

# **Changes in Health and Health Care Use of Manitobans:**

## **1985-1998**

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Health Policy and Evaluation**  
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The results and conclusions are those of the authors and no official endorsement by Manitoba Health was intended or should be implied. This report was prepared at the request of Manitoba Health as part of the contract between the University of Manitoba and Manitoba Health.

## **THE MANITOBA CENTRE FOR HEALTH POLICY AND EVALUATION**

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Manitoba has one of the most complete, well-organized and useful databases in North America. The database provides a comprehensive, longitudinal, population-based administrative record of health care use in the province.

Members of MCHPE consult extensively with government officials, health care administrators, and clinicians to develop a research agenda that is topical and relevant. This strength, along with its rigorous academic standards and its exceptional database, uniquely position MCHPE to contribute to improvements in the health policy process.

MCHPE undertakes several major research projects, such as this one, every year under contract to Manitoba Health. In addition, MCHPE researchers secure major funding through the competitive grants process. Widely published and internationally recognized, they collaborate with a number of highly respected scientists from Canada, the United States and Europe.

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## SUMMARY

This project was designed to examine the health of the Manitoba population, the supply of health care resources, access to care and use of the system over the period 1985-present (which at the time we started included data through March 1999). The purpose was to identify changes in the delivery of care, and the impact of the aging of the population, and in particular to assess how these changes have played out differently across the province.

While the Manitoba Centre for Health Policy and Evaluation has examined short term trends in the health of the population and in the delivery of care in previous reports, we have never undertaken a review covering such an extensive period.

This project brought together indicators as part of several previous and ongoing projects at MCHPE. The project was designed to answer the following questions:

- How has the health of the Manitoba population, and the health of residents of different areas of Manitoba, changed over time?
- How has the delivery of health care changed as the Manitoba population has changed, most notably as the population has aged?
- How has the health care system performed over the period of “health care reform,” a period of hospital bed closures and of strident headlines expressing growing concerns about access to care and physicians’ ability to cope with these changes?

We focus on key indicators of the health of the population (premature mortality and life expectancy), and on key characteristics of each sector (hospital, physician, nursing homes, and pharmaceuticals). Changes in access, changes in rate of contact, changes in expenditure patterns (where data are available) and changes in supply (of beds, physicians) are tracked over this 14-year period.

Because the trend data essentially speak for themselves, the series of figures are presented by themselves, each accompanied by a short explanatory paragraph. A short summary of the observed trends then follows.

The major findings after reviewing these 14-year trends are:

- There has been a remarkable overall improvement in the health of Manitobans. Life expectancy increased a full 2.6 years for males and a one year for females, and premature mortality rates (deaths before age 75) fell.
- Some vulnerable groups have not shared in these health gains. The health status of northern residents (Nor-Man, Burntwood and Churchill) which has always been among the poorest in the province, actually fell over this period.
- Use of hospitals has dropped substantially as judged by days spent in hospital per thousand residents (after adjusting for the aging population). Examining data over this 14-year time period however, makes it clear that this drop in hospital use started long before bed closures, and reflects changing practices in how quality care is delivered. The decreased use of hospitals reflects the growing evidence that long hospital stays are not necessarily good for patients. Despite the fact that more than a quarter of Manitoba's hospital beds were closed over this period, hospital expenditures in constant dollars were flat; there was no proportionate reduction in expenditures following these bed closures.
- The system has responded to an aging population: there have been very large increases in the rate at which high profile procedures including hip and knee replacement, cataract surgery and coronary artery bypass procedures are performed.
- Despite bed closures there has been an actual increase, not decrease, in the rate at which the Winnipeg residents 75 years and older have been accommodated in hospitals. Rural residents aged 75 and over (who have always been hospitalized at a higher rate than Winnipeggers in this age group) maintained their high rate of access to hospitals over the period, even after adjusting for the aging population.
- Despite the large increases in the numbers of people 75 years and older over this period (the number of Manitobans in this age group grew by 37.6%), there was a higher rate of admission to nursing homes at the end of the period, than at the beginning. (This was



true even after adjusting for the increased numbers of older adults and was true even though the number of nursing home beds per 1000 elderly has actually fallen over this period. This strongly suggests that individuals are remaining at home longer, and being institutionalized for shorter periods at the end of their life.

- Capital expenditures fell substantially over this period. Expenditures on pharmaceuticals increased by 65%, and there was a marked increase in spending on home care (although home care expenditures started at a relatively low base).

In summary, a review of the delivery of medical care in Manitoba over the last 14 years suggests that the system works and in fact works well. This conclusion is based not only on data describing how health care was delivered over this period, but on the indisputable fact that there has been a remarkable improvement in the health of Manitobans, at least in the health of most Manitobans. The challenge for the next 14 years will be to ensure those Manitobans in the most disadvantaged circumstances achieve the health benefits that the majority has achieved.

## **1. METHODS**

### **1.0 Study Period and Population**

This report analyses data from the Manitoba Research Database for the fiscal years 1985/86 through to 1998/99. Note that sometimes we use the calendar year (i.e., 1985 refers to a 1985/86) as a short-hand way of referencing the fiscal year. A population-based approach was used to study the use of health care resources by Manitoba residents (i.e., access to and use of physicians, hospital and nursing home resources, and pharmaceutical use), as well as the health status of these residents. This approach involves categorizing patients according to their region of residence, regardless of where they received their care. Population figures are taken from the Manitoba Research Database registration files and are based on the Manitoba population in December of the year in question. All residents of Manitoba, including Treaty First Nations residents were included in these analyses. See the Glossary for a description of the various terms and measures used in the document.

### **1.1 Region of Residence**

Residents of Manitoba were identified and information about region of residence was obtained using the Manitoba municipal code on the Manitoba Health Registry file as of December 31 of a specified year, except for Treaty First Nations residents. For these individuals, postal code information was used to assign region of residence. This latter procedure was used in order to locate more accurately those not living in the First Nations community to which they are registered.

### **1.2 Analytic Approaches**

To evaluate the trends in the specific indicators for the study period, for most indicators, the 1985/86 rates (measures) were used as the reference point. For some procedures analyses began using more recent years—the earliest year available is then used as reference point. It is acknowledged that the use of two data points to determine trends in longitudinal data is a methodological simplification used in this study. Carriere, Roos and Dover (2000)

recommend the use of the generalized estimating equations (GEE) method as the most efficient way to analyze large longitudinal data sets across time and space. This statistical modelling strategy is able to take into account variation across time, areas, and/or income groups. Future analyses will use the GEE method to determine trends in the data we have reviewed here.

For some analyses, we combined data over several years to get stable, reliable results. For example, age/sex-standardized premature mortality rates are estimated on the basis of three-year moving averages.

### 1.3 Level of Aggregation

Analyses contained in this report were carried out using different levels of aggregation. These included: Manitoba, Winnipeg and Non-Winnipeg areas, and groups of Regional Health Authorities (RHAs) classified by the health status of their populations (i.e., least healthy, average health and healthiest populations). Health status was measured using the premature mortality rates (rate of deaths occurring in the 0-74 year old population) of the specified RHAs. The designation *least healthy population* included Regional Health Authorities (RHAs) whose populations have Premature Mortality Rates (PMRs) that are significantly above the provincial mean. Higher PMRs indicate poorer health: one would also expect regions with higher PMRs to place greater demands on the health care system. RHAs classified as having the *least healthy populations* include Nor-Man, Burntwood and Churchill. Central, Marquette, Parkland, North Eastman and Interlake have populations with *average health* (i.e., the PMRs of these RHAs do not differ significantly from the provincial PMR). Lastly, RHAs with the *healthiest populations* have PMRs that are significantly lower than the provincial average and include South Eastman, South Westman and Brandon. In addition to these health status classifications, Winnipeg residents were assigned to a fourth group.

#### **1.4 Data Sources**

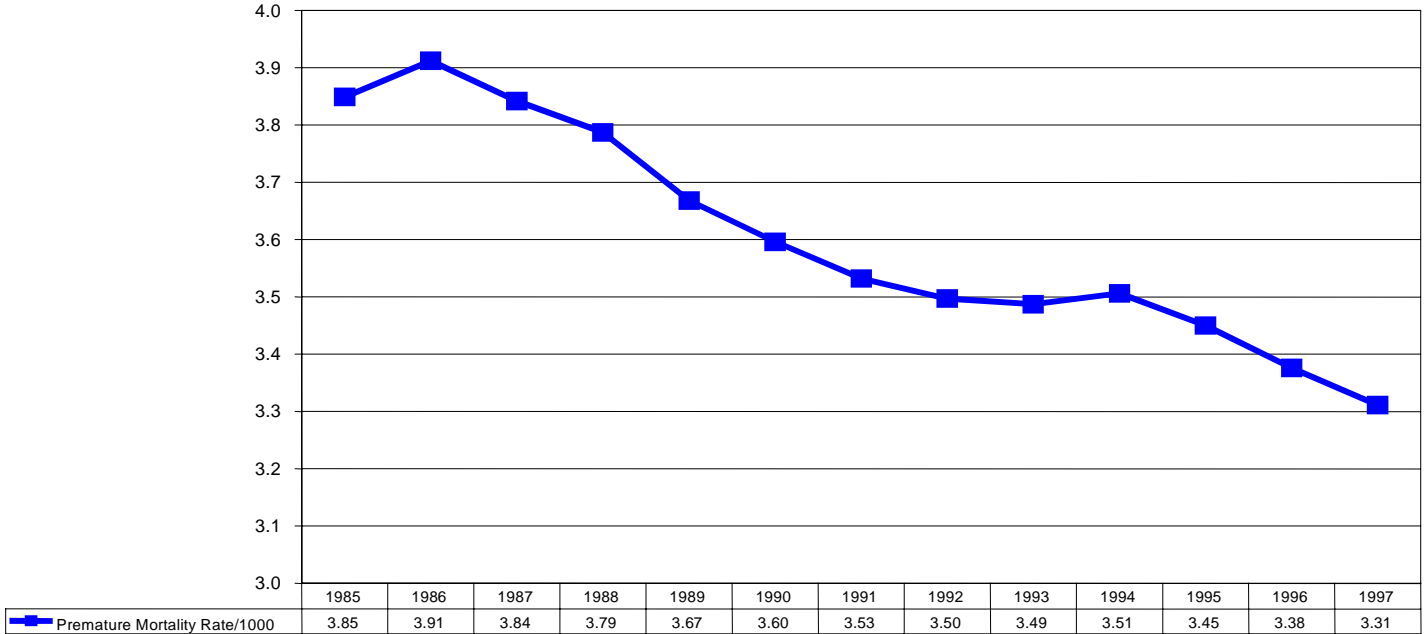
Different data sources were used for the analyses described in this report. These included files from Manitoba Health which are held in an anonymized form (no names nor addresses) in the Population Health Research Data Repository including data on Manitoban's use of pharmaceuticals, hospitals, physicians and personal care homes. Expenditure data were obtained from that published in Manitoba Health Annual Reports as well as from that published by the Canadian Institute for Health Information (CIHI). Data on physician supply were also obtained from CIHI.

## 2. TRENDS OVER TIME

The following 19 figures graphically present the findings of this project. The first two figures document the health status of Manitobans over the 14-year period. This is followed by Figure 3 which is a summary of the full 20 indicators of health care use, health care expenditures and supply of health services and physicians, organized according to how much change in the indicator there has been over time. Figures 4-6 pull out separately those indicators which were increasing, those which remained flat, and those which were trending downwards over the period. Figure 7 reviews the pharmaceutical use of Manitobans over the four-year period for which these data were available. The next set of figures (8-14) focus on the health of people aged 75 and over, and changes in their access and use of hospitals, Personal Care Homes and physicians over the 14-year period. The final set of figures (15-19) divides the province into four areas: 1: those Regional Health Authorities with the healthiest populations (South Eastman, South Westman and Brandon), 2: those Regional Health Authorities whose populations are of average health status (Central, Marquette, Parkland, North Eastman and Interlake), 3: those Regional Health Authorities whose populations have the poorest health status (Nor-Man, Burntwood, and Churchill) and 4: Winnipeg. These figures review patterns in the health of residents of these areas over the 14-year period, as well as their use of health care.

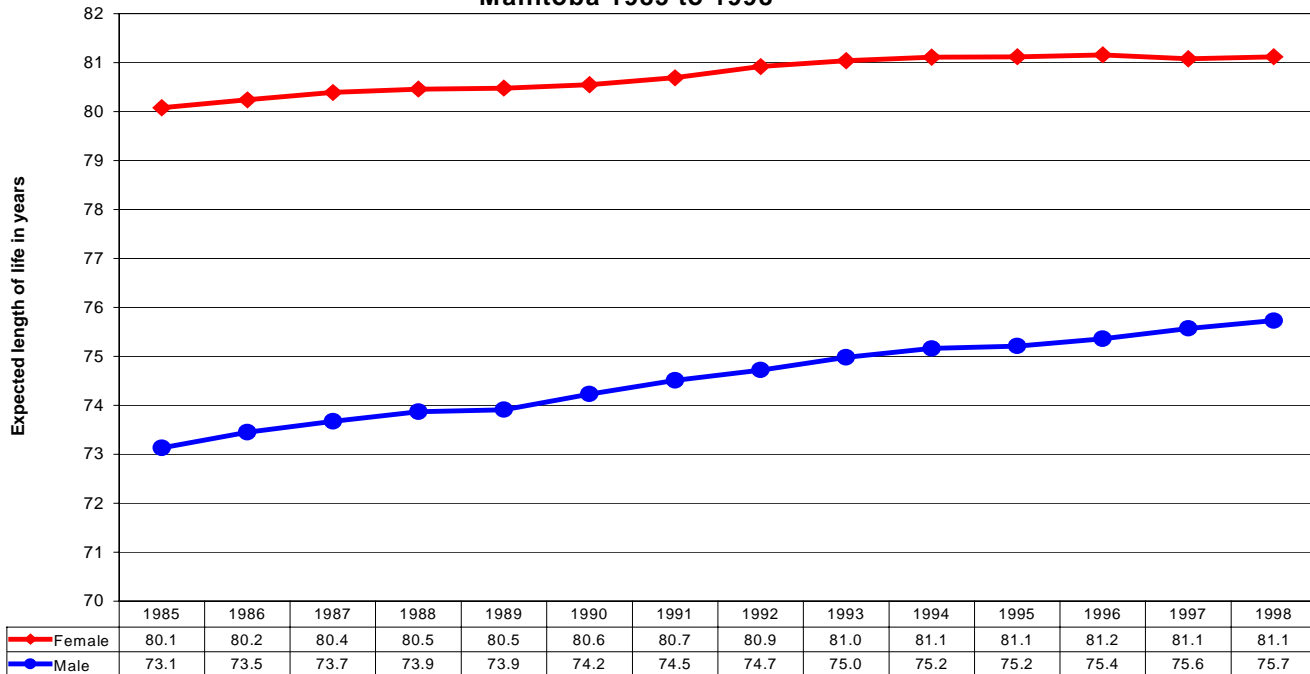
Many charts include an additional column to the right of the data table. This column shows the percent change for the indicator from the earliest to the latest year for which data were available—typically comparing rates in 1998 with those in 1985.

**Figure 1: Premature Deaths/1000 Residents  
Age 0-74, 1985 to 1997, Manitoba  
Age-Sex Adjusted Rates**



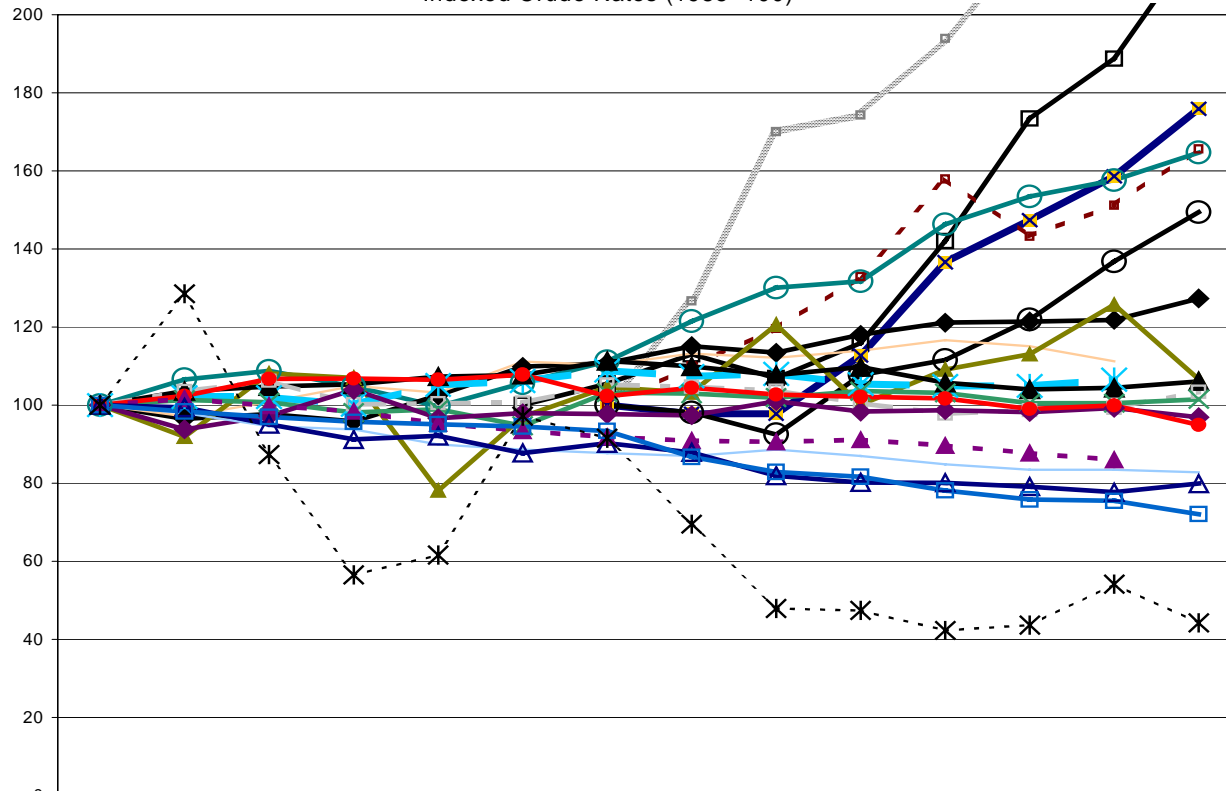
The Premature Mortality Rate (PMR) shows the rates of death of people 0 to 74 years old. PMR is considered to be a good indicator of the health status of a population. This chart shows that, on average, the PMR of Manitobans has improved substantially between 1985 and 1997, with an overall decrease in the rate of early death of 14%.

**Figure 2: Life Expectancy at Birth  
Manitoba 1985 to 1998**



Life expectancy is the age to which a person is expected to live. This chart shows the average life expectancy of Manitobans at birth. Women have a longer life expectancy than men. Between 1985 and 1998 the life expectancy of Manitobans has increased by 1 year for women and 2.6 years for men.

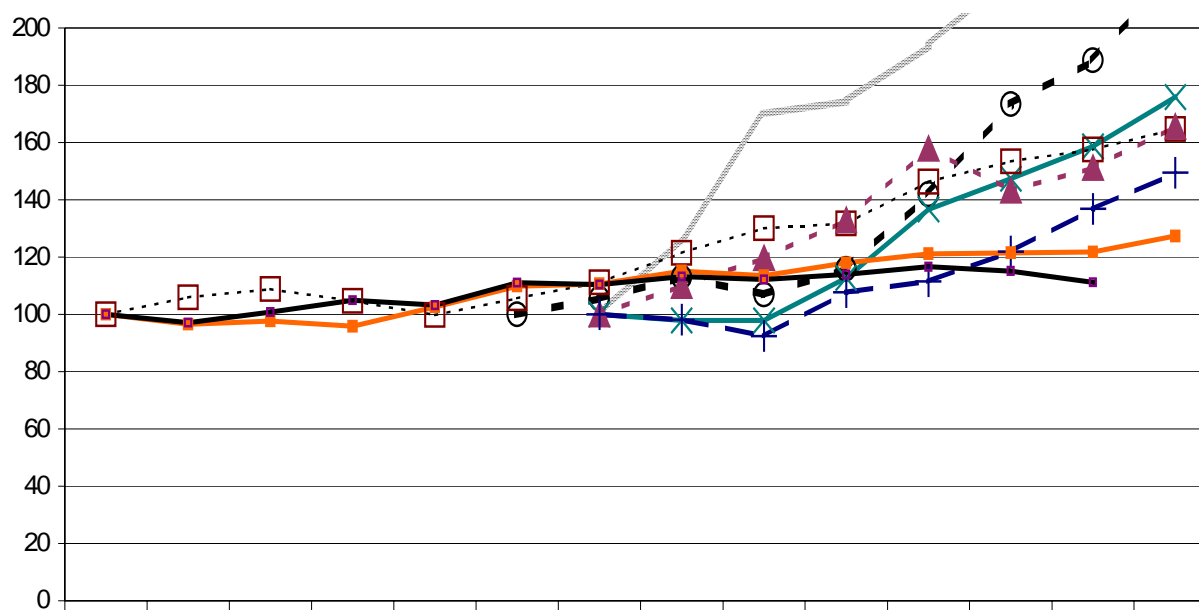
**Figure 3: Changes in Health and Health Care of Manitobans, 1985 to 1998**  
Indexed Crude Rates (1985=100)



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
Total knee replacement/1000							100.0	126.7	170.0	174.3	193.9	218.7	269.2	283.0	+183.0%
Home Care Expenditures/capita						100.0	105.5	113.0	106.9	115.9	142.0	173.4	188.7	219.4	+119.4%
Bypass surgery/1000						100.0	97.8	97.8	112.7	136.6	147.4	158.6	175.9		+75.9%
Cataract surgery/1000						100.0	110.0	119.6	132.9	157.9	143.2	151.2	165.6		+65.6%
Drug expenditures/capita	100.0	106.6	108.8	104.7	99.7	105.6	111.2	121.5	130.1	131.7	146.3	153.4	157.6	164.7	+64.7%
Total hip replacement/1000						100.0	98.1	92.5	107.7	111.5	121.9	136.8	149.4		+49.4%
Other Institutions expenditures/capita	100.0	96.5	97.7	95.8	102.5	109.8	110.7	115.1	113.4	118.0	121.1	121.4	121.8	127.3	+27.3%
PCH Expenditures/capita	100.0	97.1	100.8	104.9	103.2	111.1	110.3	113.2	112.1	113.9	116.6	115.1	111.2		+11.2%
PCH admissions/1000 age 75+	100.0	91.9	108.1	107.0	78.1	97.0	104.6	103.2	120.6	100.1	109.1	113.0	125.7	106.6	+6.6%
Physicians/1000	100.0	102.0	102.0	100.1	105.1	106.2	108.8	107.4	108.0	105.4	104.9	104.9	106.5		+6.5%
Physician visits/1000	100.0	103.6	104.8	105.3	107.3	107.7	111.3	109.9	107.7	109.7	105.7	104.0	104.4	106.1	+6.1%
Physician expenditures/capita	100.0	103.6	106.2	102.2	100.5	100.6	105.2	104.7	103.7	100.5	97.8	98.7	99.3	103.4	+3.4%
Hospitalizations/1000	100.0	101.3	100.7	98.1	98.9	94.7	103.2	102.9	101.9	103.6	103.1	100.5	100.5	101.5	+1.5%
PCH residents/1000 age 75+	100.0	93.8	97.2	103.9	96.6	97.9	97.7	97.4	101.0	98.3	98.7	98.2	99.3	96.9	-3.1%
Hospital expenditures/capita	100.0	102.4	106.7	106.8	106.5	107.8	102.3	104.4	102.7	102.1	101.7	99.0	99.9	94.9	-5.1%
Premature mortality rate/1000	100.0	101.6	99.8	98.4	95.3	93.4	91.8	90.9	90.6	91.1	89.6	87.7	86.0	86.0	-14.0%
PCH Beds/1000 age 75+	100.0	98.0	94.6	93.8	89.9	88.6	87.7	87.0	88.6	87.0	84.8	83.4	83.4	82.8	-17.2%
Hospital days/1000	100.0	99.4	95.1	91.2	92.1	87.7	90.2	87.9	81.9	80.2	80.1	79.1	77.7	79.9	-20.1%
Hospital beds/1000	100.0	98.4	96.9	95.7	95.1	94.5	93.4	86.7	82.9	81.6	78.2	75.8	75.5	72.1	-27.9%
Capital expenditures/capita	100.0	128.5	87.3	56.5	61.6	97.2	91.5	69.5	47.9	47.4	42.3	43.7	54.1	44.2	-55.8%

Twenty indicators of changes in the health and health care use of Manitobans have been selected for this report. These indicators are presented as indexed rates—that is the first year for which data are available (usually 1985) is set at a value of 100. Subsequent years are presented as the change from the earliest year. This introductory chart includes all 20 indicators. The table at the bottom of the chart lists the items in descending order from the indicators with the greatest increase over the time period to those with the greatest decrease. Subsequent charts will show these indicators in greater detail.

**Figure 4: Changes in Health Care of Manitobans  
1985 to 1998, Trending Upwards**  
Indexed Crude Rates (1985=100)

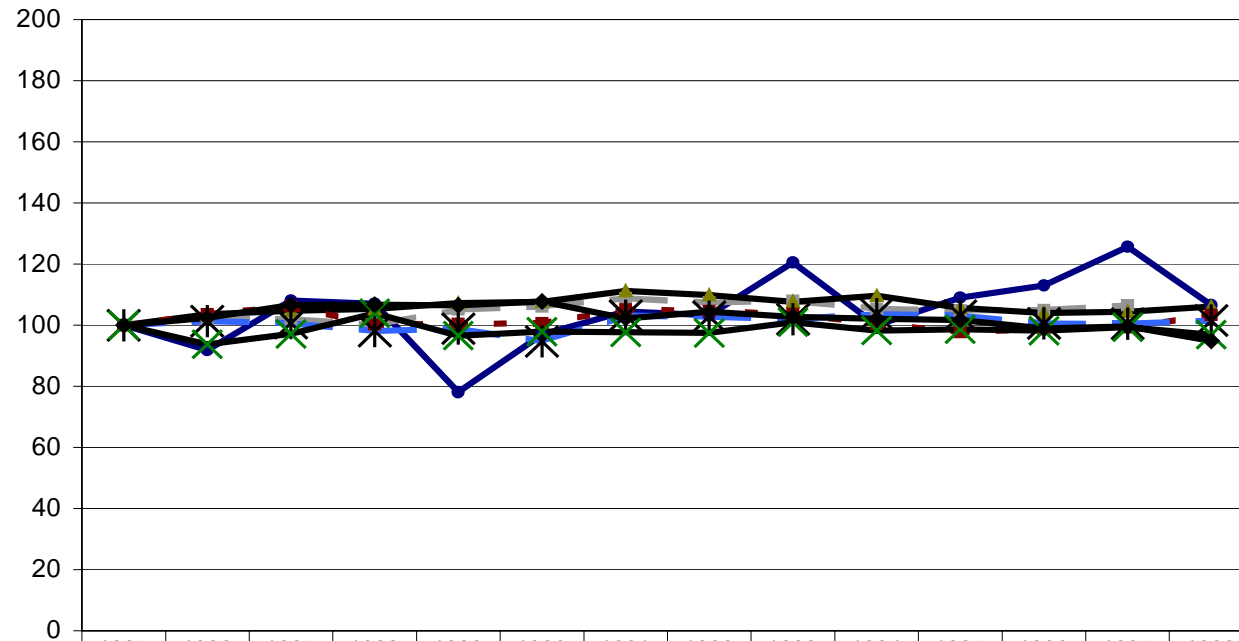


	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
----- Total knee replacement/1000							100.0	126.7	170.0	174.3	193.9	218.7	269.2	283.0	+183.0%
■ ● Home Care Expenditures/capita						100.0	105.5	113.0	106.9	115.9	142.0	173.4	188.7	219.4	+119.4%
—×— Bypass surgery/1000							100.0	97.8	97.8	112.7	136.6	147.4	158.6	175.9	+75.9%
- - □ - - Drug expenditures/capita	100.0	106.0	108.8	104.7	99.7	105.6	111.2	121.5	130.1	131.7	146.3	153.4	157.6	164.7	+64.7%
- ▲ - Cataract surgery/1000							100.0	110.0	119.6	132.9	157.9	143.2	151.2	165.6	+65.6%
—+— Total hip replacement/1000							100.0	98.1	92.5	107.7	111.5	121.9	136.8	149.4	+49.4%
—■— Other Institutions expenditures/capita	100.0	96.5	97.7	95.8	102.5	109.8	110.7	115.1	113.4	118.0	121.1	121.4	121.8	127.3	+27.3%
—■— PCH Expenditures/capita	100.0	97.1	100.8	104.9	103.2	111.1	110.3	113.2	112.1	113.9	116.6	115.1	111.2		+11.2%

Indicators that have an increase of greater than 10% between the earliest year and the latest year are considered to be trending upwards. This chart shows 8 upward trending items. It is notable that this list is made up entirely of the surgical procedure indicators, and expenditure items.



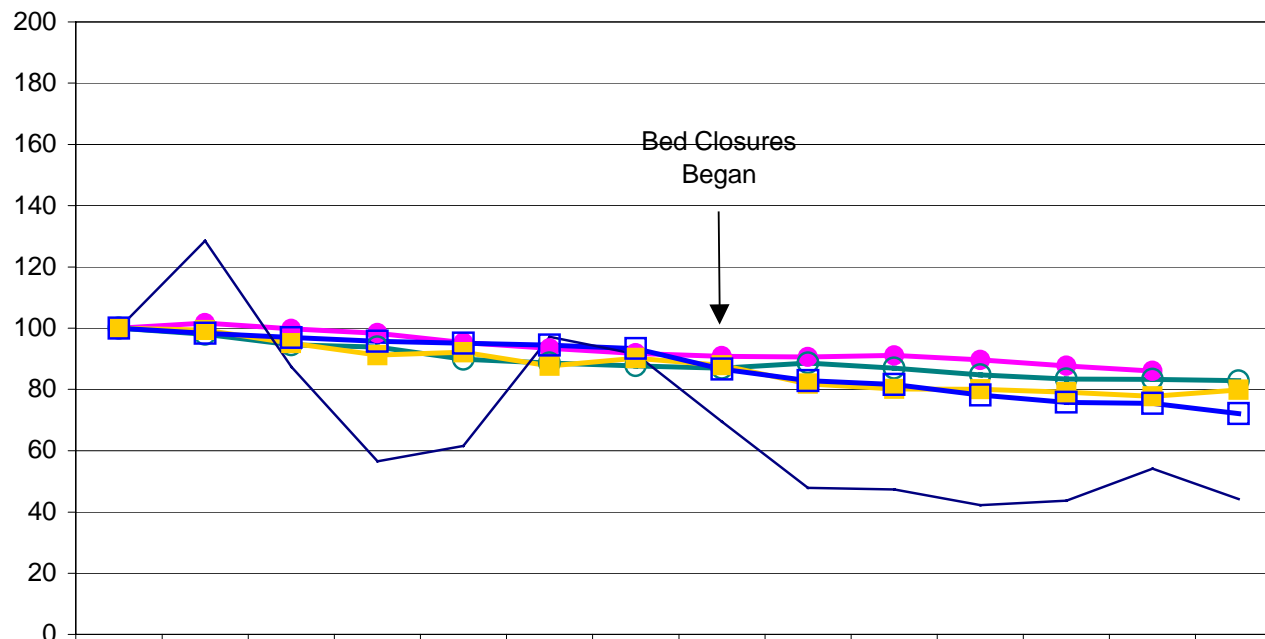
**Figure 5: Changes in Health Care of Manitobans  
1985 to 1998 Flat Trend  
Indexed Crude Rates (1985=100)**



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
—●— PCH admissions/1000 age 75+	100.0	91.9	108.1	107.0	78.1	97.0	104.6	103.2	120.6	100.1	109.1	113.0	125.7	106.6	+6.6%
—■— Physicians/1000	100.0	102.0	102.0	100.1	105.1	106.2	108.8	107.4	108.0	105.4	104.9	104.9	106.5		+6.5%
—▲— Physician visits/1000	100.0	103.6	104.8	105.3	107.3	107.7	111.3	109.9	107.7	109.7	105.7	104.0	104.4	106.1	+6.1%
—■— Physician expenditures/capita	100.0	103.6	106.2	100.2	100.5	100.6	105.2	104.7	103.7	100.5	97.8	98.7	99.3	103.4	+3.4%
—X— Hospitalizations/1000	100.0	101.3	100.7	98.1	98.9	94.7	103.2	102.9	101.9	103.6	103.1	100.5	100.5	101.5	+1.5%
—X— PCH residents/1000 age 75+	100.0	93.8	97.2	103.9	96.6	97.9	97.7	97.4	101.0	98.3	98.7	98.2	99.3	96.9	-3.1%
—◆— Hospital expenditures/capita	100.0	102.4	106.7	106.8	106.5	107.8	102.3	104.4	102.7	102.1	101.7	99.0	99.5	94.9	-5.1%

Indicators that changed less than 10% between the earliest and latest years are considered to have remained “flat”. These 7 indicators show the areas where there have been the fewest changes over the time period. The rate of personal care home admissions shows the greatest variability.

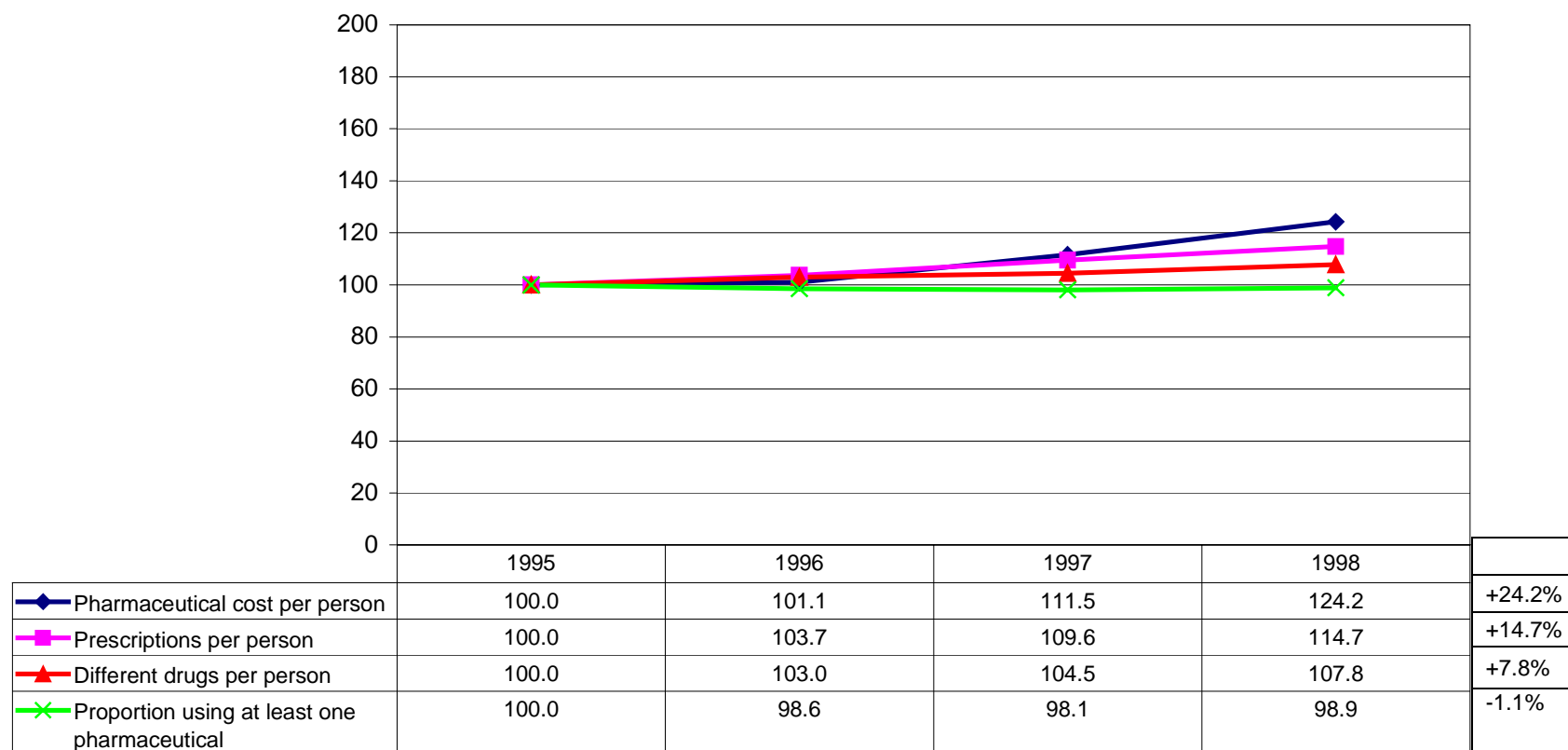
**Figure 6: Changes in Health and Health Care of Manitobans  
1985 to 1998 Trending Downwards  
Indexed Crude Rates (1985=100)**



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
● Premature mortality rate/1000	100.0	101.6	99.8	98.4	95.3	93.4	91.8	90.9	90.6	91.1	89.6	87.7	86.0		-14.0%
○ PCH Beds/1000 age 75+	100.0	98.0	94.6	93.8	89.9	88.6	87.7	87.0	88.6	87.0	84.8	83.4	83.4	82.8	-17.2%
■ Hospital days/1000	100.0	99.4	95.1	91.2	92.1	87.7	90.2	87.9	81.9	80.2	80.1	79.1	77.7	79.9	-20.1%
■ Hospital beds/1000	100.0	98.4	96.9	95.7	95.1	94.5	93.4	86.7	82.9	81.6	78.2	75.8	75.5	72.1	-27.9%
— Capital expenditures/capita	100.0	128.5	87.3	56.5	61.6	97.2	91.5	69.5	47.9	47.4	42.3	43.7	54.1	44.2	-55.8%

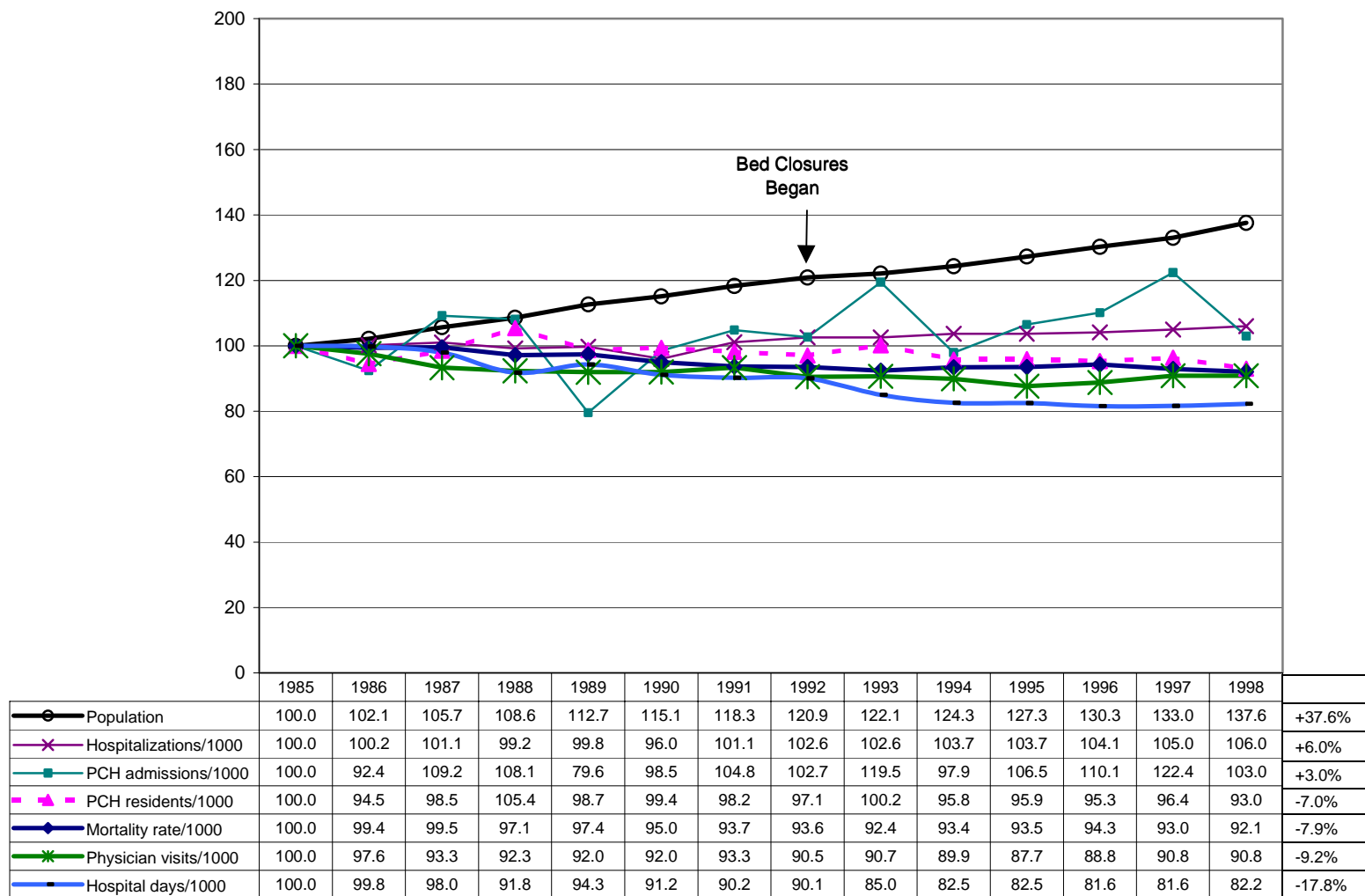
Indicators that show a decrease of more than 10% from the earliest to the latest years are considered to be trending downward. In Figure 1 the Premature Mortality Rate was shown as a rate of deaths in persons aged 0-74 per 1000 population—this chart indexes the value. There has been a substantial reduction in inpatient hospital use. The decline in actual inpatient use is somewhat understated in the “hospital days/1000” measure as we have counted outpatient surgery as a 1 day stay.

**Figure 7: Pharmaceutical Use by Manitobans**  
Indexed Age/Sex-Adjusted Rates (1995=100), 1995 to 1998



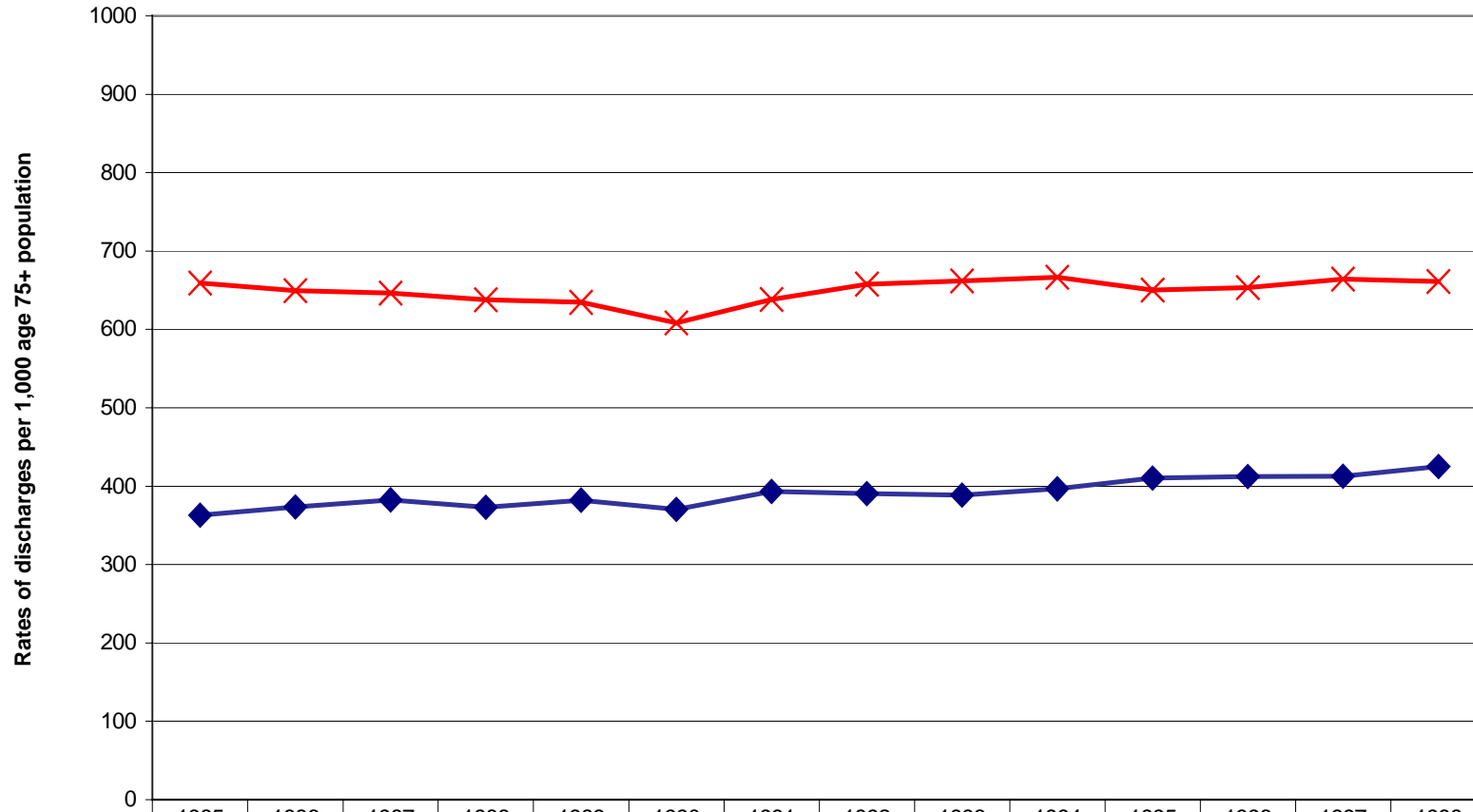
The introduction of the Drug Program Information Network (DPIN) in 1995 made it possible to study prescription drug use by Manitobans. This chart shows the change over the 4 year period in 4 indicators. There has been little change in the number of people using at least one drug, but for people who have used prescription drugs, there have been increases in both the average number of drugs used and the number of prescriptions obtained. However the biggest increase is in the cost indicator.

**Figure 8: Manitoba Population Age 75+ Indexed Adjusted Rates, Summary, 1985 to 1998**



The population of Manitoba that is 75 years and over is of particular interest, both because of the increasing numbers of people in this age group, and their relatively high use of the health care system. This chart shows both the use of health care services by people 75+, as well as an indicator of the average health status. The mortality rate of this age group has decreased by 7.9% over the 14-year period, and the population has increased by almost 38%. Note, except for the change in the numbers of this population, all rates have been adjusted to the changing age and sex structure of the population. Of particular note is that the rate of inpatient hospital care (i.e., discharges) has increased, but the number of hospital days has shown a substantial decrease.

**Figure 9: Hospitalization Rates Age 75+ for Winnipeg and Non-Winnipeg, Age/Sex-Adjusted Rates, 1985 to 1998**



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
Non-Winnipeg	659.4	649.6	646.6	637.9	634.5	608.2	638.2	657.9	662.1	666.7	650.3	653.5	664.3	661.3	+0.3%
Winnipeg	363.0	373.2	382.5	373.0	382.2	370.2	393.0	390.3	388.8	396.6	410.1	412.1	412.5	424.9	+17.1
Manitoba	498.4	499.3	503.7	494.7	497.2	478.5	503.9	511.3	511.4	516.8	516.9	518.8	523.3	528.2	+6.0%

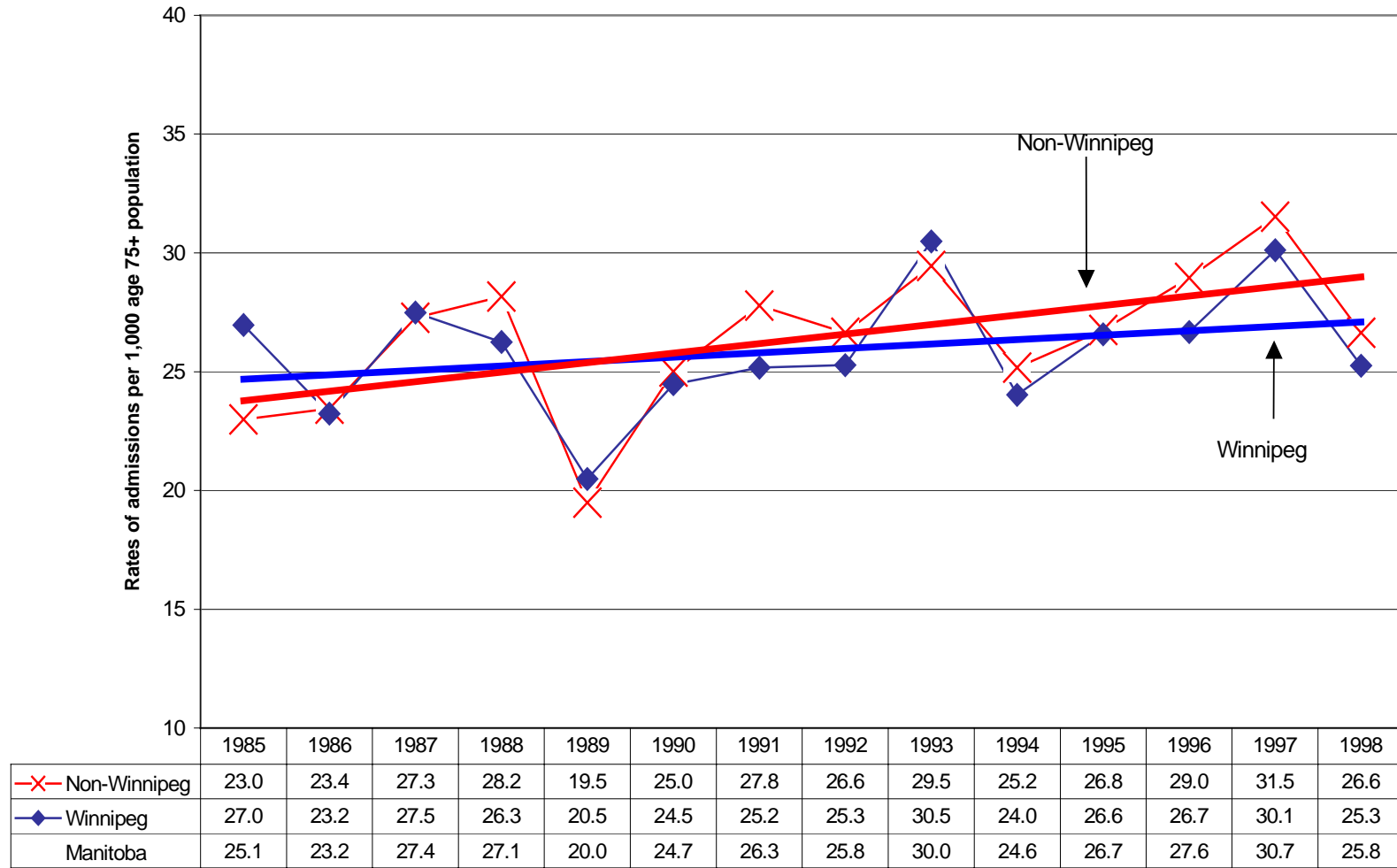
This figure shows the actual rates of hospital use by people 75 years and over, by location of their residence. People in this age group who live outside of Winnipeg are more likely to be hospitalized, but their rate of hospitalization has remained fairly constant over the 14 year time period. The 75+ population of Winnipeg has shown a substantial increase in the rate of hospitalization.

**Figure 10: Hospital Days Age 75+ for Winnipeg and Non-Winnipeg  
Age/Sex-Adjusted Rates, 1985 to 1998**



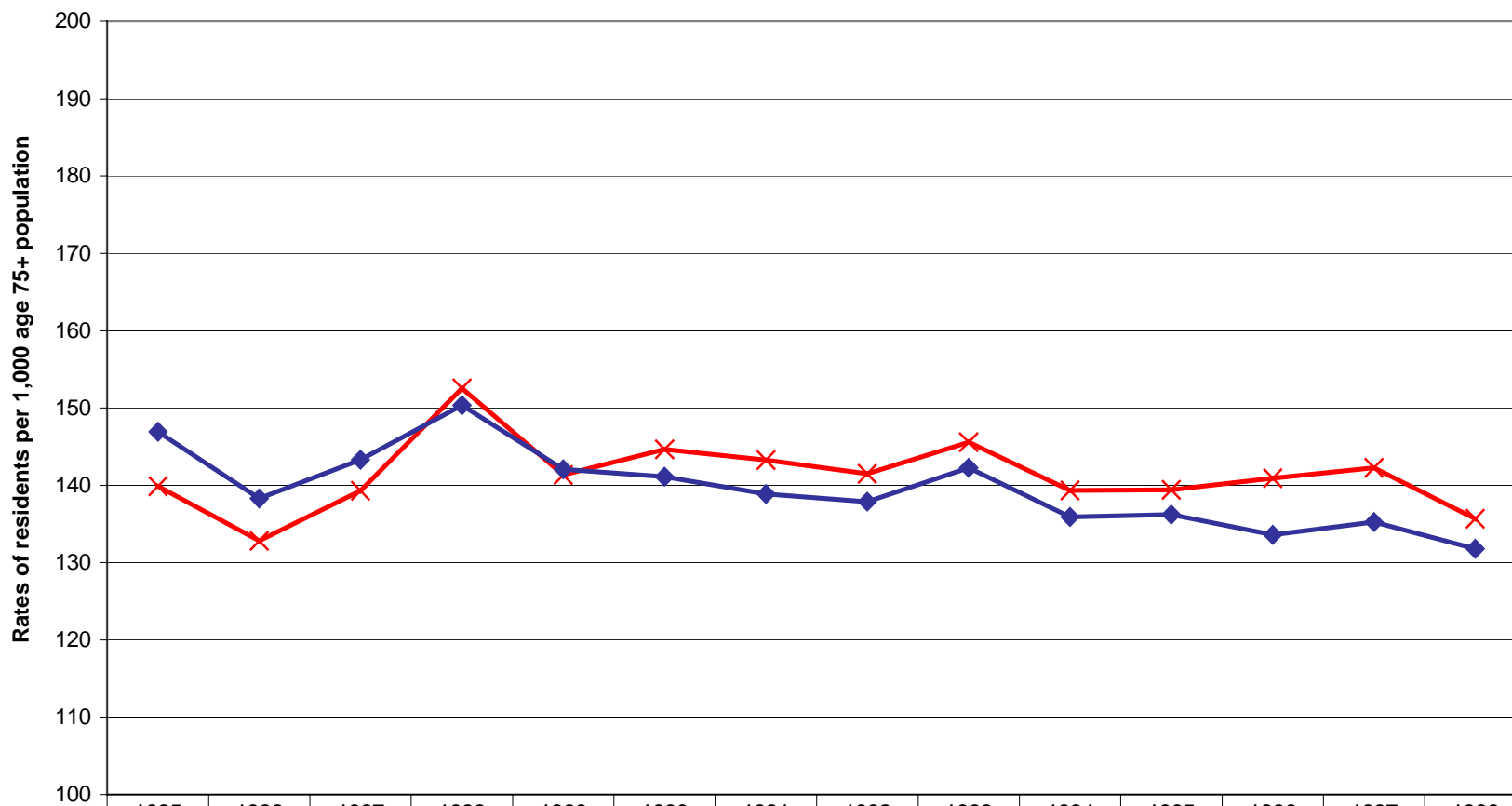
The average number of inpatient days for people 75 years and over has decreased considerably over the 14 years. People in this age group living outside of Winnipeg started out at a higher level of use, but their usage showed a greater decrease over time than did that of Winnipeg residents. Since in these analyses we count surgical outpatient procedures as a one-day stay, these analyses underestimate the decline in *inpatient* care which has actually occurred.

**Figure 11: PCH Admissions Age 75+ for Winnipeg and Non-Winnipeg  
Age/Sex-Adjusted Rates , 1985 to 1998**



The rates of Personal Care Home (PCH) admissions shows some of the greatest variability over the time period. Years of high admission rates are followed by years of low rates. While one might think the peaks reflect years in which new PCH beds become available resulting in increased admissions, since these peaks happen across the province, this is unlikely. To help in looking at the overall trend of PCH admissions, trendlines have been added to this chart, showing an upward trend for both Winnipeg and non-Winnipeg residents.

**Figure 12: PCH Residents Age 75+ for Winnipeg and Non-Winnipeg, Age/Sex-Adjusted Rates , 1985 to 1998**

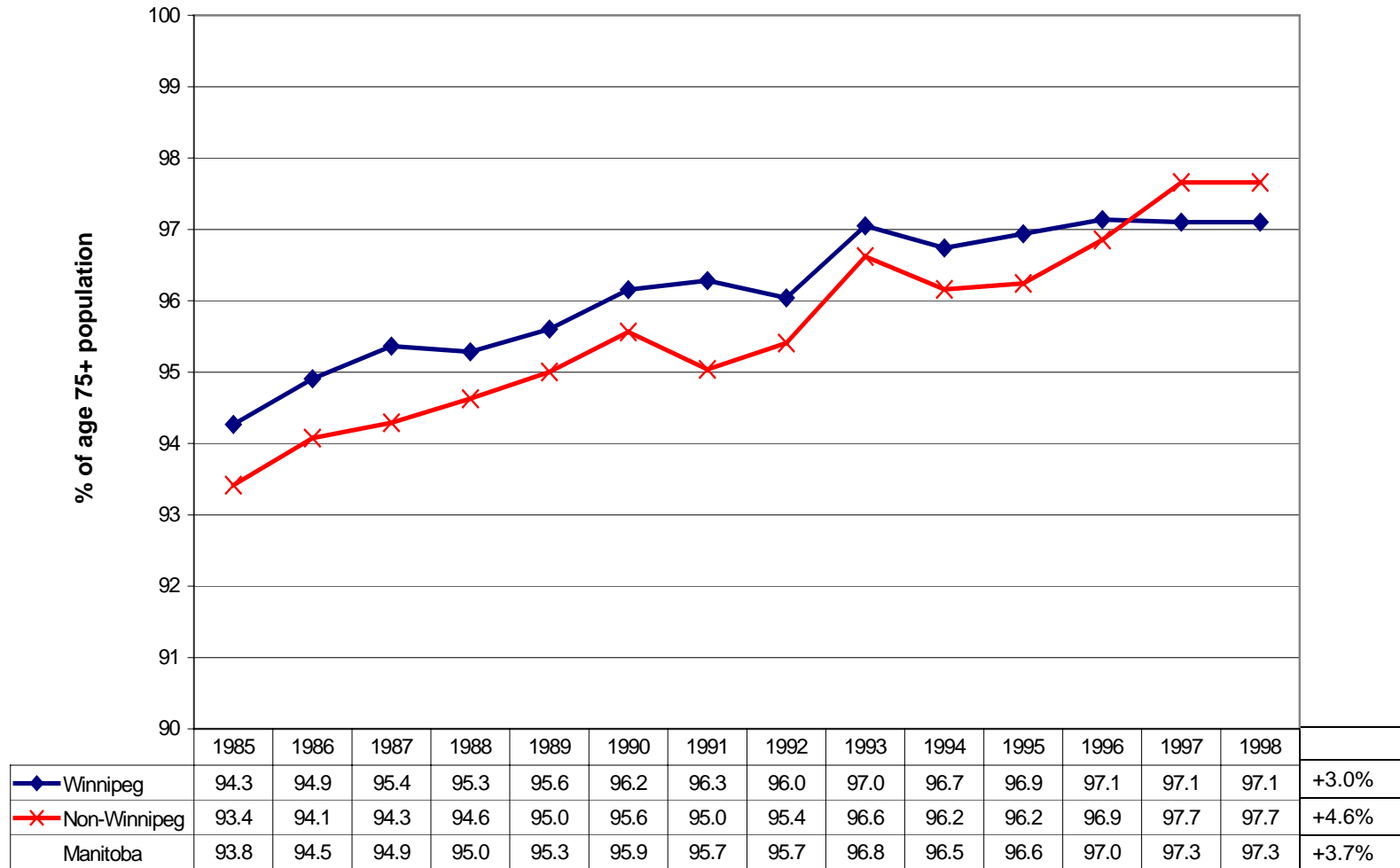


	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
Non-Winnipeg	139.9	132.8	139.3	152.5	141.3	144.7	143.3	141.5	145.6	139.3	139.4	140.9	142.3	135.7	-3.0%
Winnipeg	146.9	138.3	143.3	150.3	142.1	141.1	138.9	137.9	142.3	135.9	136.2	133.6	135.2	131.8	-10.3%
Manitoba	143.5	135.5	141.3	151.2	141.6	142.6	140.8	139.3	143.7	137.4	137.6	136.8	138.2	133.4	-7.0%

This chart shows the rate at which people 75 years and over are resident in a Personal Care Home (PCH) during a given year. It includes both those admitted that year and those admitted in previous years. There has been a general trend to a smaller proportion of older Manitobans living in PCHs over the period.

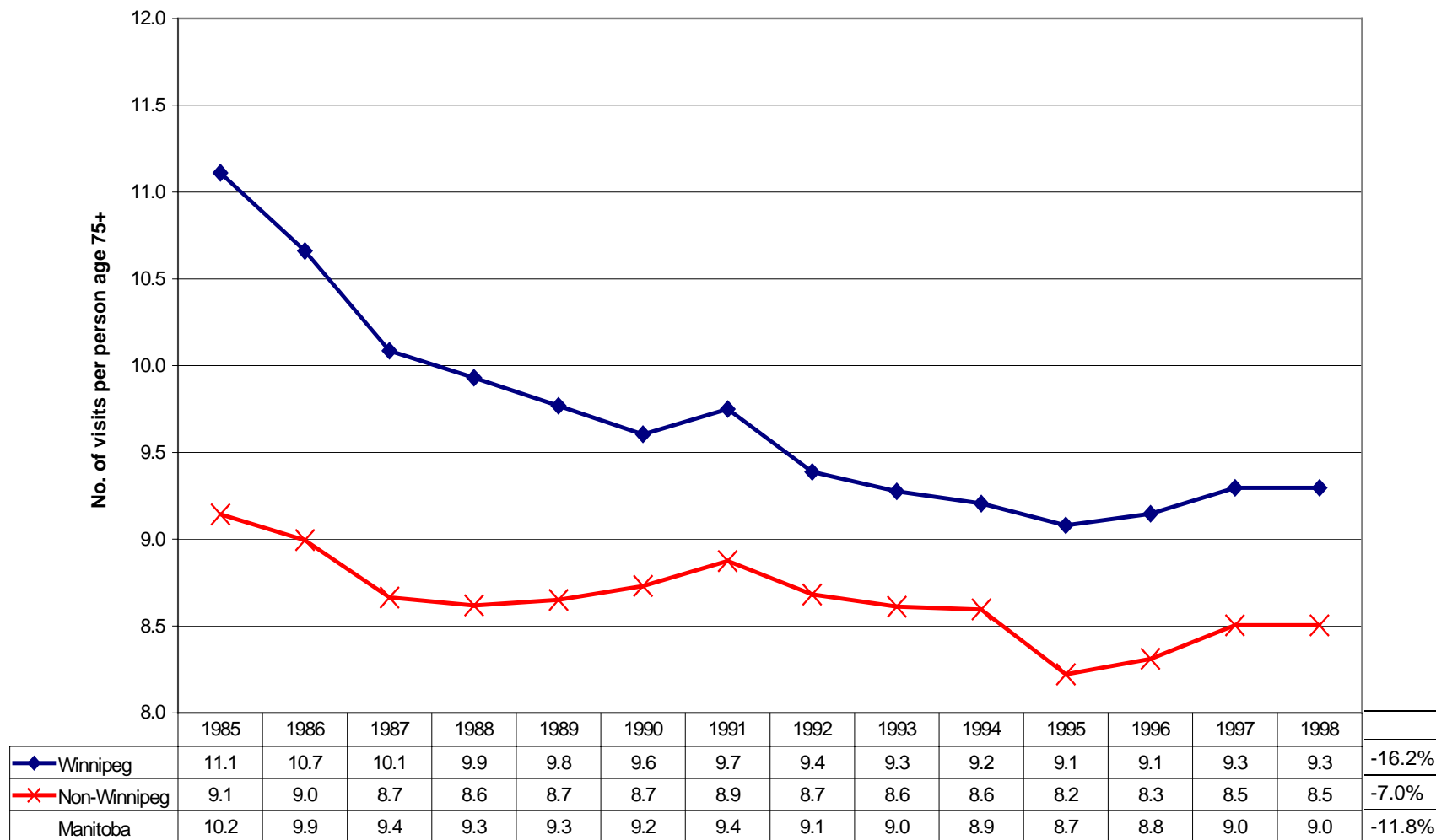


**Figure 13: People Age 75+ Making at Least One Physician Ambulatory Visit for Winnipeg and Non-Winnipeg Age/Sex-Adjusted Rates , 1985 to 1998**



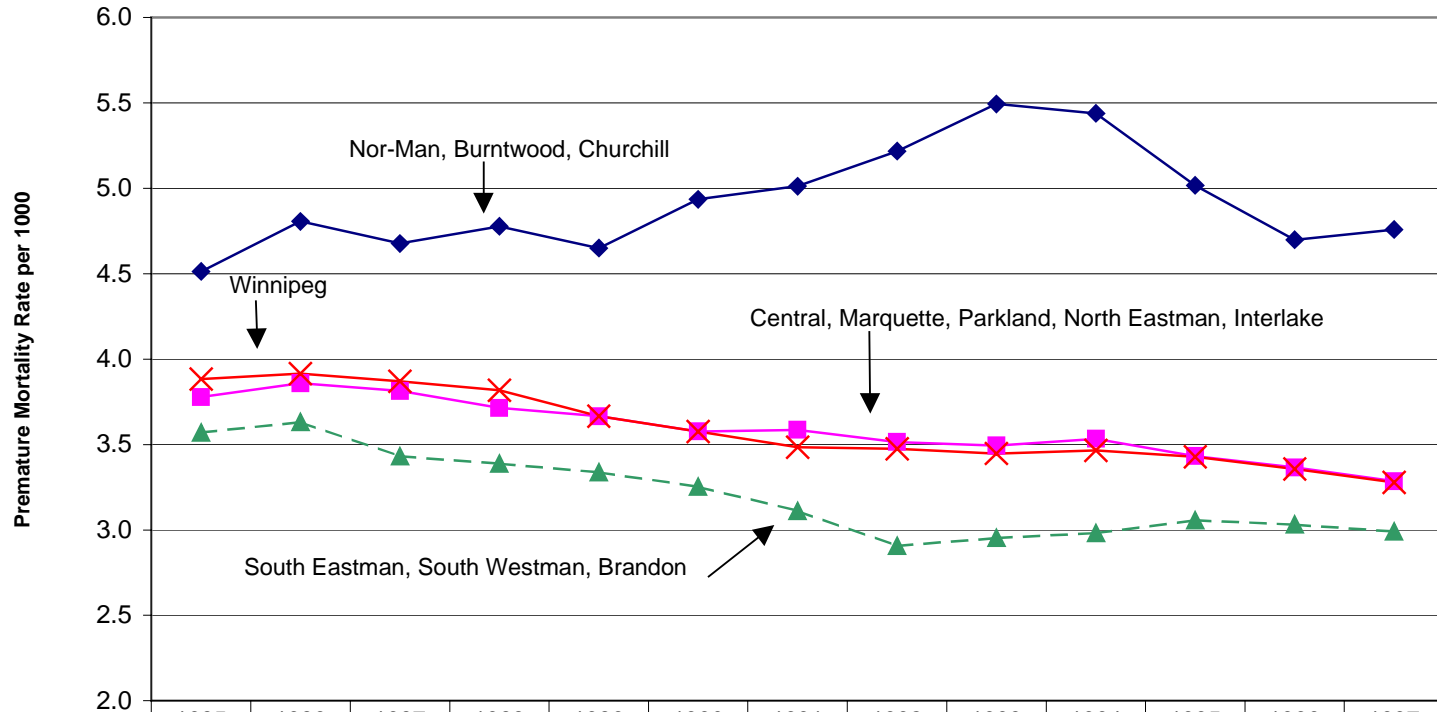
The vast majority of people 75 years and over see a physician at least once a year; this is true for both Winnipeg residents and those living outside of Winnipeg. If anything this proportion has increased over time, with over 97% of the people aged 75+ having at least one physician contact in 1998.

**Figure 14: Physician Ambulatory Visits per Person  
Age 75+ for Winnipeg and Non-Winnipeg  
Age/Sex-Adjusted Rates, 1985 to 1988**



Although there has been an increase in the proportion of people 75 years and over seeing a physician at least once, there has been a decrease in the average number of visits per year for this age group. In 1985 older Manitobans averaged 10.2 visits a year while in 1998 they averaged 9 visits a year. The number of visits for people in Winnipeg has been consistently higher, although this gap has closed, beginning in the early 1990s.

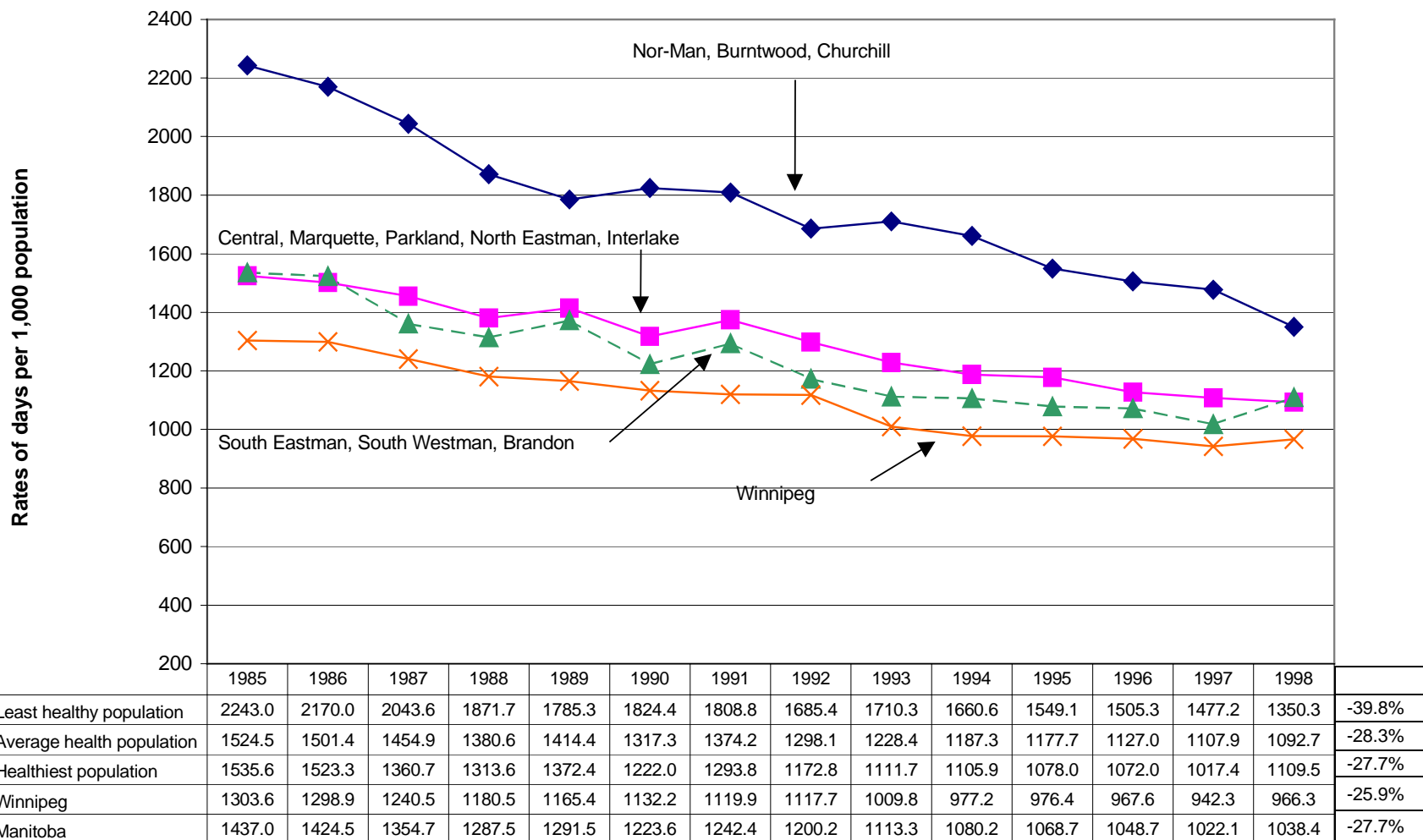
**Figure 15: Premature Mortality (Age/Sex-Adjusted)  
Rates per 1,000 Population  
1985 to 1997 (Rates are 3-yr Moving Averages)**



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	
◆ Least Healthy Population	4.5	4.8	4.7	4.8	4.7	4.9	5.0	5.2	5.5	5.4	5.0	4.7	4.8	+6.7%
■ Average Health Population	3.8	3.9	3.8	3.7	3.7	3.6	3.6	3.5	3.5	3.5	3.4	3.4	3.3	-13.2%
▲ Healthiest Population	3.6	3.6	3.4	3.4	3.3	3.3	3.1	2.9	3.0	3.0	3.1	3.0	3.0	-16.7%
× Winnipeg	3.9	3.9	3.9	3.8	3.7	3.6	3.5	3.5	3.4	3.5	3.4	3.4	3.3	-15.4%
Manitoba	3.8	3.9	3.8	3.8	3.7	3.6	3.5	3.5	3.5	3.5	3.5	3.4	3.3	-13.2%

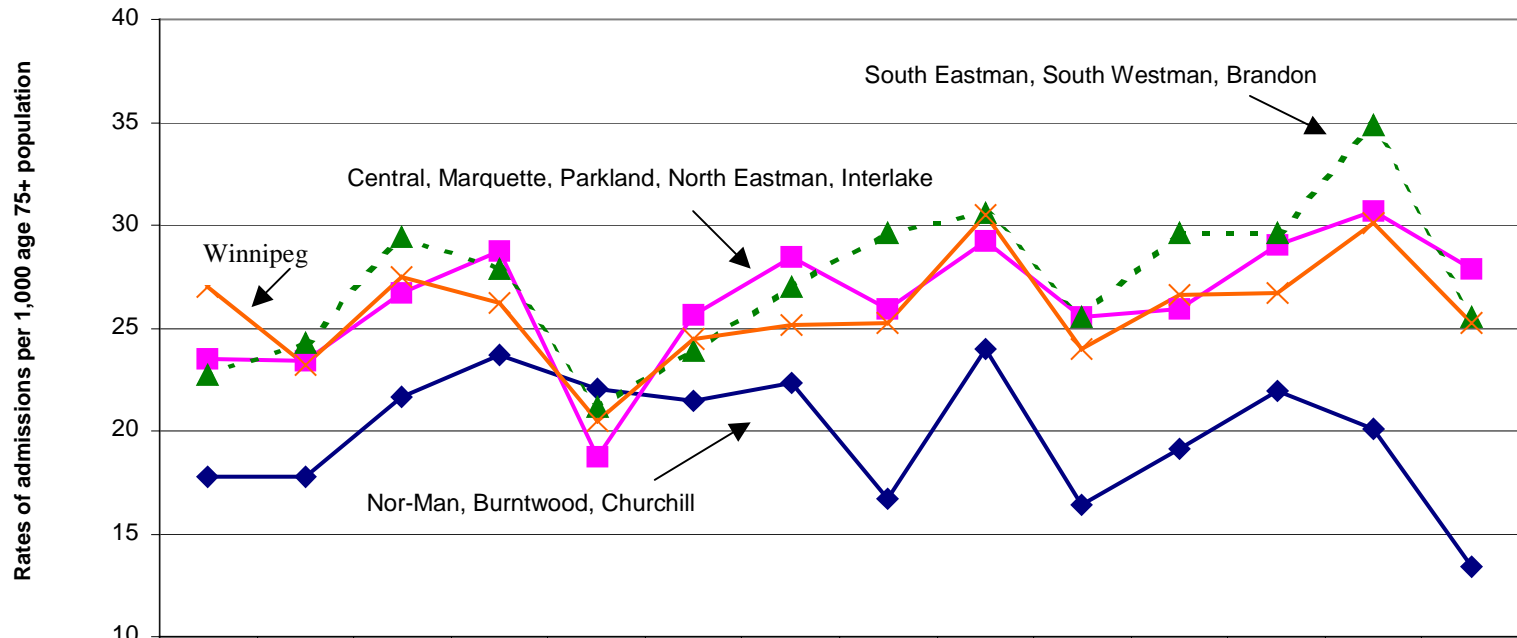
The populations of some areas of the province are, on average, healthier than populations living in other areas. The next 5 charts classify Manitoba regions into 4 groups: Winnipeg, regions outside Winnipeg with the healthiest population, regions outside Winnipeg with the least healthy populations, and regions with a population of “average” health. Winnipeg is classified separately even though there are varying levels of health status across residents of different parts of the city. The Premature Mortality Rate (PMR) of the population is used to classify the health status of the regions, with high premature mortality rates indicating poor health. This indicator measures deaths among individuals aged 0-74. This chart shows the PMR for Manitoba regions—the regions with the highest PMR have shown an increase in this rate over the 13-year period, meaning that not only was the population resident in these areas the least healthy, but the average health status of residents of these areas has worsened over this time. All other areas have shown improvement in health status, with residents of the most healthy regions showing the greatest improvement.

**Figure 16: Hospital Days by Population Health Status (RHAs)  
Age/Sex-Adjusted Rates, 1985 to 1998**



All areas have shown decreases in the number of inpatient hospital days used by their residents, with the regions with the least healthy populations showing the greatest decrease in days. The rate of decreased use of hospital days has been fairly similar in the other regions. Since in these analyses we count surgical outpatient procedures as a one-day stay, the figure underestimates the decline in *inpatient* care which has actually occurred.

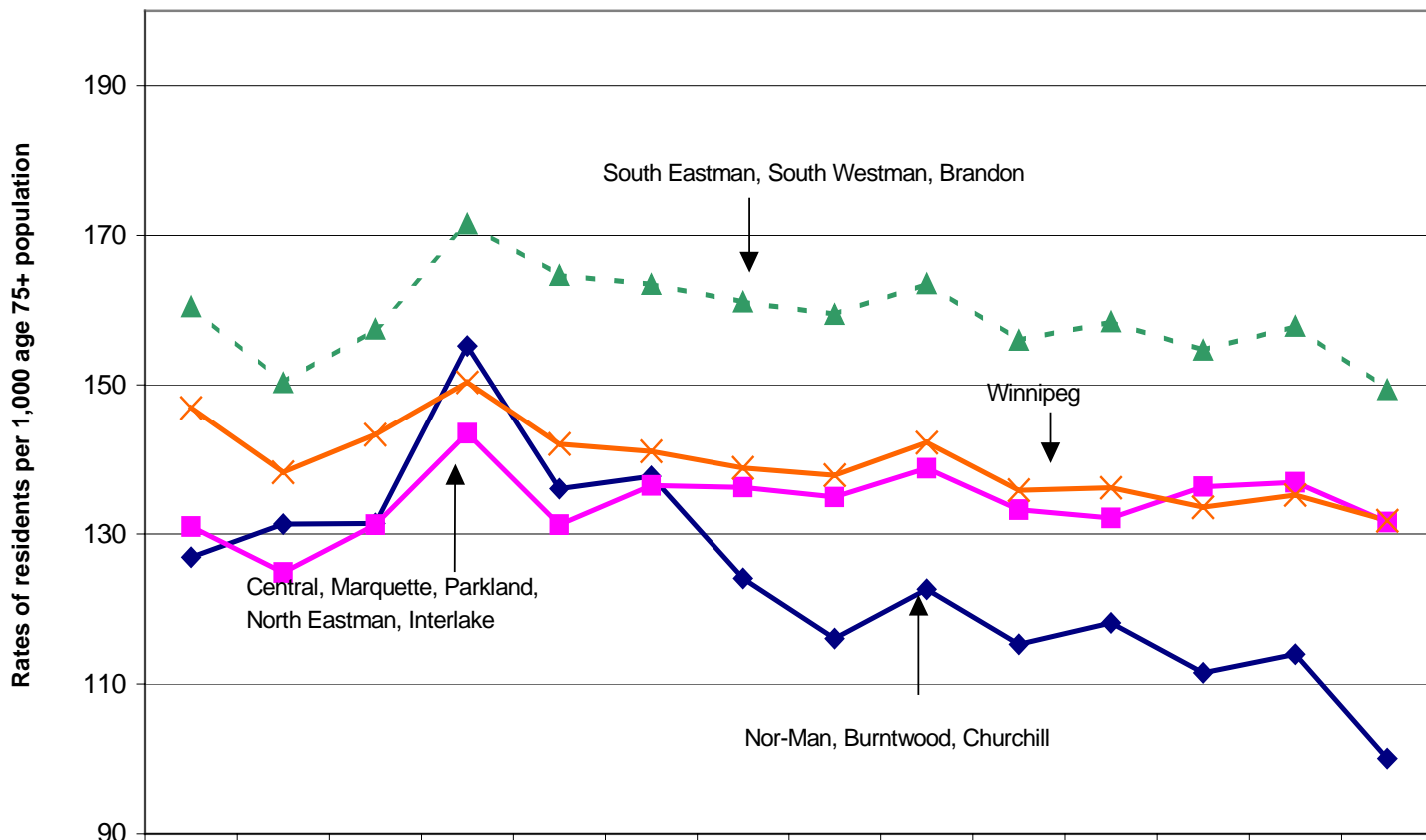
**Figure 17: PCH Admissions Age 75+ by Population Health Status (RHAs), Age/Sex-Adjusted Rates, 1985 to 1998**



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
◆ Least healthy population	17.7	17.8	21.7	23.7	22.1	21.4	22.3	16.7	24.0	16.4	19.1	22.0	20.1	13.4
■ Average health population	23.5	23.4	26.7	28.8	18.7	25.6	28.4	26.0	29.2	25.5	25.9	29.1	30.7	27.9
▲ Healthiest population	22.7	24.2	29.4	27.9	21.1	23.9	27.0	29.6	30.6	25.6	29.7	29.6	34.8	25.6
× Winnipeg	27.0	23.2	27.5	26.3	20.5	24.5	25.2	25.3	30.5	24.0	26.6	26.7	30.1	25.3
● Manitoba	25.1	23.2	27.4	27.1	20.0	24.7	26.3	25.8	30.0	24.6	26.7	27.6	30.7	25.8

A discussion of nursing home use in the North (containing the three RHAs identified as having the least healthy population) is compromised by our lack of information on federal nursing homes (operated by Indian and Northern Affairs). These beds contribute over half of the supply of nursing home beds in Burntwood region, and a substantial number of beds in Nor-Man. Therefore, our assessment focuses only on the provincially funded beds in both for profit and non-profit Personal Care Homes.

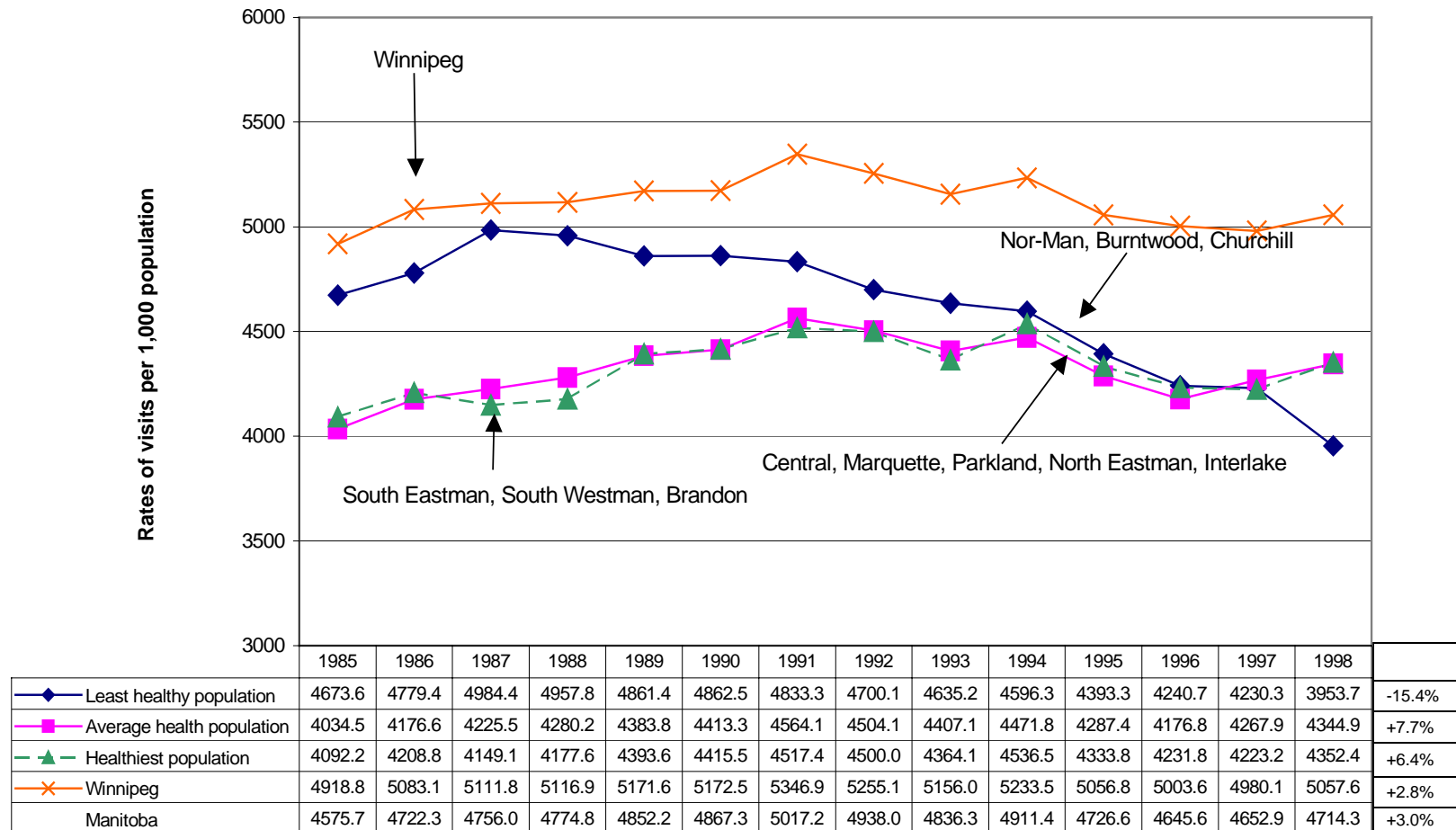
**Figure 18: PCH Residents Age 75+ by Population Health Status (RHAs), Age/Sex-Adjusted Rates, 1985 to 1998**



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
Least healthy population	126.9	131.4	131.4	155.2	136.1	137.7	124.1	116.0	122.7	115.3	118.1	111.5	114.0	100.0	-21.2%
Average health population	131.0	124.9	131.3	143.5	131.3	136.5	136.3	135.0	138.8	133.3	132.1	136.4	136.9	131.6	+0.5%
Healthiest population	160.5	150.3	157.5	171.6	164.7	163.5	161.1	159.4	163.6	156.0	158.5	154.7	157.9	149.4	-6.9%
Winnipeg	146.9	138.3	143.3	150.3	142.1	141.1	138.9	137.9	142.3	135.9	136.2	133.6	135.2	131.8	-10.3%
Manitoba	143.5	135.5	141.3	151.2	141.6	142.6	140.8	139.3	143.7	137.4	137.6	136.8	138.2	133.4	-7.0%

The proportion of people 75 years and over who are resident in Personal Care Homes (PCH) has decreased over the 14 years, as was shown in Figure 12. This chart shows that this decrease has been inconsistent between different regions—with the regions with the least healthy populations having the smallest proportion of their older residents residing in PCHs, and the largest decrease in this proportion over the 14-year time period. Regions with the most healthy populations have the highest proportion of people 75+ residing in PCHs.

**Figure 19: Physician Ambulatory Visits by Population Health Status (RHA), Age/Sex-Adjusted Rates, 1985 to 1998**



The average number of visits per year to physicians, visits which occur outside of hospital, shows residents overall rate of contact. Residents of Winnipeg have the highest rate, and there has been a small increase in this rate over the 14-year time period. The northern regions, those with the least healthy populations, had a rate of physician visits similar to Winnipeg residents in the early years, but that rate has been dropping over the years—in 1998 the least healthy populations in Manitoba had the fewest physician visits. Some of this drop is likely explained by the marked loss of fee-for-service physicians from the North; even with increased numbers of salaried physicians in North, supply in the North decreased over this period more than elsewhere in the province. In addition to the reduced physician supply, salaried physicians tend to deliver fewer patient contacts and/or some of their patient contacts may not be reported (as there is no fee incentive for doing so).

### 3. OBSERVATIONS ON THE TRENDS OVER TIME

#### A Summary with references to the Figures

#### 3.0 Health Status

**Health Status** of Manitoba's population improved. Overall, the population of the province experienced a 14% drop in premature mortality rates. Life expectancy for females increased a full year (from 80.1 to 81.1 years), and that of males increased a remarkable 2.6 years (from 73.1 to 75.7 years).

#### 3.1 Provincial Trends

**Provincial trends** between 1985 and 1998 over a broad set of indicators<sup>1</sup> are summarized in a series of Figures (3-6). Separate graphs (4-6) are given for those indicators that show an increase greater than 10% over this period, those which were basically flat (the difference between 1985 and 1998 values on the indicator was 10% or less), and those which showed a drop of more than 10% over this period.

#### Hospitals

**Access to hospitals** (discharges per 1000 people adjusted for population growth and aging) remained essentially the same despite 28% of Manitoba's hospital beds being closed over this period. The period of significant bed closures began in 1992. While the number of days Manitobans spent in hospital fell after bed closures began, the fall in hospital use started before significant bed closures had occurred, and in fact, the number of hospital days used by Manitobans fell almost as much before 1992 as from 1992 – 1998<sup>2</sup>.

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<sup>1</sup> The information presented is based on rates unadjusted for changes in the age/sex composition of the Manitoba population that aged over this period because several indicators, including the expenditure data, the supply of physicians and the supply of beds, cannot be adjusted. However, for those categories that can be adjusted, we note those differences between the crude and adjusted rates if warranted. Per capita expenditure rate trends are based on constant dollars. Appendix 1 replicates Figures 3 to 6 for the relevant indicators, using rates which have been age and sex adjusted.

<sup>2</sup> Since in these analyses we count surgical outpatient procedures as a one-day stay, these analyses understate the decline in *inpatient* care which has actually occurred.



**Expenditures** per capita on hospitals were constant despite the bed closures. (Note these and other expenditures reported here are in constant dollars, that is, they are adjusted for inflation.)

**Rates of some surgical procedures** increased substantially since 1991 (earlier data were not assessed). Notable among these were by-pass surgery, cataract surgery, total hip replacement, and total knee replacements with increases of 76%, 66%, 49% and 183% respectively. Even when adjusted for population growth and the aging of the population, these rate increases were still 68%, 53%, 39% and 166% respectively.

### **Physicians**

**The supply of physicians** per 1000 population and the number of visits per person to physicians remained about the same, as did expenditures on physician services.

### **Personal Care Homes**

**Access** (annual rate of admissions) to PCH beds increased somewhat over this period, although large increases in one year were usually followed by a year of fewer admissions. There was little change in the proportion of people 75 years and older who were residents of nursing homes over this period. (See subsequent section on the population aged 75 and over for the age/sex-adjusted figures and more details on the admission patterns). There was a decrease in the number of nursing home beds available per 1000 residents aged 75 years and over.

**Expenditures** on PCHs, according to the Annual Reports of Manitoba Health, had risen by 16.6% between 1985 and 1995, but then fell somewhat in the following two years. The increase over the period 1985 to 1997 was 11.2%.

### **Home Care**

**Expenditures** for home care services increased by 119.4% over the period 1990 to 1998, according to Manitoba Health Annual Reports.

### **Other Institutions**

**Expenditures** on “Other Institutions” (which includes nursing homes and other residential care types of facilities for ill or disabled people), according to the Canadian Institute for Health Information (CIHI), rose by 27%. Since nursing home expenditures rose much less over this period, expenditures for other institutional facilities must have risen much more rapidly.

### **Drugs**

**Expenditures** for drugs increased—CIHI data show a 64.7% increase between 1985 and 1998. We used DPIN data to examine the factors driving these increases over the 4-year period 1995 to 1998 and found that the biggest increase was in the cost of drugs. The dollars per resident spent on pharmaceuticals consumed out of hospital increased 24.2% over the period—from \$173 to \$215 per resident—see Figure 7. Over the same period the number of prescriptions per resident increased 14.7%, going from 6 to 7 per resident, and the number of different drugs used increased by 7.8% (from an average of 2.1 to 2.3 per resident). The percent of Manitobans using at least one drug remained constant over the period (67%).

### **Capital Expenditures**

**Capital Expenditures** decreased substantially, by 56% over this period. Our tracking ends in 1998, and it may be that there have been substantial additional investments since that time that are not reported here.

## **3.2 Winnipeg/Non-Winnipeg Comparisons**

Although not presented in this report, we also reviewed over-time data on the above set of indicators separately for the Winnipeg and Non-Winnipeg populations. The similarity in the 14-year trends for Winnipeg and Non-Winnipeg residents for almost all indicators is striking: both show a downward trend in premature mortality rates and hospital stays, an upward trend in high-profile surgical procedures and a flat trend in per capita physician visits. (Graphs available on request.)

### 3.3 Focus on the Manitoba Population 75 years and Older

Figure 8 summarizes our full set of indicators of health status and utilization for those Manitobans aged 75 years and older. Except for the numbers that show the total population of older residents, all rates have been adjusted to the changing age and gender structure of this population over this period. Note that for this reason there are some differences between the numbers in Figure 8 and those in Figures 3 to 6 where age/ and sex-adjustments were not made.

While those aged 75 years and older made up 4.95% of the population in 1985, by 1998 they contributed 6.6 % to the population of Manitoba; their numbers grew from 55,089 to 75,599, a 37.6% increase.

#### Health Status

The mortality rate of older Manitobans fell 7.9% over this period suggesting an improvement in health status. The fall was somewhat greater for Winnipeg's 75 years and over population (8.9%) than for this population living outside Winnipeg (6.6%). (Graphs available on request.)

#### Hospital Use

The rate at which Manitobans aged 75 years and over were hospitalized increased by 6% between 1985 and 1998 (see Figure 9). Over the whole period, Winnipeg residents were admitted to hospital at a considerably lower rate than were non-Winnipeg residents of this age group. However, Winnipeg's older residents had greater access to hospitals in 1998 than in 1985 (424 discharges per 1000 people aged 75 and over versus 363, a 17% increase<sup>3</sup>.) Those people 75 years and over living outside Winnipeg continued to use hospitals at approximately the same rate over the period.

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<sup>3</sup> As part of our analyses of Winnipeg residents' use over a period of bed closures we observed that over an 8 year period (1989/90-1996/97) the biggest decline came in the use of hospitals by the young (aged 0-18) where there was a 25% drop in short stay days and a 13% drop in cases. Over the same period there was a 28% drop in days for those aged 19-65, and a slight rise in cases (3%). People 75 years and over showed a 13% drop in days and an 11% increase in cases. All rates were adjusted for changes in the age and sex structure of the population over this period.

As measured by days/1000, the use of hospitals by people aged 75 and over was down 17.8% (13% for Winnipeg and 22% for non-Winnipeg—see Figure 10). There was at least as much decrease in hospital use among people 75 years and older before as after bed closures (9.8% versus 8.7%).

### **Personal Care Home (PCH) Use**

Because of the swings in the rate of admissions to PCH from year to year, it is difficult to identify patterns. We plotted separate trend lines for Winnipeg and non-Winnipeg PCH admission rates (Figure 11). The plotted lines make it clear that there has been a small, but distinct, overall trend upwards in the rate at which those aged 75 and over are being admitted to PCH. These rates are adjusted for the changing numbers of people in this age group, so this is an absolute increase that we observe. Moreover, the rate at which people 75 years and over from outside of Winnipeg are being admitted appears to have increased more rapidly, and overtaken the rate at which Winnipeg residents are admitted to PCH.

This small increase in the rate at which people 75 years and over are being admitted to PCH over time has not affected the overall rate of institutionalization of this population—if anything the rate has decreased over time—by approximately 7%<sup>4</sup> (see Figure 12). This suggests that people are staying longer in their homes, and that the rate of “turnover” of PCH beds has increased. Over the whole period, people 75 years and older from Winnipeg and from outside of Winnipeg resided in PCH at a very similar rate. The rate decreased more for people age 75 and over living in Winnipeg (a 10.3% decrease) than for this age group living outside of Winnipeg (a 3% decrease) (see Figure 12).

### **Physician Use**

Between 1985 and 1998 the rate at which people aged 75 years and over visited physicians decreased by 9.2%. However, over this period there was an increase in the proportion of both Winnipeg and non-Winnipeg people in this age group who contacted a physician at least once (a figure that reached 97% in 1998) (see Figure 13). The decrease in physician visits

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<sup>4</sup> Figure 12 adjusts for the changing age and sex structure of the population aged 75 and over—as compared with Figure 1 that was based on the crude numbers of people aged 75 and over each year.

was due to a drop in the number of visits made per person. While in 1985 people aged 75 years and over living in Winnipeg averaged 11 visits per person, this number declined over this period to an average of 9.3 visits in 1998 (see Figure 14). People aged 75 and over living outside of Winnipeg consistently contacted physicians less frequently than did those living in Winnipeg, with their visit rate falling from 9.1 visits per year in 1985 to 8.5 visits in 1998 (see Figure 14).

### 3.4 Comparing Regions with the Healthiest and Least Healthy Populations

Although the health of most Manitobans improved over these years, there were marked differences in health status across Manitoba's regions at the beginning of this period, and if anything the health gap widened over these years (Figure 15)<sup>5</sup>.

In Brandon, South Eastman and South Westman, the regions identified as having the healthiest populations, the rate of premature deaths dropped by 16.7. Over this same period, the rate of premature deaths **increased** by 6.7% in Nor-Man, Burntwood and Churchill, the areas with the least healthy populations. Female life expectancy, at birth, in the three Northern areas declined remarkably during these years, fully one and one half years; male life expectancy, at birth, in these regions has declined approximately one year (figures available on request). The same marked differences in health status and increases in these differences over-time has occurred between residents of Winnipeg's poorest urban neighborhoods, compared to residents of the wealthiest urban neighborhoods (figures available on request).

Since these data on population health status are based on those individuals resident in the area at each point in time, it is possible that the patterns observed are influenced by migration. That is, healthy residents may be moving out of the north (which would potentially lower this area's health status) and moving into those areas we have identified as having improving health status over time. We have agreed to undertake a second project for

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<sup>5</sup> All these figures have been adjusted for different mixes of age and sex across the areas. This is important for making fair comparisons across areas in usage patterns and in health characteristics since some areas have a higher proportion of older residents and some have a higher proportion of younger residents.

Manitoba Health in an attempt to understand why the health of the populations in the north is not improving, and we will investigate this possibility. However, previous work we have undertaken focussing on Winnipeg residents, which tracks individual health status through time according to the average household income in their neighborhood of residence, suggests that migration is not an explanation for the widening health gap between advantaged and disadvantaged Manitobans.

### **Hospital Use**

Bed closures combined with population growth in the North, resulted in the regions with the least healthy population now having fewer hospital beds per capita than are available to residents of the regions with the healthiest population.

Despite local bed availability, residents of the regions with the healthiest populations spent many fewer days in hospital over the entire period than did residents of the regions with the least healthy population. Hospital days used by residents of the regions with the healthiest populations dropped by 27.7%. But the most dramatic drop in hospital day use (39.8%) occurred among the residents living in the regions with the least healthy populations (Figure 16).

### **Personal Care Home (PCH) Use**

A discussion of PCH use in the North (containing the three RHAs identified as having the least healthy population) is compromised by our lack of information on federal nursing homes (operated by Indian and Northern Affairs). These beds contribute over half of the supply of nursing home beds in Burntwood region, and a substantial number of beds in Nor-Man. Therefore, our assessment focuses only on the provincially funded beds (in both profit and not for profit PCHs).

Near the beginning of the period, residents over 75 years of age who resided in the regions with the least healthy populations accessed provincially funded PCH beds at approximately the same rate as people of this age group who resided in other areas of the province. However, over the period, consistently fewer older residents of the least healthy regions were

admitted to PCH each year than was true elsewhere [their rates trended downwards while admission rates elsewhere increased, or showed only a small decrease (see Figure 17)]. Over this whole period, residents of the regions with the healthiest populations who were 75 years or older had a higher rate of PCH use than was true for any other area of the province (Figure 18).

### **Physician Use**

The regions with the least healthy populations appear to have lost considerable access to physicians over this period. While in 1985 residents of these areas were second only to Winnipeg residents in their rate of contacts with physicians, visit rates started to drop in 1988 and appear to have continued dropping over this period (Figure 19). The same drop was not observed in other rural areas. Some of this drop is likely explained by the marked loss of fee-for-service physicians from the North; even with increased numbers of salaried physicians in the North, the supply decreased more than elsewhere in province. In addition to the reduced physician supply, salaried physicians tend to deliver fewer patient contacts and/or some of their patient contacts may not be reported (as there is no fee incentive for doing so).

### **Pharmaceutical Use**

Rates of pharmaceutical use among the residents of the regions with the least healthy populations were higher than for residents of other regions. Rates of use among residents of the regions with the healthiest population were lowest, although their rates of increased use over the period were such that by the end there were few differences in rates of use across the areas (graphs available on request).

#### **4. APPENDIX:**

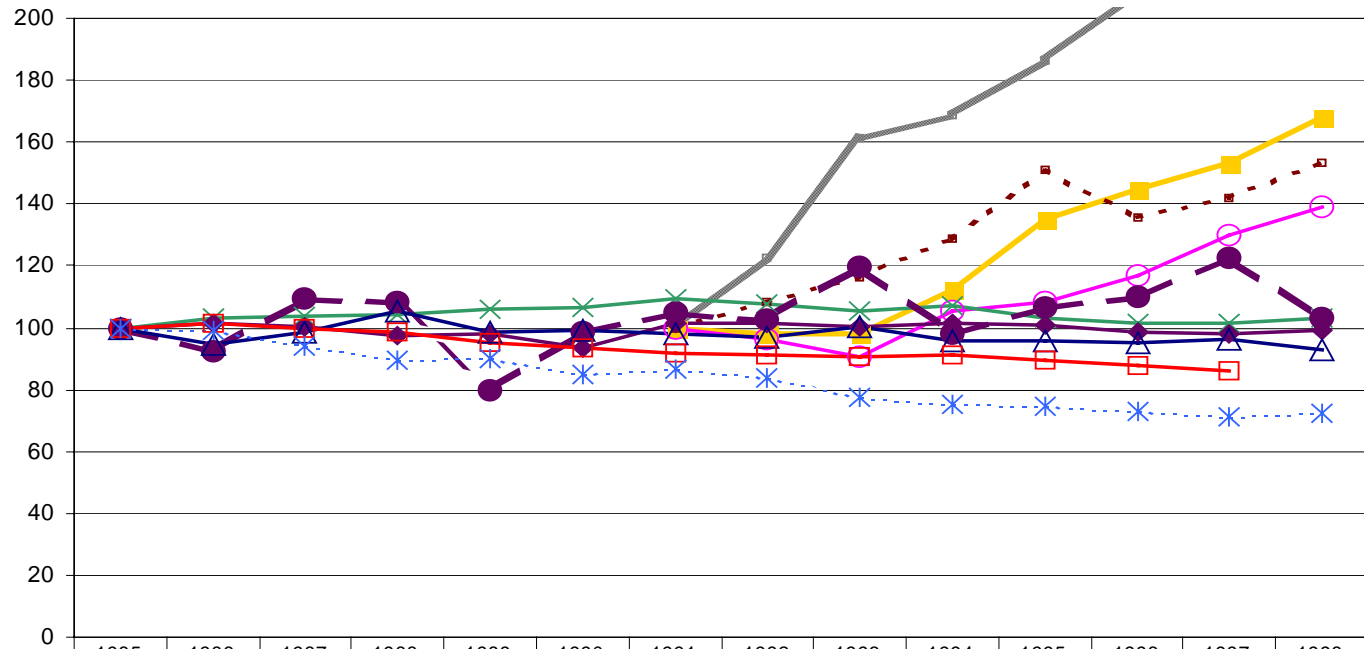
### **ADJUSTED RATES**

The following charts present age/sex-adjusted rates for indicators that were previously presented as crude rates. They correspond as follows:

- Appendix Figure A – Figure 3
- Appendix Figure B – Figure 4
- Appendix Figure C – Figure 5
- Appendix Figure D – Figure 6



**Appendix Figure A:  
Indexed Adjusted Rates, Manitoba (1985=100)**

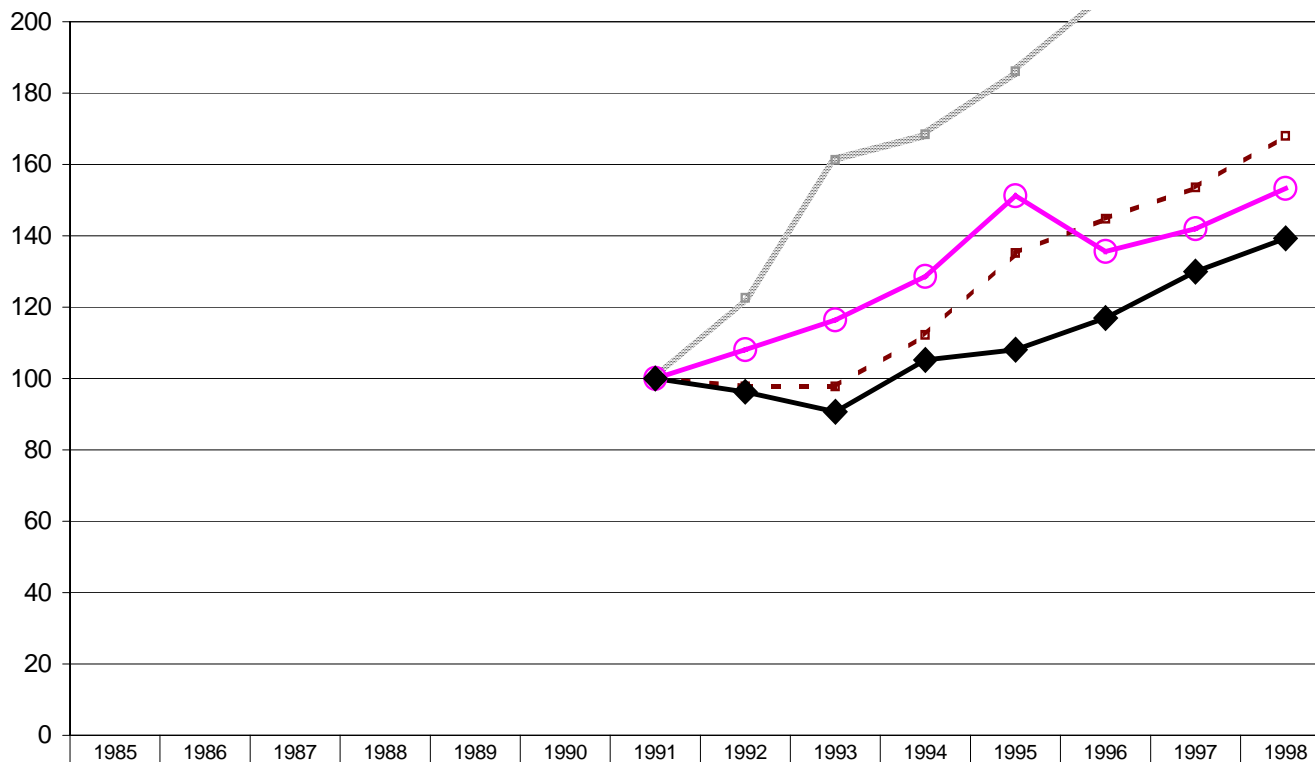


	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
— Total knee replacement/1000							100.0	122.6	161.3	168.4	186.1	208.4	256.5	265.8	+165.8%
■ Bypass surgery/1000							100.0	97.8	97.8	112.2	135.2	144.8	153.5	168.0	+68.0%
- - □ - - Cataract surgery/1000							100.0	108.1	116.4	128.6	151.2	135.6	142.0	153.3	+53.3%
○ Total hip replacement/1000							100.0	96.3	90.7	105.2	108.1	116.9	130.0	139.3	+39.3%
× Physician visits per capita	100.0	103.2	103.9	104.4	106.0	106.4	109.6	107.9	105.7	107.3	103.3	101.5	101.7	103.0	+3.0%
● PCH admissions/1000 age 75+	100.0	92.4	109.2	108.1	79.6	98.5	104.8	102.7	119.5	97.9	106.5	110.1	122.4	103.0	+3.0%
◆ Hospitalizations/1000	100.0	101.3	100.4	97.5	97.9	93.5	101.7	101.2	100.2	101.7	101.0	98.4	98.2	98.9	-1.1%
▲ PCH residents/1000 age 75+	100.0	94.5	98.5	105.4	98.7	99.4	98.2	97.1	100.2	95.8	95.9	95.3	96.4	93.0	-7.0%
□ Premature mortality rate/1000	100.0	101.6	99.8	98.4	95.3	93.4	91.8	90.9	90.6	91.1	89.6	87.7	86.0		-14.0%
- - - * - - - Hospital days/1000	100.0	99.1	94.3	89.6	89.9	85.1	86.5	83.5	77.5	75.2	74.4	73.0	71.1	72.3	-27.7%

Figure 3 used “crude rates” to show the changes over the time period. Certain indicators could not be age- and sex-adjusted\*. This chart shows those indicators that can be adjusted for differences in the age and gender distributions across the years. Thus this chart reports rates after the aging of the population has been adjusted for. There are differences in the rates of change between this Figure and Figure 3, but the ranking of indicators (most change to least change) is almost identical.

\* See the glossary for a full description of different rates that are reported here.

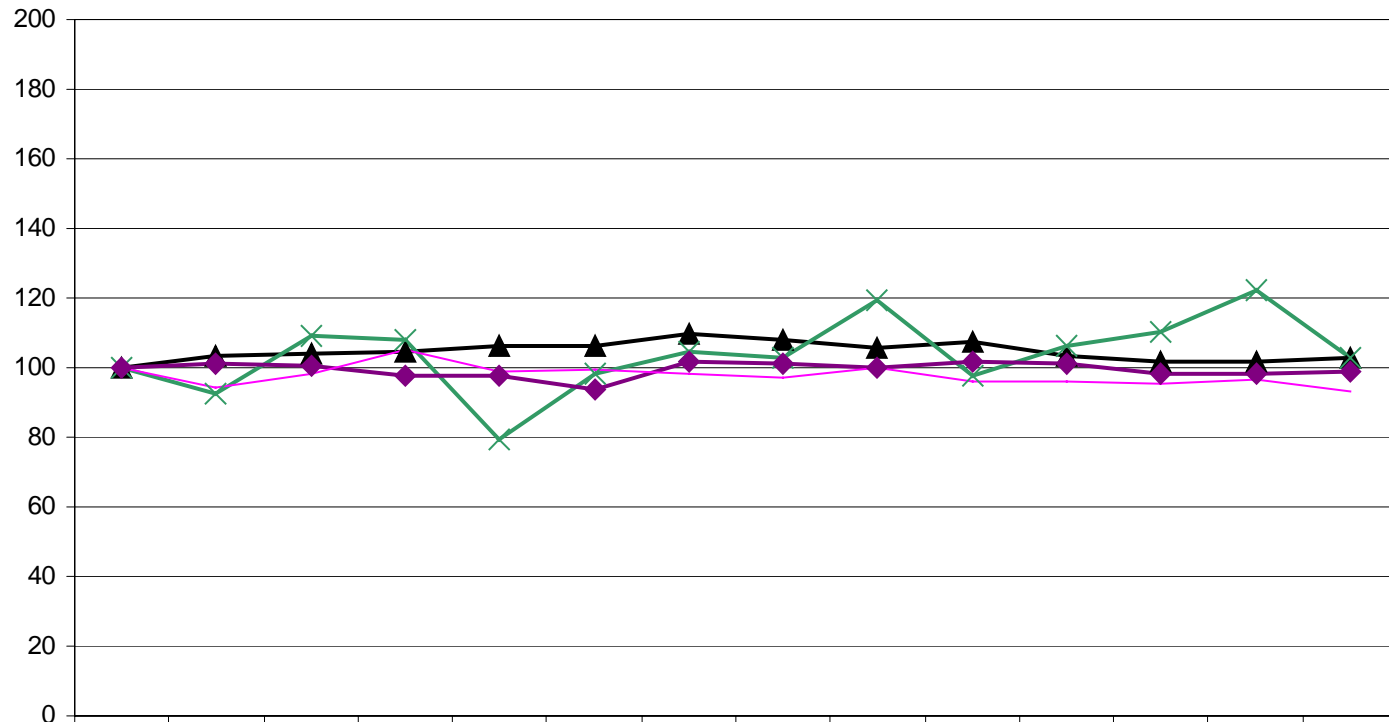
**Appendix Figure B:  
Indexed Adjusted Rates  
Manitoba, Trending Upwards (1991=100)**



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
—■— Total knee replacement/1000							100.0	122.6	161.3	168.4	186.1	208.4	256.5	265.8	+165.8%
- - ■ - - Bypass surgery/1000							100.0	97.8	97.8	112.2	135.2	144.8	153.5	168.0	+68.0%
—○— Cataract surgery/1000							100.0	108.1	116.4	128.6	151.2	135.6	142.0	153.3	+53.3%
—◆— Total hip replacement/1000							100.0	96.3	90.7	105.2	108.1	116.9	130.0	139.3	+39.3%

This figure shows the age/sex-adjusted rates for Figure 4 that was shown earlier. This adjustment did not affect the list of upward trending indicators, although there are differences in the change from the earliest year to the latest year.

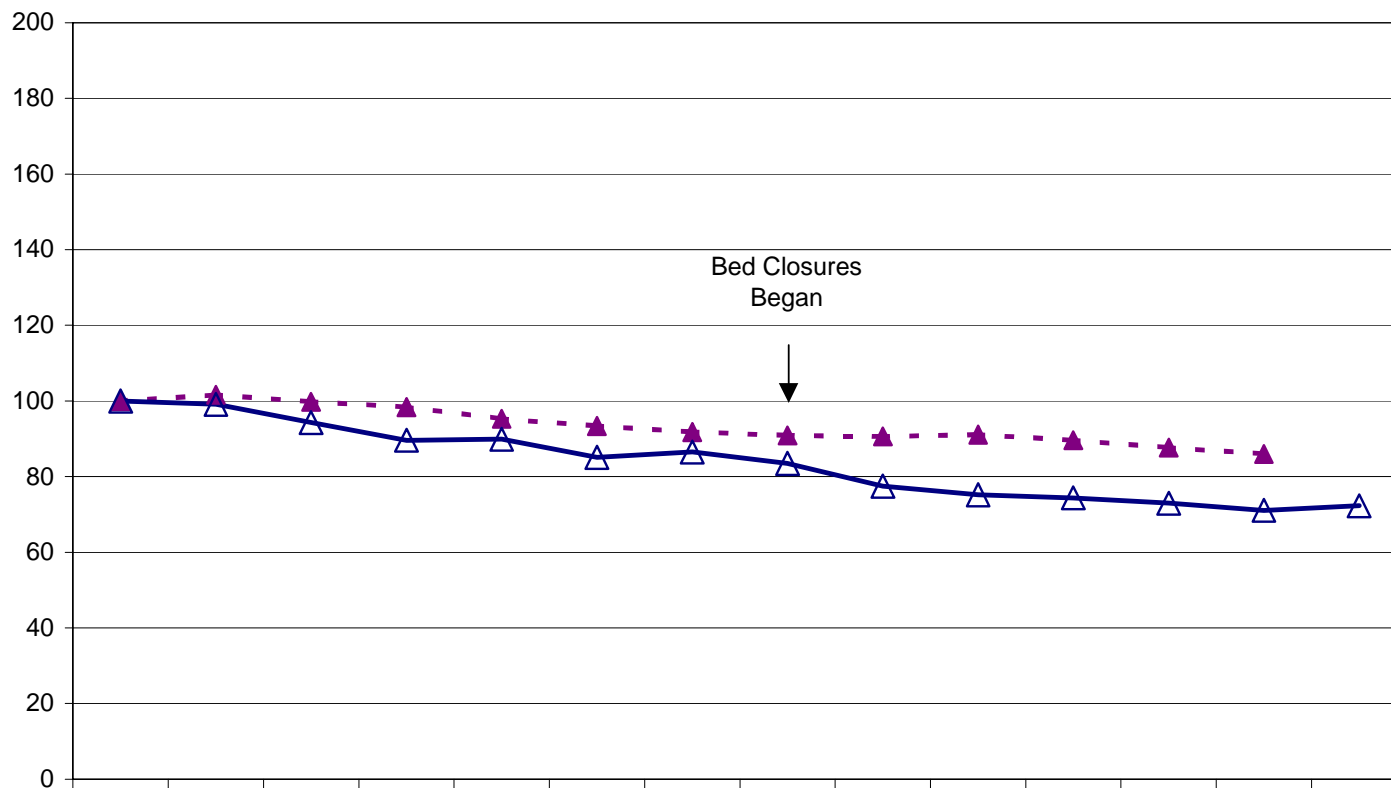
**Appendix Figure C:  
Indexed Adjusted Rates Manitoba, Flat Trend (1985=100)**



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
▲ Physician visits/per capita	100.0	103.2	103.9	104.4	106.0	106.4	109.6	107.9	105.7	107.3	103.3	101.5	101.7	103.0	+3.0%
× PCH admissions/1000 age 75+	100.0	92.4	109.2	108.1	79.6	98.5	104.8	102.7	119.5	97.9	106.5	110.1	122.4	103.0	+3.0%
◆ Hospitalizations/1000	100.0	101.3	100.4	97.5	97.9	93.5	101.7	101.2	100.2	101.7	101.0	98.4	98.2	98.9	-1.1%
■ PCH residents/1000 age 75+	100.0	94.5	98.5	105.4	98.7	99.4	98.2	97.1	100.2	95.8	95.9	95.3	96.4	93.0	-7.0%

The 7 age/sex-adjustment of the values shown in Figure 5 does change the levels, but the ranking is similar. All items that were on the “flat trend” list for crude rates also appear on the list of “flat trend” for age/sex-adjusted rates.

### Appendix Figure D: Indexed Adjusted Rates Manitoba, Trending Downwards (1985=100)



	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
- ▲ - Premature mortality rate/1000	100.0	101.6	99.8	98.4	95.3	93.4	91.8	90.9	90.6	91.1	89.6	87.7	86.0		-14.0%
- ▲ - Hospital days/1000	100.0	99.1	94.3	89.6	89.9	85.1	86.5	83.5	77.5	75.2	74.4	73.0	71.1	72.3	-27.7%

Premature Mortality Rates (PMR) shown in Figure 6 are adjusted for age and sex, and are therefore identical to those shown here. Age/sex-adjustment results in a higher rate of decrease for hospital days than was seen in the crude rates.

## **5. GLOSSARY OF TERMS**

### **5.0 Population Based Rates**

The numerator for rates was calculated by counting or summarizing events (i.e., hospitalizations) over each fiscal year for individuals identified as residents of a specified region regardless of where the event took place. For example, if a resident of Nor-Man is hospitalized in Winnipeg, that event is counted in the hospital admission rate for Nor-Man. Denominators (population counts) were based on counts of individuals resident in specified regions as indicated in the Population Health Research Data Repository registration files as of December 31 for the particular year. Rates of a particular event (i.e., hospitalizations) were developed by dividing numerator information by population denominators, measured in thousands.

### **5.1 Types of Rates Calculated**

Different rates were calculated for the various study indicators. These included: 1) crude rates; 2) age- and sex-adjusted rates; 3) indexed crude rates; and, 4) indexed sex- and age-adjusted rates.

Crude rates are not adjusted for the different age and sex compositions of the Manitoba population: the numerator consists of the number of events; the denominator consists of the population count of a particular region (or the entire province).

In addition to crude rates, age- and sex-adjusted rates of indicators were developed to permit comparisons across regions and time periods. Rates are age- and sex-adjusted using Manitoba population proportions for 1998 and a direct method of standardization. The proportion of the very young or the very old varies markedly across the regions in the province, and over time the proportion of older residents in Manitoba has grown. Since these differences may influence the patterns of care delivered, rates for different indicators were adjusted (standardized) for age differences before making comparisons of residents across regions, or across time periods. Sex-adjustments were also made due to the disproportionate

numbers of males or females that reside in specific regions of the province because it is known that males and females have different levels of health, different needs for care, and ultimately, use health care resources differently. An adjusted (standardized) rate reflects what a region's rate would have been if it had the same population structure as the whole province. Adjustment removes the effects of different population structures in influencing the rates of use of health care. These 'adjusted' rates provide an indication of the use of care in one region relative to use in another, (or group of regions when making comparisons by population health status), after the effects of population structure have been removed.

Indexed values were calculated by dividing a given year's rate by the earliest rate (i.e., the reference year for most indicators was 1985/86) and multiplying the result by 100. For example, the indexed value for 1990, where we have data for 1985 through 1998 would be estimated as follows: (1990 value divided by 1985 value) multiplied by 100. For indexed adjusted rates, this procedure is used once the rates have been age- and sex-adjusted using the direct method of standardization.

### ***Trends (Upward, Downward, Flat)***

The trends or changes in the specific study indicators over the study period (1985/86 through 1998/99) were estimated and described in this report. Trends report the magnitude and direction of any changes in the specific health indicators over time and for different regions. Trends were estimated by taking the difference between the value (rate) for 1998/99 and 1985/86 divided by the value (rate) for 1985/86 multiplied by 100 (i.e., [(value (rate) 1998/99 minus value (rate) 1985/86)/ value (rate) 1985/86] \* 100)].

“Upward,” “flat,” and “downward” trends identify those indicators that show an increase greater than 10% over this period, those which were basically flat (the difference between 1985 and 1998 values on the indicator was 10% or less), and those which show a drop of more than 10% over this period.

## 5.2 Indicators of Population Health

**Premature Mortality Rate** – (PMR) measures deaths among individuals aged 0 to 74 years of age. It is an important indicator of the general health of a population, with high premature mortality rates indicating poor health. It is defined as the number of deaths of people aged 0 to 74 years, divided by the number of residents less than 75 years in a particular area or region. The values are standardized in order to account for the age and sex differences in populations. In this analysis, the premature mortality rate was estimated using three years of data (i.e., a three-year moving average) to ensure stability of rates. The calendar years 1992 to 1996 mortality data were used to compute the premature mortality rates used to group RHAs into regions with the least healthy, average health and healthiest populations.

**Life Expectancy** is defined as the average years of life an individual of a given age is expected to live if current age-sex-specific mortality rates remain stable. Estimates of life expectancy at birth were calculated each year between 1985 and 1998. The estimates were based on the mortality experience over successive 5 years of Manitoba vital statistics data. For example, estimates of 1985 life expectancy were based on 1981-1985 mortality data while estimates for 1986 were based on 1982-1986 deaths.

**Mortality Rate Manitoba Population Aged 75+** is the proportion of Manitobans aged 75 years and older that dies during a specified period (year). The numerator is the number of persons aged 75+ years and older who die during the specific period; the denominator is the number of persons in that age group in Manitoba (or applicable region) using the population numbers). This rate was age- and sex-adjusted in order to make comparisons across regions and across time periods.

## 5.3 Utilization of Hospitals

In this report, rates of several different parameters were developed to profile different aspects of hospital utilization. The population-based parameters are expressed as rates per 1,000 residents (per year) and are presented as either crude or adjusted rates. They count events for

residents of given regions, regardless of where the event took place, so hospitalizations occurring in Winnipeg for residents of Thompson are attributed back to their home region.

***Hospitalizations per 1000*** - counts the number of hospital contacts (i.e., discharges) per 1000 residents for any given region. It is a function of both the total number of persons hospitalized and the average number of times they are hospitalized. Outpatient surgery is counted as a hospital contact. The number of separations or hospitalizations per 1000 residents is the most commonly used measure of hospital utilization (i.e., the numbers of patients treated). Rates of hospitalization were developed using the number of discharges in the numerator and the population in the denominator. In Figures 3 and 5 hospitalizations per 1000 were expressed as an indexed crude rate.

***Hospitalizations Rates per 1000 Age 75+*** - measures the rates of discharge per 1,000 residents aged 75 years and older. Both inpatient discharges and outpatient surgery were included. Hospital discharge rates were calculated for Winnipeg and Non-Winnipeg residents 75 years or older for the study period (1985/86 through 1998/99), and then compared. These rates were age- and sex-adjusted.

***Hospital Days per 1000*** - counts the total number of days of hospital care used by residents. Because of the pronounced move to outpatient surgery over this period, we also included outpatient surgery in this measure, and counted each surgical case as a one-day stay. It provides a useful estimate of the total resources used to provide hospital care to Manitobans for a specified year. It was defined as the number of days of inpatient hospital care and outpatient surgery divided by the Manitoba or regional population expressed in thousands.

***Hospital Days per 1000 age 75+*** - measures the total number of days spent in hospital by residents aged 75 years and older. This rate also counts outpatient surgery as a one-day stay. It was defined as the number of days of inpatient care and outpatient surgery divided by the population aged 75 and older, expressed in thousands.



***Hospital beds per 1000*** - is a measure of overall bed supply in a specified region. Manitoba Health publishes information about the supply of hospital beds located in each region expressed as beds per region and beds per 1,000 population (Manitoba Health Services Commission Annual Report.) The number of hospital beds per 1000 population was expressed as indexed crude rates (1985=100) to permit comparison of bed supply over time (1985/86 through 1998/99) for Manitoba.

#### **5.4 Health Expenditures**

Canadian Institute for Health Information (CIHI) data were used to estimate many of the health expenditures included in this report (CIHI, 2000). For categories that were not uniquely available in the CIHI data (namely for Personal Care Home and home care expenditures), we used the Manitoba Health Annual Reports. The calculation of costs in constant dollars was done using the Consumer Price Index (CPI) values for health and personal care. The Statistics Canada CPI calculation methodology was used for these cost conversions. All costs are expressed as per capita rates. The Manitoba population is used as the denominator for these rates.

***Hospital Expenditures*** - measures the total expenditures per capita on hospitals from 1985/86 through 1998/99. Hospitals are identified by CIHI as institutions where patients are accommodated on the basis of medical need and are provided with continuing medical care and supporting diagnostic and therapeutic services. Hospitals are licensed or approved as hospitals by a provincial government, or are operated by the Government of Canada and include those providing acute care, extended and chronic care, rehabilitation and convalescent care, psychiatric care, as well as nursing stations and outpost hospitals.

***Capital Expenditures*** - includes expenditures on construction, machinery and equipment of hospitals, clinics, first-aid stations, and residential care facilities.

***Personal Care Home (Nursing Home) Expenditures*** - describes the total annual costs associated with the operation of non-profit and for profit (proprietary) Personal Care Homes

in Manitoba. PCH costs were determined by using the Manitoba Health Annual Report data from 1985/86 through 1998/99. Federal nursing homes (operated by Indian and Northern Affairs) are not included.

***Other Institutions Expenditures*** - includes expenditures on residential care types of facilities for the chronically ill or disabled, who reside at the institution more or less permanently and which are approved, funded or licensed by provincial or territorial departments of health and/or social services. Residential care facilities include homes for the aged (including PCH or nursing homes), facilities for persons with physical disabilities, developmental delays, psychiatric disabilities, alcohol and drug problems, and facilities for emotionally disturbed children. Facilities solely of a custodial or domiciliary nature and facilities for transients or delinquents are excluded.

***Physician Expenditures*** - is a summary measure that describes costs associated with the provision of physician services. The data source for this analysis was the National Health Expenditures Database which is prepared by the Canadian Institute of Health Information.

Physician expenditures include primarily professional fees paid by provincial medical care insurance plans to physicians in private practice. Fees for services rendered in hospitals are included when paid directly to physicians by the plans. Also included are other forms of professional incomes (salaries, sessional, capitation).

The physician expenditure category does not include the remuneration of physicians on the payrolls of hospitals or public sector health agencies; these are included in the appropriate category, e.g. the hospital or the other spending category.

***Drug Expenditures*** - is a summary measure that describes a population's use of pharmaceuticals and its associated costs. At the aggregate level, drug expenditures include monies spent on prescribed drugs and non-prescribed products purchased in retail stores. This category has been disaggregated at the Canada level in the CIHI Data Tables to provide information on the following sub-categories: 1) prescribed drugs; non-prescribed drugs (i.e., over-the-counter drugs and personal health supplies). The drug category does not include

drugs dispensed in hospitals and in other institutions. These are included with the category of hospitals or other institutions.

See below (Pharmaceutical cost per person) for a definition of the indicator used in the charts providing four years of data based on Manitoba DPIN data.

## **5.5 Procedure Rates**

These analyses examine the rates of “high profile” procedures (i.e., bypass surgery, total hip replacement, total knee replacement and cataract surgery) in Manitoba. These surgical procedures are classified as “high profile” because they have been noted in the popular press as being potentially rationed in Canada. All procedures are identified from hospital separation abstracts from 1991/92 through 1998/99. The rates of bypass surgery, cataracts, total hip or total knee replacements per 1,000 residents are calculated as both crude and adjusted rates, depending upon the set of graphs examined.

## **5.6 Utilization of Personal Care Home (PCH) Resources**

PCH analyses examine the utilization of nursing home resources by Manitoba residents for the fiscal year in question (April 1 to March 31). PCH rates were based on the Manitoba population aged 75 years or older. The utilization of PCH resources by residents 75 years of age and over of different regions in Manitoba was compared. PCH residents are people who lived in a personal care home in Manitoba.

***Population aged 75+*** - measures the numbers of the Manitoba population who are 75 years or older.

***PCH Admissions per 1000 age 75+*** - measures the rates of PCH admissions for elderly residents aged 75+ years for a particular region (i.e., Winnipeg and Non-Winnipeg areas). PCH Admissions age 75+ were expressed as rates of admissions per 1,000 residents aged 75+ years. The rates were defined as the number of PCH admissions for residents aged 75+

years in a particular region divided by the total number of people in that region who were 75 years or older, expressed in thousands.

***PCH Residents per 1000 age 75+ years*** - PCH residents are people who lived in a personal care home during the year in question. Their area of residence is determined by the location of the PCH. Analyses for PCH utilization focussed on those aged 75 years and older as they are the primary users. Only residents receiving care at levels 1-4 who were 75 years and older were included. In every RHA except Burntwood and Nor-Man, PCH residents aged 75 years and older accounted for 80% or more of their residents in 1995/96. In Burntwood and Nor-Man the percentages were 61% and 78% respectively (Black, Roos, Fransoo and Martens, 1999). Federal PCH residents are not included in the analyses. The denominator for the rates is the population of the area aged 75 years and older. This rate was expressed in thousands.

## **5.7 Physician Resources**

The utilization of physician resources examines the utilization of physician resources by Manitobans for the specific fiscal year (i.e., April 1 to March 31). Analyses were limited to ambulatory physician services (i.e., office visits, consultations, outpatient and emergency department visits, visits to patients in Personal Care Homes, and visits to patients in their own homes). Visits to patients admitted to hospital were excluded. Ambulatory care delivered as part of a global tariff (e.g., six-week post-operative care period, chemotherapy and prenatal and postpartum care visits claimed at the time of delivery) was also excluded. It is likely that the utilization of physician services is somewhat understated because salaried physicians are not required to submit information for services provided.

***Physicians per 1000*** - measures physician supply in Manitoba. It is defined as the number of Manitoba physicians divided by the total Manitoba population. As this rate cannot be age/sex adjusted, it is only included in the graphs with crude rates. CIHI data (CIHI, 1997) provided the numbers of physicians, and the Manitoba Research Database registration files were used to determine the population.

***Physician Visits per 1000*** - this rate serves as a measure of the total ambulatory utilization of physician services by residents of a given region regardless of where the service took place. It is defined as the total number of physician visits made by residents of a specific region, divided by the population of the region.

***People Age 75+ making at least one physician ambulatory visit*** - measures the percentage of the elderly population (age 75+) who make at least one physician ambulatory visit within the fiscal year. It is defined as the number of residents aged 75 years and over in a particular region who make at least one ambulatory visit to a physician (regardless of where the physician was located) divided by the total population aged 75+ in the specific region multiplied by 100.

***Physician Ambulatory Visits per person age 75+*** - this rate serves as a measure of the total ambulatory utilization of physician services by people aged 75 year or older. It is defined as the total number of ambulatory physician visits made by residents, divided by the population of the respective region. This rate was expressed as the number of ambulatory visits per person age 75+.

## **5.8 Pharmaceutical Use**

While the data on overall rates of pharmaceutical expenditures were taken from CIHI figures, the following series of indicators results from an analysis of anonymized data from Manitoba's Drug Programs Information Network (DPIN). DPIN is an administrative database of prescriptions dispensed for out-of-hospital usage by Manitoba residents. DPIN is administered through real-time computer links with every community-based pharmacy in the province and is maintained by the Ministry of Health. Prescription claims consist of two components: the ingredient price of the drug and the professional fee for dispensing. DPIN data were available from 1995/96 through 1998/99 only.

***Pharmaceutical cost per person*** - provides a summary measure that describes total expenditures on pharmaceuticals per resident and includes the portions paid by government

and individuals. This summary measure does not include the amount individuals spend on pharmaceuticals available without a prescription and over-the-counter. The numerator is influenced by the number of pharmaceutical claims submitted in a particular year for residents of a specific region, the ingredient price of the drugs that are dispensed, as well as the associated dispensing fees: the denominator consisted of the region's population for that year. Note: as this measure of expenditures only includes those dispensed in retail pharmacies, the costs of drugs dispensed in hospitals, including some very expensive outpatient drugs such as cyclosporin (to prevent transplant rejection) will not be included.

***Prescriptions per person*** - this rate is a measure of intensity of drug use by Manitoba residents. It is defined as the average number of prescriptions dispensed per resident. The numerator consists of the total number of prescriptions (pharmaceutical claims submitted) dispensed in a particular year: the denominator is the Manitoba population for that year.

***Number of different drugs per person*** - this rate is another measure of the intensity of pharmaceutical use by Manitoba residents. It is defined as the number of different classifications of drugs used by individuals who have been dispensed prescriptions during a particular year divided by the Manitoba population for that year. The Anatomical Therapeutic Chemical (ATC) Classification was used to categorize the different drugs used per individual according to the specific drug's DIN (Drug Information Number).

***Proportion using at least one pharmaceutical*** - this rate is a measure of the access. It is defined as the number of residents in a particular region who are dispensed one or more prescriptions during a specified year divided by population of the region as per the population registry information of December 31 of that year.

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