



MONITORING SOCIAL INEQUALITIES IN HEALTH IN QUÉBEC

A Strategy and Indicators for Monitoring Social Inequalities in Health in Québec

INSTITUT NATIONAL
DE SANTÉ PUBLIQUE
DU QUÉBEC

Québec 

Report

A Strategy and Indicators for Monitoring Social Inequalities in Health in Québec

Vice-présidence aux affaires scientifiques

July 2013

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TRANSLATION

The translation of this publication was made possible with funding from the Public Health Agency of Canada. Linguistic revision: Nina Alexakis Gilbert, Angloversion.ca.

This document is available in its entirety in electronic format (PDF) on the Institut national de santé publique du Québec Web site at: <http://www.inspq.qc.ca>.

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LEGAL DEPOSIT – 1st QUARTER 2015
BIBLIOTHÈQUE ET ARCHIVES NATIONALES DU QUÉBEC
LIBRARY AND ARCHIVES CANADA
ISBN: 978-2-550-68718-4 (FRENCH PDF)
ISBN: 978-2-550-72128-4 (PDF)

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SUMMARY

For two decades, the reduction of social inequalities in health has been on the health policy and guidance agenda in Québec. Moreover, current monitoring activities make it possible to track social determinants of health, population health status and the use of health and social services over time and space (regionally). In spite of these achievements, Québec does not have a plan for the systematic monitoring of social inequalities in health, although the existence of these inequalities is well documented.

The goal of this report is to propose a strategy and indicators for monitoring social inequalities in health. It is the result of a joint effort on the part of regional and national surveillance professionals in Québec, from the Table de concertation nationale en surveillance, the Ministère de la Santé et des Services sociaux and the Institut national de santé publique du Québec.

The report is divided into three parts: the first presents background information and useful concepts, the second reviews points of method, and the third formulates recommendations for a strategy and indicators to be used to monitor social inequalities in health.

To initiate the monitoring of these inequalities, the report proposes 18 indicators covering the health status of the population (10 indicators) and health determinants (8 indicators). These indicators are to be cross-referenced with a deprivation index, primarily, and tracked over approximately two decades on a Québec-wide scale and for each of Québec's administrative health regions. Using the inequality measures proposed, it will be possible to monitor social inequalities in health, in relative and absolute terms, between certain population groups and in the overall Québec and regional populations.

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INTRODUCTION

Twenty years ago, in *The Policy on Health and Well-Being*, the Québec government clearly articulated its desire to reduce social inequalities in health (SIH) by addressing the determinants of health (Ministère de la Santé et des Services sociaux, 1992). Since that time, various other laws, policies and public health programs have reiterated this same desire.

During the same period, plans for monitoring health and health determinants were established in Québec and regionally. While they permit tracking of health and health determinants, these plans only rarely provide for the actual monitoring of SIH, because they often consider health and health determinants separately, as information silos, rather than jointly.

Because this situation is not unique to Québec, the WHO Commission on Social Determinants of Health (Commission on Social Determinants of Health, 2008) and, later, the WHO World Conference on Social Determinants of Health (World Health Organization, 2011) recommended that national authorities implement national systems for monitoring health equity that systematically collect data on social determinants of health and health inequalities.

The existence of SIH in Québec has long been known. Over a half-century ago, the presence of social inequalities in youth mortality rates was observed in advantaged and disadvantaged areas of Montréal (Henripin, 1961). Since then, numerous SIH have been observed throughout Québec, in large and small cities and in rural areas while, at the same time, knowledge about the factors and mechanisms at the root of SIH in Québec (Frohlich et al., 2008) and elsewhere has been advancing (Commission on Social Determinants of Health, 2008).

This research report outlines a process aimed at laying the foundations of a system for monitoring SIH in Québec. In the first part, background information and useful concepts tied to the monitoring of SIH are discussed. In the second part, points of method are addressed and, in the third part, proposals for the tracking of SIH in Québec are formulated.

This report is the result of a joint project involving the Table de concertation nationale en surveillance (TCNS), the Institut national de santé publique du Québec (INSPQ) and the Ministère de la Santé et des Services sociaux (MSSS). Many surveillance professionals in Québec and in the administrative health regions participated in this project. Work began in the fall of 2010.

1 CURRENT STATE OF AFFAIRS

1.1 BACKGROUND INFORMATION

1.1.1 SIH in Québec guidelines and policies

The current environment is favourable to the initiation of systematic monitoring of SIH, which aligns with national anti-poverty priorities and recent initiatives promoting the development of a strategy for monitoring social inequalities of health.

One of the most important of these initiatives is the report of the World Health Organization's Commission on Social Determinants of Health (Commission on Social Determinants of Health, 2008) encouraging international mobilization around this important public health issue, and proposing action strategies for achieving health equity. In discussing the main strategies for reducing social inequalities in health, this report stresses the importance of measuring and analyzing the problem and assessing the effectiveness of action. Following from the commission's work, experts underscored the need to establish monitoring systems which methodically and regularly collect information capable of guiding the development of programs and policies that tackle social inequalities in health.

Interest in SIH in Québec is not new. Already in 1992, *The Policy on Health and Well-Being* (Ministère de la Santé et des Services sociaux, 1992) had made action on health determinants and reduction of social inequalities in health central to its strategies by proposing an integrated process based on overarching strategies not unlike those proposed by the Commission on Social Determinants of Health, which include promoting the strengthening of individuals' potential; supporting living environments and developing healthy and safe environments; improving living conditions; taking action for and with vulnerable groups; harmonizing public policies and actions that promote health and well-being and providing guidelines for the health and social services system.

Reducing the gaps between social groups is one of the fundamental objectives of the Québec health and social services system, an objective stated in Section 1 of the Act Respecting Health Services and Social Services (Gouvernement du Québec, 2011b). Moreover, the minister and the directors of public health are assigned responsibility in this matter under the Public Health Act (Gouvernement du Québec, 2011a). Concerning the prevention of disease and the promotion of health, the minister "shall [...] focus, insofar as possible, on the most effective actions as regards health determinants, more particularly actions capable of having an influence on health and welfare inequalities in the population and actions capable of decreasing the risk factors affecting, in particular, the most vulnerable groups of the population" (Section 8). Regional directors of public health also have responsibility, in particular, for informing the population of the general health status of the most vulnerable groups, the principal risk factors and the interventions deemed most effective. Monitoring, as an essential function, must assist the director in fulfilling this role.

In defining the priorities for collective action for 1997-2002, the minister put forward four guiding principles, including a desire for greater commitment to combating health inequalities. The *Programme national de santé publique 2003-2012* also outlines activities

that can act on the determinants of health and reduce inequalities in health and well-being. The update of the *Programme national de santé publique 2003-2012* (Ministère de la Santé et des Services sociaux, 2008b) reiterates the importance of preventing and reducing health disparities between various population groups. Programs and services tailored to the needs of certain groups, such as integrated perinatal and early childhood services for families living in vulnerable situations, as well as more global actions supporting community development and intersectoral action, are thus closely tied to efforts to combat social inequalities in health.

On the level of policy, Québec acted as a pioneer in Canada and in North America by unanimously adopting, in 2002, the Act to Combat Poverty and Social Exclusion (Gouvernement du Québec, 2011c). While it does not contain many specific commitments or concrete measures, this law calls for Québec to join the industrialized societies with the lowest poverty levels within ten years. The government subsequently launched action plans and organized national and regional consultations. Statistical profiles on poverty and social exclusion were produced by region (Ministère de l'Emploi et de la Solidarité sociale, 2010). Québec's *Politique de périnatalité 2008-2018* (Ministère de la Santé et des Services sociaux, 2008a) also identifies combating poverty among children and young families as an absolute priority, since the socioeconomic conditions of families have repercussions on children's health and development.

Finally, it is worth noting that the reduction of SIH among Aboriginal people, for whom social and health disparity with the rest of the population is greatest, is not the subject of a specific policy in Québec, unlike at the federal level. In fact, in 1999 the *Second Report on the Health of Canadians* pointed to the need to take measures to improve Aboriginal health and suggested several areas of priority action (Health Canada, 1999). In 2004, the government of Canada made several commitments (Health Canada, 2004) as part of a long-term plan to reduce the health gap between Aboriginal people and the rest of the Canadian population.

1.1.2 SIH and monitoring activities in Québec

Monitoring plays an essential role in identifying social and health disparities. Without monitoring and comparative analysis of the health status of social groups over space and time, it would not be possible to assess the progress made in reducing social inequalities in health. Nevertheless, the tracking of SIH in Québec is not formally included in national monitoring plans and guidelines, although there is certainly interest in doing so, and much discussion and past monitoring work has advanced our knowledge in this area.

Québec has equipped itself with a guidance framework for monitoring activities, in which it developed a model of health and health determinants. This framework has, in particular, made it possible to develop a common understanding of monitoring and to build on a global conceptual model of health and health determinants. Following this initiative, monitoring actors engaged in a process of reflection which led, in 2010, to the adoption by the Ministère de la Santé et des Services sociaux (MSSS) of a conceptual framework of health and health determinants (Émond et al., 2009). This framework makes it possible to grasp all the elements necessary to understanding the complex notion of "health." Social determinants are included in this framework. We will return to these determinants later, when discussing the conceptual markers underpinning the development of a strategy for monitoring SIH.

The Québec monitoring apparatus currently consists of two monitoring plans. On the one hand, the *Plan commun de surveillance* (PCS) of the MSSS (Ministère de la Santé et des Services sociaux & Institut national de santé publique du Québec, 2005) forms the basis of activities aimed at monitoring the health status of the Québec population. The PCS covers the six areas of intervention identified in the *Programme national de santé publique* (Ministère de la Santé et des Services sociaux, 2008b) as well as the field of general monitoring. It identifies the objects that must be monitored by the majority of the administrative health regions and at the provincial level to enable health authorities to fulfill their monitoring mandate, a function assigned to the minister and to the 18 directors of public health. Serving to complement the PCS, the *Plan ministériel de surveillance multithématique* (PMSM) (Ministère de la Santé et des Services sociaux & Institut national de santé publique du Québec, 2008a) provides for important developments, including increasing the accessibility of data and the capacity for analysis required for the monitoring of socioeconomic inequalities and SIH. Structured around specific themes, this plan monitors socioeconomic inequalities and SIH linked to chronic diseases, environmental health, socioeconomic determinants and global health status. The plan calls for the material and social deprivation index or an income index to be integrated with data from the various administrative areas and with health surveys in order to produce the most complete portrait possible of SIH (Ministère de la Santé et des Services sociaux & Institut national de santé publique du Québec, 2008b). One aim of this work is to allow for the establishment of targets for the reduction of social inequalities in health in Québec.

Work is currently underway to integrate these two monitoring plans, with the aim of structuring the Québec apparatus for monitoring population health status and health determinants around a single monitoring plan, the *Plan national de surveillance*. The intention, in integrating the two monitoring plans, is to integrate and streamline the work processes associated with the development or implementation of the PCS and PMSM, to combine the work of analysis, interpretation and distribution of information generated by the PCS and the PMSM, and to ensure better positioning of the monitoring function within organizations, so as to promote more effective use of monitoring data to support decision-making at the national, regional and local levels.

As for monitoring reports that focus attention on social inequalities, several products are available: the *Portrait de santé du Québec et de ses régions* (Ministère de la Santé et des Services sociaux et al., 2011), reporting on the socioeconomic conditions of the Québec population; the reports in the "Zoom Santé" (Institut de la statistique du Québec, 2012) series, establishing links between social conditions, health and health determinants, and various reports from the Institut national de santé publique du Québec (INSPQ), tying health to social conditions, and in particular to the material and social deprivation index (Institut national de santé publique du Québec, 2012a). To date, the most complete reports on SIH in Québec are still the *Troisième rapport national sur l'état de santé de la population du Québec: Riches de tous nos enfants* (Ministère de la Santé et des Services sociaux du Québec, 2007), which includes more than one hundred indicators illustrating health gaps among youth, and the reports on SIH from the regional directors of public health (Direction de santé publique de Montréal, 2011; Direction de santé publique de la Mauricie et du Centre-du-Québec, 2012; Direction de santé publique de la Capitale-Nationale, 2012).

In spite of these achievements, Québec still does not have a system for monitoring SIH such as can be found elsewhere, as will be made clear below. However, the INSPQ website now includes a SIH heading in the "Santéscope" section (Institut national de santé publique du Québec, 2012b). Close to forty health indicators are provided on this website, broken down according to Québec's material and social deprivation indices.

In the monitoring plans of the administrative health regions, SIH monitoring has also not been systematized or formalized. However, work to systematically track inequalities identified through gender-based analysis (GBA) or the observation of gaps between local territories is very widespread. Some regions choose to monitor indicators defined by regional or local specificities, in order to identify health disparities according to territory. The analysis plans of others call for the cross-referencing of health data with a socioeconomic indicator. Following the example set at the provincial level, many regions include within monitoring profiles or annual reports from the public health directors analyses of social determinants and health, primarily overall health, but these analyses are not carried out systematically and regularly. Finally, some regions track material and social deprivation on their territory (via atlases or management reports).

1.1.3 SIH and monitoring activities outside Québec

Social inequalities in health exist in all industrialized countries. A 2005 survey of public health policies in 13 industrialized countries (including Canada) reports that all of these countries recognize that health inequalities are a major problem (Crombie et al., 2005). Combating health inequalities is the central goal of public policies in all of these countries. Certain countries have even proposed ambitious targets for the reduction of inequalities, which we will discuss later. The approach taken to reducing health inequalities varies among countries. While all recognize the role of social determinants and the need for intersectoral intervention, there is considerable variation in the political avenues taken to achieve this. Only England has a specific policy for combating health inequalities. Elsewhere, policies on poverty, inclusion and social justice are juxtaposed with health policies and the links between them are made more or less explicit.

To ensure tracking of SIH and of the targets to be achieved, many countries have equipped themselves with monitoring systems that include a battery of indicators of the social determinants of health and of health inequalities. We will provide a few examples. In the United Kingdom, the London Health Observatory (one of a network of twelve observatories) serves as a national leader in SIH by developing SIH monitoring tools, including the "Local basket of indicators" (London Health Observatory, 2012). With the indicators in this basket, it is possible not only to monitor national targets and priorities, but also to report on local particularities and priorities. In New Zealand, 71 indicators are updated annually, with special attention focused on the vulnerable Maori population (Hayward et al., 2008). In Sweden, many health determinants are also tracked using indicators. According to a recent summary (Hayward et al., 2008), the monitoring systems in the United Kingdom, Sweden and New Zealand are the most advanced and may thus be used as models.

In addition to distributing information on SIH on the internet, governments also regularly produce reports or evaluations. In England, the Department of Health recently published the report of an independent committee mandated to take stock of SIH in that country and to recommend the best strategies for tackling SIH beginning in 2010 (Marmot et al., 2010).

Conclusion

This brief overview leads to the following observations. There is genuine concern for SIH in public health policies in Québec, but this concern is not producing concrete commitments, in particular, in the form of inequality reduction targets, such as have been observed elsewhere. In Québec there are also many reports that illustrate the presence of SIH and monitoring plans that allow for analysis of the social determinants of health. However, Québec does not have an SIH monitoring plan which would allow health to be systematically linked to the social determinants of health. Examples of such plans exist in other countries.

1.2 CONCEPTUAL FOUNDATIONS

To develop an SIH monitoring plan, it is necessary from the start to define the very concept of social inequality in health and to understand how such inequalities come about and are perpetuated. A frame of reference is thus indispensable both for clarifying the connections between the multiple determinants contributing to SIH and for justifying the choice of indicators for monitoring SIH. The following explanations are based on an abundance of literature (Bernard et al., 2007; Braveman, 2006; Commission on Social Determinants of Health, 2008; Gordon, 2003; Kawachi et al., 2002; Macintyre et al., 2002; Mackenbach, 2006; Shaw et al., 2007; Solar & Irwin, 2007; Whitehead & Dahlgren, 2006; Wilkinson & Pickett, 2010; Lévesque et al., 2007) and essentially echo the observations of the WHO Commission on Social Determinants of Health (Commission on Social Determinants of Health, 2008).

1.2.1 SIH: what are they?

There are several definitions for social inequalities in health.¹ Two of them provide a good summary:

"A health difference between individuals connected to social factors or criteria of differentiation (social classes, socio-occupational categories, income categories, levels of education)" [Translation] Pierre Aïach (Aïach, 2000)

"... unnecessary, avoidable... and unfair differences"

These differences are the result of:

"health-damaging behaviour where the degree of choice of lifestyles is severely restricted; exposure to unhealthy, stressful living and working conditions; inadequate access to essential health and other public services." Margaret Whitehead (Whitehead, 1990)

¹ The expression "health inequities" is also used to signify the modifiable and unjust nature of the inequalities observed. In this report, the expression "social inequalities in health" is synonymous with health inequities.

The definitions proposed in the literature reflect all the relationships between health and membership in a social category; they go beyond the field of health alone and enter into the overall functioning of society: the balance of power, gender differences, income distribution structure, conditions in local living or work environments, accessibility of services, etc.

SIH take the form of differences between men and women, or between socioeconomic groups or territories, as regards many aspects of population health. For the most part, they are avoidable and unjust.

They are avoidable, because they result from social processes that can be acted upon to reduce gaps in exposure to or the distribution of certain health determinants. They are unjust, because in our society, all people should have an equal chance at good health and survival, regardless of their social status. Social inequalities in health thus reflect an inequity in the distribution of the social determinants that form the basis of health (education, income, security, access to health services, etc.). They produce not only health gaps between social groups, but also a "health gradient," according to which the more socially disadvantaged individuals are, the more disadvantaged they are with respect to health.

This health gradient may be more or less steep, depending on the level of inequality prevailing in a society, and the differences between groups located at the socioeconomic extremes, at the top and bottom of the scale. Thus, social inequalities in health should first be measured with reference to the extreme positions on the axis of any particular socioeconomic scale (Braveman, 2006). This being said, a continuum of inequalities emerges between the poles of the axis, an uninterrupted sequence whose various levels form a continuous gradient such that, at each level, those above are better off than those below. Thus, measures of inequality must also make evident the existence of this continuum between the extremes.

Despite this reality, social inequalities in health are avoidable. They may be reduced by wealth redistribution policies and by programs providing universal access to health and education services, in particular. When such policies and programs are accompanied by sufficient means, they yield results. However, by themselves, policies and programs are not sufficient. It is also important to build on the participation of individuals and communities and, thus, to support their efforts to develop their own potential and their ability to take action to maintain and improve their health.

1.2.2 SIH: what are their origins?

As represented by the conceptual model adopted by the WHO Commission on Social Determinants of Health (Figure 1) (Commission on Social Determinants of Health, 2008; Solar & Irwin, 2007; Lévesque et al., 2007), many factors contribute to the formation of social inequalities in health.

Structural determinants and socioeconomic position

SIH firstly result from structural determinants such as overall economic prosperity and the protective mechanisms put into place by governments. Certain social or public policies (education, work, housing, transport, social protection, health) and other safety nets (income tax, transfers) can make a difference in terms of economic inequalities.

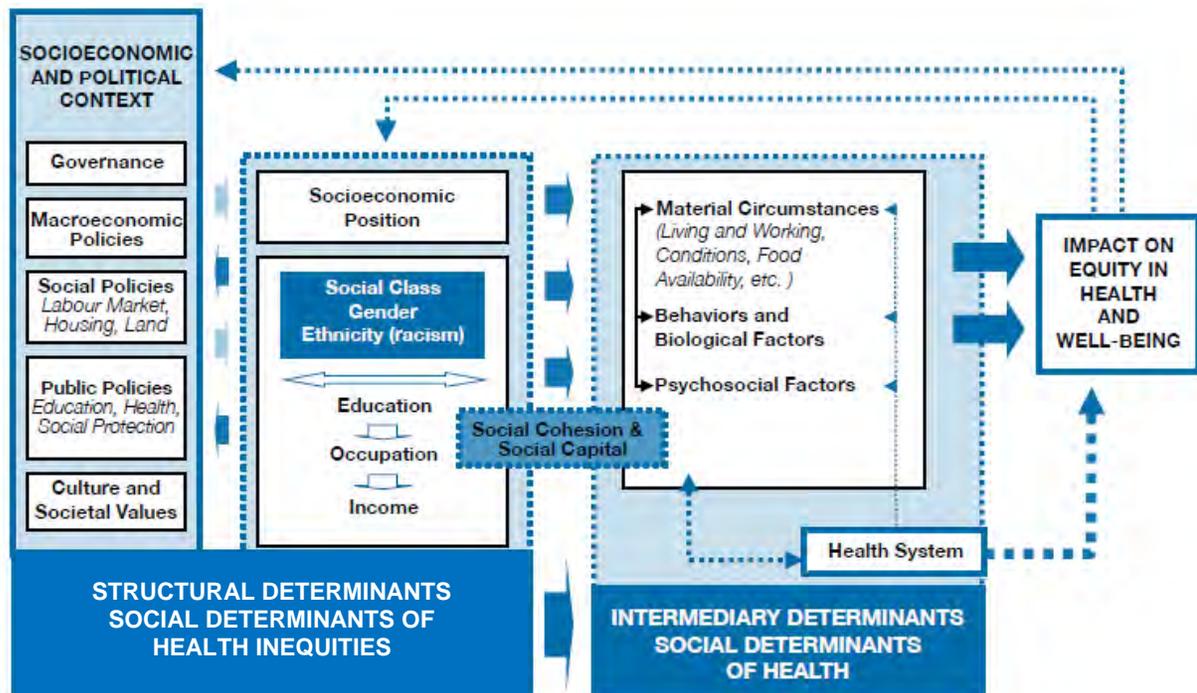


Figure 1 WHO model of social determinants of health and of health inequalities

Each individual's socioeconomic position also plays a major role with respect to SIH. Each individual has an income, a social status and a class position which positions him or her in relation to others in a society. Where income differences are great, social distances are also great, and social stratification is more pronounced. However, it would appear that people are sensitive to inequalities at all levels. In wealthy countries that have a more unequal distribution of income, social and health problems rise as inequality increases.

Socioeconomic position is often presented as a "cause of causes," because it conditions other factors that have an impact on health.

Intermediary determinants

Each person's position is, firstly, intimately tied to the **material conditions** of their living environment, workplace, home and community. This is true of working conditions, for example, which carry variable health risks. In jobs at the bottom of the social scale, where little schooling is required, more significant health risks are often faced: exhausting work, repetitive motions, exposure to chemicals, standing position, manual handling of loads, risk of injuries and accidents, etc. The same holds true for place of residence, which presents both resources (recreational and sporting facilities, healthy foods, etc.) and risks for health, whether related to population density, automobile traffic or the quality of housing. In addition

to these material characteristics, the **social dimension** of living environments impacts health, through factors such as solidarity and social cohesion, mutual trust and community life.

More global **psychosocial factors** also have an impact on health. An unfavourable socioeconomic position creates psychosocial stress through negative life events, financial difficulties leading to day-to-day worries, and an imbalance between the efforts made (such as at work) and the material and symbolic rewards received. Factors connected to work organization, such as work-related pressure, play an important role in explaining inequalities in cardiovascular health. Not working or the insecurity tied to the fear of job loss or periods of unemployment can affect mental health by promoting anxiety and depression, and can also affect cardiovascular health. To compound effects, these situations lead to a reduction in material resources and an additional source of stress. All these forms of psychosocial stress may lead to poor health, either through biological mechanisms (by affecting the endocrine or immune system), or by inducing risky behavioural mechanisms. In fact, psychosocial stress leads people to adopt more risky behaviours, such as smoking or binge drinking.

Lifestyle or health behaviours are major contributors to inequalities in morbidity and mortality. This is particularly true for smoking. The prevalence of smoking is in fact strongly associated with socioeconomic status, and is affected by income and education as much as by occupation. Physical activity and diet are also major risk factors, correlated to obesity and hypertension, which contribute to inequalities in morbidity and mortality. Generally, smoking, binge drinking, less frequent consumption of healthy foods, lack of physical activity and other behaviours unfavourable to health are more common in lower socioeconomic segments of the population, although there are variations depending on context and the persons concerned.

It should be noted that **biological factors**, such as an individual's age, sex and genetic inheritance can interact with lifestyles and modulate the impact of behavioural habits on social inequalities in health. These biological factors also interact with risks connected to the physical environment, with the elderly and the very young being more sensitive to these risks.

Finally, inequalities of access to **health services and care** can also exacerbate health gaps. The accessibility of front-line services in Québec, for example, depends on various factors, including income, age and recent immigration status. The health system can attenuate the various consequences of illness in individuals' lives. It can ensure that health problems do not lead to subsequent physical and social deterioration. The system can also, through preventive services (e.g., vaccination and mammography) protect individuals against health risks.

The aggregate effect of health determinants

Health determinants can be considered separately but, in reality, these determinants combine and interact with each other throughout people's lives, in association with their socioeconomic position. Thus, a low income may go hand in hand with binge drinking, a harmful work environment, unhealthy housing, etc. SIH must be viewed as an accumulation of health determinants across the life trajectory. This perspective may give rise to a variety of

approaches to monitoring: monitoring of health determinants, of health problems or of groups identified as vulnerable due to an accumulation of health determinants and problems (e.g., Aboriginal persons, recent immigrants, single-parent families, children living in families below the low income cut-off, persons with activity limitations, single persons). The accumulation of determinants may produce considerable gaps in health, either related to general health or to specific physical or mental health problems. General and specific measures of health must be tracked with reference to various indicators of social position.

Inequalities are not a static phenomenon; they are socially constructed by the disparities between disadvantaged persons and the more affluent. Because disadvantaged people perform the most difficult jobs, they are subject to a concentration of all risk factors (Baudelot, 2010). This produces a "transfer of living time" to the most advantaged in society. In other words, the difference in life expectancy observed is not viewed simply as years lost, but as years given (McAll, 2008).

Health and health determinants

While structural and intermediary health determinants may create SIH, conversely, poor health may have harmful economic and social consequences, such as job loss, isolation or social exclusion and a breakdown of the essential elements of social relationships: home, family, romantic relationship, work and the dominant lifestyles in a given society. And these consequences may, in turn, further undermine health.

Persons with a higher socioeconomic status are in general better protected against the negative consequences of illness. Studies show that these persons cope better with illness, in particular, because they have insurance or job security. Combined, these individual situations can have repercussions for all of society, such as impacts on productivity.

1.2.3 SIH in conceptual frameworks in Québec

The conceptual frameworks supporting health monitoring in Québec and Canada are descriptive outlines and do not deal specifically with SIH. They aim to categorize health determinants according to their specific dimensions. However, they can be used to identify major categories of health determinants to be considered in connection with the monitoring of social inequalities in health in Québec. These frameworks are useful for quickly identifying certain indicators that can be compared over time and space via the Statistics Canada Health Indicators (Statistics Canada & Canadian Institute for Health Information, 2004). Finally, since these conceptual frameworks guide the practice of monitoring and collecting data, they are also very useful for the integration of determinants specific to the Québec and Canadian contexts.

In Québec, a conceptual framework of health and health determinants was developed recently (Émond et al., 2009) in order to identify the scope of information fields to cover and the determinants to monitor in connection with population health. One of the goals of this conceptual framework is to gradually improve the practice of monitoring, in particular the monitoring of certain objects covered less than others, such that the necessary data are made accessible and the methods of analysis are diversified.

This framework (Annex 1) highlights the fields, categories and subcategories associated with each area of monitoring. As is evident, this framework includes the principal elements previously identified in the discussion of the determinants of SIH. The outer circles contain the structural determinants of health (global context and various systems - health, education, professional, etc.). The central circle points to the integration of the socioeconomic position of individuals with the intermediary determinants of health affected by living environments (family, educational, work, residential and local). These intermediary determinants (biology, lifestyle, parenting skills) are grouped in the circle immediately preceding the population's health status. This framework may also be extremely useful to developing an approach to SIH in vulnerable groups, such as Aboriginal populations or single-parent families.

Conclusion

These conceptual markers allow us to envision a strategy and indicators for monitoring SIH in Québec. In an initial phase, these markers may be used to integrate general indicators of health status that already exist, and have even been analyzed in connection with the population's socioeconomic conditions, but have not yet been considered from the perspective of systematic monitoring. In a second phase, these markers may guide conceptual and methodological developments in the measurement of certain structural or intermediary determinants or the tracking of populations identified as vulnerable.

2 METHODS

Moving from policy orientations or theoretical frameworks to the practice of monitoring is not easy, but it can be done. International literature reviews in fact reveal the existence of approaches and tools that permit measurement and tracking of social inequalities in health (Bonney et al., 2007; Hayward et al., 2008; Mackenbach et al., 2007). Similarly, the proposals of a work group and the accomplishments of a Manitoban team suggest that such tools may be useful on a Canada-wide scale (Martens & et al., 2010; Population Health Promotion Expert Group & Healthy Living Issue Group, 2009). Finally, even here in Québec, certain reports from directors of public health are good examples of broad, integrated analyses of measures of social inequalities in health (Direction de santé publique de Montréal, 2011; Direction de santé publique de la Mauricie et du Centre-du-Québec, 2012; Ministère de la Santé et des Services sociaux du Québec, 2007).

The objective of this chapter is to move from theory to the practice of monitoring social inequalities in health (SIH) in Québec, by proposing an inventory of methods. There are four sections in this chapter. The first establishes certain guideposts for the selection of indicators and analytical approaches, while the second offers an overview of available tools, examining, in succession, health indicators, social categories and measures of inequality. The third section explores a specific application of these tools, the development of SIH reduction targets. Finally, the last part seeks to define neighbourhood units, the grouping of which can be a tool for monitoring health inequalities at the sub-regional scale. These methodological observations will be applied in the next chapter to the formulation of concrete recommendations for tracking SIH in Québec.

2.1 GUIDEPOSTS FOR MONITORING SIH

While, in the first chapter, SIH were briefly defined as gaps in health or health determinants dependent on certain social categories – gaps that are a product of society and are therefore unjust and avoidable –, it is important now to define the nature of an indicator of social inequalities in health and explain how it differs from indicators of health or of health determinants (Graham & Kelly, 2004; Hayward et al., 2008).

An indicator of health or of health determinants is an expression of the average level of this indicator in the overall population. Examples would be life expectancy or the proportion of smokers. However, an improvement in these indicators in a population may mask an increase in gaps between the various groups making up this population. An indicator of social inequalities in health will provide information about the unequal distribution of health or of health determinants between certain social groups (sometimes territorial groups) in the population. For example, it may convey gaps in life expectancy at birth or in the proportion of regular smokers according to income, education, employment or other social indicators.

More formally, an indicator of social inequalities in health contains three inseparable components (Figure 2) (Braveman, 2006):

- a health or health determinant indicator that is modifiable,²
- an indicator of social position,
- a measure of health inequality that expresses the distribution of a health (or health determinant) indicator according to social position.

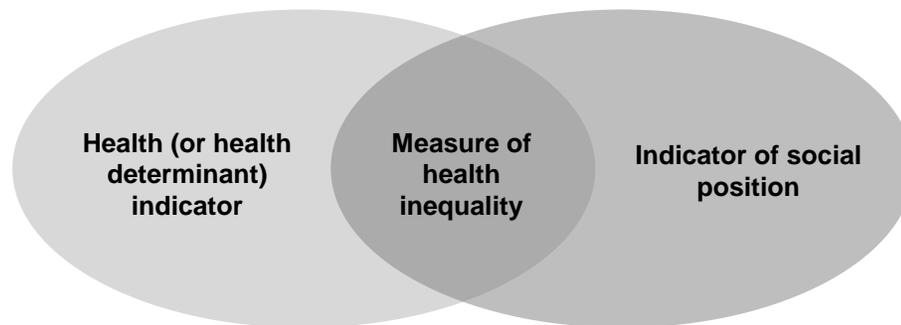


Figure 2 The three components of an indicator of social inequality in health

Each of these three components of an indicator of social inequality in health will be examined in greater detail in the next section.

There are two possible approaches to measuring social inequalities in health, the first considers the overall population, and the second considers vulnerable groups (Hayward et al., 2008). In the first case, the indicators produced cover all social categories and the focus is on their variations within the overall population. In the second case, the indicators produced focus solely on a vulnerable group, such as Aboriginal persons or single-parent families. The same indicators can be used in both cases, or measures more specific to the vulnerable groups considered can be applied. Both approaches are feasible in Québec.

Finally, regardless of the approach selected, it is important to specify certain criteria that must guide the choice of indicators of social inequalities in health. These criteria are diverse in nature, at once theoretical and methodological, and apply to the three components forming an indicator of social inequalities in health. They are based both on suggestions found in the literature (Bonney et al., 2007; Exworthy et al., 2006; Hayward et al., 2008; Kunst et al., 2001; Marmot et al., 2010; Population Health Promotion Expert Group & Healthy Living Issue Group, 2009; Frank & Haw, 2011) and on considerations specific to the monitoring of health and health determinants as practiced in Québec (Ministère de la Santé et des Services sociaux & Institut national de santé publique du Québec, 2005; Ministère de la Santé et des Services sociaux, 2007; Ministère de la Santé et des Services sociaux & Institut national de santé publique du Québec, 2008a; Ministère de la Santé et des Services sociaux & Institut national de santé publique du Québec, 2008b).

² One that can be affected by health promotion, prevention and protection or through actions targeting other areas of activity, such as transportation, housing or better distribution of income.

Thus, an indicator of social inequalities in health must:

- Reflect an important health or social reality and report on the essence of the problem considered (content validity).
- Have a clear interpretation, in terms of the association between social determinants and health status and in terms of being comprehensible to decision-makers and practitioners in the field concerned (face validity).
- Be associated with actions and organizations able to intervene to reduce the inequalities observed.
- Possess certain statistical properties such as precision (power), often connected to a minimum number of cases, reliability (reproducibility) and sensitivity (detection of change).
- Be simple to calculate, using databases (administrative, health surveys, etc.) already in existence in Québec.
- Be producible at the provincial scale and at the scale of each administrative health region, and allow tracking of inequalities over time. Comparisons outside of Québec, at the scale of Canada, for example, are also an asset.
- Present a complete and nuanced view of inequalities, making use of diverse data sources, but also diverse variables of social position and measures of inequality between groups at extreme ends of the spectrum and between all groups within the population.

To initiate the monitoring of social inequalities in health, it is suggested that general indicators of health status and health determinants be preferred along with simple inequality measures, whose scope is specified, before engaging in more complex analyses aimed at illustrating gradients in the population or causal relationships. With an eye to this principle, the tools useful for monitoring SIH are presented below.

2.2 THE COMPONENTS OF AN INDICATOR OF SIH

Three components of an indicator of SIH will be described briefly, in the following order: 1) health or health determinant indicators; 2) social position variables; and 3) measures of inequality in health. This review does not claim to be exhaustive. It is based on a certain number of practical guides and on experiences in measuring SIH, here in Québec, in Canada and elsewhere (Benach et al., 2003; Bonnefoy et al., 2007; Boström & Rosen, 2003; Braveman, 2006; Department of Health, 2007b; Department of Health, 2007c; Department of Health, 2007a; Havard et al., 2008; Hayward et al., 2008; Krieger et al., 2003; Kunst & Mackenbach, 1994; Kunst et al., 2001; Marmot et al., 2010; Martens & et al., 2010; Morris & Carstairs, 1991; Pampalon & Raymond, 2000b; Pampalon & Raymond, 2003; Pampalon et al., 2009b; Population Health Promotion Expert Group & Healthy Living Issue Group, 2009; Rehkopf et al., 2006; Salmond et al., 1998; Schuurman et al., 2007; Stafford et al., 2008; Tello et al., 2005; Équipe de recherche sur les inégalités sociales de santé, 2009; Ross et al., 2000). Readers wishing to learn more may obtain, on request, all of the reading notes on the works and articles consulted.

2.2.1 Health or health determinant indicators

The indicators by which health and health determinants are characterized can be grouped according to the conceptual model illustrated in Figure 1. Thus, some indicators may be tied to population health and well-being, while others may be linked to its intermediary determinants and structural determinants (Table 1).

Indicators of health and well-being

These indicators convey the health status and well-being of the population. Many of them are already monitored in Québec, but have not been included in a strategy for the systematic monitoring of SIH. These indicators are chiefly connected to mortality and morbidity, whether diagnosed or perceived. Some indicators apply to the entire population and present a global or summary view of health, from the perspective of life or health expectancy, for example. Other indicators target specific groups, such as children and youth, or specific aspects such as mental health, cancer or diabetes. All of these indicators derive from administrative registries or general health surveys and are available on a recurrent basis at the provincial and regional scales.

Table 1 Indicators of health status and of health determinants

Health and well-being	
<p>Overall health and well-being Life expectancy at birth and at various ages Disability-adjusted life expectancy at birth and at various ages Perception of health Perception of mental health and of psychological well-being Functional health (health utilities index) Life satisfaction</p> <p>Mortality General mortality Perinatal, infant and youth mortality (< 5 years) Premature mortality (< 75 years) Mortality by cause (cancer, lung cancer, road accident, suicide, circulatory system, smoking) Potential years of life lost (0 -74 years)</p> <p>Hospital morbidity General hospitalization Hospitalization by cause (mental disorders, tuberculosis, intentional and unintentional trauma)</p> <p>Material conditions Housing (quality, cost, homelessness) Exposure to second-hand smoke Air and water quality Access to green spaces Access to recreational facilities (playing fields, pools, etc.) Access to media (internet or television at home)</p> <p>Health care system Breast and cervical cancer screening Mammography and Pap tests Vaccinations (DPT, MMR) Visits to generalist or specialist physicians Dental visits (and presence of dental insurance) Outpatient surgery CLSC intervention Continuity of care (follow-up of medical examinations) Diabetes-related amputation Beta-blocker prescription following an infarction Stay in care facility Home assistance</p> <p>Education Education (level attained, diploma obtained) Dropout rate</p> <p>Occupation Employment status (active-inactive) Employment insurance beneficiaries Chronic unemployment</p> <p>Social networks Single mothers, low income</p>	<p>Morbidity Prevalence of long-term limitations Prevalence of chronic diseases (cancer, CVD, asthma, diabetes, arthritis, multiple sclerosis, mental illness and dementia) Prevalence of HIV infections, chlamydia infections Prevalence of suicide attempts Prevalence of oral disease, dental extraction</p> <p>Others Child development Social and emotional adjustment of youth Learning in young children Adolescent pregnancy and fertility Low birth weight</p> <p style="text-align: center;">Intermediary determinants</p> <p>Lifestyle indicators Smoking (regular smokers) Binge drinking Drug use Physical activity (brisk walking) Walking or biking to work Food insecurity Breastfeeding of newborns Diet (consumption of fruits and vegetables) Overweight and obesity (body mass index)</p> <p>Biological factors Age and sex</p> <p>Psychosocial factors Feeling of safety in local environment Stress at work Psychological stress and decision-making autonomy at work</p> <p>Social cohesion Sense of community belonging Residential stability (or mobility)</p> <p style="text-align: center;">Structural determinants (Socioeconomic position)</p> <p>Income Income and income distribution of persons and households Assets and asset distribution of persons and households Poverty (poor children, working poor)</p> <p>Ethnicity Immigration status Ethnic or religious background Aboriginal population</p> <p>Deprivation Deprivation indices</p>

NOTE: This typology is not definitive. It is inspired by the conceptual framework in Figure 1, and some indicators could be grouped differently.

Indicators of intermediary determinants

These indicators characterize the material conditions of the population's existence: housing, the physical environment and access to services. They also measure aspects of individuals' lifestyles, such as smoking, alcohol and drug use, diet and physical activity. They consider the health system, preventive activities (screening and vaccination) and treatments (medical examinations, outpatient surgery and continuity of care), care facility accommodation and home assistance. They also reflect biological factors (age and sex), psychosocial factors (e.g., stress at work) and social cohesion in the community. All of these indicators derive from administrative registries or general health surveys and are, for the most part, available on a recurrent basis at the Québec scale and at the regional scale.

Indicators of structural determinants

The indicators identified cover only a specific domain of structural determinants of health, namely that of socioeconomic position or of membership in a category on the social scale. The literature consulted is largely silent as to indicators concerning governance, social and public macroeconomic policies, culture and societal values.

The indicators conveying the socioeconomic condition of individuals in the population relate to education, occupation, income, ethnicity, social networks or to aggregated forms of socioeconomic conditions such as deprivation indices. In the context of monitoring SIH, these indicators may be used in two ways. The first is to track these indicators over time and space (e.g., regionally). This corresponds to the measurement of income gaps or changes in the unemployment rate in a population, for example. This way of measuring social inequalities is widespread in current practice. The second way is to combine these indicators with indicators of the population's health status. This corresponds to the measurement of health gaps related to the population's income or employment status. This second application is crucial for measuring SIH and is the subject of the next section.

2.2.2 Social position variables

In order to identify social inequalities in health within a population, it is necessary to combine health indicators with social position variables. Many variables can be used for this purpose. We will differentiate here between two major categories of such variables, according to the type of observation unit: individual-level variables and geographic variables.

Individual-level variables

Individual-level variables are those that can be directly associated with the characteristics of the individual. These include variables conveying the socioeconomic status of the person or his or her membership in a category on the social scale or a social class. These classes are often described through reference to income, education, employment status (labour market activity/inactivity), position in the labour market, occupation (profession) or owner/renter status. The variables used most often are personal income (gross, net, average, adjusted, by bracket, etc.) and education level (highest level attained/completed, more educated versus less educated, etc.).

Other variables characterize the family to which the person considered belongs. For example, these many concern the income, education or position/social class (occupation and profession) of the parents, availability of health insurance or even the quality of the person's residence.

Sociodemographic variables such as gender, age, ethnic or religious background, race, immigration status or Aboriginal status are sometimes used as combination or stratification variables for demonstrating SIH.

These individual-level variables primarily derive from health surveys, with some exceptions. For example, mother's education level is found in the *Fichier des naissances vivantes du Québec* (Genereux et al., 2008; Luo et al., 2006) and occupation is found in death certificates in certain European countries (Curtin et al., 1998; Minder, 1993; Vallin et al., 2001).

Geographic variables (simple or composite)

Geographic variables convey characteristics of the territory of residence of the person in question. They are often used in the absence of individual-level variables. Geographic variables may be simple (SGV) or composite (CGV).

Examples of SGVs include the average income of the residents of a given territory (sector, rural area, urban area) as well as several indicators concerning residents' level of education, also aggregated by territory (proportion of persons 25 years and older with less than a high school diploma; proportion of persons 25 years and older with a four-year college education). Finally, the proportion of persons living below the poverty threshold is sometimes used as an SGV.

CGVs integrate several variables that pertain to a given territory. The use of such variables and of so-called deprivation indicators is most widespread in Great Britain (Carr-Hill & Chalmers-Dixon, 2005). After the development of simple indicators (Carstairs & Morris, 1989; Jarman et al., 1991; Townsend, 1987), more complex measures came into being (Noble et al., 2008), including the Index of multiple deprivation. This index, comprising 37 indicators, makes it possible to obtain a unique deprivation score for each of the territories studied in England. The Québec Index of Material and Social Deprivation, which integrates six variables associated with the characteristics of Québec dissemination areas, is also a composite, area-based indicator of social position (Pampalon & Raymond, 2000a; Pampalon et al., 2009a).

Other geographic variables

Other types of geographic variables make it possible to compare territories without their necessarily being associated with or grouping according to a social position indicator. These may apply to regions, sectors, places of residence, living environments (urban vs. rural) or the fact of living in a small territory.

Social position variables used in Québec

Several indicators of social position are available in Québec. The use of a particular type of indicator in the analysis of SIH is often determined by the data source used. Thus, analyses of survey data most often make use of individual-level variables (income or education), while in analyses of medico-administrative data, the index of material and social deprivation is most often employed.

Studies by the GPI Atlantic group recommend using a broad range of social position variables in order to obtain a complete and nuanced overview of SIH (Hayward et al., 2008). In Québec, there are few studies that implement this approach. However, the report *Riches de tous nos enfants* by the national director of public health on the health of children and youth is an excellent demonstration of the possible combinations of variables available in Québec for producing measures of social inequalities in health (Ministère de la Santé et des Services sociaux du Québec, 2007). Using multiple data sources, this report illustrates the inequalities in health faced by Québec children on the basis of several health indicators and social position variables, both individual and geographic.

2.2.3 Measures of health inequality

In order to estimate the health gaps tied to the social position of individuals or groups in a population, it is necessary to use certain statistical measures that convey the nature and magnitude of these gaps. The measures presented here are applicable to the Québec context, since the data required for their use are available. They are also complementary and make it possible to paint a complete and nuanced picture of SIH (Couffinhal et al., 2003; Hayward et al., 2008; Mackenbach & Kunst, 1997; Martens & et al., 2010; Munoz-Arroyo & Sutton, 2007; The World Bank, 2011; Koolman & Van Doorslaer E., 2004). Table 2 summarizes the inequality measures selected. Some describe inequalities in absolute terms, others in relative terms. Some concern certain groups in the population, while others concern the population as a whole.

Table 2 Measures of inequality

		Absolute inequalities	Relative inequalities
Inequalities between certain groups	Usually between extreme groups	Rate difference	Rate ratio
Inequalities between all groups in the population	Indices based on linear regression	Slope index of inequality (SII)	Relative index of inequality (RII)
	Other indices		Concentration index (CI)
	Measure of impact if all groups had the characteristics of the most advantaged groups	Population attributable risk (PAR) Reduction in number	Population attributable risk (PAR) Percentage of reduction

An example is used to facilitate comprehension of these measures. This example focuses on premature mortality among Québec men in connection with material deprivation, for the period 2004-2008. Table 3 shows the rate of premature mortality³ in men according to deprivation quintiles for all of Québec. Quintile 5 (Q5) corresponds to the group with the highest material deprivation while quintile 1 (Q1) corresponds to the most advantaged group.

³ Premature mortality refers to death occurring before age 75.

Table 3 Rate of premature mortality (death before age 75) in Québec men according to material deprivation quintile, 2004-2008

Material deprivation quintile	Rate of premature mortality (100,000 inhabitants)
Q5 (most disadvantaged)	431
Q4	376
Q3	341
Q2	305
Q1 (most advantaged)	256
Québec	346

Source: MSSS, death records 2004-2008.

Rate difference (Q5-Q1)

The difference in rate corresponds here to the difference between the rates of groups at the extreme ends of the deprivation index, i.e., the most disadvantaged group (Q5) and the most advantaged group (Q1). This difference represents the absolute difference between the rates of these two groups. If the rate of premature mortality in the most disadvantaged quintile (Q5) is 431 per 100,000 inhabitants and the rate of the most advantaged quintile (Q1) is 256, the difference between these rates is 175 deaths per 100,000 inhabitants (431 – 256). In other words, there are 175 more deaths (per 100,000 persons) in the most disadvantaged group (Q5) than in the most advantaged group (Q1).

Rate ratio (Q5/Q1)

The rate ratio is obtained by dividing the rate of the most disadvantaged group (Q5) by that of the most advantaged group (Q1). This ratio indicates the proportion by which the rate of premature mortality in the most disadvantaged group is higher than that of the most advantaged group. The rate of premature mortality in the most disadvantaged quintile (Q5) is 431 per 100,000 inhabitants and the rate in the most advantaged quintile (Q1) is 256. Thus, the rate ratio is 1.68 (431 ÷ 256), meaning that the rate of the most disadvantaged group (Q5) is 68% higher than that of the most advantaged group (Q1).

Slope index of inequality (SII) and relative index of inequality (RII)

Unlike the preceding indices, these indices convey the progression of mortality in the entire population according to deprivation quintiles, and do not compare only the two extreme deprivation quintiles. They are calculated using a linear regression analysis of the mortality rates of each deprivation quintile, from the most advantaged to the most disadvantaged. The result of the analysis can be illustrated using a straight line that summarizes the progression of mortality according to deprivation (Figure 3).

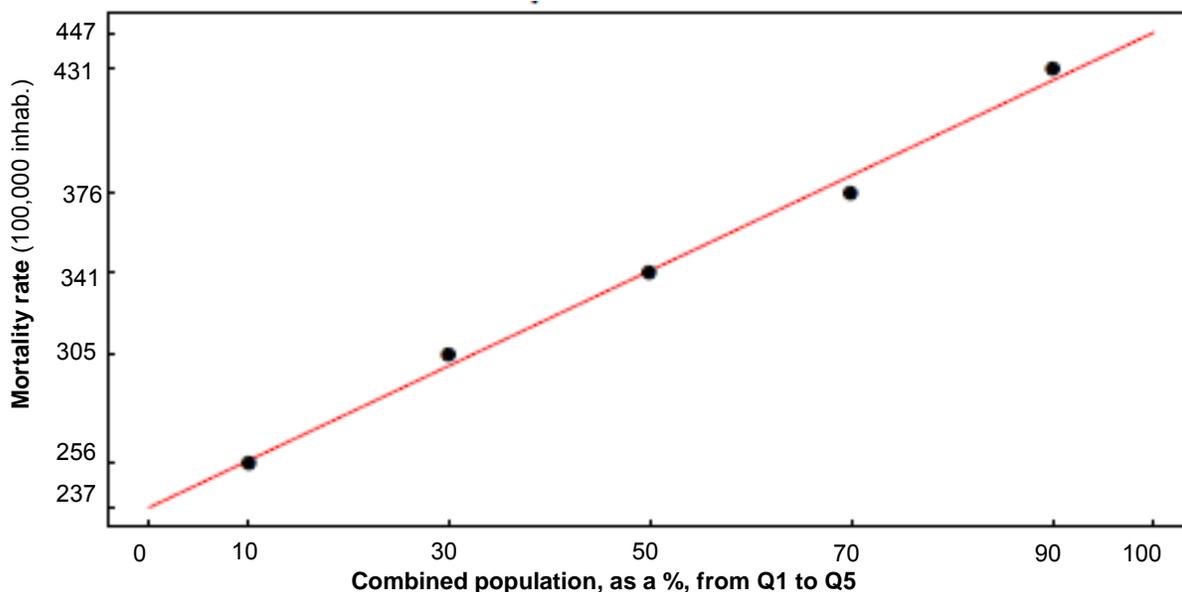


Figure 3 Regression line of rate of premature mortality (death before age 75) in Québec men according to material deprivation, 2004-2008

Note: The combined population corresponds to the mid-point of each deprivation quintile, e.g.: 10% for Q1, 30% for Q2, ..., 90% for Q5.

The slope index of inequality (SII) represents the difference between the highest mortality rate (at 100%) and the lowest (at 0%) of the population, or 210 deaths per 100,000 inhabitants (447 – 237). It represents the absolute difference in mortality separating the most advantaged individual and the least advantaged individual in this population. The relative index of inequality (RII), for its part, relates this difference in mortality to the average mortality rate in the overall population. The value of this index is 0.607 (210 / 346). Expressed as a percentage, this means that the size of the gap in mortality according to deprivation is equivalent to about 60% of the average mortality rate. The higher this percentage, the greater the inequality with regard to the phenomenon being studied.

Concentration index (CI)

This index also conveys the progression of mortality in the overall population according to deprivation quintile. This index is based on a comparison between cumulative deaths and cumulative population according to deprivation quintile and may be illustrated as a curve (Figure 4).

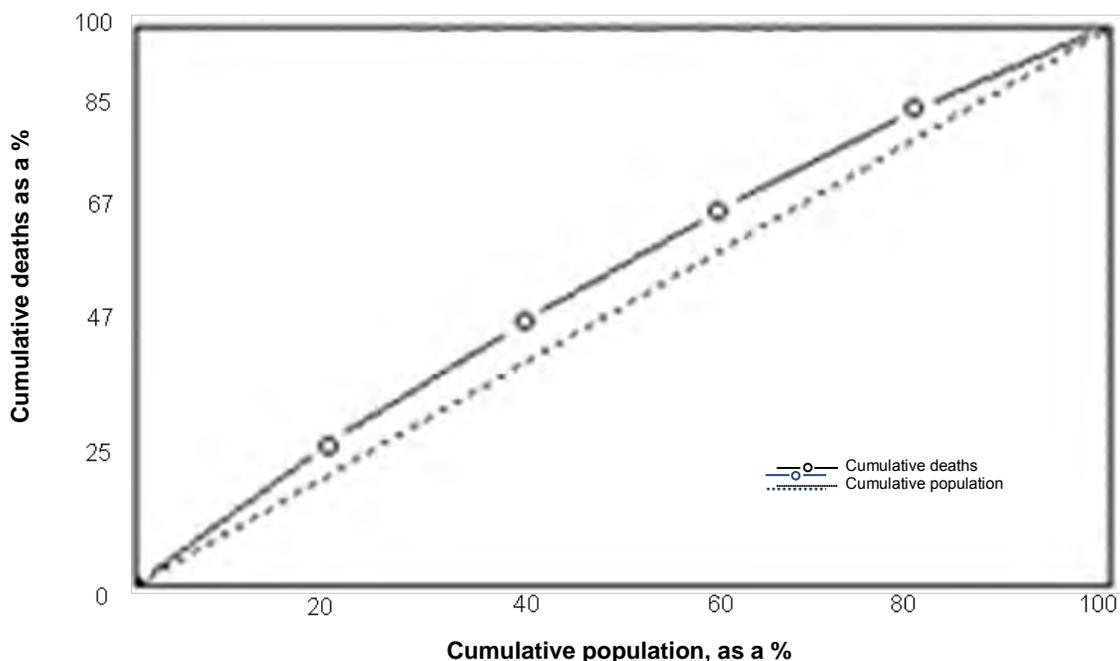


Figure 4 Concentration curve of premature mortality (death before age 75) in Québec men according to material deprivation, 2004-2008

Note: Deaths and population are accumulated according to deprivation quintile from the most disadvantaged (Q5) to the most advantaged (Q1).

If this curve is a diagonal line, there is perfect equality of premature deaths between deprivation quintiles. Thus, each deprivation quintile, accounting for 20% of the population, would register 20% of the deaths. If this curve lies above the diagonal line, there is a concentration of deaths in the disadvantaged quintiles (Koolman & Van Doorslaer E., 2004). In the example selected, the most disadvantaged quintile accounts for 25% of the deaths, while the two most disadvantaged quintiles account for 47% of the deaths.

The index resulting from this comparison may vary from -1 (all deaths occurring in the most disadvantaged quintile) to +1 (all deaths occurring in the most advantaged quintile). In the example used, the index is -0.0984, and indicates a certain concentration of deaths in the disadvantaged groups. By multiplying this index by 75 ($0.0984 \times 75 = 7.34$), we can give it meaning, observing that inequalities in premature mortality according to deprivation would disappear if about 7.4% of deaths moved from the most disadvantaged to the most advantaged quintiles (Koolman & Van Doorslaer E., 2004).

Population attributable risk (PAR)

The population attributable risk (PAR) represents the reduction in premature mortality that could be obtained if all individuals were subject to the mortality rate of a reference group, usually the most advantaged group. In our example, quintile 1 serves as the reference group.

This reduction may be estimated in absolute terms (number of deaths) or relative terms (percentage of deaths). The PAR by number is obtained by calculating the difference between the number of deaths observed in the population and the number of deaths that

would be observed if the population had the mortality rate of the most advantaged quintile (Q1). For the male population of Québec, this difference corresponds to an average of 3,185 deaths per year during the period 2004-2008. These deaths are the ones that could be attributed to material deprivation and that could be avoided if all Québec men were subject to the mortality rate of the most advantaged group (Q1). By dividing this number by the total number of deaths in the male population (3,185 / 12,794), we obtain the PAR as a percentage, in this case 25%. This means that one quarter of premature deaths in Québec men can be attributed to material deprivation.

Table 4 summarizes all the inequality measures illustrated here, concerning the premature death of Québec men for the period 2004-2008. These measures offer many perspectives on the inequalities observed, a prerequisite for a complete and nuanced portrait of the situation.

Table 4 Summary of measures of inequality of premature mortality (death before age 75) in Québec men according to material deprivation, 2004-2008

Rate difference (rate per 100,000 inhabitants)	175
Rate ratio	1.68
Slope index of inequality (SII) (Rate per 100,000 inhabitants)	210
Relative index of inequality (RII)	60%
Concentration index (CI)	-0.0984
Population attributable risk (PAR)	
Number of deaths	3,185
Percentage of deaths	25%

These measures can be applied, as they are here, to mortality rates, but also to other types of rates, such as rates of hospital morbidity, and rates of incidence or prevalence of certain diseases. Some may also be applied to proportions and general measures of health such as life expectancy.

2.3 QUANTITATIVE TARGETS FOR REDUCING SIH

2.3.1 International experiences

In the current context, where most developed countries recognize the existence of SIH on their territory, many have equipped themselves with national strategies and policies for reducing these inequalities (Judge et al., 2006; Norwegian Ministry of health and Care Services, 2007). However, the level of commitment with regard to SIH varies by country, ranging from a legislative commitment to commitments to more explicit action, such as the monitoring of indicators over time, as discussed in point 1.1.3, or the adoption of SIH reduction targets (Judge et al., 2006).

For the European region, the World Health Organization (WHO) was the first to suggest a "quantitative" target for SIH reduction. Thus, in 1985, WHO-Europe proposed reducing the differences in health status between countries and groups in the region by at least 25%, by improving the health statuses of the most disadvantaged countries and groups (World Health

Organization - Regional Office for Europe, 1985). More recently, in 1999, "HEALTH21 – The health for all policy framework for the WHO European Region" (World Health Organization - Regional Office for Europe, 1999), suggests two SIH reduction targets: 1) "By the year 2020, the present gap in health status between member states of the European region should be reduced by at least one third"; 2) "By the year 2020, the health gap between socioeconomic groups within countries should be reduced by at least one fourth in all member states, by substantially improving the level of health of disadvantaged groups."

In alignment with these global commitments, many countries have adopted quantitative targets for reducing SIH. Some have adopted the WHO recommendations or proposed only one or two targets. The countries of the United Kingdom and Ireland have proposed a broader range of SIH reduction targets (Judge et al., 2006).

The four countries of the **United Kingdom** share a common approach which consists of reducing SIH in the long term. However, the countries have different reduction targets, reflecting the context and needs of each (Hayward et al., 2008).

The SIH monitoring system developed in **England** is based on national reduction targets (Department of Health, 2003; Department of Health, 2008). The targets proposed are the reduction by at least 10% by 2010 of the infant mortality gap between the socioeconomic group engaged in routine and manual occupations and the entire population, as well as the reduction, by the same percentage, of the gap in life expectancy at birth between the most disadvantaged group, the "Spearhead Group," and the population as a whole. This country also recommends "intermediate" SIH reduction targets that are integrated in health improvement objectives for the general population. For example, there was a proposal to reduce by at least 20% by 2010 the incidence of cancer in persons below age 75, while reducing by at least 6% the gaps between the most disadvantaged quintile and the entire population. Heart disease and smoking were also targeted by these reduction goals.

Wales has also proposed SIH reduction targets (Hayward et al., 2008). Overall, these targets aim to improve health and reduce SIH between the most and least advantaged regions within the country. More specifically, the targets involve reducing the difference in mortality between the most disadvantaged 20% and the most advantaged 20% for mortality by cancer and heart disease for the period 2004-2012. There is also a target more specifically concerning children, which aims to reduce the gap in the incidence, severity and mortality of injuries suffered by pedestrians between the most disadvantaged 20% and the most advantaged 20% of the population. With respect to older persons, the aim is to improve the level of physical activity from moderate to high among persons 50-65 years old. Finally, there is a target for improvement of mental health in informal caregivers (Welsh Assembly Government, 2005).

Scotland has proposed general reduction targets which aim, by 2010-2012, to increase the life expectancy and the healthy life expectancy at birth for all men and women living in all regions of Scotland and to reduce inequalities between the most and least advantaged groups. These targets will be maintained for 10 additional years, or until 2020-2022 (Scottish Executive, 2003).

For the period 2000-2010, **Northern Ireland** has proposed a 50% reduction in the difference in life expectancy at birth between persons living in the most and least advantaged regions, as well as a 20% reduction in the difference between the lowest and highest socioeconomic group, as to the proportion of the population suffering from a long-term chronic disease (Hayward et al., 2008).

In 2002, the **Republic of Ireland** proposed a 10% reduction by 2007 in the gap in premature mortality between the lowest socioeconomic groups and the highest, for diseases of the circulatory system, cancers, injuries and poisonings, as well as a reduction in the gap in the low birth weight rate between the lowest socioeconomic group and the highest. It also proposed a reduction in the gap in life expectancy at birth between the minority indigenous population (the Traveller Community) and the whole population (Government of Ireland - Social, 2002).

The **Netherlands** were inspired by the recommendations of the European division of the WHO (World Health Organization - Regional Office for Europe, 1999) to develop their principal SIH reduction target, which is a 25% reduction by 2010 in the gap in healthy life expectancy at birth between low socioeconomic status persons and those at higher levels, to be accomplished by increasing the values in the most disadvantaged group (Bonney et al., 2007; Hayward et al., 2008). This country also proposes a series of "intermediate" reduction targets that are also quantifiable. In particular, goals include increasing the rate of children from the poorest social classes entering secondary school, keeping income inequalities at the 1996 level, decreasing the proportion of low-income households, keeping financial compensation tied to a health problem at work at the 2000 level and increasing the proportion of chronically ill people in paid employment. In addition, there is a proposal to reduce by half the gaps related to smoking, sedentary lifestyle and obesity between those with high and low levels of education. There is also a goal to reduce by half the gap in the percentage of claims connected to a high level of physical effort at work between the two groups located at the extremes in terms of education level, and to improve the sense of control at work among the least educated. Finally, the country aims to keep the gap in the use of health services between persons with low and high levels of education at the 1998 level (Bonney et al., 2007).

Finland's target is to reduce differences in mortality according to gender, education and occupation by 20% by 2015 (Judge et al., 2006).

For two decades, the **United States**, via "Healthy People," has sought to reduce disparities in health, disparities connected to race, ethnicity, gender, age, sexual orientation, socioeconomic status and geographic location. While, initially, the goal was to reduce and then eliminate these disparities, the targets for 2020 are to attain health equity, reduce disparities and improve the health of all groups (United States Department of Health and Human Services, 2011). No quantifiable objective (or target) for reduction of disparities is suggested. However, the gaps related to 7 general targets, and 26 quantitative targets specific to intervention sectors will be tracked. The general targets concern life expectancy and healthy life expectancy at birth, activity limitations and the prevalence of chronic diseases, while the specific targets focus on access to services, including prevention

services, environment, maternal and infant health, lifestyles and social determinants (the dropout rate).

Other countries, such as **Denmark, France, Hungary, Italy, Norway, Poland, Slovakia** and **Sweden** also propose SIH reduction strategies, without having quantitative targets (Judge et al., 2006; Norwegian Ministry of health and Care Services, 2007). These countries produce, on a more or less systematic basis, reports that allow the changes in several SIH indicators to be assessed. For example, in Sweden, public health reports published every four years track a series of SIH indicators.

2.3.2 The components of an SIH reduction target

Most of the targets identified are composed of common dimensions. These include a chosen indicator of health and well-being, a social position variable, a measure of health inequality, a reference group and a time horizon. These components are also influenced by limits associated with the data and the SIH tracking system (Marmot et al., 2010).

Indicators of health and well-being

The indicators of health and well-being to prioritize for SIH reduction targets should be those for which SIH between groups persist in spite of an improvement in the average level of the health indicator in the overall population. Moreover, in order to ensure the relevance of SIH reduction targets and of the strategy for achieving them, these indicators should be modifiable over time, so they can be adapted to new priorities. Finally, in constructing inequality reduction targets, the choice of indicators of health and well-being should not be limited to a single indicator, so that the different dimensions of the SIH as well as different time horizons (short, medium and long term) can be reflected (Marmot et al., 2010).

The indicators of health and well-being associated with SIH reduction targets may be global indicators such as infant mortality (Department of Health, 2008) and life expectancy (Department of Health, 2008; Government of Ireland - Social, 2002; Scottish Executive, 2003), healthy life expectancy (Bonney et al., 2007; Scottish Executive, 2003; United States Department of Health and Human Services, 2011) and premature mortality (Government of Ireland - Social, 2002). Other targets relate to significant causes of mortality (Government of Ireland - Social, 2002; Judge et al., 2006; Welsh Assembly Government, 2005) such as cardiovascular diseases, cancer, injuries or poisonings, or to major risk factors such as smoking, obesity or physical inactivity (Bonney et al., 2007; United States Department of Health and Human Services, 2011).

Finally, certain countries propose targets particularly affecting vulnerable groups, such as children, the elderly, persons suffering from long-term chronic illnesses, etc. (Bonney et al., 2007; Government of Ireland - Social, 2002; Hayward et al., 2008; Welsh Assembly Government, 2005; United States Department of Health and Human Services, 2011).

Social position variables

Social position variables defined by individual-level characteristics including income, level of education attained, social class or occupation are usually used in SIH reduction targets. In Scandinavia and the United Kingdom, however, ecological measures are used (Hayward et

al., 2008). In England, for example, a deprivation index based on groupings of territories (local authorities) is used. These groupings of territories are classified according to five indicators: 1) life expectancy at birth for men; 2) life expectancy at birth for women; 3) mortality rate due to cancer for persons under age 75; 4) mortality rate due to diseases of the circulatory system for persons under age 75; and 5) average score of the multiple deprivation index in 2004. These groupings of territories are then divided into quintiles (Department of Health, 2007b; Department of Health, 2007c).

Measures of health inequality

The measures of health inequality used in SIH reduction targets also differ from one country to another. As is true for the choice of an indicator of health and well-being, there is no "perfect" measure of health inequality. The reduction targets identified are calculated based on relative or absolute measures of inequality. As mentioned in section 2.2.3, Measures of health inequality, presenting several indicators of social inequality in health makes it possible to produce a complete and nuanced portrait of SIH. This is why SIH reduction targets should have both relative and absolute reduction objectives (Marmot et al., 2010). However, these different ways of measuring SIH can sometimes lead to confusion in the interpretation of results (Marmot et al., 2010).

The reference group used in the targets

In the targets examined, most of the countries aim to reduce the health disparity between the most disadvantaged group and a reference group (usually the most advantaged population or the population average). Scotland and Wales, however, propose to reduce this gap by improving the position of the most disadvantaged group (Judge et al., 2006). Yet neither of these approaches takes into account the impact of the social gradient on health. SIH reduction targets should, thus, focus on health differences among all social groups, and not just between the extreme ends of the deprivation index. Overlooking this element is not without consequence. When a particular population group (the most disadvantaged) is targeted, many other disadvantaged groups in the population see themselves as excluded from "priority action" (Marmot et al., 2010). To our knowledge, none of the European countries listed proposes a target for reducing the existing gradient between socioeconomic position and health across the entire population (Judge et al., 2006).

Finally, there may be sizable difficulties tied to the definition of a reference group. This is the case, for example, when heterogeneity within a target group (usually, the most disadvantaged) is not taken into account. This is also the case for changes in the "target" group over time (geographic mobility, changes in the labour market, etc.). Finally, a reduction in the gap affecting the target group may often be achieved simply by targeting the largest number of individuals, who are not necessarily the most disadvantaged (Marmot et al., 2010).

The time horizon and monitoring of targets

The SIH reduction targets identified are formulated with reference to a time horizon that varies by country, ranging from 15 to 25 years. Thus, the horizon targeted for life expectancy at birth in England extends from 1995-1997 to 2010 (Department of Health, 2008), the horizon associated with the targets proposed by the WHO or Scotland extends from 1995 to

2020 (Department of Health, 2008; Scottish Executive, 2003; World Health Organization - Regional Office for Europe, 1999), and the horizon used in the United States extends from the mid-2000s to 2020 (United States Department of Health and Human Services, 2011).

Certain targets are also systematically tracked. However, the tracking of targets depends on the indicator of health and well-being chosen, and consequently on the availability of data connected to this indicator (Marmot et al., 2010). Certain countries produce reports providing information on the tracking of targets and indicate whether targets have been met. For instance, England tracked these SIH reduction targets in 2005, 2007 and 2009 (Department of Health, 2008; Department of Health, 2009; Department of Health, 2007b; Department of Health, 2007c; Department of Health, 2007a).

In brief, SIH reduction targets are a useful way to draw attention to SIH, to mobilize the health sector and its many partners, and to give meaning to action. They make an impression on decision makers and increase the likelihood that appropriate action plans will be developed and implemented (Judge et al., 2006).

2.3.3 A concrete example of an SIH reduction target

In England, one of the SIH reduction targets proposed is a minimum 10% reduction, between 1995-1997 and 2010, of the gap in life expectancy between the most disadvantaged group, the Spearhead Group, and the national average for all of England (Figure 5).

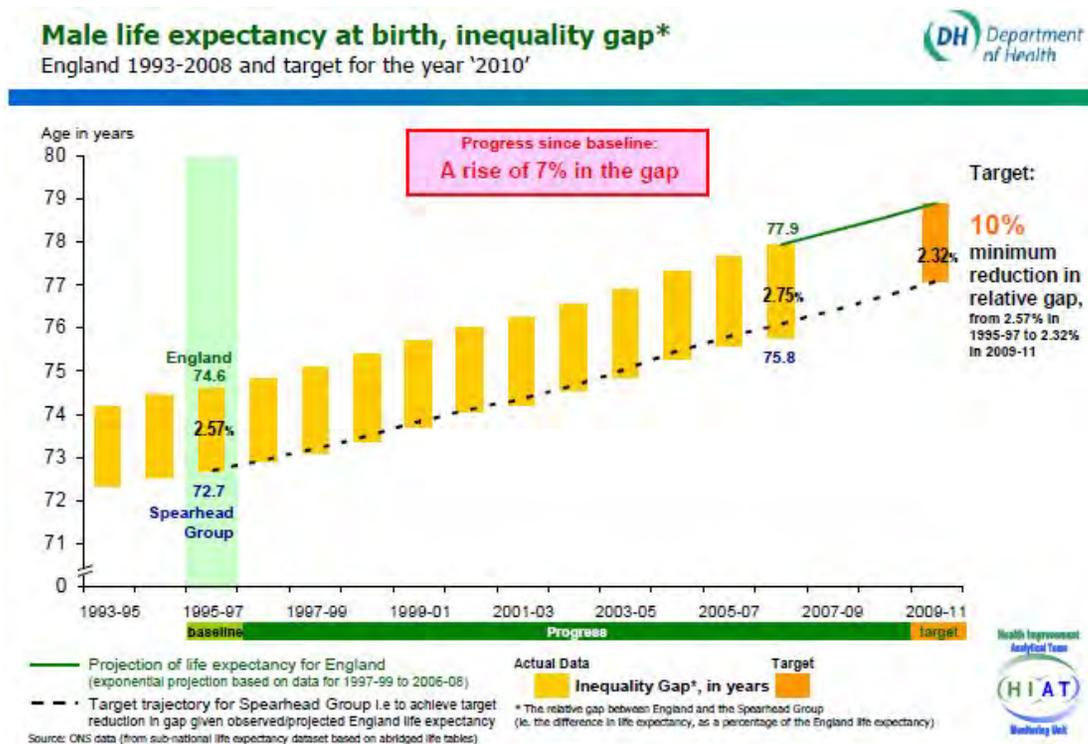


Figure 5 Gap in male life expectancy at birth, England, 1993 to 1998

Source: Department of Health (2009).

The indicator of health and well-being being tracked for this target is life expectancy at birth. In the specific case of this target, the life expectancy at birth is calculated based on a rolling three-year annual average for the period from 1995-1997 to 2009-2011. The social position variable used for this target is a grouping of territories, consisting of local health authorities grouped into quintiles according to health and deprivation indicators (described above). The reference group selected for this target is the set of local health authorities (all quintiles combined). The measure of health inequality used for this target is the relative gap in life expectancy, i.e., the difference as a percentage between the life expectancy at birth for the most disadvantaged group (here called the Spearhead Group) and the life expectancy at birth for all of England, for men only. The time horizon for this SIH reduction target is the period from 1995-1997 to 2010. Life expectancy is evaluated based on the data for the reference period (1995-1997) and it is tracked as new data become available. The last report on the tracking of this target presents the most recent data for life expectancy at birth, covering the period 2006-2008, and shows an increase in life expectancy in all groups. However, the Spearhead Group posted a lower increase in life expectancy than the other groups, resulting in a widening of the gap. Consequently, meeting the targets fixed for 2010 remains a challenge (Department of Health, 2009).

Conclusion

This brief review of SIH reduction targets demonstrates that such targets have been proposed in many countries. Should Québec wish to propose similar targets, an understanding of these targets, their components and their formation may be useful. In fact, Québec possesses all the methodological tools necessary for setting SIH reduction targets at the province-wide scale and at the regional scale (data sources, indicators and measures of inequality).

2.4 DEFINING NEIGHBOURHOOD UNITS

Defining neighbourhood units is a way of understanding social inequalities in health (SIH) from a geographical perspective. These units are socially constructed realities (whether the physical environment or social environment is concerned) where unit-by-unit variability is connected to health. In the context of our project, neighbourhood units can be defined as a social position variable (discussed in section 2.2), based on which health inequalities can be observed. As part of an approach to monitoring SIH at the regional scale, the definition of neighbourhood units adds a new tool for analyzing SIH, referring not only to the social and economic characteristics of the population, but also to those of their living environment. It also makes it possible to associate knowledge with action at the scale of local communities. This is why such exercises have been carried out at the international level as well as in several regions of Québec. Another reason is that, in Québec, these exercises assist in fulfillment of the populational responsibility assigned to the administrative health regions and the centres de santé et de services sociaux (health and social services centres) (CSSS).

2.4.1 Background and purposes

Pursuant to the Public Health Act, the health and social services agencies, through their public health department (PHD) create a profile that describes health differences according to certain characteristics of the population, including the territory of residence. Traditionally,

the surveillance professionals present various indicators of health and well-being, or their determinants, at the scale of administrative or institutional territories such as the régions sociosanitaires (administrative health regions) (RSS), réseaux locaux de services (local health networks) (RLS), municipalités régionales de comté (regional county municipalities) (MRC), centres locaux de services communautaires (local community service centres) (CLSC), municipalities or, (for large municipalities), boroughs.

Particularly in recent years, surveillance professionals in Québec have shown increasing interest in health information at a fine geographical scale. In fact, a number of regions have sought to better understand and characterize small populations, whether these are referred to as neighbourhood units or local communities or called by other names. Similarly, territorial inequalities in health (TIH) are being tracked on the basis of these groupings, although this tracking does not yet involve health inequality measures.

Moreover, in several regions, the CSSS has asked the PHD to produce data at the smallest possible geographic unit. The populational responsibility assigned to the RLS and coordinated by the CSSS necessitates an understanding of the populations of the different territories and strengthens this request as well as the relevance of providing data for local action. By raising the awareness of local stakeholders, detailed knowledge of environments stimulates projects aimed at improving living conditions.

Finally, the interest in working with small-scale health information is connected to the fact that, too often, the administrative divisions in effect bring together heterogeneous populations with diverse characteristics. The information provided is therefore unable to report on diversity at the local scale.

This section will take stock of the various experiences with dividing territories into smaller units in order to identify local communities or neighbourhood units with relatively homogeneous characteristics.⁴ Our aim is to provide a brief analysis of these experiences, examine their strengths and weaknesses, and use them to create recommendations for regional authorities wishing to define neighbourhood units.

Such units make it possible to improve the understanding of SIH at the local level and to support decision-making that promotes community development and improvement of the health of the populations concerned.

2.4.2 Literature review

An overview of the practice of defining fine units, or neighbourhood units, was produced by means of a search of the scientific literature⁵ and a review of regional experiences, published or unpublished, of surveillance teams in Québec's regional public health departments.

⁴ For the purpose of this document, the term "neighbourhood unit" is used without differentiation to refer to a fine geographic unit, often smaller than a municipality, but larger than a dissemination area (DA).

⁵ The expression "scientific literature" aims to differentiate studies based on publication type and is in no way meant to suggest that Québec regional experiences are not scientific in the epistemological sense.

The review of the scientific literature was conducted using the PubMed database. A query⁶ aimed at identifying articles that refer to the boundaries of neighbourhood units generated 320 results. Of these, 309 articles were excluded, because they describe studies whose objective was not to delineate neighbourhood units for health analyses in an industrialized country. One article was excluded because the methodology was not described (Tatalovich et al., 2006). Ten articles were selected (Cutchin et al., 2011; Drackley et al., 2011; Flowerdew et al., 2008; Glazier et al., 2005; Haynes et al., 2007; Lebel et al., 2007; Riva et al., 2008; Ross et al., 2004; Stafford et al., 2008; Weiss et al., 2007). In addition to these, two articles known to team members and deemed relevant were included, although they were not identified by the PubMed query (Cockings & Martin, 2005; Wilkins, 1980). Of the twelve articles selected, six describe Canadian studies (including four from Québec), four describe studies performed in the United Kingdom and two discuss American studies.

Recent regional experiences were reviewed by the regional members of the Table de concertation nationale en surveillance (TCNS), a group of representatives of regional health status surveillance teams from Québec's 18 public health departments. Each member was questioned as to the existence, in their surveillance team, of experience with delineating neighbourhood units (or local communities). If necessary, a description of the regional experience was prepared. Of the 18 health regions in Québec, 16 respondents from regional surveillance teams completed the information. Information on a 17th region was obtained through data previously collected by the Comité de travail sur la démarche de caractérisation et de mobilisation des communautés (a committee created by the TCNS) in March 2011 (Groupe de travail sur la démarche de caractérisation et de mobilisation des communautés de la TCNS, 2011). This information was compiled in a chart and then validated by the regional respondents, in order to identify the criteria used to delineate neighbourhood units or local communities. Of these 17 regions, 8 have not engaged in a process of delineating neighbourhood units. Of the regions that have engaged in a process of delineating local communities, 5 regions have completed this process and 4 regions are still engaged in the process.

For each study and regional experience considered in this literature review, reading notes were prepared and are available on request. Similarly, the chart used to integrate and then validate the information from the regional respondents is available on request.

2.4.3 Approaches to defining neighbourhood units

Basic information

All of the studies published in scientific reviews and four of the regional experiences delineated neighbourhood units with reference to the socioeconomic status of the local populations, using either census variables (e.g., education, income, ethnicity, family structure) or using an index derived from census data, such as a deprivation (Ministère de l'Éducation, 2012; Pampalon et al., 2009a) or devitalization index (Ministère des Affaires municipales, des Régions et de l'Occupation du territoire, 2010). Certain experiences or

⁶ The following query was limited to titles and abstracts of articles published in English or in French since 1990: *(delineation OR boundary OR boundaries) AND (neighbourhood OR neighborhood OR "local area" OR local-area OR residential OR milieu)*.

studies combined socioeconomic data with various types of geographic information, such as land use maps (Weiss et al., 2007), natural boundary maps (e.g., railroads, major arteries, bodies of water (Glazier et al., 2005; Ross et al., 2004; Stafford et al., 2008)), administrative boundaries used in contexts other than that of the census (e.g., municipal districts (Glazier et al., 2005; Lebel et al., 2007; Ross et al., 2004)) or aerial photography (Cutchin et al., 2011). Other regional experiences instead combined this type of geographic information with population numbers, but without referring to socioeconomic data.

Territorial limits

The spatial units used to delineate neighbourhoods were often small territories chosen to favour the socioeconomic homogeneity of the local population. The Canadian studies, including all the regional Québec experiences collected, used dissemination areas (DA) (Dallaire & Bourassa, 2012; Lebel et al., 2007; Riva et al., 2008) or census tracts (CT), before 2006 (Drackley et al., 2011; Glazier et al., 2005) defined by Statistics Canada. A regional experience in Québec used a scale finer than that of dissemination areas, delineating neighbourhood units as groupings of dissemination blocks.

Certain studies preferred the use of municipal administrative divisions. Wilkins based his groupings on the "planning neighbourhoods" defined by the City of Montréal and on the boundaries of neighbouring municipalities (Wilkins, 1980), while Ross et al. did the same, but instead used "residential units" to subdivide the City of Montréal (Ross et al., 2004). The studies performed in the United Kingdom made use of divisions based on "enumeration districts" (Cockings & Martin, 2005; Flowerdew et al., 2008; Haynes et al., 2007) or "wards" (Stafford et al., 2008); the "enumeration districts" and the "wards" may be considered to be equivalent to Canadian dissemination areas and census tracts, respectively. The study by Weiss et al. (Weiss et al., 2007), conducted in the United States, used American census tracts. Only one study did not base the delineation of neighbourhoods on a pre-existing division, using instead an aerial photograph (Cutchin et al., 2011).

Criteria

The effort to define local populations based on their homogeneity is the element most commonly present in studies published in scientific journals or in the experiences collected (Drackley et al., 2011; Flowerdew et al., 2008; Glazier et al., 2005; Haynes et al., 2007; Riva et al., 2008; Stafford et al., 2008; Weiss et al., 2007). Two studies also took into consideration the internal coherence of the environments with respect to the built environment and land use (Cutchin et al., 2011; Weiss et al., 2007), while two other studies mention the importance of defining units by maximizing the heterogeneity between them (Riva et al., 2008; Weiss et al., 2007). All of the regional experiences wanted the geographic delineation of neighbourhood units to also take into account the concept of "the lived environment," referring to the population's perception of their living environment (Boisvert, 2007).

Population size (average or minimum) is a criterion frequently encountered in studies published in scientific journals (Cockings & Martin, 2005; Drackley et al., 2011; Flowerdew et al., 2008; Lebel et al., 2007; Wilkins, 1980). Some specified a maximum number of units to be created (Flowerdew et al., 2008; Stafford et al., 2008; Wilkins, 1980). In most of the

regional experiences, while a particular population size was frequently sought (from 1,000 to 5,000 persons), this was not a hard and fast requirement.

In many studies and regional experiences, the desire was for the boundaries of neighbourhood units to coincide with those of census units (Cockings & Martin, 2005; Flowerdew et al., 2008; Haynes et al., 2007; Lebel et al., 2007) or with the presence of natural boundaries, such as bodies of water, railroads or roads (Cutchin et al., 2011; Drackley et al., 2011; Glazier et al., 2005). It is worth noting that many approaches were based on the use of census data, which ensured correspondence with census territories, without expressly making this a criterion. Certain approaches imposed criteria related to geometric shape or to the density of units, to avoid the "doughnut hole" effect or the formation of peninsulas, for example (Cockings & Martin, 2005; Flowerdew et al., 2008; Haynes et al., 2007; Stafford et al., 2008). Finally, only one study based the definition of neighbourhood units on the homogeneity of the population with regard to the object of the analysis. An analysis of mortality gaps was produced in this way.

Methods used

Different methods were used to produce neighbourhood units in the studies published in scientific journals. Most of these methods can be grouped into three categories: statistical methods (Drackley et al., 2011; Lebel et al., 2007; Riva et al., 2008), automated geographic aggregation (Cockings & Martin, 2005; Flowerdew et al., 2008; Haynes et al., 2007; Stafford et al., 2008) and human interpretation (Cutchin et al., 2011; Glazier et al., 2005; Lebel et al., 2007; Ross et al., 2004; Weiss et al., 2007; Wilkins, 1980). Certain studies used more than one method. The regional experiences reviewed all opted for an approach based on human interpretation.

The statistical methods aim to identify similarities between basic territorial units, but do not consider their location or their proximity. Principal component analysis (PCA) and cluster analysis are the most commonly used statistical methods. PCA aims to synthesize different characteristics of the environment: it produces one or more factors that describe a trend observed in several variables at once. The factors produced by a PCA are continuous variables that can then be categorized to form a certain number of groups. Through cluster analysis, territorial units can be categorized into a predefined number of groups based on their simultaneous similarity with respect to several variables. Neighbourhood units can thus be formed by merging contiguous units belonging to the same group.

Automated methods of geographic aggregation may differ from each other somewhat, but they share an iterative approach and the use of small territorial units that will be aggregated with each other. They are differentiated from the statistical methods described above by the fact that the location (contiguity) of the units is taken into account. With each iteration, two contiguous territorial units are merged. The choice of units to be merged depends on the criteria previously imposed by the analyst. For example, the aim may be to obtain the neighbourhoods that are most dense and nearest in size to a target population. At a given iteration, the two territories merged will be selected from all the pairs of contiguous territories, and the pair chosen will be the one that produces a division that best satisfies the pre-

established criteria. The iterations will cease when all possible mergers no longer produce any improvements in the division based on the pre-established criteria.

The studies relying on human interpretation applied it in different ways. However, for the regional experiences, the methods applied were in some respects similar. In fact, the regional approaches and most of the studies selected relied on the judgment of local stakeholders or experts, using their knowledge of the area as the basis for division (Bourassa & Dallaire, 2012; Lebel et al., 2007; Ross et al., 2004). In three studies (Cutchin et al., 2011; Glazier et al., 2005; Wilkins, 1980), the division of neighbourhoods was based more on the judgment of the analysts (researchers). Weiss et al. (Weiss et al., 2007) performed observations in the field, supported by maps of the population and of land use.

In general, in the regional experiences examined, local actors had to combine cartographic representations of the territory with their knowledge of the area, in order to identify communities on a consensual basis. Note that the type of local actor involved in these encounters varies from one experience to another, or even from one sub-territory to another in the same region. They could be citizens or stakeholders from university, community or institutional settings.

Several studies, reports and regional experiences (14 partenaires incluant l'Agence de la santé et des services sociaux de l'Outaouais, 2011; Boisvert, 2007; Boisvert et al., 2010; Bourassa et al., 2010; Dallaire, 2012; Glazier et al., 2005; Loslier, 1976; Loslier, 1977; Richard, 2011; Wilkins, 1980) mentioned groupings or typology/classification of territorial units. The groupings consisted of amalgamations of various territorial units (CT, municipalities, zones, regions, neighbourhood units or local communities) into larger units (social areas, classes, regions, poles, rural sectors). In the regional experiences, the groupings were sometimes motivated by a statistical power requirement and sometimes by the usefulness of characterizing rural communities at an intermediate scale larger than the village but smaller than the CLSC. In one regional experience (Dallaire, 2012), local actors were consulted in order to delineate local communities and to group them into larger territorial units. The typology exercises reported mainly consisted of a socioeconomic classification. Many regional experiences reported a typology of seven categories based on a correlation between the variables of the material and social deprivation index and the "social-health index proposed in the national monitoring system" [*Translation*] (Boisvert, 2007). For more details, refer to the table in Annex 2.

2.4.4 Advantages and limitations of approaches

In spite of sometimes major differences in the nature of the approach, nearly all of the exercises sought to create neighbourhood units consisting of socioeconomically homogeneous populations large enough to ensure adequate statistical power for the analysis of standard health phenomena. The boundaries set attempt to integrate as many small territories as possible associated with the area covered. Correspondence with natural boundaries (such as bodies of water and roads) is also often desired, sometimes explicitly, but also implicitly through the use of census territories, which themselves are defined taking these natural boundaries into account. Leaving aside these similarities, the differences in the

methods used are associated with both advantages and limitations as regards the creation of neighbourhood units.

Certain studies (Institut national de santé publique du Québec, 2012a; Ross et al., 2004; Stafford et al., 2008) demonstrate that the different divisions do not produce significant health differences, although one study (Cockings & Martin, 2005; Stafford et al., 2008) suggests that establishing administrative divisions that are not tied to the socioeconomic homogeneity of the populations may underestimate SIH.

Advantages

- The use of boundaries modelled on census boundaries facilitates the production of socioeconomic profiles of local populations by permitting a direct connection to the profiles produced by Statistics Canada; this limits the cost of data acquisition. However, tables can be ordered from Statistics Canada (acquisition costs should be anticipated) for divisions that do not correspond to the boundaries of the DA, but they would have at a minimum to correspond to the boundaries of the dissemination blocks.
- It may be beneficial to combine methods, with respect to their dependence on population density for example (urban neighbourhood units with a large population compared to rural local communities with a small population).
- It may be beneficial to group local, low-population communities to enhance statistical power. Such an exercise, by reducing the number of territorial units to be characterized, could also facilitate the production of indicators for monitoring SIH.
- Grouping or typology of neighbourhood units would give the regions a second social stratification indicator (a territorial one) that includes a limited number of groups.

Advantages of statistical methods

- Statistical methods have the advantage of being easier to understand, and the software and experience they require are more easily accessible than automated geographic aggregation methods.
- Statistical methods can contribute to or serve as a starting point for human interpretations (e.g., local actors). However, they can also be applied without recourse to consultations, which require the involvement of a certain number of people.

Advantages of geographic aggregation methods

- Geographic aggregation methods can contribute to or serve as a starting point for human interpretations (e.g., local actors). However, they can also be applied without recourse to consultations, which require the involvement of a certain number of people. Note that one study (Haynes et al., 2007; Stafford et al., 2008) reports that an automated division may work as well as a division based on the perceptions of local stakeholders.

Advantages of human interpretation methods

- One study (Cutchin et al., 2011; Stafford et al., 2008) suggests that divisions established by human interpretation produce more homogeneous neighbourhoods than those obtained on the basis of administrative or arbitrary divisions.
- Human interpretation exercises have the advantage of producing divisions that could be qualified as having multiple criteria, since they rely on syntheses the individuals make by taking multiple types of information into consideration simultaneously.
- When they are developed by seeking the consensus of local stakeholders, human interpretation exercises produce divisions that are consistent both with the socioeconomic determinants of health and with intervention.
- Human interpretation exercises may be just as "scientific" as those opting for statistical tools. Moreover, these methods promote the involvement of people from the area and appropriation of the results.

Limitations

- The requirement of a correspondence with census boundaries may limit the capacity to represent spaces corresponding to lived environments. This phenomenon is particularly apparent in rural areas, where the census territories at the finest scale, the dissemination areas (DA), are physically larger than the urban areas.
- The delineation of local communities with small populations (e.g., in rural areas) may create a high number of territorial units to be characterized, whether through profiles or through SIH monitoring indicators.

Limitations of statistical methods

- The geographic location of territorial units (that is, their proximity or contiguousness) is not taken into account, resulting in groups of territories that are not necessarily contiguous.
- Since they do not necessarily seek the consensus of local stakeholders, there is a risk that they will result in divisions inconsistent with socioeconomic determinants. Consequently, they may be less likely to promote the involvement of local people and their appropriation of the results and the interventions that may stem from this.

Limitations of geographic aggregation methods

- The automation of multiple criteria is generally painstaking or even impossible to accomplish given that many criteria are qualitative and perceptual in nature.
- Automated geographic aggregation methods have the disadvantage of being harder to understand, and the software and experience they require are less easily accessible than statistical methods.
- Because they do not necessarily seek the consensus of local stakeholders, they are at risk of producing divisions inconsistent with both the socioeconomic determinants of health and with intervention.

Limitations of human interpretation exercises

- Human interpretation exercises require the use of consultations, which require the involvement of a certain number of people.

Feasibility in Québec and in the regions

- The three methods presented here are complementary and may readily be employed together, as has been done in the regions.
- The regional approaches used in Québec seem to be compatible with the production of SIH monitoring indicators at the scale of neighbourhood units. Adequate balance between the size and number of the territorial units seems to be a determining factor. The existing grouping and typology exercises seem to constitute facilitating factors.

Conclusion

This review of experiences of delineating neighbourhood units (or local communities) has demonstrated that such units have been delineated and characterized in many countries and in many of Québec's regions. This research pertaining to local communities is central to the approach of the Groupe SISS, because these communities may serve as social position variables (stratifiers) for indicators of health and of health determinants.

3 PROPOSALS

In this report, we have seen that the desire to reduce social inequalities in Québec is very much present in government guidelines and policies for the health sector and for other sectors closely tied to health. We have also seen that the presence of social inequalities in health (SIH) in Québec is well documented. In spite of this knowledge, Québec still does not perform systematic monitoring of SIH by producing, analyzing and disseminating indicators at the provincial scale and at the scale of its health regions.

The third part of this report includes proposals aimed at laying the foundations for the systematic monitoring of SIH in Québec. These proposals include a selection of indicators and a strategy for monitoring SIH, which clarifies the steps in the process and the expected outcomes.

3.1 INDICATORS FOR MONITORING SIH

To establish the monitoring of SIH indicators in Québec, the Groupe SISS proposes that a system comprising indicators and measures covering all of Québec and each of its health regions be put in place. This system will include the following elements, associated with the three components of an SIH indicator.

Indicators of health and of well-being

The Groupe SISS suggests initiating the establishment of the system with a "common core" of 18 indicators (Table 5), which can be supplemented by other measures⁷ derived from studies on the monitoring of SIH, such as those conducted by the Centre Léa-Roback. The types of indicators proposed are aligned with the conceptual model developed by the WHO (Figure 1) and the typology adopted for the literature review (Table 1). The Groupe SISS proposes ten indicators of health and well-being: overall indicators and indicators more specific to health problems or to groups (youth in particular). Also suggested are seven indicators of intermediary determinants tied to lifestyles and one indicator targeting the structural determinants of health. For the most part, these indicators are recommended or are used in systematic monitoring elsewhere in Canada and internationally (Annex 3).

The indicators were selected based on previously mentioned criteria (section 2.1). The first criterion was that these indicators should reflect an important health reality in Québec. It should be possible to associate the indicators selected with policies, programs or intervention plans (Annex 4) and with demonstrated and significant SIH (based, for example, on measures of relative risk of ± 1.5 between extreme groups). Strong SIH have been noted in Québec for healthy life expectancy (Pampalon, 2002; Pampalon & Raymond, 2003), premature mortality (Pampalon et al., 2008a; Pampalon et al., 2009a; Pampalon et al., 2008b), mortality by suicide and by road accident (Hamel & Pampalon, 2002; Pampalon et al., 2008b; Burrows et al., 2010; Burrows et al., 2011), hospitalization for severe trauma

⁷ The Groupe SISS suggests considering, in a later phase, indicators such as life expectancy at age 65, incapacity, avoidable mortality, sense of community belonging, the psychological distress index, school readiness and dropout rates and measures of access to the care system (e.g., access to a family doctor, vaccination, breast cancer screening, dental services and free vision exams for young people).

among youth (Gagne & Hamel, 2009), prevalence of diabetes (Gagne & Hamel, 2009; Schmitz et al., 2009; Ouhoummane et al., 2009; Institut national de santé publique du Québec, 2012d; Émond et al., 2005) lung cancer incidence (Institut national de santé publique du Québec, 2012c), preterm birth (Auger *et al.*, 2012), adolescent fertility (Institut national de santé publique du Québec, 2012e; Pampalon & Raymond, 2003) and youth in care of child protection (Ministère de la Santé et des Services sociaux du Québec, 2007; Pampalon & Raymond, 2003). Sizable inequalities have also been observed for obesity (Lamontagne & Hamel, 2009; Lamontagne & Hamel, 2012; Nolin et al., 2008; Agence de la santé publique du Canada, 2011), food insecurity (Blanchet & Rochette, 2011; Dubois, 2006), smoking (Dubé, G. et al., 2011; Lasnier, B. et al., 2012; Canadian Institute for Health Information, 2008), binge drinking (Canadian Institute for Health Information, 2008; Du Mays & Bordeleau, 2011), housing conditions, residential mobility and the youth dropout rate, here illustrated by the lack of a high school diploma (Équipe de recherche sur les inégalités sociales de santé, 2009; Pampalon et al., 2011; unité Études et analyses de l'état de santé de la population, 2012).

Table 5 Proposed indicators for monitoring social inequalities in health

Health and well-being	
<p>Health and overall well-being</p> <p>1 Healthy life expectancy at birth Data sources: Death records and health surveys (perception of health, fair-poor)</p> <p>Mortality</p> <p>2 Premature mortality (< 75 years) Data sources: Death records</p> <p>3 Mortality by suicide Data sources: Death records</p> <p>4 Mortality by road accident Data sources: Death records</p> <p>Hospitalization</p> <p>5 Severe trauma among youth (< 15 years) Data sources: Hospitalization records</p> <p>Lifestyle indicators</p> <p>11 Obesity (BMI ≥ 30) Data sources: Health surveys</p> <p>12 Food insecurity Data sources: Health surveys</p> <p>13 Smoking (regular smokers) Data sources: Health surveys</p> <p>14 Binge drinking Data sources: Health surveys</p> <p>Education</p> <p>18 Young people without certificate or diploma (20-34 years old) Data sources: Census</p>	<p>Morbidity</p> <p>6 Prevalence of diabetes Data sources: Records of chronic diseases</p> <p>7 Lung cancer incidence Data sources: Tumour registry</p> <p>Others</p> <p>8 Preterm birth (< 37 weeks) Data sources: Birth records</p> <p>9 Adolescent fertility (< 20 years) Data sources: Birth records</p> <p>10 In care of child protection (< 18 years) Data sources: Banque commune LJ-LPJ</p> <p style="text-align: center;">Intermediary determinants</p> <p>Material conditions</p> <p>15 Poor housing conditions (major repairs) Data sources: Census</p> <p>16 Unaffordable housing (+ 30% of gross income) Data sources: Census</p> <p>Social cohesion</p> <p>17 Residential mobility (< 5 years) Data sources: Census</p> <p style="text-align: center;">Structural determinants (Socioeconomic position)</p>

Note: This classification of indicators may vary. Lifestyle indicators may be considered indicators or morbidity (e.g., obesity) or of material conditions (e.g., food insecurity).

To be selected, the indicators should also be included in the monitoring plans currently in effect in Québec (Annex 5) and satisfy requirements tied to monitoring activities, on the level of production, analysis and interpretation of statistics. With regard to the production of indicators, the data sources must be available, it must be possible to track the indicators over a substantial period of time (± 20 years), the definition of these indicators must be stable over time and it must be possible to produce statistically precise measures for Québec and for its health regions. Finally, it must be possible to arrive at intelligible interpretations of the variations in these indicators over time and space, highlighting possible contributing factors. Work is currently underway to determine whether the indicators proposed satisfy all or some of these requirements.

Social position variables

To interpret social inequalities in health and health determinants, the Groupe SISS suggests stratifying the indicators of health and health determinants according to two variables, one social and the other territorial.

The social variable will be the material and social deprivation index when the indicator of health and health determinants is drawn from administrative sources or a choice of individual indicators (e.g., income, education, employment, household or family structure) when the data is drawn from surveys. Work will be conducted to identify these individual indicators and to compare the inequalities observed when using these individual indicators and when using the deprivation index.⁸

For the purposes of SIH monitoring, and to offer a common basis for comparisons between the regions and all of Québec, the social variable will be given preference in the production and distribution of indicators.

The territorial variable corresponds to the local communities or neighbourhoods as defined by the regional authorities. Several regions have already delineated such units, and some have even grouped them into a smaller number (see section 2.4). Indicators of health or of health determinants may be produced by local community or neighbourhood, but for the data to be reliable, it is usually preferable to group these units (≈ 7 groups per region, although the number may vary according to the size of the region). For regions interested in dividing or grouping sub-regional units and producing indicators on this basis, research inspired by regional experiences may be conducted, with the support of the INSPQ.

For the regions of Nord-du-Québec, Terres-Cries-de-la-Baie-James and Nunavik, it is difficult to envision such stratifications, given the small size of the populations concerned. If the 18 indicators are produced for each of these regions, they will have to be stratified, if applicable, at the sub-regional level and, if necessary, a workable procedure for achieving this will have to be verified.

⁸ In a later phase, it will also be possible to explore an income measure, at the territorial scale, as a supplement to the material and social deprivation index.

Measures of inequality

The Groupe SISS proposes applying a variety of measures in order to produce a complete and nuanced portrait of SIH. These measures will make it possible to monitor changes in SIH in the overall Québec population and in the regional populations, as well as changes between population groups (extreme groups) in relative and absolute terms.

Two measures of inequality in the overall population will be utilized: the concentration index and the population attributable risk. The first indicates the percentage (%) of events or situations tied to health status or health determinants that would have to be redistributed among population groups to achieve an equitable (or equal) distribution among all groups. Analyses based on premature mortality demonstrated that results of the concentration index were equivalent to those of the relative index of inequality. The population attributable risk indicates the number and proportion of such events or situations that could be avoided if the entire population enjoyed the rates observed in the most advantaged group. This risk thus indicates the gains that could be achieved if the entire population of Québec (or of a region) enjoyed the best socioeconomic conditions.

Two measures of inequality between extreme groups will be selected, the ratio and the rate difference. These two measures can be used to estimate the relative and absolute gaps, respectively, between extreme groups: the most and least advantaged groups according to the social position variable selected. These measures reflect the size of the gulf between certain population groups.

3.2 A STRATEGY FOR PRODUCING INDICATORS

To follow up on these proposals and to lay the foundation for monitoring SIH in Québec, the production of indicators will begin with two pilot projects, each targeting a specific indicator. First, we will set out the steps for producing an indicator and propose a grouping of indicators.

The steps for producing an indicator

To produce indicators for monitoring SIH in Québec, several steps are necessary. The first concerns the data source. If this source exists, is it accessible? Does it allow the indicator to be tracked over space and time using a definition of the indicator that remains stable over time? Does it allow the association of this indicator with the deprivation index or with other socioeconomic characteristics? The next steps are collecting the useful data, linking the data sources, and then calculating the rates and indices of inequalities called for by the project. The next steps are analyzing the results to assess their statistical validity, and interpreting the results in light of studies performed in Québec, known risk factors and policies and programs associated with the indicator. Subsequently, the indicator must be prepared for presentation. This involves drafting a simple and illustrated text including a summary of the context, a description of the data and methods used, an analysis and discussion of results, and references for the indicator. Finally, this text will be validated by users to ensure that it meets their needs.

A grouping of indicators

For the production of indicators, it may be useful to group them by data source. In fact, each source raises particular challenges, whether related to access to data, to changes in the definition of the indicator over time or to the ability to precisely track the indicator over space and time. The 18 indicators proposed can be grouped according to five sources: death records (indicators 1 to 4), birth records (indicators 8 and 9), health surveys (indicators 1, 11 to 14), the Canadian census (indicators 15 to 18) and various records from the health and social services sector (indicators 5, 6, 7 and 10).

CONCLUSION

The purpose of the proposals in this report is to lay the foundations of a system for monitoring SIH in Québec. They concern 18 indicators of health status and health determinants, stratified according to social position and territory, that can be monitored over time and space (at the Québec level, the regional level and sub-regionally). These proposals and their implementation constitute a ground-breaking contribution to knowledge about SIH, because currently no systematic and concerted monitoring of SIH is performed either across Québec or regionally. So far, national or regional reports on SIH have relied on the ad hoc production of indicators.

However, these proposals are only a starting point, necessarily limited and incomplete, intended to lead toward a system for monitoring SIH in Québec. This type of system must provide for regular updating of the indicators proposed and for the addition of new indicators, in response to research, such as that conducted by the Centre Léa-Roback. Such a system must also permit comparisons with the rest of Canada or with other countries, if possible. Finally, this type of system must integrate all indicators relevant to the monitoring of SIH, not just those expressing the scope of SIH (the 18 indicators proposed), but also those associated with certain social determinants of health (e.g., income, education, employment, family structure), whose changes and variations should be tracked across Québec and in the regions. Several of these indicators are already being tracked (*Portraits de santé du Québec et de ses régions*).

REFERENCES

- 14 partenaires incluant l'Agence de la santé et des services sociaux de l'Outaouais (2011). *Portrait des communautés.*
- Aïach, P. (2000). De la mesure des inégalités : enjeux sociopolitiques et théoriques. In A. Leclerc, D. Fassin, H. Grandjean, M. Kaminski, & T. Lang (Eds.), *Les inégalités sociales de santé* (Paris: Éditions La Découverte/INSERM).
- Auger, N., Park, A. L., Gamache, P., Pampalon, R., & Daniel, M. (2012). *Is material area deprivation more strongly associated with preterm birth than social area deprivation?* Social Science & Medicine, Submitted.
- Baudelot, C. (2010). *Les inégalités de santé: le point de vue d'un sociologue.* Actualité et dossier en santé publique, 73.
- Benach, J., Yasui, Y., Borrell, C., Pasarín, M. I., Martínez, J. M., & Daponte, A. (2003). *The public health burden of material deprivation: excess mortality in leading causes of death in Spain.* Prev Med, 36, 300-308.
- Bernard, P., Charafeddine, R., Frohlich, K. L., Daniel, M., Kestens, Y., & Potvin, L. (2007). *Health inequalities and place: a theoretical conception of neighbourhood.* Soc Sci Med, 65, 1839-1852.
- Blanchet, C. & Rochette, L. (2011). *Sécurité et insécurité alimentaire chez les Québécois : Une analyse de la situation en lien avec leurs habitudes alimentaires.* Québec: Institut national de santé publique du Québec.
- Boisvert, R. (2007). *Les indicateurs de développement des communautés : Vers le déploiement d'un dispositif national de surveillance.* Trois-Rivières: Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec.
- Boisvert, R., Pepin, Y., & Lemay, F. (2010). *Les inégalités de santé et de bien-être en Mauricie et au Centre-du-Québec: Une analyse écologique (Phase III).* Trois-Rivières: Direction de santé publique, Agence de santé de la Mauricie et du Centre-du-Québec.
- Bonnefoy, J., Morgan, A., Kelly, P. K., Butt, J., Bergman, V., and al. (2007). *Constructing the evidence base on the social determinants of health: A guide.* Geneva: UK, National Institute for Health and Clinical Excellence. Chile, Universidad del Desarrollo.
- Boström, G. & Rosen, M. (2003). *Measuring social inequalities in health - politics or science?* Scandinavian Journal of Public Health, 31, 211-215.
- Bourassa, A., Brunet, L., & Veilleux, S. (2010). *Caractérisation des communautés locales : connaître et mobiliser pour mieux intervenir. Portrait sommaire.* Sainte-Marie, Québec: Agence de la santé et des services sociaux de Chaudière-Appalaches.
- Bourassa, A. & Dallaire, L. (2012). *Résumé des démarches auprès des régions de délimitation et de caractérisation des communautés locales et unités de voisinage.*

- Braveman, P. (2006). *Health disparities and health equity: concepts and measurement*. *Annu Rev Public Health*, 27, 167-194.
- Burrows, S., Auger, N., Gamache, P., St-Laurent, D., & Hamel, D. (2011). *Influence of social and material individual and area deprivation on suicide mortality among 2.7 million Canadians: a prospective study*. *BMC Public Health*, 11, 577.
- Burrows, S., Auger, N., Roy, M., & Alix, C. (2010). *Socio-economic inequalities in suicide attempts and suicide mortality in Québec, Canada, 1990-2005*. *Public Health*, 124, 78-85.
- Canadian Institute for Health Information (2008). *Reducing Gaps in Health. A Focus on Socio-Economic Status in Urban Canada*. Ottawa (Ontario): CIHI.
- Carr-Hill, R. & Chalmers-Dixon, P. (2005). *The Public Health Observatory handbook of Health Inequalities Measurement*. Oxford: South East Public Health Observatory.
- Carstairs, V. & Morris, R. (1989). Deprivation: explaining differences in mortality between Scotland and England and Wales. *BMJ*, 299, 886-889.
- Cockings, S. & Martin, D. (2005). *Zone design for environment and health studies using pre-aggregated data*. *Soc.Sci.Med*, 60, 2729-2742.
- Commission on Social Determinants of Health (2008). *Closing the gap in a generation: Health equity through action on the social determinants of health*. Geneva: World Health Organization.
- Couffinhal, A., Dourgnon, P., & Tubeuf, S. (2003). *Outils de mesure des inégalités de santé : où en est la recherche?* CREDES.
- Crombie, I. K., Irvine, L., Elliot, L., & Wallace, H. (2005). *Closing the Health Inequalities Gap: An International Perspective*. WHO Europe. University of Dundee. NHS Health Scotland.
- Curtin, F., Morabia, A., & Bernstein, M. (1998). *Lifetime exposure to environmental tobacco smoke among urban women: differences by socioeconomic class*. *Am J Epidemiol*, 148, 1040-1047.
- Cutchin, M. P., Eschbach, K., Mair, C. A., Ju, H., & Goodwin, J. S. (2011). *The socio-spatial neighborhood estimation method: an approach to operationalizing the neighborhood concept*. *Health Place.*, 17, 1113-1121.
- Dallaire, L. (2012). *Contribution d'indicateurs de surveillance au développement des communautés locales en Montérégie, Communication personnelle*. Agence de la santé et des services sociaux de la Montérégie.
- Dallaire, L. & Bourassa, A. (2012). *Tableau résumé des démarches régionales de délimitation et de caractérisation des communautés locales et unités de voisinage*.
- Department of Health (2003). *Tackling health inequalities. A programme for action*. London: Department of Health, UK.

- Department of Health (2007a). *Health Inequality Target Monitoring - Infant Mortality*. London, UK: Department of Health.
- Department of Health (2007b). *Health Inequality Target Monitoring - Life expectancy at birth*. London, UK: Department of Health.
- Department of Health (2007c). *Health Inequality Target Monitoring - Mortality*. London, UK: Department of Health.
- Department of Health (2008). *Tackling Health Inequalities: 2007 Status Report on the Programme for Action*. London: Department of Health, UK Government.
- Department of Health (2009). *Tackling Health Inequalities: 2006-08 Policy and Data Update for the 2010 national Target*. London: Department of Health.
- Direction de santé publique de la Capitale-Nationale (2012). *Rapport du directeur régional de santé publique sur les inégalités sociales de santé. Comprendre et agir autrement pour viser l'équité en santé dans la région de la Capitale-Nationale*. Agence de la santé et des services sociaux de la Capitale-Nationale.
- Direction de santé publique de la Mauricie et du Centre-du-Québec (2012). *Rapport du directeur de santé publique sur les inégalités sociales de santé en Mauricie et au Centre-du-Québec. Les inégalités sociales de santé ne sont pas une fatalité : voyons-y!* Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec.
- Direction de santé publique de Montréal (2011). *Rapport du directeur de santé publique 2011. Les inégalités sociales de santé à Montréal. Le chemin parcouru*. Montréal: Agence de la santé et des services sociaux de Montréal.
- Drackley, A., Newbold, K. B., & Taylor, C. (2011). *Defining socially-based spatial boundaries in the region of Peel, Ontario, Canada*. *Int.J Health Geogr.*, 10, 38.
- Du Mays, D. & Bordeleau, M. (2011). *La consommation d'alcool au Québec : évolution et portrait régional*. Québec: Institut de la Statistique du Québec.
- Dubé, G., Traoré, I., & Bordeleau, M. (2011). *La prévention du tabagisme chez les jeunes : Le poids de certains facteurs sociaux*. Institut de la statistique du Québec.
- Dubois, L. (2006). Food, Nutrition and Population Health: From Scarcity to Social Inequalities. In J. Heymann, C. Hertzman, M. L. Barer, & R. G. Evans (Eds.), *Healthier Societies. From Analysis to Action*. (pp. 135-172). New-York: Oxford University Press.
- Émond, A., Gosselin, J. C., & Dunnigan, L. (2009). *Cadre conceptuel de la santé et de ses déterminants : Résultat d'une réflexion commune*. Québec: Direction de la surveillance de l'état de santé. Ministère de la Santé et des Services sociaux.
- Émond, V., Ouhoumane, N., Rochette, L., Pampalon, R., & Hamel, D. (2005). *Regional, local and socioeconomic variations in diabetes prevalence and complications in Québec*. In CDA/CSEM Professional Conference and Annual Meeting (Canadian Diabetes Association).

- Équipe de recherche sur les inégalités sociales de santé (2009). *La pauvreté et l'exclusion sociale, leur genèse et leur réduction : Le rôle déterminant des milieux de vie*. Rapport déposé au Fonds québécois de la Recherche sur la société et la culture (FQRSC). Québec: Université Laval, Centre de santé et de services sociaux de la Vieille-Capitale, Institut national de santé publique du Québec.
- Exworthy, M., Bindman, A., Davies, H., & Washington, A. E. (2006). *Evidence into policy and practice? Measuring the progress of U.S. and U.K. policies to tackle disparities and inequalities in U.S. and U.K. health and health care*. *Milbank Q*, 84, 75-109.
- Flowerdew, R., Manley, D. J., & Sabel, C. E. (2008). *Neighbourhood effects on health: does it matter where you draw the boundaries?* *Soc.Sci.Med*, 66, 1241-1255.
- Frank, J. & Haw, S. (2011). *Best practice guidelines for monitoring socioeconomic inequalities in health status: lessons from Scotland*. *Milbank Q*, 89, 658-693.
- Frohlich, K., De Koninck, M., Demers, A., Bernard, P., & (Eds) (2008). *Les inégalités sociales de santé au Québec*. Montréal: Les Presses de l'Université de Montréal.
- Gagne, M. & Hamel, D. (2009). *Deprivation and unintentional injury hospitalization in Québec children*. *Chronic Dis Can*, 29, 56-69.
- Genereux, M., Auger, N., Goneau, M., & Daniel, M. (2008). *Neighbourhood socioeconomic status, maternal education and adverse birth outcomes among mothers living near highways*. *J Epidemiol Community Health*, 62, 695-700.
- Glazier, R. H., Vahabi, M., Damba, C., Patychuk, D., Ardal, S., Johnson, I. et al. (2005). *Defining needs-based urban health planning areas is feasible and desirable: a population-based approach in Toronto, Ontario*. *Can.J Public Health*, 96, 380-384.
- Gordon, D. (2003). *Area-Based Deprivation Measures: A U.K. Perspective*. In I.Kawachi & L. Berkman (Eds.), *Neighborhoods and Health* (pp. 179-210). Oxford University Press.
- Gouvernement du Québec. (2011a). *Public Health Act*. Compilation of Québec Laws and Regulation, chapter S-2.2. Ref Type: Bill/Resolution.
- Gouvernement du Québec. (2011b). *Act respecting health services and social services*. Compilation of Québec Laws and Regulation, chapter S-4.2. Ref Type: Bill/Resolution.
- Gouvernement du Québec. (2011c). *Act to combat poverty and social exclusion*. Compilation of Québec Laws and Regulation, chapter L-7. Ref Type: Bill/Resolution.
- Government of Ireland - Social, C. a. F. A. (2002). *Building an Inclusive Society*. http://www.socialinclusion.ie/publications/building_an_inclusive_society.pdf [On-line].
- Graham, H. & Kelly, P. K. (2004). *Health inequalities: concepts, frameworks and policy*. London: London: Health Development Agency, National Health Service.

- Groupe de travail sur la démarche de caractérisation et de mobilisation des communautés de la TCNS (2011). *Grille comparative des initiatives en développement des communautés*.
- Hamel, D. & Pampalon, R. (2002). *Traumatismes et défavorisation au Québec*. Québec: Institut national de santé publique du Québec.
- Havard, S., Deguen, S., Bodin, J., Louis, K., Laurent, O., & Bard, D. (2008). *A small-area index of socioeconomic deprivation to capture health inequalities in France*. *Soc Sci Med*, 67, 2007-2016.
- Haynes, R., Daras, K., Reading, R., & Jones, A. (2007). *Modifiable neighbourhood units, zone design and residents' perceptions*. *Health Place.*, 13, 812-825.
- Hayward, K., Colman, R., & Pannoza, L. (2008). *Health Disparities Indicators. Background Report for Developing Health Disparities Indicators in Canada*. Halifax, Nova Scotia: GPIAtlantic.
- Health Canada (1999). *Toward a Healthy Future. Second Report on the Health of Canadians*. Ottawa: Health Canada.
- Health Canada (2004). *Commitments to Aboriginal Health*. http://www.hc-sc.gc.ca/hcs-sss/delivery-prestation/ftcollab/2004-fmm-rpm/fs-if_abor-auto-eng.php [On-line].
- Henripin, J. (1961). *L'inégalité sociale devant la mort. La mortinatalité et la mortalité infantile à Montréal*. *Recherches sociographiques*, 3-34.
- Institut de la statistique du Québec (2012). *Zoom Santé. Divers rapports*. Institut de la statistique du Québec.
- Institut national de santé publique du Québec (2012a). *Publications de l'INSPQ reliées à l'indice de défavorisation matérielle et sociale*. <http://www.inspq.qc.ca/santescope/liens.asp?comp=9&nav=M> [On-line].
- Institut national de santé publique du Québec (2012b). *Santéscope website*. <http://www2.inspq.qc.ca/santescope/Default.asp?Lq=en> [On-line].
- Institut national de santé publique du Québec (2012c). *Adjusted rate of lung cancer incidence, by level of material and social deprivation, both sexes, Québec, 2000-2004*. <http://www2.inspq.qc.ca/Santescope/element.asp?Lq=en&NoEle=749> [On-line].
- Institut national de santé publique du Québec (2012d). *Adjusted rate of diabetes prevalence, for the population 20 years and over by sex, by level of material and social deprivation, Québec, 2000-2004*. <http://www.inspq.qc.ca/Santescope/element.asp?NoEle=848> [On-line].
- Institut national de santé publique du Québec (2012e). *Fertility rate among women 15-19 years by level of material and social deprivation, Québec, 2000-2004*. <http://www2.inspq.qc.ca/Santescope/element.asp?Lq=en&NoEle=732> [On-line].
- Jarman, B., Townsend, P., & Carstairs, V. (1991). *Deprivation indices*. *BMJ*, 303, 523.

- Judge, k., Platt, S., Costongs, C., & Jurczak, k. (2006). *Health Inequalities: a Challenge for Europe*. UK Presidency of the EU 2005.
- Kawachi, I., Subramanian, S. V., & Meida-Filho, N. (2002). *A glossary for health inequalities*. J Epidemiol Community Health, 56, 647-652.
- Koolman, X. & Van Doorslaer E. (2004). *On the interpretation of a concentration index of inequality*. Health Econ, 13, 649-656.
- Krieger, N., Chen, J. T., Waterman, P. D., Soobader, M. J., Subramanian, S. V., & Carson, R. (2003). *Choosing area based socioeconomic measures to monitor social inequalities in low birth weight and childhood lead poisoning: The Public Health Disparities Geocoding Project (US)*. J Epidemiol Community Health, 57, 186-199.
- Kunst, A. E., Bos, V., & Mackenbach, J. P. (2001). *Monitoring socio-economic inequalities in health in the European Union: guidelines and illustrations. A report for the Health Monitoring Program of the European Commission. Final report*. Rotterdam, The Netherlands: Department of Public Health. Erasmus University.
- Kunst, A. E. & Mackenbach, J. P. (1994). *Measuring socioeconomic inequalities in health*. Copenhagen: WHO, Regional Office for Europe.
- Lamontagne, P. & Hamel, D. (2009). *Le poids corporel chez les enfants et les adolescents du Québec : de 1978 à 2005*. Québec: Institut national de santé publique du Québec.
- Lamontagne, P. & Hamel, D. (2012). *Poids corporel de la population adulte québécoise: Mise à jour 2005. Exploitation des données de l'ESCC 3.1*. Québec : Institut national de santé publique du Québec.
- Lasnier, B., Leclerc, B. S., & Hamel, D. (2012). *Les inégalités sociales de santé en matière de tabagisme et d'exposition à la fumée de tabac dans l'environnement au Québec*. Institut national de santé publique du Québec.
- Lebel, A., Pampalon, R., & Villeneuve, P. Y. (2007). A multi-perspective approach for defining neighbourhood units in the context of a study on health inequalities in the Québec City region. Int J Health Geogr, 6, 27.
- Lévesque, J. F., Pineault, R., Robert, L., Hamel, M., Roberge, D., Kapetanakis, B. and al. (2007). *Les besoins non comblés de services médicaux : un reflet de l'accessibilité des services de première ligne?* Agence de la santé et des services sociaux de Montréal.
- London Health Observatory (2012). *Basket of Indicators*. http://www.lho.org.uk/LHO_Topics/National_Lead_Areas/Basket_Of_Indicators/BasketOfIndicators.aspx [On-line].
- Loslier, L. (1976). *La mortalité dans les aires sociales de la région métropolitaine de Montréal*. Québec: Ministère des Affaires Sociales.
- Loslier, L. (1977). *La différenciation spatiale et sociale de la mortalité dans la région métropolitaine de Québec*. Montréal: Département de Géographie. Université du Québec à Montréal.

- Luo, Z. C., Wilkins, R., & Kramer, M. S. (2006). *Effect of neighbourhood income and maternal education on birth outcomes: a population-based study*. CMAJ, 174, 1415-1420.
- Macintyre, S., Ellaway, A., & Cummins, S. (2002). *Place effects on health: how can we conceptualise, operationalise and measure them?* Soc Sci Med, 55, 125-139.
- Mackenbach, J. P. (2006). *Health inequalities: Europe in profile. An independent, expert report commissioned by the UK Presidency of the EU*. Rotterdam: Department of Public Health. Erasmus MC.
- Mackenbach, J. P. & Kunst, A. (1997). *Measuring the magnitude of socio-economic inequalities in health: an overview of available measures illustrated with two examples from Europe*. Social Science & Medicine, 44, 757-771.
- Mackenbach, J. P., Kunst, A., & al. (2007). *Tackling Health Inequalities In Europe: An Integrated Approach. EUROTHINE. Final report*. Rotterdam: Erasmus MC.
- Marmot, M., Allen, J., & al. (2010). *Fair Society, Healthy Lives. The Marmot Review. Strategic Review of Health Inequalities in England Post-2010*. London, UK: Department of Health.
- Martens, P. & al. (2010). *Health Inequities in Manitoba: Is the Socioeconomic Gap in Health Widening or Narrowing over Time?* Winnipeg, Manitoba: Manitoba Centre for Health Policy.
- McAll, C. (2008). *Transfert des temps de vie et perte de raison : l'inégalité sociale comme rapport d'appropriation*. In K.L. Frohlich, M. De Koninck, P. Bernard, & A. Demers (Eds.), *Les inégalités sociales de santé au Québec* (pp. 87-110). Montréal: Les Presses de l'Université de Montréal.
- Minder, C. E. (1993). *Socio-economic factors and mortality in Switzerland*. Soz Praventivmed, 38, 313-328.
- Ministère de l'Éducation, du Loisir et du Sport (2012). *Indices de défavorisation*. http://www.mels.gouv.qc.ca/stat/Indice_defav/Index_ind_def_cs2006.htm [On-line].
- Ministère de l'Emploi et de la Solidarité sociale (2010). *Profils statistiques régionaux*. <http://www.mess.gouv.qc.ca/statistiques/profils/index.asp> [On-line].
- Ministère de la Santé et des Services sociaux (1992). *The Policy on Health and Well-Being*. Québec: Ministère de la santé et du bien-être.
- Ministère de la Santé et des Services sociaux (2007). *Cadre d'orientation pour le développement et l'évolution de la fonction de surveillance au Québec*. Québec: Direction de la santé publique, MSSS.
- Ministère de la Santé et des Services sociaux (2008a). *Politique de périnatalité 2008-2018*. Québec: Gouvernement du Québec.

- Ministère de la Santé et des Services sociaux (2008b). *Programme national de santé publique 2003-2012. Mise à jour 2008*. Québec: Gouvernement du Québec.
- Ministère de la Santé et des Services sociaux, Institut national de santé publique, & Institut de la statistique du Québec (2011). *Pour guider l'action - Portrait de santé du Québec et de ses régions*. Gouvernement du Québec.
- Ministère de la Santé et des Services sociaux & Institut national de santé publique du Québec (2005). *Plan commun de surveillance de l'état de santé de la population et de ses déterminants 2004-2007*. Québec: Ministère de la Santé et des Services sociaux.
- Ministère de la Santé et des Services sociaux & Institut national de santé publique du Québec (2008a). *Plan de surveillance multithématique. Cadre de référence*. Québec: Ministère de la Santé et des Services sociaux.
- Ministère de la Santé et des Services sociaux & Institut national de santé publique du Québec (2008b). *Plan de surveillance multithématique. Thème 6 : Déterminants socio-économiques et état de santé globale*. Québec: Ministère de la Santé et des Services sociaux.
- Ministère de la Santé et des Services sociaux du Québec (2007). *Troisième rapport national sur l'état de santé de la population du Québec. Riches de tous nos enfants*. Québec: Directions des communications, MSSS.
- Ministère des Affaires municipales des Régions et de l'Occupation du territoire (2010). *Des communautés à revitaliser, un défi collectif pour le Québec*. Québec.
- Morris, R. & Carstairs, V. (1991). *Which deprivation? A comparison of selected deprivation indexes*. *J Public Health Med*, 13, 318-326.
- Munoz-Arroyo, R. & Sutton, M. (2007). *Measuring Socio-Economic Inequalities in Health: A Practical Guide*. Glasgow, Scotland: Scottish Public Health Observatory.
- Noble, M., McLennan, D., Wilkinson, K., Whitworth, A., & Barnes, H. (2008). *The English Indices of Deprivation 2007*. London: Department for Communities and Local Government.
- Nolin, B., Blanchet, C., & Kuzmina, E. (2008). *Enquête de santé auprès des Cris, 2003. Habitudes alimentaires, activité physique et poids corporel*. Institut national de santé publique du Québec.
- Norwegian Ministry of Health and Care Services (2007). *National Strategy to Reduce social Inequalities in Health. Report no. 20*. <http://healthinequalities.thehealthwell.info/search-results/national-strategy-reduce-social-inequalities-health-norwegian-ministry-health-and-car> [On-line].
- Ouhoumane, N., Abdous, B., Emond, V., & Poirier, P. (2009). *Impact of diabetes and gender on survival after acute myocardial infarction in the Province of Québec, Canada--a population-based study*. *Diabet.Med*, 26, 609-616.

- Pampalon, R. (2002). *Espérance de santé et défavorisation au Québec, 1996-1998*. Québec: Institut national de santé publique du Québec.
- Pampalon, R., Hamel, D., & Gamache, P. (2011). *Residential mobility, deprivation and health in Québec*. 14th International Medical Geography Symposium. 14th International Medical Geography Symposium. Durham, UK.
- Pampalon, R., Hamel, D., & Gamache, P. (2008a). *Les inégalités sociales de santé augmentent-elles au Québec?* Institut national de santé publique du Québec. Les Publications de l'Institut.
- Pampalon, R., Hamel, D., Gamache, P., & Raymond, G. (2009a). *Un indice de défavorisation pour la planification de la santé au Canada*. *Maladies chroniques au Canada*, 29, 199-213.
- Pampalon, R. & Raymond, G. (2000a). *Un indice de défavorisation pour la planification de la santé et du bien-être au Québec*. *Maladies chroniques au Canada*, 21, 113-122.
- Pampalon, R., Hamel, D., & Gamache, P. (2008b). Évolution de la mortalité prématurée au Québec selon la défavorisation matérielle et sociale. In K.Frohlich, M. De Koninck, P. Bernard, & A. Demers (Eds.), *Les inégalités sociales de santé au Québec* Montréal: Les Presses de l'Université de Montréal.
- Pampalon, R., Hamel, D., Gamache, P., & Raymond, G. (2009b). *A deprivation index for health planning in Canada*. *Chronic Dis Can*, 29, 178-191.
- Pampalon, R. & Raymond, G. (2000b). *A deprivation index for health and welfare planning in Québec*. *Chronic Dis Can*, 21, 104-113.
- Pampalon, R. & Raymond, G. (2003). *Indice de défavorisation matérielle et sociale : son application au secteur de la santé et du bien-être*. *Santé, Société et Solidarité*, 191-208.
- Population Health Promotion Expert Group & Healthy Living Issue Group (2009). *Indicators of health Inequalities*. Ottawa: Pan-Canadian Public Health Network.
- Public Health Agency of Canada (2011). *Obesity in Canada*. Public Health Agency of Canada, Canadian Institute for Health Information.
- Rehkopf, D. H., Houghton, L. T., Chen, J. T., Waterman, P. D., Subramanian, S. V., & Krieger, N. (2006). *Monitoring socioeconomic disparities in death: comparing individual-level education and area-based socioeconomic measures*. *Am J Public Health*, 96, 2135-2138.
- Richard, P. (2011). *Recueil de cas de recherche interventionnelle en santé des populations. Initiative sur la santé de la population canadienne*. Sherbrooke.
- Riva, M., Apparicio, P., Gauvin, L., & Brodeur, J. M. (2008). *Establishing the soundness of administrative spatial units for operationalising the active living potential of residential environments: an exemplar for designing optimal zones*. *Int.J Health Geogr.*, 7, 43.

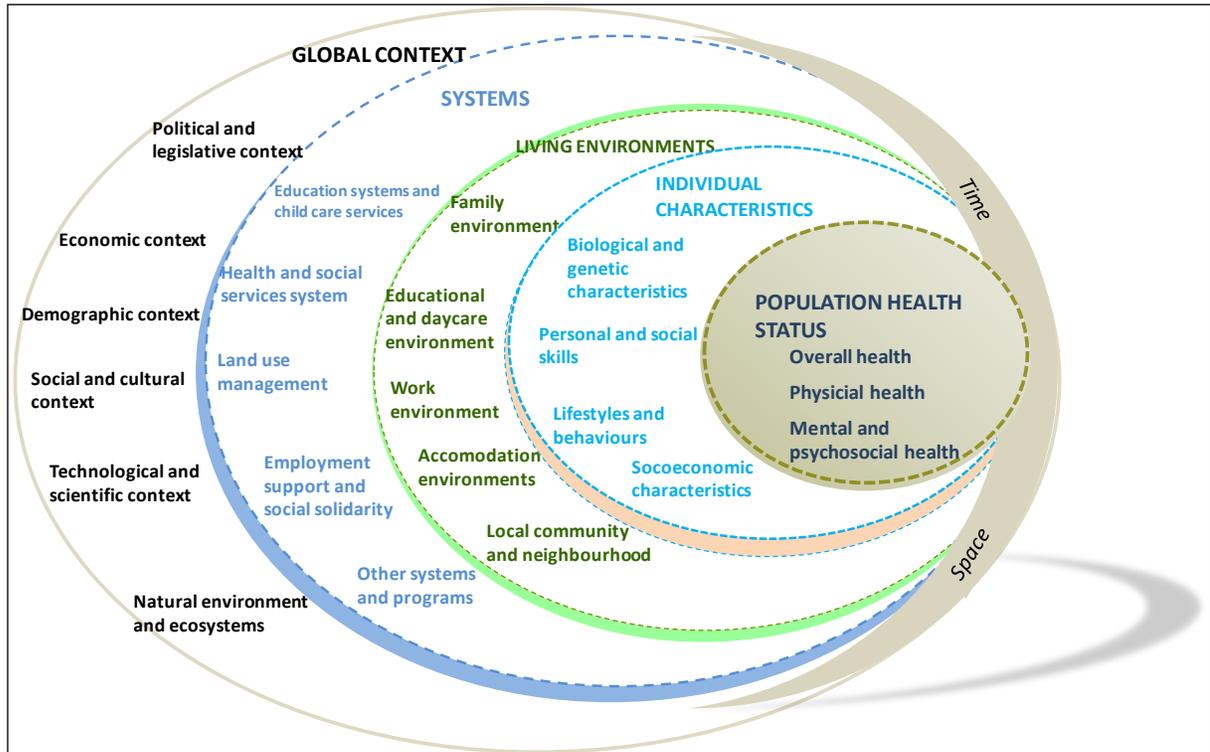
- Ross, C. E., Reynolds, J. R., & Geis, K. G. (2000). *The Contingent Meaning of Neighborhood Stability for Resident's Psychological Well-Being*. *American Sociological Review*, 65, 581-597.
- Ross, N. A., Tremblay, S. S., & Graham, K. (2004). *Neighbourhood influences on health in Montreal, Canada*. *Soc.Sci.Med*, 59, 1485-1494.
- Salmond, C., Crampton, P., & Sutton, F. (1998). NZDep91: A New Zealand index of deprivation. *Aust N Z.J Public Health*, 22, 835-837.
- Schmitz, N., Nitka, D., Gariepy, G., Malla, A., Wang, J., Boyer, R. and al. (2009). *Association between neighborhood-level deprivation and disability in a community sample of people with diabetes*. *Diabetes Care*, 32, 1998-2004.
- Schuurman, N., Bell, N., Dunn, J. R., & Oliver, L. (2007). *Deprivation indices, population health and geography: an evaluation of the spatial effectiveness of indices at multiple scales*. *J Urban Health*, 84, 591-603.
- Scottish Executive (2003). *Improving health in Scotland: The Challenge*.
- Shaw, M., Galobardes, B., Lawlor, D. A., Lynch, J., Wheeler, B., & Davey Smith, G. (2007). *The handbook of inequality and socioeconomic position*. Bristol, UK: The Policy Press.
- Solar, O. & Irwin, A. (2007). *A Conceptual Framework for Action on the Social Determinants of Health*. Geneva: Commission on social determinants of health, WHO.
- Stafford, M., Duke-Williams, O., & Shelton, N. (2008). *Small area inequalities in health: are we underestimating them?* *Soc Sci Med*, 67, 891-899.
- Statistics Canada & Canadian Institute for Health Information (2004). *About health indicators*. Health indicators, 2004.
- Tatalovich, Z., Wilson, J. P., Milam, J. E., Jerrett, M. L., & McConnell, R. (2006). *Competing definitions of contextual environments*. *Int.J Health Geogr.*, 5, 55.
- Tello, J. E., Jones, J., Bonizzato, P., Mazzi, M., Amaddeo, F., & Tansella, M. (2005). *A census-based socio-economic status (SES) index as a tool to examine the relationship between mental health services use and deprivation*. *Soc Sci Med*, 61, 2096-2105.
- The World Bank (2011). *Quantitative Techniques for Equity Analysis - Technical note # 7*. The World Bank.
- Townsend, P. (1987). *Deprivation*. *Journal of Social Policy*, 16, 125-146.
- Unité Études et analyses de l'état de santé de la population (2012). *Données sur le logement et la scolarité selon l'indice de défavorisation matérielle et sociale, recensement 2006*.
- United States Department of Health and Human Services (2011). *Healthy People 2020*. <http://www.healthypeople.gov/2020/default.aspx> [On-line].

- Vallin, J., Meslé, F., & Valkonen, T. (2001). *Tendances en matière de mortalité et mortalité différentielle*.
- Weiss, L., Ompad, D., Galea, S., & Vlahov, D. (2007). *Defining neighborhood boundaries for urban health research*. *Am.J Prev.Med*, 32, S154-S159.
- Welsh Assembly Government (2005). *Inequalities in Health: The Welsh Dimension 2002-2005*. <http://wales.gov.uk/topics/health/publications/health/reports/inequalitieshealth?lang=en> [On-line].
- Whitehead, M. (1990). *The concepts and principles of equity and health*. Copenhagen: WHO Regional Office for Europe.
- Whitehead, M. & Dahlgren, G. (2006). *Concepts and principles for tackling social health inequities in health: Levelling up Part 1*. WHO Regional Office for Europe.
- Wilkins, R. (1980). *L'inégalité sociale face à la mortalité à Montréal, 1975-1977*. *Cahiers Québécois de Démographie*, 9, 159-184.
- Wilkinson, R. & Pickett, K. (2010). *The spirit level. Why equality is better for everyone*. London, UK: Penguin books.
- World Health Organization - Regional Office for Europe (1985). *Targets for health for all*. Copenhagen, Denmark: WHO, Europe.
- World Health Organization - Regional Office for Europe (1999). *Health21 The health for all policy framework for the WHO European Region*. Copenhagen.
- World Health Organization (2011). *Closing the gap in a generation: Health equity through action on the social determinants of health: Working paper*. Geneva: World Health Organization.

ANNEX 1

CONCEPTUAL FRAMEWORK OF HEALTH AND HEALTH DETERMINANTS

CONCEPTUAL FRAMEWORK OF HEALTH AND HEALTH DETERMINANTS



ANNEX 2

GROUPINGS AND TYPOLOGY OF NEIGHBOURHOOD UNITS

Groupings and typologies of neighbourhood units

Article	Groupings	Notes	Typology	Notes
Shaw 2000	no		no	
Shaw 2004	no		no	
Shaw 2005	no		no	
Hayes 2002	no		no	
Pearce 2006	no		no	
Boisvert 2007	no		yes	Correlation between variables of the material and social deprivation index and "social-health index"
Choinière 1991	no		no	
Courteau 1996	no		no	
Goulet 2009	no		no	
Henripin 1961	no		no	
Lebel 2007	no		no	
Loslier 1976	yes	From 384 units (284 census tracts and 100 mun.) to 19 social areas	yes	Socioeconomic classification
Loslier 1977	yes	From 37 municipalities to 5 classes	yes	Socioeconomic classification
Wilkins 1980	yes	From 13 municipalities to 5 classes	yes	According to life expectancy
Stafford 2008	no		no	
Riva 2008	no		no	
Gauvin 2007	no		no	
Cockings 2005	no		no	
Flowerdew 2008	no		no	
Weiss 2007	no		no	
Cutchin 2011	no		no	
Drakley 2011	no		no	
Haynes 2007	no		no	
Talalovich 2006	no		no	
Glazier 2011	yes	From five large zones to 15 smaller regions	yes	According to homogeneity of income (prop. under SFR)
Ross 2004	no		no	

Article	Groupings	Notes	Typology	Notes
GTCDC 2011	yes	CL sometimes grouped into categories or zones (between 5 and 7)	yes	Socioeconomic class and consultation of stakeholders
region 02	not given		not given	
region 04	yes	Rarely	yes	see Boisvert 2010
region 05	yes	Very often	yes	see Richard 2012
region 07	yes	Always rural	yes	see ASSS Outaouais
region 08	yes	not given	yes	Classification of communities on the vitality-vulnerability scale
region 09	not given		not given	
region 12	yes	see Garant 2009	yes	see Garant 2009
region 16	yes	see Dallaire 2012	no	
CSSS Vieille-Capitale	no		no	
Boisvert 2010	see above	see above	yes	Typology in 7 categories of local communities: 1) problematic, 2) vulnerable, 3) advantaged, 4) comfortable, 5) average, 6) to be monitored or emerging, 7) resilient
Richard 2012	see above	see above	yes	Typology using quantitative and qualitative elements Work in progress (completion expected by spring 2012)
DSP Montréal 2011	no		no	
ASSS Outaouais	see above	see above	yes	Typology in 5 categories of local communities: 1) vulnerable, 2) advantaged, 3) balanced, 4) resilient, 5) atypical
Garant 2009	yes	Exceptions for statistical validity	yes	Exploratory typology: 1) local communities considered highly advantaged, 2) local communities considered to be experiencing problems
Dallaire 2012	yes	Service poles and rural sectors	no	

ANNEX 3

INDICATORS PROPOSED WITH REGARD TO EXPERIENCES FROM CANADA, THE WHO AND ENGLAND

Indicators proposed with regard to experiences from Canada, the WHO and England

INDICATOR	GPIAtlantic Headline indicators	Pan- Canadian Public Health Network	Manitoba Centre for Health Policy	WHO Commission on Social Determinants	England DH Status report Marmot review Headline indicators	London Health Observatory Local basket of inequality indicators
	2008	2009	2010	2008	2008 & 2010	2012
1 Healthy life expectancy at birth	X not prioritized	Life expectancy and perception of health, separately			X proposed	X
2 Premature mortality			X	X adult		X
3 Mortality by suicide	X	X	X	X specific cause		X
4 Mortality by road accident		X		X specific cause	X	X
5 Severe trauma among youth	X All ages					X All ages
6 Prevalence of diabetes		X	X	X		X
7 Lung cancer incidence		X				Death in persons < 75 years
8 Preterm birth		X				
9 Adolescent fertility	Adolescent pregnancy		Adolescent pregnancy		Adolescent conception	Adolescent conception
10 In care of child protection						
11 Obesity	X	X		X		X youth
12 Food insecurity	X	X				
13 Smoking (regular smokers)		X		X	X	Quit within 4 weeks
14 Binge drinking		X		Alcohol, not specified		
15 Poor housing conditions	X not prioritized	X		X housing conditions	Non-decent housing	
16 Affordable housing	X	X		X housing conditions		X
17 Residential mobility	X				X Selective migration	
18 Young people without certificate or diploma	20-24 years without HSD		HSD in 6 years (grade 9 to 12)		High school certificate	Miscellaneous measures

NOTE: The GPIAtlantic, Pan-Canadian Public Health Network and the WHO Commission on Social Determinants reports discuss proposed indicators. Manitoba and England monitor these indicators systematically. The indicators can be stratified according to an administrative division and/or a social position variable, which may vary.

ANNEX 4

**INDICATORS PROPOSED WITH REGARD TO QUÉBEC
POLICIES, PROGRAMS AND INTERVENTION PLANS**

Indicators proposed with regard to Québec policies, programs and intervention plans

INDICATOR	Policies, programs and plans	Internet sites
1 Healthy life expectancy at birth	Public Health Act, <i>Programme national de santé publique</i>	http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=/S_2_2/S2_2_A.html http://publications.msss.gouv.qc.ca/acrobat/f/documentation/2003/03-216-02A.pdf
2 Premature mortality	Public Health Act, <i>Programme national de santé publique</i>	http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=2&file=/S_2_2/S2_2_A.html http://publications.msss.gouv.qc.ca/acrobat/f/documentation/2003/03-216-02A.pdf
3 Mortality by suicide	Centre de prévention du suicide de Québec (suicide prevention centre). <i>Plan d'action en santé mentale</i> , MSSS, 2005	http://www.agps.info/ http://www.cpsquebec.ca/comment-aider/ http://publications.msss.gouv.qc.ca/acrobat/f/documentation/2005/05-914-01.pdf
4 Mortality by road accident	<i>Politique de sécurité en transport</i> , Ministère des transports, SAAQ	http://www.mtg.gouv.qc.ca/portal/page/portal/grand_public/vehicules_promenade/securete_routiere/politique_securete_transport#cadreinter http://www.saaq.gouv.qc.ca/en/road_safety/behaviour/index.php
5 Severe trauma among youth	Trousse de prévention des traumatismes à domicile survenant à de jeunes (child home injury prevention kit)	http://wpp01.msss.gouv.qc.ca/appl/c25/C25resultats.asp?ref=PSSP-976&nb=999&aff=D
6 Prevalence of diabetes	Politique ministérielle en nutrition (departmental policy on nutrition), MSSS (under review)	http://publications.msss.gouv.qc.ca/acrobat/f/documentation/2008/08-208-01.pdf http://www.diabete.qc.ca/html/le_diabete/prvenir.html
7 Lung cancer incidence	Plan de lutte au tabagisme (Anti-smoking plan)	http://www.msss.gouv.qc.ca/sujets/santepub/tabac/index.php?actions-gouvernementales-lutte-tabagisme-en
8 Preterm birth	<i>Politique de périnatalité</i> (Perinatal policy) (SIPPE program)	http://publications.msss.gouv.qc.ca/acrobat/f/documentation/2008/08-918-01.pdf
9 Adolescent fertility	<i>Politique de périnatalité</i> (Perinatal policy) (SIPPE program)	http://publications.msss.gouv.qc.ca/acrobat/f/documentation/2008/08-918-01.pdf
10 In care of child protection	Child protection centres, CSSS services	http://www.acjq.ca/ http://www.msss.gouv.qc.ca/en/sujets/problemes_sociaux/troubled_youth.php
11 Obesity	Politique ministérielle en nutrition (departmental policy on nutrition), MSSS (under review)	http://publications.msss.gouv.qc.ca/acrobat/f/documentation/2008/08-208-01.pdf
12 Food insecurity	Politique ministérielle en nutrition (departmental policy on nutrition), MSSS (under review)	http://publications.msss.gouv.qc.ca/acrobat/f/documentation/2008/08-208-01.pdf

INDICATOR	Policies, programs and plans	Internet sites	
13 Smoking (regular smokers)	Plan de lutte au tabagisme (Anti-smoking plan)	http://www.msss.gouv.qc.ca/sujets/santepub/tabac/index.php?actions-gouvernementales-lutte-tabagisme-en	
14 Binge drinking	Alcohol problem prevention centres and programs	http://educalcool.qc.ca/en/	http://www.cqld.ca/ http://www.acrdq.qc.ca/
15 Poor housing conditions	Housing improvement assistance programs (SHQ)	http://www.habitation.gouv.qc.ca/english.html	
16 Affordable housing	Social, community and affordable housing assistance programs (SHQ)	http://www.habitation.gouv.qc.ca/english.html	
17 Residential mobility	Social, community and affordable housing assistance programs (SHQ)	http://www.habitation.gouv.qc.ca/english.html	
18 Young people without certificate or diploma	Anti-dropout program	http://www.jeunes.gouv.qc.ca/strategie/defi-education-emploi/decrochage-scolaire.asp	http://www.fondationlds.qc.ca/fondation.htm

ANNEX 5
INDICATORS PROPOSED AND QUÉBEC MONITORING PLANS

Indicators proposed and Québec monitoring plans

INDICATOR	Plan	Object, measure or indicator	Line
1 Healthy life expectancy at birth	PCS	Life expectancy:	40
	PCS	Proportion of population not perceiving themselves to be in good health	12
	PMSM-6	Life expectancy adjusted according to health status	5
2 Premature mortality	PCS	Premature mortality	49
3 Mortality by suicide	PCS	Mortality rate by cause, suicide	177
	PMSM-3	Mortality rate by suicide	1
4 Mortality by road accident	PCS	Road accidents, mortality rate by cause	291
5 Severe trauma among youth	PCS	Injuries at home, unintentional falls, recreation or sports traumas	300-301-305-303-307-308
6 Prevalence of diabetes	PCS	Diabetes, prevalence of diabetes	233
	PMSM-1	Prevalence, incidence, measures of mortality, hospitalization and use of health services	
7 Lung incidence cancer	PCS	Tumours, rate of incidence by site and/or type of cancer	39
	PMSM-1	Cancer site, prevalence and survival	
8 Preterm birth	PCS	Prematurity, proportion of premature live births	122, 140
9 Adolescent fertility	PCS	Adolescent pregnancy, fertility rate	133
	PMSM-3	Adolescent pregnancy	
10 In care of child protection	PCS	Physical and psychological abuse, sexual assault and negligence with respect to children and adolescents, rate of incidence of new intakes under the <i>Youth Protection Act</i> .	160
11 Obesity	PCS	Body weight, proportion of population declaring themselves overweight	52
12 Food insecurity	PCS	Food insecurity, proportion of population living in food insecurity	103, 277
13 Smoking (regular smokers)	PCS	Smoking, proportion of current smokers	107 268
	PMSM-1	Proportion of current smokers (cross-referenced variable)	14
14 Binge drinking	PCS	Consumption of alcohol, proportion of population presenting with high consumption (5 glasses or more) of alcohol 12 times a year or more	112 170
15 Poor housing conditions	PCS	Quality of housing, proportion of private dwellings requiring major repairs	81
16 Affordable housing	PCS	Financial accessibility of housing, distribution of houses according to the proportion of income devoted to property expenses	106
17 Residential mobility	PCS	Population age 5 years and up having moved within the last 5 years	68
	PMSM-6	Residential mobility and socioeconomic characteristics	1
18 Young people without certificate or diploma	PCS	Education, proportion of the population without high school diplomas	83

PCS: *Plan commun de surveillance de l'état de santé de la population et de ses déterminants, 2004-2007*, MSSS, 2005.

PMSM-1: *Plan ministériel de surveillance multithématique*. Theme 1: Lifestyles, behaviours and chronic diseases, MSSS, 2008.

PMSM-3: *Plan ministériel de surveillance multithématique*. Theme 3: Social environment and mental and psychosocial health status, MSSS, 2008 PMSM-6: *Plan ministériel de surveillance multithématique*. Theme 6: Socio-economic determinants and overall health status, MSSS, 2008.



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