Measuring Community Health Outcomes for a Basic Income Pilot

Submission to Special Advisor on Basic Income Hugh Segal, August 17, 2016

Overview

The Association of Local Public Health Agencies (alPHa) – Ontario Public Health Association (OPHA) Health Equity Workgroup is pleased to have this opportunity to provide additional input into the basic income pilot discussion paper being prepared by Special Advisor Hugh Segal. Following our consultation meeting with Hugh Segal and Maripier Isabelle on July 14, 2016, further advice was requested on the measurement of community health outcomes. The Table on page 4 provides the specific community health indicators and data sources we recommend, and the remainder of the submission provides rationale for these recommendations, as well as related recommendations on study design, individual-level data collection, and the potential role of the public health sector.

The Complex Relationship between Income and Health

Understanding the complex relationships between income and health can inform the design of Basic Income Pilot study. Income is related to health in three ways: through the gross national product of countries, the income inequalities that exist within a country/province, and the actual income of individuals (Marmot, 2002). The latter two are the most important when considering health inequalities in a high income country such as Canada. While providing a Basic Income (BI) may have some influence on income inequalities - especially if provided widely at a provincial level - it is most likely the influence on recipients' income levels and income security that will be associated with the most significant health outcomes in a community.

Beyond individual income levels and income security, neighbourhood level effects also contribute to health status and can mitigate or exacerbate the impacts of individual income. Considering this, the BI pilot must impact a sufficient number of individuals within a community and provide a sufficient enough increase in income to actually impact the health of a community. Taking into account both individual and community level impacts of a basic income, two approaches to measurement of health outcomes are required. First, an overall estimate of the community level change in a health outcome, and second, disaggregating (i.e. breaking down) each health outcome by income level to determine if there is more of a change in those in the lowest income group. We would anticipate that the improvement in health for those in low income (and who, therefore, may receive BI) would be greater than the improvement for those in high income, contributing to lessening health inequalities, which is an important outcome to demonstrate. This "income gradient" is usually examined by comparing the health of the highest income quintile (top fifth) in a community versus the health of the lowest income quintile (lowest fifth) in a community, either by dividing their rates (a relative measure of inequality) and/or by subtracting them (an absolute measure of inequality) (CIHI, 2015).

It is also important that the changes in the income gradients for health outcomes are examined within the context of the overall change to income inequalities in the community as a result of the BI provided to residents of the pilot community. For example, one might expect to see a reduction in health inequities between income groupings that mirrors the reduction of income inequalities themselves.

While the relationship is complex between income and health, it is worth considering the key mechanisms through which income is thought to impact the measured outcomes, i.e., through a direct effect on material needs (e.g. healthy food, safe housing, affordable prescription drugs and dental care), or through an effect on social connectedness and the opportunity to control life circumstances (e.g. ability to make choices, reduced stress). Both aspects should be considered in the selection of community level health outcomes.

The Basic Income Pilot and Community Level Health Outcomes

Receiving a basic income is hypothesized to impact health outcomes through a number of complex mechanisms. The most well-known and documented health outcomes associated with income are: smoking, chronic diseases, all-cause mortality, and life expectancy. These health outcomes and their associated inequities are slow to change over time, and may not be the best ones to select when the time horizon to examine outcomes is relatively short, as in the case of a BI Pilot. A number of studies that have examined the health impacts of providing income and/or housing supports have found limited improvements in health outcomes, often because follow up periods are too short (Larrimore, 2011; Pickett & Wilkinson, 2015). Therefore to understand changes in community level health outcomes, indicators need to be selected which are highly associated with income but also where a meaningful change would be expected in a short period of time.

Some of the shorter term significant health impacts that have been associated with providing increased incomes or rent geared to income housing include those related to mental health, psychological distress, and pain (Costello, 2003; Dunn, 2015; Gibson et al, 2014). In addition, there have been improvements in outcomes that are more closely related to income itself, such as food insecurity (i.e. affording nutritious food) and life stress (i.e. worrying less about money) (Emery et al, 2013; Dunn, 2015). As well, Tarasuk et al (2015) has shown that household food insecurity is, in turn, a robust predictor of health care utilization independent of other social determinants of health.

The most direct health evidence we have of possible health outcomes related to BI comes from Forget (2011) and Brownell (2016). Forget (2011) highlighted the impact of increased incomes on decreasing the gap between intervention and control communities for hospitalizations related to “accidents and injuries”, hypothesizing that influencing factors may be that individuals with more income security would not need to work in dangerous jobs, would be less likely to consume alcohol and other substances that put them at risk for injuries, and children may have greater parental supervision. In addition, hospitalization due to mental health diagnoses followed a pattern very similar to that of accidents and injuries. Another source of direct evidence is from Brownell et al (2016). This research examined the impact of receipt of an unconditional prenatal income supplement over six years in Manitoba. Health impacts included a 21% reduction in low birth weight and an 18% reduction in preterm births, along with improvements in small for gestational age births, breastfeeding and large for gestational age births. Shankardass (2014) showed similar relationships in perinatal outcomes with income in Nova Scotia.

The perinatal period and early childhood experiences can change one’s health trajectory over an entire life course. These two critical stages along with other times of vulnerability and dependence such as the transition to adulthood (“emerging adult” years) and older age, is where the impact of the social determinants of health can have more influence (Davies, 2011). Therefore health outcomes associated with these specific vulnerable life stages may be more likely to show a shift as a result of BI. Examples of perinatal outcomes have been mentioned previously (Brownell, 2016) and support this hypothesis. In addition, studies have reported on improvements in child test scores associated with increased incomes (Milligan & Stabile, 2011; Forget, 2011). Importantly, there have been consistent associations between Readiness to Learn (or Early Development Vulnerabilities) based on the Early Developmental Instrument (EDI) and income levels (CIHI, 2014).

Beyond health outcomes specifically, there are a number of social outcomes that are closely related to health (i.e. social determinants of health) which are very important to measure. We have not included substantial content on these outcomes in this submission as were asked to focus on community health outcomes, however we would be happy to comment on these further in future. Examples include prevalence of housing affordability (those spending 30 percent or more of their income on housing costs) and unemployment, which could be monitored with the long form census, and Ontario's Poverty Reduction Indicators, specifically high school graduation rates, education progress (grade 3 and 6 EQAO results) and the prevalence of youth not in education/ employment/ training, which are valuable indicators that are related to an individual's health trajectory and may be available at a community level.

When examining prevalence of a health outcome, statistical power is maximized when the prevalence occurs in about one-half of the population. For a very low prevalence (e.g. <10%, such as for certain perinatal outcomes), it is worth noting that a larger sample size will be required to detect significant differences when the effect of an intervention actually exists. This was considered when making recommendations on potential indicators, generally suggesting outcomes that are of relevance to most of the population and not so rare that too few cases will be found in the community under study.

Disaggregation of the Outcomes by Sex and Income:

It is also worth noting that a couple of studies that were reviewed indicated that examining the changes in health outcomes by sex is important, as some outcomes may be more likely to occur in males versus females (such as emotional problems and pain) or in females versus males (such as improvements in food security) (Milligan & Stabile, 2011; Dunn, 2015).

As described earlier, it is not only the absolute change in health outcomes at a community level that should be considered over the duration of the pilot, but also the change in the gap in each outcome between the richest and poorest members of the community. Outcomes need to be disaggregated by income groups, so that the change in health for each group and the change in health inequality (or gap) between groups can be detected.

Association of Public Health Epidemiologists in Ontario (APHEO) Core Indicators:

Based on the considerations above, the table on the following page summarizes the community health indicators and data sources that may be most appropriate for consideration for Ontario's BI pilot.

APHEO has collaborated with partners to develop over 120 standardized public health indicators. Many of these indicators are already being reported at a local level by public health units and baseline values may be available for larger communities. Wherever possible, the use of standardized indicators is recommended and consultation with local public health unit epidemiologists is advised.

Table: Community Level Health Indicators to Measure for a Basic Income Pilot

Category	Indicator	Data Source(s)**
Shorter Term Outcomes (< 3-5 years) ***– most appropriate for a Basic Income Pilot***		
Mental Health & Addictions	Self-Rated Mental Health Life stress* Sense of Community Belonging* Emergency department visits for a mental illness or an addiction (Health Quality Ontario, 2016)	CCHS or RRFSS CCHS CCHS IntelliHEALTH
Household Food Insecurity	Household Food Insecurity* Vegetable and Fruit Consumption* (may be improved as a consequence of improved food security)	CCHS CCHS or RRFSS
Healthcare Utilization	All-cause Emergency Department Visits All-cause Hospitalizations Primary Care Visits	IntelliHEALTH IntelliHEALTH ICES (special data request)
Injury	Injury-related Emergency Department Visits* Injury-related Hospitalizations*	IntelliHEALTH IntelliHEALTH
Intentional Self-harm	Intentional Self-Harm Related Hospitalizations*	IntelliHEALTH
Perinatal Outcomes	Low birth weight* Pre-term birth rate* Small for gestational age*	IntelliHEALTH or Better Outcomes Registry & Network (BORN)
Medium Term Outcomes		
School Readiness	Children Vulnerable in Areas of Early Development (see CIHI, 2014)	The Early Development Instrument (EDI)
Self-Rated Health	Self-Rated Health*	CCHS or RRFSS
Smoking	Adult Current Smokers*	CCHS or RRFSS
Longer Term Outcomes (10+ years)		
Chronic Diseases	Chronic Disease Hospitalization* Prevalence of Chronic Diseases	IntelliHEALTH CCHS or RRFSS or a special request from ICES
Diabetes	Prevalence of Diabetes (special data request from ICES)	Ontario Diabetes Database
Mortality	Potentially Avoidable Mortality* All-cause Mortality* Life Expectancy*	IntelliHEALTH (Vital Statistics) IntelliHEALTH (Vital Statistics) IntelliHEALTH (Vital Statistics)

**** indicates an APHEO core indicator***

***** a description of each data source can be found here:*** http://core.apheo.ca/index.php?pid=261#Data%20Sources

Finding the Signal in the Noise: Evaluating the Impact of the Basic Income Pilot on Community Health Outcomes

While selecting appropriate health outcomes is critical, this cannot be done without considering the methodological challenges that exist when attempting to attribute the impact of receiving a basic income on changes in health outcomes at the community level. Essential to disentangling these complex mechanisms is an appropriate study design and data collection plan.

Study Design

The design of the Basic Income Pilot will have a significant impact on the ability to measure resulting impacts on community health outcomes. Important features include:

1) Consideration should be given to the **benefit level (basic income) provided to participants in the intervention group** to ensure that it is at a level that is hypothesized to improve health outcomes. In addition, there may be consideration given to the value of randomly varying levels of the minimum basic income assigned to participants to be able to study the potential dose-response relationship related to changes in the basic income level on health.

2) **The size and number of communities that receive the basic income intervention.** Of particular concern is **to ensure sufficient statistical power to detect differences in health outcomes** that may result from BI, there needs to be a large enough sample size of people whose incomes have been enhanced/supplemented as part of the Basic Income Pilot. This can be achieved by (i) picking a large community to pilot, (ii) ensuring a saturation model is used as the intervention, and (iii) sampling sufficient respondents from the community to measure health outcomes. A statistician can be consulted to assist with both sample size as well as study design characteristics.

3) **The comparability of the selected control community(s) is an important factor for consideration**. Selecting control participants or community(s) (i.e. those that do not receive the basic income intervention) that are as similar as possible to the intervention community (e.g.in demographic characteristics and health status) is essential for minimizing potential confounding (both measured and unmeasured) and therefore ensuring that any observed effects are caused by the basic income intervention. For example, concerns have previously arisen around the comparability of the intervention and control groups when examining the effects of unconditional income transfers on birth outcomes (Racine, 2016).

4) **The time horizon of both the Basic Income Pilot and the follow-up for changes in health outcomes**. Extending the Basic Income Pilot over several years is essential for examining the potential cumulative effects of receiving the intervention. This approach would enable the study of whether the impacts of receiving a basic income go beyond protection against short-term income shocks and help shape life course trajectories for educational achievement, employment and health. In addition, the **study follow-up** for such a pilot needs to be long enough for health effects to be able to be seen. For some conditions and diseases, such as cancer, the impacts are not felt until many years later. Changes in eating behaviours and physical activity are compounded over time and lifelong changes may be necessary to see health impacts. As mentioned previously, shorter term health outcomes related to income are often most highly related to those with a direct tie to income, such as food insecurity, psychological distress, and self-rated mental health.

Therefore, to assess the impact of basic income on community health outcomes, careful consideration must be given to the benefit level assigned in the intervention, the population receiving the intervention, the comparability of the control population to the intervention population and time horizon of the Basic Income Pilot and study follow-up. To help ensure the strongest statistical power to detect changes in

community health outcomes from BI, one would want to consider a larger community, with a saturation site, over a prolonged period of time (as long as possible given this is a pilot project). If no improved health outcomes are found, it may not be an indication that BI is not achieving such outcomes, but that the initiative is too small and has not been in place long enough to see the delayed health impacts in the population. Short follow up periods have been noted as a challenge in previous studies that examined income interventions and their association to health outcomes.

Data Collection

To evaluate the impact of the basic income intervention on health outcomes, high quality data from before, during and after the intervention will be necessary. In parallel with the Basic Income Pilot and the measurement of community health outcomes as described above, it would be extremely valuable if individual level health outcomes were also measured by setting up a cohort study. The study population should include all participants receiving the basic income intervention and a control arm of comparable participants from Ontario receiving the current social assistance and benefits available to all Ontarians. The cohort study should encompass data collection on demographic factors, social determinants of health (e.g. food insecurity, housing), sources of income, aspects of the intervention (e.g. barriers to participation, what the money was used for, stigma), social assistance participation, health behaviours and mental health, social networks and other primary and secondary outcomes of interest. In addition, the survey should encompass other areas impacted by the Basic Income Pilot, including information on educational achievement, employment and economic outcomes. Where possible, this information should be collected using standardized measurement tools similar to existing data sources to allow for comparability across other study populations in Ontario and Canada. Moreover, collected data should be enhanced through routinely collected administrative data through data linkage. For example, adding income information collected for tax purposes for a more objective measure of income and wealth in study participants.

It is important that consent to be followed up for research and evaluation purposes be sought from all participants in the Basic Income Pilot study cohort. This will enable secondary research and evaluation, not part of the original Basic Income Pilot timetable, thereby enhancing the potential learning opportunities from this important social experiment. For example, consent to follow-up would enable BI recipients to be invited to participate in focus groups or key informant interviews to better understand for whom and how the intervention works. In addition, to enhance the health data collected as part of the cohort, permission and the necessary information to link project data to administrative and health databases will greatly enhance research and evaluation efforts, particularly the impact of basic income on health over longer time horizons. The benefit of administrative health data in evaluating population health interventions were observed in evaluating the health impacts of the MINCOME experiment (Forget, 2011).

Is a Basic Income Pilot Cohort Study necessary?

While there are existing data sources that can provide some of the information described above, primary data collection will be necessary to fully disentangle the impact of the Basic Income Pilot. A number of challenges can occur when trying to measure the health status at a community level, especially in smaller towns or rural locations. Consideration should be given to the following:

- **Individual Level Data:** There is no existing data source that will have individual level information on the intervention, outcomes of interest and potential confounders (e.g. demographic information) necessary to evaluate the community level health impacts of the Basic Income Pilot.
- **Administrative Data:** In the absence of including tax information into administrative data, it will likely not be possible to identify participants who received the intervention in the Basic Income Pilot. Data is also limited to information routinely collected by the health system. Information is often lacking at

individual level on socio-demographic factors and health behaviours. Using area-level indicators derived from the census will not be specific enough to evaluate an individual level BI intervention.

- **Survey Methodology:** Surveys such as the Canadian Community Health Survey may not be designed for analysis at the community level of geography and the predefined weights may not be appropriate to use. This is an important consideration for community level health outcomes comparisons, if for example CCHS participants were to be targeted as a potential control group. In order to effectively use CCHS data to measure outcomes of the pilot, the geographical area selected for the pilot needs to be defined in a way that is compatible with Statistics Canada's sampling methods. For instance, selecting Census Metropolitan Areas would ensure the CCHS sampling frame aligns with the pilot. In addition, changes to survey methodology are also important to consider for trends over time or combining multiple years of data. The CCHS underwent a major redesign for the 2015 cycle. As a result, Statistics Canada is recommending that data from 2015 onwards not be compared to data prior to 2015 (Statistics Canada, 2015).

- **Risk Factor Surveillance System (RRFSS):** Data collection could be enhanced through established collections of community level survey data such as the Rapid Risk Factor Surveillance System (http://www.rrfss.ca). In order to have sufficient sample size for the health outcomes associated with a Basic Income pilot, a customized survey available through RRFSS may be a solution. The purpose of RRFSS is to provide timely data relevant to local community needs where a specific sample size for a specific geography can be purchased with results available within 2 months. There are over 250 different modules to choose from, and additional modules can be added at request. Fourteen of the 36 public health units in Ontario are currently using RRFSS and may be producing population health estimates at the municipal level.

- **Small Sample Sizes and Large Confidence Intervals:** There may appear to be changes in health outcomes over time, but because of small sample sizes there may be large confidence intervals (i.e. uncertainty about the exact size of the health effect). This, along with the many statistical comparisons to be made for various health indicators, may result in health differences that are not statistically significant. Sample sizes also need to be large enough to be able to disaggregate the community level health outcome into income groups (often quintiles), essentially increasing the required sample size five-fold.

Role of the public health sector in the BI pilot

Measuring the impact of the Basic Income Pilot on community health outcomes in Ontario will require an extensive multidisciplinary study. The public health community in Ontario has invaluable experience in this regard. The Association of Local Public Health Agencies (alPHa) - Ontario Public Health Association (OPHA) Health Equity Workgroup, in collaboration with the Association of Public Health Epidemiologists in Ontario (APHEO), can provide important perspectives as to current community level health inequities in Ontario and which community health indicators should be assessed, in addition to supporting community-level conversations on basic income. We welcome the opportunity to provide advice on the planning and implementation of a Basic Income Pilot in these regards. In addition, a provincial-wide organization with extensive experience evaluating the impact of population-level interventions on population health and health inequities in Ontario would be ideal for conducting the proposed study. Public Health Ontario is one potential organization with the appropriate expertise, among others. Funding an independent study of the Basic Income Pilot can help avoid the MINCOME experience, where the pilot was ended without much analysis or a final report (Forget, 2011). Planning for and executing a proper study will be key to translating any findings from this experiment into knowledge and practice.

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