Primary Care/Specialty Care in the Era of Multimorbidity

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This slide dramatically exposes the differences between the United States and other countries and among various other western industrialized countries with regard to life expectancy (on the right side of the graph), per capita costs of the health care system in US dollars (on the left), and number of doctor visits (on the left side of the graph) and the number of doctor visits (the thickness of each line). The costs of the US health care system are so high that they cannot be depicted on the graph. It is evident that the high costs are not a result of an excessive number of doctor visits. (Other data show that it is not a result of more hospitalizations either. Rather, the high costs are due to much greater costs and frequency of interventions done both in the outpatient and inpatient settings.) The high costs in the US are not reflected in better health outcomes; at least 13 of these countries that are depicted have better life expectancies. Moreover, high costs in general are not highly associated with high life expectancy, and several countries have lower life expectancies than would be expected from their level of costs (and vice versa). Countries with relatively large numbers of doctor visits tend to do better than expected (given their low costs) on life expectancy.
This slide shows the well-known direct relationship between the density of health professionals and one aspect of the health of populations: health professional supply. As this slide shows, the relationship holds only on average, and there is considerable variation, with some countries having many health workers but still relatively high child mortality under age 5. There is even one country with few health workers that has a child mortality the same as the United States and Cuba. Clearly, it is not the number of health professionals that influences child mortality; rather, it must be how those health professionals are organized and what they do that is the influence.

It is apparent that the supply of primary care physicians and specialist physicians is NOT the determining factor in the primary care versus specialist orientation of health services system. The evidence suggests that it is what primary care physicians and specialists do that influences health outcomes and costs. We understand very well what the appropriate role of primary care physicians is, but we do not know very well what the appropriate role of specialists is in effective and efficient health systems.
There is now good evidence, from a variety of studies at national, state, regional, local, and individual levels that good primary care is associated with better health outcomes (on average), lower costs (robustly and consistently), and greater equity in health.
Primary health care oriented countries

- Have more equitable resource distributions
- Have health insurance or services that are provided by the government
- Have little or no private health insurance
- Have no or low co-payments for health services
- Are rated as better by their populations
- Have primary care that includes a wider range of services and is family oriented
- Have better health at lower costs

Sources:
In an international comparison of 18 OECD countries, they were rated* according to whether their primary care systems were strong (high scores) or weak (low scores). Trends in potential years of life lost were examined after also taking into account other influences on health. Even after considering changes in gross domestic product, percentage of elderly people, total number of doctors per capita, average income, and smoking and drinking percentages, people in countries with strong primary care had fewer years of life lost than people in the poor primary care countries, and the differences widened over time.


Many other studies done WITHIN countries, both industrialized and developing, show that areas with better primary care have better health outcomes, including total mortality rates, heart disease mortality rates, and infant mortality, and earlier detection of cancers such as colorectal cancer, breast cancer, uterine/cervical cancer, and melanoma. The opposite is the case for higher specialist supply, which is associated with worse outcomes.

Sources:
This slide summarizes the conclusions of many studies. Primary health care is a worldwide imperative. Avoiding an excessive supply of specialists minimizes unnecessary care and reduces costs. Equity in health is facilitated by a primary care orientation and a reduction in specialty services, which are inequitably distributed almost everywhere. Responding to patients’ problems is a rate limiting step in achieving accurate diagnosis and management. Coordinating care reduces duplication and adverse events. Avoiding adverse events improves the safety of services. Certain payment mechanisms facilitate more appropriate care. Information systems (especially if electronic) improve care if the information in them is pursuant to better primary care over time. The increasing focus on prevention requires better coordination between public health and primary care,. The following slides provide specificity for some of these imperatives.
The data in this “spider’s web” depict the achievement of the essential features of primary care in primary care practices in an area of Brazil. It also shows the considerable agreement between the three sources of information: patients, practitioners, and managers in the facilities. A score of five represents the maximum, with a score of zero representing the minimum possible. Whereas the facilities scored high on the range of services available (“resources available”) and on a family focus of the health services, scores were relatively low for accessibility of the services. This study showed the potential for application of a standardized and validated instrument (the PCAT) to assess the quality of delivery of primary care services, from the viewpoint of users, providers, and managers. In this way, possible improvements can be discussed and implemented.
A study of individuals seen in a year in large health care plans in the US found:

<table>
<thead>
<tr>
<th></th>
<th>elderly</th>
<th>non-elderly</th>
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</thead>
<tbody>
<tr>
<td>percent who saw a specialist</td>
<td>95</td>
<td>69</td>
</tr>
<tr>
<td>average number of different specialists seen</td>
<td>4.0</td>
<td>1.7</td>
</tr>
<tr>
<td>average number of visits to specialists</td>
<td>8.8</td>
<td>3.3</td>
</tr>
<tr>
<td>total visits to both primary care and specialists</td>
<td>11.5</td>
<td>5.9</td>
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</table>


In 5 large health plans in the US, the vast majority of individuals who sought care in a year saw at least one specialist; 19 of every 20 elderly individuals did so. The “average” user of health services saw almost 2 different specialists with an average of over 3 visits per year. The elderly saw an average of 4 different specialists in a year, with almost 9 different visits. Such a situation poses major problems for coordination of care, possible duplication of interventions, and greater likelihood of conflicting interventions and adverse effects.
A study of individuals (ages 20-79) seen over two years in Ontario, Canada, found:

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent who saw a specialist</td>
<td>53.2</td>
</tr>
<tr>
<td>Median number of visits to specialists</td>
<td>1.0</td>
</tr>
<tr>
<td>Total visits to both primary care and specialists</td>
<td>7.0</td>
</tr>
</tbody>
</table>


In Ontario, Canada, only about half of adults (under age 80) saw a specialist in a year, with most seeing no more than 1. Thus, the stronger primary care orientation of the Canadian health care system (as compared with the United States) and its greater comprehensiveness of services (shown on other slides) are associated with much lower use of specialists.
The US has a significantly higher proportion of people (compared with Canada, France, Netherlands, New Zealand, United Kingdom) who see two or more specialists in a year – 27%, and 38% among people with chronic illness. Even these figures, obtained from population surveys, understate the heavy use of multiple physicians seen in a year in the US.

Sources:

Seeing a large number of different physicians, including specialists, is potentially dangerous for people. This chart shows that a much larger percentage of people in the US have seen four or more doctors in the most recent two years. Increased frequency of adverse events is at least partly a result of the prescription of large numbers of medications, some of which are very powerful recent additions to the armamentarium of available medications. These new medications have relatively high unintended effects. As the frequency of adverse events rises with increasing number of physicians seen, the practice of frequent referrals and self-referrals to specialists is likely to be detrimental to health, particularly in view of evidence that inappropriate specialty care often is associated with worse health.

In the United States, half of all outpatient visits to specialist physicians are for the purpose of routine follow-up.

Does this seem like a prudent use of expensive resources, when primary care physicians could and should be responsible for ongoing patient-focused care over time?

In New Zealand, Australia, and the US, an average of 1.4 problems (excluding visits for prevention) were managed in each visit. However, primary care physicians in the US managed a narrower range: 46 problems accounted for 75% of problems managed in primary care, as compared with 52 in Australia and 57 in New Zealand.


The fact that New Zealand, Australia, and the US treat more health problems in their primary care sector indicates that their primary care services are more comprehensive and that fewer problems are referred unnecessarily to specialists, with unnecessary increases in cost of health services.

Comprehensiveness in primary care is necessary in order to avoid unnecessary referrals to specialists, especially in people with comorbidity.
30% of PCPs and 50% of specialists in southwestern Ontario reported that scope of primary care practice has increased in the past two years. Physicians in solo practice or hospital-based were more likely to report an increase than those in large groups. Family physicians were less likely than general internists or pediatricians to express concern about increasing scope.

Source: Chan BT. The declining comprehensiveness of primary care. CMAJ 2002;166:429-34.
The procedures and interventions in this chart were unanimously reported (2008) as performed in primary care settings by experts in ten countries. In the US, most or all of these procedures are performed by family physicians, but few are performed by primary care internists or primary care pediatricians. Because primary care practice in the US is often provided by general internists and general pediatricians, overall, comprehensiveness of primary care is less in the US than in other comparable countries.

NOTE: This list does NOT represent the full complement of procedures and services in primary care because the survey did not contain an exhaustive list of the possibilities.


<table>
<thead>
<tr>
<th>Procedure</th>
<th>Procedure</th>
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<tbody>
<tr>
<td>Wart removal</td>
<td>IUD insertion</td>
</tr>
<tr>
<td></td>
<td>IUD removal</td>
</tr>
<tr>
<td></td>
<td>Pap smear</td>
</tr>
<tr>
<td>Suturing lacerations</td>
<td>Hearing screening</td>
</tr>
<tr>
<td>Removal of cysts</td>
<td>Vision screening</td>
</tr>
<tr>
<td>Joint aspiration/injection</td>
<td>Age-appropriate surveillance</td>
</tr>
<tr>
<td>Foreign body removal (ear, nose)</td>
<td>Family planning</td>
</tr>
<tr>
<td>Sprained ankle splint</td>
<td>Immunizations</td>
</tr>
<tr>
<td>Remove ingrowing toenail</td>
<td>Smoking counseling</td>
</tr>
<tr>
<td>Behavior/MH counseling</td>
<td>Home visits as needed</td>
</tr>
<tr>
<td>Electrocardiography</td>
<td>Nutrition counseling</td>
</tr>
<tr>
<td>Examination for dental status</td>
<td>OTHERS?</td>
</tr>
</tbody>
</table>

*Unanimous agreement in a survey of family physician experts in ten countries (2008)
These are the procedures that are provided in primary care in Canada. In contrast, many of these services are not available in primary care in the US.

Source: Canadian Institute for Health Information. The Evolving Role of Canada’s Fee-for-Service Family Physicians, 1994-2003: Provincial Profiles. Ottawa, Ontario, Canada: Canadian Institute for Health Information, 2006.
There are differences in comprehensiveness of services even within countries. For example, in Canada, family physicians differ in the range of services they have available. Physicians in the province of British Columbia have practices that include a wider range of activities of more different types, including more types of procedures and greater likelihood of providing mental health services. In general, only about half to two thirds of family physicians in most provinces are involved in the care of their patients when the latter are hospitalized.
The Appropriate Management of Multimorbidity in Primary Care
This graph shows that the higher rates of referral or self-referral in the United States are found at every level of morbidity burden in the populations of the two countries.


In this study carried out primarily in US family practices, the most common characteristic of patients who were referred to specialists was a high degree of morbidity burden, as measured by the combination of different types of conditions that people experience in a year. It was more important than prevalence of any particular diagnosis or type of diagnosis, whether or not the diagnosis was surgical, and whether or not gate-keeping was a feature of the primary care provided. For just those diagnoses for which referral could be considered discretionary, morbidity burden was not a major influence on likelihood of referral.
The more common the condition in primary care visits, the less the likelihood of referral, even after controlling for a variety of patient and disease characteristics.

When comorbidity is very high, referral is more likely, even in the presence of common problems.

IS THIS APPROPRIATE? IS SEEING A MULTIPLICITY OF SPECIALISTS THE APPROPRIATE STRATEGY FOR PEOPLE WITH HIGH COMORBIDITY?

In a non-elderly US population of patients, just over two-thirds have low burdens of morbidity, i.e., relatively few diseases, most or all of which are not serious. Just under 30% have moderate degrees of morbidity, and about 5% have multiple comorbidity, at least some of which is serious. These average percentages vary considerably by their main diagnoses; 12-13% of people with asthma, hypertension, or lipoid disorders, almost one in four with diabetes or mental health problems (depression, anxiety, neuroses), or one in three with thrombophlebitis or osteoporosis. About one-half of those with ischemic heart disease and three in five with congestive heart failure have high burdens of comorbidity. Having any one of these types of conditions makes it very unlikely (less than one in four) to have low burdens of morbidity (compared with 2/3 of all patients). That is, have one type of long-lasting illness is associated with greater likelihood of comorbidity.
Comorbidity Prevalence

1. The percentage of Medicare beneficiaries with 5+ treated conditions increased from 31 to 40 to 50 in 1987, 1997, 2002.
2. The age-adjusted prevalence increased for
   - Hyperlipidemia: 2.6 to 10.7 to 22.2
   - Osteoporosis: 2.2 to 5.2 to 10.3
   - Mental disorders: 7.9 to 13.1 to 19.0
   - Heart disease: 27.0 to 26.1 to 27.8
3. The percentage of those with 5+ treated conditions who reported being in excellent or good health increased from 10% to 30% between 1987 and 2002.

MESSAGE: “Discretionary diagnoses” are increasing in prevalence, particularly those associated with new pharmaceuticals. How much of this is appropriate?


During the 15-year period from 1987-2002, the proportion of people who reported being in good-excellent health tripled. During the same period, the diagnosis of several major chronic conditions increased by two to seven times, and the extent of multi-morbidity increased from one-third of the population to half the population. That is, much of the increase in diagnoses is not associated with increased “illness” in the population, yet the indications for treatment with increasingly powerful medications run the risk of iatrogenic diseases for those with these newly diagnosed conditions.
Population subgroups differ systematically in their overall burden of comorbidity. This slide shows that individuals in population groups disadvantaged by virtue of race, ethnicity, educational level, or income group have higher morbidity burdens (as represented by having more chronic diseases) than is the case for the population as a whole.

This graph, concerning people of age 65 and over in the US, shows that rates of hospitalization for causes that should be preventable by good primary care, rates of complications during hospitalization, and costs of care increase rapidly with increases in comorbidity (as measured by the number of types of chronic condition per person). That is, comorbidity is associated with higher costs, higher hospitalization for preventable conditions, and more adverse effects.

Controlled for morbidity burden*:

The more DIFFERENT generalists seen: higher total costs, medical costs, diagnostic tests and interventions.

The more different generalists seen, the more DIFFERENT specialists seen among patients with high morbidity burdens. The effect is independent of the number of generalist visits. That is, the benefits of primary care are greatest for people with the greatest burden of illness.

*Using the Johns Hopkins Adjusted Clinical Groups (ACGs)

Resource Use, Controlling for Morbidity Burden*

The more DIFFERENT specialists seen, the higher total costs, medical costs, diagnostic tests and interventions, and types of medication.

*Using the Johns Hopkins Adjusted Clinical Groups (ACGs)
The data in this chart, based on experiences in the United States, show that the best predictor of subsequent costs of care is the ACG morbidity burden measure (number of different types of diagnosed morbidity – ADGS – or number of different types of serious (major) morbidity types). Neither hospitalization nor costs in the prior year predicted subsequent resource use as well as the morbidity measure. (Not shown is the ACG measure of combinations of types of morbidity – which does as well or better for uses of the ACG system that concern utilization of different types of morbidity and prediction of subsequent morbidity.)
In a study of adults of ages 20-79 seen over a two-year period, the number of different types of morbidity was the leading influence on both the number of primary care and specialist visits. The second most important influence was the extent of morbidity, that is, the pattern of different combinations of different kinds of diagnoses as reflected in resource use. Other influences were weaker.
These data, from one province in Canada, show that there is little difference in resource use for people with only acute conditions, people with any chronic conditions, or people with only serious chronic conditions when the morbidity burden is the same. However, increasingly higher morbidity burden (i.e., more multimorbidity) is associated with progressively higher resource use, and the increase is the same regardless of the type of diagnosis (acute, chronic, major chronic). Chronic conditions alone do not, by themselves, imply high need for resources.

The adverse effect of low socioeconomic status (in this case as reflected in low income) is even more striking than is customarily noted when the variety of manifestations of ill health is taken into account. This graph shows a progressive increase in total morbidity with decreasing income in the population of Ontario, Canada. The effect is much stronger and more consistent when measured by the ACG measure, most likely because the vulnerability of people in lower social classes is not only toward more morbidity but also a greater variety of morbidity as a result of greater threats to their health.
Capitation is used to pay physicians in much of the province of Ontario, Canada. When the capitation fee is set to take account only of differences in age and sex distributions of the practice population, there is very little difference in what practices with low income and higher income populations receive. However, when the greater morbidity burden of lower income populations is taken into account, through application of the ACG morbidity burden measure, practices caring for lower income populations receive a much higher capitation, commensurate with the greater amount of effort required of physicians with such practices.
Methods (I)

- Representative sample of 66,500 adults (age 18 or older) enrolled in Clalit Health Services (Israel’s largest health plan) during 2006
- Data from diagnoses registered in electronic medical records during all encounters (primary, specialty, and hospital), and health care use registered in Clalit’s administrative data warehouse

Methods (II)

- Morbidity spectrum: ADGs were used to classify the population into 3 groups:
  - Low (0-2 ADGs)
  - Medium (3-5 ADGs)
  - High (>=6 ADGs)
- Clalit's Chronic Disease Registry (CCDR):
  - ~180 diseases. Based on data from diagnoses, lab tests, Rx
- Charlson Index:
  - Based on data from the CCDR
  - Range 0-19

Methods (III)

Resource use:
- Costs: total, hospital, ambulatory (standardized price X unit)
- Specialist visits
- Primary care physician visits
- Resource use ratio: mean total cost per morbidity group divided by the average total cost

Resource Use in Adults with No Chronic Conditions

• 30% of persons with no chronic conditions have an average resource use ratio higher than some of the people (5%) with 5 or more chronic conditions

• This is, resource use in populations is not highly related to having a chronic condition, in the absence of consideration of other conditions


Resource Use in Adults with Chronic Conditions

- Some people with as many as 6 chronic conditions have less than average resource use
- Prevalent conditions in persons with 6 chronic diseases and below average resource use:
  - 80% hypertension
  - 71% hyperlipidemia
  - 42% diabetes
  - 30% osteoporosis

Morbidity Spectrum Explains Health Care Resource Use ($R^2$)

<table>
<thead>
<tr>
<th></th>
<th>Total cost</th>
<th>Hospital costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, sex</td>
<td>12%</td>
<td>6%</td>
</tr>
<tr>
<td>Chronic condition count, age, sex</td>
<td>20%</td>
<td>9%</td>
</tr>
<tr>
<td>Charlson, age, sex</td>
<td>22%</td>
<td>12%</td>
</tr>
<tr>
<td>ADG, age sex</td>
<td>42%</td>
<td>27%</td>
</tr>
</tbody>
</table>

*Total costs: Hospital, ambulatory and Rx costs trimmed at 3 standard deviations above the mean.

A wide variety of studies indicates that it is not the presence of chronic conditions, or even the number of chronic conditions that contributes to high costs. Rather, it is the extent of different types of diagnoses and the pattern of the co-existing types of diagnoses that exerts the greatest influence on resource use and, hence, costs of care, as well as being a major challenge for the care of patients in health systems that are focused primarily on individual diagnoses and the quality of care for individual conditions as if they existed alone.
Chronic Conditions and Use of Resources

Implications for care management:
- Care management based on selection of patients based on chronic disease counts (e.g., persons with 4 or more chronic conditions) will include many “false positives” (i.e., persons with low morbidity burden and low associated resource use) and will miss many who could benefit from such interventions.

• Implications for research:
  - Adjustment for morbidity based on chronic condition counts or the Charlson score fails to capture the morbidity burden of 40-60% of the population.
  - Adjustments using chronic condition counts or the Charlson score explain only half or less of the variance explained by ADGs (morbidity spectrum).

Applications of Morbidity-Mix Adjustment

1. Physician/group oriented
   • Characterizing and explaining variability in resource use
   • Understanding the use of and referrals to specialty care
   • Controlling for comorbidity
   • Capitation payments
   • Refining payment for performance
2. Patient/population oriented
   • Identifying need for tailored management in population subgroups
   • Surveillance for changes in morbidity patterns
   • Targeting disparities reduction
3. Improve understanding of genesis of vulnerability to multiple illnesses
Choice of Comorbidity Measure Depends on the Purpose

- population morbidity assessments
- prediction of death
- prediction of costs
- prediction of need for primary care services
- prediction of use of specialty services

The US is focused heavily on costs of care. Therefore, it focuses in measures for predicting costs and predicting deaths.

A primary care-oriented health system would prefer a measure of predicting need for and use of specialty services.
Multimorbidity and Use of Primary and Secondary Care Services

- Morbidity and comorbidity (and hence multimorbidity) are increasing.
- Specialist use is increasing, especially for routine care.
- The appropriate role of specialists in the care of patients with different health levels and health needs is unknown.
We know that

1. Inappropriate referrals to specialists lead to greater frequency of tests and more false positive results than appropriate referrals to specialists.
2. Inappropriate referrals to specialists lead to poorer outcomes than appropriate referrals.
3. The socially advantaged have higher rates of visits to specialists than the socially disadvantaged.
4. The more the subspecialist training of primary care MDs, the more the referrals.

A MAJOR ROLE OF PRIMARY CARE IS TO ASSURE THAT SPECIALTY CARE IS MORE APPROPRIATE AND, THEREFORE, MORE EFFECTIVE.

Sources:
What is the right number of specialists?

What do specialists do?

What do specialists contribute to population health?
What We Do Not Know

The contribution of specialists to

• Unnecessary care (due to overestimation of the likelihood of disease)

• Potentially unjustified care (due to inappropriateness of guidelines when there is comorbidity)

• Adverse effects (from the cascade effects of excessive diagnostic tests)
What We Need to Know

- What specialists contribute to population health
- The optimum ratio of specialists to population
- The functions of specialty care and the appropriate balance among the functions
- The appropriate division of effort between primary care and specialty care
- The point at which an increasing supply of specialists becomes dysfunctional

Starfield 11/05
SP 6504
This chart captures the essence of the difference between disease-oriented (vertical) health services and person-oriented (horizontal) health services. Disease-oriented programs are unable to deal with people’s health problems in the context of their evolution over time and, especially, with the evolution of other seemingly unrelated health problems and disabilities.

Conclusion

Virchow said that medicine is a social science and politics is medicine on a grand scale.

Along with improved social and environmental conditions as a result of public health and social policies, primary care is an important aspect of policy to achieve effectiveness, efficacy, and equity in health services.
Conclusion

Although sociodemographic factors undoubtedly influence health, a primary care oriented health system is a highly relevant policy strategy because its effect is clear and relatively rapid, particularly concerning prevention of the progression of illness and effects of injury, especially at younger ages.
This slide summarizes the conclusions of many studies. Primary health care is a worldwide imperative. Avoiding an excessive supply of specialists minimizes unnecessary care and reduces costs. Equity in health is facilitated by a primary care orientation and a reduction in specialty services, which are inequitably distributed almost everywhere. Responding to patients' problems is a rate limiting step in achieving accurate diagnosis and management. Coordinating care reduces duplication and adverse events. Avoiding adverse events improves the safety of services. Certain payment mechanisms facilitate more appropriate care. Information systems (especially if electronic) improve care if the information in them is pursuant to better primary care over time. The increasing focus on prevention requires better coordination between public health and primary care. The following slides provide specificity for some of these imperatives.