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Physician Use, Physician Supply: Looking Back to the Future

MANITOBA CENTRE FOR HEALTH POLICY

Summary of the report:
*Physician Resource
Projection Models*
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KEY POINTS

- Greater demand for service by some age groups may decrease service for others
- Projections of the growth of service requirements in physician specialties can be used to manage training of specialists and family physicians
- Differences in physician productivity created challenges in projecting service needs

Is there a doctor in the house? Answering that question is easy; it's either yes or no. Will there be a doctor in the house in 2010 or 2020? Answering that one is a lot more difficult.

Essentially, answering that second question is what we—The Manitoba Centre for Health Policy—have been trying to do. MCHP was asked by Manitoba Health & Healthy Living if it was possible to create a formula that would tell them how many doctors would be needed in future years.

Now some of you might be thinking, Why not take the number of physicians we have now and multiply it by the amount Manitoba's population is expected to grow by 2010 or 2020? Wouldn't that work?

There are several problems with that approach. First of all it assumes we have enough physicians right now—including a perfect balance of specialties. Yet there is evidence to suggest there has been a continual shortage of services in many medical areas. It also doesn't take into account population characteristics, like age. Nor does it consider the productivity of the physicians, such as whether they are full or part-time.

So, given the shortcomings of that approach (and others), we decided to focus on the number of services that will be required by the population. We looked at four physician specialty areas: general practice, paediatrics, general surgery and orthopedic surgery. For general practice, we looked at data from 1984-2006. For the other three groups, we looked at the years 1991-2006. With the two surgical specialties, a separate estimate is offered on how

many physicians might be needed to meet the service demand.

Equivalent Services Measure

Arguably, the health needs of the population, with adjustments made for age and sex, will be fairly consistent over time. To anticipate the need for physician services in the future we looked at Manitoba's use of physician services in the previous 24 years. One of the main ways of doing that was by looking at what physicians billed for during that time. Such information—all of it anonymized—is contained in our Population Health Research Data Repository, which we call simply the Repository.

This was not without its problems. How services are billed changes over time. Services that were once billed separately may be grouped into one bill today or vice-versa. Consider a service like prenatal care. In the early part of our study period a single billing for prenatal service (represented by a specific code number) from Doctor A might actually represent 12 prenatal visits from a patient lumped together. Today, each prenatal visit is billed separately, so we might find a prenatal billing code 12 times from Doctor A for one patient. Two different billing methods, but each represents the same total clinical activity.

This is one example of why we created the Equivalent Services Measure or ESM. The ESM essentially is a technique that allows us to measure fairly and compare clinical activities—basic to complex—from different years regardless of their billing procedures.



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How does the ESM work?

For each specialty area there is a corresponding ESM, which essentially paints a picture of the total services provided each year by that group. But to make the picture more complete, we also need the age and sex of the people who received the services. Here’s how it works.

Let’s look at one service provided in general practice: the complete physical. The ESM might tell us how many complete physicals were provided in 1984 to females in each age group and to males in each age group. Following that, we can compare 1984 to 1985, 86, 87 and so on.

Let’s say that year to year the numbers are fairly consistent. We can then take these past patterns to look ahead: By 2020, based on information provided to us on the projected age, sex and size of Manitoba’s population, there will be a demand for X number of complete physicals to be given by the Province’s generalist physicians or GPs (a.k.a. general practitioners or family doctors).

Now what if we see, say, a downward trend where over the years fewer people per 1000 are having complete physicals? Then that trend, or any other trend we observe, would have to factor in to our projections. That’s why we felt it was important to look at a large span of years, not just the last three or four.

Okay, so our ESM models can project the number and complexity of services that will be needed but what planners want to know is the number of doctors that will be needed to treat the population effectively.

Providing answers on physician numbers is a lot more elusive. Many factors have influenced physician productivity over the last 20 years. Some of these factors are physician gender, age, length of time in practice, and hours spent at

work. The relatively low number of surgeons compounds those difficulties.

Given these limitations, where possible, we transformed our service needs projections into estimates for the number of physicians. We stress these are general estimates only, not absolute numbers.

We must also stress that while trends play an important role in our projections, trends can change. It will be necessary to follow up from time to time to see if those trends are continuing and adjust our projections as needed.

General Practice/Primary Care

There has been an interesting change in service delivery by generalist physicians (GP) (General Practitioner/Family Physician). Patients 40 and under are receiving a lower proportion of GP services than they used to while patients 41 to 80 count for a much higher proportion.

What does it mean? Well the most likely suggestion is that during the last twenty or so years there have not been enough GPs to go around.

With only so many services available, a greater demand for service from some age groups means less service for others.

So on the one hand our model projects that a 20% increase in ESM for GPs will be required by 2020. This is consistent with the projected growth of the population. On the other hand, since our projections are based on what is thought by some to be a period of doctor shortage, we may actually need more than 20%.

We should also point out that the number of physicians required is influenced not only by services required, but also by other factors such as the geographical distribution of both doctors and patients. We could not take this distribution into account because only provincial population projections were available, not local.

Table 1: Change (%) in Projected Equivalent Services Measure (ESM) for Family Physicians Using the Medium Population Projections

	Base and Change in Projected Population	Base and Change in Projected ESM
2005/06 (base)	1,175,360	149,504,023
2010	+4.93 %	+5.06 %
2015	+9.29 %	+10.72 %
2020	+13.37 %	+16.56 %

Table 2: Change (%) in Projected Equivalent Services Measure (ESM) for Pediatric Work Using the Medium Population Projections

	Base and Change in Projected Population	Base and Change in Projected ESM		
		GPs and Pediatricians	GPs only	Pediatricians only
2005/06 (base)	300,411	26,288,219	16,560,723	9,894,706
2010	-0.13 %	-6.14 %	-8.93 %	+0.04 %
2015	+0.24 %	-10.34 %	-16.11 %	+2.91 %
2020	+2.77 %	-13.38 %	-21.40 %	+5.34 %

Pediatrics

Both GPs and pediatricians* provide general services to patients under 18 years of age. As we've mentioned, given what appears to be a shortage of GPs, the increasing use of generalist services by people over 40 has occurred at the same time that there was a decreased use of services provided to those 40 and younger.

This trend of reduced GP services over time includes those provided to young Manitobans 18 and under. If this trend continues to 2020, we project another 13% drop in total services (by GPs and pediatricians) provided to Manitoba's young (See table 2).

So what do we make of this trend? Are our young people healthier than they used to be? Maybe. Have they been over-serviced in the past? Maybe. It could also be that our paediatric population is not receiving the number of services it needs and that the situation is going to get worse.

General Surgery

General surgery provides a perfect illustration of the divide between projecting the need for services and projecting the number of doctors needed to provide those services.

We can say with some confidence that based on past patterns, we will need 27% more general surgery by the year 2020 (see Table 3). Answering the question of how many general surgeons will be needed is, as suggested earlier, a lot more elusive.

For one thing, there are physicians, especially in rural areas, whom you won't find registered as "general surgeons" but whose work includes general surgical procedures—such as hernia repair, varicose vein repair, and gall bladder surgery. So our projection for general surgery is based in part on procedures provided by GPs.

We also found that the productivity of general surgeons is related to the amount of time the surgeon has been working in Manitoba.

For example, at the time of this study, there were 71 general surgeons in Manitoba. If our projections are based only on the surgeons who were operating in Manitoba for the whole study period (1991-2006), we would actually need fewer surgeons by 2020—63 instead of 71. If we base our calculations only on the productivity of surgeons present during the last seven years we would need 80 to meet projected demands.

There are many possible reasons why newer general surgeons are less productive but our study doesn't look at the whys. One contribut-

Table 3: Change (%) in Projected Equivalent Services Measure (ESM) for General Surgery Using the Medium Population Projections

	Base and Change in Projected Population	Base and Change in Projected ESM
	2005/06 (base)	1,175,360
2010	+4.93 %	+9.32 %
2015	+9.29 %	+17.87 %
2020	+13.37 %	+27.08 %

*There are also pediatricians who provide more specialized services. However, in a province as small as Manitoba, the number of these specialists is not driven by the need for services. Rather, a minimum number is needed to ensure that there is at least one specialist on-call at all times. Thus, they are not included in our study.

ing factor might be, as recent studies have shown, that younger physicians and surgeons may not see as many patients as the older ones did. The real point here, however, is that predicting how many surgeons will be needed year to year is pretty dodgy.

Orthopedic Surgery

Looking at orthopedic surgery, our ESM model projects an 88% increase in services by the year 2020 (see table 4). This exceeds by far the predicted growth of the population.

There are several reasons for this upward trend. For one, there is an increasing need for orthopedic procedures, especially hip and knee replacements. This is due in part to the aging population and in part to the fact that proportionately more and more Manitobans are obese. Also, since replacement joints are more durable, more Manitobans at younger ages are having these procedures. In addition, surgical techniques have improved enabling surgeons to perform more procedures daily.

Here again, we attempted to convert our service projections into an estimated number of surgeons required. And again we were faced with most of the same limitations and variables we

faced with general surgeons. So we can say that to meet projected demand, based on patterns of use over the last 15 years and population predictions, that by 2020 we will need 83 orthopedic surgeons—a 90% increase. But we also must say that a lot of unknown factors influence that number. One of the “unknown factors” may be the use of alternative health care providers for some of the workload, such as the use of physician assistants in orthopedic surgery.

Looking Ahead

This study is of interest not only to Manitoba Health and Healthy Living, but also to the University of Manitoba’s Faculty of Medicine. If it is possible to determine that Manitoba is not graduating enough physicians to keep up with the needs of the population, it’s easy to see how that might influence enrollment. Consider also the possible impact on enrollment of being able to calculate a need for X number of GPs, paediatricians, orthopedic surgeons, and so on.

Unfortunately, if we’ve learned anything from this study, it’s that predicting physician resource needs for the future is at best an inexact science. This is especially true when trying to translate those predictions into numbers of physicians. We could do so only in two of the four specialty areas, and even then we could only project a range of numbers, not absolutes.

That being said, ESM is a workable means of fairly comparing services over the years in different specialty areas. Using those past patterns of use in combination with population projec-

tions, we are able to some extent to predict future use of services for all specialty areas in our study.

We’re not suggesting these are the “correct” numbers. A lot of factors—many of which cannot be incorporated into our projections—

influence the accuracy of these predictions. And as mentioned, patterns can change, so these numbers will need to be revisited every few years.

Will there be a doctor in the house in 2010? 2015? 2020? The ESM may not give you all the answers, but it’s a good place to start.

Table 4: Change (%) in Projected Equivalent Services Measure (ESM) for Orthopedic Surgery Using the Medium Population Projections

	Base and Change in Projected Population	Base and Change in Projected ESM
2005/06 (base)	1,175,360	11,199,008
2010	+4.93 %	+25.64 %
2015	+9.29 %	+53.75 %
2020	+13.37 %	+87.82 %

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