
CHC COST EFFECTIVENESS LITERATURE

Submitted to the Association of Ontario Health Centers

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General Introduction

Project Description

In December 2004, the AOHC commissioned a report on the current state of the academic literature concerning the cost-effectiveness of CHCs. A growing set of assumptions about CHC cost-effectiveness required a definitive review of what evidence actually existed.

It was important to determine what cost-effectiveness research looked like in the academic world. That is, what types of methodologies and definitions were most common for cost studies, effectiveness studies and cost-effectiveness studies? Upon review of the literature, future research suggestions were made.

Through a better understanding of the research around the cost-effectiveness of various primary care models, not only can the current debate be better informed but future research can also be developed. Although health care costs are a hot button political issue, there seems to be little well informed debate on the topic. CHC cost-effectiveness, for example, is being evaluated on the basis of doctor/patient throughput (a simple division of the number of patients a doctor sees in a period). This rudimentary measure is almost guaranteed to give a skewed result. The extension of the results from methodologically sound research could help to better inform policy decisions. In addition, those methodologies might be re-applied and adapted to 21st century health care. Future research in the area of primary care cost-effectiveness could further define best practices and hone current cost-effective strategies for providing care.

Description of Sources

The articles for this review were compiled from December 2004 through March 2005. The goal of the review was to exhaustively catalogue articles relating to the cost-effectiveness of CHCs in Ontario. This broad category subsequently broke down into CHC effectiveness, CHC cost studies and CHC hospitalization rates. The primary geographic focus was in order of preference Ontario, Canada, United States, rest of world. Other topics including non-physician clinicians, modes of payment and other modalities of care were encountered. These other topics were catalogued less rigorously. Articles that did not relate specifically to cost or effectiveness of CHCs were generally not included.

The search terms employed were combinations of terms for CHCs and terms for cost-effectiveness. Community health centers come in a variety of forms, some are named health centers and some are not. Care was taken to examine studies that generally reflect the Ontario CHC model which is typified by the use of non-physician clinicians, salaried professionals, a focus on health promotion/disease prevention and a community focus. The terms for CHCs include:

- Community Health Center
- CHC
- Health Center
- Neighbourhood Health Center

- Federally Qualified Health Center (FQHC)
- Pre-paid group practice
- CLSC (Quebec)
- Public Clinic

The term Fee for Service (FFS) was also used as it is the most common CHC comparator.

The above CHCs terms were searched in combination with terms for cost-effectiveness which include:

- Cost
- Effectiveness
- Outcomes
- Quality
- Efficiency
- Economic
- Financial
- Hospitalization

A variety of secondary search terms were also employed when examining particular facets of the CHC cost-effectiveness issue. These included:

- Nurse Practitioners (NP)
- Kaiser Permanente (one of America's premier non-profit HMO providing high quality, vertically integrated care on a cost effective basis), NHS, HMO

Two primary search engines were used scholar.google.com, www.ncbi.nlm.nih.gov (pubmed, medline).

Particular sites were examined for other articles. These included www.nachc.com (National Association of Community Health Centers) and www.aohc.org (Association of Ontario Health Centers). The ministries of health for all Canadian provinces were examined. In addition, the holdings in the AOHC library were examined for non-published papers.

As always, the bibliography of key articles was examined for clues to other articles. The bibliographic trail was followed until all relevant articles were collected.

Particular search efforts were made around Kaiser Permanente. Kaiser is one of America's premier non-profit HMO's providing proven cost effective care. It was thought that this model might provide insight into cost-effective primary care. Barbara Starfield was also examined extensively because the Ontario Ministry of Health has used her work to substantiate the development of alternatives to the FFS modality. Papers published by the "system-link" department at McMaster University were also reviewed given their relevant to community and preventative primary care.

Limitations

The relative paucity of CHC-specific research created particular challenges for writing this review. The lack of specific CHC cost effectiveness research is compounded by the dated nature of the research that does exist. Readers should be wary of drawing specific conclusions in today's health care field from dated studies. This is particularly the case when conclusions rely on the decreased level of preventative medicine in private practice. For instance, 20 years ago there was little effort to systematically integrate preventative medicine into FFS practice. Today there has been a push to integrate preventative care into FFS, and the impact of these efforts on practice are not yet clear. Where appropriate, sections will be preceded by a note on their relevance to the present day. Also, when studies are cited, the published year is included to help the reader judge their relevance.

Document Sections

The "Literature Review" places the literature in a narrative, easily accessible paragraph form. This section was meant for the general reader who is interested in the trends of general themes. Every article in the "Annotated Bibliography" section is footnoted at least once in the "Literature Review"

The "Future Research" section analyzes the literature with a view to needed next steps. It lays out methodologies that may be useful in future research. The section is broken into three sub-sections outlining different research areas including cost studies, outcome studies and hospitalization studies.

The "Annotated Bibliography" section is a citation list ordered by the primary author's last name of all articles used. Each article has a brief description of its contents as they relate to cost-effectiveness.

The "Glossary" contains all acronyms used in this document and a brief description of what each means.

The "Theme-Ordered Bibliography" section orders the citations in the "Annotated Bibliography" by theme instead of by author last name. In addition it removes the paragraphs containing their content. Some articles are listed in more than one theme as appropriate. Also the themes of the "Theme-Ordered Bibliography" match up directly with the themes in the "Literature Review."

Literature Review

Introduction

The literature review is broken up into nine themes. These themes are in no particular order; however they are related in several ways. The articles reviewed in a particular theme are listed in the “Theme-ordered bibliography” at the end of this document. In addition, every article in the “Annotated Bibliography” is referenced at least once in the “Literature Review”. Some articles may be reference more than once as they may apply to more than one theme.

As mentioned in the “General Introduction”, cost effectiveness studies often break down into cost studies and effectiveness studies outlined in the “CHC Effectiveness” and “CHC Cost Studies” sections. One of the integral parts of effectiveness is prevention. Thorough prevention procedures can lead to better outcomes as problems are caught early. Prevention articles can be found in “CHC Preventative Care.” One of the key drivers of overall health care costs is hospitalizations. CHCs historically have done well at reducing hospitalization and this is outlined in “CHCs and Hospitalization Rates.”

In addition to cost-effectiveness specific questions, other studies were uncovered. One group of studies under “History of CHCs” outlines the roots of modern day CHCs. Another set of studies are themselves literature review or overview papers. These can be found under “Overview Studies/Literature Review.” In the section “Benefits of Other Modalities of Care,” approaches to reducing costs and improving outcomes in other health care sectors are examined.

Finally the effect of payments methods and other health care professionals is examined. In “Method of Payment,” comparisons are made between the behaviors of salaried vs. fee for service doctors. In “Non-Physician Clinicians (NPC)” the benefits of other health care professionals such as NPs, nurses and social workers to CHCs is investigated.

History of CHCs

This section highlights the papers that cover the history of CHCs. These papers generally do not come to any broad conclusions but may be useful in familiarizing a reader with how CHCs developed.

In order to understand the role CHCs may play in contemporary health challenges and trends, it is helpful to be aware of the historical role played by these forms of health care delivery. One such review is found in Hutchison et al (2002). Jonathan Lomas (1985) provides a detailed overview and history of the first CHC in Ontario, which opened in Sault Ste. Marie during the 1970s.¹ Finally, Carole Suschnigg (2001) examines the context that gave rise to the introduction of CHCs in Ontario during the 1970s, their slow

¹ Lomas, Jonathan. “Chapter 12: Evaluation.” *First and Foremost in Community Health Centres: The Centre in Sault Ste Marie and the CHC Alternative*. Toronto: University of Toronto Press, 1985.

growth in the 1980s and their rapid expansion in the early 1990s. Suschnigg suggests that the focus on funding CHCs should rise again in the political arena.²

CHC Effectiveness

This section deals with the outcome or effectiveness research on CHCs. Sometimes CHCs are compared against FFS and other times they are compared against external standards of care. The general conclusion is that in most studies CHCs compare well to FFS and outside standards.

Unlike other areas, there are some relatively recent papers on CHC effectiveness. Starfield et al (1994) notes that low cost CHCs can compete with higher cost modes of care in terms of effectiveness. Two studies of patient satisfaction, Roby et al (2003) and Shi et al (2003) show that CHCs are competing well with other modes of care. The Chin et al (2000) study paints a negative picture of CHCs with respect to diabetes care but those results are questionable given that no other modes of care were evaluated. The Ulmer (2000) study reflects positively on CHC in four key conditions. Many of the other studies are considerably dated.

Of the ten studies examining the effectiveness of Community Health Centres, the majority conclude that CHCs perform well when compared to other forms of primary care delivery. One study by Chin et al (2000) suggests that CHCs are not meeting American Diabetes Association guidelines for good diabetes care (only 3 of the 55 CHCs surveyed were within 25 percent of the standard), however no comparison is made between CHCs and other forms of health care delivery.³ One study by Barbara Starfield (1988) offers more neutral conclusions, suggesting that current studies of all forms of health care delivery examining outcome measures are insufficient.⁴

According to those studies that found that CHCs perform better than other forms of health care delivery, the effectiveness of CHCs is found in the consistency and quality of care the patients receive.

Two studies suggest that CHCs offer greater consistency in care. In an Ontario study, Mott et al (1973) suggest that Group Health Associations (GHAs) are able to offer greater continuity of care because of the concentration of services they offer and the teamwork approach to health care delivery they employ.⁵ In their study of health care experiences of CHC patients, Shi et al (2003) find that, when compared to Health Maintenance

² Suschnigg, Carole. "Reforming Ontario's Primary Health Care System: One Step Forward, Two Steps Back?" *International Journal of Health Services*, 31, (1), 2001: 91-103.

³ Chin et al. "Quality of Diabetes Care in the Community Health Centers." *American Journal of Public Health*, 90, (2), 2000: 431-434.

⁴ Starfield, Barbara. *Primary Care: Balancing Health Needs, Services, and Technology*. New York: Oxford University Press, 1988, 377-396.

⁵ Mott, F.D., J.E.F. Hastings and A.T. Barclay. "Prepaid Group Practice in Sault Ste. Marie, Ontario: Part II: Evidence from the Household Survey." *Medical Care*, XI, (3), May/June 1973: 173-188.

Organizations (HMOs), CHCs offer ongoing care, greater coordination of services, comprehensiveness and community orientation.⁶

Six studies suggest that CHCs provide high quality care. According to a recent (2003) American study, when both the clinical performance and patient experience of CHCs are analyzed, Roby et al find that CHCs score higher in terms of appropriate and effective care.⁷ Through the use of case studies, Michael Rachlis (1997) finds that CHCs are well placed to contribute to solving current health care challenges through their effective, programmed focus on non-acute care.⁸ Starfield et al (1994) finds that patients in medium cost community health centres, when compared to patients in physician offices and hospital outpatient facilities, scored the best in terms of quality assessments.⁹ Freeman et al (1982) conclude that CHCs are more likely to provide health services to minorities, the poor, the poorly educated, children and women, and CHCs are more likely to be closer to their patients than hospital outpatients and private practice patients.¹⁰ In her recent American study of ambulatory care sensitive conditions (ACSCs), Cheryl Ulmer (2000) suggests that CHCs generally exceed important elements identified in treating four ACSCs including high blood pressure, middle ear infections, diabetes and asthma.¹¹ Finally, DeFries (1975) finds that CHCs are effective because they score higher than other forms of health care delivery in terms of patient satisfaction.¹²

CHC Preventative Care

This section deals with a more specific aspect of outcomes, namely preventative care. CHCs have taken on the rubric of preventive care and this section examines their performance, which has generally been good.

This area of research provides a particularly useful examination of the role of CHCs as all of these studies were conducted in Canada. Unfortunately, all of these studies are more than 5 years old and the most recent study (Hutchison et al 1998) showed that there was no relationship between the form of training, sex, type of reimbursement and size of

⁶ Shi, Leiyu, Barbara Starfield, Jiahong Xu, Robert Politzer and Jerrilyn Regan. "Primary Care Quality: Community Health Center and Health Maintenance Organization." *Southern Medical Journal*, 96, (8), August 2003: 787-794.

⁷ Roby, Dylan, Sara Rosen Baum and Dan Hawkins. *Exploring Healthcare Quality and Effectiveness at Federally-Funded Community Health Centers: Results from the Patient Experience Evaluation Report System (1993-2001)*. Washington DC: National Association of Community Health Centers. March 2003: 1-17.

⁸ Rachlis, Michael. *Community Health Centres: Leading the Way to A Cost-Effective Health Care System*. Toronto: 1997. AOHC: AR 0678.

⁹ Starfield, Barbara, Neil R. Powe, Jonathan R. Weiner, Mary Stuart, Donald Steinwachs, Sarah Hudson Scholle and Andrea Gerstenberger. "Costs vs. Quality in Different Types of Primary Care Settings." *Journal of the American Medical Association*, 272, (24), December 28, 1994: 1903-1908.

¹⁰ Freeman, Howard, Jill Kielcolt, Harris Allen II. "Community Health Centers: An Initiative of Enduring Utility." *Milbank Memorial Fund Quarterly*, 60, (2), 1982: 245-267.

¹¹ Ulmer, Cheryl, et al. "Assessing Primary Care Content: Four Conditions Common in Community Health Center Practice." *Journal of Ambulatory Care Management*, 23, (1), 2000: 23-38.

¹² DeFries, Gordon. "On Paying the Fiddler to Change the Tune: Further Evidence from Ontario regarding the Impact of Universal Health Insurance on the Organization and Patterns of Medical Practice." *Milbank Memorial Fund Quarterly*, 53, (2), 1975: 117-148.

practice and the amount of preventative care the physician provides.¹³ The older studies show more of a gap between FFS and CHCs which may suggest a narrowing of that gap.

The remaining studies, however, present evidence for the effectiveness of preventative health care provided by CHCs. According to this research, CHCs offer better preventative care, for the most part, because of two important factors. The first of these is related to the type of remuneration found in CHCs. Abelson and Lomas, in their 1990 interviews of health care providers in fee-for-service (FFS) practices, Health Service Organizations (HSOs) and CHCs, found that 50 percent of FFS physicians said that their mechanism of payment limits their capacity to provide prevention services.¹⁴ Battista and Spitzer (1983), in their Quebec study, examine the extent to which physicians in different clinical settings provide cancer prevention to adult patients. CLSC doctors are far more likely to provide early testing and preventative care in a general sense. Part of the reason for this, according to Battista and Spitzer, is that the FFS schedule does not effectively reimburse physicians for preventative health care.¹⁵ Michael Rachlis (1997) relies on case studies to make a similar argument and finds that CHCs offer an alternative to the “perverse incentives” of the FFS remuneration system. According to Vayda et al (1989), CHCs provide benefits to doctors who participate in continuing education, which may also play a role in improving prevention methodology.¹⁶

The second reason why CHCs are better able to offer preventative care than other forms of health care delivery is situated in their multidisciplinary nature. Battista and Spitzer (1983) conclude that doctors in CLSCs and Family Medical Teaching Centers are more likely to do mammograms in women aged 50-59, conduct stool tests in patients over 45 and do PAP smears in part because of the multidisciplinary setting they provide and the variety of health care professionals they employ. Vayda et al (1989) also find that CHCs and HSOs, because of the variety of resources they possess, are more likely to recall patients for immunizations, pap tests and to monitor the hospitalization patterns of their patients, all of which play an important role in preventative care.

Non-Physician Clinicians (NPC)

This section deals primarily with Nurse Practitioners (NP) although there are other non-physician clinicians. Generally, doctors cost the more than all other clinicians. NPCs cost significantly less, usually starting at 50% less. In addition, CHCs tend to use

¹³ Hutchison, Brian, Christel A. Woodward, Geoffrey R. Norman, Julia Abelson and Judy A. Brown. “Provision of Preventative Care to Unannounced Standardized Patients.” *Journal of the Canadian Medical Association*, 158, (2), 27 January 1998: 185-193.

¹⁴ Abelson, Julia and Jonathan Lomas. “Do Health Service Organizations and Community Health Centres Have Higher Disease Prevention and Health Promotion Levels than Fee-for-Service Practices?” *Canadian Medical Association Journal*, 142, (6), 1990: 575-581.

¹⁵ Battista, Renaldo N. and Walter O. Spitzer. “Adult Cancer Prevention in Primary Care: Contrasts Among Primary Care Practice Settings in Quebec.” *American Journal of Public Health*, 73, (9), September 1983: 1040-1041. AOHC: AR 0670.

¹⁶ Vayda, Eugene, A. Paul Williams, H. Michael Stevenson, Karin Domnick Pierre, Mike Burke and Janet Barnsley. “Characteristics of Established Group Practices in Ontario.” *Healthcare Management FORUM*, 2, 1989: 17-23, AOHC: AR 0047.

significantly more NPs than any other modality of primary care. As such, NPs are seen as a major contributor to cost-effective care.

Non-physician clinicians include the other professionals working in primary care, these might include nurses, nurse practitioners, dieticians, counselors etc. Nurse practitioner studies tend to be more recent since the adoption of this profession into primary care has also been fairly recent.

Goldman and Grossman (1983) suggest a clear cost savings in the use of NPCs and find that CHCs would be more cost effective if they increased their use of NPCs.¹⁷ In their Ontario-based studies, Rachlis (1997) and Vayda et al (1989) find that CHCs make effective use of non-physician health professionals for routine care. Cooper et al (2001) conclude that the increasing participation of NPCs is both cost effective and satisfactory to patients. Further, Cooper et al find that NPCs provide an appropriate substitute to physician care in areas of lower-complexity and, in some cases, give supplementary care to that provided by physicians.¹⁸ Begley et al (1989) note that there is a strong correlation between cost effectiveness and the use of non-physician clinicians.¹⁹ Finally, Way et al (2001) suggest that nurse practitioners and family physicians offer unique skills and knowledge in the delivery of primary care. Nurse practitioners tend to offer more disease prevention and supportive services while family practitioners provide more curative and rehabilitative care.²⁰

Benefits of Other Modalities of Care

This section focuses on lessons learned in other areas of health care. Although this literature review is focused specifically on CHCs, cost-effectiveness is an active topic in other areas as well. This section analyses those discussions.

Promising CHC research is also found in the overall benefits seen in alternative modalities of care. Here, ten studies examining other forms of health care delivery are reviewed. Unfortunately, much of this research does not focus on CHCs specifically. However, they do examine the benefits of forms of health care delivery that are comparable to the CHC system and, as such, offer insights into how CHCs could most effectively be structured. These studies tend to be more recent and as such more relevant.

To begin, three of these studies offer examinations of alternative forms of primary care delivery in a general sense. Hutchison et al (2002) examine the various types of primary

¹⁷ Goldman, Fred and Michael Grossman. "The Production and Costs of Ambulatory Medical Care in Community Health Centres." *Advances in Health Economics and Health Services Research*, 4, 1983: 1-56.

¹⁸ Cooper, Richard A. "Health-Care Workforce for the Twenty-First Century: The Impact of Nonphysician Clinicians." *Annual Review of Medicine*, 52, 2001: 51-61.

¹⁹ Begley, Charles, Catherine Dowd, Roy McCandless. "A Cost-Effectiveness Evaluation of the Primary Health Care Projects for the Poor." *Evaluation and the Health Professional*, 12, (4), 1989: 437-452.

²⁰ Way, David, Linda Jones, Bruce Baskerville and Nick Busing. "Primary Health Care Services Provided by Nurse Practitioners and Family Physicians in Shared Practice." *Journal of the Canadian Medical Association*, 165, (9), 30 October 2001: 1210-1214.

care delivery in Canada including the CHC, AHAC, HSO, PCN and FHN.²¹ Fleming and Andersen (1996) analyze the American Medical Health Services Program (MHSP). In comparison to outpatient departments and emergency rooms, MHSPs are able to replace the services offered in a less costly manner. The results of this study are slightly ambiguous, however, as MHSPs are no more able than other forms of health care delivery to make casual users into regular users; further, they do not create the continuity of care expected nor did they produce high levels of patient satisfaction.²² Fries et al (1998) examine how health care delivery can more effectively reduce the demand for health care. This study concludes that programs that integrate self-management of disease, reduction of risk and heightened self-efficacy are vital in the reduction of the demand for health care.²³

Other studies look at more specific forms of alternative modalities of care, including the Kaiser Permanente HMO in the United States, the National Health System (NHS) in Britain, and community approaches to health care. Feachem et al (2002), Light & Dixon (2004) and Ham et al (2004) all compare Kaiser and NHS and find the Kaiser system to be more cost effective. Feachem et al (2002) provide the most muted findings of this nature and suggest that Kaiser's savings are situated in the integration throughout the system, the efficient management of hospitalization rates, the benefits it receives through competing with other HMOs for business and higher investments in information technology.²⁴ Light and Dixon (2004) suggest that the NHS could learn from the Kaiser Permanente model by adopting integrative governance and collaborative contracting (enforcing budget and responsibility sharing across all health care practitioners) in the clinic setting. This will help to reduce inefficiencies and waste and provide incentives to treat patients quickly and effectively.²⁵ Finally, Ham et al (2004) encourage the adopting of Kaiser's integration of inpatient and outpatient care, its focus on chronic diseases and emphasis on self-care and immediate care, and its integration of prevention, diagnosis, treatment and care.²⁶

The final form of analysis looking at the benefits of other modalities examines community approaches to health care delivery. Browne et al (1995,1999,2001), through a variety of studies, suggest that the most effective forms of health care are cooperative

²¹ Hutchison, Brian, Julia Abelson, Chris Woodward, Riley Johnston. *Environmental Scan of Primary Health Care in Ontario*. Hamilton: McMaster University Centre for Health Economics and Policy Analysis, 2002. AR 1353.

²² Fleming, Gretchen V. and Ronald M. Andersen. "The Municipal Health Services Program: Improving Access to Primary Care Without Increasing Expenditures." *Medical Care*, 24, (7), July 1996: 565-579.

²³ Fries, James F., C. Everett Koop, Jacque Sokolov, Carson E. Beadle and Daniel Wright. "Beyond Health Promotion: Reducing Need and Demand for Medical Care: Health Care Reforms to Improve Health While Reducing Costs." *Health Affairs*, 17, (2), March/April 1998: 70-84.

²⁴ Feachem, Richard G.A., Neelam K. Sekhri, Karen L. White. "Getting More for their Dollar: A Comparison of the NHS with California's Kaiser Permanente." *British Medical Journal*, 324, 19 January 2002: 135-143.

²⁵ Light, Donald and Michael Dixon. "Making the NHS More Like Kaiser Permanente." *British Medical Journal*, 328, 27 March 2004: 763-765.

²⁶ Ham, Chris, Nick York, Steve Sutch and Rob Shaw. "Hospital Bed Utilization in the NHS, Kaiser Permanente and US Medicare Programme: Analysis of Routine Data." *British Medical Journal*, 327, 29 November 2003: 1-2. Downloaded from bmj.com on 22 December 2004.

(they link health care, social services and mental health services), integrated (as opposed to individual, disease-oriented or fragmented), accessible, coordinated, comprehensive, holistic, proactive and tailored to patients' needs.²⁷ Community services, which provide integrated and proactive services to the chronically ill at early stages of their illnesses, produce lower health delivery costs and manage disease more effectively.²⁸ Finally, Watt et al (1999) assert that equal or better outcomes arise out of community programs that focus on anticipated need, as opposed to patients' unique, immediate, medical situations, for the same or lower costs.²⁹

Method of Payment

This section examines the importance of salaried vs. FFS doctors. CHC doctors are salaried. Method of funding is the primary economic motivator for doctor behaviour. Here the studies that examine that area are examined.

The benefits of non-FFS remuneration systems have already been mentioned above (including Rachlis, Abelson and Battista). However, two studies focus their research entirely upon this advantage of CHC health care.

Gosden et al (1999) find that FFS doctors use more services (i.e. referrals to other services) than salaried doctors. There is evidence to suggest that the additional use of services is not always necessary or appropriate. Hence, if governments are attempting to reduce health care costs, salaried payment systems are more likely to produce this end.³⁰ Hutchison et al (2001) point out that although there have been numerous calls for transformation, the dominant structure of service based on solo or small-group practices funded through an FFS remains dominant in Canada. Policy-makers wishing to see transformations in this system should focus on small, incremental changes as opposed to massive structural shifts.³¹

CHC Cost Studies

As noted above, cost-effectiveness studies break down along cost and effectiveness lines. This section examines the cost side of the equation. Generally these studies are quite

²⁷ Browne, Gina, Jacqueline Roberts, Carolyn Byrne, Amiram Gafni, Robin Weir and Basanti Majumdar. "The Costs and Effects of Addressing the Needs of Vulnerable Populations: Results of 10 Years of Research." *Canadian Journal of Nursing Research*, 33, (1), 2001: 65-76. Browne, Gina, Jacqueline Roberts, Amiram Gafni, Carolyn Byrne, Robin Weir, Basanti Majumdar and Susan Watt. "Economic Evaluations of Community-Based Care: Lessons from Twelve Studies in Ontario." *Journal of Evaluation in Clinical Practice*, 5, (4), 1999: 367-385.

²⁸ Browne, Gina, Jacqueline Roberts, Amiram Gafni, Robine Wier, Susan Watt and Carolyn Byrne. "More Effective and Less Expensive: Lessons from Five Studies Examining Community Approaches to Care." *Health Policy*, 34, 1995: 95-112.

²⁹ Watt, Susan, Gina Browne, Amiram Gafni, Jacqueline Roberts and Carolyn Byrne. "Community Care for People with Chronic Conditions: An Analysis of Nine Studies of Health and Social Service Utilization in Ontario." *The Milbank Quarterly*, 77, (3), 1999: 363-392.

³⁰ Gosden, T., L. Pedersen and D. Torgerson. "How Should We Pay Doctors? A Systematic Review of Salary Payments and their Effect on Doctor Behaviour." *Quarterly Medical Journal*, 92, 1999: 47-55.

³¹ Hutchison, Brian, Julia Abelson and John Lavis. "Primary Care in Canada: So Much Innovation, So Little Change." *Health Affairs*, 20, (3), May/June 2001: 116-131.

dated. Nonetheless, CHCs seem to perform well in overall costs, particularly when hospitalization costs are included.

A number of studies analyze the overall cost of CHCs. Four of these examine costs in the Canadian context, seven in the American context and one examines a CHC in South Africa. The area of CHC cost studies is perhaps the most dated. All of the thorough Canadian research occurred before 1983. The most recent Canadian study was performed in 2002. However it was not peer reviewed and seems to have been done on an ad hoc basis. As such, caution should be exercised when extending its results. More recent American studies have been done with positive results. What can be said is that historically there has not been any research showing CHCs falling behind FFS in terms of cost.

In Canada, all four studies find that CHCs are more cost effective than other forms of health care delivery. A sub-study of the *Umbrella Alberta Primary Health Care Project* (2002) uses shadow billing to show the Alexandra clinic CHC to be cost effective as its budget is less than it the total would be if it billed through a FFS program. The study was not peer reviewed and appears to be preliminary in nature³². Rein Lepnurm (1995) finds that the costs associated with CHC patients are consistently lower than FFS patients in this overview article. In Quebec, increased investment in CHCs has allowed the province to provide primary care to over 90 percent of the population at 6 percent of the total budget.³³ Peter Ruderman (1973) concludes that Saskatchewan CHCs are far less expensive than similarly sized FFS group practices.³⁴ Finally, a study from Saskatchewan Health (1983) shows that total health care costs are lower at CHCs than at FFS practices.³⁵

In the United States, Begley et al (1989) find that public clinics (similar to walk-in clinics in Ontario) perform the best in terms of average costs per encounter, and CHC and hospital ambulatory care follow close behind. Private practices are the most costly. Davis and Schoen (1979) find that the costs per patient in CHCs are comparable to FFS practices.³⁶ Goldman and Grossman (1983) offer a similarly ambiguous picture of the cost effectiveness of CHCs by analyzing the internal cost functions of CHCs without comparing them to other forms of health care delivery. Duggar et al (1994) examine Medicaid claims in California and New York and find that CHC patients showed

³² Alexandra Community Health Centre. "Evaluation of the Alexandra Community Health Centre as a Model of Primary Health Care." Substudy # AB301-2 of the *Umbrella Alberta Primary Health Care Project*, 2002: 66-76.

³³ Lepnurm, Rein. "Consumer-Sponsored Health Centres and Health Reforms in Canada." *Journal of Ambulatory Care Management*, 18, (1), 1995: 39-46.

³⁴ Ruderman, Peter. *Economic Characteristics of Community Health Centres: Report to the Community Health Centre Project*. Ottawa: Information Canada, 1973.

³⁵ Saskatchewan Health. "Community Clinic Study." Policy Research and Management Services Branch, July 1983. AOHC: AR 0050.

³⁶ Davis, Karen and Cathy Schoen. *Health and the War on Poverty: A Ten-Year Appraisal*. Washington: Brookings Institute, 1978: 189-192.

considerable cost savings (between 29 and 42 percent) when compared to FFS patients.³⁷ Nathan Stacy (2000) finds that CHCs offer comparable managed care service to that found in other providers, with lower costs.³⁸ Starfield et al (1994) finds that low cost clinics are equally capable of providing high quality care as their high cost counterparts. Finally, Stuart and Steinwachs (1993) assert that mean total payments are much higher for hospital outpatient users than for Federally Qualified Health Centers (FQHCs) and office-based users.³⁹

In a primarily internal study (1991), the Alexandra clinic in South Africa analyzed its costs in terms capital and operating expenditures. Unfortunately, no statistically valid comparisons were made to other modalities of primary care delivery.⁴⁰

Overview Studies/Literature Reviews

This section reviews papers that are themselves reviews of CHC cost-effectiveness literature. Although these papers do not come to conclusions on their own, they are useful tools in overviewing a wide-range of articles quickly.

Overview studies or literature reviews bring together various CHC studies to create a meta-picture. All of these reviews suggest that CHCs either improve or maintain the cost-effectiveness/efficiency and accessibility of health care delivery. Many of these meta- studies are in fact quite recent although the studies they overview can often themselves be dated.

Three of these studies focus on the cost effectiveness and efficiency of CHCs. Angus and Manga (1990) suggest that all studies they reviewed found that co-operative, consumer sponsored CHCs are more cost effective than FFS practices.⁴¹ Hawkins and Schwartz (2003) come to similar conclusions in their study focusing on the cost effectiveness of American CHCs, suggesting that states could save up to \$1.2 billion annually by investing in CHCs.⁴² Rein Lepnurm (1995) supports this assertion in his analysis of Canadian CHCs. Montalo and Dunt (1992) provide an overview of Australian and international literature on the place of general physician practice in CHCs. Contrary to most other overview studies, these researchers uncover articles that have found little

³⁷ Duggar, BC, et al. *Health Services Utilization and Costs to Medicaid of AFDC Recipients in New York and California Served and Not Served by Selected Community Health Centers*. Center for Health Policy Studies, 1994. AOHC: 0125.

³⁸ Stacy, Nathan L. "The Experience and Performance of Community Health Centers Under Managed Care." *The American Journal of Managed Care*, 6, (11), November 2000: 1229-1239.

³⁹ Stuart, Mary E. and Donald M. Steinwachs. "Patient-Mix Differences Among Ambulatory Providers and Their Effects on Utilization and Payments for Maryland Medicaid Users." *Medical Care*, 31, (12), 1993: 1119-1137.

⁴⁰ Valli, A., P. Ferrinho, J. Broomberg, T.D. Wilson, and C. Robb. "Costs of Primary Health Care at the Alexandra Health Centre." *SAMJ South African Medical Journal*, 80, October 1991: 396-399.

⁴¹ Angus, Douglas E. and Pran Manga. "Co-op/Consumer Sponsored Health Delivery Effectiveness." *The Canadian Co-operative Association*. Ottawa, 1990.

⁴² Hawkins, Daniel Junior and Roger Schwartz. "Health Centers and the States Partnership Potential to Address the Fiscal Crisis." *Journal of Ambulatory Care Management*, 26, (4), 2003: 285-295.

change in terms of cost, patient satisfaction and promotion of disease prevention with the introduction of CHCs.⁴³

Two studies by Politzer et al highlight the accessibility of CHCs. In 2001, Politzer and Yoon conclude that health centres are capable of reducing health care access disparities as they provide regular sources of care.⁴⁴ Elsewhere, Politzer et al (2003) claim that CHCs are progressive facilities delivering community oriented and enabling health care.⁴⁵ The ARA Consulting Group (1992) provides an overview of CHCs around the world.⁴⁶

CHC and Hospitalization Rates

This section examines the significant effect that CHC care can have on hospitalization rates. As noted in the Cost Studies section, CHCs tend to perform well on costs and do so because they manage to reduce hospital visits. Here, a more in-depth analysis is made of studies that come to that conclusion.

The literature examining the hospitalization rates of CHC clients is both prolific and consistent. In total, eight studies from Canada suggest that CHCs reduce hospitalization rates, and similar conclusions are found in eleven studies from the United States. As is the case with other categories, there is relatively little recent research. In Canada, all of the substantive research was done before 1983. In the US, the more recent research suggests that CHCs and FFS may be closer in terms of hospitalization rates than earlier studies, see Stuart & Steinwachs (1993) and Falik et al (2001). Although the evidence is conflicting (see Duggar et al 1994), it might suggest a narrowing of the gap between CHCs and FFS hospitalization rates. Again it is unclear how the American experience would apply to Canada.

In the Canadian context, DeFriese (1975) finds that patients who use CHCs for their primary care have reduced hospitalization rates of approximately 25%. Mott et al (1973) suggest that users of GHAs use other facilities, including hospitals, less often. Angus and Manga (1990) suggest that reduced hospitalization rates are the main reason why CHCs are more cost effective than FFS practices. Overall, their review suggests that CHCs reduce hospital usage between 10 and 40 percent. Hastings et al (1973) show that hospital utilization (in terms of admission rates) in CHC users is 24 percent lower than in

⁴³ Montalo, Michael and David Dunt. "The Evaluation of General Practice in Community Health Centres: A Critical Review." *Center for Health Program Evaluation*: Working Paper 25. October 1992: 1-19.

⁴⁴ Politzer, Robert M. and Jean Yoon. "Inequality in America: The Contribution of Health Centers in Reducing and Eliminating Disparities in Access to Care." *Medical Care Research and Review*, 58, (2), June 2001: 234-248.

⁴⁵ Politzer, Robert M., Ashley H. Schempf, Barbara Starfield, and Leiyu Shi. "The Future Role of Health Centers in Improving National Health." *Journal of Public Health Policy*, 24, (3/4), 2003: 296-306.

⁴⁶ ARA Consulting Group Incorporated. *Final Report: Evaluability of Assessment of Ontario's Community Health Centre Program*. Evaluation Project Group Strategic Planning and Evaluation Project Community Health Centre Program, 1992.

patients using individual physicians.⁴⁷ Lepnurm (1995) finds that costs for CHC patients are consistently lower, and that they require fewer hospital days and prescription drugs than FFS patients. Lomas (1985) similarly points to the reduced hospitalizations seen in CHC patients when compared to FFS users. According to Ruderman and the Saskatchewan Health study (1983), the majority of savings seen in CHCs is due to lower hospital costs. Saskatchewan Health finds that CHC patients had between 23 and 31 percent fewer inpatient days, 10 and 23 percent fewer stays in hospital and 9 and 15 percent shorter stays over FFS patients. Morris Barer (1981) finds that, even under the challenging circumstances facing CHCs in Canada, prepaid group practices and CHCs have lower rates of hospitalization than private practices (approximately 20 percent less inpatient care).

However, Barer also points to the fact that, in order for this reduced rate of hospitalization to result in savings in health care spending, the beds freed in hospitals would have to be closed. The reason is that if beds exist they tend to be filled and as such some of the freed beds do not result in actual savings because they are simply filled by other patients. A 20% bed reduction, would only result in a 5-8% percent reduction in total Ontario health care spending⁴⁸

Studies in the American context produce similar conclusions. Freeman et al (1982) find that patients who use CHCs for their primary care have reduced hospitalization rates of approximately 25 percent. According to Freeman et al this reduction in hospitalization could allow for hundreds of millions of dollars in savings. Stuart et al (1993) suggest that the distinctions between the costs of CHC and hospital outpatients can be attributed to the higher admission rates for hospital outpatient users. Deprez et al (1987) conclude that CHCs have a substantial effect on hospitalization in communities where procedures are done on an outpatient basis in the CHC as opposed to inpatients in the hospital.⁴⁹ Duggar et al (1994) show similar improvements in inpatient days, stays in hospital and lengths of stays to those seen in the Saskatchewan Health study above. Andrew Epstein (2001) points to the savings that Federally Qualified Health Centers (FQHC) may produce as they significantly lower preventable hospitalization rates, particularly in elderly and low-income populations who are more likely to seek preventable hospitalization.⁵⁰ Falik et al (2001) examine hospitalization of patients with ACSCs and find that FQHCs are also able to significantly reduce the likelihood of hospitalization and emergency room visits for patients with ACSCs.⁵¹

⁴⁷ Hastings, J.E.F., F. D. Morr, A. Barclay and D. Hewitt. "Prepaid Group Practice in Sault Ste. Marie, Ontario Part I: Analysis of Utilization Records." *Medical Care*, XI, (2), March-April 1973: 91-103.

⁴⁸ Barer, Morris. Chapter 1: The Organization of Medical Care Delivery. *Community Health Centers and Hospital Costs in Ontario*. Toronto: Ontario Economic Council, 1981: 16-67. Barer, Morris. Chapter 7: Hospital Expenditure Differentials – Implications and Summary. *Community Health Centers and Hospital Costs in Ontario*. Toronto: Ontario Economic Council, 1981: 153-167.

⁴⁹ Deprez, Ronald, Bet-Ellen Pennell, Mary Anne Libby. "The Substitutability of Outpatient Primary Care in Rural Community Health Centers for Inpatient Hospital Care." *Health Services Research*, 22, (2), June 1987: 207-233.

⁵⁰ Epstein, Andrew J. "The Role of Public Clinics in Preventable Hospitalizations Among Vulnerable Populations." *Health Sciences Research*, 36, (2), June 2001:405-420.

⁵¹ Falik, Marilyn, Jack Needleman, Barbara L. Wells and Jodi Korbs. "Ambulatory

Finally, Hochheiser et al (1971), Manning et al (1984), Moore et al (1972) and Nobrega et al (1982) show that communities that invest in CHCs see a clear and significant reduction in hospitalization rates.⁵²

Conclusion to Narrative Bibliography

In summary, the vast majority of research relating CHCs shows that they bring significant improvements in all of the categories analyzed above. In those studies where the results are not as clear, CHCs, at the very least, provide equal levels of health services to other modalities of care and never imply a decrease in efficiency or quality of health care delivery.

However, the dated nature in several of the key categories including cost studies, effectiveness studies and hospitalization studies shows the need for more research. The comprehensive Canadian studies are at least 20 years old and offer only limited insight into today's primary care setting. Nonetheless, the research, even if dated, has been positive in terms of relative cost effectiveness of CHCs and FFS. What future Ontario research should examine is not only the classic models of primary care but also the new hybrid models that attempt to blend FFS with more interdisciplinary care. To date there are no studies examining the cost effectiveness of these newer models.

Care Sensitive Hospitalizations and Emergency Visits: Experiences of Medicaid Patients Using Federally Qualified Health Cares." *Medical Care*, 39, (6), 2001: 551-561.

⁵² Hochheiser, Louis I., Kenneth Woodward and Evan Charney. "Effect of the Neighbourhood Health Center on the Use of Pediatric Emergency Departments in Rochester, New York." *The New England Journal of Medicine*, 285, (3), July 15, 1971: 148-152. Manning, Willard G., Arleen Leibowitz, George A. Goldberg, William H. Rogers, and Joseph P. Newhouse. "A Controlled Trial of the Effect of a Prepaid Group Practice on Use of Services." *New England Journal of Medicine*, 310, (23), June 7, 1984: 1505-1510. Moore, Gordon T., Roberta Bernstein and Rosemary A. Bonanno. "Effect of a Neighbourhood Health Center on Hospital Emergency Room Use." *Medical Care*, X, (3), May-June 1972: 240-247. Nobrega, Fred T., Iqbal Krishan, Robert K. Smoldt, Charles S. Davis, Julie A. Abbott, Eda G. Mohler and Walter McClure. "Hospital Use in a Fee-for-Service System." *Journal of the American Medical Association*, 247, (6), February 12, 1982: 806-810. Okada, Louise M. and Thomas T. H. Wan. "Impact of Community Health Centers and Medicaid on the Use of Health Services." *Public Health Reports*, 95, (6), November-December 1980: 520-534.

Future Research

Future Research Introduction

There is surprisingly little recent research on the cost-effectiveness of different modes of primary care in the Ontario or even the Canadian context. The need to update the knowledge around cost-effectiveness is even more pressing given the proliferation of hybrid model of primary care. These hybrid models incorporate aspects of the more established capitation, direct budget support and fee-for-service models. Without an updated understanding of the strengths and weaknesses of initial primary care models, new hybrids risk being constructed on hearsay instead of fact. The hybrid models would include LHINs, FHNs, PCNs as well as the older models of FFS, CHC and capitation (HSO). In addition, such knowledge would facilitate much needed evaluation of these new hybrids with reference to the older ones.

In addition, recent research that has been done has not necessarily been published in peer-reviewed journals. As such, these studies are harder to find and less accessible. Wherever possible AOHC should endeavour to associate the work it sponsors with the academic world and push to have that work published in a peer reviewed journal.

Below is a review of three distinct research projects that would fill needed gaps in the current primary care modalities of care cost-effectiveness literature.

1. Effectiveness study of Ontario models of care

It has been 15 years since there have been any papers on the differences in effectiveness of primary care models in Ontario. There have been some more recent American studies but overall this topic is understudied, both at home and internationally.

An effectiveness study would examine three things: the patient experience, the provider experience and an analysis of patient outcomes across different models. The goal would be to paint a picture of how well different models of care are treating patients. In an ideal situation, this effectiveness study would be linked to a cost study. However, if past research is any indication, these studies are hard enough on their own without attempting combine them. As such, the effectiveness and cost studies are described separately in this document.

To examine the patient and provider experience, survey instruments would likely function best. Starfield's PCAT survey or something similar would suffice. The goal would be to evaluate how patients and providers view the health care experience. This experience should be viewed through several lenses including accessibility, prevention, continuity of care, comprehensiveness, family/community oriented, cultural appropriateness and overall experience. A view through these various lenses should give policy makers a much stronger understanding of the strengths and weaknesses of

particular models. It might also give particular models areas to focus on when internal policies are being reviewed.

It should be noted that on these first two areas of investigation, the Elizabeth Bruyere center in Ottawa is engaged in such research. Their project will sample four primary care modalities, CHCs, FFS, HSO and FHN. Unfortunately they have not expanded their sample to include other PHC hybrids in Ontario. This is at least in part due to the novelty of these newer models. Nevertheless, the Bruyere findings should be a much needed update on how primary care models in Ontario are doing.

The third portion of an effectiveness study would examine the more pressing question of what effect different models have on case outcomes. A survey of patients and providers answers this question only tangentially and subjectively. It is instructive to examine the question more objectively in the hopes of gaining more insight into the strengths and weaknesses of each model.

The evaluation of outcomes is fraught with challenges⁵³ and is often put aside in cost studies due to the complexity of evaluation. In particular, a thorough evaluation of outcomes demands the ability to compare outcomes across diagnoses. As well, any outcome should be adjusted for the initial state of the patient least doctors who see severely ill patients be unfairly penalized. Finally, a standard measure of morbidity needs to be incorporated to adjust for complicating factors as they occur. To attempt the measurement for even one of these issues is daunting.

What researchers have preferred to do is use proxy measures for outcomes. In particular, they have focused on so called “tracer” conditions.⁵⁴ It has been shown that good treatment in particular diseases is highly correlated with good treatment in other diseases.⁵⁵ As such, only a small subsection of actual disease treatments need to be examined to get a proxy for how the entire practice is doing in treating disease. These tracer conditions include: Diabetes, Asthma, Hypertension/Heart attacks and pre/perinatal care. In each of the following the quality of care, preventive procedures, appropriate testing etc are evaluated based on best practices, usually based on the disease association’s recommendations, ex. The American Diabetes Association.⁵⁶

The tracer condition approach bypasses many of the outcome evaluation problems. Although it does not directly address cross-diagnosis measurements, initial state or morbidity, it provides a proxy for how well key patients are being treated.

⁵³ Starfield, Barbara. *Primary Care: balancing health needs, services, and technology*. New York : Oxford University Press, 1998, 377-396.

⁵⁴ See Birch J., L. Jonathan, M. Rachlis, J. Abelson, (1990) HSO performance: A critical appraisal of current research (CHEPA Working Paper Series 90-1). Hamilton, Ontario, Canada: Center for Health Economics and Policy Analysis.

⁵⁵ Ulmer, Cheryl, et al. “Assessing Primary Care Content: Four Conditions Common in Community Health Center Practice.” *Journal of Ambulatory Care Management*, 23, (1), 2000: 23-38.

⁵⁶ Chin et al. “Quality of Diabetes Care in the Community Health Centers.” *American Journal of Public Health*, 90, (2), 2000: 431-434.

2. Ontario Cost study

The last extensive cost study examining different modalities of care in Ontario was performed in Sault Ste Marie on data emerging from the late 70s.⁵⁷ When approaching the issue of cost-effectiveness in Ontario, it is fair to say there is no current data that would allow us to decide the issue in anyone's favour. The health care system has made significant changes since the 1970s involving not only treatment options but also the role of preventive medicine, the increased pressure from chronic diseases and the evolving nature of the models themselves. The most recent Canadian study was completed in 2002 in Alberta although its applicability is limited because it only investigated CHC billing patterns.⁵⁸ The most recent cost study comparing different modalities was completed in 1983 in Saskatchewan.⁵⁹ Although these prior studies are instructive in a general sense, they are dated and have only limited applicability to the modern situation. Given the paucity of Canadian, much less Ontario, research on the cost structure of modalities of care, such a study is long overdue.

The scope of costs to be examined will inevitably have a bearing on the final results. The older Canadian studies have tended to spread the net as widely as possible given difficulties in data collection. Generally, once the user population was defined for each modality of care, then the full costs those users incurred in the health care system was recorded. These costs would include the initial point-of-contact costs but would also include the cost of ambulatory care, hospital care, specialist visits etc. Some studies also examined pharmaceutical costs which are not necessarily covered under the provincial health insurance umbrella. The goal is to determine what effect different forms of primary care have on overall health care costs.

Although there has been little work done comparing the health care costs for modalities of primary care in Ontario, there is a growing expertise in analyzing health care costs generally. McMaster's 'System-link' project has focused on the area of cost effectiveness in health care but has focused on the effectiveness of particular programs instead of on modalities of care.⁶⁰ Focusing on a particular innovative program has the

⁵⁷ Hastings, J.E.F., F. D. Morr, A. Barclay and D. Hewitt. "Prepaid Group Practice in Sault Ste. Marie, Ontario Part I: Analysis of Utilization Records." *Medical Care*, XI, (2), March-April 1973: 91-103.

⁵⁸ Alexandra Community Health Center. "Evaluation of the Alexandra Community Health Centre as a Model of Primary Health Care", Substudy #: AB301-2 of "Umbrella Alberta Primary Health Care Project", 2002, 66-76.

⁵⁹ Saskatchewan Health, "Community Clinic Study" Policy Research and Management Services Branch, July 1983.

⁶⁰ Watt, Susan, Gina Browne, Amiram Gafni, Jacqueline Roberts and Carolyn Byrne. "Community Care for People with Chronic Conditions: An Analysis of Nine Studies of Health and Social Service Utilization in Ontario." *The Milbank Quarterly*, 77, (3), 1999: 363-392. Browne, Gina, Jacqueline Roberts, Carolyn Byrne, Amiram Gafni, Robin Weir and Basanti Majumdar. "The Costs and Effects of Addressing the Needs of Vulnerable Populations: Results of 10 Years of Research." *Canadian Journal of Nursing Research*, 33, (1), 2001: 65-76. Browne, Gina, Jacqueline Roberts, Amiram Gafni, Carolyn Byrne, Robin Weir, Basanti Majumdar and Susan Watt. "Economic Evaluations of Community-Based Care: Lessons from Twelve Studies in Ontario." *Journal of Evaluation in Clinical Practice*, 5, (4), 1999: 367-385. Browne, Gina, Jacqueline Roberts, Amiram Gafni, Robin Wier, Susan Watt and Carolyn Byrne. "More Effective and Less Expensive: Lessons from Five Studies Examining Community Approaches to Care." *Health Policy*, 34, 1995: 95-112.

benefit of vastly reducing the sample size and simplifying collection requirements. Nonetheless, the expertise at collecting global health care costs within the Ontario context exists and should be exploited.

One of the enduring challenges for this type of study, whether in Ontario or elsewhere, is the selection of comparison groups. The earlier Canadian studies only compared CHCs to Fee for Service care. As such, only two groups were needed. Given the proliferation of modalities in Ontario in the past ten years, at least five groups would be needed now for CHC, FFS, HSO, LHIN and FHN. One of the selection challenges is to avoid patients self-selecting a particular type of care. There is some evidence that people who ideologically agree with CHC style care will seek care earlier.⁶¹ In an ideal situation, patients would be randomly assigned to a particular modality of care, hence avoiding the self-selection issue. However, within the context of universal health care that is not a viable option. The other strategies have involved selecting statistically comparable sub-segments of the initial larger populations. The members of these sub-segments are then tracked over the length of the study instead of tracking the entire population. While ignoring the self-selection issue, this strategy adjusts for relevant risk factors. On the other hand, population wide results can be adjusted for relevant risk factors using statistical/econometric models. This second option is often seen as less valid than the direct sub-segment matching. Given the complexity of examining at least five populations, expediency may need to win out over completeness in an effort to get results.

One of the other enduring challenges of modality of care studies is the applicability of the final results to other jurisdictions. No doubt, the population characteristics vary between Saskatchewan and Ontario. It may be that these differences will critically affect the results and hence invalidate any cross-jurisdictional application of the Saskatchewan results to the Ontario situation, for example. This same criticism may well apply within the same province, making a study in Toronto invalid in the Sudbury context. Where site selection is concerned, it seems reasonable that the primary determinant should be the existence of all of the modalities of care. Once that criteria has been met then different risk contexts should be considered, a rural vs. an urban setting or a high income vs. low income setting. Having results from several different risk settings would be invaluable in terms of understanding the strengths and weaknesses of each model.

Ongoing research at the Bruyere center in Ottawa should at least partially inform the cost picture. Using chart audits and econometric adjustments, their aim is to determine the cost structure of four modalities of care in Ontario. They expect their sample size to be quite large (60 centers for each modality) and as such their results should have cross-province relevance. The drawback is that by focusing exclusively on point-of-contact costs the study inevitably excludes the more significant costs of other areas of the health care system, particularly hospitalization. As such, this research will only provide a partial picture.

⁶¹ A. P. Ruderman, Economic characteristics of community health centres : report to the Community Health Centre Project, Ottawa, Information Canada, 1973.

In terms of cost effectiveness, most studies examining health care costs have been purely cost studies and have not measured outcomes. In part this is due to the complexity of measuring outcomes in the first place. Certainly a cost-effectiveness study is preferable to a cost study, however, given the lack of both, even a cost study would help to inform the debate. It should be noted that the “System-Link” project that examines health care costs usually does it in the context of cost-effectiveness so there is expertise to draw on in that regard.

3. The Effect of Modalities of Care on Hospitalization

The most costly care that can be provided in the health care system is hospitalization. As such, any discussion of health care costs must inevitably involve a discussion of hospitalization costs. While there may be cost efficiencies within hospital operations, the best way to reduce hospital costs is to keep people out of them and reduce their stays when they are admitted. Prior studies of modalities of primary care have shown that one of the key determinants of health care costs generally is hospitalization costs.⁶² It should be noted that there is not a one-to-one relationship between hospitalization reductions and cost reductions.⁶³ However, there is still a strong connection. Therefore, hospitalization rates can stand as a proxy to health care cost when the calculation of health care costs becomes too difficult.

Generally there are three measures of hospitalization: inpatient days, separations (discharges) and length of stay. Each is measured independently although they are related. Prior studies have shown no clear pattern in terms of which models are best in reducing which measures. In fact, even in CHC specific studies, the measures that form the reduction in hospitalization differ from study to study.⁶⁴

It should be noted that reduced hospitalization does not mean refusing service or inappropriate early discharges. Patients are always admitted to hospitals as needed. Instead, reduced hospitalization comes from moving ambulatory care out of the hospital setting, providing alternatives to the emergency room and implementing better disease management programs to catch problems early. Generally the determinants for this in terms of primary care are after-hours or immediate access to health care professionals, preventive and disease management discussions with patients, implementing preventive tests for patients at risk, programs to help patients live with chronic disease and providing ambulatory care outside of the hospital setting. The proliferation of primary care models has attempted to provide these services in various ways. An analysis of hospitalization patterns would help to determine which of the modalities has been the most successful at implementing them.

⁶² Saskatchewan Health, “Community Clinic Study” Policy Research and Management Services Branch, July 1983.

⁶³ Barer, Morris. Chapter 7: Hospital Expenditure Differentials – Implications and Summary. *Community Health Centers and Hospital Costs in Ontario*. Toronto: Ontario Economic Council, 1981: 153-167.

⁶⁴ See for instance: Duggar BC, et al. Health Services Utilization and Costs to Medicaid of AFDC Recipients in New York and California Served and not Served by Selected Community Health Centers. Center for Health Policy Studies, 1994.

Future Research Conclusion

With the paucity of studies on Ontario primary health care, there exists a wide variety of new research that would be helpful. The most recent studies in Canada on cost effectiveness date back to the early 80s. For studies that are specific to Ontario, one would have to look to the late 70s. Needless to say, updated research would be a valuable guide for policy makers in the health care field.

In terms of cost studies, research that includes all health care costs, not just the initial ones, will be most useful. On the outcome side, tracer diagnoses may provide a useful proxy for overall health care outcomes. Finally, hospitalization is one of the most costly yet preventable areas of health care. Studying hospitalization rates based on primary care provider may provide insight into overall health care costs.

Annotated Bibliography

Abelson, Julia and Jonathan Lomas. “Do Health Service Organizations and Community Health Centers Have Higher Disease Prevention and Health Promotion Levels than Fee-for-Service Practices?” *Canadian Medical Association Journal*, 142, (6), 1990: 575-581.

This relatively recent Ontario study provides one of the few surveys of health care providers as opposed to health care recipients. Interviews were conducted with 23 fee-for-service (FFS) practices, 19 health service organizations (HSOs) and 11 community health centers (CHCs). CHCs appear to perform health promotion activities slightly, but significantly better than HSOs or FFSs (see Table 2, page 578) and few HSOs and no FFSs are making use of non-physician health practitioners. Of further interest is the finding that almost 50 percent of FFS practices stated that their mechanisms of payment limited their capacity to provide prevention services (pg 579). This study does not analyze long-term outcome and quality measures.

Alexandra Community Health Center. “Evaluation of the Alexandra Community Health Centre as a Model of Primary Health Care”, Substudy #:AB301-2 of “Umbrella Alberta Primary Health Care Project” <http://www.health.gov.ab.ca/about/phc/projects/Calgary/AlexandraCHC/description.htm>, 2002, 66-76.

Shadow billing is used to determine the monetary amount that services provided by a community health center would cost if they were billed through a FFS framework. Comparability of shadow billing is complicated by the fact that physicians operating under alternative funding models are likely to behave differently than FFS physicians, however many of these distinctions (including the use of phone consultations and multiple purpose visits) were taken into account in this eight-week shadow billing study at the Alexandra CHC in Calgary. The results of this study differ depending on the type of calculation used. The Alexandra Clinic receives a budget of \$367,270.00 per year from the ministry of health. If only doctor visits are billed for, the clinic would recover \$202,852 through shadow billing (pg 68-70). If phone treatment and prescription renewals are billed as visits, the CHC would bill \$266,232 (pg 70-71). If multiple issues treated are billed each as separate visits, the CHC would bill \$298,547 (pg 71-73). If non-billable services are included, the CHC would bill \$380,117 (pg 73-74). Once all the above steps are included the CHC appears to be cost effective in that its budget is less than its shadow billing total.

Angus, Douglas E. and Pran Manga (1990), “Co-op/Consumer Sponsored Health Delivery Effectiveness”, *The Canadian Co-operative Association*, Ottawa. AOHC: AR 1179

Angus and Manga provide one of the more extensive literature reviews on the cost effectiveness of CHCs as compared to other forms of primary health care. Their review

was produced for the Canadian Cooperative Association and may therefore contain some bias in favour of the funders. According to Angus and Manga, all of the studies they reviewed found that co-operative, consumer sponsored CHCs are more cost effective than comparable FFS practices. The main driver of this cost effectiveness is significantly reduced hospital utilization in patients using consumer sponsored/co-operative health care clinics (pg 7-9). Overall non-FFS health care delivery systems have been found to reduce rates of hospitalization from 10 to 40 percent.

Studies from Saskatchewan, Ontario and the United States which found hospitalization rates to be lower in community clinics suggested that early detection and treatment of disease made possible by the continuity of care found in the integration of health and social services as a reason for the reduced rates of hospitalization (pg 10-11). The study also highlights possible savings on prescription drugs (pg 10) and the innovative nature of CHC health delivery (pg 14). A thorough bibliography of CHC research is also provided (pg 69-77)

ARA Consulting Group Inc. *Final Report: Evaluability Assessment of Ontario's Community Health Centre Program. Evaluation Project Group Strategic Planning and Evaluation Project Community Health Center Program, 1992.*

This report examines the ways that Ontario CHCs can be evaluated and suggests ways that they might change procedures to become more evaluable. The literature review is useful in understanding some of the background to CHC evaluation in addition to some of the common challenges. In particular, the report notes that CHCs are a worldwide phenomenon emerging originally in the USSR and since then becoming established in Canada, the US, the UK, Australia, Ceylon, Russia, Cuba, India, Egypt, Columbia and Burma (pg 5-7). Some of the common challenges to CHC cost effectiveness studies are that they focus exclusively on cost and exclude outcomes, they use poorly matched comparison groups, who is a CHC user is ambiguous and users of CHCs self-select themselves for that type of care (pg 10-12). The report concludes that it is difficult to make generalization from the studies it found due to inconsistent methodologies.

Barer, Morris. Chapter 1: The Organization of Medical Care Delivery. *Community Health Centers and Hospital Costs in Ontario. Toronto: Ontario Economic Council, 1981: 16-67.*

In this exhaustive study, first of American analyses of CHCs and then of the Canadian experience, Barer offers an analysis of the various methodological and practical challenges facing research of CHCs in Canada. In particular, this chapter focuses on the lower hospitalization effects of CHC type primary health care. Under the framework of universal insurance, problems of enrollment, opposition and capitalization provide many challenges for prepaid group practices (PGPs). Even under these difficult circumstances however, PGPs and CHCs are found to have lower rates of hospital utilization than practices using private practitioners.

Barer examines alternative explanations for this difference by analyzing patient, physician and hospital factors. Patient factors including health status, payment coverage and socioeconomic factors on hospital utilization rates are found to be of little significance. Physician factors affecting hospital usage include physician-to-population ratios, hospital admitting privileges, quality of care provided and method of remuneration. The only factor among these with any clearly established significance is the method of physician reimbursement/profit/income sharing. Finally, in analyzing the effects of hospital factors on hospital utilization rates Barer examines the availability of beds, admission and discharge policies, influence of medical staff in determining operating policies, reimbursement methods and availability of other ambulatory services. All of the above are found to affect utilization but not in a manner that influences one population more than another. Overall, the fact that hospital utilization consistently is reduced as practices move away from FFS and towards salaried remuneration cannot be overlooked.

Barer, Morris. Chapter 7: Hospital Expenditure Differentials – Implications and Summary. *Community Health Centers and Hospital Costs in Ontario. Toronto: Ontario Economic Council, 1981: 153-167.*

In this later chapter of his book, Barer analyzes the differences in hospital expenditures when CHCs are used. Studies suggest that investment in CHCs does reduce the amount of inpatient care by approximately 20 percent (see Table 26, page 154); however, in order for this reduction to result in savings in health care spending, the beds freed would have to be closed, potentially increasing yearly cost savings by 35 percent. This increase in savings however from a 20% bed reduction, would only result in a 5-8% percent reduction in total Ontario health care spending. The fact that universal health insurance allows patients to shop for providers limits cost savings. It is important to experiment with the CHC/PGP concept in Canada in order to develop ways to more widely implement this form of health care delivery. Overall, while Barer identifies himself as an advocate for CHCs, he suggests that his analysis provides an insufficient base from which to condone or condemn the use of CHCs in Canada.

**Battista, Renaldo N. and Walter O. Spitzer. “Adult Cancer Prevention in Primary Care: Contrasts Among Primary Care Practice Settings in Quebec.” *American Journal of Public Health, 73, (9), September 1983: 1040-1041.*
AOHC: AR 0670**

Battista and Spitzer compare the extent to which four different types of primary (general physician) care provide cancer prevention to their adult patients. This 1983 short-term study compares doctors in FFS practices in urban areas (165) and in rural (165), salaried physicians in community health centers (CLSCs) (81) and physicians in Family Medical Teaching Centers (FMCs) (69) who are reimbursed for each session. The study concludes that doctors in CLSCs and FMCs were more likely to conduct mammograms in women aged 50-59, stool testing for occult blood (non-visible blood in the stool) in patients over 45, PAP smears and, in general, offered more preventative treatment in its broadest sense (see Tables 1-2 page 141). Additionally, FFS physicians were more likely

to over-rely on tests not found to be effective in early cancer testing for lung cancer including chest x-rays and sputum cytology (see Table 3, page 141). After adjustments were made for variations found between physicians including age, sex, language, number of patients seen, group or solo practice and continuing education the findings remained unchanged. While it was impossible to make adjustments for the patients in this study, FFS physicians tend to see a higher proportion of middle- and upper-income status, often a more prevention minded group. The likely cause of the disparity found is situated in the fact that CLSCs and FMCs are multidisciplinary clinics, including a wide variety of health care professionals. Additionally, the FFS schedule does not effectively reimburse preventative health care activities.

Begley, Charles, Catherine Dowd, Roy McCandless. “A Cost-Effectiveness Evaluation of Primary Health Care Projects for the Poor.” *Evaluation and the Health Professional*, 12, (4), 1989: 437-452.

Begley et al examine nine clinics in Texas that are funded to provide health care to the poor. Several different models of care are represented including HMOs, CHCs, FFS, health departments, medical schools and hospital based ambulatory care. In each case encounters and costs were calculated. Results are adjusted for regional wage differences and capacity utilization. They are not adjusted for relevant risk factors, outcomes or initial diagnosis. In general, more resources were spent on diagnosis/treatment and emergency care for acute and chronic conditions (pg 445). Overall adjusted costs ranged from \$37/encounter to \$15/encounter (pg 448). Public clinics performed the best at an average of \$21.50/encounter, CHCs and hospital ambulatory care came next with a cost of \$23.50/encounter and private practices were most costly at \$29.18/encounter (pg 448). The authors also note that there is a strong correlation between cost effectiveness and the use of non-physician clinicians (pg 449).

Browne, Gina, Jacqueline Roberts, Carolyn Byrne, Amiram Gafni, Robin Weir and Basanti Majumdar. “The Costs and Effects of Addressing the Needs of Vulnerable Populations: Results of 10 Years of Research.” *Canadian Journal of Nursing Research*, 33, (1), 2001: 65-76.

This recent, long-term study analyzes ten years of research on the costs and results of attempts to reduce health inequalities. The findings suggest that, within the framework of a national health insurance system, inequality reduction measures will pay for themselves within a year as costs decrease as people are able to access the services they need in a timely fashion (see Figure 5, page 68). Within a national health insurance system, patients tend to use whatever services are available, even if these are inappropriate to their needs; currently the most expensive services provided are those taken from a piecemeal approach that do not meet the needs (or vulnerabilities) of the patient. The greatest savings in health care spending can be found among those who use the system frequently. This study suggests that the most effective modes of health care delivery, which ensured that patients received the appropriate care, were those that were cooperative (linking health care, social services, and mental health services), comprehensive, holistic, and proactive. This study is highly generalized however, as it

focuses upon the findings of other studies. No mention of accounting for socioeconomic, demographic or health factors is made nor is any analysis of long-term quality outcome measurements.

Browne, Gina, Jacqueline Roberts, Amiram Gafni, Carolyn Byrne, Robin Weir, Basanti Majumdar and Susan Watt. “Economic Evaluations of Community-Based Care: Lessons from Twelve Studies in Ontario.” *Journal of Evaluation in Clinical Practice*, 5, (4), 1999: 367-385.

In this recent analysis, Browne et al evaluate the findings of 12 studies of patients in Southern Ontario communities suffering from chronic physical and mental health conditions in terms of the well-being outcomes and expenditures of the different community-based approaches to care. Overall, health care delivery services that were integrated (as opposed to individual, disease-oriented or fragmented) showed the highest levels of client outcomes with the lowest expenditures for services (see Figure 2, page 383). Studies I-V found that the costs associated with piecemeal and crisis oriented care are higher than those connected to comprehensive, proactive, long-term approach health services. Studies VI-XII suggested that health-oriented, proactive care is most effective for patients who are mentally or cognitively impaired or exhibit addictive risks. Combined, these studies suggest that a clear potential for savings can be found using a coordinated approach to care. The most efficient modes of care are those which are integrated, accessible, holistic and tailored to patient needs. The studies reviewed used different outcome measures appropriate to the topics being analyzed and were designed with increasing methodological finesse.

Browne, Gina, Jacqueline Roberts, Amiram Gafni, Robin Wier, Susan Watt and Carolyn Byrne. “More Effective and Less Expensive: Lessons from Five Studies Examining Community Approaches to Care.” *Health Policy*, 34, 1995: 95-112.

This article is earlier in a series of reviews of studies conducted about the nature of community care (also see Browne et al and Watt et al). Here, Browne et al examine the effects of different types of community health services on chronically ill patients. Five studies of communities in Southern Ontario are examined; in each study wellbeing outcomes are quantified and compared with the expenditures associated with the programs. Overall the studies reviewed suggest that when compared to approaches to care that are fragmented and reactive (see Figure 2, page 106), community services, which are both integrated and proactive, showed equal or better health outcomes (measured using a variety of mental, physical and emotional questionnaires and evaluative tools) with lower levels of cost (cost of health care delivery was measured universally across all five studies in terms of costs to the system, loss of income for both patient and caregivers, and a variety of other expenses) (see Figure 1, page 105). According to Browne et al, providing proactive services to the chronically ill at the early stages of their illnesses will lower health delivery costs and provide more effective management of disease. Chronically ill patients are particularly important to study as they use a disproportionate amount of health services. In fact, these studies suggest that

high use of services can be explained more by emotional and attitudinal issues than disease severity, further emphasizing the cost effectiveness and importance of community-oriented care that is integrated and proactive, creating clients with the skills to manage their health and risks.

Chin et al. “Quality of Diabetes Care in the Community Health Centers.” *American Journal of Public Health*, 90, (2), 2000: 431-434

Chin et al note the paucity of CHC specific diabetes research which is unfortunate because diabetes can be a good indicator of overall quality of care. In this study, CHCs in the Midwest were examined to determine how closely they adhered to the American diabetes association guidelines for good diabetes care. Four measurements were taken of glycosylate hemoglobin, dilated eye, diet intervention and foot care. It was determined that CHCs were largely not meeting the ADA standards. Only 3 of the 55 CHCs surveyed were within 25% of the standard. Variation between CHCs was large. No comparison was made between CHCs and other forms of primary care.

Cooper, Richard A. “Health-Care Workforce for the Twenty-First Century: The Impact of Nonphysician Clinicians.” *Annual Review of Medicine*, 52, 2001: 51-61.

The prevalence and impact of the increasing number of non-physician clinicians (NPCs) is updated and expanded upon in this recent short-term literature review from the United States. Cooper believes that while physicians were the dominant providers of patient care in the United States over the past century, recent decades have seen increased training of NPCs (including nurse practitioners [NPs], clinical nurse specialists [CPCs], certified nurse-midwives [CNMs] and physician assistants [PAs], as well as alternative chiropractic, acupuncture and naturopathy specialists). In addition, the expansion of the laws and regulations surrounding their work and their autonomy from doctors and, due to their recent access to reimbursement, the undertaking of many tasks normally provided by physicians by NPCs has impacted their presence in the health care system. The number of NPs practicing in a clinic setting, in particular, has risen dramatically (see Figure 1, page 53). By 2005, it is expected that more than 115,000 NPs will be in clinical practice. NPs have wide-ranging duties including diagnosis and care of patients as well as, in some states, prescriptive authority.

The increasing number of practicing NPCs, according to Cooper, is directly related to changes occurring in the health care system. In evaluating the effectiveness of this shift in health care delivery, Cooper has found the participation of NPCs (in general) to be cost-effective and satisfactory to patients. Because of their success and effectiveness, clinics, physician group practices and health maintenance organizations (HMOs) are bringing in NPCs to their practices. NPCs, it seems, act as appropriate substitutes to physician care in the area of lower-complexity care and some NPCs provide additional care to that delivered by physicians, including counseling and patient education.

Davis, Karen, Cathy Schoen. *Health and the War on Poverty: A Ten Year Appraisal.* Washington: Brookings Institute, 1978: 189-192.

This study is somewhat dated by analyzing data from the 1970s but it does provide an historical perspective for American CHCs. In particular, in the period of 1974-1975 CHC costs per patient were comparable to FFS practices. Also CHCs saw reductions in hospitalization over the same period (pg 190). When cost is calculated on a cost per patient basis, CHC justifiably underperforms given the additional services they provide. Expenditures per patient on diagnostics, X-rays, lab tests and pharmaceuticals are on par with FFS (pg 191). Some further studies suggest that encounter costs are not significantly misaligned from similar HMO models of primary care.

DeFriese, Gordon. “On Paying the Fiddler to Change the Tune: Further Evidence from Ontario Regarding the Impact of Universal Health Insurance on the Organization and Patterns of Medical Practice.” *Milbank Memorial Fund Quarterly*, 53, (2), 1975: 117-148.

In this dated but heavily referenced article, DeFriese performs a random survey of the Sault Ste. Marie population in 1973 after the establishment of universal health care in Ontario. He compares his findings to the 1968 WHO investigation of the Group Health Center (GHC) there. In particular he finds patterns similar to other GHCs in the US at the time. For instance, his studies suggest that users experience less continuity of care and describe that care as less personal. The GHC also showed higher rates of use than solo practices but with fewer days spent in hospital (25% less than solo practice). The author notes that the source for this reduction is unclear given that there does not seem to be large difference in preventive procedures as measured by time since last visit. In general GHC patients were slightly more satisfied than solo patients.

Deprez, Ronald, Beth-Ellen Pennell, Mary Anne Libby. “The Substitutability of Outpatient Primary Care in Rural Community Health Centers for Inpatient Hospital Care.” *Health Services Research*, 22, (2), June 1987: 207-233

In this study, Deprez et al examine the effects of CHCs in rural Maine on hospitalization. Using stronger than usual statistical techniques and comparison groups, the authors determine that CHC users (vs. non-users) are less likely to spend time in a hospital. In the study CHCs have higher hospital admission rates in younger patients; the pattern is reversed for older patients. This same pattern continues through the rest of the measures. In terms of average hospital admissions, CHCs admit 47% patients, those patients spend 67% fewer days although the average length of stay is about the same. The authors go to determine that similar communities without a CHC have statically similar admission rates and hospitalization days casting some doubt on whether CHCs are actually lowering hospitalization rates. Deprez et al conclude that CHCs have a “substitution effect” on hospitalization where procedures are done on an outpatient basis in the CHC instead of inpatient at the hospital. So CHC outpatient care substitutes for the same more costly care if it were to be provided in a hospital outpatient or inpatient ward.

**Duggar BC, et al. *Health Services Utilization and Costs to Medicaid of AFDC Recipients in New York and California Served and not Served by Selected Community Health Centers.* Center for Health Policy Studies, 1994.
AOHC: 0125**

Using Medicaid claims data, patients from the same zip code using CHCs and not using CHCs are compared. Four CHCs in California (records from 1989) and 6 CHCs in New York state (records from 1991) were selected for this study. The results were not adjusted for relevant risk factors although they were statistically significant. In each area two separate studies were done, one that included maternity patients and one that did not. If maternity patients are included, women seem to disproportionately use the health care system.

CHC non-maternity patients in California showed a total cost savings of 33% over their FFS comparison. Prescription drug costs were overall 40% less for CHC patients, inpatient care and outpatient care each showed a 14% savings. The primary cost savings was in lower hospitalization rates. Although hospital admissions were slightly higher (8%), hospital inpatient days were 14% less and average length of stay was 23% shorter. The difference is more striking when non-maternity cases are examined with 38% fewer hospital admissions, 51% fewer inpatient days and a 22% shorter average length of stay.

CHC non-maternity patients in New York State showed a total cost savings of 30% over their FFS comparison. Prescription drug costs were overall 29% less for CHC patients, inpatient care was 42% cheaper and outpatient care showed a savings of 7%. In contrast to California, the largest driver of cost savings was a reduction in inpatient CHC costs. Hospital admissions were 22% less, hospital inpatient days were 46% less and average length of stay was 19% shorter. The difference is more striking when non-maternity cases are examined with 66% fewer hospital admissions, 67% fewer inpatient days.

The New York study also examined costs for Diabetic and Asthmatic CHC users. Although the results were not statistically significant due to small sample sizes, the authors note that they may show a general direction. Diabetics at NY CHCs were 43% cheaper. Asthmatics at NY CHCs were 53% cheaper.

Epstein, Andrew J. “The Role of Public Clinics in Preventable Hospitalizations Among Vulnerable Populations.” *Health Sciences Research*, 36, (2), June 2001:405-420.

This recent long-term study attempts to discover the effects of public ambulatory clinics on preventable hospitalization rates by examining the discharge rates of elderly and low-income individuals with ambulatory care sensitive conditions (ACSCs) from 1995-97; patients with access to private insurance were excluded from the analysis. Areas with populations of at least 2000 people were examined in each county in Virginia; medically under-served areas (MUAs) containing a Federally Qualified Health Center (FQHC) had significantly lower rates of preventable hospitalization (5.8 fewer per 1000) than MUAs lacking an FQHC (see Table 1, page 410). These findings suggest that the availability of

FQHCs results in increased access to primary care by elderly and low-income populations. As low-income and elderly patients are more likely to seek hospitalization, this shift in primary service may have implications for the cost of health care delivery. Controls and adjustments were made for socioeconomic and demographic factors.

Falik, Marilyn, Jack Needleman, Barbara L. Wells and Jodi Korbs. “Ambulatory Care Sensitive Hospitalizations and Emergency Visits: Experiences of Medicaid Patients Using Federally Qualified Health Cares.” *Medical Care*, 39, (6), 2001: 551-561.

Falik et al compare the hospital admission and visit rates for American Medicaid beneficiaries with ambulatory care sensitive conditions (ACSC) who rely on Federally Qualified Health Center (FQHC) with ACSC patients who do not rely upon FQHCs. The data source for the study was taken primarily from 1992 Medicaid Research Files for Kentucky, Maine, Missouri, Pennsylvania and Washington. The conclusion of this study, which took into account and attempted to control for factors including socioeconomic status, insurance, location, demographics and underlying chronic conditions, found that using FQHCs for a regular source of care significantly reduces the likelihood of hospitalization and emergency room visits for ACSCs, resulting in the possibility for substantial savings in health care.

Among the FQHC patients studied, 1.5 percent were admitted to the hospital one or more times while 1.9 percent of the comparison group had one or more admissions (see Table 3, page 557). Further, FQHC patients were 0.8 percent less likely to visit the emergency room (see Table 5, page 557). Given that the individuals studied had been diagnosed with ACSCs, this difference in hospital utilizations could have resulted in 88,000 fewer hospitalizations and 175,000 fewer emergency room visits among the 22 million American children and non-elderly adults eligible for Medicaid in 1992.

Feachem, Richard G.A., Neelam K. Sekhri, Karen L. White. “Getting More for their Dollar: A Comparison of the NHS with California’s Kaiser Permanente.” *British Medical Journal*, 324, 19 January 2002: 135-143.

Feachem et al, similar to Ham et al and Light and Dixon below, compare the cost effectiveness and performance levels of the United Kingdom’s national health system (NHS) model with the Kaiser Permanente system in California. The costs were measured by evaluating the operating costs (adjusted for age and socioeconomic characteristics of the populations) of both systems. Performance was measured by comparing inputs, access to service, responsiveness and some quality indicators. The findings of this study, while similar to Ham et al and Light & Dixon, are far less drastic. Overall, the costs per capita for each system were similar within 10 percent (see Table 1, page 136), \$1764/capita for the NHS and \$1951/capita for Kaiser Permanente. However, for approximately the same cost, the Kaiser Permanente provided more comprehensive and convenient primary care and offered faster access to specialists and hospital facilities. It is interesting to note that primary care services in the Kaiser system are offered in multi-specialty centers that employ doctors, physician assistants, and nurse practitioners and

contain physiotherapy, mental health, radiology, laboratory and various specialist services. Feachem et al suggest that this disparity is due to Kaiser's higher levels of integration throughout the system, its efficient management of hospital utilization rates, the benefits it obtains through a competitive system and higher investments in information technology.

Fleming, Gretchen V. and Ronald M. Andersen. "The Municipal Health Services Program: Improving Access to Primary Care Without Increasing Expenditures." *Medical Care*, 24, (7), July 1996: 565-579.

The Medical Health Services Program (MHSP) in the United States was created to respond to concerns regarding fragmented care in public hospitals and other health care delivery facilities. This older, long-term analysis by Fleming and Andersen examined the effects of the program on the population served and changes in medical care expenditures by conducting baseline surveys in 1978 to 1980 and follow-up surveys in 1981 to 1983. MHSPs were able to reach the intended populations, although they may not have been anymore successful than other health delivery systems in turning casual users into regular users. MHSPs were able to replace services offered in outpatient departments and emergency rooms, providing less costly and more primary care focused delivery (see Table 4, page 572). However, MHSPs did not provide the continuity of care expected, nor did they produce a high degree of patient satisfaction (see Table 5, page 573 and Table 4, page 574). Finally, MHSPs supplied a cost-effective alternative for Medicare beneficiaries, but not for public hospital users or Medicaid recipients. It is clear however, that MHSPs did not result in higher expenditure rates. In this study adjustments were made for factors including age, sex, race, education, employment, length of residence in the region, insurance, income and health status.

**Freeman, Howard, Jill Kielcolt, Harris Allen II. "Community Health Centers: An Initiative of Enduring Utility." *Milbank Memorial Fund Quarterly*, 60, (2), 1982: 245-267
AOHC: AR 0025**

In this dated yet heavily referenced article, Freeman et al examine several of the claims about CHCs and focus specifically on their relationship with hospital outpatient departments. The study uses two data sets, one from 1968-1971 and a second from 1975. Both sets were drawn from 12 communities with CHCs. By reviewing the data, it appears that CHCs are more likely to provide health services to minorities, the poor, the poorly educated, children and women. CHCs are also more likely to be closer to patients than hospital outpatient departments (pg 252-254). The difference is even more significant when CHCs are compared to private practices. When it comes to the source of CHC patients, an historical comparison of the two periods show that CHCs are effective at moving patients over from hospital outpatient care (pg 254). However, much variability within the above measures exists across different sites.

When it comes to hospitalization, CHC users have significantly lower hospitalization rates than do their hospital outpatient peers. Private practice users land between these

two poles. The reduced hospitalization is fairly constant across CHC sites. Further statistical analysis reveals that standard risk measures are insufficient to explain the reduction in hospitalization (pg 256). The authors estimate that there would be a 25% reduction in hospitalization if one could successfully move patients from hospital outpatient department to CHCs. If only a portion of the US citizens using hospitals as their primary means of health care could be switched over, the savings would be in the hundreds of millions of dollars. Freeman et al call for further experiments that would randomly assign patients to different modes of health care in order to better understand how CHCs achieve their savings.

Fries, James F., C. Everett Koop, Jacque Sokolov, Carson E. Beadle and Daniel Wright. “Beyond Health Promotion: Reducing Need and Demand for Medical Care: Health Care Reforms to Improve Health While Reducing Costs.” *Health Affairs*, 17, (2), March/April 1998:70-84.

While the vast majority of articles reviewed in this bibliography focus on the supply side of health care delivery, Fries et al turn their attention to examining ways in which the demand for health care may be reduced. For Fries et al reducing the demand for health care is key to reducing its costs. Medical demand is related to but independent of medical need. Reducing the demand for health care, therefore, does not imply holding back necessary services. Instead, reducing demand for services implies increasing the number of informed consumers selectively choosing their most appropriate forms of care. In this fairly recent study the authors examine thirty-two programs that have proven to be effective in reducing health risks and costs. Their findings suggest that programs integrating self-management of disease (see Exhibit 1, page 75), reduction of risk and heightened self-efficacy are vital in terms of reducing health care demand. Overall, the definition of health promotion should be broadened to include multi-intervention programs and a focus on personal responsibility for health (See Exhibit 2, page 77). Further, health promotion should be aimed at long-term as opposed to short-term health outcomes. The optimal system would use the lowest level of service that allows for the highest health outcomes made possible through the creation of informed and confident individuals who are able to make effective decisions regarding their own health.

Goldman, Fred and Michael Grossman. “The production and costs of ambulatory medical care in Community Health Centers.” *Advances in Health Economics and Health Services Research*, 4, 1983: 1-56.

Although the conclusions of the study are now dated, it remains the most extensive economics/statistical investigation of CHCs costs to date. In particular, the authors examined 518 centers between 1978 and 1979. The goal was to examine the internal cost functions of CHCs in isolation by looking at per encounter costs and input utilization. The study revealed that CHC generally have flat cost curves, not U-shaped as the theory would suggest meaning that efficiencies of scale are small to non-existent, particularly when transportation costs are included (pg. 31). In other words, smaller centers are relatively more efficient than bigger ones. Goldman & Grossman also found that CHCs

that received more of their funding from fee-for-service sources, including Medicaid, tended to be more costly and less efficient. Grants tended to produce more efficient outcomes. When it came to non-physician aids, it was determined that CHC use them too sparingly and efficiency could be increased if more were employed. The authors also directly valued the inefficiencies in CHC due to non-optimal input use (i.e. using doctors when nurses would have sufficed) and found that it was costing \$1.43/encounter in direct costs and \$2 in total medical costs. The authors concluded that CHCs were as good as private practices at minimizing costs through better use of lower cost inputs. This paper found no evidence that the public sector CHCs were less efficient than the private sector in providing primary health care.

Gosden, T., L. Pedersen and D. Torgerson. “How Should We Pay Doctors? A Systematic Review of Salary Payments and their Effect on Doctor Behaviour.” *Quarterly Medical Journal*, 92, 1999: 47-55.

In this literature study from the United Kingdom, Gosden, Pedersen and Torgerson reviewed all of the available national and international literature examining the effect of salaried payment on the behaviour of physicians. Evidence provided suggests that salaried physicians use tests less often and make fewer referrals than doctors paid by FFS or capitation (see Table 2, pp. 51-52). Salaried physicians also perform fewer procedures per patient and have a lower throughput of patients per doctor, while at the same time engaging in lengthier consultations and more preventative care than FFS physicians (see Table 2, pp. 51-52). Overall, FFS physicians provided the highest levels of services and if governments are venturing to reduce costs of health care, salaried payment systems are more likely to achieve this end. Gosden et al admit that this review remains incomplete. Few of the studies measured health outcomes; none examined whether or not salaried physicians differentiated between patients in terms of health needs making it impossible to come to conclusions about the efficiency, effectiveness or equity of salaried physicians. Further, Gosden et al confront the fact that the studies reviewed are of varying quality, but suggest that, due to the methodological restraints of these types of analyses, a call is made for more rigorous research.

Ham, Chris, Nick York, Steve Sutch and Rob Shaw. “Hospital Bed Utilisation in the NHS, Kaiser Permanente, and the US Medicare Programme: Analysis of Routine Data.” *British Medical Journal*, 327, 29 November 2003: 1-5. Downloaded from bmj.com on 22 December 2004.

In this long-term, recent, qualitative and quantitative study from the United Kingdom, hospital bed usage by patients aged over 65 diagnosed with 11 of the leading causes of bed day use in the National Health Service (NHS) in England, Kaiser Permanente in California and Medicare in the US are compared. Readily available data from 2000 and 2001 in each of the systems was analyzed. Ham et al discovered that bed day use in the NHS is three and half times higher than Kaiser’s standard rate, twice that of the standard Medicare rate in California and over 50 percent higher than the standard Medicare rate in the United States (see Table 3, page 3). Interviews with clinicians and managers at Kaiser facilities suggest that Kaiser was able to achieve the most efficient results through

low admission rates and shorter stays, but also due to the nature of care provided. Kaiser facilities attempt to integrate inpatient and outpatient care, focus on chronic diseases, place emphasis on self-care and immediate care, and integrate prevention, diagnosis, treatment and care. Physicians in Kaiser facilities share responsibility for the success of the system and therefore have an incentive to reduce hospital stays. This study attempted to control for differences in population characteristics.

Hastings, J.E.F., F. D. Morr, A. Barclay and D. Hewitt. “Prepaid Group Practice in Sault Ste. Marie, Ontario Part I: Analysis of Utilization Records.” *Medical Care*, XI, (2), March-April 1973: 91-103.

This 1973 study by Hastings et al examines service utilization at a Group Health Association (GHA) in Sault Ste. Marie. Research for this study was conducted between 1967 and 1968, prior to the introduction of universal medical insurance in Canada. However, this, like the vast majority of CHC studies, finds that hospital utilization rates in users of the GHA is 24 percent lower (see Table 2, pg 94) than patients receiving individual physician care. This reduction in hospital usage appears come from control of admissions rather than a decreased length in stay. Further, among patients admitted to the hospital, the percentage of GHA users who had two or more admissions was 13.3% compared to 21.5% of individual physician patients with more than one admission (see Table 4, page 95). In addition GHA patients had fewer surgical operations, were more likely to see a doctor once a year, and receive immunizations and check-ups, were more likely to be serviced by the appropriate specialist and to undergo laboratory investigation on an outpatient basis. The sample populations were matched for factors including age, sex, family composition, education, income, religion, country of birth and length of residence in the area. The extent to which this study can be generally applied is limited as it examined the experience at only one GHA.

Hawkins, Daniel Junior and Roger Schwartz. “Health Centers and the States Partnership Potential to Address the Fiscal Crisis.” *Journal of Ambulatory Care Management*, 26, (4), 2003: 285-295.

This 2003 literature review by Hawkins and Schwartz examines the cost-effectiveness of community-owned preventative and primary health care throughout the United States and suggests that increased investment in this form of health care delivery would save money at the state level. Health Centers are prevalent throughout the United States. Hawkins and Schwartz refer to a variety of American studies including those conducted by Epstein (2001) and Politzer (2001) both of which are reviewed here. These references further support the claim that in communities where health centers are present, preventable hospitalizations are much lower than in communities lacking health centers. According to these studies, the Medicaid program saves over 30 percent in annual spending per recipient because of the decline in special referrals and hospital admissions. States may encounter savings of \$1.2 billion annually by investing in community health centers and combined federal and state Medicaid spending may reach \$3 billion annually.

Hochheiser, Louis I., Kenneth Woodward and Evan Charney. “Effect of the Neighbourhood Health Center on the Use of Pediatric Emergency Departments in Rochester, New York.” *The New England Journal of Medicine*, 285, (3), July 15, 1971: 148-152.

The results of this dated 1971 long-term study offers clear and significant evidence of reduced hospitalization rates when investments are made in CHCs. Hocheiser et al analyze the effectiveness of neighbourhood health centers (NHCs) in reducing pediatric emergency room visits. Visits to emergency facilities prior to the construction of an NHC in 1967 were compared to the number of visits 9 and 21 months after the opening of the health center. Between 1967 and 1970, pediatric visits to emergency rooms decreased 38 percent (see Table 3, page 149). In nearby regions lacking NHCs, pediatric emergency room visits remained stable or increased.

Adjustments were made for income, time and day of visit, age, sex, race and health complaint. When monitoring day and time of hospital visits, researchers found that children living near the NHC did not visit the emergency room more when the health center was closed on the weekends, suggesting the consistency and quality of care received at the NHC. As the study also monitored the health complaints made by the patients, researchers were able to analyze the way in which the emergency room was being used. Hochhesier et al discovered that emergency room visits for infections dropped 56 percent from 1967 to 1970 while emergency room visits for injury declined 34 percent. The significance of these findings further increase when one considers that a clinic that did not offer comprehensive or outreach services was available prior to the opening of the NHC, and had little effect on reducing hospital usage.

Hutchison, Brian, Julia Abelson and John Lavis. “Primary Care in Canada: So Much Innovation, So Little Change.” *Health Affairs*, 20, (3), May/June 2001: 116-131.

In this recent policy-oriented review of Canadian primary health care policies, Hutchison et al examine the possibilities for change in Canada’s health care system. While, for Hutchison et al, it appears unlikely that major changes in policy will occur, some significant, incremental change is possible if there is a reorientation of the way in which policy is developed. Although there have been calls for transformation, the dominant structure of service based on solo or small-group practices funded through an FFS system remains very much intact throughout the Canadian health care system. The Medical Care Act (1966) laid the terms of public payment of private medical service, thereby enshrining FFS as the dominant mode of physician payment in Canada. The 1983 Canada Health Act clarified the central characteristics of provincial health systems including ‘comprehensiveness’ which was defined as health services that were provided by hospitals and physicians, further clarifying the central role of these institutions. These and other institutional frameworks, including the federal model, have restricted the possibility for large-scale transformation. However, if policy-makers focused upon small, incremental changes as opposed to massive structural shifts, more alternative forms of care may become available.

**Hutchison, Brian, Julia Abelson, Chris Woodward, Riley Johnston. *Environmental Scan of Primary Health Care in Ontario*. Hamilton: McMaster University Center for Health Economics and Policy Analysis, 2002.
AR 1353**

Although this survey does not specifically focus on CHC cost effectiveness, there are several sections that are useful in understanding the history of CHCs and primary care in Ontario. In particular the various types of primary care (CHC, AHAC, HSO, PCN, FHN, NGFP and CSC) are reviewed in some detail (pg. 16-24).

Hutchison, Brian, Christel A. Woodward, Geoffrey R. Norman, Julia Abelson and Jucy A. Brown. “Provision of Preventive Care to Unannounced Standardized Patients.” *Journal of the Canadian Medical Association*, 158, (2), 27 January 1998: 185-193.

In this fairly recent short-term study from Hamilton, Ontario by Hutchison et al, the relationship between the training and practice of primary care family physicians and the provision of preventative care services is examined. The findings of this study differ from others reviewed here. The nature of preventative care was evaluated in terms of the guidelines laid out in the Canadian Task Force on the Periodic Health Examination and sixty-two doctors participated. Between September 1994 and August 1995, unannounced ‘standardized’ patients posed as new patients for these family physicians representing the following groups: 48-year-old male, 70-year-old male, 28-year-old female, 52-year-old female. Overall, physicians provided 65.6% of the Task Force’s ‘Grade A’ services, 31% of ‘Grade B’ services, 22.4% of ‘Grade C’ services, 21.8% of ‘Grade D’ services and 4.9% of ‘Grade E’ services (see Table 3, page 190) suggesting that the guidelines have been insufficiently integrated into clinical practices. It appears that the form of training, sex, type of reimbursement, (salary, capitation or FFS) and size of practice (solo or group) of the physician was not related to the amount of preventative of care provided.

Lepnurm, Rein. “Consumer-Sponsored Health Centers and Health Reforms in Canada.” *Journal of Ambulatory Care Management*, 18, (1), 1995: 39-46.

In this fairly recent study, Lepnurm offers a Canadian perspective on the use of CHCs and finds that they offer a more cost effective and equal quality of health care delivery. By looking at three major methodologically sound studies conducted in the 1970s at three community clinics in Regina, Saskatoon and Prince Albert, Lepnurm analyzes the type of people seeking care, the number of services sought and health care costs associated with CHC clients as compared to FFS users. The main difference in the type of people seeking care was found in the fact that between 32% and 51% of CHC clients consciously chose the type of care offered in this setting. All three studies found that the costs for CHC patients were consistently lower and that they required fewer hospital days and prescription drugs than FFS patients. In terms of the health care costs associated with each group, while GP and specialist costs for CHC clients were higher than FFS users, this was more than offset by savings in hospital and prescription drug use. Long-

term outcome measurements are not analyzed in this study however, the increased investment in CHCs in Quebec have allowed them to reach over 90 percent of the population at 6 percent of the total provincial budget.

Light, Donald and Michael Dixon. “Making the NHS More Like Kaiser Permanente.” *British Medical Journal*, 328, 27 March 2004: 763-765.

Building upon the study by Ham et al, in this very recent study by Light and Dixon, the manner in which Britain’s National Health Service (NHS) could benefit from modeling after the United States Kaiser Permanente model is examined. Light and Dixon suggest that while the British government has committed to learning from the Kaiser system, such as integrative governance and collaborative contracting in the clinic setting, are being overlooked. Unlike Ham et al, Light and Dixon provide a clear comparison between the Kaiser system and the British NHS (see Table 1, page 764). Kaiser is a prepaid, fixed budget design, focusing on an integrated approach to keeping patients healthier so that they do not have to see a doctor. Doctors are hired especially for the system and support a holistic approach to health. Doctors from all levels of care share the budget and responsibility for the system. NHS, in comparison, is a segmented financial and organizational system in which a clear distinction is made between the budgetary and pay arrangements of different types of health care providers. Overall, in assessing the differences between the NHS and the Kaiser, Light and Dixon suggest that the NHS needs to create ‘collaborative contracting’, enforcing budget and responsibility sharing across all health care practitioners, thereby ensuring that inefficiencies and waste affect all physicians, providing incentives to treat patients quickly and effectively.

Lomas, Jonathan. Chapter 12: Evaluation. First and foremost in community health centres: the centre in Sault Ste Marie and the CHC alternative. Toronto: University of Toronto Press, 1985.

This book is a review of the Sault Ste Marie clinic, chapter 12 reviews the evaluations performed at the clinic and for CHCs generally. Lomas points out that claims based comparisons handicap CHCs because such cost comparisons exclude hospitalization costs. CHCs tend to perform better in terms of reducing hospitalizations than do FFS practices (pg 162-163). Convenience for CHC patients in terms of “one stop shopping” is also rarely factored in (pg 164). Nonetheless, Lomas reviews the studies performed on the Sault Ste Marie clinic and points out their respective strengths and weaknesses (pg 167). The chapter concludes with the uncertainty of the payoff of long term programs where effects may not be fully felt for decades (pg 168-169)

Manning, Willard G., Arleen Leibowitz, George A. Goldberg, William H. Rogers, and Joseph P. Newhouse. “A Controlled Trial of the Effect of a Prepaid Group Practice on Use of Services.” *New England Journal of Medicine*, 310, (23), June 7, 1984: 1505-1510.

This 1984 long-term study by Manning et al analyzes hospital utilization rates for Group Health Cooperative (GHC) clients as compared to FFS users. Four groups were examined, a FFS group who did not pay for their services (431 clients), a FFS group who shared the cost of their services (782 clients), a GHC experimental group (1149 clients) and a GHC control group (733 clients). In order to analyze the costs associated with each group, all expenditures were monitored. Individuals with higher incomes, those who were institutionalized, disabled or eligible for Medicare were excluded from the study. Expenditure statistics were not corrected for differences in age and sex.

Overall, expenditures for the GHC experimental group were 28 percent lower than the free FFS group and 23 percent lower in the GHC control group (see Table 1, page 1507). Hospital admissions and hospital days for both groups of GHC users were 40 percent less than the FFS clients (see Table 2, page 1508). Face-to-face visits were the same for all plans, however the number of preventative visits was significantly higher for GHC users. Service use from other non-GHC sources was small. Manning et al conclude that lower hospital use rates of GHC clients suggest that the form of health care delivery at GHCs is less ‘hospital-intensive’ and therefore, less expensive. Outcome and quality measurements were not included in this study, however, making it difficult to analyze the long-term viability of this style of health care delivery.

Montalo, Michael and David Dunt. “The Evaluation of General Practice in Community Health Centres: A Critical Review.” *Center for Health Program Evaluation: Working Paper 25*. October 1992: 1-19.

Montalo and Dunt provide an overview of Australian and international literature on the place of general physician practice in CHCs. Overall, these researchers focus on articles that have found little change in terms of cost, patient satisfaction and promotion of disease prevention with the introduction of CHCs into communities, including the Hamilton Ontario study by Hutchison et al above. A clear distinction has arisen in the Australian setting between CHCs that have integrated general practice into primary health care services offered, while this has not been true of CHCs in New South Wales. Studies in the regions suggest that relations between physicians and CHCs are rather ambivalent. The majority of physicians believe they should play a leading role in CHCs and prefer FFS remuneration while community health staff hold a high degree of suspicion in their relationships with general practitioners. Montalo and Dunt suggest that while many studies examine the possible benefits of CHCs, too little evaluation is occurring within these institutions to truly assess their success.

Moore, Gordon T., Roberta Bernstein and Rosemary A. Bonanno. “Effect of a Neighbourhood Health Center on Hospital Emergency Room Use.” *Medical Care*, X, (3), May-June 1972: 240-247.

This short-term and dated study from 1972 produced by Moore et al found that hospital utilization in a neighbourhood where a health center was introduced remained stable while it continued to rise in other neighbourhoods (in the same city) lacking a health center (see Table 2, page 242). This study also showed a clear distinction between the ways in which these groups use emergency rooms.

Moore et al studied the opening of a neighbourhood health center in the Boston community, Charlestown in 1969 where many residents were turning to the emergency room for their primary care. Two years following the opening of the neighbourhood health center two-thirds of Charleston residents (10,000 patients) had registered at and used the health center at least once. In the final four months of the study, 460 patients who used the emergency room were interviewed; 265 were registered at the health center and 195 were not. Of those registered at the health center, 93.6 percent stated that they had regular medical care outside of the emergency room compared to 75.4 percent of the non-health-center users who made the same claim (see Table 5, page 244). Further, more than 20 percent of those registered at the health center had been referred to the emergency room by their physician, while only 10.8 percent of those not registered at the health center had been referred by a physician (see Table 6, page 244). Moore et al found that emergency rooms were being used more effectively by NHC clients perhaps reducing emergency room use over time.

Mott, F.D., J.E.F. Hastings and A.T. Barclay. “Prepaid Group Practice in Sault Ste. Marie, Ontario: Part II: Evidence from the Household Survey.” *Medical Care*, XI, (3), May/June 1973: 173-188.

This analysis is a continuation of Hastings et al (1973) above as it examines the household surveys to come out of the comparison between users of a Group Health Association (GHA) and an individual physician practice. Here, variations in medical care behaviour among sample populations were analyzed by conducting 615 household surveys of those attending the GHA and 592 with those receiving individual physician care. No significant differences were found in the incidence of acute illness, disability, response to illness or attitudes toward medical care (see Tables 2-7, pages 176-181). Thus, the distinctions between the populations remain in their interactions with the health care systems. Users of the GHA had an increased concentration of services at their facility and therefore used other facilities, including hospitals, less often and received greater continuity of care produced by a teamwork approach to health care delivery.

Nobrega, Fred T., Iqbal Krishan, Robert K. Smoldt, Charles S. Davis, Julie A. Abbott, Eda G. Mohler and Walter McClure. “Hospital Use in a Fee-for-Service System.” *Journal of the American Medical Association*, 247, (6), February 12, 1982: 806-810.

By comparing hospital use patterns in a region serviced almost exclusively by FFS, multi-service group practices with the national average, Nobrega et al conclude that the organization of medical care may have important implications for hospital use. It is important to note that while these clinics are FFS, the physicians are salaried and all surplus revenues of the clinics are invested in research and education. Conducted in 1976 in Minnesota, Nobrega et al have found that hospital use rates were significantly less here than the national average (see Tables 1-2, page 807). Specifically, the hospital discharge rate was 30 percent less than the national average and the number of hospital days was 38 percent less than the national rate. These differences must be explained by variations in motivation, philosophy and organization of practice. As the clinic is run on a FFS basis, there is no incentive to under-serve users, allowing the clinics to practice philosophy according to their preferences as opposed to costs producing an acknowledged high quality of care. Despite this, there is no analysis of the long-term outcome and quality measurements required to understand if conservative hospital usage is a superior form of health care delivery.

Okada, Louise M. and Thomas T. H. Wan. “Impact of Community Health Centers and Medicaid on the Use of Health Services.” *Public Health Reports*, 95, (6), November-December 1980: 520-534.

Okada and Wan attempt to fill a void in studies of CHCs in the United States by discussing the impact of these programs on the use of health services, particularly in terms of physician visits, hospitalization and dental visits. This dated, long-term study focuses primarily on the capacity of Medicaid and CHCs to reduce the inequality in access to health care throughout the United States. Baseline surveys were conducted before the introduction of CHCs in 1968-71 and follow-up surveys four to seven years later in 1975 in five communities throughout the United States. Clients of CHCs were primarily those who had used hospitals as their primary source of care prior to the introduction of CHCs, thereby increasing the efficiency of health care delivery. CHCs were successful in lowering hospital admissions when compared to other health care providers in the same region. The rate of hospitalization of patients served by private physicians was 59 percent above the rate of those using CHCs (see Table 11, page 528). Similarly, among people using hospital clinics, the hospitalization rate was 45 percent higher than CHC clients. Adjustments were made for factors including sex, income, race and insurance coverage.

Politzer, Robert M., Ashley H. Schempf, Barbara Starfield, and Leiyu Shi. “The Future Role of Health Centers in Improving National Health.” *Journal of Public Health Policy*, 24, (3/4), 2003: 296-306.

This 2003 study involves a literature review to assess the access to care made possible by increased investment in community health centers throughout the United States. Politzer et al view CHCs as progressive facilities delivering health care that is community oriented and enabling. Little in the way of specific cost effective or quality indicator statistics are provided, however Politzer et al acknowledge that in 2001, the Bush administration committed to increase investment in CHCs to serve an additional 6.1 percent of those lacking access to care. Also of interest is a study by McAlearney (2002) finding that even under tight budget constraints CHCs are able to provide effective services.

Politzer, Robert M. and Jean Yoon. “Inequality in America: The Contribution of Health Centers in Reducing and Eliminating Disparities in Access to Care.” *Medical Care Research and Review*, 58, (2), June 2001: 234-248.

Similar to Browne et al (2001) above, this recent review of studies conducted in the United States assesses the relationship between access to appropriate health care and reductions in health disparities. These studies suggest that health centers are capable of reducing health care access disparities by providing regular sources of care. The subsequent effect of this reduction in health inequality on health costs is examined by some studies including Falik et al (1998) that suggest populations with access to health centers have lower rates (as high as 22 percent less) of avoidable hospitalization for ambulatory care sensitive conditions (ACSCs). As a result, health centers demonstrate a 30 to 34 percent reduction in Medicaid costs. Offering one of the few glimpses of long-term outcome measurements of changes in the way in which health is delivered, Franks and Fiscella (1998) show that patients with a personal primary care physician had lower mortality than those with specialists as personal physicians.

**Rachlis, Michael. *Community Health Centers: Leading the Way to a Cost-Effective Health Care System*. Toronto: 1997.
AOHC: AR 0678**

Rachlis argues that CHCs are well placed to contribute to solving current health care challenges. Although he relies more on specific cases and arguments rather than data, he does highlight many of the possible ways CHCs can create a less costly health care system. He highlights specific CHC programs in diabetes (pg 5), mental health (pg 6), care for the elderly (pg 6-7), cancer patients (pg 7-9) and self-care (pg 9-11). The author goes on to suggest that CHCs are better able to utilize non-physician health professionals and serve rural communities. Rachlis concludes that a renewed focus on non-acute care and away from the perverse incentives of a fee for service remuneration system is needed. CHCs are well positioned to meet these challenges.

Roby, Dylan, Sara Rosenbaum and Dan Hawkins. *Exploring Healthcare Quality and Effectiveness at Federally-Funded Community Health Centers: Results from the Patient Experience Evaluation Report System (1993-2001)*. Washington DC: National Association of Community Health Centers. March 2003: 1-17.

Studies conducted in recent years across the United States have suggested that patients feel that health care providers are inadequate, inappropriate and ineffective. The findings of this recent, long-term study by Roby et al suggest that the experience of patients in federally-funded CHCs differ greatly from this trend. There are two ways in which health care can be measured in terms of quality and effectiveness. The first of these is through examination of clinical care performance and the second is through evaluation of patient experiences. The findings of Roby et al suggest that CHCs score high in terms of both forms of evaluation.

Finding a gap in studies examining patient experiences, Roby et al conducted two patient surveys, one in 1993, the other in 2001. Overall patient satisfaction was high in both survey sets and went up over the eight-year gap between the studies. Respondents who were ‘very satisfied’ with their care went up from 41 percent in 1993 to 63 percent in 2001 while the number of respondents who were ‘dissatisfied’ or ‘very dissatisfied’ with their care reduced from 4 percent in 1993 to 1 percent in 2001 (see Figure 4, page 8). In 2001, 99 percent of patients’ surveyed said they were ‘satisfied’ or ‘very satisfied’ with the care received at CHCs. This percentage of satisfaction is significantly higher than other recent studies of perceptions of care in physician family offices, Kaiser Family Foundations, and others. This satisfaction was directly related to the high scores the CHCs received in these same surveys in relation to the equity, appropriateness, effectiveness and timeliness of care received (see Figures 5-8, pages 10-13).

Ruderman, Peter. *Economic characteristics of community health centres : report to the Community Health Centre Project*. Ottawa: Information Canada, 1973.

Although quite dated at this point (reviews data from 1963-1968), this report does give some historical background to the CHC cost-effectiveness debate. In particular the report shows that Saskatchewan CHCs are strikingly cheaper than similarly sized FFS group practices (pg 24-25). However, when CHCs are compared to solo FFS practices or smaller general group practices, the costs are similar. Most of the savings CHCs show is due to lower hospitalization costs. Ruderman notes that there is evidence that patients who agree ideologically with CHCs will seek treatment earlier possibly averting condition escalation (pg 26). Finally, there were some indications that CHC’s lower cost may have been reversed in the years following the initial study (pg 29).

**Saskatchewan Health, “Community Clinic Study” Policy Research and Management Services Branch, July 1983.
AOHC: AR 0050**

This study stands as one of the most recent comprehensive studies examining CHC cost effectiveness in Canada. It studied patients from two Saskatchewan CHCs, one in Prince

Albert and one in Saskatoon. 15,297 CHC patients were matched with similar risk profiled FFS patients.

The study revealed that CHC patients incurred more specialist costs: 16% higher in Prince Albert, 20% higher in Saskatoon. However, hospital utilization was lower for CHC patients. In Prince Albert, CHC patients had 23% fewer inpatient days, 10% fewer stays in hospitals, 15% shorter stays for a 23% cost savings over FFS. Saskatoon CHC patients had 31% fewer inpatient days, 24% fewer stays in hospital, 9% shorter stays for a 30% cost savings over FFS. Shorter hospital stays were most dramatic for the elderly (pg 33,36).

CHC patients also had lower prescription drug usage. The Prince Albert clinic prescribed 8% fewer prescriptions for a savings of 11% in drug costs. The Saskatoon clinic prescribed 21% fewer prescriptions for a savings of 21% in drug costs. Again the reduction is most dramatic for the elderly (pg 48).

Total health care costs were lower at CHCs than at FFS practices. The savings at Prince Albert were 13% and the savings at Saskatoon were 17%. The study does not review the causes for this difference in health care utilization.

Shi, Leiyu, Barbara Starfield, Jiahong Xu, Robert Politzer and Jerrilyn Regan.
“Primary Care Quality: Community Health Center and Health Maintenance Organization.” *Southern Medical Journal*, 96, (8), August 2003: 787-794.

This recent short-term study analyzes the quality of primary health care offered at CHCs to that found in HMOs in South Carolina. Unlike many studies of CHCs, Shi et al examine the health care experience of CHC patients by interviewing clients regarding the accessibility, comprehensiveness, coordination, continuity and accountability of care. Earlier studies have shown that when these primary care attributes are met, the effectiveness and efficiency of care increase.

Mail surveys were sent to HMO and CHC users and follow-up interviews were conducted with CHC users to assess the experience with the services for each group. The HMO sample included mostly white, higher-income individuals while the CHC population was predominantly nonwhite and lower-income. The HMO sample reported higher quality of primary care in terms of first contact (accessibility and use) while CHC patients reported higher scores on all other aspects of primary care including ongoing care, coordination of service, comprehensiveness and community orientation. These findings suggest that HMOs remain problem-focused, offering episodic care (see Table 3, page 793). Due to the fact that only one HMO and one CHC were analyzed, the generalizability of this study is limited. Further, Shi et al examined the experience of health care as opposed to its outcomes; however, linkages have been made between primary care and health outcome in other studies.

Stacy, Nathan L. “The Experience and Performance of Community Health Centers Under Managed Care.” *The American Journal of Managed Care*, 6, (11), November 2000: 1229-1239.

In this recent American study Stacy analyzes the key components that CHCs must address in order to remain viable in the shift to a focus on managed care by examining the performance of seven geographically diverse CHCs with multiple-year managed care contracts. Questionnaires assessed CHC operations, data relating to the costs and utilization of managed care were collected separately and interviews gauging the performance of the CHCs were also conducted. The findings of this analysis (similar to many studies reviewed here) suggest that CHCs offered comparable managed care service to that found in other providers, with lower costs, lower utilization of specialty services and lower referral services (see Table 2, pages 1232-1233) and lower monthly pharmacy costs (per patient). Further, CHCs have positive reputations in the communities they serve, provide expertise in preventative care programs and offer an important source of managed care enrollment. While Stacy acknowledges that the performance of each CHC is affected by the type of community served and the availability of funding, among other factors, it does not appear that these were considered in the results of the study.

Starfield, Barbara. *Primary Care: balancing health needs, services, and technology*. New York : Oxford University Press, 1998.

Starfield examines a broad range of health related issues in her book, most of which is unrelated to cost effectiveness of CHCs. However, chapter 17 (pg 377-396) does contain an overview of suggested future research, a section of which examines outcome measures. She notes that although there are some outcome measures, they are often not clinically useful. The current measures (WONCA, DUSOI etc.) fail to take into account the initial differences in the extent of illness. They also generally fail to adequately measure more than one type of morbidity making it difficult to compare the quality of care across diagnoses.

Starfield, Barbara, Neil R. Powe, Jonathan R. Weiner, Mary Stuart, Donald Steinwachs, Sarah Hudson Scholle and Andrea Gerstenberger. “Costs vs. Quality in Different Types of Primary Care Settings.” *Journal of the American Medical Association*, 272, (24), December 28, 1994: 1903-1908.

Starfield et al offer a relatively recent retrospective quality of care review of patients seeking care in physician offices, CHCs and hospital outpatient facilities in the state of Maryland. Overall, no consistent relationships between the type of health care delivery and cost-effectiveness or quality of care could be found. However, patients in medium-cost community health centers did score the best or second best for most of the quality assessments. Also of interest is the fact that in terms of indicators of access, appropriateness and outcome of care, hospital clinics consistently scored the worst of the three forms of health care delivery. In their discussion, Starfield et al suggest that the lack of linkage existing between quality and costs is important as low cost clinics appear

equally capable of providing high quality care as high cost facilities. In this study no adjustments were made for factors including income, sex and race.

Stuart, Mary E. and Donald M. Steinwachs. “Patient-Mix Differences Among Ambulatory Providers and Their Effects on Utilization and Payments for Maryland Medicaid Users.” *Medical Care*, 31, (12), 1993: 1119-1137.

In this relatively recent long-term study Stuart and Steinwachs examine the effects of patients’ demographic and diagnostic factors upon the utilization and cost of health care delivery. Allowing for these factors explains 44 percent of the variation in ambulatory use, 21 percent of hospital admissions and 13 percent in Medicaid payments. Interestingly, a large percentage of the variation remains unexplained by these factors, which Stuart and Steinwachs attribute to distinctions in provider efficiency. Mean total payments per patient, even after being adjusted for patient-mix characteristics were significantly higher for outpatient users (\$1,162) than for Federally Qualified Health Centers (FQHC) (\$740) or private practice (\$720) users (see Table 7, page 1129). These high mean payments could be attributed to higher admission rates for outpatient users (0.18) than for FQHC (0.11) and office-based (0.10) users (see Table 7, page 1129). Once again, outcome and quality based measurements remain absent from this analysis.

Suschnigg, Carole. “Reforming Ontario’s Primary Health Care System: One Step Forward, Two Steps Back?” *International Journal of Health Services*, 31, (1), 2001: 91-103.

In light of the recent push toward community-oriented, holistic care Shuschnigg examines the context that gave rise to the introduction of CHCs in Ontario during the 1970s, their slow growth during the 1980s and their rapid expansion of the early 1990s. Shuschnigg examines the rise of CHCs through the perspective (initiated by the 1973 Hastings Report) that they offer an alternative, cost-effective model of primary care. Some CHCs were introduced (mostly through local activism) in the 1970s and early 1980s, but following contentious relations between the government and physicians, the late 1980s saw the rise of HSOs (capitation funded) instead of CHCs. HSOs, however, did not offer the expected reduction in costs. In the early 1990s, the Ontario government turned once again to CHCs which increased in number from 29 in 1991 to 56 in 1995. Shuschnigg suggests that the 1995 decision by the PC government to freeze funding for this program is likely to repeat mistakes made in the past and the focus should once again be placed on funding CHCs.

Ulmer, Cheryl, et al. “Assessing Primary Care Content: Four Conditions Common in Community Health Center Practice.” *Journal of Ambulatory Care Management*, 23, (1), 2000: 23-38.

Ulmer et al examine how CHCs treat four Ambulatory Care Sensitive Conditions (ACSC): high blood pressure, inner ear infections, diabetes and asthma. Twenty centers across 10 states were involved in the 1996-1997 chart audit. Instead of using the ideal for treatment as other studies have done, the authors (see Chin et al 2000) created a “reality

based” norms based on other studies of the average treatment level. CHCs generally exceeded the 17 elements identified in treating the four indicator conditions. The authors note that CHCs had a more difficult time in besting the norms when procedures were complex and when lab tests or specialist care was involved. There were also large variations between centers. Upon linear regression analysis, 80%-90% of that variation remains unexplained by standard risk measures. There also appears to be a strong correlation between the 4 indicators. Therefore the use of only one or two indicators would likely give a good idea of the overall quality of care.

Valli, A., P. Ferrinho, J. Broomberg, T.D. Wilson, C. Robb. “Costs of primary health care at the Alexandra Health Centre.” *SAMJ South African Medical Journal*, 80, October 1991: 396-399.

The cost examination of the Alexandra clinic is primarily internal. The various functions of the clinic are costed out in terms of both the operating and capital costs of the clinic. A comparison is made to the national per patient cost where the Alexandra center appears to be slightly less although no attempt is made to adjust for relevant risk factors. The article concludes that the calculation of the costs of various CHC services can be a useful tool in allocating scarce resources.

Vayda, Eugene, A. Paul Williams, H. Michael Stevenson, Karin Domnick Pierre, Mike Burke and Janet Barnsley. “Characteristics of Established Group Practices in Ontario” *Healthcare Management FORUM*, 2, 1989: 17-23. AOHC: AR 0047

Vayda et al examine whether or not the theoretical benefits of group practices in Ontario are actually being realized in those practices. The method involves surveying CHCs, HSOs and FFS group practices on a variety of topics. Of relevance to CHC cost effectiveness is the finding that CHCs/HSOs are statistically more likely to employ non-physician medical staff for routine care, recall patients for immunizations and pap tests and monitor hospitalization patterns of their patients (pg 20). The attitudes of physicians working in CHCs/HSOs also differ from their FFS colleagues. CHCs/HSOs were also more likely to provide fringe benefits to physicians who participate in continuing education. Vayda et al point out that an expansion of the CHC system may encourage private practices to emulate them making it difficult to estimate the overall effect (pg 22-23).

Watt, Susan, Gina Browne, Amiram Gafni, Jacqueline Roberts and Carolyn Byrne. “Community Care for People with Chronic Conditions: An Analysis of Nine Studies of Health and Social Service Utilization in Ontario.” *The Milbank Quarterly*, 77, (3), 1999: 363-392.

Similar to the first Browne et al study found above, Watt et al provide a qualitative analysis of nine quantitative studies conducted in Southern Ontario. Recent shifts in health care delivery have focused upon finding more effective, less expensive and deinstitutionalized forms of treating chronic illnesses. Institutional care is based upon ‘medically-defined intervention’ and tends to be focused on patients’ unique, immediate medical situations. Watt et al examine the lessons which have come out of nine studies of people with chronic conditions receiving community care. The findings in eight of the nine studies reviewed suggest that equal or better outcomes arise out of programs focused on anticipated need for the same or lower costs (see Table 5, page 381). One study found that while integrated care improved wellbeing, it did so at a higher expense (see Table 5, page 381).

Way, Daniel, Linda Jones, Bruce Baskerville and Nick Busing. “Primary Health Care Services Provided by Nurse Practitioners and Family Physicians in Shared Practice.” *Journal of the Canadian Medical Association*, 165, (9), 30 October 2001: 1210-1214.

Way et al provide a recent Canadian perspective regarding collaborative work occurring between family physicians (FPs) and nurse practitioners (NPs), both of whom provide unique skills and knowledge to the delivery of primary care. This study, as part of a larger initiative to improve collaboration between NPs and FPs reports on the baseline data from two rural Ontario primary care clinics where services are provided by NPs and FPs. Way et al analyzed data from 122 visits with NPs and 278 visits with FPs. The main reasons why NPs were sought out were quite different than the reasons FPs were consulted. However, health promotion services were similar for both, while FPs provided more curative (29.3 vs. 18.8) and rehabilitative services (63.7 vs. 15.0) (see Table 2, page 1212). NPs, on the other hand, provided a higher amount of disease prevention (78.8 vs. 55.7) and supportive (43.8 vs. 33.7) services than FPs. Further, NPs were far more likely than family physicians to refer patients for a follow-up with a fellow NP (see Table 3, page 1213).

Way et al believe that NPs are underutilized in terms of rehabilitative and curative health care delivery and referral patterns between these two health care practitioners were more unidirectional than bidirectional. However, the fact that this covered only two practices may limit its general applicability. Adjustments were made for a variety of factors including sex, age and employment status.

General Conclusion

In summary, the CHC cost-effectiveness research is quite dated, particularly within the Canadian context. The most recent primary care cost study in Ontario was performed in the late 1970s. The last Canadian primary care cost study was performed in the early 1980s. Some more recent cost studies have been performed in the United States but significant institutional differences exist between the two countries. On the outcomes side, there is more recent research but it is still dated. It is safe to say that little is factually known about the cost-effectiveness of primary care models in Ontario today. The past studies should be used as guides in the general absence of better information. They offer a starting point from which future research can begin. They also offer valuable methodological insights into what future research should look like.

Identifying studies that address both ‘costs’ and ‘effectiveness’ is a particular challenge. Most studies break down along the constituent parts of cost and effectiveness. Cost studies generally do not track outcome measures. Instead they assume that professional standards of care are respected. Cost studies that involve the entire universe of health care costs often yield quite different results than do studies of just the cost of the doctor’s office.

For their part, outcome studies generally do not track costs. Outcomes, particularly across diagnoses, are notoriously difficult to measure. As such, outcomes are usually compared within diagnoses. Interestingly, a strong performance in the treatment/prevention of some diagnoses is highly correlated with performance in others. Even with these limitations, program specific cost-effectiveness research has been performed. However it may be difficult to expand these methodologies to the entire patient roster of a primary care provider.

The actual results of CHC cost-effectiveness research is encouraging. Although the research is dated, CHCs perform well on both the cost and effectiveness fronts. When costs are calculated only in terms of what it costs to provide service, CHCs generally cost more than FFS. However, once the entire basket of health care goods is included, CHCs tend to do much better, usually due to decreased hospitalization. In terms of outcomes, CHCs are usually better at preventive care and disease management. In the worst studies, CHCs are about the same as FFS in terms of cost and effectiveness. In the best studies, CHCs show cost savings upwards of 40% over FFS and significantly better prevention programs.

Glossary of Terms

ACSC – Ambulatory Care Sensitive Condition: conditions where appropriate ambulatory care could prevent or reduce the need for admission to hospital.

AHAC – Aboriginal Health Access Centres: a type of community health centre focused on aboriginal health

AOHC – Association of Ontario Health Centers

CHC – Community Health Center: A particular mode of primary care delivery typified by salaried professionals (including doctors), more extensive use of non-physician clinicians, usually with a community board and focused on health prevention/chronic disease management.

CLSC – Centre Local de Services Communautaires, Local Community Service Centre: Quebec based community health centers built on a provincial network. These centers tend to have more diagnostic equipment and outpatient procedures than in other provinces.

FFS – Fee for Service: The vast majority of primary care doctors across Canada are paid on a fee for service basis. That is to say that they are remunerated on a service as well as a procedure basis as defined by a provincial schedule. By contrast, community health center doctors are paid on salary

FHN – Family Health Network: One of the hybrid models developed in Ontario incorporation fee for service and some salaried professionals

FQHC – Federally Qualified Health Center: A community health center in the United States that has been qualified to receive funding from Medicaid and Medicare. It is located in a medically underserved area.

GHA – Group Health Associations: Precursors for the modern CHC in that they were subscription based and not fee for service. However they existed before universal health care and were therefore paid for completely by members

HMO – Health Maintenance Organization: A vertically integrated health care organization where doctors, hospitals, specialists etc are all organized within a single structure. The label is usually applied to American for-profit health companies using this model.

HSO – Health Service Organization: The Ontario capitation funding model. Through capitation funding physicians are paid a certain amount for every patient on their roster. That payment is the same whether the patient is sick or well.

LHIN – Local Health Integration Network: An attempt by the government of Ontario to arrange local health services under a common umbrella. The goal is to make health services accountable locally.

NHS – National Health Service: The national health care network in the United Kingdom. It is a vertically integrated system paid for from the public purse

NP – Nurse Practitioner: This type of highly trained nurse can operate with an expanded scope of practice. S/he can prescribe medication, maintain patient rosters and refer patients to specialists.

NPC – Non-Physician Clinician: Refers to primary care health professionals who are not doctors. It may include nurses, nurse practitioners, dieticians, counselors and others.

PCN – Primary Care Network: One of the hybrid models developed in Ontario incorporating fee for service and some salaried professionals.

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