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DOES LIVING IN RURAL COMMUNITIES RATHER THAN CITIES REALLY MAKE A DIFFERENCE IN PEOPLE'S HEALTH AND WELLNESS?

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DOES LIVING IN RURAL COMMUNITIES RATHER THAN CITIES REALLY MAKE A DIFFERENCE IN PEOPLE'S HEALTH AND WELLNESS?

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SUMMARY

For a number of years now, the rural areas of industrialized countries have been going through a major crisis. They are experiencing a massive population exodus, primarily of young people, and are losing a considerable number of jobs, primarily to cities and major metropolitan areas. Some authors even go so far as to talk about the “slow death” of rural communities. Yet in Quebec and the rest of Canada, a significant portion of the population—roughly one in five persons—currently lives in rural communities. Under these circumstances, it seemed legitimate to ask: is living in rural communities rather than cities having an impact on the health and wellness of the rural population?

When we began to examine this question, the first thing we realized was that the knowledge developed thus far about the health and wellness of this population was too sparse and too out of date to provide a clear enough picture of the situation. The purpose of the present study has therefore been to describe and illustrate more completely and systematically the health of the people who live in the small, chiefly rural communities of Quebec, and the environment in which they live. This study also provided an opportunity not only to deepen but also to broaden our knowledge of rural communities in industrialized countries. Both here and in other countries, health and wellness issues are critical to any process for revitalizing rural areas, yet these issues have been far less thoroughly documented than others, particularly economic ones.

Our approach to this study was exploratory and descriptive. It consisted in compiling, integrating, and interpreting a variety of statistics from recent sources, including the 2001 Census of Canada, the 2000-2001 Canadian Community Health Survey, and Quebec's databases for its official records of births, hospitalizations, and deaths from 1998 to 2000. Using these sources, we calculated over 70 indicators for various aspects of health, including general health, specific health problems, determinants of health, and the use and organization of health care services.

What does “rural” mean?

For the present study, we began by using the main elements of Statistics Canada's Statistical Area Classification to divide all Quebec municipalities into two large geographic sets, which we refer to as “urban areas” and “rural area.” “Urban areas” consists of the sum of all Census Metropolitan Areas and Census Agglomerations (CMAs and CAs) in Quebec. “Rural areas” consists of the sum of all municipalities outside of CMAs and CAs, which by definition means municipalities with populations below 10,000. Next, we divided these rural areas into three categories of metropolitan influence zones (MIZs), according to the degree of influence that CMAs/CAs exert on employment in these communities. These categories are strong MIZs, moderate MIZs, and weak or no MIZs, respectively, proceeding outward from the immediate periphery of urban areas and agglomerations out to the borders of Quebec. The value of this classification is that it lets us not only make comparisons between Quebec's urban and rural areas as a whole, but also to explore the diversity of conditions among rural areas.

Population patterns and socio-economic conditions

About 21% of all Quebeckers live in rural areas: 6% in strong MIZs, 11% in moderate MIZs, and 5% in weak or no MIZs. Demographically, rural areas as a whole lost nearly 1% of their population from 1996 to 2001, while urban areas' population grew by 2%. But this rural population loss was not shared evenly among all categories of MIZ. While strong MIZs, adjacent to large urban centres, saw their populations grow faster than urban areas' (up 2.3%), weak and no MIZs, the ones farthest from these centres, saw the greatest population loss (down 4.0%).

Employment conditions, incomes, and education levels are all far better in urban areas and generally deteriorate the farther one gets from the large centres. There is also more agriculture in rural areas closer to these centres. The farther one goes into the country, the more agriculture gradually gives way to forestry, mining, and fishing.

There are, however, more single-parent families and persons living alone in urban areas, though the proportion of such families and persons increases as one heads toward rural areas with weak or no metropolitan influence.

General health

Overall health indicators show few differences between rural dwellers and city dwellers. Life expectancy at birth is less than one year lower in rural areas than in urban ones (78.8 years compared with 79.4). Among rural areas, this expectancy declines slightly as one moves from MIZs close to major centres (79.6 years) to those farthest away (77.9 years). The difference for health expectancy at birth (which combines mortality and disability) is not much greater. It is 70.5 years in rural areas and 72.0 years in urban areas. This indicator does not vary significantly among the three categories of MIZs.

This relative advantage for city dwellers disappears with age, however. Life expectancy at age 65 is 14.4 years in urban areas and 14.2 in rural areas. This indicator eliminates the effect of certain forms of mortality that strike the young, such as infant mortality, for which the rate is far higher in rural areas and rises steadily as one moves from strong MIZs to weak ones. The difference between MIZs closest to and farthest from major centres is over double.

Specific health problems

It is with regard to specific health problems that rural areas differ the most from urban ones. Rural areas as a whole experience distinctly higher mortality rates for stomach and lung cancers, as well as for obstructive pulmonary diseases, including bronchitis, emphysema, and asthma. (Among rural areas, moderate and weak or no MIZs tend to differ the most from urban areas as regards these causes of death.) Urban areas, meanwhile, show notably higher rates of mortality due to breast cancer and ischemic heart disease, such as myocardial infarctions. But of all causes of death, traumas are the ones for which the differences between urban and rural areas are greatest. Mortality due to motor vehicle traffic accidents is three times higher in the country than in the city, and the rate of death by suicide is also higher in the country. This higher rural mortality for both of these causes is observed in all three

types of MIZs. These two causes of death are also among those for which the mortality differences between the sexes are greatest, with women being better off (about 1 female death for every 2 male deaths in traffic accidents, and about 1 for every 4 by suicide). But while the mortality gap between the city and the country is seen among both men and women with regard to motor vehicle traffic accidents, the situation with regard to suicide is quite different: for this cause of death, the difference between rural and urban areas is significant among men only.

As regards health problems reported by the population, rural areas seem to be less affected by non-food allergies, asthma, and back pain. However, residents of MIZs closest to large centres report more cases of heart disease and diabetes.

Fertility

Rural and urban areas contrast sharply in their fertility patterns. Up to age 30, women's fertility is higher in rural areas. After age 30, it is far higher in urban areas. Fertility among teenage mothers is especially high in rural areas, particularly in weak or no MIZs, where close to 3% of teenage girls (2.7%) have babies (compared with 1.4% in urban areas). The proportion of low birth weight babies (< 2,500 grams) does not differ significantly between rural and urban areas.

Lifestyle behaviours

The picture with regard to lifestyle behaviours is mixed. While smoking rates are higher in rural areas, regular use of alcohol is more common in urban ones. Overweight and leisure-time sedentarity are more prevalent in rural areas. Lastly, food insecurity seems lower in the MIZs farthest from major centres than in other rural and urban areas.

Contacts with health professionals

In general, residents of rural communities are more likely to have a family physician than residents of cities are. However, rural residents are also less inclined to consult physicians (both general practitioners and specialists), and even less likely to use the services of dentists and orthodontists. For these latter professionals, the low tendency to consult grows steadily lower as one proceeds from strong MIZs to weak or no MIZs.

Hospitalization rates

The pattern for hospitalization is the opposite. Hospitalization rates are higher in rural areas, and especially in weak or no MIZs, where the hospitalization rates exceed those for urban areas by more than 40%. The length of hospital stays, however, is shorter in rural areas. Among rural areas, it is the MIZs closest to and farthest from urban centres that have the shortest hospital stays.

Preventive health services

Use of preventive health services, such as screening tests for cervical and prostate cancer, seems less common in rural areas, and this is especially so for the PSA blood test to detect prostate cancer. The percentage of people who have their blood pressure checked (a measure recommended to help prevent cardiovascular disease) does not vary between rural and urban areas.

Impact of health care services

But do these differences in the delivery of services and the availability of resources have an impact on the health of the population, in general? To examine this question, we considered two indicators: avoidable deaths and appropriate hospitalizations. "Avoidable deaths" comprises premature deaths (before age 65) due to certain causes (such as asthma, hypertension, and cervical cancer) for which there are appropriate medical treatments which, if applied in time, can reduce the number of such deaths. "Appropriate hospitalizations" consists of hospitalizations that are required to perform medical procedures that can significantly improve patients' quality of life (for example, angioplasty, coronary bypass, hip replacement, and cataract removal). For both of these indicators, we observed little or no difference between rural and urban areas.

The differences between these areas, as we have seen, lie chiefly in the organization of the health-care system, or certain aspects of it. This is confirmed by the variations in hospitalizations that are considered avoidable because they are associated with medical conditions that can be treated in primary-care settings such as medical and outpatient clinics. (Examples of such conditions include pneumonia, heart failure, hypertension, and diabetes.) Such avoidable hospitalizations are more common in rural areas, and this tendency increases systematically as one moves from the MIZs nearest major centres to those farthest away.

The bottom line: people in rural and urban areas are similar in their general state of health, but differ in their specific health problems.

Two major findings emerge from this study. Overall, in terms of general health, the situation of residents of Quebec's rural communities is comparable to that of Quebec's urban residents. Though Quebec's rural communities are clearly experiencing social and economic problems and certain deficiencies in the organization of their health-care institutions, these problems and deficiencies seem to be having very little impact on the general health of their populations. Moreover, rural residents' life expectancy and health expectancy at birth are just about the same as those of urban residents.

On the other hand, living in a rural community rather than a city really does make a difference in the nature of the health and wellness problems that people experience. Suicide (especially among men) and motor vehicle traffic accidents are problems of great concern in Quebec's rural communities. The same is true for infant mortality, which is much higher in rural areas that are not directly adjacent to major urban centres. Other causes of mortality, such as stomach and lung cancer, are also more prevalent in rural areas. It is also worth noting that rural residents are more likely to be overweight and have a greater tendency to be regular smokers.

On the positive side, rural residents seem less susceptible to ischemic heart disease and breast cancer. The tendency toward earlier childbearing among rural women might be a protective factor in the case of breast cancer. However, this tendency raises some concerns when it involves teenage mothers, and in this connection we must note the very high birth rate among teenage women in the MIZs farthest from major centres.

Quebec's urban and rural areas differ appreciably in the organization of their health care services. The main difference is the important role that hospitalization still plays in primary care in rural communities. Both the general hospitalization rate and the avoidable hospitalization rate are much higher in rural areas.

Our study does, however, highlight the importance of family physicians in the eyes of rural residents. These doctors often provide rural residents' first point of contact with the health care system and consequently represent the foundation of the organization of health care in rural communities. As recommended by the Commission on the Future of Health Care in Canada (the Romanow Commission), these family physicians in general practice should be called on to become specialists in rural medicine.

Important avenues for research and intervention

Lastly, this study provides some important avenues for research and intervention. First of all, it shows the value of public health research that not only distinguishes rural areas from urban areas but also recognizes the differences among rural areas. Our study revealed many significant differences from one type of rural area to another. Initiatives to improve rural health should therefore not be planned according to a "one size fits all" model, but rather tailored to the complexities of each situation.

In order to obtain a more complete picture of health and wellness in rural Quebec, some issues and problems not dealt with in this study should be investigated further. They include youth protection, crime, integration of older persons, the professional environment, and social networks. Further research should also be done on certain health issues that are of particular concern in rural areas, including lung disease, suicide, and motor vehicle traffic accidents.

Our results do identify several potential targets for intervention in rural areas. Programs to address specific causes of death, such as suicide and motor vehicle traffic accidents, and certain lifestyle problems such as smoking and leisure-time sedentarity, would be especially desirable. The availability of certain health care services, such as dentistry and orthodontia, should also be improved. Lastly, better follow-up with certain client groups, in particular pregnant women (especially pregnant teenagers) and psychologically vulnerable people, could alleviate certain health problems such as infant mortality and suicide.

But the fact remains that the health disparities between rural and urban areas have their roots in the social, economic, and demographic problems that rural areas are experiencing. The kinds of programs just mentioned are important, but the primary means of solving certain health problems must be to revitalize rural communities and improve the general conditions in which their people live.

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1 INTRODUCTION

1.1 PURPOSE OF THIS STUDY

According to the conventional wisdom, the health and wellness of rural residents is not as good as that of urban residents. But not everyone shares this view. In Quebec, the findings of earlier studies appeared to confirm it, but most of these studies are now relatively old. More importantly, they were not systematic, and they provided only a partial, imprecise picture of the health and wellness of a few specific parts of Quebec.

The purpose of the present study was therefore to describe and illustrate, more completely and systematically, the health and living conditions of Quebec's small, principally rural, communities. Our approach was essentially exploratory and descriptive. It consisted in compiling, integrating, and interpreting a variety of statistics from recent sources, including the 2001 Census of Canada, the 2000-2001 Canadian Community Health Survey, and Quebec's official records of births, hospitalizations, and deaths from 1998 to 2000. Also, in this study, to enable readers to explore variations in health among different types of rural areas in Quebec, as well as between the rural and urban areas of the province, we applied the new Metropolitan Influence Zones (MIZs) typology developed by Statistics Canada in 2000 (du Plessis et al., 2001).

This report also provides interested readers with a general review of the current state of knowledge concerning the health of rural populations in industrialized countries. In this regard, this report examines relevant context, social issues, access to care, health status, differences among rural areas, and international experiences. It is hoped that this review will provide food for thought and help to overcome both the excessively positive and the excessively negative perspectives on rural health that prevail in certain quarters.

This study thus provides an opportunity not only to deepen but also to broaden our knowledge of rural communities in industrialized countries. Its specific goal is to explore the health and wellness dimension of the population of Quebec's rural communities. This dimension is inextricably linked with the economic, social, cultural, and political dimensions, and it is just as indispensable as they are to any process aimed at the revitalization and sustainable development of these communities. Both here and elsewhere, the health and wellness aspect of rural communities, however vital it may be, is still far less well documented than other aspects. This study is therefore designed to partly fill this gap, as well as to stimulate Quebecers' interest in issues of rural health.

1.2 BACKGROUND AND ISSUES

In Quebec health care circles, the passage on July 25, 2002 of Bill 114, *An Act to Ensure the Continued Provision of Emergency Medical Service* (Gouvernement du Québec, 2002), elicited strong reactions. This law ordered designated general and emergency room physicians on regional health board lists to work in emergency departments where services had been or threatened to be suspended. This statute included several coercive administrative, civil, and criminal enforcement provisions. However, following vehement protests by physicians, this law ultimately had to be repealed at the end of the same year.

In passing this law, the government had one objective: to solve the problem that certain regions continue to experience with discontinuities and interruptions in the provision of emergency medical services, to which all Quebecers are entitled. This problem is attributable largely to the unequal distribution of medical human resources and the shortage of such resources in certain parts of the province, in particular small, chiefly rural communities and remote areas.

In the long run, this dysfunction in the provision of emergency medical services could harm the health of the people who live in these communities. Hence the Quebec government is not simply facing a problem in delivering medical services, but rather a broader problem: the health of people living in rural communities. This problem is not specific to Quebec. It is shared by other Canadian provinces and by most industrialized countries, because they have experienced the same two trends in their societies: massive urbanization throughout the 20th century, accompanied by an equally massive decline in rural communities. These trends have had a decisive impact on the situation that rural communities now face with respect to their health and their access to health care.

1.2.1 The decline of rural communities

In the late 19th century, the countries that are now described as “industrialized” began a major shift in their societies, one that continued and accelerated after the Second World War. Over this period, these societies, which were once predominantly rural and agrarian, gradually became predominantly urban and industrial, and then post-industrial. In Canada, the 1930s really marked the transition from the age of rural dominance to the age of rural decline (Troughton, 2002, p. 22).

This shift resulted in some profound changes in these societies. Quickly, cities and metropolitan areas became the “natural” setting for human life and the centre stage for economic, political, scientific, and cultural activity. Hence researchers, planners, and decision-makers devoted most of their attention to these beehives of activity. Conversely, as urban hegemony grew and asserted itself in all spheres of society, rural society began to collapse. As Troughton stresses, this massive urbanization is largely responsible for the decline of rural communities and the problems that they are now experiencing, including health problems:

Urban-driven change during the latter half of the twentieth century, especially its centralizing tendencies and pervasive influences, is largely the base of the current set of problems, including those of rural health. (Troughton, 2002, p. 22).

At first the decline of rural areas was demographic. The considerable increase in agricultural productivity forced many farm workers off the land and caused a massive exodus from rural areas. It was mainly the young who left for the cities in search of jobs and education. As a result, the population of rural areas became gradually but markedly older. Then the decline became economic, political, and cultural. The drop in population led directly to the closing of many service institutions, such as schools, banks, post offices, and hospitals, which were much more of a paying proposition in the cities. Likewise, certain transportation links deteriorated, while others simply shut down. The economic energy of these communities was sapped; the range of available occupations became narrower. A vicious cycle set in, driving both people and businesses away from these areas.

As urban areas became increasingly dominant, rural areas came to depend on them more and more, not only financially and politically, but also for professional expertise.

This process of decline in rural communities can be summed up as a combination of three interlinked phenomena: fragmentation, disaggregation, and marginalization. Fragmentation means the breakdown of the relatively homogeneous economic, social, and cultural environment that rural communities represented before they went into decline. This fragmentation has led to a great diversification of rural areas, so that some are now primarily agricultural, some industrial, some dedicated to tourism, and so on. Disaggregation refers chiefly to the loss of population, services, businesses, and jobs. Marginalization is a manifold phenomenon. It includes geographic isolation of rural communities (geographic marginalization), weakening of their economic role (economic marginalization), and their exclusion from political and decision-making processes (political marginalization).

Obviously, not all rural areas in all industrialized countries have been affected by this process in the same way or to the same extent. But variants of this vicious cycle have been reported and described in most industrialized countries, and in particular in Quebec and Canada (Hamel, 2000; McKie, 1992), the United States (Loue et al., 2001), and Australia (Humphreys et al., 2002; Cribb, 1994). Cribb provides a remarkably vivid description of this process of decline in the rural communities of Australia, through what he calls a domino effect of collapsing services (*ibid.*, p. 13):

Characteristically, the post office goes first, replaced by an agency. In any rural community the closure of the post office, not a greatly significant act itself, has come to symbolize doom. The rail line close as traffic dries up. The banks pull out as population and industry start to slide. Rail and telecommunications workers are relocated to larger centres. [...] The doctor retires or packs his bags. In small towns, the school is the next target: the classic mixed-age country classroom supervised by a single teacher is virtually extinct. Parents are forced to send their children to schools far away. The local garage, the machinery dealer, the car dealer and the repair shop all succumb. Outside interests buy the gracious old pub and run it on a shoestring while it moulders towards collapse. It is a dispiriting process experienced by several hundred formerly thriving Australian communities. (*Ibid.*, p. 13).

In Canada, where roughly one person in five lived in a rural area as of 2001 (du Plessis et al., 2001), the picture is scarcely any brighter. For the past several decades, small, essentially rural communities have been struggling with economic problems and losing their people as well as their jobs and services (Bollman, 1992). The situation is so bad that it recently made the cover of the Canadian edition of *Time* magazine, which referred to the “slow death” of Canada’s small towns (Catto, 2003). McKie paints a good picture of the hardships that residents of Canadian rural areas must endure, compared with their urban fellow citizens:

(...) Many services characteristic of urban life are not (or are no longer) delivered in rural areas. Information is less available. (...) Municipal services are also less available. These include responsive policing, the full range of emergency and chronic care medical services, the full range of consumer goods and services (which are more expensive and choice-constrained in rural areas), and the full range of educational services (such as specialist courses in electronics, data processing, and telecommunications technology). These tend to be unavailable in rural areas. Urban amenities such as neighbourhood swimming pools and tennis courts, and full service libraries are not generally available either. (McKie, 1992, pp. 428-429).

Though this brief sketch of the decline of rural communities in industrialized countries cannot be generalized, it does provides a better context for understanding current health issues among rural populations. Population ageing, economic difficulties, geographic isolation, and other factors all suggest that the rural communities of industrialized countries have special characteristics and special needs as regards their health, wellness, and access to health care.

1.2.2 Interest shown in the health of rural populations by the governments of Canada and Quebec

Differences in health, wellness and access to care between rural residents and urban residents are emerging more and more clearly, with the latter often having the advantage. To the extent that the industrialized countries are trying to guarantee all their citizens a certain degree of equity in health and health care, the health of people living in rural areas is thus a subject of major interest.

This interest has been reflected in Canada. The Commission on the Future of Health Care in Canada (the Romanow Commission) recognized that people living in Canada’s rural and remote communities are often disadvantaged in terms of health, access to health care, and access to health professionals. The Commission regards efforts to overcome these problems as one of Canada’s national health priorities (Health Canada, 2002).

Not all Canadian provinces are making equal efforts to address these problems. Some provinces, such as Ontario, with its Rural and Northern Health Care Framework (Ontario. Ministry of Health, 1997) and Saskatchewan, with its Saskatchewan Commission on Medicare (Saskatchewan. Saskatchewan Health, 2001) have shown a great interest in these problems and share a common view of the need for rural areas to build strong links with large urban centres.

Quebec has long taken an active interest in the health of its Aboriginal people. The reports of two Quebec commissions on health and social services (*Rapport de la Commission d'enquête sur les services de santé et les services sociaux*, Gouvernement du Québec et al., 1988, and *Rapport de la Commission d'étude sur les services de santé et les services sociaux*, Gouvernement du Québec et al., 2001) take particular note of the difficulties that Aboriginal communities in the Far North experience in accessing health care. The issues in such remote areas are, however, somewhat different from those in other rural areas.

These two reports, as well as the Quebec health and social services ministry's statement of Quebec's public-health priorities for 1997-2002 (*Priorités nationales de santé publique 1997-2002*, Gouvernement du Québec, MSSS, 1997) and the same ministry's strategic plan for 2001-2004 (*Plan stratégique 2001-2004 du ministère de la Santé et des Services sociaux*, Gouvernement du Québec, MSSS, 2001), remain fairly evasive about the more specific issue of the health of people living in rural communities.

Yet the Quebec government is not insensitive to the health of rural residents. In 2001, it adopted its *Politique nationale de la ruralité* [Quebec policy on rural communities] which states that:

[translation] "The Government of Quebec and its partners officially recognize the importance of Quebec's rural communities and hereby make a joint commitment to work for their renewal, prosperity, and survival."
(*Gouvernement du Québec, ministère des Régions*, 2001, p. VIII).

In its discussion of its goal of "[translation] ensuring the quality of life in rural communities and making them more attractive" (*ibid.*, p. 41), this policy states that:

"[translation] The health and social services ministry will take the specific needs of rural areas into account in its objectives, policies, and programs, in its planning, and in the organization of services throughout Quebec."
(*ibid.*, p. 45).

Quebec's health and social services ministry has also issued a number of directives to define the objectives of its policies and programs that affect rural areas. Bill 114, passed in July 2002 and cited as an example earlier in this report, was certainly a result of these directives, one of which states that the ministry plans:

"[translation] – to ensure that pre-hospital emergency services are adequately deployed in rural areas and to enter into agreements with municipal associations to make first-response services available." (*ibid.*, p. 45).

Thus, the Quebec government's interest in the health of its rural population is recent but definitely present in the objectives of its health policies and programs. This interest in rural health is clearly part of the Quebec government's broader, multifaceted efforts to revitalize rural communities.

1.3 SPECIFIC ISSUES OF HEALTH, WELLNESS, AND ACCESS TO HEALTH CARE IN RURAL PARTS OF INDUSTRIALIZED COUNTRIES

1.3.1 Difficulties in accessing health care services

Rural communities in industrialized countries today face two major problems with regard to health care services, about which there is a broad international consensus. First, these areas experience difficulties in accessing even the most rudimentary health and social services. Second, all these areas have trouble in attracting and retaining medical staff. These two closely related problems create a situation that is sometimes harmful to the health of these communities.

Many studies from various countries have reported the problems that rural residents experience in accessing health care and the negative consequences that these problems have for their health. These problems affect all or almost all areas of health and medicine. Rural communities are widely acknowledged to have inadequate access to: various techniques for diagnosing cancer (Monroe et al., 1992; Howe et al., 1995; Zhang et al., 2000; Hawley et al., 2001) and for treating it (Jack et al., 2003); oral and dental health professionals (Vargas et al., 2002, 2003a, 2003b; Westover, 1999; Pacza et al., 2001; Steele et al., 2000); ophthalmologists (Madden et al., 2002); prenatal and perinatal medical care (Nesbitt et al., 1989; Loda et al., 1997); nursing homes (Coburn et al., 2003); and psychiatrists (Clayer et al., 1995).

But not all residents of rural areas suffer a disadvantage in access to health care services. In some cases there are few differences between rural and urban dwellers (Gillanders and Buss, 1993).

1.3.2 Obstacles to accessing health care services

Rural communities face several generally recognized obstacles to accessing health care. Geographic distance, first of all, can pose a considerable barrier (Fearn, 1987; Coward and Cutler, 1989). In general, the farther people live from a hospital, the less they are hospitalized (Fearn, 1987). Travelling several dozen or even several hundred kilometres to receive care takes effort and entails costs—not just the money it costs to travel, but also costs measured in lost time, lost earnings, social isolation, and the risks of travel itself. Such effort and costs are often hard to sustain, not only for the patients themselves, but also for those around them. This effort can be made substantially more strenuous by the physical environment which, in rural areas, often places more restrictions on travel (Ramp et al., 1999; Rickets, 1999; Wakerman, 1999).

Lack of financial resources can also obstruct access to health care (Aday et al., 2001). In Canada, even though people benefit from a universal health care system, financial resources can still play a decisive role in access to care when patients must travel extensively to obtain it. As the report of the Commission on the Future of Health Care in Canada (the Romanow Commission) states:

People in rural communities also have the added burden of paying for the high costs of travel in order to access the care they need. This often means days or weeks away from family and social support as well as the added cost of accommodation and meals. (Health Canada, 2002, p. 162).

Education and familiarity with the health care system also play a significant role in access to care. To be accessible, health and social services must be visible to the community. Most of the time, government agencies, educational institutions, and the media provide this necessary visibility. But because such information outlets are often inadequate or even non-existent in rural communities, the message has a harder time getting out, which can represent a further obstacle to accessing health care services (McKie, 1992; Ramp et al., 1999).

Rural residents' difficulties in accessing health care can also have a cultural component. Some rural residents have a certain distrust of cities and the people who live there. This distrust and the feeling of abandonment have only been aggravated as rural communities have lost their services to urban areas, where the decisions to restructure services by centralizing them have been made unilaterally (Bryant, 1999).

"Culture shock" is an especially important factor in rural Aboriginal communities. Members of these communities have very specific cultural traits that are generally quite different from those of the care providers. In such cases, medical practices must be harmonized with these people's beliefs, their way of life, and the way that they perceive or conceive of medicine (MacLeod et al., 1998; Ramp et al. 1999; Health Canada, 2002). This problem mainly affects countries such as Canada, Australia, and the United States.

But the largest obstacle to health care access in rural communities remains the lack of medical staff: physicians in general practice, emergency room physicians, other specialist physicians, and nurses. This shortage of medical professionals is due largely to the difficulties that rural communities experience in attracting and retaining them (Bushy, 2002; Health Canada, 2002; Pollet and Harris, 2002). But it can also be attributed in no small part to the steps that certain governments, including some in Canada, have taken to reorganize health care by closing small hospitals in rural areas, imposing quotas that restrict the number of professionals who can be trained, and so on (James, 2001; Pollet and Harris, 2002).

In addition to restrictive, centralizing government measures, several other factors work against rural areas and interfere with their recruitment and long-term retention of medical professionals. For example, professionals in rural settings must often practice under conditions where technical resources and technologies are older and more limited and where medical support staff is very limited, if not non-existent. Rural practice also means more travelling for medical professionals, who ultimately must carry a heavier workload (MacLeod et al., 1998; MacLeod 1999).

Physicians and nurses in rural areas also suffer from professional isolation, lack of recognition, and prejudices. For instance, they get less chance to consult colleagues about treatment methods, diagnoses, and so on. Hence they feel a greater sense of responsibility, but also experience correspondingly greater psychological stress. Nurses are especially sensitive to this problem, because they are the front-line care providers in those communities where, even in the best case, a physician is present only occasionally (Bushy, 2002; MacLeod 1999). Aggravating this situation is the lack of recognition from colleagues practicing in urban areas, who often see rural practice as tantamount to professional failure. Such prejudices have been reported frequently, even in the institutions where medicine is taught. For example, the best medical students are rarely encouraged to become country doctors. Instead, they are often groomed for careers as great surgeons at major metropolitan hospitals.

Social and geographic proximity to patients and lack of anonymity also make rural practice more complicated. For example, patients may feel embarrassed, especially if their health problems are due to “deviant” behaviours, and hence be more reluctant to consult their doctors, which in the long run can seriously compromise their health. Medical professionals themselves may experience this lack of anonymity as somewhat oppressive socially, psychologically, and emotionally (MacLeod, 1999; Bushy, 2002).

This proximity with the residents of their communities also imposes responsibilities on physicians and nurses beyond those inherent in their professions. It is not at all rare for members of rural communities to see their medical professionals as sources of knowledge and wisdom incarnate. Rural residents sometimes expect doctors and nurses to act as consultants, mediators, leaders, and so on—roles to which they do not necessarily aspire (Farmer et al., 2003).

Lastly, several other factors in the economic, social, and cultural environment of rural communities have been reported as posing obstacles to attracting and retaining medical professionals. These factors include lack of job opportunities for spouses, lack of nearby services such as schools and daycares, and lack of recreational facilities, all of which can make medical professionals reluctant to move to rural areas, especially for the long term (Farmer et al., 2003; Hays, 1999).

Whatever their cause, these difficulties in attracting and retaining medical professionals pose serious problems for rural communities in industrialized countries. By limiting access to health services in these communities, these difficulties can contribute to a situation that is detrimental to their residents' health.

1.3.3 Health and wellness of rural populations

Among industrialized countries, there is far less unanimity about the actual health and wellness of rural populations than about their access to health and social services. From a review of the international literature on the health and wellness of populations in rural settings, two different pictures emerge.

The first picture portrays rural populations as being in trouble and having poorer health and less wellness than city dwellers. This is the picture one generally finds in the North American and Australian literature. The second picture is quite the opposite. It portrays rural people as having a relative advantage and generally enjoying better health and wellness than their urban counterparts. This “popular belief” is especially prevalent in the United Kingdom but is also fairly widespread in other European countries, such as Denmark, the Netherlands, and France. Ultimately, as we shall see, the situation is not so clear-cut or black and white. For a given health indicator, some countries will find that rural residents are worse off than urban ones, while other countries will find the opposite. Sometimes, the results of various studies within a single country will point to different or even contradictory conclusions.

The following review of the literature is not exhaustive—far from it. There have been many, many studies on health and wellness disparities between rural and urban settings. Indeed, the purpose of this review is to show, through the primary indicators of health and wellness, that there is no single pattern that applies generally to all industrialized countries.

The studies on mortality from all causes combined provide a good first example of the variety of perspectives and findings concerning the health of rural populations. For example, several studies have found higher mortality rates in rural areas of the United States (Miller et al., 1987, 1994) and Australia (Mathers, 1995). But other U.S. studies have shown that among older people, mortality seems to be much lower in rural areas (Smith et al., 1995; Hayward et al., 1997). Other studies seem to indicate that in the United States, the risks of mortality are higher in urban areas among men, but not among women (House et al., 2000). In the United Kingdom, on the other hand, mortality from all causes combined is generally lower among rural populations (Phillimore and Reading, 1992; Charlton, 1996).

Comparisons of rural and urban areas with regard to cardiovascular disease do not produce any clearer a picture. In the United States, rural populations seem to be more prone to such disease (Miller et al., 1987), especially women (McCarty et al., 2002) and particularly women of colour (Taylor et al., 2002). In some parts of Italy (Barbagallo et al., 2001) and Spain (Subirats i Bayego et al., 1997), rural residents also appear more likely to suffer from cardiovascular disease. But in England and Wales, the standardized mortality rates for cardiovascular disease are lowest in rural settings and in the most socially and economically advantaged areas, and highest in urban, port, and industrial areas (Charlton, 1996).

Cancer patterns also clearly illustrate the complexity of the observed health differences between rural and urban communities. Geographic patterns of cancer incidence and mortality vary greatly with age, sex, and cancer site, sometimes to the advantage of rural communities, other times to their detriment. Doll's study (1991) showed that among 13 populations studied in 13 different industrialized countries, cancer incidence and mortality tended to be higher in urban areas for 23 of the 26 cancer sites considered. (Cancers of the lips and eyes seemed to be more common in rural areas, however.) Doll's findings have been corroborated by subsequent studies in France (Victoria et al., 1994), Denmark (Friis and Storm, 1993), the Netherlands (Schouten et al., 1996), England (Wake, 1993), and the United States (Risser, 1996). However, these studies also show that there are still substantial variations according to sex and cancer site.

Studies on rural and urban residents' perceptions of their own health and wellness also seem to have produced mixed results. Some studies have found that this perception varies mainly with people's age group. The youngest and oldest age groups in rural areas tend to perceive their health and wellness more negatively than those in urban areas (Eggebeen and Lichter, 1993; Manious and Kohrs, 1995). For middle-aged people, some studies find the opposite pattern (Eggebeen and Lichter, 1993), while others find no difference between rural and urban residents (Manious and Kohrs, 1995).

Although, as we have just seen, for many health and wellness indicators, it is hard to say whether rural or urban populations are better off, certain health problems are recognized as being more likely to affect people living in rural areas. These include mental health problems (Wagenfeld, 1990; Human and Wasen, 1991; Clayer et al., 1995; Johnsen et al., 1997; Hartley et al., 1999; Judd and Humphreys, 2001); mood disorders and anxiety (Diala and Muntaner, 2003); and suicides (Pesonen et al., 2001; Singh and Siahpush, 2002; Middleton et al., 2003), especially among youth (Low and Andrews, 1990; Dudley et al., 1997; Leenaars et al., 1998) and among Aboriginal people in Australia (Clayer and Czechowicz, 1991) and Canada (Regnier, 1994; Royal Commission on Aboriginal Peoples, 1995; Katt et al., 1998; Masecar, 1998). The same is true for vision problems (Madden et al., 2002), oral/dental health problems (Westover, 1999; Steele et al., 2000; Pacza et al., 2001; Vargus et al., 2002, 2003a,

2003b), and motor vehicle traffic accidents (Thouez et al, 1991; Chen et al., 1995; LaValley et al., 2003) and the serious injuries that they cause (Stella et al., 2001).

As regards lifestyle factors, here again, behaviours that put health at risk are not necessarily more prevalent among rural residents. Sedentarity among adults (Parks et al., 2003) and more specifically among women (Wilcox et al., 2000), smoking among adolescents (Aloise-Young et al., 2002) and high-risk sexual behaviours (Thomas et al., 1996) are problems more frequently encountered in rural areas, in the United States in particular, in the southeastern part of that country. On the other hand, a survey in the United Kingdom showed that older people living in rural settings, even if they get less physical exercise, do eat more fruits and vegetables than those living in urban settings (Morgan et al., 2000).

Certain aspects of the environment in which rural people live and work are known for their harmful effects on health. The activities associated with agriculture, fishing, mining, and logging, all very common occupations in rural communities, are very widely responsible, both directly and indirectly (through environmental contamination and degradation), for roadway accidents (Gerberich et al, 1996), many serious if not fatal injuries (Williams et al, 1997), various kinds of contamination (Vuitton, 2003), respiratory problems (Dolphin et al, 1993, 1998a, 1998b), and certain types of cancers (Blair et al, 1985; Doll, 1991).

Ultimately, it is hard to claim that the rural parts of industrialized countries constitute an environment that is harmful to the health of the people who live there. True, access to care is often deficient in rural communities, and this deficiency is recognized as having a determining effect on the incidence of certain health problems (oral/dental health problems, vision problems, late diagnosis of cancer, and so on). But despite the difficulties that rural people experience in accessing care, the state of their health does not seem to be systematically poorer than their urban counterparts'. This is because access to care and use of health care services are not the only determinants of health. The environment in which individuals live, and their social and economic characteristics, also play a major role in their health and wellness (Blane, 1999; Mustard et al, 1997; Marmot et al, 1999; Marmot and Wilkinson, 1999; Leclerc et al, 2000; Seeman and Crimmins, 2001).

That said, urban areas do not necessarily constitute a healthier environment. For example, atmospheric pollution, noise pollution, other miscellaneous nuisances, and crime are largely urban phenomena. In addition, severe material and social deprivation, which has a decisive impact on many health and wellness indicators, is observed chiefly in the cores of metropolitan areas and urban agglomerations (Townsend, 1987; Pampalon and Raymond, 2003). This last argument is often cited by British researchers to explain better health and wellness indicators among rural populations. But controversy surrounds this issue. Many studies in the United Kingdom have shown that the economic and social prosperity and well-being traditionally ascribed to rural parts of that country were only illusory, or rather only the result of methodological artifacts associated with the use of generic ecological substitutes, such as the deprivation indices developed by Townsend (1987) and Carstairs and Morris (1989) (Phillimore and Reading, 1992; Cox, 1998; Haynes and Gale, 2000; Martin et al, 2000).

Thus the demographic, social, and economic characteristics of rural and urban populations seem to be more responsible for differences in their health than the settings in which they live. This point has been brought home in many studies which found that controlling for age, sex, and/or most social and economic characteristics considerably reduced, if it did not eliminate, the gap between rural residents

and urban residents with regard to the health indicator concerned (Miller et al, 1987; Phillimore and Reading, 1992; Senior et al, 2000).

1.3.4 Research on the health of rural populations in Quebec

The health and wellness of Quebec's population has been the subject of a number of geographic analyses over the past 30 years. Regional variations in mortality and other health, wellness and lifestyle indicators have been found within the province (Bernard et al, 1975; Loslier, 1976, 1977, 1979; Wilkins, 1980; Pampalon, 1985, 1986). Since the mid-1980s, efforts have also been made, in particular through the surveys conducted by *Santé Québec* (Quebec's health and social services ministry), to explore health throughout the province in a more systematic fashion. These efforts have made it possible to produce a "health portrait" of Quebec that identifies and characterizes regions that are homogeneous in terms of health, wellness, and living environment (Pampalon, 1985, 1986, Pampalon et al, 1995). Some of these regions include Quebec's rural areas (Pampalon, 1991).

Overall, however, these geographic studies of health in Quebec have accorded less importance to rural areas than to cities. There have been several studies on variations in health and lifestyle indicators among Quebec's main urban areas (Côté and Barriault, 1987; Pampalon, 1985, 1986; Loslier, 1979) and even among different parts of metropolitan Quebec City (Lacroix-Dubé and Youde, 1981; Loslier, 1977; Ferland, 2000; Ferland *et coll.*, 2000; Pageau et al, 2001; Legault and Mercier *et coll.*, 2003) and metropolitan Montreal (Loslier, 1976; Wilkins, 1980; O'Loughlin et al, 1987; Choinière, 1993). In contrast, there have been very few studies of Quebec's rural areas. Many of those studies that do exist are now fairly old, and they are generally fairly sketchy, isolated, and non-systematic.

In a review of the Quebec literature, Pampalon (1994) summarizes the general health situation in Quebec's rural areas as follows: "[translation] The city and the country scarcely differ in their overall health indicators, though the global health index from the *Santé Québec* survey does slightly favour the country. The basic difference between these two settings is in the kinds of health problems that people experience. People in the cities are more vulnerable to chronic illnesses (heart disease and cancer), pneumonia, cirrhosis, and homicide, while people in the country are more susceptible to traumas, bronchitis, asthma and emphysema, infectious diseases, hypertensive illnesses, and a particular form of cancer (stomach cancer) ... Among rural areas, the health differences between inhabitants of the St Lawrence valley and of more remote regions are not negligible, though they are scarcely reflected in the life-expectancy statistics. The overall health of residents of remote areas of Quebec is markedly inferior to that of their fellow citizens in the St Lawrence valley. People in these remote areas are also especially susceptible to osteoarticular diseases and experience twice as many disabilities as their fellow citizens."

It has also been reported that the most serious motor vehicle traffic accidents in Quebec occurred in rural areas (Thouez et al, 1991). Another study has also revealed that drunken driving represents a major problem among young people in rural areas, even if only because of the absence of alternative means of transportation (Audet et al, 1995).

There have also been a few studies on environmental and occupational risks in rural Quebec. For instance, one study found higher relative risks of cancer among rural populations, associated with the use of several pesticides (Godon et al., 1989a; Godon et al, 1989b). Intensive vegetable farming, which uses the most pesticides, is also suspected of playing a role in Parkinson's disease (Barbeau et

al, 1987). One study has also reported abnormally high rates of fairly rare cancers (peritoneal, pleural, tongue, and lip) in asbestos-mining regions (Graham et al 1977). Lastly, heating with wood stoves, which is fairly common in rural areas, has been shown to be a very important risk factor in the etiology of nasal polyposis (Kim and Hanley, 2002).

The issue of accessibility of health care services has also been documented by Thouez et al (1988), who developed methods for estimating such accessibility for rural areas of Quebec. Another, more recent study about health care in Quebec showed that general and specialist physicians practicing in rural areas were less inclined to prescribe new medications (Tamblyn et al, 2003). Lastly, another study emphasized the importance of computer technologies for improving preventive medicine in rural areas (Hogg, 1990).

In the present study, as noted at the start of this report, we take a very general approach to health in rural Quebec. We thus revisit the picture provided by Pampalon (1994) and explore a great many sources of data, introducing new indicators and applying a new classification of rural areas developed by Statistics Canada for the 2001 Census.

Any study about rural areas must begin with a definition of what is meant by “rural.” Hence Part 2 of this report reviews the definitions most commonly found in the scientific literature, then presents the operational definition of this concept that we have used in this study. This definition lets us explore variations in health among different areas of rural Quebec as well as in comparison with the urban parts of the province.

In Part 3 of this report, we define the spatial grid that we used for our analysis, the indicators that we chose for it, and the methods that we used to calculate them. Our analysis was designed to highlight differences in health both between Quebec's rural communities as a whole and its urban areas and among the various categories of rural areas examined in this study.

In Part 4 of this report, we discuss the results of our analysis, in light of the international literature and of earlier Quebec studies. We point out the similarities and the differences between the situation in Quebec and the situation observed elsewhere. We also discuss the limitations of this study, in particular as regards the definition of “rural” and the indicators that we have chosen.

In the concluding section of this report, we review the main results of our study and point out its implications both for future research on public health and for designing future public health and social services policies and programs.

2 DEFINITION OF RURAL COMMUNITIES

In any study on the health of rural populations, a key element, if not the most important one, is the definition of “rural.” Depending on what definition is used, the size and the demographic and socio-economic composition of the population studied will vary, as will the characteristics of its physical environment (du Plessis et al, 2001). Hence the scope, validity, and comparability of the study's results will all depend on how “rural” has been defined.

At first glance, the definition of “rural” may seem obvious, but only at first glance. A closer look reveals vast confusion between the perceptions and the realities of rural communities, which, to make matters more complex, vary in both time and space (Troughton, 1999). Even the scientific literature is replete with myths and romantic notions about rural life.

2.1 COMMON DEFINITIONS OF “RURAL”

Many different definitions of “rural” are in use now throughout the world and even within individual countries, and Canada is no exception (Bosak and Perlman, 1982; Ricketts and Johnson-Webb, 1997; Johnson-Weeb et al, 1997; Pitblado et al, 1999). Amidst this welter of definitions, many refer to no particular conceptual or methodological framework, or do so in only a limited way (Bosak and Perlman, 1982). The reason is that there is no unanimity about the concept of “rural” among researchers or even among planners and decision-makers (Johnson-Weeb et al, 1997). The debate always revolves around whether this concept refers to geographic considerations, or to social, cultural, or even economic ones (du Plessis et al, 2001).

In many cases, to get around the difficulties of defining “rural,” a negative definition of “urban” is developed instead, since this concept is easier to grasp. Thus, practically speaking, “rural” is often defined as anything that is not urban (Troughton, 1999).

Many criteria have been used to distinguish what is urban and hence what is rural. The ones most commonly used are population size, population density, distance from an urban centre (measured either in units of length or in travel time), spatial contiguity, economic activity, and proportion of residents commuting to work in an urban centre. In order to distinguish between urban and rural space, breakpoint values are specified. For example, depending on the criterion, a given geographic or administrative territorial unit may be regarded as rural if:

- it has a population of less than 1,000;
- it has a population density of less than 150 inhabitants per square kilometre;
- its distance from an urban centre exceeds 30 kilometres, or 30 minutes' travel by automobile;
- the proportion of its labour force working in the primary sector exceeds 50%;
- the proportion of its labour force that commutes to work in an urban centre every day is less than 50%.

However, these negative definitions of rural in relation to urban quickly prove unsatisfactory. They tend to dichotomize space into two monolithic entities, one urban, the other rural, while totally failing to reflect the wide range of subtle variations that may be seen among populations and communities as one moves from the business centre of a great metropolis outward to the remote hinterland. To compound this problem, urbanization has made the landscape more complex. The suburbs have spread so much that it is now hard to say where the urban space ends and the rural space begins. This fluid zone at the outskirts of urban agglomerations is sometimes referred to as “rurban space,” a mixture of rural and urban.

Under these circumstances, criteria such as distance, population, and population density become less useful for defining the boundaries between rural and urban areas, especially if these criteria are used alone. Moreover, some authors argue that the concept of “rural” also refers to social and cultural attributes that reflect, for example, a particular way of life (Halfacree, 1993; Shucksmith 1994), and that thus allow rural settings to be distinguished from urban ones. But while urbanization may not have affected all areas directly, urban culture and lifestyles have become widespread among people living in rural communities. These ideas, which are not necessarily representative of the current concept of “rural,” also have the drawback of being hard to apply in practice to develop a definition of this concept.

Thus there are many different ways to define the concept of “rural.” The best ones are those that impose fewer restrictions, combine several criteria, and preserve some fine gradations between the downtown core of a metropolis and the most remote outreaches of rural space. As some authors have pointed out, it may be neither desirable nor feasible to seek a universally acceptable definition of “rural” (Halfacree, 1993; Pitblado et al, 1999). What is essential is that the definition chosen be relevant to the issues at hand while also remaining applicable operationally (du Plessis et al, 2001).

2.2 DEFINITIONS OF “RURAL” IN CANADA AND QUEBEC

When du Plessis et al (2001) investigated the definitions of “rural” that could be applied for national-level policy analysis in Canada, they identified at least six different definitions of this kind. All these definitions offer the advantage of being based on geostatistical units established by Statistics Canada (except for the ones based on Canada Post's rural postal codes). They can therefore be linked with many databases and used to construct relative indexes or indicators for populations living in rural areas (Pitblado et al, 1999).

These various definitions employ many criteria to distinguish rural areas from urban ones. We have already mentioned most of these criteria, such as the population size and density of the geographic unit, the percentage of the labour force that commutes to work in an urban centre, and the distance to such a centre. The following are the six alternative definitions of “rural” presented in the analysis bulletin by du Plessis et al (2001):

- **Census rural** refers to individuals living in the countryside outside centres of 1,000 or more population;
- **Rural and small town** refers to individuals in towns or municipalities outside the commuting zone of larger urban centres (with 10,000 or more population). These individuals may be disaggregated into zones according to the degree of influence of a larger urban centre (called Census metropolitan area and Census agglomeration influenced zones (MIZ));
- **OECD (Organization of Economic Co-operation and Development) rural communities** refers to individuals in communities with less than 150 persons per square kilometre. This includes the individuals living in the countryside, towns and small cities (inside and outside the commuting zone of larger urban centres);
- **OECD predominantly rural regions** refers to individuals living in Census divisions with more than 50% of the population living in OECD rural communities. This includes all Census divisions without a major city;
- **Beale non-metropolitan regions** refers to individuals living outside metropolitan regions with urban centres of 50,000 or more population;
- **Rural postal codes** refers to individuals with a “0” as the second character in their postal code. These individuals live in areas where there are no letter carriers (i.e. residents go to a post office or corner postal box to pick-up their mail)” (*ibid.*, p. 6).

The definition adopted by Quebec's official statistics agency, the *Institut de la statistique du Québec* (ISQ), is the “Census rural” definition, which is based on population or population density breakpoints for Census enumeration areas. This definition does not distinguish gradations among rural areas. The OECD and Beale definitions do make some such distinctions, but both are based on Census divisions (CDs), large territorial units established by provincial statute and lying at a midpoint on the continuum between the province and the municipality. Because the objective of the present study is to observe specific health patterns in rural communities on a fairly fine scale, these two definitions would not be appropriate.

In this study, we have therefore opted for the “rural and small town” definition, which disaggregates rural space into several metropolitan influence zones (MIZs) and is based on the Census subdivision (CSD), which designates a municipality (du Plessis et al, 2001).

2.3 AN OPERATIONAL DEFINITION FOR THIS STUDY: METROPOLITAN INFLUENCE ZONES

The Metropolitan Influence Zones (MIZ) typology introduced by Statistics Canada in 2000 was the product of research going back almost a decade in that organization's Geography Division. The purpose of this research was to better differentiate the non-metropolitan areas of Canada (McNiven et al, 2000). Note that the meaning of the acronym “MIZ” was changed in the course of a consultation process; it now stands for “Census metropolitan and Census agglomeration influenced zones.” During this same process, the definition of MIZ was tested on several occasions and further refined.

Specifically, under this definition, rural areas and small towns that lie outside the commuter sheds¹ of Census Metropolitan Areas (CMAs) and Census Agglomerations (CAs) are classified into four types of zones:²

- strong MIZs;
- moderate MIZs;
- weak MIZs;
- no MIZs.

The degree of urban influence is determined essentially from the rate of commuting³ (travel between home and work) to large urban centres (CMAs or CAs). The distance to an urban centre has also been used as a second measure to refine and validate the classification of MIZs adopted by the researchers.

As McNiven et al (2000) and other authors (Morrill et al, 1995) have pointed out, commuting is certainly the concept that best reflects “economic and social integration between areas” and, consequently, “the relative influence of an urban centre on a rural area (or any related area)” (McNiven et al, 2000, p. 3). Indeed, commuters increasingly take advantage of their trips to work to make secondary trips for services such as daycare, shopping, and doctor visits (U.S. Department of Transportation, 1994).

Measuring the degree of urban influence on rural areas to identify differences among them is especially appropriate for the issues addressed in the present study (Government of Canada, 1998). The degree of urban influence on a community indirectly determines how readily it can access many services available in large urban centres, including health care services, and the accessibility of health care and social services is a determinant of the health of the community's population. In this study, we therefore considered it more relevant to differentiate rural areas according to their degree of urban influence rather than strictly according to the size or density of their populations.

Lastly, the MIZ definition is based on a territorial unit, the Census subdivision (CSD), that let us draw on many different databases and perform analyses on a fairly fine scale—that of the municipality or “community,” which is appropriate for studying many rural issues, including health, that are largely community-based (du Plessis et al, 2001).

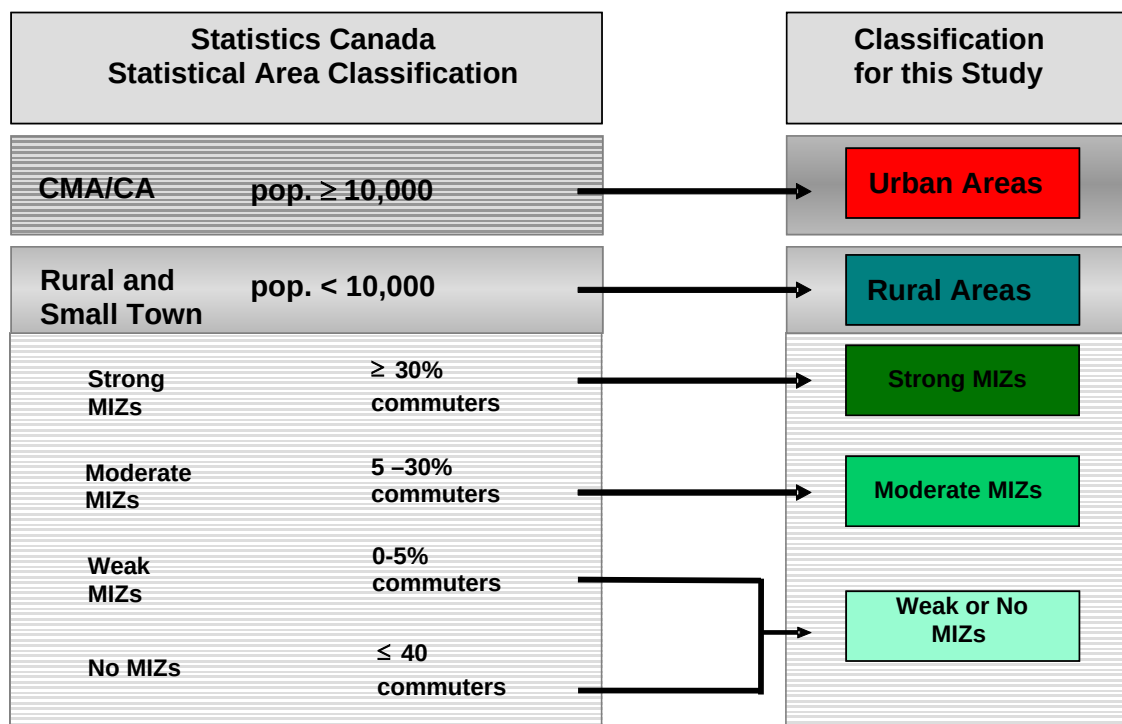
For this study, our operational definition of “rural” thus consisted of rural areas and small towns, classified into MIZs. We did, however, make one adjustment. For methodological reasons (basically to get larger population numbers and hence more robust statistics), we grouped weak MIZs and no MIZs into one category. Figure 1 shows how the classification of rural areas used in this study relates to Statistics Canada's “Rural and Small Town” definition. As can be seen in this figure, our classification places every rural area into one of three categories: strong MIZ, moderate MIZ, and weak or no MIZ.

¹ The commuter sheds of CMAs and CAs consist of neighbouring municipalities where 50% or more of the labour force commutes daily to the urban core of the CMA or CA (Statistics Canada, 1999).

² For details on the breakpoints (in percentage of commuters) that were used to perform this classification, see Figure 1.

³ The commuting rate is equal to the percentage of residents of the municipality who travel daily to work in a CMA or CA.

Figure 1: Relationship between Statistics Canada's "Rural and Small Town" definition and the classification used in this study



Source: McNiven et al, 2000.

3 METHODOLOGY

In this section, we present our spatial analysis grid, the indicators that we decided to use in this study, and some information about how we calculated them.

3.1 SPATIAL ANALYSIS GRID

In this study, our spatial analysis grid refers to two kinds of space: urban areas, composed of all Census Metropolitan Areas (CMAs) and Census Agglomerations (CAs) in Quebec; and rural areas, composed of all the rest of Quebec. Our basic territorial units are Census subdivisions (CSDs), which represent municipalities and equivalent entities such as Indian reserves. (Note that Indian reserves and the regions of Kativik and Terres-cries-de-la-Baie-James are sometimes excluded from certain databases that we used in this study.)⁴

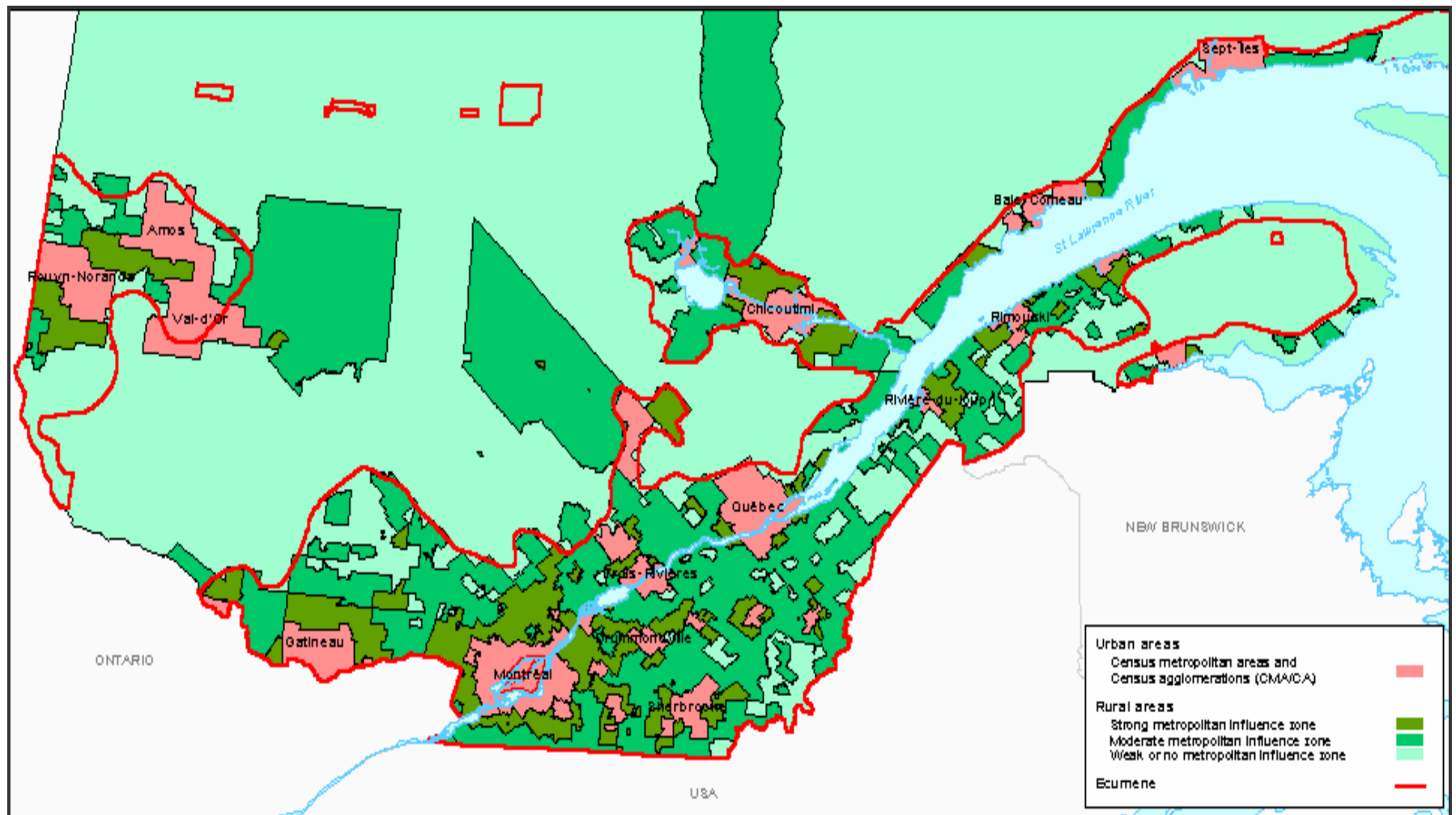
In this study, we have treated all urban areas of Quebec as a single entity, composed of all CSDs that lie in CMAs and CAs defined by Statistics Canada (Statistics Canada, 2003). The rural areas of Quebec, on the other hand, have been divided into three types of zones according to Statistics Canada's MIZ typology (McNiven et al, 2000), presented in the preceding section of this report. We have thus classified all Quebec CSDs outside of CMAs and CAs into weak or no MIZs, moderate MIZs, and strong MIZs, according to the criteria presented in Figure 1. Figure 2 shows the locations of Quebec's urban areas (CMAs/CAs) and of its rural areas classified by MIZ.⁵ Unsurprisingly, all of the CSDs subject to strong urban influence lie on the immediate periphery of CMAs/CAs. Most of the CSDs subject to moderate urban influence lie south of an imaginary line running from the Hull CMA to the Quebec City CMA, or along the St. Lawrence River as far east as Havre St. Pierre on the North Shore and St. Anne des Monts on the South Shore. There are also a few CSDs classified as belonging to moderate MIZs in the periphery of the CMAs/CAs of Chicoutimi-Jonquière, La-Tuque, Val-d'Or, Amos, and Rouyn-Noranda. Lastly, all the other CSDs in Quebec are classified as weak or no MIZs. They consist basically of the vast majority of the communities of northern Quebec (as far south as the imaginary line just mentioned) and the Gaspé Peninsula.

Using this classification, we calculated values for the various indicators that we had chosen to illustrate the distinctive health characteristics of Quebec's rural communities. We were thereby able to make comparisons not only between Quebec's urban areas and its rural areas, but also among the three categories of MIZ into which its rural areas had been divided.

⁴ These include the Census of Canada, as regards socio-economic data, and the Canadian Community Health Survey.

⁵ For 2001 population breakdowns into urban areas and MIZs for each of Quebec's health and social services administrative regions, see Appendix 1.

Figure 2: Location of urban areas (CMAs/CAs) and rural areas (MIZs), Quebec, 2001



Research and analysis unit, Quebec ministry of health and social services
November 2003

Source: Statistics Canada, 2001 Census. Compilation: Research and analysis unit.

3.2 DATA SOURCES

The present study uses over 70 indicators, chiefly from the following six sources of data:

- 2001 Census of Canada, Statistics Canada;
- 2000-2001 Canadian Community Health Survey (CCHS), Statistics Canada;
- Quebec death records database, 1998 to 2000, *Gouvernement du Québec*;
- Quebec birth records database, 1998 to 2000, *Gouvernement du Québec*;
- Quebec hospitalization records database. (Med-Écho), 1998-1999 to 2000-2001, *Gouvernement du Québec*;
- List of Quebec ministry of health and social services institutions, 2003, *Gouvernement du Québec*.

Using the data for Census subdivisions from these sources, we calculated the indicators for our chosen spatial grid: urban areas and rural areas, with the latter divided into three categories of MIZs. For two of these sources (Quebec's death records database and its birth records database for the year 2000), we had to assign a small number of events in proportion to those assigned in the preceding years among the MIZs, because of the municipal mergers that occurred in January 2001, for which the municipal codes had already been updated by the time we extracted the data (September 2003). Also, for two sources (the deaths and hospitalizations databases for all three years examined), we were unable to obtain the figures for deaths and hospitalizations of Quebecers that occurred outside of Quebec. These events have thus been slightly underestimated, but without affecting their distribution between urban and rural areas or their distribution by MIZ.

These data sources cover our entire target territory, except that some of them do not cover Indian reserves and the health and social services regions of Nunavik and Terres-cries-de-la-Baie-James. The same is true for the Census, as regards the socio-economic data, and the Canadian Community Health Survey, which does not cover these populations and includes only the population age 12 and over.

3.3 INDICATORS

To begin our analysis, we used the 2001 Census data to determine the **population** of Quebec's urban areas, rural areas, and MIZs, by age and sex. We also used the Census data to provide an overview of the **social and economic characteristics** of these areas and MIZs.

We used the Quebec government's death records database to estimate **life expectancy** at birth and at age 65, **total (all causes) mortality**, **infant mortality**, and **mortality by cause of death** (Appendix 2). We also singled out one particular form of mortality for special analysis: deaths that are considered **avoidable**, meaning premature deaths (before age 65) from a number of medical conditions for which effective treatments exist (Appendix 3). These conditions include asthma, hypertensive diseases, strokes, cervical cancer, and ischemic heart disease. High rates of avoidable mortality in a particular territorial unit may indicate deficiencies in the organization of the health care system in that unit (Holland et al 1997).

We used data from the Canadian Community Health Survey to illustrate people's **perception of their own health**, the prevalence of certain **diseases**, and the main **lifestyle behaviours**, which include smoking, drinking alcohol, and physical activity or sedentarity during leisure time; visits to

physicians, dentists, and other health professionals; and use of **preventive tests and examinations**, such as mammograms and Pap smears. We also combined the measure of disability from this survey with mortality to estimate people's **health expectancy**: how many years (starting at birth or at a specified age such as 65) people could expect to live without being limited in any significant way in their daily lives.

We used the Quebec government's hospitalization records database to determine the **rate of hospitalization** and the average duration of hospital stays. We also used this database to characterize the extent of **avoidable hospitalizations** and of **appropriate hospitalizations** for certain procedures (Pageau et al, 2001, p. 256 and 260). Avoidable hospitalizations are hospitalizations for a set of medical conditions that could be treated in a primary-care setting such as a doctor's office or an outpatient clinic. These conditions include pneumonia, diabetes, asthma, and heart failure (Appendix 4). A high rate of avoidable hospitalizations in a particular territorial unit may indicate problems with access to primary-care services in that unit. Appropriate hospitalizations, on the other hand, are hospitalizations that are required to perform medical procedures that can significantly enhance patients' quality of life. These include angioplasty, coronary bypass, hip replacement, and cataract removal (Appendix 5).

We used the Quebec government's birth records database to calculate the **total fertility rate** (average number of children per woman of childbearing age, i.e., 15 to 49), the **birth rate by mother's age** (in particular for teenage mothers, age 15 to 19); and the **percentage of low birth weight babies** (< 2,500 grams).

Lastly, we used the list of Quebec ministry of health and social services institutions and other data from this ministry to obtain information about the **public and private institutions, community agencies**, and **beds or places available** in health and social services institutions.

3.4 ADJUSTMENTS AND TESTS

Most of the indicators that we calculated in this study are rates or proportions. We adjusted these values for population age and sex to eliminate the effect of population structure on comparisons between urban and rural areas and among MIZs. We also adjusted all indicators calculated from the death records database, the Canadian Community Health Survey (CCHS), and the hospitalization records database (except for average duration of hospital stays) to factor out the differences by age and sex. To make these adjustments, we used the direct standardization method, taking as our reference the entire population of Quebec by age and sex, from the 2001 Census. For those rates and proportions that we calculated from CCHS, we also applied bootstrap weights supplied by Statistics Canada, to take the effect of the sample design into account. This weighting let us correct for the effects of the over- or under-representation of certain population groups and certain geographic areas in CCHS samples, as well as for the effects of dependencies among individuals in the sample.

Also, working with sample data (such as those from CCHS) rather than population data, or with data for a dynamic population in a finite time interval (such as the deaths, births, and hospitalizations data) can introduce a certain amount of error into the estimated rates and proportions. To address this issue, we performed tests for differences (assuming an approximately normal distribution for the estimated difference) with a significance level of 5%. Here is an example of how these tests worked. Let there be two areas *A* and *B*. The following formula is then used to test whether the proportion observed in area *A* is significantly different from that in area *B*:

$$Z = \frac{(\text{proportion for area } A - \text{proportion for area } B)}{\sqrt{(\text{variance of proportion for area } A + \text{variance of proportion for area } B)}}$$

For rates that referred to a dynamic population, we used the logarithmic transformation, which was necessary to satisfy the criteria for the normal approximation. The *Z* score then became:

$$Z = \frac{\ln(\text{rate for area } A) - \ln(\text{rate for area } B)}{\sqrt{\left(\frac{\text{Var}(\text{rate for area } A)}{(\text{rate for area } A)^2} + \frac{\text{Var}(\text{rate for area } B)}{(\text{rate for area } B)^2} \right)}}$$

When the *Z* scores are calculated using these equations, if the value of *Z* is greater than or equal to the critical value 1.96, then the value for region *A* is significantly higher than the value for region *B*, at the 5% significance level. Conversely, if the value of *Z* is less than -1.96, then the value for *A* is significantly lower than the value for *B*, at the 5% significance level. In both cases, setting a 5% significance level means accepting that there is (at most) a 1 in 20 chance that this observed difference does not really exist (that there is actually no difference between the regions for the rate or proportion concerned).

In this study, we performed these tests on the calculated differences: a) between all rural areas and all urban areas (between the sum of all MIZs and the sum of all CMAs and CAs), b) between each of the three categories of MIZs and all urban areas, and lastly, c) between each category of MIZs and all other rural areas (the two other categories combined).

3.5 PRESENTATION OF RESULTS

To present our results, we have classified our indicators so as to illustrate the following dimensions of health in Quebec's rural and urban communities: social and economic indicators, general health status, specific health problems, fertility and birth rates, contacts with health professionals, use of preventive tests and examinations, availability of health and social services system resources, and lastly, the overall impact that the health and social services system may be having on the health and wellness of the populations of the communities concerned.

We have presented some of our results in tables, some in figures, and some using both, when we wanted to illustrate a situation in more detail. In all cases we have specified the complete name of each variable and the associated unit of measurement. Our tables show the values for each indicator for all of the geographic entities considered, in the following order: all urban areas ("CMAs/CAs"), all rural

areas ("MIZs"), strong MIZs, moderate MIZs, weak or no MIZs, and, lastly, Quebec as a whole ("Total, Quebec"). The figures also show the values of the indicators for each of the geographic entities considered (except for Quebec as a whole), and sometimes express differences between rural and urban areas as a percentage.

The following conventions are used in these tables and figures.

Tables



= value significantly higher ($p < 0.05$) in all rural areas or in one category of MIZs than in all urban areas



= value significantly lower ($p < 0.05$) in all rural areas or in one category of MIZs than in all urban areas

+

= value significantly higher ($p < 0.05$) in one category of MIZs than in the two others making up all rural areas

-

= value significantly lower ($p < 0.05$) in one category of MIZs than in the two others making up all rural areas

Figures

★

= value significantly higher or lower ($p < 0.05$) in all rural areas or in one category of MIZs than in all urban areas

○

= value significantly higher or lower ($p < 0.05$) in one category of MIZ than in the two others making up all rural areas

Lastly, in analyzing our results, we emphasize those where the most significant differences were found. We thus try to highlight the most striking disparities between the health and wellness of Quebec's rural and urban communities.

4 RESULTS

4.1 RESULTS BY DIMENSIONS OF HEALTH AND WELLNESS

Both the health of Quebec's urban and rural populations and their use of health and social services are tied into the overall social, economic, and demographic characteristics of the communities in which they live. Hence to begin this presentation of our results, it is essential to provide an overview of these characteristics.

4.1.1 Social, economic, and demographic characteristics

As of 2001, Quebec's rural population (according to Statistics Canada's "rural and small town" definition) accounted for slightly more than 20% of its total population (Table 1). Since 1996, Quebec's rural population has shrunk by nearly 1%, while its urban population has grown by 2%. But the most striking differences in population growth were among the three categories of MIZs that make up Quebec's rural areas. While the population of strong MIZs (those closest to urban centres) grew by over 2%, the population of weak or no MIZs (those farthest from urban centres) shrank by 4%.

The population of Quebec's rural communities as a whole includes slightly more young people (below age 15) and old people (age 65 and over) than Quebec's urban areas. But the population in strong MIZs shows a different pattern, with the highest proportion of young people and the lowest proportion of old people of all the geographic entities considered. Among these entities, it is the moderate MIZs that have the oldest population structure in Quebec.

Employment, income, and education conditions are distinctly better in urban communities than in rural ones, and, in general, the farther away from urban centres, the worse these conditions become. As one would expect, the economies of rural areas are more resource-based than those of urban areas. Among rural areas, those closer to urban centres rely more on agriculture for employment; as one moves farther from these centres, mining, forestry, and fishing gradually replace agriculture.

Rural residents are more likely than city dwellers to own their own homes, though this pattern falls off the farther one goes into the country. The proportion of people living alone and the proportion of single-parent families are lower in rural areas, though both of these proportions tend to rise in more remote areas.

To sum up: though rural areas do differ from urban areas in their overall social, economic, and demographic characteristics, strong MIZs (rural areas adjacent to major urban centres) resemble urban areas far more closely in these respects, while differing greatly from those rural areas where urban influence is only moderate, or weak, or non-existent. Thus strong MIZs can be described as mixed communities characterized by typically rural economic activities (chiefly agriculture) and suburban-type populations (relatively young and affluent, and growing).

4.1.2 General health status

In their general health status, as measured by indicators such as life expectancy and health expectancy (which combines mortality and disability), Quebec's rural residents scarcely differ at all from their urban counterparts (Table 2). Urban dwellers have less than a 1 year advantage in life expectancy at birth, and less than a 1.5 year advantage in health expectancy at birth. The difference in rural and urban residents' perception of their own health is similarly small. Among rural areas, these indicators decline slightly as one moves from those MIZs adjacent to major centres to those farther away. The largest difference among these MIZs is for life expectancy at birth, and it totals 2 years.

Table 1: Some social and economic characteristics of urban and rural Quebec, 2001

Geographic entity Characteristic		All Urban Areas (CMAs/CAs) ¹	All Rural Areas (MIZs) ²	Strong MIZs	Moderate MIZs	Weak or no MIZs	Total, Quebec
Population	n	5,681,453	1,556,026	439,797	789,980	326,249	7,237,479
- growth (since 1996)	%	2.0	-0.8	2.3	-1.3	-4.0	1.4
- young (age < 15)	%	17.7	18.4	19.4	17.6	19.1	17.8
- old (age 65 and +)	%	13.0	14.0	12.1	15.4	13.3	13.3
Income ³	\$	51,576	43,902	47,404	42,012	43,880	50,013
Employment ⁴	%	60.1	54.4	58.0	54.2	49.9	58.9
Unemployment ⁵	%	7.7	10.3	8.2	9.9	14.6	8.2
Employment by sector ⁶							
- agriculture	%	0.5	6.2	6.3	7.0	3.8	1.7
- forestry, mining, fishing	%	0.2	2.2	0.9	2.0	4.8	0.6
Education ⁷							
- no diploma	%	30.0	43.5	39.3	44.5	46.8	32.8
Families (with children < age 15) ⁸	%	35.3	33.0	34.0	31.8	34.7	34.8
- single parent	%	20.0	15.1	13.5	15.5	16.4	18.9
People living alone ⁹	%	13.1	10.0	9.0	10.8	9.6	12.4
Housing ¹⁰							
- rented	%	46.6	24.5	19.2	25.3	29.7	42.1
- requiring major repairs	%	7.1	10.6	10.3	10.4	11.9	7.8

¹ Census metropolitan areas and Census agglomerations

² Metropolitan influence zones

³ Average annual private household income, year 2000, in \$

⁴ Persons with paid jobs, as a percentage of the total population age 15 and over

⁵ Unemployed persons, as a percentage of the total work force

⁶ Workers in the agriculture, forestry, mining, and fishing industries (excluding labourers), as a percentage of the total labour force

⁷ Persons with no degree, diploma, or certificate, as a percentage of the total population age 15 and over

⁸ Families with children below age 15 as a percentage of all families; single-parent families with children below age 15 as a percentage of all families with children below age 15

⁹ People living alone as a percentage of all people living in private households

¹⁰ Dwellings that are rented or that require major repairs, as a percentage of all private dwellings

Source: 2001 Census of Canada

In both life expectancy at birth and health expectancy at birth, however, the city dwellers' advantage over rural residents is larger among men than among women (Figure 3). The downward trend as one moves from strong to weak MIZs is seen in both sexes for life expectancy at birth, but not for health expectancy at birth. This is due to the absence of significant differences in disability rates among these rural areas, as can be seen in the disability data presented for the two sexes combined in Table 2. The urban residents' advantage disappears completely with age, however. For example, health expectancy at age 65 for both sexes combined is 14.4 years in urban areas and 14.2 in rural ones.

Both life expectancy at birth and health expectancy at birth are sensitive to another general indicator of a population's health: infant mortality, which is deemed to reflect both living conditions and the performance of the primary health-care system. Infant mortality is higher in rural areas and rises steadily and substantially as one proceeds from those closest to urban centres to those farthest away. It is more than twice as high in the latter as in the former.

4.1.3 Some specific health problems

A look at mortality rates by cause of death reveals some striking contrasts between urban and rural Quebec (Table 3). Rural areas show higher rates of death due to stomach cancer and cancers of the trachea, bronchi, and lungs, while women in rural areas seem less likely to die of breast cancer. When one compares rural areas, strong MIZs show lower mortality due to stomach cancer, while moderate MIZs show lower mortality due to cancers of the trachea, bronchi, and lungs.

Like mortality due to this last group of cancers, mortality due to obstructive pulmonary diseases (such as bronchitis, emphysema, and asthma) is higher in rural areas than in urban ones, but only in moderate and weak or no MIZs. Once again, among all rural areas, it is the strong MIZs, closest to major centres, that achieve the best scores.

Patterns of death from circulatory diseases show fewer contrasts between urban and rural residents. Mortality due to ischemic heart disease (such as myocardial infarctions), however, is lower both in rural areas as a whole and in each category of MIZ than it is in urban areas. The incidence of death from hypertensive disease is significantly higher in weak or no MIZs, while that of death due to stroke is appreciably lower in strong MIZs than in moderate MIZs.

Traumas are the category of causes of death for which the differences between urban and rural areas are greatest. Mortality due to motor vehicle traffic accidents is three times higher in the country than in the city, and suicides are also more common in the country. The higher mortality rates due to these two causes persist for all three categories of MIZ. These are also the causes of death for which the mortality differences between the sexes are greatest, with women having the advantage (about one woman dies in a traffic accident for every two men who do so, and one woman by suicide for every four men who do so). The differences between the city and the country for mortality due to motor vehicle traffic accidents persist when the figures are broken down by sex. But this is not so for death by suicide, where only the difference between urban men and rural men is significant (Figure 4).

Lastly, in terms of specific health problems reported by their populations, rural areas seem less subject to non-food allergies, asthma, and backaches (Table 4). However, residents of those rural areas closest to cities report more cases of heart disease and diabetes.

Table 2: Life expectancy at birth, health expectancy at birth, total mortality, infant mortality, disability, restrictions on activities of daily living, and negative perception of own health, urban areas and rural areas, Quebec, 1998-2001

Geographic entity Indicator		All Urban Areas (CMAs/CAs) ¹	All Rural Areas (MIZs) ²	Strong MIZs	Moderate MIZs	Weak or no MIZs	Total, Quebec
Life expectancy	yrs	79.4	78.8	79.6 +	78.7	77.9 -	79.2
Health expectancy ³	yrs	72.0	70.5	70.8	70.5	70.2	71.7
Total mortality ⁴	⁰ /10000	732	741	697 -	750	761 +	734
Infant mortality ⁵	⁰ /100	4.83	5.73	3.56 -	5.21	9.29 +	5.01
Disability ⁶	%	8.2	9.9	10.9	9.7	9.4	8.6
Restrictions on activities ⁷	%	7.2	7.9	7.5	8.1	8.0	7.3
Neg. perception own health ⁸	%	10.6	12.3	12.7	12.3	11.6	11.0

 = value significantly higher (p < 0.05) in all rural areas or in this category of MIZ than in all urban areas
 = value significantly lower (p < 0.05) in all rural areas or in this category of MIZ than in all urban areas
 + = value significantly higher (p < 0.05) in this category of MIZ than in the 2 others making up all rural areas
 - = value significantly lower (p < 0.05) in this category of MIZ than in the 2 others making up all rural areas

¹ Census metropolitan areas and Census agglomerations

² Metropolitan influence zones

³ Life expectancy without disability. The measure of disability is defined in note 6.

⁴ Average annual number of deaths per 100,000 population

⁵ Number of deaths before age 1 per 1,000 births

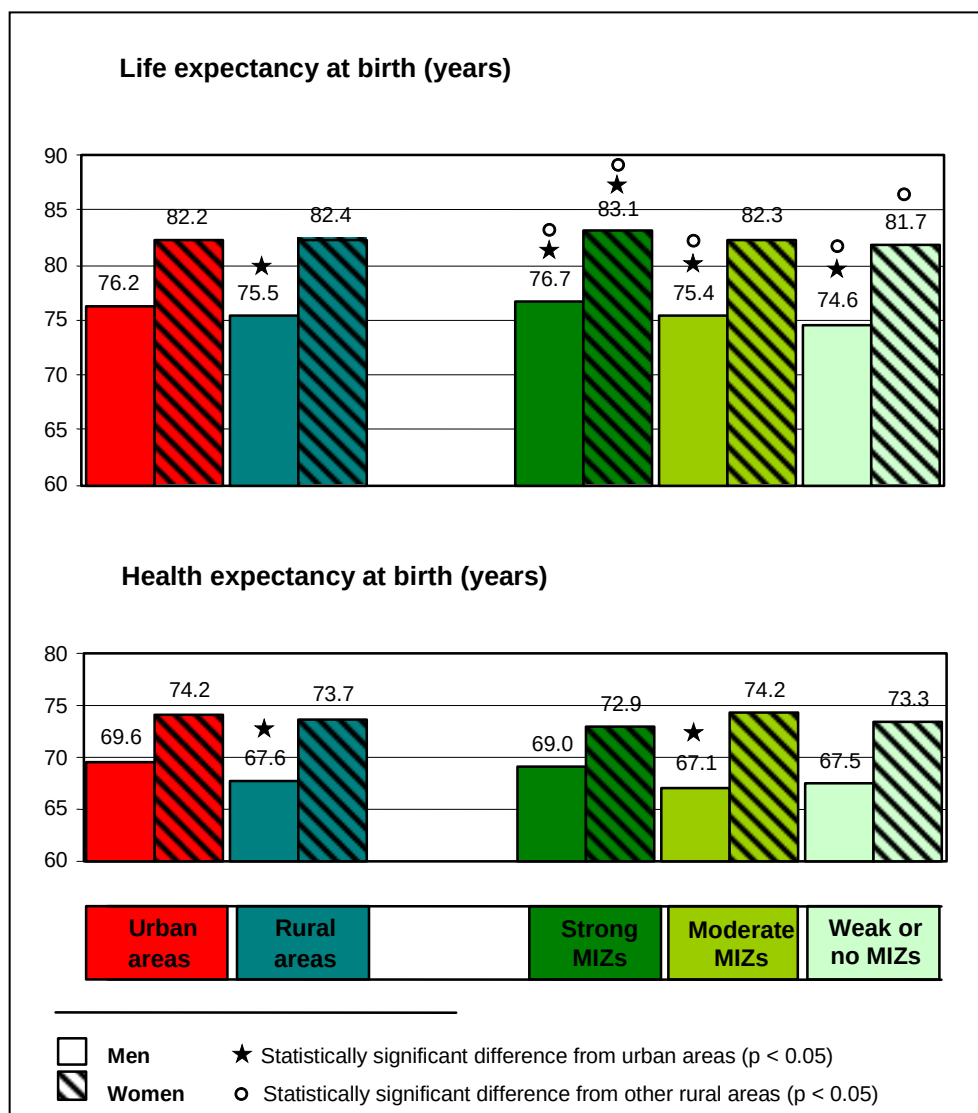
⁶ Percentage of people who often have difficulty in hearing, seeing, communicating, walking, climbing stairs, bending, learning, or doing any similar activities

⁷ Percentage of people who often have to reduce their activities at school, work, or home because of a physical or mental condition or a health problem

⁸ Percentage of people who consider their health fair or poor

Sources: Quebec birth and death record databases, 1998 to 2000; Canadian Community Health Survey, 2000-2001

Figure 3: Life expectancy at birth and health expectancy at birth, by sex, all urban areas, all rural areas, and MIZs, Quebec, 1998 to 2000



Sources: Quebec birth and death record databases, 1998 to 2000; Canadian Community Health Survey, 2000-2001

Table 3: Mortality¹ by cause of death, all urban areas, all rural areas, and MIZs, Quebec, 1998-2000

Geographic entity Cause of death	All Urban Areas (CMAs/CAs) ²	All Rural Areas (MIZs) ³	Strong MIZs	Moderate MIZs	Weak or no MIZs	Total, Quebec
Cancers						
Stomach	7.6	9.2	7.6 -	9.9	8.8	8.0
Colon and rectum	27.5	26.9	26.1	27.6	25.9	27.4
Trachea, bronchi, lungs	65.8	68.9	71.3	65.8 -	74.5 +	66.5
Breast	31.5	27.0	26.0	26.8	28.5	30.5
Prostate	29.4	29.8	27.3	30.8	31.5	29.7
Circulatory diseases						
Hypertensive disease	4.4	4.8	4.0	4.6	6.1 +	4.5
Ischemic heart disease	139.5	128.0	124.8	130.2	125.2	136.9
Stroke	42.6	42.8	37.2 -	45.3 +	41.1	42.6
Obstructive pulmonary diseases	38.3	42.7	37.4 -	44.3 +	44.0 +	39.3
Traumas						
Motor vehicle traffic accidents	4.6	12.7	11.0	13.8 +	12.3	6.3
Accidental falls	5.8	5.2	5.2	5.5	4.5	5.7
Suicide	12.7	16.8	16.5	16.8	17.3	13.5

-  = value significantly higher (p < 0.05) in all rural areas or in this category of MIZ than in all urban areas
 = value significantly lower (p < 0.05) in all rural areas or in this category of MIZ than in all urban areas
+ = value significantly higher (p < 0.05) in this category of MIZ than in the 2 others making up all rural areas
- = value significantly lower (p < 0.05) in this category of MIZ than in the 2 others making up all rural areas

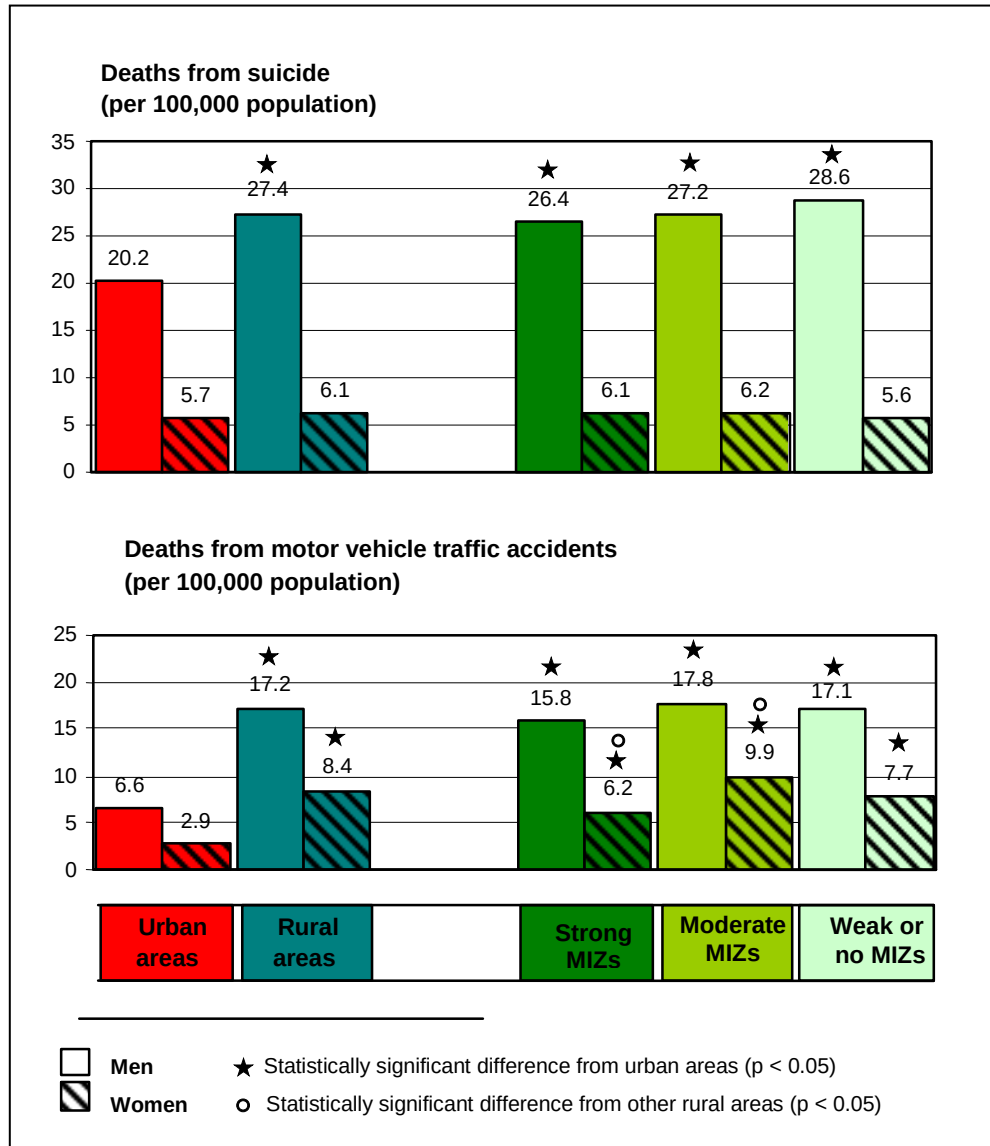
¹ Average annual number of deaths per 100,000 population

² Census metropolitan areas and Census agglomerations

³ Metropolitan influence zones

Sources: Quebec death records database, 1998 to 2000. *Perspectives démographiques, Service du développement de l'information*, MSSS, February 2001

Figure 4: Deaths from suicide and motor vehicle traffic accidents, men and women, all urban areas, all rural areas, and MIZs, Quebec, 1998 to 2000



Sources: Quebec death records database, 1998 to 2000. *Perspectives démographiques, Service du développement de l'information, MSSS, February 2001*

4.1.4 Fertility and birth rates

Fertility is higher in rural areas than in urban areas (Table 5), and women in rural areas have their babies far earlier (Figure 5). Before age 30, fertility of women in rural areas far surpasses that of urban women. After age 30, the situation reverses. Fertility among teenage women follows this same general pattern and shows some interesting variations from one MIZ category to another. Thus, teenage women in rural areas are more fertile than teenage women in cities, except in strong MIZs, the ones closest to major urban centres. It is in weak or no MIZs, farthest from major centres, that teenage women's fertility is highest; in these areas, nearly 3% of teenage women (2.7%) give birth to a child—twice as many as in urban areas. For the percentage of low birth weight babies, however, no significant differences between urban areas and rural areas were found.

4.1.5 Selected lifestyle behaviours

The percentage of regular smokers is higher in rural areas than in urban areas of Quebec, and the percentage of former regular smokers is just as much so, at least in certain MIZs (Table 6). People who live in the country are also far less physically active during their leisure time than people who live in the city. Hence it may be no surprise that being overweight is more common in rural areas.

In contrast, regular consumption of alcohol (at least once drink per month) is more common in cities, though it is also common in MIZs adjacent to major centres. In fact, it is in the MIZs farthest from these centres that alcohol consumption is lowest. As far as excessive alcohol consumption is concerned (at least five drinks on a single occasion, at least once per month), no significant variations were found between urban and rural areas or among MIZs.

The situation for food insecurity is slightly different. For this indicator, there is no major difference between urban and rural areas as a whole, but food insecurity is significantly lower in the MIZs farthest from major centres than in other rural areas. Lastly, no statistically significant variations were found from one kind of area to another in the percentage of mothers who breastfeed, though this figure does go down slightly as one moves from the MIZs closest to major centres to those farthest away.

4.1.6 Health care utilization

A higher percentage of rural residents than urban residents have their own family doctor (Table 7). On the other hand, rural residents consult medical doctors (including both general practitioners and specialists) less often than city dwellers do. Rural residents are also far less inclined to use the services of dentists and orthodontists, and their propensity to do so diminishes steadily as one moves farther out into the country. Nevertheless, the proportion of residents reporting unmet health care needs shows no significant differences between the city and the country or among the three categories of MIZ that make up Quebec's rural areas. The level of interest in alternative health care is also fairly uniform across all of these geographic areas in Quebec.

Table 4: Prevalence of selected health problems¹ reported by urban and rural residents, Quebec, 2000-2001

Geographic entity Problem	All Urban Areas (CMAs/CAs) ²	All Rural Areas (MIZs) ³	Strong MIZs	Moderate MIZs	Weak or no MIZs	Total, Quebec
	%	%	%	%	%	%
Food allergies	5.8	5.5	5.9	5.2	5.8	5.8
Other allergies	25.1	21.6	23.5	21.2	20.3	24.3
Asthma	8.9	7.7	7.1	7.8	7.9	8.6
Heart disease	5.1	5.7	6.5	5.2	5.8	5.3
Hypertension	12.6	12.6	12.1	12.6	13.3	12.6
Backache	13.7	12.4	13.1	11.9	12.5	13.5
Arthritis or rheumatism	11.3	11.9	12.3	11.3	12.6	11.4
Diabetes	4.0	4.4	5.4 +	3.9 -	4.6	4.1
Migraine	7.5	7.0	6.9	7.3	6.6	7.4

 = value significantly higher ($p < 0.05$) in all rural areas or in this category of MIZ than in all urban areas
 = value significantly lower ($p < 0.05$) in all rural areas or in this category of MIZ than in all urban areas
 + = value significantly higher ($p < 0.05$) in this category of MIZ than in the 2 others making up all rural areas
 - = value significantly lower ($p < 0.05$) in this category of MIZ than in the 2 others making up all rural areas

¹ Number of persons reporting this problem per 100 persons

² Census metropolitan areas and Census agglomerations

³ Metropolitan influence zones

Source: Canadian Community Health Survey, 2000-2001

Table 5: Total fertility rate, births to teenage mothers, and percentage of low birth weight babies, all urban areas, all rural areas, and MIZs, Quebec, 2000-2001

Geographic entity Indicator	All Urban Areas (CMAs/CAs) ¹	All Rural Areas (MIZs) ²	Strong MIZs	Moderate MIZs	Weak or no MIZs	Total, Quebec
Fertility rate ³	n 1.47	1.69	1.67	1.67 -	1.77 +	1.50
Births to teen mothers ⁴	‰ 14.0	17.6	12.7 -	15.1 -	28.7 +	14.8
Low birth weight babies ⁵	% 5.75	5.94	5.87	5.80	6.29	5.79

 = value significantly higher ($p < 0.05$) in all rural areas or in this category of MIZ than in all urban areas
 = value significantly lower ($p < 0.05$) in all rural areas or in this category of MIZ than in all urban areas
 + = value significantly higher ($p < 0.05$) in this category of MIZ than in the 2 others making up all rural areas
 - = value significantly lower ($p < 0.05$) in this category of MIZ than in the 2 others making up all rural areas

¹ Census metropolitan areas and Census agglomerations

² Metropolitan influence zones

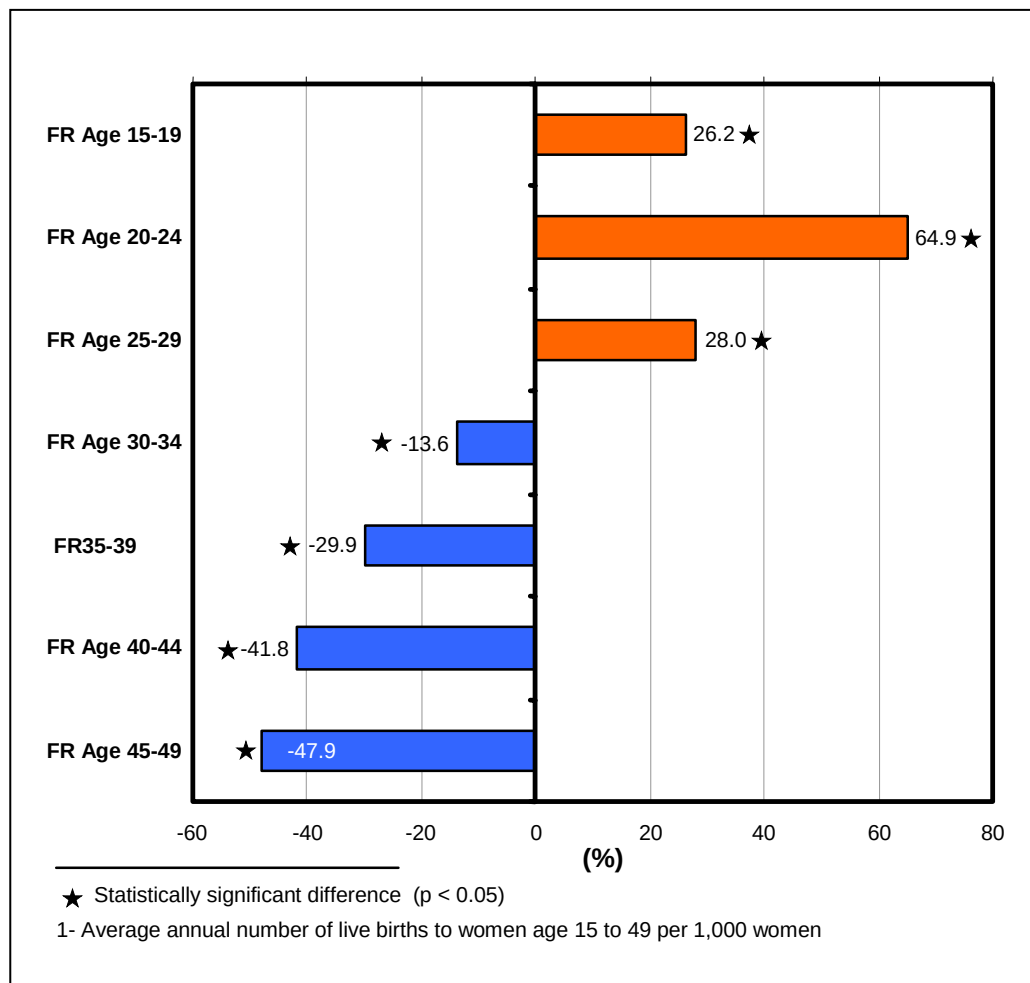
³ Average annual number of children per woman age 15 to 49

⁴ Average annual number of live births to women below age 20 per 1,000 women age 15 to 19

⁵ Average annual number of babies born weighing less than 2,500 grams per 100 babies born

Sources: Quebec birth records database, 1998 to 2000. *Perspectives démographiques, Service du développement de l'information*, MSSS, February 2001

Figure 5: Percentage difference between fertility rates¹ (FR) in rural areas (total for all MIZs) and in urban areas, by age group, Quebec, 2000-2001



Sources: Quebec birth records database, 1998 to 2000. *Perspectives démographiques*, Service du développement de l'information, MSSS, February 2001

Table 6: Prevalence of selected lifestyle behaviours¹ among urban and rural residents, Quebec, 2000-2001

Geographic entity Behaviour	All Urban Areas (CMAs/CAs) ² %	All Rural Areas (MIZs) ³ %	Strong MIZs %	Moderate MIZs %	Weak or no MIZs %	Total, Quebec %
Tobacco use						
Regular smokers	24.2	27.7	28.8	27.4	26.8	24.9
Former regular smokers	25.9	27.2	29.1	25.4 +	28.9	26.2
Alcohol use						
Regular drinkers ⁴	64.8	59.3	63.8 +	58.4	56.1 -	63.6
Excessive drinkers ⁵	14.8	14.9	16.6	13.9	14.7	14.8
Physical activity⁶						
Active	30.2	25.3	26.4	24.3	25.9	29.1
Sedentary	30.3	37.1	38.3	38.0	33.4 -	31.7
Overweight	28.4	32.4	32.6	33.0	30.7	29.2
Food insecurity	10.4	11.1	11.6	11.6	9.3 -	10.6
Breastfeeding⁷	71.4	71.5	73.2	71.2	70.7	71.8

 = value significantly higher (p < 0.05) in all rural areas or in this category of MIZ than in all urban areas
 = value significantly lower (p < 0.05) in all rural areas or in this category of MIZ than in all urban areas
 + = value significantly higher (p < 0.05) in this category of MIZ than in the 2 others making up all rural areas
 - = value significantly lower (p < 0.05) in this category of MIZ than in the 2 others making up all rural areas

¹ Number of persons reporting this habit per 100 persons

² Census metropolitan areas and Census agglomerations

³ Metropolitan influence zones

⁴ Persons who had consumed alcoholic beverages at least once per month during the past 12 months

⁵ Persons who had consumed 5 or more alcoholic drinks on a single occasion at least once per month during the past 12 months

⁶ Persons regarded as physically active and physically sedentary during their leisure time

⁷ Mothers who had given birth during the past 5 years and had breastfed or tried to breastfeed their baby

Source: Canadian Community Health Survey, 2000-2001

Table 7: Contacts with health professionals¹ and unmet health care needs, all urban areas, all rural areas, and MIZs, Quebec, 2000-2001

Geographic entity Contact	All Urban Areas (CMAs/CAs) ² %	All Rural Areas (MIZs) ³ %	Strong MIZs %	Moderate MIZs %	Weak or no MIZs %	Total, Quebec %
Has a family doctor	69.9	77.5	77.5	78.8	74.8	71.5
Has consulted within the past year						
A medical doctor	78.5	75.4	75.2	76.0	74.7	77.9
A dentist or orthodontist	55.0	43.8	46.9 +	43.1	41.6	52.6
An alternative health care provider	11.2	11.1	12.9	10.9	9.4	11.2
Has unmet health care needs	12.7	12.3	12.5	12.6	11.2	12.6

-  = value significantly higher ($p < 0.05$) in all rural areas or in this category of MIZ than in all urban areas
 = value significantly lower ($p < 0.05$) in all rural areas or in this category of MIZ than in all urban areas
 + = value significantly higher ($p < 0.05$) in this category of MIZ than in the 2 others making up all rural areas
 - = value significantly lower ($p < 0.05$) in this category of MIZ than in the 2 others making up all rural areas

¹ Percentage of persons who reported such contacts

² Census metropolitan areas and Census agglomerations

³ Metropolitan influence zones

Source: Canadian Community Health Survey, 2000-2001

Unlike consultations with medical doctors, hospitalizations are more common in rural areas than in urban areas, and this is especially the case for the rural areas farthest from urban centres, where the hospitalization rate exceeds that in the cities by about 40% (Figure 6). The average length of hospital stays, however, is shorter in rural areas than in urban ones. Among rural areas, it is the MIZs closest to and farthest from urban centres that average the shortest hospital stays.

4.1.7 Selected preventive health services

Doctors recommend certain tests and examinations for early detection of abnormalities that may be associated with certain cancers—for example, mammograms for breast cancer, Pap smears for cervical cancer, and PSA blood tests for prostate cancer. The use of these tests and examinations seems to be less common in rural areas than in urban areas, especially in the case of the PSA test (Table 8). On the other hand, mammograms seem to be slightly more common both in rural areas as a whole and in each category of MIZ making up these rural areas.

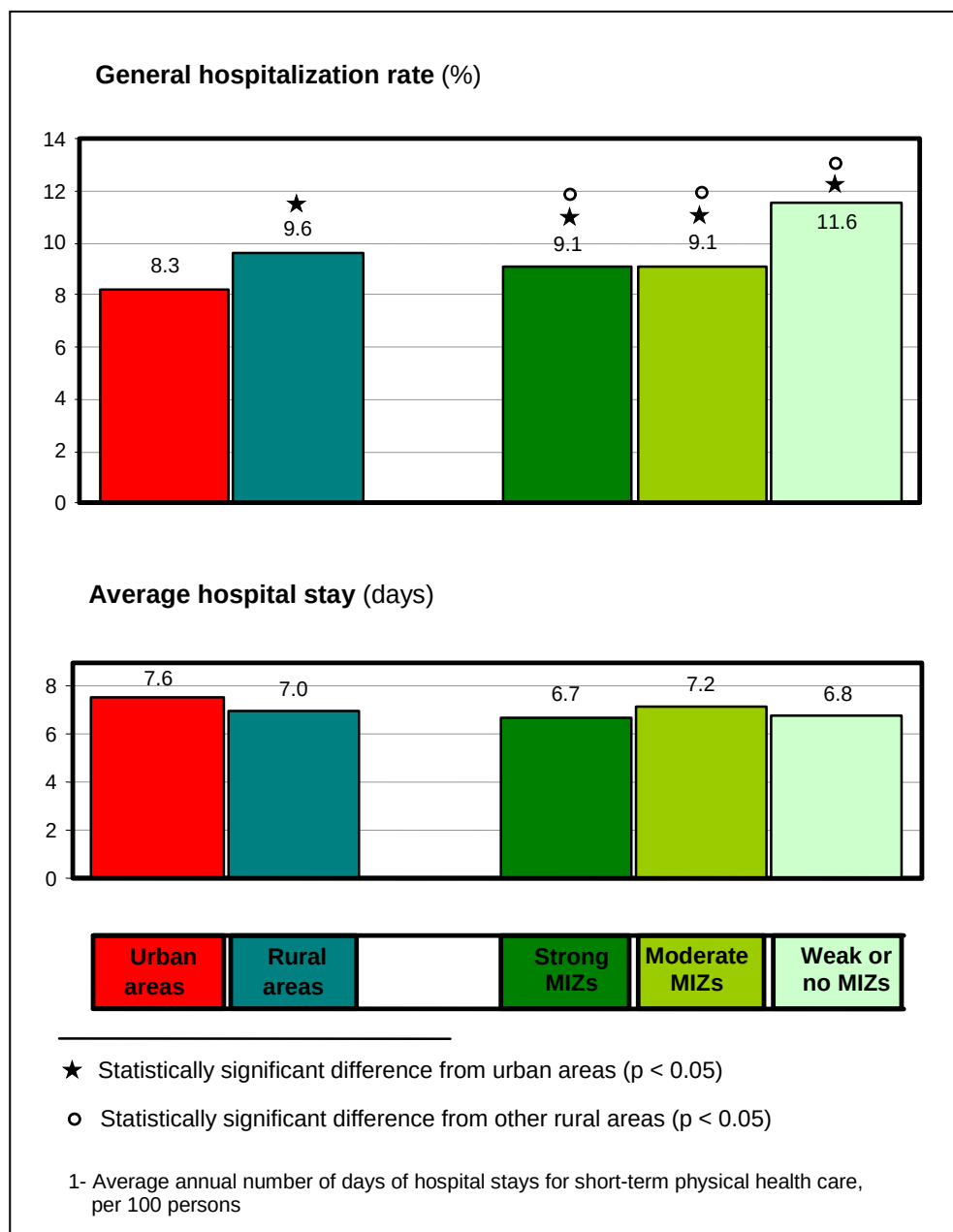
Among the three categories of rural areas (MIZs), there are few variations in the use of these preventive health services, though residents of moderate MIZs do seem slightly less inclined to use them, while residents of weak or no MIZs seem somewhat more inclined to do so, especially in the case of Pap smears.

The use of other preventive health services, such as blood pressure checks and flu shots, is also slightly less common in rural areas than in urban ones, but the differences are not statistically significant. The use of these services does seem to increase slightly as one moves away from the immediate rural fringe of major urban centres, but with no significant differences among the various types of MIZs.

4.1.8 Availability of health care system resources

The first set of availability indicators that we will examine consists of the number of beds or places available in various types of institutions that provide health and social services in Quebec. These include general and specialized care hospital centres (including and excluding university-affiliated centres), psychiatric hospital centres, residential and long-term care centres, youth centres, and other residential institutions, group homes, and centres that provide accommodations for alcoholics, drug addicts, and people with mental or physical impairments. In general, the total number of beds and places available, for all these types of institutions combined, is higher in urban areas than in rural ones (12.3 beds per 1,000 population, compared with 10.0). However, there are some large disparities among the various categories of rural areas. Those closest to large centres have the lowest total number of beds per 1,000 population (5.8), but this number increases considerably as one moves farther out in the country. It is twice as high (11.2) in moderate MIZs and almost three times as high (15.5) in weak or no MIZs. Thus it is the strong MIZs, closest to the cities, that drag the indicator for all rural areas down below the indicator for all urban areas (Table 9).

Figure 6: General hospitalization rates (all causes)¹ and average length of hospital stays for short-term physical health care, all urban areas, all rural areas, and MIZs, Quebec, 1998-1999 to 2000-2001



Source: Med-Écho hospitalizations database, 1998-1999 to 2000-2001

Table 8: Use of certain preventive health services,¹ all urban areas, all rural areas, and MIZs, Quebec, 2000-2001

Geographic entity Service	All Urban Areas (CMAs/CAs) ² %	All Rural Areas (MIZs) ³ %	Strong MIZs %	Moderate MIZs %	Weak or no MIZs %	Total, Quebec %
Blood pressure check ⁴	72.6	70.8	69.9	70.8	72.0	72.2
Pap smear test ⁵	64.2	61.4	62.2	58.8	65.7 +	63.6
PSA blood test ⁶	28.1	24.3	25.6	22.9	25.8	27.2
Mammogram ⁷	73.7	76.4	77.1	75.3	77.9	74.3
Flu shot ⁸	59.6	57.1	54.4	56.6	61.3	59.0

-  = value significantly higher (p < 0.05) in all rural areas or in this category of MIZ than in all urban areas
 = value significantly lower (p < 0.05) in all rural areas or in this category of MIZ than in all urban areas
 + = value significantly higher (p < 0.05) in this category of MIZ than in the 2 others making up all rural areas
 - = value significantly lower (p < 0.05) in this category of MIZ than in the 2 others making up all rural areas

- ¹ Percentage of persons who reported having used this service
² Census metropolitan areas and Census agglomerations
³ Metropolitan influence zones
⁴ Persons who had their blood pressure checked within the past year
⁵ Women age 18 and over who had a Pap smear test within the past year
⁶ Men age 40 and over who had a PSA blood test in the past year
⁷ Women age 50 to 69 who had a mammogram within the past two years
⁸ Persons age 65 and over who received a flu shot within the past year

Source: Canadian Community Health Survey, 2000-2001

Table 9: Number of beds/places and number of beds/places per 1 000 people¹ in public health and social services institutions, by type of institution, all urban areas, all rural areas, and MIZs, Quebec, 2003

Institution	Geographic entity		All Urban Areas (CMAs/CAs) ²	All Rural Areas (MIZs) ³	Strong MIZs	Moderate MIZs	Weak or no MIZs	Total, Quebec
	n	%						
General and specialized care hospital centres	n		19,033	1,543	108	574	861	20,576
	%		3.35	0.99	0.25	0.73	2.64	2.84
- non-university centres	n		10,818	1,543	108	574	861	12,361
	%		1.90	0.99	0.25	0.73	2.64	1.71
Psychiatric hospital centres	n		1,239	41	0	41	0	1,280
	%		0.22	0.03	0.00	0.05	0.00	0.18
Residential and long-term care centres	n		38,481	9,602	1,640	5,640	2,322	48,083
	%		52.1	47.5	28.7	54.9	54.7	51.1
Youth centres	n		2,825	507	108	274	125	3,332
	%		2.33	1.44	1.04	1.58	1.62	2.13
Other residential institutions,⁴ group homes, and centres	n		8,131	3,777	664	2,295	818	11,908
	%		1.43	2.43	1.51	2.91	2.51	1.65
TOTAL	n		69,770	15,523	2,552	8,885	5,049	85,239
	%		12.3	10.0	5.80	11.2	15.5	11.8

¹ Number of beds or places per 1,000 residents, based on total population, except for youth centres (pop. < age 18) and residential and long-term care centres (pop. age 65 and over)

² Census metropolitan areas and Census agglomerations

³ Metropolitan influence zones

⁴ Residential institutions for alcoholics, drug addicts, and persons with mental or physical impairments

Source: *Répertoire des établissements et installations*, MSSS, 2003

Table 10: Other health and social services resources, all urban areas, all rural areas, and MIZs, Quebec, 2001-2003

Geographic entity Resource		All Urban Areas (CMAs/CAs) ¹	All Rural Areas (MIZs) ²	Strong MIZs	Moderate MIZs	Weak or no MIZs	Total, Quebec
Private senior citizens' residences ³	n °/°°	64,740 87.7	12,885 63.7	2,493 43.6	7,639 74.4	2,753 64.9	77,625 82.5
Medical clinics ⁴	n °/°°	1,127 0.20	239 0.15	53 0.12	147 0.19	39 0.12	1,366 0.19
CLSCs (local community service centres) ⁵	n °/°°	171 0.03	221 0.14	19 0.04	114 0.14	88 0.27	392 0.05
Dental clinics ⁶	n °/°°	885 0.16	213 0.14	41 0.09	137 0.17	35 0.11	1,098 0.15
Community agencies ⁷	\$ c	106.1 1.87	34.6 2.22	3.4 0.77	17.0 2.15	14.3 4.38	140.7 1.94

¹ Census metropolitan areas and Census agglomerations

² Metropolitan influence zones

³ Persons age 65 and over in private senior citizens' residences, number and number per 1,000. Includes private for-profit and not-for-profit residences, co-operatives, and religious communities

⁴ Medical clinics, number and number per 1,000 population

⁵ CLSC head offices and service points, number and number per 1,000 population

⁶ Dental clinics, number and number per 1,000 population. Does not cover the Abitibi-Témiscamingue and Saguenay—Lac-Saint-Jean administrative regions.

⁷ Amounts, in millions of dollars and dollars per capita, provided to community agencies by MSSS [Quebec ministry of health and social services]

Sources: *Répertoire des établissements et installations*, MSSS, 2003; *Registre des résidences pour personnes âgées avec services*, January 31, 2003; Telephone survey of medical clinics, 2002; *Système d'information et de gestion des organismes communautaires*, 2001; *Répertoire des ressources Info Health CLSC*, 2003

An analogous pattern prevails for other indicators concerning public health-care resources. First of all, the number of dollars per capita provided to community agencies by the Quebec ministry of health and social services (MSSS) is slightly higher in rural areas as a whole than in urban areas (\$2.22 compared with \$1.87). But here too, there are substantial differences among rural areas. The amount per capita ranges from \$0.77 in strong MIZs to \$2.15 in moderate MIZs to \$4.38 in weak or no MIZs. The number of CLSC head offices and service points per 1,000 population follows a similar pattern, with the advantage for rural areas over urban ones being even more marked in this case (Table 10).

The situation is somewhat different for those indicators dealing with more privately operated health services (senior citizens' residences, medical clinics, and dental clinics). The number of seniors (persons age 65 and over) in private residences per 1,000 seniors and the numbers of medical and dental clinics per 1,000 population are lower in rural areas as a whole and in each category of MIZ individually than they are in urban areas. For all three indicators, among rural areas, the relative level of resources (per 1,000 seniors or per 1,000 population) is highest in the moderate MIZs and lowest in the strong MIZs (Table 10).

4.1.9 Impact of health care system on health

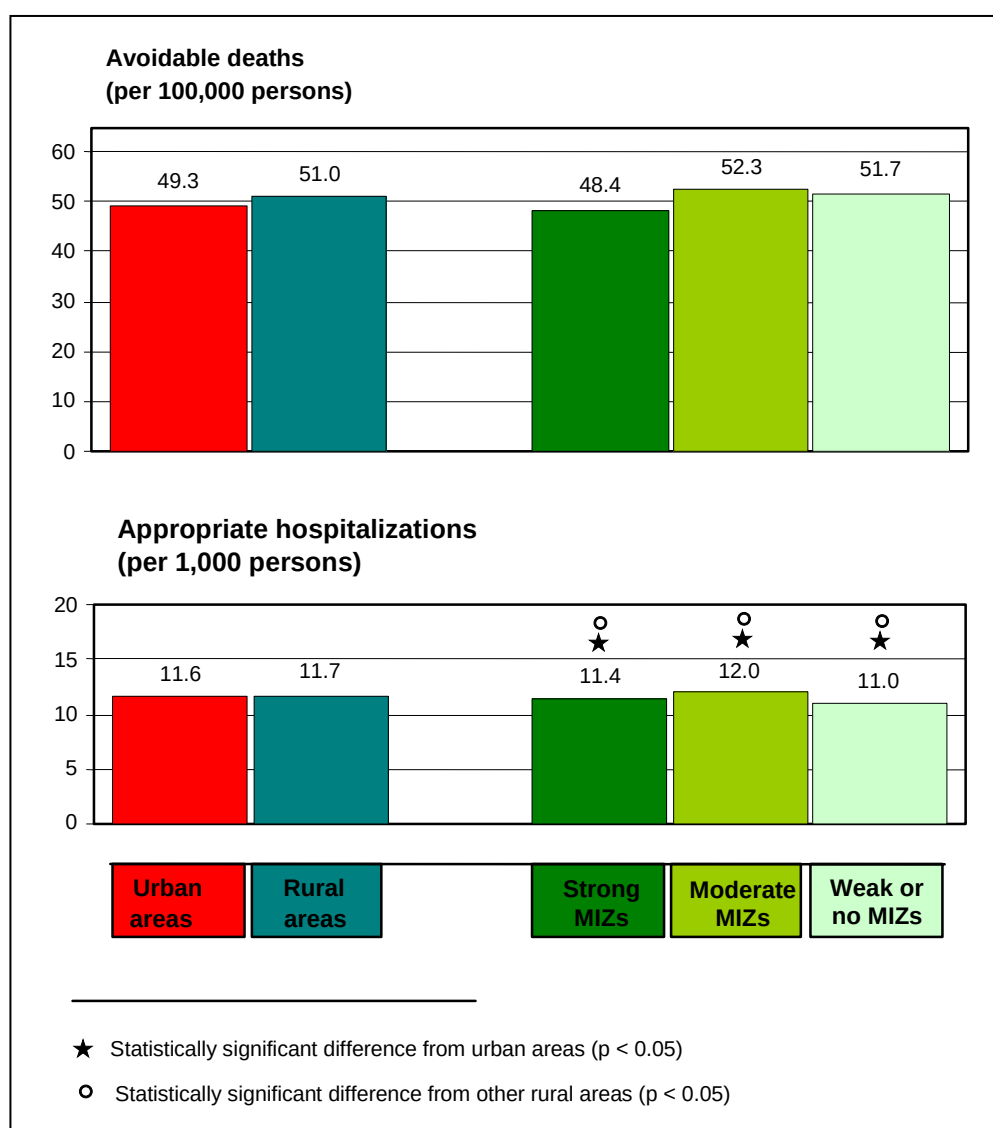
As we have seen, residents of Quebec's urban and rural areas do differ in their contacts with health professionals, their use of health care services, and the extent to which health care resources are available to them. But do these differences ultimately have an impact on their health? Two other indicators that we examined can help to answer this question, though only in a very general way. These indicators can reveal deficiencies in the organization of the health care system. It is essential that any such deficiencies then be examined more closely through more in-depth, more specific analyses.

The first of these indicators is "avoidable deaths": deaths from medical conditions for which appropriate treatments exist which, if provided in a timely manner, can reduce the frequency of deaths. For these avoidable deaths, we observed no significant differences between urban areas and rural areas or among the different categories of MIZs (Figure 7).

The second indicator is "appropriate hospitalizations": hospitalizations for certain surgical procedures that are carried out in a hospital setting and that can significantly improve patients' quality of life. For these appropriate hospitalizations, there is no significant difference between urban areas and rural areas as a whole. There are just some small though statistically significant differences among MIZs. Moderate MIZs have an advantage of about one percentage point over weak or no MIZs (Figure 7).

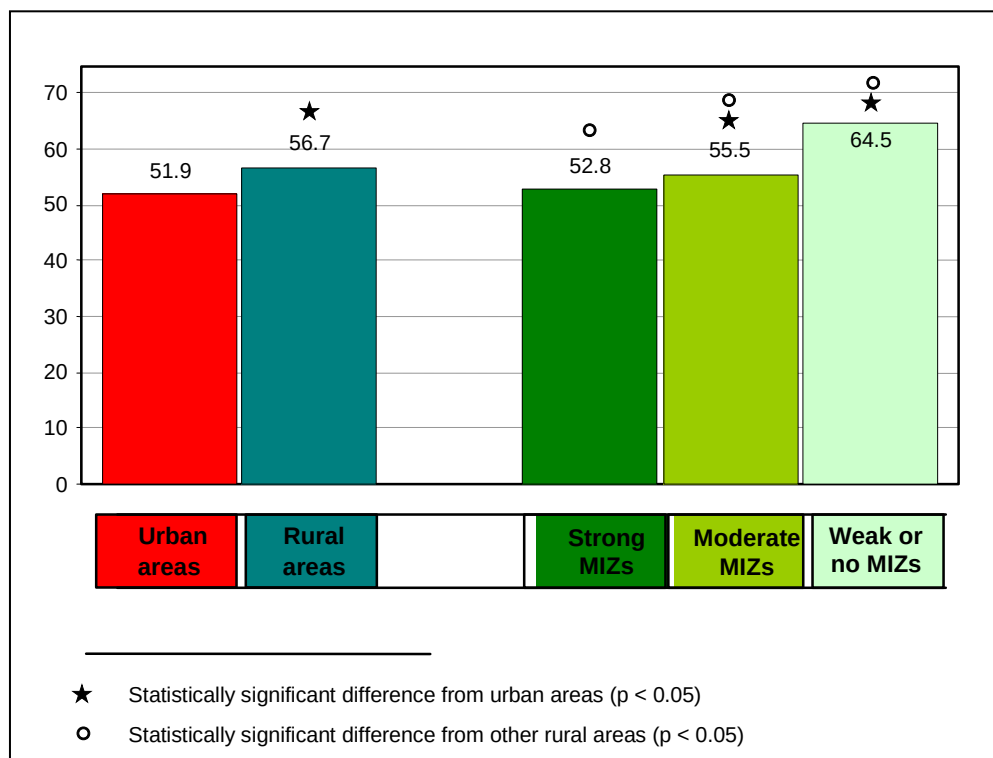
The last indicator that we looked at in this group does not reflect the health-care system's impact on health so much as its organization and, more specifically, the presence of difficulties in accessing primary care. This indicator is "avoidable hospitalizations": hospitalizations for medical conditions that could be treated in a primary care setting such as a medical clinic or outpatient clinic. The frequency of avoidable hospitalizations is higher in rural areas than in urban areas and increases with distance from urban centres (Figure 8).

Figure 7: Avoidable deaths and appropriate hospitalizations, all urban areas, all rural areas, and MIZs, Quebec, 1998 to 2000



Sources: Med-Écho short-term hospitalizations database, 1998 to 2000. Quebec death records database, 1998 to 2000. *Perspectives démographiques, Service du développement de l'information*, MSSS, February 2001

Figure 8: Avoidable hospitalizations, all urban areas, all rural areas, and MIZs, Quebec, 1998 to 2000



Sources: Med-Écho short-term hospitalizations database, 1998 to 2000. Quebec death records database, 1998 to 2000. *Perspectives démographiques*, Service du développement de l'information, MSSS, February 2001

4.2 RESULTS BY METROPOLITAN INFLUENCE ZONES (MIZs)

This section looks more closely at some specific characteristics of each of the three categories of metropolitan influence zones (MIZs) into which Quebec's rural areas have been classified for the purposes of this study. This section does not review all of the results for each kind of MIZ, but instead looks at the most distinctive traits of each.

4.2.1 Strong MIZs

In many ways, strong MIZs are quite different from other rural areas. Located in the immediate vicinity of large urban centres, strong MIZs, in many of their demographic, social, economic, and health-related characteristics, resemble urban areas more closely than they do the two other kinds of MIZs. However, strong MIZs also share some specific features with the two other kinds of MIZs that leave no doubt as to the strong MIZs' rural character.

As far as the contrasts are concerned, strong MIZs are the only rural areas whose population grew from 1996 to 2001. It rose by 2.3%, even more than the 2.0% growth seen in urban areas. Strong MIZs are also the rural areas with the highest proportion of people below age 15 (19.4%) and the lowest proportion of people age 65 and over (12.1%) in the entire province. Strong MIZs also do better than other rural areas when it comes to employment and income, though not so well as the major urban centres. Agriculture in strong MIZs accounts for about the same proportion of the labour force as in moderate MIZs and a higher proportion than in weak or no MIZs. Forestry, mining, and fishing, on the other hand, account for a much smaller proportion of the labour force in large MIZs than in the two other kinds. The percentage of rental housing in strong MIZs is also the lowest in the entire province.

This favoured rural belt also enjoys very good general health, relative both to other rural areas and to urban areas. Life expectancy at birth in strong MIZs is 79.6 years, higher than in urban areas or any other rural areas. Health expectancy at birth, on the other hand, is comparable to that in other rural areas and slightly over one year shorter than in urban areas.

Strong MIZs also have far lower general and infant mortality rates than urban areas or the two other kinds of rural areas. But in their indicators for disabilities, restrictions on activities, and residents' perception of their own health, strong MIZs are more like other rural areas than like urban areas.

An analysis of the specific causes of death in strong MIZs reveals some sharp contrasts. For several causes of death, strong MIZs compare very well with all other areas, rural and urban, and in some cases do even better. This is true for stomach, prostate, and breast cancer; hypertensive disease; ischemic heart disease; stroke; and obstructive pulmonary diseases. But strong MIZs are not the only ones with lower mortality rates for ischemic heart disease and breast cancer. In this sense, these MIZs are more like other rural areas, which seem to be equally spared by these causes of death. However, strong MIZs also share other rural areas' far higher rates of death from motor vehicle traffic accidents and suicides, compared with urban areas.

In their high prevalence of heart disease and diabetes, strong MIZs again stand out from all other rural and urban parts of the province. Another distinctive trait of strong MIZs is their low rate of births to teenage mothers—the lowest in the province and less than half the rate for weak or no MIZs.

Though physically adjacent to urban centres, strong MIZs differ fairly sharply from them in residents' lifestyle behaviours. In fact, for our selected lifestyle indicators, strong MIZs generally show results similar to those for the two other kinds of MIZs. The only clear-cut difference is that strong MIZs have a far higher percentage of regular drinkers, almost equalling that in urban areas.

As regards contacts with health professionals and availability of health care resources, the percentage of residents who consult dentists and orthodontists is higher in strong MIZs than in other rural areas, though still well below the percentage in urban areas. Interestingly, strong MIZs appear to be the parts of Quebec where the availability of health-care resources is most limited. In particular, the number of beds per 1,000 population, for all types of institutions combined, is two times less than in urban areas and nearly three times less than in weak or no MIZs. This pattern persists in the availability of other health services, whether they are more private in nature (private residences for senior citizens, medical clinics, and dental clinics) or public (CLSCs).

Lastly, strong MIZs' overall rates of hospitalization and rates of avoidable hospitalization are somewhat lower than those of other MIZs, but fairly comparable with those for urban areas.

4.2.2 Moderate MIZs

Geographically situated between the immediate periphery of Quebec's major urban centres and its most remote countryside, moderate MIZs generally differ both from urban areas and from strong MIZs (which, as we have just seen, are fairly different from other rural areas). Moderate MIZs are not, however, as different from strong MIZs as weak or no MIZs are. In fact, the results for moderate MIZs often lie midway between those for strong MIZs and those for weak or no MIZs.

Like weak or no MIZs, moderate MIZs saw a decline in population from 1996 to 2001, but not so large a one (only 1.3%, compared with 4.0%). Moderate MIZs stand out, however, for having a lower proportion of persons below age 15 (17.6%) and a higher proportion of persons age 65 and over (15.4%) than any of Quebec's other rural areas or its urban areas.

Employment, income, and education indicators in moderate MIZs are generally worse than in strong MIZs, but better than in weak to no MIZs. The same is true for the proportion of single-parent families. Note, however, that average annual private household income in the year 2000 was lower in moderate MIZs than in any other rural areas.

The general health of residents of moderate MIZs differs appreciably from that of residents of urban areas and strong MIZs and more closely resembles that of residents of weak or no MIZs. It occupies a sort of halfway position in the rural space.

An analysis of causes of death reveals some more distinctive patterns in moderate MIZs. These zones have the highest mortality rates in the province for stomach cancer and the lowest among the province's rural areas for lung cancer. Deaths due to stroke are also more common in moderate MIZs than in urban areas or in any other rural areas. Lastly, the proportion of people who report suffering from diabetes is significantly lower than in other rural areas.

When it comes to fertility and birth rates, moderate MIZs more closely resemble strong MIZs. The total fertility rates for these two types of MIZs are identical (1.67). Their rates of births to teenage mothers are of the same order of magnitude. The rate for moderate MIZs is slightly higher, but still almost two times less than the rate for the rural areas farthest from Quebec's major urban centres.

In terms of lifestyle behaviours, the main difference between moderate MIZs and other rural areas is that moderate MIZs have a lower proportion of former regular smokers.

In their use of health services, residents of rural communities subject to moderate metropolitan influence are slightly more likely than other rural residents to have a family doctor and to consult medical doctors, but the differences are not statistically significant. The average hospital stay in moderate MIZs is about half a day longer than in strong MIZs and weak or no MIZs. Residents of moderate MIZs are also less inclined than other Quebecers to take advantage of preventive health care services such as Pap smear tests and PSA blood tests.

The availability of certain resources related to individuals' health and wellness in moderate MIZs generally falls midway between their availability in strong MIZs and in weak or no MIZs and is almost comparable to that in urban areas. The availability of private resources (private residences for seniors, medical clinics and dental clinics) is greater, however, in moderate MIZs.

Lastly, moderate MIZs have higher rates of avoidable hospitalization than urban areas and strong MIZs, while also having the highest rate of appropriate hospitalizations in the province.

4.2.3 Weak or no MIZs

Weak or no MIZs—the rural communities farthest from major urban centres—definitely show the most contrast with urban areas and with rural areas in their immediate periphery. Weak or no MIZs also generally present the most worrisome health and social conditions of any rural areas.

First of all, the social, economic, and demographic indicators for weak or no MIZs are fairly bleak. While urban areas and strong MIZs experienced population growth between 1996 and 2001, weak or no MIZs had the largest decline (4.0%). However, the percentages of young people (below age 15) and old people (age 65 and over) in weak or no MIZs are comparable to the percentages in strong MIZs.

Employment and education indicators are worse in weak or no MIZs than in other rural areas. The percentage of the labour force employed in agriculture has fallen, while the percentage employed in forestry, mining, and fishing has risen and is distinctly higher than in other rural areas.

Weak or no MIZs also have the highest proportion of single-parent families of any rural areas, as well as the highest proportions of rental housing and housing that needs major repairs.

Residents' general health is also worse in weak or no MIZs than in any other rural areas. Life expectancy and health expectancy at birth are shorter than anywhere else in the province. General mortality, and especially infant mortality, are higher than in other rural areas or in urban areas. Yet despite all these findings, residents of weak or no MIZs show no greater tendency to perceive their own health as fair or poor.

As regards specific health conditions, the results for weak or no MIZs are similar to those for the two other kinds of MIZs, except that the rates of death from lung cancer, hypertensive disease, and obstructive pulmonary diseases are significantly higher than in other rural areas.

In their fertility and birth rates, weak or no MIZs are sharply differentiated both from other rural areas and from urban areas. The total fertility rate is appreciably higher in these MIZs, but the biggest difference is in the rate of births to teenage mothers, which is about twice as high as in urban areas and other rural areas.

In their residents' lifestyle behaviours, weak or no MIZs also display some distinctive traits. Compared with other rural areas, these MIZs have significantly lower proportions of regular drinkers, people who are sedentary during their leisure time, and people who live with food insecurity.

Even though the observed differences are not statistically significant, among all rural residents, those who live in weak or no MIZs are the least likely to have a family doctor or to consult a medical doctor (general practitioner or specialist), dentist, orthodontist, or alternative health care provider. But conversely, they are also the least likely to report unmet health care needs. Lastly, rates of hospitalization are much higher in weak or no MIZs than in other rural areas or in urban areas.

The situation differs, however, as regards use of certain preventive health services. Residents of weak or no MIZs seem systematically more inclined than other rural residents to have blood pressure checks, Pap smears, PSA tests and mammograms, though the differences are not statistically significant except for the Pap test.

In the availability of certain health system resources, weak or no MIZs seem to be relatively better off than other rural areas (especially strong MIZs) and even than urban areas. For example, the number of beds per 1 000 population, for all types of health care institutions combined, is almost 16 in weak or no MIZs, compared with under 12 in moderate MIZs, just under 6 in strong MIZs, and 12 in urban areas. The amount of funding per capita that Quebec's health ministry provides to community agencies is also much higher in weak or no MIZs than in any other part of Quebec. The same is true for the number of CLSCs (local community service centres). On the other hand, the availability of quasi-private services, such as private residences for seniors, medical clinics, and dental clinics, is more limited in weak or no MIZs than in moderate MIZs or urban areas, but still far better than in strong MIZs.

Lastly, as regards their residents' interactions with the health care system, weak or no MIZs—the rural areas farthest from major urban centres—differ from other rural areas once again, with higher rates of avoidable hospitalizations and lower rates of appropriate hospitalizations.

5 DISCUSSION

5.1 WHAT DIFFERENCES DOES LIVING IN RURAL COMMUNITIES RATHER THAN CITIES MAKE TO PEOPLE'S HEALTH AND WELLNESS?

The fundamental question that this study attempted to address was: "Does living in rural communities rather than cities really make a difference in people's health and wellness?" In light of our findings, we are almost tempted to give two answers.

On the one hand, living in rural communities rather than cities appears to have little effect on general health and wellness. Rural residents' life and health expectancies at birth are comparable to those of urban residents, though slightly lower. This reflects the tendency that has been observed Canada-wide for life expectancy at birth to be lower in communities with fewer than 1,000 inhabitants (Wilkins, 1992).

But on the other hand, that is where the comparability between rural and urban residents' health and wellness stops. Though rural residents can expect to live as long or almost as long as urban residents, they can also apparently expect to live under different health and wellness conditions. Living in rural areas rather than urban ones seems likely to make a difference in the kinds of health and wellness problems that people experience, as well as in the organization of the health care services that they can access. It is on these differences that the following discussion will focus.

First of all, the proportion of residents who report suffering from some form of disability or who perceive their own health as only fair or poor is still higher in Quebec's rural areas. In an earlier, Canada-wide study, it was observed that rates of disability were generally higher in small, essentially rural communities (Wilkins, 1992). In the United States, a study showed that it was only people age 65 and over living in non-metropolitan areas whose physical and mental health and perception of their own health were poorer than their counterparts' in metropolitan areas (Mainous III and Khors, 1995). Another study in the U.S. found that rural residents, regardless of their age, rated their own physical health more poorly than city residents did, which is somewhat similar to the pattern observed here in Quebec (Eggebeen and Lichter, 1993).

However, among all the general indicators of health, it is infant mortality that raises the most concerns for Quebec's rural communities, and especially for those farthest from major urban centres. Infant mortality is higher in Quebec's rural areas as a whole than in its urban areas. But it also varies widely among these rural areas, running twice as high in the most remote ones as in those adjacent to large urban centres. This finding is not new in Canada. Nation-wide, infant mortality from 1975 to 1977 was up to 43% higher in smaller communities (fewer than 1,000 inhabitants) than in major metropolitan areas. For Quebec, several theories might be offered to explain this pattern. One would be inadequate monitoring of pregnant women, especially those whose pregnancies might involve complications. It has in fact been shown fairly recently in Quebec that Level 1 and Level 2 hospital centres still had too many low-birthweight newborns who should have been transferred to higher-level centres (Level 2 or Level 3) that were better equipped to deal with their special needs (*Comité d'enquête sur la mortalité et la morbidité périnatales*, 2000).

In this connection, another U.S. study, also conducted nation-wide, found that higher risks of infant mortality and tardy use of prenatal care were associated with living in non-metropolitan areas (Larson et al, 1997). Thus, shortcomings in preventive prenatal care and in monitoring of pregnant women in the most isolated rural areas of Quebec might at least partly explain the higher infant mortality rates observed in these areas.

Turning to more specific indicators of health and wellness, we again see differences, and sometimes major ones, between the city and the country. Our analysis of mortality rates by cause of death was definitely the one that revealed the largest differences between these settings. Specifically, the rates of death from traumas, in particular suicides and motor vehicle accidents, run much higher among rural residents, as well as among men. However, these findings are neither new nor limited to Quebec.

First of all, suicide has been reported many times in Canada and elsewhere as a very disturbing cause of death in rural areas (Pesonen et al, 2001; Singh and Siahpush, 2002; Middleton et al, 2003). Men, and in particular young and Aboriginal people, generally constitute the population at greatest risk (Low and Andrews, 1990; Clayer and Czechowicz, 1991; Regnier, 1994; Royal Commission on Aboriginal Peoples, 1995; Dudley et al, 1997; Leenaars et al, 1998; Katt et al, 1998; Masecar, 1998). This problem is still hard to explain, but several possible theories come to mind. Factors that might contribute to higher mortality rates from suicide in rural communities include the harsher social and economic conditions that prevail in rural areas, the phenomenon of anomie or social disintegration (Clayer and Czechowicz, 1991) that is observed especially in communities where Native people live, and lastly, the lack of mental health professionals in these communities.

The problem of motor vehicle accidents in rural areas of industrialized countries has also been highlighted many times, in Quebec (Thouez et al, 1991; Audet et al, 1995), the United States (Chen et al, 1995; LaValley et al, 2003), and Australia (Stella et al, 2001). In areas where population density is low, where people have to travel long distances to access services, and where there is no public transportation, use of automobiles becomes not only necessary but also more frequent, thus increasing the risk of traffic accidents (Thouez et al, 1991; Audet et al, 1995). Driving while impaired by alcohol or drugs might be another explanatory factor (Stella et al, 2001). Here in Quebec, driving while alcohol-impaired has been reported as a pattern of significant concern among young people in rural areas (Audet et al, 1995). Other factors increasing the risks of traffic accidents in rural areas may include bad weather; rough topography; poor road maintenance; unlit roads; lack of traffic signs and signals; the presence on the roads of heavy farming, logging, and mining vehicles that can seriously obstruct traffic; and, lastly, excessive speed (Chen et al, 1995; Stella et al, 2001; LaValley et al, 2003).

Our analysis of causes of death also showed that rural areas experience significantly higher rates of death from stomach and lung cancer and obstructive pulmonary disease. Few studies elsewhere have analyzed disparities between urban and rural settings for these two cancers, and even fewer have done so for obstructive pulmonary diseases as a category, so it is hard to compare our results with observations for these illnesses in other countries.

However, from what we could find in the literature on stomach and lung cancer, our results would appear to run counter to what is usually seen in industrialized countries. In a review of numerous studies on 26 types of cancer among 13 populations of industrialized countries, it was found that with the exception of myelomas and cancers of the eyes and lips, the relative incidence and mortality of the 23 other cancers, including stomach and lung cancer, were higher in cities, among both men and

women (Doll, 1991). Moreover, in our own study we found that rural residents are more likely than city dwellers to be regular smokers, or former regular smokers, which certainly affects the health of their lungs and hence their risk of having lung cancer or obstructive lung disease. The overrepresentation of this unhealthy behaviour in rural areas might thus be one factor explaining the higher rates of mortality from lung cancer and obstructive pulmonary disease that are seen in Quebec's rural areas. Another possibility is that the situation regarding lung cancer is recent, which we will discuss later on, and that for this reason it differs from the findings made elsewhere in the 1980s.

Stomach cancer is recognized as being associated with specific dietary habits such as eating large amounts of salted, marinated, or smoked foods or only limited amounts of fruits and vegetables, as well as with infection by the bacterium *Helicobacter pylori* (Stewart, B.W. and P. Kleihues, 2003, pp. 194-195). One might hypothesize that Quebec's city residents and rural residents differ somehow in their dietary habits. The differences in their tendency to be overweight suggest that this may be the case, but there have been no studies to date that support this hypothesis.

Living in rural parts of Quebec is not, however, necessarily synonymous with being disadvantaged in terms of health. For some diseases, it may even afford an advantage. For instance, our study found that residents of all three categories of rural areas (MIZs) are less likely than urban residents to suffer from breast cancer or ischemic heart disease.

Our observations with regard to breast cancer in Quebec seem fairly consistent with observations elsewhere in the world. For example, a study conducted in Spain by Vioque et al (1997) showed that from 1975 to 1991, mortality due to breast cancer was higher in the Spanish provinces that had the highest income levels, the lowest proportion of women living in rural areas, and the lowest parity (number of children born per woman). Though the design of our study is different, in Quebec we do observe higher breast cancer mortality in urban areas, where in fact average annual private household income is the highest and the total fertility rate is the lowest. We can therefore suppose, without being able to confirm, that the same factors come into play to reduce breast cancer mortality among rural women in Quebec. Be that as it may, this observation is not very surprising. Breast cancer is in fact one of the very few forms of cancer that is recognized to preferentially affect women of higher socio-economic status. Thus we see a dual tendency, among countries on the one hand and within countries on the other. Worldwide, breast cancer is more common in industrialized countries than in developing countries (Stewart, B.W. and P. Kleihues, 2003, pp. 188-189). And nationally, breast cancer is more common among women with the highest socio-economic status (Faggiano et al, 1997). Also relevant in this regard is that early fertility, high parity, and breastfeeding are all recognized as helping to protect women against breast cancer (Stewart, B.W. and P. Kleihues, 2003, p. 189). Thus, the higher total fertility rate and earlier fertility observed in Quebec's rural areas may have something to do with their relatively lower rates of breast cancer mortality. Lastly, we note the interesting finding that as one goes farther into the country, breast cancer mortality increases, while breastfeeding decreases. However, the differences among the three categories of rural areas (MIZs), both for breast cancer mortality and for breastfeeding, are not statistically significant.

Regarding cardiovascular disease, the results of international research on disparities between urban and rural areas have varied quite widely from country from country. There have also been very few studies that focused specifically on ischemic heart disease and compared different kinds of communities. One such study, conducted in the state of Illinois in the United States, showed that hospital mortality following myocardial infarctions, the major type of ischemic heart disease, tends to

be higher in rural areas (Hand et al, 1996). Another study, in Australia, found that hospital mortality seven days after infarctions was higher in non-metropolitan hospitals (Vu et al, 2000). Can we thereby conclude that the results of the present study indicate an opposite trend in Quebec? That is hard to say, especially since our study did not deal with hospital mortality or even 7-day mortality. Moreover, our results include other forms of ischemic heart disease besides myocardial infarctions. It is interesting to note, however, that in Quebec, lifestyle behaviours such as smoking, leisure-time sedentarity, and being overweight—all major risk factors for ischemic heart disease (Heart and Stroke Foundation of Canada, 1999, p. 23-43)—are more prevalent among rural residents (Table 6). So why do they seem to be less vulnerable to ischemic heart disease? Is some protective factor at work in the rural environment? Or are we seeing some artifact associated with a substitution phenomenon for the cause of death? The present study does not let us answer these questions, but they merit further investigation.

Living in the country rather than the city also seems to be a marker for certain lifestyle behaviours that are important for individuals' health and wellness. Here we are referring explicitly to smoking, being overweight, and leisure-time sedentarity, all of which, as we have seen, are important in the development of certain pathologies. These three behaviours are more common in Quebec's rural areas as a whole than in its urban areas. But when rural areas are broken down by MIZ, only the strong and moderate MIZs show higher rates for these behaviours than urban areas do. The figures for weak or no MIZs are not significantly higher than those for urban areas. Conversely, the propensity to drink alcohol regularly is lower in rural areas as a whole than in urban areas. In strong MIZs, the proportion of people who report drinking alcohol regularly (at least once per month) is significantly higher than in other rural areas, and about the same as in urban areas.

These geographic differences in lifestyle behaviours of course arise from many factors, and these factors may of course differ among and be specific to each of these behaviours. However, many studies have shown that these health-related behaviours generally have one point in common: they largely reflect the economic and social status of the individuals concerned. Thus, though this is only a hypothesis, the geographic differences in lifestyle behaviours uncovered in this study may reflect social and economic inequalities among the areas studied. According to the Quebec 1998 health and social survey, the most disadvantaged people are the ones most likely to engage in unhealthy behaviours such as smoking, leisure-time sedentarity, and malnutrition (Daveluy et al, 2000). In our study, we observed a consistency between the decline in socio-economic indicators as one moves toward the moderate MIZs and the stronger tendency to smoke, to be sedentary in one's leisure time, and to be overweight. But this hypothesis does not suffice to explain the differences observed among the various geographic areas, since the weak or no MIZs, with the poorest socio-economic indicators, nevertheless showed lower rates of these unhealthy behaviours than other rural areas did. Some other possible explanations might have to do with differences in access to sports and recreational facilities or in the extent to which individuals' awareness of healthy lifestyle choices has been increased through targeted prevention programs.

A recent study showed that in Canada, people living in rural areas are no more likely to smoke than people living in urban areas, except in Quebec, where the proportion of smokers in rural areas is still higher (Pitblado et al, 1999, pp. 53-54). This corroborates our own findings about smoking. Also, despite some methodological differences, our findings also confirm those of other studies in the U.S., in particular about leisure-time activity or sedentarity and obesity. The likelihood of following the recommendations about physical activity thus appears to be positively associated both with income level and with living in an urban area, and *vice versa* (Parks et al, 2003). Meanwhile, obesity seems to

be more prevalent among rural residents than among urban residents, though this difference does diminish when demographic variables are controlled (Sobal et al, 1996).

Turning now to the measures used in this study to describe certain aspects of the health care system, we can conclude from our findings that there is no significant difference between the city and the country, or even among the three kinds of MIZs, with regard to the overall positive or negative impact that this system may be having on the public's health. We saw no difference in avoidable mortality or in appropriate hospitalizations among the various kinds of geographic areas considered.

The differences among these areas are more in the organization and availability of services. First of all, the rate of hospitalization is higher in rural areas, especially in the most remote MIZs, and people tend to be hospitalized for medical conditions that could very well be treated in a primary-care setting such as a doctor's office or outpatient clinic. A study conducted in the province of Manitoba in fiscal year 1991/1992 also found higher hospitalization rates in rural areas than in the urban area of Winnipeg (Black et al, 1995). This study also found that rural residents were more likely than urban residents both to be hospitalized for more serious health conditions and to use short-term hospital care. The relative abundance of hospital beds in rural parts of Quebec might explain the higher rates of hospitalization in these areas. Other factors also may come into play. An important one is the distance that people have to travel to receive care. It is far harder and more harmful for a hospital to send someone home with a health problem when they have travelled a long way to get there. In this regard, the highest hospitalization rate observed in this study was for the most remote rural areas, which further argues for the importance of the distance factor. Lastly, as the Manitoba study indicated, rural residents may wait longer before they feel the need to seek health care, because of their different perception of health (Garrison, 1998; Heckman et al, 1998; Matthews et al, 1997; Weinert and Long, 1987). Thus, by the time they show up at the hospital, they may have more serious health conditions that make hospitalization unavoidable.

The higher rates of overall hospitalizations and avoidable hospitalizations in Quebec's rural communities, especially the most remote ones, may indicate certain deficiencies in first-contact health care services and in routine care in particular. The present study cannot confirm this hypothesis with any certainty, but it should be noted that this observation has already been made at the national level by Statistics Canada in 2001 (Sanmartin et al, 2001):

There may be room for improvement regarding routine care and health information or advice to reduce the number of individuals using services such as hospitals and emergency rooms for first contact services at any time of the day. (*Ibid.*, p. 21.)

This situation is even more likely to be found in rural areas.

As noted previously, in Quebec, rural residents are more likely than city dwellers to have family doctors. This finding reflects the reliance that rural residents generally place on general practitioners, not only because these physicians and the nurses who work with them are usually the only medical professionals in rural areas, but also because, in the eyes of rural residents, they often embody support, comfort, knowledge, and wisdom (Farmer et al, 2003). People who live in rural communities are also more receptive to the more holistic kind of medicine that family physicians practice, which

emphasizes listening to patients, trying to understand them, and paying attention to their particular needs, rather than sticking to purely “medical” issues (Miller et al, 1987).

In this regard, the general practitioners and nurses who often constitute rural residents' first contact with the health care system and thus represent the cornerstone of the health care structure in rural areas should be called on to become “specialists in rural medicine” (Health Canada, Commission on the Future of Health Care in Canada, 2002). Medicine today is becoming saturated with specialists. These physicians play an important role in the health care system. But what rural areas need most is generalist physicians and nurses. These professionals act as the first link in the system and deliver primary care, which is often what people need most.

Medical schools have a critical role to play in this regard. All industrialized countries recognize that financial incentives are needed to attract these primary health care providers to rural areas. But incentives alone are not enough, especially when it comes to retaining these professionals over the medium and long run. Several studies and commissions have therefore recommended that, in tandem with financial incentives, changes be made in the content and orientation of the training that these professionals receive. To encourage their students to practice in rural areas, medical schools should first of all encourage them to do their internships in rural communities. It has been shown many times that students who become familiar with rural communities and their residents are more likely to go back there to practice after graduation. In this regard, it is also important to facilitate the recruitment of candidates from rural areas, notably by offering them financial aid (Hart et al, 2002). University faculties of medicine should also offer comprehensive programs in rural medicine, to prepare future professionals for the distinctive features of rural communities and for the implications that these features have for medical practice and daily life (Pollet and Harris, 2002; Rourke and Strasser, 1996). Such programs would also help to break down prejudices against rural practice by developing professionals who are “specialists in rural medicine” (Hart et al, 2002).

None of the foregoing, however, minimizes the role that traditional specialist physicians must play in rural communities, where their presence is essential to prevent and treat certain health and wellness conditions. Consider, for example, obstetricians or psychiatrists who, according to our findings, are sorely needed in rural Quebec. So are dentists and orthodontists. Our findings show that residents of rural Quebec are less inclined to consult these professionals, and that the tendency to do so decreases in those areas where urban influence is weakest or non-existent. It seems highly likely that the limited availability of dentists and orthodontists, as well as of other specialists, in rural Quebec has a great deal to do with residents' limited tendency to consult them. But this situation is far from unique to Quebec and has been observed in a number of industrialized countries. There have been many studies showing very wide variations in the use of oral and dental health care services among different parts of the same country, with the rates of use being higher in urban areas (Vargas et al, 2002, 2003a, 2003b; Westover, 1999; Pacza et al, 2001; Steele et al, 2000). In Canada, such variations have previously been found in Ontario (Pitblado and Pong, 1995) and in most other provinces, including Quebec (Pitblado et al, 1999). Ultimately, it is the availability of specialists as a whole that represents a problem in rural areas of industrialized countries.

To conclude this discussion of our main findings, it is important to say a bit more about what we learned regarding the availability of health care system resources in Quebec. The indicators that we used to measure the availability of these resources in this study were essentially rates of resources to population. Such indicators provide only a very rough, theoretical picture of the situation and in no

way measure the actual accessibility of health care services. For example, our figures on numbers of local community service centres (CLSCs), medical clinics, and dental clinics are not weighted according to the number of professionals and other health-care providers working at each of these institutions. If such a weighting were applied, the pattern of variations might be quite different. Likewise, these figures do not reflect where the resources within an area are physically located, which can also have some major consequences for accessibility. A measure of the accessibility of health care services for residents of a given area could take many other factors into account, such as the average distance that residents have to travel to receive these services, the means of transportation that they have to use, the hours that these services are available to them, whether these services are covered by their medical insurance, whether they have the financial means to pay for services that are not covered, and so on. To complement the present study, it would therefore be helpful to calculate such measures of accessibility for both medical resources and hospital resources. The measures that have already been developed by Quebec's health and social services ministry, such as bed rates adjusted for distance and competition, could be used for this purpose (Piché and Côté, 1997).

5.2 HAS THE COMPARATIVE HEALTH OF QUEBEC'S URBAN AND RURAL RESIDENTS CHANGED OVER THE YEARS?

In this study we could not produce data that would have let us compare the various indicators over time and thus identify any trends. Moreover, the innovative design of this study, in which we combined data from many sources on the basis of a new geographic unit—the MIZ—meant that we could not make any direct comparisons with past studies. Since the late 1970s, there have in fact been various studies (cited earlier in this report) that explored certain aspects of public health in urban and rural Quebec. These studies used large-scale health and social surveys to look at either mortality or general health, its determinants, and its consequences. But these studies and surveys used different methodologies from the ones that we have used here (different geographic units, different methods of calculating indexes, and so on). We therefore cannot offer very precise assessments of any changes that may have occurred in the health of the residents of the areas concerned. What we can highlight, however, are the major changes, the most striking differences, that cannot be ascribed to methodology alone.

When we look at certain general indicators of health, such as life expectancy at birth or the prevalence of disabilities, we see few changes over the years in the comparative health of Quebec's urban and rural residents. In the late 1970s, average life expectancy in rural areas was slightly higher than in urban areas, and now it is slightly lower. But this urban/rural difference amounts to only about one year, when the average life expectancy for Quebec as a whole is now about 80 years. The pattern for the overall rate of disabilities is similar: this rate is now higher in rural areas, but the difference between rural and urban areas is still minimal.

There has also been little change in health differences among different kinds of rural areas. The gradual decline in health as one proceeds from the rural areas nearest Quebec's major urban centres to those at its remote periphery was already apparent in the health and social surveys conducted in 1987 and 1992-1993.

Similarly, there have been few changes in most of the specific health problems experienced by rural residents. However, the pattern for some causes of death has changed since the late 1970s. The rate of mortality from cancers of the trachea, bronchi, and lungs used to be lower in rural areas than in urban

areas, but is now higher. Likewise, the rate of death by suicide used to be lower among rural women than among urban women; now the rates for these two groups are equivalent. Lastly, though infant mortality and mortality from motor vehicle traffic accidents have fallen substantially throughout Quebec, the gaps between the city and the country in the mortality rates for these two causes have grown somewhat, to the detriment of the country in both cases.

5.3 WHAT DOES THE PRESENT STUDY CONTRIBUTE TO RESEARCH ON PUBLIC HEALTH IN QUEBEC AND ELSEWHERE?

The first major contribution of this study is that it draws on a very broad range of sources of data and indicators to simultaneously consider the general health of the rural populations concerned and some of their specific health problems, as well as their fertility, lifestyle behaviours, and use of health care services, along with certain measures relating to the organization of the health care system that serves them. Until now, these various aspects of the health and wellness of people living in rural communities have seldom been studied in Quebec and Canada, and rarely so extensively. In Quebec, there have been some in-depth, wide-ranging studies of individuals' health and wellness in the past. They have included the health and social surveys conducted in 1987, 1992-1993, and 1998 (*Santé Québec*, 1988a and 1988b; Pampalon et al, 1990; *Santé Québec* et al., 1995a and 1995b; Pampalon et al, 1995; Daveluy et al, 2000) and a major study of health in Quebec and its regions (Pageau et al., 2001). But none of this research focused specifically on residents of rural communities. In the rest of Canada, there have been only a few fairly broad studies on rural health. Among these studies, those conducted by the Centre for Rural and Northern Health Research at Laurentian University, in Sudbury, Ontario, have been of fundamental importance. This centre, working in cooperation with the Canadian Institute for Health Information and the College of Family Physicians of Canada, has laid the foundations of a methodology for evaluating health and wellness in rural communities and has demonstrated the as yet untapped potential for deriving indicators on various scales from existing Canadian databases (Pitblado et al, 1999). The present study, conducted in Quebec, in a sense illustrates the nature of this potential.

It is desirable for researchers to exploit this potential, because doing so will enable them not only to document some aspects of health that have been left relatively unexplored in the past, but also to better understand how the various dimensions of health and wellness interact. Such initial studies will also identify interesting avenues for research that can then be explored in more tightly focused studies. By adopting a multidimensional approach based on a broad range of indicators and data sources, such studies will ensure a substantially more subtle analysis and understanding of the structure of health inequalities between residents of urban and rural communities. As we have seen in the present study, similarities in the life expectancy or health expectancy of urban and rural residents can very easily mask health problems that are very specific to the urban or rural setting. Likewise, communities with comparable health indicators may exhibit marked differences in their health practices and in the organization of their health care institutions. All of this ultimately implies that no one set of public health initiatives can suit every type of community.

Another contribution of the present study is that it is based on a spatial analysis grid that was developed by Statistics Canada only recently and had previously been put to very little use. This grid distinguishes several different degrees of "rurality." Recognizing diversity among rural communities is just as important as distinguishing them from urban ones. The many significant differences that we observed among the various types of rural areas in this study only reinforce this axiom, which has

been previously stated on many occasions. The concept “rural” may be understood differently by different individuals and in different countries, but it is essential to adopt a definition that can not only distinguish rural from urban but also differentiate various degrees along the urban-rural continuum.

In Canada there are no fewer than six different scholarly definitions of “rural,” based on various criteria, breakpoint values, and territorial units. Past studies have shown that these definitions vary in the kinds of rural issues that they are appropriate for analyzing, and that the definition chosen for any given study should be determined by the nature of the research question and its geographic scope (local, regional, national, or international) (du Plessis et al, 2001). Among these definitions, the MIZ typology developed by Statistics Canada and used in the present study has proven especially useful and appropriate for our particular research questions. This typology distinguishes various degrees of rurality and thus makes it possible to explore variations in health and wellness not only between rural areas and urban areas, but also among rural areas. The MIZ typology has the further advantage of being based on a fairly small territorial unit, the Census subdivision (CSD), which is suitable for describing health and wellness at the local level and also allows the rural areas of interest to be delimited more precisely. Lastly, because this typology is based on the geography of the Census of Canada, it provides all the flexibility needed for more detailed analyses at higher levels of aggregation, such as the administrative regions into which Quebec is divided for purposes of planning and managing health care services. The MIZ typology also provides the opportunity to draw fairly broadly from the many databases on health and wellness that are compatible with the Census geography.

Lastly, we should stress that the MIZ typology used in this study differs appreciably from other approaches to dividing rural territory into various zones. This typology does not identify rural areas according to an *a priori* socio-economic or functional profile, but instead does so according to the strength of their ties with major urban centres. Thus, the MIZ classification refers more to concepts such as place of work, distance, adjacency, and accessibility (McNiven et al, 2000) than to any socio-economic characteristics of the rural areas concerned or any functional classification of these areas (such as traditional, agricultural, industrial, and tourism-based). In Quebec, there have been past studies that used social, economic, and demographic data from the province's health and social surveys to classify rural areas as vulnerable, intermediate, and not vulnerable (Pampalon et al, 1990, 1995). In France, an exploratory study on health and rural communities, conducted by three regional health insurance associations (Urcam Franche-comté et al, 2002), provides a good illustration of how rural areas can be classified according to socio-economic and functional criteria. But the MIZ typology also incorporates a socio-economic and functional spatial grid to some extent. The social and health indicators that we calculated for MIZs (Table 1) do in fact show that as the influence of CMAs/CAs weakens, the socio-economic characteristics of rural areas deteriorate, and other economic activities increasingly give way to mining, forestry, and fishing. Ultimately, these three different methods of classifying rural areas are interrelated, and the best method to choose depends on what issue is being analyzed.

5.4 LIMITATIONS OF THIS STUDY

The present study does have certain limitations of various kinds, and readers are accordingly encouraged to interpret the results with caution.

First of all, methodologically speaking, one set of limitations may be inherent in the various databases that we used. These databases may contain gaps in certain data sets, as well as data-entry and coding errors. Second, this study makes extensive use of the Canadian Community Health Survey of 2001, which deals with a sample rather than a population. Thirdly, the data on births, deaths, and hospitalizations used in this survey cover a three-year period only. Hence the rates calculated in this study represent estimates and involve a margin of error, which we have set here at less than 5%. Thus there is still one chance in 20 that the observed differences among areas do not really exist.

Conversely, sometimes, certain differences among geographic units cannot be reported as statistically significant precisely because of the excessive variability in certain estimates. Repeating this study at regular intervals would make it possible to assess the significance of these differences more accurately.

Readers should also be aware that while classifying rural areas into MIZs seems to be an appropriate choice for our particular set of research questions and issues, it does have its limitations. Like any other classification based on breakpoint values, it includes an arbitrary element, and the distinctions between areas close to these breakpoints can become blurry. Also, because the MIZ typology is quite recent, there is no ready way to make comparisons between this study and other studies. For the same reason, this study does not incorporate any time dimension, because we could not analyze changes in our indicators over time with any degree of accuracy. If this study is repeated on future occasions, however, this time dimension could be incorporated from now on.

Lastly, though this study incorporates a great many indicators documenting various aspects of health and wellness, it is still only a partial picture of reality. Moreover, because it was deliberately designed to be exploratory and descriptive, it does not allow any cause-and-effect connections to be established among the various dimensions of health and wellness that it examines. Thus, if this study has revealed some territorial disparities in health and wellness, they are still hard to explain, except by hypotheses that would still need to be tested.

6 CONCLUSION

This study has shown both the specificity and the plurality of Quebec's rural communities with regard to health, its determinants, and the characteristics of the health care system that serves them. This study has also shown the need to explicitly recognize the existence of the rural world and the diversity of rural communities when one is conducting health and wellness research or designing health and wellness policy.

In the present study, we have attempted to highlight a number of indicators that could provide the basis for an overall assessment of health in Quebec's rural communities. Though we have addressed a number of issues in this study, there were others that ought to be studied but that we could not address, for lack of time and resources, though certainly not for lack of interest or lack of relevant data. These issues include: situations of abuse, neglect, and behavioural problems in youth that are referred to Quebec's regional youth protection branches; crime in its various forms, on which data are maintained by Quebec's ministry of public safety; the workplace, on which Quebec's occupational health and safety commission maintains a wealth of information; the whole subject of mental health, which can be better characterized now that the data from Cycle 1.2 of the Canadian Community Health Survey are available; and lastly, social networks (which some rural community workers consider a distinctive feature of rural life), their cohesiveness, and their roots in the community. If the present study has demonstrated the importance of community groups in rural settings, and especially in the most remote rural areas, it could still have taken greater advantage of the information that the Canadian Community Health Survey provides on social networks. One question asked in this survey revealed that the sense of belonging to one's local community is stronger in rural communities and increases the farther a community is from urban centres.

Developing such an overall picture of health and wellness in rural communities will be a necessary but by no means sufficient condition for a proper understanding of the interactions between the many determinants of health and health itself. In order to achieve such an understanding, more targeted and specific studies will be required. In particular, it will be essential to adjust the scale of the analysis and examine the situation at the local level in depth, for example, by targeting certain regional county municipalities whose characteristics reflect the diversity of Quebec's rural communities. Such a project is currently under way in the Quebec City area (De Koninck et al, 2002), but this project will have to be extended to other regions to better reflect rural diversity. It will also be essential to conduct more specific analyses of some complex issues that represent major concerns for Quebec's health care system. One such issue is the organization of primary health care in rural settings, and more particularly of the primary care services available in remote areas, which cannot be understood without some special efforts. Two large-scale projects (Loslier et al, 2003; Gauthier et al, 2003) are currently examining this issue. Such initiatives should be encouraged and developed on other topics.

Though there is thus still much to be done to improve our knowledge of rural health, the present study has already provided some information that can be useful for designing public health and social policies, programs, and services. First of all, this study has shown that current efforts in this regard must explicitly take the unique realities of rural life into account. How can these policies, programs and services reach the people who live in rural communities, and how should they be adjusted to fit the particular characteristics of these people and communities?

These questions must be addressed first of all by the health and social services system. Rural Quebec's high levels of infant mortality must be addressed not only through the primary care provided in doctor's offices and local public clinics (CLSCs), but also through local maternal and infant health programs (*Santé maternelle et infantile*) and programs such as *Soutien aux jeunes parents* and *Naître égaux et grandir en santé*, which target very young parents and very poor parents, respectively. The high rates of suicide in Quebec's rural areas must be addressed by regional suicide-prevention centres. The persistence of certain harmful lifestyle behaviours in Quebec's rural areas, such as smoking, being overweight, and being sedentary during one's leisure hours (whether out of choice or for lack of recreational opportunities) must be addressed by provincial and regional public health authorities, who must develop intervention strategies adapted to the needs of rural communities.

Some of the answers to these rural health questions must be provided by other government bodies outside the health and social services system—not least of all those in charge of transportation, given the number of fatal accidents that occur on Quebec's rural roads. The authorities responsible for education, employment, and income security must also play a role to help raise the general living conditions of rural residents. These conditions remain inferior to those of urban residents—a fact that certainly has some bearing on health and wellness in Quebec's rural communities.

7 BIBLIOGRAPHY

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APPENDICES:
ADDITIONAL TABLES

Table A-1: Population breakdown by urban areas and MIZs for Quebec health and social services administrative regions, 2001

Region Number	Region Name	Population in 2001*	Rural Areas			
			Urban Areas	Strong MIZs	Moderate MIZs	Weak or No MIZs
01	Bas-Saint-Laurent	n	86,276	17,939	60,817	35,598
		%	43.00	8.94	30.31	17.74
02	Saguenay-Lac-Saint-Jean	n	199,943	20,704	31,309	26,323
		%	71.85	7.44	11.25	9.46
03	Québec	n	553,748	18,708	55,165	11,296
		%	86.67	2.93	8.63	1.77
04	Mauricie et Centre-du-Québec	n	31,871	34,337	116,070	6,492
		%	66.88	7.25	24.50	1.37
05	Estrie	n	176,346	15,425	73,186	20,656
		%	61.74	5.40	25.62	7.23
06	Montréal-Centre	n	1,812,723	n/a	n/a	n/a
		%	100.00			
07	Outaouais	n	258,953	14,632	33,313	8,648
		%	82.07	4.64	10.56	2.74
08	Abitibi-Témiscaminque	n	90,480	4,861	17,786	32,970
		%	61.93	3.33	12.17	22.57
09	Côte-Nord	n	55,892	2,888	23,296	15,690
		%	57.17	2.95	23.83	16.05
10	Nord-du-Québec	n	n/a	n/a	n/a	16 314
		%				100.00
11	Gaspésie-Îles-de-la-Madeleine	n	2,955	604	18,020	75,345
		%	3.05	0.62	18.59	77.74
12	Chaudière-Appalaches	n	183,459	15,090	158,864	25,963
		%	47.85	3.94	41.44	6.77
13	Laval	n	343,005	n/a	n/a	n/a
		%	100.00			
14	Lanaudière	n	253,909	97,037	35,062	2,487
		%	65.36	24.98	9.03	0.64
15	Laurentides	n	320,598	55,380	59,182	26,206
		%	69.49	12.00	12.83	5.68
16	Montréal	n	1,026,295	142,192	107,910	n/a
		%	80.41	11.14	8.45	
17	Nunavik	n	n/a	n/a	n/a	9 632
		%				100.00
18	Terres-cries-de-la-Baie-James	n	n/a	n/a	n/a	12 629
		%				100.00

* Not adjusted for under-enumeration

n/a = not applicable

Note: Because of rounding, the sum of the above percentages does not always equal 100%.

Source: Statistics Canada, 2001 Census

Table A-2: Causes of death with ICD-9 codes

Cause of death	ICD-9 Code
Stomach cancer	151
Colon and rectal cancer	153-154
Lung cancer	162
Breast cancer	174
Prostate cancer	185
Hypertensive disease	401-405
Ischemic heart disease	410-414
Stroke	430-438
Obstructive pulmonary disease	490-496
Motor vehicle traffic accidents	E810-E819
Accidental falls	E880-E888
Suicide	E950-E959

Sources: Quebec death records database, 1998 to 2000. Perspectives démographiques, Service du développement de l'information, MSSS, February 2001.

Table A-3: Avoidable causes of death, age groups considered, and ICD-9 codes

Cause of Death	Age Group Considered	ICD-9 Code
Tuberculosis	5-64	010-018, 137
Chronic heart diseases of rheumatic origin	5-44	393-398
Asthma	5-44	493
Abdominal hernia	5-64	550-553
Hypertensive disease and stroke	35-64	401-405, 430-438
Perinatal mortality	All deaths before age 7 days, plus stillbirths	
Ischemic heart disease	35-64	410-414
Cervical cancer	35-64	429.2
Hodgkin's disease	5-64	201
Respiratory diseases in children	1-14	460-519
Appendicitis	5-64	540-543
Cholelithiasis, cholecystitis and cholangitis	5-64	574-575.1, 576.1
Mortality associated with pregnancy and childbirth	All ages	630-676
Breast cancer	25-64	174
Peptic ulcers	25-64	531-534

Source: *Le portrait de santé: le Québec et ses régions, édition 2001*, p. 262.

Table A-4: Avoidable causes of hospitalization, age groups considered, and ICD-9 codes

Cause of Hospitalization	Age Group Considered	ICD-9 Code
Ruptured appendix	All ages	540.0
Pneumonia	5-49	480-486, 487.0
Heart failure	18 and over	428
Gangrene	18 and over	785.4
Diseases avoidable by immunization	18 and over	032, 037, 041.2, 041.5, 070.2, 070.3
Pyelonephritis	18 and over	590
Obstructed abdominal hernia	18 and over	552
Asthma	5-49	493
Cellulitis	18 and over	682
Diabetes	18 and over	250
Hypopotassemia	18 and over	276.8
Malignant hypertensive disease	18 and over	401.0, 402.0, 403.0, 404.0, 405.0
Ulcer with perforation or hemorrhage	18 and over	531-534 except fourth-digit subdivisions 3, 7 and 9
Phlebitis without pulmonary embolism	18 and over	451, except for cases where one of the 15 secondary diagnoses is ICD-9 = 415.1

Source: *Le portrait de santé: le Québec et ses régions, édition 2001*, p. 260.

Table A-5: Procedures for which hospitalization is considered appropriate, with their Canadian Classification of Diagnostic, Therapeutic and Surgical Procedures (CCDTSP, or CCP) codes

Procedure	CCDTSP/CCP Code
Cataract surgery	27.3, 27.4, 27.6
Retina surgery	28.4, 28.6
Angioplasty	48.0
Coronary bypass	48.1
Pacemaker implant	49.7, 49.8
Total hip replacement	93.5
Replacement of head of femur	93.6
Total knee replacement	93.41, 93.43

Source: *Le portrait de santé: le Québec et ses régions*, édition 2001, p. 256