacy to be outside of its core mandate and did not integrate it into regulatory policy… A similar problem has plagued federal Internet policymaking in the past, where literacy is acknowledged as important but not sufficiently explored" Shepherd and Henderson, Digital Literacy in Digital Strategy (2019)

[23] Statistics Canada, Canadians' proficiency on the Internet (2021)

[24] Ibid.

[25] Statistics Canada, Internet-use Typology of Canadians: Online Activities and Digital Skills (2021)

[26] Quan-Haase et al, Revisiting the digital divide in Canada: The impact of demographic factors on access to the Internet, level of online activity, and social networking site usage (2014)

[27] Canada Internet Registration Authority (CIRA), The gap between us: Perspectives on building a better online Canada (2018)

second out of the 7& (tied with Germany).[28] While providing a useful comparison across countries, the World Economic Forum data is limited in that a country's score is based on survey responses from executives as opposed to a representative sample of the Canadian population.[29]

Internet Skills Positively Correlate with Wireless Connectivity

The CIUS provides some insight into the Internet skills, which is one type of digital skill, of people in Canada by asking individuals whether they have engaged in eight Internet-related activities in the last twelve months.[30] From these responses, we developed an index that shows how many Internet-related activities people engage in by CIUS wireless divide category.

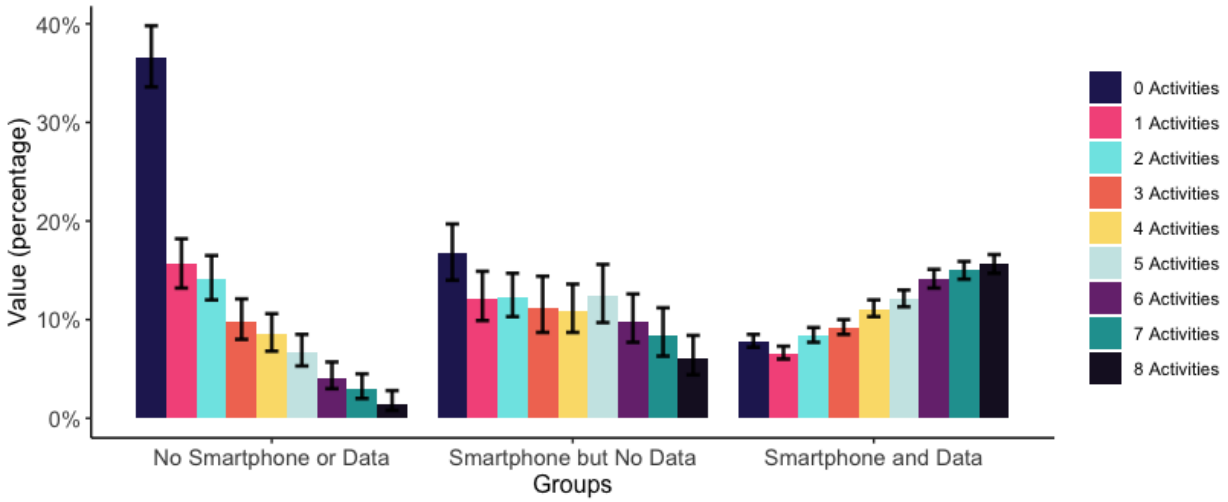

Figure 9: Number of digital skills activities undertaken in the past 12 months.

The data highlight that people with a smartphone and data plan engage in more Internet-related activities than people within the divide. While it is not surprising that people with greater connectivity display more internet-related skills, the correlation between wireless connectivity and Internet-related skills suggesting a link between wireless connectivity and Internet skills. Of people with no smartphone or data plan, 16 percent (CI 5%: 13, 18) engaged in only one Internet-related activity. In contrast, only 7 percent (CI 5%: 6, 7) of the people outside of the wireless divide did one of the activities. In addition, a striking percentage

[28] World Economic Forum, Global Competitiveness Report (2019)

[29] "Response to the survey question "In your country, to what extent does the active population possess sufficient digital skills (e.g., computer skills, basic coding, digital reading)?" [1 = not all; 7 = to a great extent] | 2018–2019 weighted average or most recent period available"
Ibid.

[30] Activities are: deleting browser history, blocking emails, including junk mail and spam, blocking other types of messages, manually unsubscribing from emails or text messages sent from businesses, manually marking an unsolicited email as spam in inbox, downloading files from the Internet to your computer or other devices, uploading files or photos to an online data storage space, and enabling automatic updates for, or manually updated, operating systems on mobile devices.

of people with no smartphone or data plan (37 percent, CI 5%: 34, 40) have not engaged in any activities reflecting Internet skills.[31]

Importantly, what these findings do not show is the causal relationship between digital skills and the wireless divide. It is unclear whether lower levels of demonstrated digital skill are a reason why people lack full connectivity or whether the lack of wireless connectivity itself is a reason for lower levels of demonstrated Internet use capabilities. Furthermore, the data do not enable us to investigate whether an individual would be able to perform those tasks if they needed to or if they had the appropriate devices and service. Despite these unknowns, the data are clear that there is a relationship between the digital skills people demonstrate and wireless connectivity. More research on the relationship between connectivity and skills is required.

Gaps May Exist in Digital Skills Learning Opportunities

The CIUS asks participants whether they have engaged in any digital skills learning opportunities in the past 12 months.[32] Similar to the index presented in Figure 9, we construct an index that reflects the number of learning opportunities undertaken by individuals during that period, which include free online training, programs offered through older adults' centres, and paid training offered by an employer, among others. People without a smartphone or data plan are more likely to not engage in any learning activities (67 percent (CI 5%: 63, 70)) than people with a smartphone but no data plan (56 percent (CI 5%: 52, 60)) or people with both a smartphone and data plan (49 percent (CI 5%: 48, 51)).

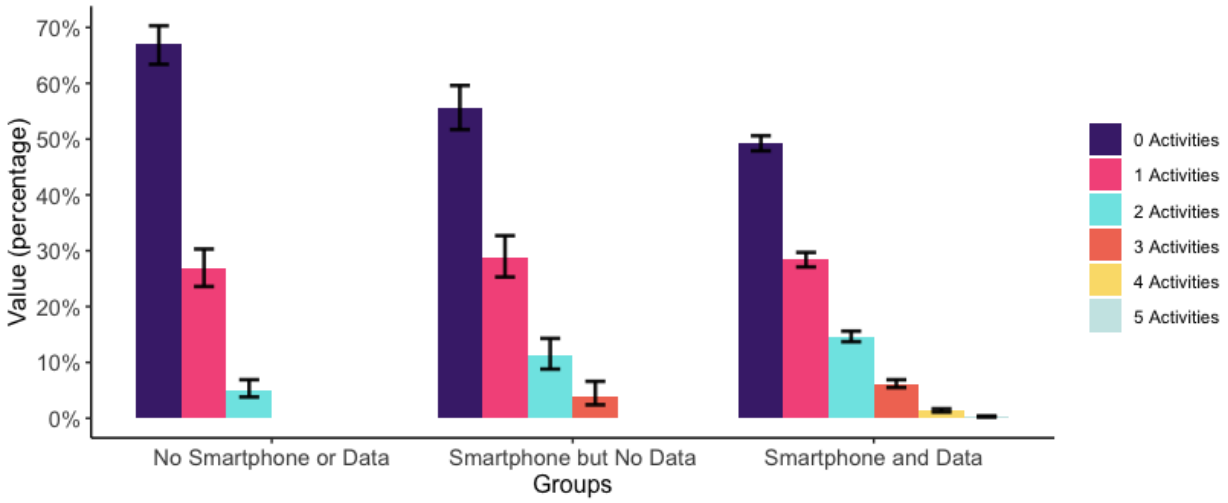

Figure 10: Number of learning activities undertaken in the past 12 months.

[31] Furthermore, it is critical to note that these results suggest shortcomings that may be the result of the self-reported nature of the data. Specifically, it is highly unlikely that 8 percent (CI 5%: 7, 9) of people with a smartphone and data plan have not engaged in any Internet-related activity, such as downloading or uploading a file. We discuss this point in more detail in the section on *Enhancing the CIUS*.

[32] Learning opportunities are: free online training or self-guided learning, getting instruction or help from friends or family, getting free training through community centers, senior centers or provided by public programs or organizations, getting training paid for by yourself or employer, or engaging with other learning activity.

Roughly a quarter of individuals across all three groups have taken instruction or help from friends or family within the last 12 months.[33] Instruction from friends and family is also the most common learning activity reported by people in both wireless divide groups captured in the CIUS: 26 percent for people with partial wireless connectivity (CI 5%: 23, 30) and 22 percent for people with no connectivity (CI 5%: 20, 26). The most common learning opportunity for individuals with a smartphone and data plan is free online training or self-guided learning (31 percent, CI 5%: 30, 33). Furthermore, these individuals are more likely to have engaged in this type of learning opportunity than people with partial wireless connectivity (22 percent, CI 5%: 19, 26) or fully lacking wireless connectivity (11 percent, CI 5%: 9, 13).

The CIUS data on demonstrated Internet skills and digital skills learning opportunities raises some interesting questions. On the one hand, the data suggest that there may be a skills gap that correlates with the wireless divide. However, the data also suggest that people in the divide, particularly those lacking both a smartphone and data plan, are the most likely to not engage in any learning activities. Furthermore, when they do, they rely primarily on support from family and peers rather than more formal learning opportunities like training through community or seniors' centres. More research is required to understand why people in the wireless divide engage in fewer learning opportunities, particularly more formal learning options.

The Need for Learning Opportunities and "Pulling" Skills Development

Despite empirical results showing lower take up of formal learning opportunities for people deepest in the wireless divide, interviewees were in favour of greater learning opportunities for building digital skills. There may be a particular need for learning opportunities for specific sub-populations; findings of previous research shows that inequity in digital skills falls along the lines of existing structural inequalities affecting marginalized groups like low-income individuals.[34] Results from the CIUS suggest that older adults in particular could use support in enhancing digital skills to overcome reported difficulty in making the best use of wireless connectivity. Older adults made up 80 percent (CI 5%: 71, 87) of those reporting that they do not have a smartphone because it is too difficult to use. This response could be driven by technical or physical barriers to device use.

[33] 25 percent of people with full connectivity (CI 5%: 24, 26), 26 percent for people with partial wireless connectivity (CI 5%: 22, 30) and 23 percent for those fully lacking connectivity (CI 5%: 20, 26).

[34] "While it is beyond the scope of this paper to provide a definitive answer, our results suggest that differences in access, level of online activity, and SNS adoption are all influenced by key demographic factors –factors that reflect existing inequalities in society."
Quan-Haase et al, Revisiting the digital divide in Canada: The impact of demographic factors on access to the Internet, level of online activity, and social networking site usage (2014)

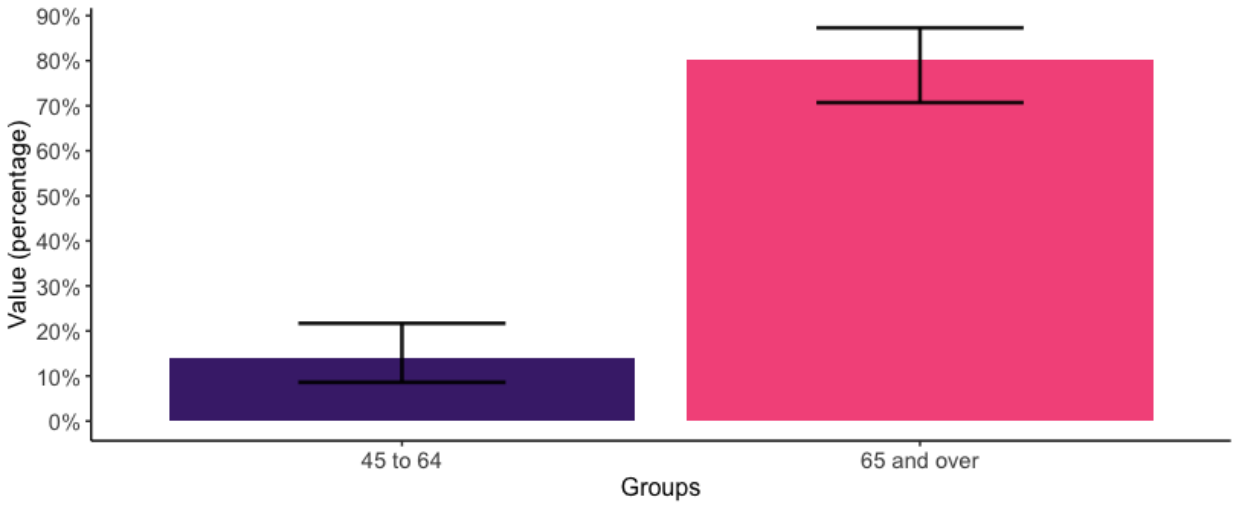

Figure 11: Reason for not having a smartphone - (too difficult to use) by age.

However, even if more opportunities were provided to people within the wireless divide, it is not clear whether these types of interventions are taken up by people who need them most. People may choose not to take opportunities to enhance their digital skills because they see no need or do not find the learning opportunities available to them suitable or appropriate.

Past research suggests that a lack of suitable learning opportunities may be a contributing factor to the skills divide correlated with the wireless divide. In its 2018 survey of organizations working to tackle the wireless divide in Canada, CIRA found that access to funding for digital skills and literacy programs was restrictive, and often organizations were focused on building coding skills rather than basic digital competencies.[35]

A key insight presented by interviewees is that individuals are more likely to engage in learning opportunities if they are tied to existing needs rather than digital skills in the abstract – an approach of "pulling" rather than "pushing" digital skills. For example, an organization providing transitional services to low-income individuals was able to give clients free devices as well as service to maintain access to programming at the outset of the COVID-19 pandemic. Not only did the organization maintain high participation rates in programming, but anecdotally also saw an increase in digital skills in their clients and a greater comfort with using the devices for more general connectivity needs. They suggested pairing learning opportunities with social programs that target populations currently access to increase uptake. By pairing access to devices with existing needs, individuals may be more likely to develop digital skills organically.

[35] "As one respondent put it, not every young person will grow up to be a coder or programmer, but everyone will need to live and thrive in a digital world."
Canada Internet Registration Authority (CIRA), The gap between us: Perspectives on building a better online Canada (2018)

5. Consequences of the Wireless Divide

A lack of or limited wireless connectivity can lead to various forms of social and economic exclusion. To gain some insight into the consequences of inhibited wireless access from the view of the CIUS, we use results from the survey to compare how people in the wireless divide differ from those outside the divide by online access to government services and e-commerce. We combine these empirical results with discussion arising from qualitative interviews.

DIGITIZING GOVERNMENT SERVICES MAY BE LEAVING SOME BEHIND

Several interviewees highlighted the impact of government trends towards digitizing their services on people without adequate wireless access. Fittingly, the CIUS asks individuals about the government activities they have conducted online in the past year.[36] Using these responses, we created an index that shows how many activities an individual has engaged in during that period. These activities include filing income taxes, downloading government forms that were then submitted in person, accessing an account for a government program, among others.

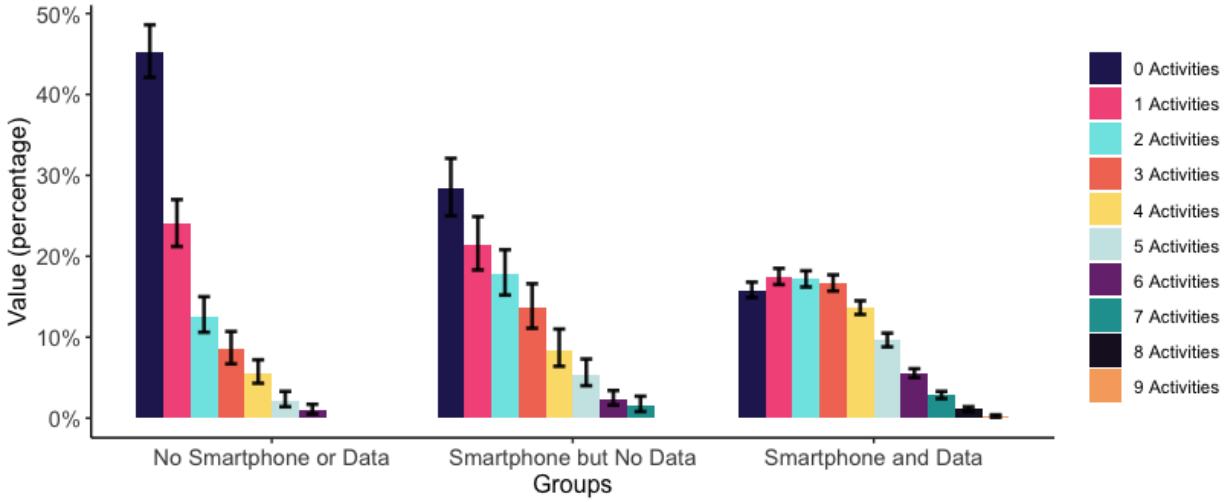

Figure 12: Number of government-related activities conducted online.

There is some degree of overlap in outcomes presented in Figure 12, particularly between individuals with both a smartphone and data plan and those with a smartphone but no data plan. However, individuals fully lacking wireless connectivity are more likely to have no interaction with online government services, with 45 percent (CI 5%: 42, 49) of individuals fully lacking wireless connectivity responding with zero activities compared to 28 percent (CI 5%: 25, 32) for individuals with partial wireless connectivity and only 16 percent (CI 5%: 15, 17) for people with a smartphone and data plan.

[36] Activities include: filing income taxes; paying a government service fee, tax, fine or ticket; researching information; expressing your opinion or providing feedback during an online government consultation relating to government policies or programs; downloading a government form that was submitted in person; submitting a form or application for a government program or service online; accessing an account for a government program or service; communicating with a government organization by email or via social networking; and other activities.

We cannot definitively say that the lack of wireless connectivity is the cause of these results. However, they do suggest that individuals experiencing the wireless divide may face barriers in interacting with online government services. This finding aligns with insights provided by interviewees that the increasing shift to digitization for many government social programs on which low-income individuals and older adults rely on may be leaving some under-connected people behind.

PEOPLE IN THE WIRELESS DIVIDE ARE LESS ENGAGED IN THE DIGITAL ECONOMY

The CIUS also includes a number of questions related to amounts spent on various categories of e-commerce in the past year, from which we can create another variable that shows whether an individual has engaged in any kind of e-commerce. People lacking wireless connectivity are much less likely to have engaged in e-commerce than individuals with partial connectivity or people with both a smartphone and data plan; only 31 percent (CI 5%: 27, 34) report any e-commerce spending in the past year compared to 56 percent (CI 5%: 52, 60) for individuals with a smartphone but no data plan and 80 percent (CI 5%: 79, 81) for individuals with a smartphone and data plan.

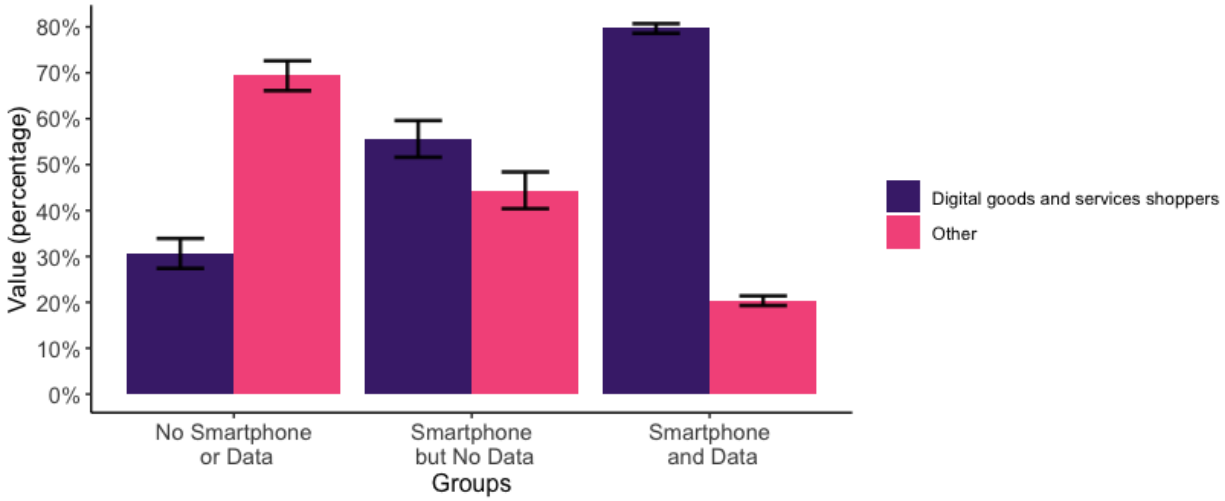

Figure 13: Instances of online shopping for digital goods and services.

These results mirror those we find when examining the wireless divide and the online purchase of physical goods; 56 percent (CI 5%: 53, 59) of individuals fully lacking wireless connectivity have not made an online purchase of physical goods in the last 12 months compared to 32 percent (CI 5%: 28, 35) of individuals with partial connectivity and 13 percent (CI 5%: 12, 13) of individuals with both a smartphone and data plan.

Again, while we cannot say definitively that the lack of wireless connectivity is the causal factor in this outcome, these results provide another indirect indicator of a lack of ability to access services individuals might take for granted. Like access to government programs, certain categories of e-commerce, grocery delivery for instance, may be more relevant for groups such as older adults or people with disabilities who may face mobility issues.

6. The Faces of Canada's Wireless Divide

We now examine some distinct demographic profiles within the wireless divide: low-income individuals, older adults, new Canadians, and people with disabilities. The aim of these profiles is to provide a more in-depth investigation into specific demographics that can help policy makers better target policy interventions to these groups. These profiles are based on the demographic information gathered from the CIUS and presented in the previous sections, as well as insights drawn from key informant interviews. The profiles are not exhaustive of the survey population but represent large and distinct enough groups to enable further analysis.

Although each profile is distinct, they are also intersectional. Thus, policy makers must consider multiple facets of a person's experience when crafting interventions. Of the different demographic variables examined, low income stands out as a cross-cutting factor. Coming through in both the CIUS data and interviews, income was consistently a factor compounding other demographic factors present in the wireless divide.

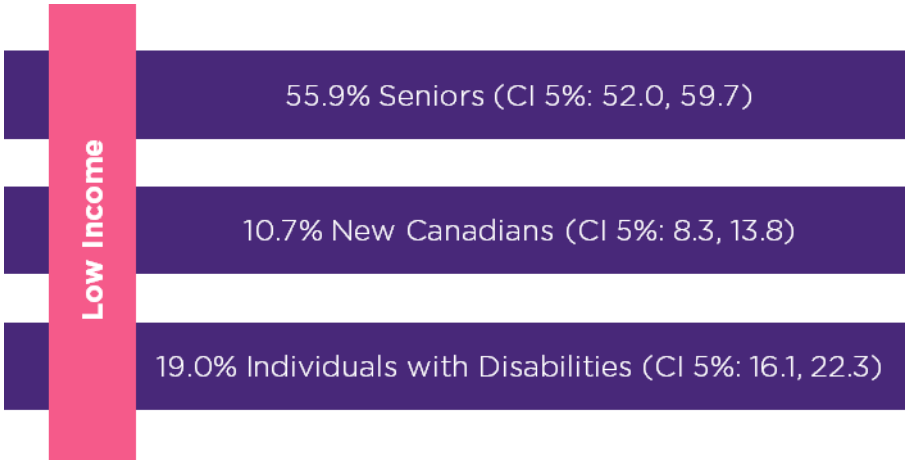

Figure 14: Intersectionality of low-income with key demographics in the wireless divide, 2020 CIUS.

In the sections that follow, we examine each of the four profiles in turn. Bringing together additional data from the CIUS and results from key informant interviews, we consider potential drivers and consequences of the wireless divide that are specific to the profile group and consider how different policy responses might be targeted accordingly.

LOW-INCOME INDIVIDUALS

Results from the CIUS and insights from interviewees highlight the important relationship between income, wireless connectivity, and affordability. However, other factors such as housing stability, employment, engagement with government services, and age may also play a critical role in determining a person's wireless connectivity needs and the consequences of failing to have those needs met.

Potential Drivers: Cost and Intersecting Demographics

Analysis of data from the CIUS in previous sections shows that people in the first income quartile, defined by before-tax census family income, make up about 44 percent of people who do not own a smartphone or have a data plan, and 29 percent (CI 5%: 26, 32) of people with a smartphone but no data plan (Figure 2). Results in Figure 8 also illustrate that people with low incomes that lack smartphones are more likely to report cost as a barrier to owning a smartphone than people from other income groups.

However, while low-income individuals are more likely to report cost as a barrier to owning a smartphone, cost is not the primary reported reason for not having a smartphone. In fact, the cost of service or devices is not different from other reasons in a statistically significant way, as Figure 15 illustrates.

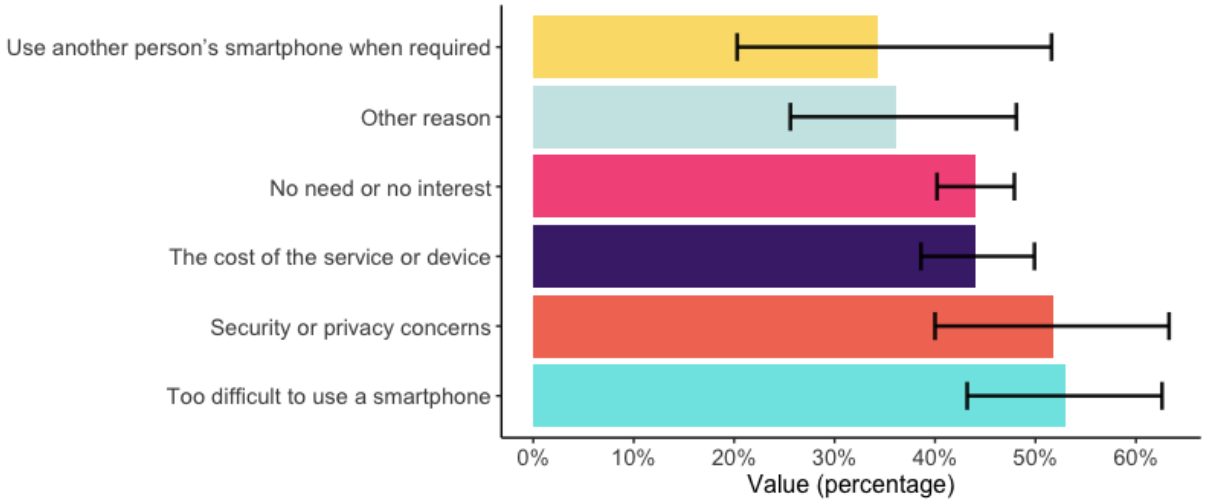

Figure 15: Lowest income quartile (quartile 1) - reasons for not having a smartphone.

The results of Figure 15 suggest that income alone may provide only limited insight into the causes of the divide and should be considered alongside other demographic factors. Age is an important demographic factor to consider. Older adults represent 35 percent (CI 5%: 34, 36) of low-income people in the population overall, yet make up 70 percent (CI 5%: 66, 74) of the low-income population without both a smartphone and data plan. As the following section focusing on older adults illustrates, older adults are most likely to report not having a smartphone because they find it difficult to use of have no need or interest. The large proportion of older adults within the segment of the population that is low-income is a potential driver of the results presented in Figure 15.

Consequences: "Reachability", Government Services, and Unstable Housing as a Complicating Factor

Interviews with service providers highlighted the growing expectation of some baseline level of constant connectivity, often discussed as reachability, in Canadian society. Whether trying to find housing, applying for a job, or being made aware of last-minute schedule changes at a job already held, low-income individuals are expected to be able to receive and respond to

communications in short timeframes only realistic with some kind of wireless connectivity. In this way, wireless connectivity can serve as both a tool for overcoming low income and precarity, but also a barrier if it cannot be obtained.

Multiple interviewees also discussed how beginning before but accelerated by the pandemic, governments at all levels are moving away from in-person application and interactions for social programs to more centralized and digital alternatives. While interviewees noted the increased efficiency and improved accessibility in some cases, this shift adds another dimension to the cost of the wireless divide for individuals that rely on these services.

In addition, unstable housing can amplify the need for wireless connectivity for low-income individuals. Interviewees discussed how individuals with available but unstable housing were more likely to rely on wireless connectivity for the bulk of their Internet-related activity because of the risks of relying on home broadband at a single address. In the same conversation it was noted that unhoused individuals are more likely to rely on wireless connectivity as a baseline point of contact, a method of being reached with no fixed address. Interviewees suggested these individuals were more likely to have a smartphone but may rely on services such as public WiFi access to maintain some level of intermittent connectivity. This finding is corroborated by research findings from Ryerson Leadership Lab, previously discussed.[37]

Overall, interviews highlight that both wireless connectivity needs and experiences of the wireless divide can differ greatly among individuals within the broader, low-income demographic category. These differences may be driven by a person's housing stability, their digital interactions with government services, and employment, among other factors.

Solutions: Reducing Costs, Pay-as-You Go and Prepaid Options, and "Pulling" Digital Skills

To bring down the barriers for low-income individuals meeting their connectivity needs, interviewees discussed policy recommendations focused on reducing the cost of connectivity. Interviewees recognized the impact of existing programs offered by either government or telecom service providers that provide discounted access to devices and service. However, they noted that these programs often target more narrow groups, leaving some low-income individuals out of their scope. Partnerships were suggested between telecommunications service providers and organizations working with low-income individuals to identify and connect individuals whose connectivity needs cannot be met by in-market options.

For unhoused individuals in particular, interviewees suggested a more robust range of pay-as-you-go or prepaid options should be made available in the market. The recurring nature of prepaid plans was flagged by interviewees as a barrier for a population with no fixed addresses and who are more likely to have intermittent access to a device.

Although survey responses suggest a role for programs aimed at building digital skills for low-income individuals, interviewees focused primarily on access to connectivity. When discussing skills development, interviewees emphasized more organic skill building related to

[37] Ryerson Leadership Lab, Mapping Toronto's Digital Divide (2021)

the needs of individuals, digital skills that is "pulled" rather than "pushed." For example, an organization providing transitional services to low-income individuals was able to give clients free devices as well as service to maintain access to programming at the outset of the COVID-19 pandemic. Not only did the organization maintain high participation rates in programming, but anecdotally also saw an increase in digital skills in their clients and a greater comfort with using the devices for more general connectivity needs.

OLDER ADULTS

Older adults (aged 65 and older) make up a sizable proportion of the wireless divide. They are the second largest age group within the sub-population that has a smartphone but no data plan, making up approximately 30 percent of this group (Figure 1). They are also the group most likely to have neither a smartphone nor data plan, representing over 60 percent of individuals lacking both a smartphone and data plan.

Potential Drivers: Difficulty Using Technology and Lack of Interest

Older adults are also the most likely age category to report not having a smartphone and data plan because it is too difficult to use (Figure 11). This finding is corroborated by the results presented in Figure 16, which show that the number one reason reported by older adults for not having a smartphone is difficulty in use, followed by having no need or interest, though the latter is not statistically different from the reason of cost at a 5 percent significance level.

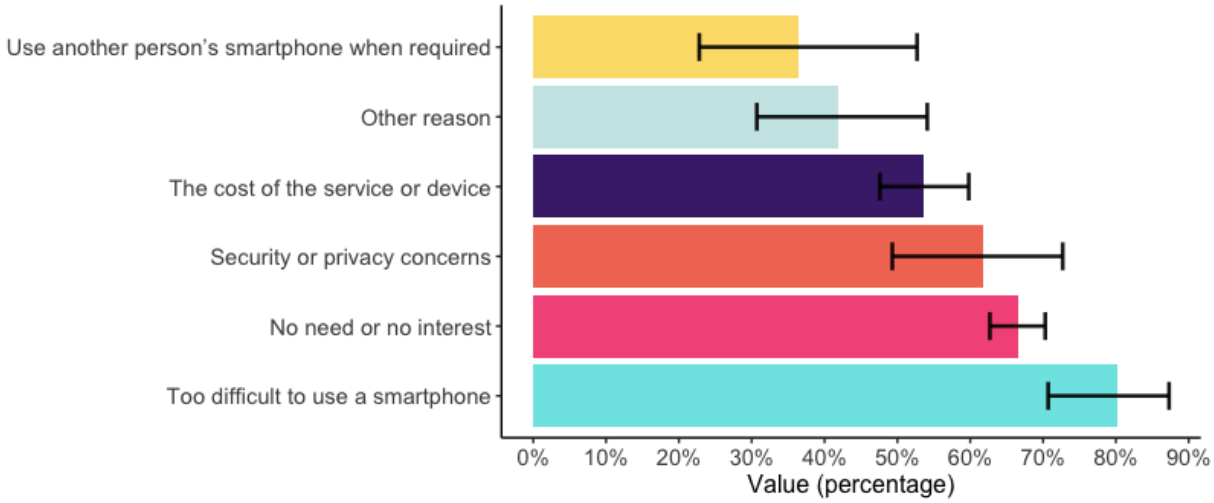

Figure 16: People 65 years and over - reasons for not having a smartphone.

Based on insights from interviewees and the results of Figure 16, it may be that the reported lack of need or interest in having a smartphone reflects a genuine lack of interest rather than a proxy for cost barriers. These results also suggest that there may always be a portion of older adults that remains a part of the wireless divide within the CIUS survey results unless perceptions of wireless connectivity need shifts in the population. This outcome will be worth tracking over a longer term as more elements of daily life become tied to persistent

connectivity and as "digital native" populations make up a larger share of the top of the demographic pyramid.

That a portion of this group may legitimately have no interest in wireless connectivity should not overshadow barriers that do exist for older adults in overcoming the wireless divide. Key informant interviews reinforced results from the CIUS that older adults are more likely to report complexity of using mobile services as the reason for their lack of connectivity. When discussing difficulty of use as a potential barrier to connectivity in general, older adults were the demographic group often highlighted by interviewees as lacking comfort and familiarity with more advanced devices, and more likely to rely on alternatives such as a landline for their connectivity.

Consequences: Social Isolation and Less Access to Government Services

Interviewees spoke to the social element of connectivity being particularly relevant for older adults. During the pandemic, interviewees reported clients in the senior demographic experiencing more acute social isolation when increased health risk meant they were unable to interact in-person with friends and family for longer periods of time. As COVID-19 and other contagious diseases such as the flu continue to pose a threat to the health of older individuals, connectivity will continue to have an outsize role in preventing social isolation and loneliness.

Older adults were also seen as impacted by the increasing digitization of access to social services, again raising the stakes of the wireless divide for a population that might be more comfortable with other forms of connectivity or otherwise have no interest in wireless connectivity.

Solutions: The Puzzle of Learning Opportunities and "Pulling" Digital Skills

Where difficulty of use or comfort with the technology were understood as a barrier to connectivity, interviewees suggested an expansion of digital skills and education programs delivered through community organizations focused on senior populations. However, results from the CIUS focusing on the uptake of digital skills learning activities showed that very few older adults made use of training through community centres, senior centres, or other public programs, with 1.4 percent (CI 5%: 1.0, 1.9) of individuals over 65 years old reporting making use of them within the past year. The CIUS data does not provide us insight into why people chose certain learning opportunities or chose not to pursue learning activities at all. The seeming conflict here between the CIUS data and interviewee responses highlights a potentially fruitful avenue for further research.

Returning to the concept of "pulling" rather than "pushing" digital skills, potential policy responses for enhancing senior's digital skills might include more hands-on support components to existing social services programs accessed by older adults. This approach may be particularly relevant to programs that are shifting to digital-first delivery to ensure older adults in the wireless divide are not left behind. This kind of literacy training could go beyond simply accessing and interacting with social programs to include more general skills to help prevent the social isolation noted by interviewees.

NEW CANADIANS

In previous sections we found that the percentage of landed immigrants within the group of people that do not have a smartphone or data plan was relatively small, making up 7 percent (CI 5%: 5, 9) of all people in this category. In contrast, 18 percent (CI 5%: 15, 21) of people who have a smartphone but no data plan are landed immigrants, which is approximately the same percentage for those that have both a smartphone and data plan (Figure 6).

Given the design of the CIUS, our definition of "new Canadian" is limited to landed immigrants, in turn limiting our empirical analysis of new Canadians within the wireless divide. However, insights from interviewees have illustrated key barriers these populations face in accessing wireless connectivity, the consequences of this lack of connectivity, and possible solutions.

Potential Drivers: Language and Lack of Credit History

Data from the CIUS provides little insight into the reasons why landed immigrants may chose not to have a smartphone. Given the relatively small size of this sub-population, we have limited data on the reasons for why people choose to not have a smart phone and data plan. From the data that have not been suppressed, we can infer that the most common reasons for not having a smart phone are cost and having no need or interest, although these results are not statistically distinct from each other at a 5 percent level.

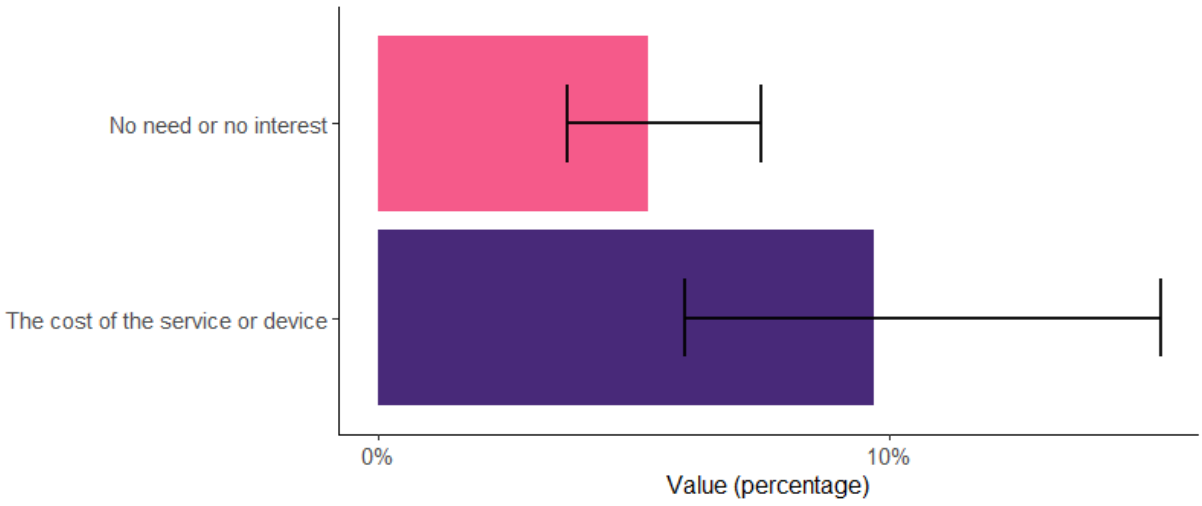

Figure 17: New Canadians (immigrants) - reasons for not having a smartphone.

Consequences and Solutions: Greater Diversity in Marketing Materials and Efforts to Reduce the Credit Barrier

However, the primary barriers to wireless connectivity identified by interviewees were language barriers and the lack of credit history for access to postpaid services (similar to that identified for low-income people). Although it was noted that marketing is available in other languages in select community marketing materials, newcomers with other language proficiencies are at a disadvantage when trying to access connectivity offered primarily in

English and French. This is compounded by a lack of credit history shutting off access to postpaid options and leaving new Canadians to what is perceived as a less robust prepaid market than those available in other international markets.

From the perspective of organizations looking to support new Canadians, particularly refugees, individuals and families go without services and support that they could otherwise benefit from because organizations are unable to identify and connect with them. In addition to connecting with support organizations, new Canadians have specific international connectivity needs when it comes to maintaining contact with friends and family members in their countries of origin.

Beyond marketing materials and sales support available in a broader range of languages and targeted to newcomer communities, a more robust set of prepaid options or targeted exemptions for credit checks, were highlighted as potential solutions for new Canadians as they establish themselves in their new home. Both private sector efforts could be reinforced by government assistance that provides a more direct path to accessing connectivity services as part of the immigration process.

INDIVIDUALS WITH DISABILITIES

Data from the CIUS did not find evidence to suggest that people with self-reported disabilities are more or less likely to fall within the wireless divide than people who do not report having a disability. However, interventions for addressing the wireless divide targeting people with disabilities may still be warranted given that these individuals may have unique accessibility needs. Results from the CIUS and interviews highlighted physical and other barriers in using wireless technologies.

Potential Drivers: Difficulty of Use

For people with disabilities, one of the most common stated reasons for not having a smartphone is difficulty of use, although this response is not statistically distinct from other reasons such as cost or security or privacy concerns.

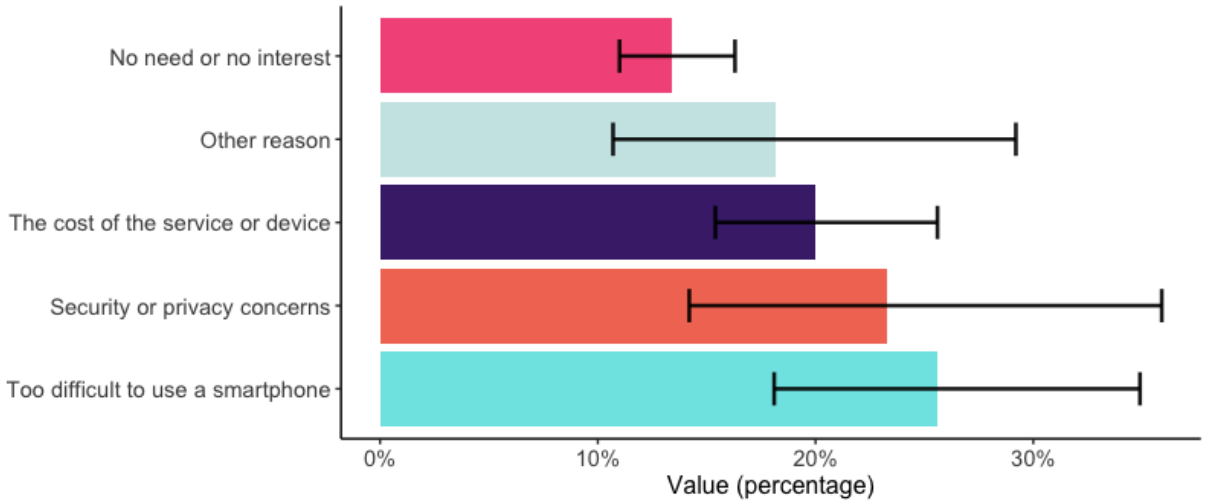

Figure 18: People with disabilities - reasons for not having a smartphone.

Whereas for older adults, difficulty of use may reflect a lack of familiarity with a given technology, difficulty of use for individuals with disabilities may be more directly tied to an individual's specific disability, creating a barrier to accessing technologies designed for mass markets without full consideration of accessibility issues. Although private firms like TracFone in the United States target specific disabilities such as hearing loss, much more targeted policy supports may be required to ensure access to wireless connectivity for all individuals.

Consequences and Solutions: Incorporating Physical Barriers into Public and Private Sector Efforts to Address the Divide

Like low-income individuals, interviewees said that government programs targeted to individuals with disabilities are digitizing. This trend presents additional barriers to some for accessing the social services intended to recognize and support their disabilities. For example, Ontario Disability Support Program (ODSP) is one of the programs highlighted as increasingly moving to a digital-first delivery model.

The fact that the digitization of government services was raised across nearly all demographic groups of interest reinforces the risk that the shift to digital-first delivery might be leaving behind some people that these programs are intended to serve. For people with disabilities specifically, supports to help individuals address the physical barriers of wireless connectivity should be a piece of both private and public sector efforts to narrow the wireless divide.

Some programs aimed at addressing device barriers include the requirement under the CRTC Broadcasting and Telecom Regulatory Policy 2009-430 that request wireless service providers offer handsets to customers "who are blind and/or have moderate to severe mobility or cognitive disabilities",[38] and accessibility services provided by telecom companies like TELUS,

[38] CRTC, Handsets for People with Disabilities (N.D.).

Rogers, and Bell. However, we have not found any evaluations of these initiatives, and therefore do not have evidence to whether they have been effective.

7. Directions for Future Research

Following this study, there remains room for further research into Canada's wireless divide. We have identified three broad areas where further research would be beneficial, discussed in more detail below.

SURVEYING UNHOUSED INDIVIDUALS AND THOSE WITH UNSTABLE HOUSING

An important sub-population in the wireless divide conversation are individuals who are unhoused or have unstable housing. It is unclear the degree to which the CIUS incorporates responses from these individuals, and reaching these individuals is likely a challenge across several Statistics Canada surveys. However, having more refined data on this sub-population's use of wireless services would be helpful for better understanding the scope of the wireless divide and uncovering possible interventions geared to this segment of the population. Data collection partnerships with service providers could be a possible solution. Another option could be to include questions of wireless use and needs in homelessness point-in-time counts undertaken across several municipalities in Canada.

EVALUATION OF CURRENT PROGRAMS

Two key themes arose from the analysis that point to the need for fulsome evaluations of current programs already in place that aim to bridge the wireless divide, offered by both public and private actors.

First is the theme of program access. All non-universal programs require decisions about how benefits should be targeted. However, interview results suggest that some individuals within the wireless divide, particularly low-income individuals, are unable to access existing programs that would otherwise help them overcome the divide. Interviewees shared that many programs currently in place are useful. Nevertheless, their eligibility criteria, which may be conditional on full receipt of other government programs like the Canada Child Benefit or the Guaranteed Income Supplement, may be too restrictive. As a result, some people in need of support may not be able to access it.

This challenge also has bearing on the current Connecting Families initiative implemented by the Ministry of Innovation, Science and Economic Development Canada, and private-sector partners. While Connecting Families focuses on promoting access to broadband Internet, the eligibility criteria of the program are similar to that of several wireless-specific programs discussed by interviewees. A comprehensive evaluation of Connecting Families and other wireless-specific programs (of which TELUS' Mobility for Good program is the only program we know to exist) could investigate whether current eligibility criteria inhibit the effectiveness of these programs.

The second key theme is the puzzle of digital skills development. Data from the CIUS and insights from interviewees illustrated a complex relationship between digital skills, wireless connectivity, and interventions intended to enhance skills that is worthy of further investigation.

Interviewees articulated the need for more skill development opportunities. However, data from the CIUS and secondary sources found that people deepest in the divide are most likely to not engage in any learning activities to enhance their skills. Furthermore, data from the CIUS show that people in the divide are generally unlikely to engage in more traditional learning activities, such as classes at community or older adults' centres (although some people do). Past research on the issue of digital skills developments suggests that part of the low take up of these learning opportunities may be caused by course curricula that does not meet the needs of participants and inadequate funding to these initiatives.

However, results from the CIUS show that all people in Canada regardless of their connectivity are most likely to enhance their skills by asking a friend of family member for help rather than through formal training. The public's gravitation towards more informal learning formats could align with the notion of "pulling" rather than "pushing" digital skills raised in interviews, where learning opportunities are made available to people who are seeking to accomplish a specific online task.

Here, more in-depth evaluation of current programs that provide skills development opportunities would be helpful. Such evaluations could help identify delivery methods that are most effective. Furthermore, these evaluations could also help to answer question of whether a lack of digital skills is a cause or symptom of insufficient wireless connectivity. As policy makers seek to close the digital divide, understanding the potential role of digital skills in causing or perpetuating the divide is critical.

DEVELOPING A MEASURE OF DIGITAL INCLUSION

Globally, policy makers have developed indices that reflect the current state of digital inclusion and the digital divide.[39] With these indices, policy makers can track digital inclusion over time and create evidence-based policy interventions to enhance digital inclusion. Canadian policy makers should consider developing metrics for tracking the digital divide, which includes the wireless divide, to track progress and guide policy development. As we see it, there are two general approaches that could be taken for developing a measure of digital inclusion or the digital divide.

The first, which we call the *index approach*, mirrors that of the Australian Digital Inclusion Index (ADII). Survey results are aggregated into an index ranging in value from 0 to 100, which can be further disaggregated by geography and demographic group. A value of 100 represents a hypothetical "perfectly digitally included" individual, which serves as a yardstick for comparing digital inclusion across the county.

[39] A thorough overview of indices implemented elsewhere can be found in Measuring Australia's Digital Divide: The Australian Digital Inclusion Index 2020.

The second approach follows the method we have taken for this report, and we call it the *benchmark approach*. We aim to identify a sub-population within Canada that does not meet a basic threshold of wireless connectivity or digital inclusion and designate these individuals as in the digital divide (or digitally excluded). Progress towards digital inclusion can be tracked over time by the number or percentage of people that do not meet this threshold. This approach mirrors that of other federal government initiatives, such as *High-Speed Access for All: Canada's Connectivity Strategy*.[40]

Box 1: Benchmarking Approach for Canada's Wireless Divide

To quantify the wireless divide, we use the Canadian Internet Use Survey (CIUS), which surveys people in Canada 15 years of age and older, to identify people without either a smartphone or a data plan. We make use of two questions posed in the CIUS:

- Do you have a smartphone that you use for personal use (question SM_Q010)?
- Do you have access to the Internet through a mobile data plan for personal use (question AC_Q030)?

People with a smartphone but no data plan, and those lacking both a smartphone and data plan constitute the wireless divide.

However, there are also areas where an index approach may outperform a measure of digital inclusion based on benchmarking. One area is in defining adequacy – a limitation in our definition of the wireless divide that we speak to earlier in this report. Establishing a broadly applicable level of adequacy for defining the wireless divide under a benchmark approach presents several challenges.

Currently, the appropriate level of connectivity that adequately meets the needs of people in Canada is unclear based on currently available data. Furthermore, individuals may have different needs for connectivity, challenging the notion of a basic, universal level of connectivity. For example, people with unstable housing may have greater mobile data needs than others. In addition, these needs may change over time with changes to a person's occupation, family responsibilities, etc.. Data needs on average may also change over time as wireless technologies change. Ultimately, further research into what constitutes wireless connectivity adequacy is warranted.

Furthermore, an index may do a better job of capturing digital skills as a dimension of digital inclusion. The concept of digital inclusion is broader than just connectivity. A person's ability to effectively use that connectivity is also relevant. The way that digital skills ought to be captured within a benchmark approach is unclear at this point and would require further consideration and research.

[40] High-Speed Access for All: Canada's Connectivity Strategy.

8. Enhancing the CIUS

Through both the review of quantitative survey data and in discussions with interviewees that work with communities in the wireless divide, some limitations of the CIUS emerged as a source of data for understanding Canada wireless divide for the purposes of developing policy interventions. To address these limitations, we recommend the following enhancements to the survey:

Adequacy. Additional questions that directly capture whether an individual has adequate wireless connectivity or is under-connected would be insightful. These questions could include those directly asking the individual whether they perceive themselves being under-connected and how this under-connection manifests in their life (e.g., purchasing smaller amounts of data than needed).

Prepaid versus postpaid plans. The need for more prepaid options was a recurring theme in our analysis. Questions that identify whether an individual with wireless connectivity has either a postpaid or prepaid plan could be useful in further understanding varieties in the depth or intensity of the wireless divide for some individuals.

Reasons for not having a smartphone or data plan. Currently, when asking individuals about reasons for a lacking both a smartphone and data plan, the CIUS asks only why an individual does not have a smartphone. Furthermore, the structure of the survey is such that the individuals who report a reason for not having a smartphone also lack a data plan. Thus, researchers cannot separate out possibly different rationales for not having a smartphone and not having a data plan. Reformulating the survey so that it captures separate rationales for not having a smartphone and not having a data plan would be helpful in unpacking the potential drivers of the wireless divide.

Wireless versus broadband skills. The CIUS presents questions on digital skills but does not differentiate between skills that are wireless specific and those that apply to Internet use more generally or broadband specifically. Questions on digital skills that distinguish between uses of broadband or wireless Internet would be insightful for exploring potential barriers or solutions to the wireless divide.

Digital skills capacity. Questions in the CIUS related to digital skills ask whether an individual has performed a given activity within the last 12 months, but not whether the individual could perform that activity if needed. Expanding these questions to ask about capabilities in performing these tasks would provide a more detailed picture of digital skills gaps impacting the wireless divide.

Conclusion

The role of wireless communication in the daily lives of individuals is only set to grow in the coming years as new communications technologies such as 5G are rolled out across the country. But as expectations around constant connectivity grow in tandem, the consequences of an individual being unable to be wirelessly connected will only increase. Results form this

study show that today people in the divide are less likely to access government services online, running the risk of being left behind as governments move towards the digitization of programs. These individuals are also less engaged in the digital economy, being less likely to purchase both physical and digital goods online.

Approximately 13 percent of people aged 15 and older are in the wireless divide, making up 4.3M people. Of people in the divide, approximately 45 percent lack both a smartphone and data plan, and 55 percent have a smartphone but no data plan. Older adults are a very prominent demographic within the wireless divide, making up just under half of people in the divide (approximately 43 percent). By comparison, in 2020 older adults were approximately 21 percent of all people 15 years of age and older.

In addition to older adults, another prominent demographic in the wireless divide are people with low incomes, measured as before-tax census family income. People in the first income quartile make up a disproportionate number of people in the wireless divide (approximately 35 percent). Older adults make up more than half of low-income people in the divide. Education levels also differ notably between people who are inside and outside the divide. Just under half of people in the divide (approximately 43 percent) have a high school education or less. In contrast, only 28 percent (CI 5%: 26, 29) of people with both a smart phone and data plan have a high school education or less.

While there are differences across the wireless divide by gender, identity as a visible minority, and immigration status, these differences are less pronounced than those related to age, income, and education. We do not find evidence that province, Indigeneity, and disability are notable demographics within the wireless divide.

In this study we explored four potential drivers of the wireless divide: access, technological reluctance, affordability, and digital skills. Access is not a likely driver of the divide given that nearly all people in Canada have access to mobile coverage. With respect to digital skills, people in the wireless divide demonstrate fewer skills but it is less clear whether lower levels of digital skill are a cause or consequence of the wireless divide. More research into the causality of this relationship is required. However, there is evidence that technology reluctance and affordability are potential drivers of the divide, specifically for people who lack both a smartphone and data plan.

Approximately 5 percent of people in Canada aged 15 and older reported not having a smartphone because they have no need or interest. Given that about 7.5 percent of people 15 and older do not have a smartphone, this result is notable. Similarly, 2 percent of people in Canada 15 and older reported cost as a reason for not having a smart phone. Of individuals that reported cost as a reason, 44 percent (CI 5%: 39, 50) belong to the lowest income quartile. While low income is associated with being the wireless divide, income alone may provide only limited insight into the causes of the divide and should be considered alongside other demographic factors, particularly age.

It is also important to consider the limitations of the data available in the CIUS on self-reported reasons for being in the wireless divide. First, these results only pertain to people who lack a smartphone. Yet, close to half of the divide is comprised of people with a smartphone but who lack a data plan. Second, given these reasons for not having a smartphone are self-reported, some people may report having no need or interest in wireless connectivity but in reality face cost barriers in accessing full wireless service. People may respond in this way due to embarrassment or other social or psychological pressures. Lastly, it may be that perceptions of cost are tied to the value individuals perceive in wireless technologies. For example, if someone has a lower level of digital skills, they may perceive wireless connectivity as being too costly since they are unlikely to get the same value out of this technology as someone with greater digital skills. Despite these limitations, results on reasons why people do not have a smartphone provide some useful insight into the causes of the wireless divide.

Analysis of our key informant interviews and the CIUS data also brought forward three core recommendations for supporting people in the wireless divide:

- *Increasing access to wireless programs*. Interviewees highlighted the usefulness of industry programs that make wireless connectivity more accessible (such as TELUS' Mobility for Good program, which is the only mobile-specific subsidy program we found in our search). However, they also stressed that these programs may be inaccessible to some who need them because they are often tied to receipt or participation in government programs, like the Guaranteed Income Supplement for older adults. These government programs may have high administrative barriers for some potential recipients, which has knock-on effects for accessing wireless programs. Expanding access to these wireless connectivity programs my modifying their eligibility criteria may increase their effectiveness.

- *More prepaid and pay-as-you go options*. For unhoused individuals and those living in unstable housing, wireless serve may in inaccessible because they do not have a stable address. Additionally, people with poor or no credit may also face barriers to accessing wireless service offered though a subscription. Increasing options available for prepaid and pay-as-you go plans in the market would enhance access to wireless connectivity for underhoused, low-income and new Canadians in particular.

- *"Pull" digital skills development*. Data from the CIUS show that there is scope for innovation in how we support people in developing digital skills. People in the divide are less likely to pursue learning opportunities than people outside the divide, and when they do they tend to rely on informal instruction from friends and family. Learning supports could be retooled to emphasize "pulling" rather than "pushing" skills development by tying learning opportunities to the current needs of recipients. This approach could look like providing technology or training to people that require connectivity to access support programs, helping them fulfil a concrete need rather than build digital skills in the abstract.

In addition to these policy recommendations, the study uncovered other areas for advancement when it comes to understanding the wireless divide and possible solutions to address it:

- *Evaluation*. Full evaluations of both public and private programs addressing the wireless divide, such as TELUS' Mobility for Good program and the Connecting Families Initiative from Innovation, Science and Economic Development Canada, should be undertaken to establish their effectiveness and identify specific areas of improvement.

- *Measurement of the wireless divide*. A method for measuring the wireless divide over time should be developed to enable policy makers and industry partners to set goals for closing the divide and track progress.

- *Surveys*. Unhoused individuals and people with unstable housing are likely not captured in the Canadian Internet Use Survey. However, information on wireless connectivity of these individuals could be gathered as part of point-in-time homelessness counts. Furthermore, questions could be added to the Canadian Internet Use Survey that would enable researchers to gain more insight into the potential drivers of the wireless divide and to define the wireless divide more precisely.

Annex A – Informant Interview Questionnaire

1. Who are the people you serve? What are the demographic characteristics of people you serve who do not have access to mobile services?

2. What are the reasons they do not have access to mobile services?

3. What do you see as the key drivers for these demographics not having mobile services? Do these drivers differ across demographic groups?

4. Do you have some clients that have a smartphone but no data plan? What are the reasons for people having a smartphone but no data plan? How common is this?

5. We are exploring this concept that there are multiple "digital divides". That is, people who lack mobile service may face multiple different barriers in day-to-day life. For example, not having access to mobile services may have less ability to navigate public transit, access education services, etc.

    a. What are the consequences of not having access to mobile services?

    b. Do these impacts differ across demographic groups? For example, do older adults face different barriers than parents or new Canadians? What about intersectionalities of these identities?

6. What would be the most effective way to address the barriers to mobile wireless for your clients?

Annex B – Additional Considerations for Defining the Wireless Divide

In the section *Quantifying the Wireless Divide*, we discuss our rationale for including people who have no interest in a smartphone or data plan in the wireless divide. This Annex expands on this discussion, presenting additional factors that we considered when establishing our definition of the wireless divide.

Information gaps in the CIUS were a core consideration when we developed our approach. The survey asks individuals who do not have a smartphone why they do not have one, and participants can indicate having no need or interest in these technologies. In principle, the responses to this question could be used to exclude people with no interest in owning a smartphone from the wireless divide. However, the CIUS does not ask people lacking a data plan why they do not have one. Since our definition of the digital divide depends on access to both a smart phone and data plan, the CIUS does not provide sufficient information to identify and remove individuals who have a smart phone but do not have a data plan because of no need or interest in a data plan.

Even if the CIUS were extended to include questions on why people do not have a data plan, there are limitations in the self-reporting of this type of information. Specifically, the concern is that people may report having no need or interest in wireless connectivity, but in actuality face cost or other barriers in accessing full wireless service. People may respond in this way due to embarrassment or other social or psychological pressures. This challenge is inherent to the self-reported nature of the data and is unlikely to be fully avoided if we rely on self-reported data to ascertain interest in wireless service.

Additionally, even if we could reasonably assume that individuals provide fully accurate responses to why they do not have a smartphone or data plan, there are also conceptual challenges in defining someone's inherent interest in wireless connectivity. Given most people have to pay for wireless service and a smartphone, there is an unavoidable relationship between price, one's perceived value of wireless connectivity, and the choice to purchase a smartphone and data plan. Someone may report having no interest in full wireless connectivity not necessarily because they cannot afford it, but rather because the value they would get from full wireless connectivity is outweighed or equal to the price they would pay for this connectivity. That is, these individuals may have no interest in wireless connectivity given their willingness to pay and prevailing prices.

The intention of excluding people with no interest in wireless connectivity is to enable policy makers to better target interventions. However, excluding people who report having no interest in wireless connectivity may be counterproductive. It runs the risk of creating a definition of the wireless divide that is conditional on price or ability to pay. If prices for wireless connectivity were to increase, then the wireless divide would shrink, and vice versa. The result would be an unstable target population for policy intervention, potentially confounding progress towards closing the wireless divide and making it difficult to consistently track progress towards closing

the divide. In contrast, using clearly measurable indicators such as having a smartphone and data plan provides a stable wireless divide sub-population at the cost of potentially being overly broad in approaches to addressing the wireless divide, a preferable tradeoff.