Current State Assessment of

Health Line Support to

Chronic Disease Management

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Final Report

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EXECUTIVE SUMMARY

This current state assessment of health line support to chronic disease management was conducted by the Quality Improvement of Literacy, Telecare and Self-Help (*QUILTS*) Group and Jeanne Legare and Associates over the summer of 2004.

The assessment incorporated:

- a review of published and grey literature on health line initiatives that support chronic disease management in Canada, the United Kingdom, Australia and elsewhere, and;
- identification and exploration of health line chronic disease models and modules that have been found to be the most successful and which may be the most appropriate for the multi-jurisdictional initiative.

FINDINGS

There is little in the way of published evidence to support jurisdictional decision-making regarding choice of chronic disease to target for implementation, nor to inform health line models, modules or processes for implementation. The evidence that is available tends to be rather weak, reflecting the early stage of development of these technologies, and limited experience in implementation. There are also recognized methodological issues including availability and usability of data that limit ability to report on personal health or health system outcomes beyond those immediately related to the call centre intervention. By and large the interventions seem to generate positive client satisfaction and are able to demonstrate some acute care cost savings, but there is no indication of their impact of other parts of the care system or longer term outcomes.

International experience with Health Lines and chronic disease management is concentrated in the United States, where call centres have become routine features of managed care. In other jurisdictions, health lines are a newer phenomenon, initially focused on first contact care.

In the United Kingdom, NHS Direct moved from pilot phase to a national service in 2000, and has just been commissioned as a special health authority and service provider to primary care trusts. Chronic disease management has been deemed a national priority, and is strongly influenced by the Wagner model of chronic disease care and “Kaiser solutions” around health service integration, patient empowerment and case management. While there is no defined role for NHS Direct in the chronic disease strategies at present, a number of opportunities have been identified and are conceptualized as “add-on” services that could be developed and marketed to primary care trusts.

Australia and New Zealand are in the early days of health line development, and the services have not been well integrated with other health systems. Australia has piloted McKesson mental health call centre programming for community support of the acute phase of illness, including triage of new episodes and post discharge contact. The programs appear to have a reasonable reach and tend to be positively received by clients and stakeholders, but the impacts on longer term health status or health system utilization have not been measured.

American approaches to chronic disease management tend to cluster around two models of care. The "whole population" approach is associated with Kaiser Permanente and affiliates such as the Group Health Cooperative in Seattle. This approach features a broad base of integrated programming spanning prevention, early identification and interventions stratified by risk. Population approaches to care use health lines as part of patient assessment, education, case management and care reminder strategies, but evidence of impact is generally reported in terms of the overall model of care rather than the health line contribution. The "disease management" approach is more often associated with insurer or payer organizations and focuses efforts on identifying those most "at-risk" and providing interventions aimed at improving health outcomes and decreasing acute care utilization costs. Disease management approaches to care lend themselves to sophisticated health technology and home telehealth applications to support evidence-based physician practice, patient education and compliance. Programs tend to be disease-specific and may or may not deal with co-morbidities. They are generally able to show an impact on hospital utilization and patient quality of life, particularly when focused on sicker, less optimally managed patients.

Integrated disease management programs are available from a multitude of American-based vendors. Congestive heart failure, asthma, diabetes and COPD programs are popular. Most use nurse call centres as part of the service package, and have capacity for advanced home monitoring and electronic record management. Development and refinement of Health Line modules for chronic disease management is in its early days. McKesson was the only vendor identified that had developed chronic disease management modules for Health Lines, and to date there are no recognized evaluations beyond self reported utilization trend data. Other vendors indicated that they were able to "package" chronic disease "tool kits" to match customer requirements.

Within the Canadian health care context, health line-enabled chronic disease strategies are more likely to be effective when integrated with primary care providers and community self management programs. Key informants from other jurisdictions recommend:

1. Establish the credibility of the health line service to engage primary care practitioners and physicians in integrated chronic disease strategies.

2. Health lines have potential as powerful building blocks in an integrated chronic disease management strategy, but they are not a "silver bullet" nor a stand-alone solution.

3. Avoid "silo" effects from stand alone health line activities or isolated disease management strategies.
    - Health line strategies that are not aligned with other chronic disease services/providers are likely to have minimal impact at best, and may end up confusing patients.
    - Disease management becomes increasingly complex for clients with co-morbidities, and it is counter-productive to have different case managers for different conditions.

4. Anticipate the need to customize "off-the-shelf" chronic disease management modules and solutions.

5. Ensure information management supports are in place to capture program activities, generate reports and measure impacts. One drawback to evaluation of NHS Direct has been the use of separate personal identification numbers for NHS Direct interactions and those with the rest of the health system.

6. Be aware of the evidence for effectiveness of individual components of health line chronic disease interventions. There are particular issues impacting the effectiveness of case management and client self-management/educational strategies. For example, provision of information alone will not change patient behaviour, but there are proven self-management strategies involving information provision.

7. Identification, recruitment and retention of patients into chronic disease management programs can be challenging.

8. High-intervention disease management strategies have the potential to retain highly-satisfied but otherwise stable clients, which can impact access and cost effectiveness. These programs should consider strategies to transition patients to less intensive levels of care as appropriate.

9. Projected cost savings will be higher if historical baseline data is used (as opposed to concurrent controls), particularly if diagnostic or medication costs are rising.

In other jurisdictions, choices of chronic diseases to prioritize for intervention are influenced by low-risk, high satisfaction solutions (asthma), the population impact of the disease (diabetes), the potential for improved care and acute care savings (congestive heart failure), and readiness of other key players to launch an integrated disease management approach. Similar opportunities will present themselves in each jurisdiction and provide a foundation for readiness that is key to launching complex initiatives. We have uncovered no evidence to suggest that health line interventions are ineffective in management of any particular chronic disease, however there are considerable cautions about health line interventions as a stand-alone strategy.

RECOMMENDATIONS

1. In the absence of evidence of effectiveness, health line support to chronic disease management should look to opportunities within the chronic disease model framework, and be informed by broader evidence of effectiveness for the specific intervention. Implementation should be monitored and evaluated.

2. Effective leverage of Health Line infrastructure within an integrated system of care will be increased through efforts which build strong relationships with health care providers including physicians and regional health authorities, develop staff skills in decision support and patient self management education, and ensure that health line information systems are able to communicate with chronic disease care providers and systems.

3. We have uncovered no evidence to suggest that health line interventions are ineffective in management of any particular chronic disease, however there are considerable cautions about health line interventions as a stand-alone strategy.

4. Rigorous evaluation of Canadian health line initiatives supporting chronic disease management will make a valuable contribution to evolving international understanding of the value of Health Lines as part of an integrated system of care.

TABLE OF CONTENTS

BACKGROUND

The Canadian Centre for Chronic Disease Prevention and Control reports that chronic diseases are among the most common and costly health problems facing Canadians, as well as being the most preventable.

Effective management of chronic disease is one of the most pressing issues facing western health care, and at least one analyst has deemed it "the key to a sustainable health care system" [1]

Internationally, there is a growing interest in the development of self-management tools and supports for individuals living with chronic health conditions. These range from the United Kingdom's Expert Patient Initiative [2] through strategies that improve the access and scope of health care professional involvement. There is growing recognition that chronic disease management (CDM) is a central aspect of primary care, and that new strategies are needed to support prevention, diagnosis and treatment in the community. Jurisdictions such as the United Kingdom, Australia and New Zealand as well as managed care programs in the United States are exploring options for expansion of health lines into chronic disease management.

In Canada, the seven jurisdictions involved in the Health Lines Multi-jurisdictional collaboration have undertaken a number of parallel initiatives to support primary care and chronic disease management reform. Many of these are situated within the Western Health Information Collaboration (WHIC), and still others are proceeding on a jurisdiction-specific basis.

In May 2004, WHIC released a Current State Assessment of Chronic Disease Management in the four western provinces (British Columbia, Alberta, Saskatchewan and Manitoba). This report identified common themes in the jurisdictional approaches to chronic disease management, including:

- All jurisdictions have done some work in diabetes and have an interest in building upon this work. Strong general interest was also indicated for hypertension, renal failure, congestive heart failure and depression.
- Jurisdictions are looking for ways to sustain the CDM initiative post March 2006 by incorporating CDM into the broader picture of health care reform. Jurisdictions need to find ways to sustain the improvements started through this project.
- Jurisdictions place chronic disease management within the umbrella of the Primary Health Care Reform Framework.

[1] Rachlis, M. Presentation to the 38th Annual Mackid Symposium on Chronic Disease Management. Winnipeg, MB May 13, 2004.
[2] http://www.ohn.gov.uk/ohn/people/er_report.pdf

- Several jurisdictions supplement this strategy with the Wagner CDM model. Others have developed detailed models combining elements of Primary Health Care Frameworks with the Wagner model.

PURPOSE

This current state assessment of health line support to chronic disease management has been commissioned by the Health Lines Multi-jurisdictional collaborative as a means of identifying opportunities to leverage health line infrastructure as an enabler in management of chronic disease.

The assessment has four key components:

1. **A literature review** (published and grey literature) of health line initiatives that support chronic disease management in Canada, the United Kingdom, Australia and elsewhere, including:
   - A description of chronic disease management models and modules being used by jurisdictions.
   - A synthesis of evaluative findings associated with the use of health lines to support chronic disease management.
   - Identification of chronic diseases that have been found to be best suited for management using health lines.
   - Assessment of gaps in the available literature of the use of health lines to support chronic disease management.

2. **Identification and exploration of health line chronic disease models and modules** that have been found to be the most successful and which may be the most appropriate for the multi-jurisdictional initiative, including:
   - An analysis of the applicability of the selected models and modules for health lines in Canadian jurisdictions.
   - Description and analysis of the real and/or perceived impacts, benefits and drawbacks of the models and modules.
   - Identification of recommendations offered by those who have implemented them.

3. **Synthesis and analysis** of available information from the literature review and model exploration, including gaps in the current state and potential opportunities for the use of health lines to support chronic disease management.

4. **Recommendations to the Multi-Jurisdictional Steering Committee regarding**:
   - Which chronic diseases should be targeted for implementation of health line chronic disease management, including the rationale for the recommendation.
   - Which health line chronic disease models, modules and processes should be considered for implementation in the participating jurisdictions, including the rationale for the recommendation.

METHODS

We conducted a search of published and grey literature to identify articles or studies involving use of health lines in chronic disease management. The framework for the literature review is found in Appendix 1. Published articles were identified through a search strategy that is described in Appendix 2, while grey literature was identified through Internet search strategies and key informant interviews.

Four hundred and forty-nine unique citations were identified from the electronic databases, and 4 from the grey literature. Of these, 8 potentially relevant citations were identified. Three additional evaluation reports were identified through key informant interviews (Western Australia, New Zealand and McKesson).

We excluded citations describing various applications of nurse phone advice in clinical settings (n=63). The contextual issues impacting the effectiveness of these interventions in a call centre setting are complex and merit a more in-depth review than is possible within the scope of this assessment. The citations have been noted and set aside for potential future use.

Key informants associated with promising chronic disease and health line initiatives were identified and asked to participate in a brief interview. While the time frame for the project did not allow for response from all of those identified, we believe that the information contributed by those who did participate provides a representative cross-section of available experience and advice.

FINDINGS

1. THE LITERATURE

There are few published reports of the use of health lines to support chronic disease management. We identified three reports that used primary data collection and described the methods used to assess caller and service characteristics of new health line applications to mental health services (Table 1), and eight study descriptions or reports that did not provide sufficient information to assess study quality or the impacts of the health line service (Table 2).

In the United Kingdom, a study of mental health calls to *NHS Direct* reported on the use of the national health line to support the NHS Direct Mental Health Initiative (Payne et al, 2003). The study indicated that approximately 3% *of NHS Direct* calls were in relation to mental health issues, most commonly depression, stress and anxiety. The majority of mental health calls were made "out of hours", and by a person calling on behalf of the patient. Mental health callers were more likely than other *NHS Direct* callers to be referred to care, and were less likely to feel that the nurse was able to give them advice or deal with their problem.

NHS Direct is a population-focused health line that is strongly integrated with primary health care services and practitioners. The article does not make mention of a specific mental health chronic disease model of care underlying the advice provided by the nurses. However, it does make recommendations to enhance nurses' knowledge of mental health problems and to improve mechanisms for referral.

The second study describes a model of care for rare chronic illness that extends expert information, advice and care to general callers, caregivers and health professionals through the use of an expert-based nurse telephone service (Harvey et al, 1998). The article reports the results of a retrospective review of a national nurse information, education and referral line (*CANDID*) to support care for those with early onset dementia in the United Kingdom. Specially trained nurses based at the national treatment centre provided information and support to patients (registered and general callers), families, caregivers and clinicians. The article makes no mention of clinical guidelines or protocols to guide the advice given by the nurse, however it does indicate that the advice is reviewed by a consultant neurologist and psychiatrist.

The third study describes the impacts of a first access mental health line providing triage, case management (including outcalls) and referral in Western Australia using McKesson mental health software (Western Australia, 2004). The evaluation was conducted six months following service implementation and is largely descriptive in nature. It reported on call centre service utilization, caller

characteristics, caller and stakeholder satisfaction, and the clinical appropriateness of the advice provided. Impact on local health services and after-hours management of calls was measured through patient reports of how they would have managed had the service not been available. Twenty percent indicated they would have attempted suicide. Most callers were existing mental health service clients, and the service was valued by clients and stakeholders for its contribution to continuity of care.

These studies were based on data from the early stages of health line implementation and contain little information to assess the quality of care or the patient or health system outcomes achieved. However, as the services become more established it is reasonable to assume that broader impacts and outcomes will be measured, reported and available to other jurisdictions.

We also identified a number of descriptive reports which do not address evaluation issues, but do signal the presence of health line applications for chronic disease care that could be monitored for future evaluation activity. A number of these deal with McKesson disease management and call centre applications. McKesson has compiled a summary document noting internal and published evaluations for its disease management programs and nurse triage services (McKesson Health Solutions, 2004). The asthma, diabetes and heart failure disease management programs are multifaceted, multidisciplinary interventions that include targeting and stratification of enrolees, clinical practice guidelines, electronic records to support care management, and use of nurse triage call centres to support recruitment, outreach and education. The document indicates that the evaluations show positive impacts on clinical indicators and health service utilization for the integrated disease management programs. To date, there are no evaluations specific to the health line/contact centre chronic disease products.

2. CHRONIC DISEASE MODELS AND MODULES BEING USED IN OTHER JURISDICTIONS

United Kingdom

In the United Kingdom, *NHS Direct* moved from pilot phase to a national service in 2000, and has just been commissioned as a special health authority and mandated service provider to primary care trusts. Its core business (the Helpline, OnLine and recently introduced *in-time* digital TV) is delivered nationally, while second tier “nationally enhanced services” are evolving, currently focused on support for after hours care. A third and more recent service priority is development of “locally enhanced services” which would be commissioned by local primary care trusts to support local area delivery plans. Chronic disease management applications are currently conceptualized within the framework for locally enhanced services (United Kingdom, 2004).

Chronic disease management has been established as a national priority in the UK, and is being approached from a "whole systems, whole population" framework. The Wagner model of chronic disease management is generally accepted, and there is a strong focus on achieving improved outcomes and efficiencies through adapting "Kaiser models" of care. Key features of the Kaiser model with particular relevance to health lines include system integration, changing the role of the patient through building self-management skills, and active case management of the most vulnerable. Priority conditions for chronic disease intervention in the UK are chronic obstructive pulmonary disease (COPD), heart failure, diabetes and asthma.

To date, the role of *NHS Direct* in chronic disease management is largely at the planning or "hypothetical" stage[3], however a number of opportunities have been identified for leveraging this resource to improve chronic care in local health service delivery plans. Potential roles include:

- Use of *NHS Direct* to provide regular telephone support to chronic disease patients using care plans and decision support tools
- Telemonitoring and phone monitoring to support early discharge
- Use of *NHS Direct OnLine* and *NHS Direct Digital TV* for teaching and demonstration purposes[4].

At present, three chronic disease pilot projects are being trialed in local trust areas. While health lines are not key features of the pilots, all include aspects of chronic disease management that could potentially be provided through nurse call centres. The pilots are:

1. The "Pfizer Haringey Health Partnership" uses five nurse care mangers to provide telephonic support, "coaching" and referral to the 600 high-risk clients being treated for diabetes, heart failure and coronary heart disease. The project evaluation is expected in Fall 2005 and will report on feasibility and replicability, clinical and behavioural measures, health service utilization, and patient and staff satisfaction.

2. The Evercare project uses advanced primary nurses to provide intensive case management and care coordination to support vulnerable elderly living in the community. When necessary, a highly responsive care network can intervene and "fast track" clients through needed services, with the goal of maintaining independence and avoiding unnecessary health service utilization.

3. The "Kaiser projects" focus on improved system integration, shared information systems and supporting patient involvement and responsibility.

[3] Personal communication, Dr. Nick Robinson, September 1, 2004
[4] NHS Digital TV was launched in summer 2004 and builds on the NHS Direct OnLine knowledge base. The service is targeted at older users, the young and low income families.

Patient self-management is a key component of the Kaiser model, and is supported by the Kaiser-Healthwise resource suite (Handbook, OnLine and Nurse call centre)

New Zealand

New Zealand's *Healthline* was launched in May 2000 as a two-year pilot project involving four health regions selected to reflect the diversity of the national population. *Healthline* is a McKesson managed first contact program that links callers with nurses who provide 24/7 health information, advice and triage. Full national coverage is expected to be in place by 2005. Current services do not provide specific supports for chronic disease management and at the present time there are no plans for use of call centre technology within chronic disease programs.

Australia

In Australia, health care is a shared responsibility between the federal (primary care) and state governments (acute and public health). There are multiple examples of telephone health support services in all states, however most are specific to a particular disease, condition or service.

In 2001, Western Australia contracted with McKesson for provision of a state-wide first contact telephone mental health service. *Mental Health Direct* employs experienced registered nurses using mental health endorsed guidelines to provide advice, with support from a psychiatrist and experienced mental health professionals. The model of care is utilized primarily by urban residents, and was found to lack the level of support required by those living in remote and rural areas. In 2003, two pilot projects were implemented using experienced mental health clinicians working in collaboration with the local mental health staff to provide continuing care, and to ensure consistent client management. *SouthWest 24* provides 24 hour service to residents in the Southwest region, while *Ruralink* provides after-hours support to residents of Midwest and Gascoyne regions.

SouthWest 24 and *Ruralink* are first contact centres that aim to prevent after-hours admissions and presentations to hospital through key functions of crisis assessment and intervention, and follow-up support. The services provide triage, assessment and counselling, supports for shared management (such as the ability to leave standing orders), and information supports to health and other care providers. Outcalls to clients, carers and caregivers are provided. The six-month evaluation (Western Australia, 2004, reviewed in the Literature section of this report) was generally positive and the service has since been enhanced to act as a single-point of entry for all adult community mental health service referrals. The

service enhancement is intended to promote coordination and reduce the risk of people falling through the gaps.

There is reference to a similar McKesson-based service in rural New South Wales (*Greater Murray Access Line*) however we have been unsuccessful in gaining further information on the service or its impacts.

United States

Nurse call centres and disease management programs have become routine parts of health care management in the United States. Much of the innovation around Telecare management of health and disease originates in the United States, and is exported to health systems internationally.

American approaches to chronic disease management tend to cluster around two models of care. The "whole population" approach is associated with Kaiser Permanente and affiliates such as the Group Health Cooperative in Seattle. This approach features a broad base of integrated programming spanning prevention, early identification and interventions stratified by risk. Potential cost savings are through disease avoidance, prevention of disease progression and better management of high risk clients.

The second US approach to care focuses on "disease management" and is most often associated with insurer or payer organizations. It focuses on identifying those most "at-risk" and providing intensive interventions aimed at improving health outcomes and decreasing health service utilization costs. The interventions are often focused on a particular disease and may or may not deal with co-morbidities. Cost savings are greatest in settings where quality of care can be improved, and where hospitalizations can be avoided.

Examples of Whole Population Approaches

Kaiser Permanente

The Kaiser Permanente group have adopted the Wagner model of chronic disease management and have integrated the Healthwise® suite of resources (Handbook, OnLine and Nurse call centre) into their patient education and self-management strategies. The Kaiser approach has been shown to result in considerable health benefit while decreasing unnecessary health service utilization. It is based on an integrated system of supports and services, however we are not aware of any specialized call centre supports to chronic disease management.

Indiana Medicaid Chronic Disease Management Program

The Indiana Chronic Disease Management Program was developed as a result of Medicaid legislation requiring implementation of a disease management program for recipients with diabetes, asthma, congestive heart failure, hypertension, or who are at high risk of chronic disease. The program has been developed in partnership with the MacColl Institute for Healthcare Innovation, and is built on the Wagner model of chronic disease management. The multi-faceted intervention uses a nurse-supervised call centre to provide non-clinical outreach services to clients on a regular basis, and nurse case managers who work with high-risk clients and their primary care physician to improve health outcomes.

Program members are identified through Medicaid claims data and stratified into two groups. Those who are identified as lower severity are connected with Care Coordinators working in a centralized call centre. The coordinators are trained non health professional staff working under supervision of a registered nurse. Clients are contacted quarterly for assessment and educational purposes: the topic of the phone call varies based on the client's illness and the area of education that they are most interested in.

Members who are identified as higher severity are assigned to one of the two nurse care management networks. Nurse Care Managers work with the Medicaid members' primary medical providers to deliver a consistent message to members regarding management of their chronic disease. Nurse Care Managers will also provide one-on-one assessments and education to participants for a 4-6 month intervention period and then for a 2-month reinforcement phase during which the participant will be transitioned to the call centre for ongoing, quarterly assessments.

Client records are managed on a web-based interface that facilitates sharing of clinical and patient information between health care providers including the call centre. Evaluation results are expected to be available in fall 2004.

Example of a Disease Management Approach

Washoe Health System/Hometown Health Hotline

The Hometown Health Hotline is part of the Washoe Health System and provides general health information and disease management support services to members insured through Hometown Health or patients of the Washoe Medical Centre. Medicare, Medicaid and self-pay patients are not disqualified. It is situated in Northern Nevada and serves approximately 1000 insured clients and a population of up to 350,000 clients of the Medical Centre.

Hometown Health Hotline uses McKesson software for diabetes, asthma, and congestive heart failure, and will be incorporating COPD and hypertension

modules in the future. The McKesson software adheres to standards of the Disease Management Association of America, including population identification/stratification, evidence-based practice guidelines and patient self-management education.

Hometown Health Hotline chronic disease programs provide telemonitoring, risk assessment and monthly mailings of educational materials. High-risk clients are assessed and medically managed through the Medical Centre. Congestive heart failure patients have access to in-home technology from Cardiocom that transmits weight and health information to the nurse case manager, who can recommend medication adjustments.

In addition to federally mandated standards, the Hometown chronic disease programs monitor clinical indicators, health service utilization, and patient and provider satisfaction. There are no formal evaluations of the chronic disease programs, however Hometown Health shows "before-after" reductions in health service use by patients in the congestive heart failure program (n=116) ranging from 11% reduction in hospital admissions to a 27% decrease in average length of stay. Congestive heart failure has provided the best return on investment, with a 66% ($1.2M) decrease in admission-related medical centre costs. The diabetes program is considered to have longer term return on investment potential, while the asthma program makes a significant contribution to quality of life, particularly for children.

Advice From Other Jurisdictions

Key informants in other jurisdictions provided a number of practical recommendations for decision makers considering leveraging health line infrastructure to support chronic disease management.

1. Establish the credibility of the health line service to engage primary care practitioners and physicians in integrated chronic disease strategies.

2. Health lines have potential as powerful building blocks in an integrated chronic disease management strategy, but they are not a "silver bullet" nor a stand-alone solution.

3. Avoid "silo" effects from stand alone health line activities or isolated disease management strategies.
    - Health line strategies that are not aligned with other chronic disease services/providers are likely to have minimal impact at best, and may end up confusing patients.
    - Disease management becomes increasingly complex for clients with co-morbidities, and it is counter-productive to have different case managers for different conditions.

4. Anticipate the need to customize “off-the-shelf” chronic disease management modules and solutions.

5. Ensure information management supports are in place to capture program activities, generate reports and measure impacts. One draw-back to evaluation of NHS Direct has been the use of separate personal identification numbers for NHS Direct interactions and those with the rest of the health system.

6. Be aware of the evidence for effectiveness of individual components of health line chronic disease interventions. There are particular issues impacting the effectiveness of case management and client self management/educational strategies. For example, provision of information alone will not change patient behaviour, but there are proven self-management strategies involving information provision.

7. Identification, recruitment and retention of patients into chronic disease management programs can be challenging.

8. High-intervention disease management strategies have the potential to retain highly-satisfied but otherwise stable clients, which can impact access and cost effectiveness. These programs should consider strategies to transition patients to less intensive levels of care as appropriate.

9. Projected cost savings will be higher if historical baseline data is used (as opposed to concurrent controls), particularly if diagnostic or medication costs are rising.

3. SYNTHESIS AND ANALYSIS

International experience with health lines and chronic disease management is extremely limited outside of the United States. Development and refinement of chronic disease modules for health lines is in its early days: few vendors appear to have developed specific modules, and there are no recognized evaluations beyond self-reported utilization trend data.

In the United Kingdom, health line chronic disease management strategies are being conceptualized as “locally enhanced” services that could be developed in collaboration with and paid for by primary care trusts. There is much potential for leveraging *NHS Direct* capacity to support chronic disease management, but no active initiatives at present.

Australia and New Zealand are in the early days of health line development, and the services have not been well integrated with other health systems. Australia

has piloted McKesson mental health management programs primarily for community support of the acute phase of illness, including triage of new episodes and post discharge contact. The programs appear to have a reasonable reach and tend to be positively received by clients and stakeholders, but the impacts on longer term health status or health system utilization have not been measured.

Use of health lines to support chronic disease management strategies is best developed in the United States. Population approaches to care use health lines as part of patient assessment, education, case management and care reminder strategies, but evidence of impact is generally reported in terms of the overall model of care rather than the health line contribution. Disease management approaches to care focus on targeted high risk segments of the chronic disease population and use health line support combined with specialist care to provide intensive case management and educational interventions. They are generally able to show an impact on hospital utilization and patient quality of life, however program impacts are influenced by the ability to recruit and retain clients where considerable improvements in quality of care and self-management are possible. There appears to be a strong market for these programs among health insurance agencies seeking improved outcomes and cost containment within a defined benefit plan population.

Current evidence supports the view that chronic disease management is best implemented from an integrated, multi-disciplinary approach to care that includes patient education and self-management. While health lines have a role to play, the success of disease management programs is also reliant on the quality of care available through other health services and providers. In the United States, access to health care service is largely controlled by “payer” systems, with different care options available to those accessing service through employer or private insurance plans, public plans such as Medicare and Medicaid, or self pay. Canadian jurisdictions should be aware that American experience with service utilization and cost savings impacts might be based on select patients or variable access to service.

Within the Canadian health care context, health line-enabled chronic disease strategies are more likely to be effective when integrated with primary care providers and community self-management programs. Key informants from other jurisdictions recommend establishing the credibility of the health line with physicians in advance of implementing shared care strategies, and ensuring that health line information systems are capable of capturing and sharing the data necessary to show the impacts of the health line intervention. They also caution against investing in “silo technology” that fragments care by disease or results in mixed messaging in the face of co-morbidities.

Canadian jurisdictions are likely to approach health line support to chronic disease management within the context of larger initiatives driven by communities, health

regions or primary care groups. Potential roles will likely be negotiated based on a combination of identified opportunities and solutions that can be brought to the table.

To date, there is little firm evidence available to inform implementation of health line strategies to support chronic disease management. The evidence that is available tends to be rather weak, reflecting the early stage of development of these technologies, and the limited experience in implementation. There are also recognized methodological issues including availability and usability of data that limit ability to report on personal health or health system outcomes beyond those immediately related to the call centre intervention. By and large the interventions seem to generate positive client satisfaction and are able to demonstrate safety and some acute care cost savings, but there is no indication of their impact on other parts of the care system or longer-term outcomes.

A considerable literature on effective management of chronic disease does exist, including proven interventions for managing individual chronic diseases, patient self-management strategies, telephone based health assessment and the use of case management techniques for high-risk clients. By and large, the literature shows mixed results from similar interventions, and effectiveness is generally based on a combination of the content, process and context of the intervention.

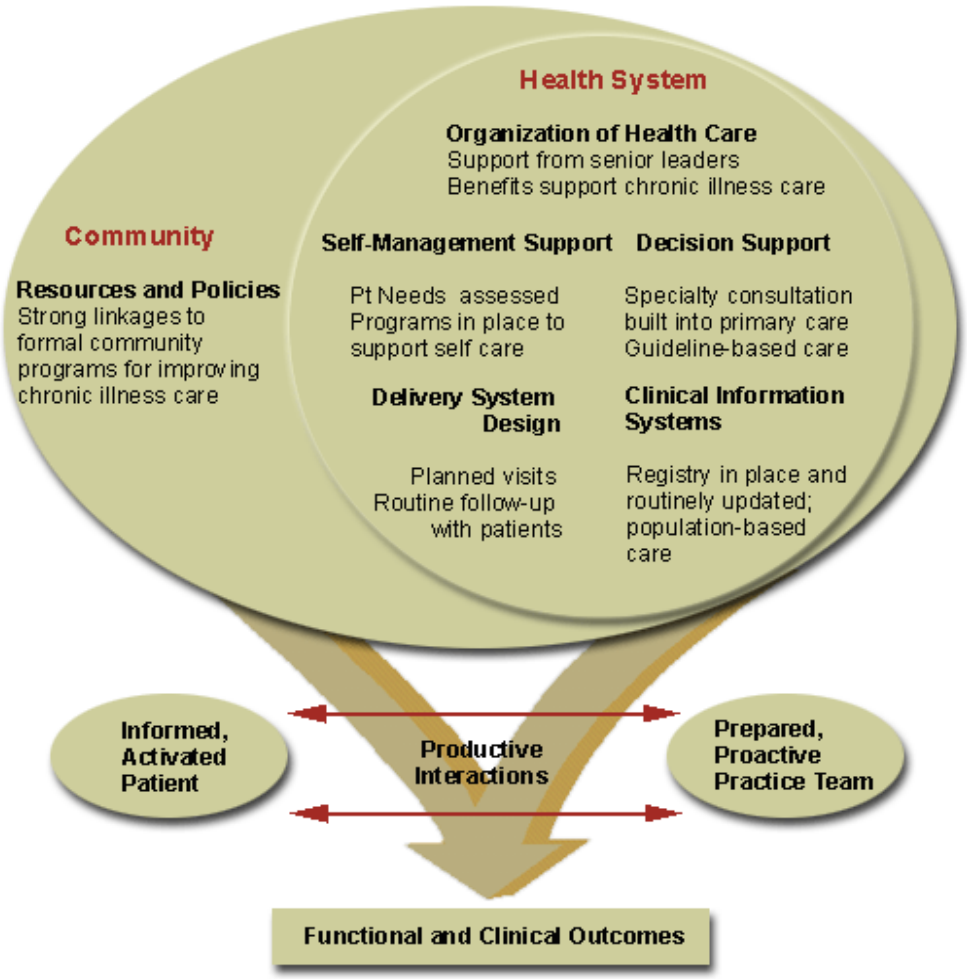
Many chronic disease modules incorporate one or more of these identified components of chronic care management (e.g. case management, post discharge follow-up, patient education) however the issues impacting effectiveness in health line settings are complex and merit a more in-depth review than is possible within the scope of this assessment. Implementation success will depend to some degree on the extent to which the overall model of care reflects the essential elements of effectiveness for each of the foundational elements.

Integration of care and care providers appear to be a key features of effective chronic disease management, and future evaluations should move beyond a focus on call centre utilization to consider the impact of health line interventions within the broader context of care. It will also be important to understand the effectiveness of disease-specific modules in management of patients with multiple chronic diseases and/or co-morbidities.

4. POTENTIAL OPPORTUNITIES FOR THE USE OF HEALTH LINES TO SUPPORT CHRONIC DISEASE MANAGEMENT

There are a number of potential opportunities for use of health lines to support chronic disease management within Canadian jurisdictions. For illustration purpose, we present these within the context of Wagner-type models of chronic disease management, a simplification of which is presented below.

Figure 1. The Chronic Care Model



OPPORTUNITIES TO LEVERAGE HEALTH LINE SUPPORT FOR COMMUNITY LINKAGES

Aim: to mobilize community resources to meet the needs of patients.

1. Health line staff can become familiar with community programs that support patient self-management and encourage callers to register for these programs.
2. Health line staff can inform professionals of community resources
3. Health line staff can ensure callers are aware of the informational services within their communities.
4. Health line staff can assist callers to locate and register for chronic disease programs (roles range from information provision to acting as an enrolment centre).
5. Health line staff can assist in the case manager or navigator roles.
6. Health line staff can provide after hours support and appointment scheduling within parameters negotiated with local service providers

OPPORTUNITIES TO LEVERAGE HEALTH LINE SUPPORT FOR PATIENT SELF MANAGEMENT

Aim: to empower and prepare patients to manage their health and health care. Emphasis on the important role that patients have in managing their own health care.

1. Health line staff can teach professionals how to use Skills Mastery techniques:
    a. get the patient to establish a goal he/she want to achieve
    b. have client develop a weekly action plan to accomplish a specific activity leading toward accomplishment of the goal
    c. make a follow-up call to see how well patient achieved his/her action plan
2. Health line staff can teach professionals to use a “problem-solving” strategy
3. Health line staff can teach safe and effective medication use
4. Health line staff may engage in a professional “Navigator Role”.
5. Health line staff can explain the various roles of healthcare team members and how they are accessed.
6. Health line staff can function as a patient advocate
7. Health line staff can engage in lifestyle counselling and motivational interviewing
8. Health line staff can provide information, support and problem solving
9. Health line staff can help patients prepare for a doctor’s visit
10. With special tools and training, health line staff can conduct phone-based risk assessment and follow-up sessions

11. With appropriate tools and training, health line staff can assist callers to learn appropriate home monitoring skills (e.g. blood glucose monitoring, spirometry)

OPPORTUNITIES TO LEVERAGE HEALTH LINES FOR DECISION SUPPORT

Aim: to promote clinical care that is consistent with scientific evidence and patient preferences. Integration of evidence based guidelines into daily clinical practice.

1. Health line staff can disseminate "Best Practice" guidelines and protocols to professionals who call
2. Health line staff can interact with callers' health care team, including working from a shared care plan
3. Health line staff can teach professionals how to use self-management tools such as Mastery Learning and Problem Solving Techniques with their patients.
4. With appropriate training, health line staff can provide decision-support skills and resources to callers.

OPPORTUNITIES TO LEVERAGE HEALTH LINE SUPPORT FOR DELIVERY SYSTEM DESIGN

Aim: to assure the delivery of effective, efficient clinical care and self-management support. Focus on teamwork and an expanded scope of practice for team members to support chronic care.

1. Health line staff can serve in the navigator role
2. With appropriate integration supports and electronic record sharing, health line staff can act as a member of a patient's personal care team, contributing to a common care plan and patient information record.
3. Health line staff can conduct periodic telephone assessments and triage patients to appropriate services.
4. Health line staff can provide case management support within protocols developed with local chronic disease service providers.

OPPORTUNITIES TO LEVERAGE HEALTH LINE SUPPORT FOR CLINICAL INFORMATION SYSTEMS

Aim: to develop information systems based on patient populations to provide relevant client data. Organize patient and population data to facilitate efficient and effective care.

1. Health line staff can make reminder and follow-up phone calls to patient subgroups regarding necessary tests, appointments and interventions
2. With appropriate information supports and permissions, health line staff can access standing orders or specific care plan information and share the results of their interactions with the rest of the care team.

5. RECOMMENDATIONS

This current state assessment of health line support to chronic disease management has established that there is little in the way of published evidence to support jurisdictional decision-making regarding choice of chronic disease to target for implementation, nor to inform health line models, modules or processes for implementation.

1. In the absence of such evidence, an approach which looks to opportunities within the chronic disease model framework and within evolving multidisciplinary chronic disease care teams is recommended, informed by evidence regarding the effectiveness for the specific interventions. In other jurisdictions this includes using health line staff to:
   - conduct periodic health assessments and triage clients to care,
   - navigate or schedule clients to appropriate services,
   - provide best practices information support to other members of the care team.
   - provide or contribute to patient education supports

   With appropriate training and supports, health line staff could also move into much more integrated roles including case management, decision support and medication adjustment. As there is no firm evidence for the effectiveness of these roles within call centre settings, appropriate evaluation measures should be put into place.

2. The assessment has also established that effective chronic disease management builds on an integrated system of health and community supports and services, informed by evidence-based best practices. Services provided through the health line are but one component of a complex system of care. Effective leverage of health line infrastructure

within an integrated system of care will be increased through efforts which build strong relationships with health care providers including physicians and regional health authorities, develop staff skills in decision support and patient self management education, and ensure that health line information systems are able to communicate with chronic disease care providers and systems.

3. In other jurisdictions, choices of chronic diseases to prioritize for intervention are influenced by the population impact of the disease (diabetes), the potential for improved care and acute care savings (congestive heart failure), and readiness of other key players to launch an integrated disease management approach. Similar opportunities will present themselves in each jurisdiction and provide a foundation for readiness that is key to launching complex initiatives. We have uncovered no evidence to suggest that health line interventions are ineffective in management of any particular chronic disease, however there are considerable cautions about health line interventions as a stand-alone strategy.

4. Rigorous evaluation of Canadian health line initiatives supporting chronic disease management will make a valuable contribution to evolving international understanding of the value of Health Lines as part of an integrated system of care.

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VENDOR SURVEY

MCKESSON
Has Care Enhance Call Centre software for congestive health failure. McKesson also provides integrated disease management programs for asthma, diabetes and COPD. Modules are based on Disease Management Association of America guidelines.

CLINIDATA
Have not developed specific chronic disease modules for Health Lines, but have electronic tool sets to support chronic disease management. Will partner with program sponsors to deliver support.

HEALTHWISE
Do not provide specific disease management modules for Health Lines, but will work with clients to customize the Knowledgebase to support chronic disease management needs

HEALTHLINES
Did not respond within timeframe for study

CARDIAC SOLUTIONS
Did not respond within timeframe for study

CLASSIFICATION OF LITERATURE REVIEWED

GROUP 1 CITATIONS

Studies or articles that make assertions about or describe health lines that provide support services to the public for chronic disease management.

- McKesson Health Solutions (2004). Documenting the Financial Value of McKesson's Care Enhance Disease Management and Nurse Triage Services. McKesson Health Solutions Care Enhance Services, Broomfield Colorado.

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- Hefty participation rates facilitate solid outcomes and ROI for telephonic diabetes effort (2001). *Disease Management Advisor., 7,* 152-155.

- Humana CHF program cuts costs, admissions (1998). *Healthcare Benchmarks., 5,* 173-175.

- Advice nurses help payer manage chronically ill: call lines support disease management (1996). *Case Management Advisor.7(4):54-6, 1996 Apr.,* 54-56.

- Description of a rural Australian free call telephone mental health information and support service (2002). *Australasian Psychiatry Vol 10 (4),* 365.

GROUP 2 CITATIONS

Studies that involve primary data collection and in which the methodology used is described. These studies may address implementation, including factors such as customer satisfaction and utilization related to such health lines or client or health system outcomes related to the use of such health lines.

1. **Strong Methodology (Use rigorously conducted RCT's, Quasi-experimental designs)**

    - No studies identified

2. **Moderately Strong Methodology (Use other rigorously conducted designs including qualitative ones)**

- No studies identified

3. Weak Methodology (Anything else)

- Payne, F., Jessopp, L., Harvey, K., Plummer, S., Tylee, A., & Thornicroft, G. (2003). Is NHS Direct meeting the needs of mental health callers? *Journal of Mental Health.12(1):19-27, 2003 Feb.(13 ref),* 19-27.

- Harvey, R. J., Roques, P. K., Fox, N. C., & Rossor, M. N. (1998). Candid-counselling and diagnosis in dementia: A national telemedicine service supporting the care of younger patients with dementia. *International Journal of Geriatric Psychiatry.Vol.13(6)()(pp 381-388), 1998.,* 381-388.

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TABLE 1 LITERATURE REVIEW

NAME OF HEALTH LINE SERVICE AND DESCRIPTION	CITATION	METHODS USED	SUMMARY OF FINDINGS	WEAKNESSES	QUALITY RATING
NHS Direct Mental Health Initiative	Payne et al, 2003	Secondary analysis of data from an evaluation of the NHS Direct Mental Health Initiative Survey of mental health callers Analysis of routine call data from NHS Direct Volume of callers Characteristics of callers Caller satisfaction	Mental health calls represent average of 3% of workload across NHS Direct sites Most calls made by someone other than the patient, and received out of hours Depression, stress/anxiety most common issue identified 59% of callers in contact with other services, usually GP More likely than other NHS Direct callers to be referred to care Less satisfied than other NHS Direct callers: less likely to feel that the nurse was able to give them advice or deal with their problem	Descriptive only No caller or health system outcomes identified	Weak

TABLE 1 ….CONT'D

NAME OF HEALTH LINE SERVICE AND DESCRIPTION	CITATION	METHODS USED	SUMMARY OF FINDINGS	WEAKNESSES	QUALITY RATING
Counselling and Diagnosis in Dementia (CANDID) Surrey, UK Point of contact and information for patients and carers before, during and after investigation and diagnois of early-onset dementia Clinical management advice to doctors and health professionals (general inquiry and specific to registered patients) Provided through a national multidisciplinary specialist clinic (150 new referrals per year and 500 patients in ongoing follow-up)	Harvey et al, 1998.	Retrospective review first 2 years operation General information all calls Linked call and patient records for registry patients	1121 calls about half from registered patients 67 letters to GPs with care recommendations based on call 5% of calls from MDS 13% of calls from nurses and social workers There is no mention of clinical guidelines or protocols associated with the advice given by the nurse.	Descriptive only No client or health system outcomes identified	Weak

TABLE 1 ….CONT'D

NAME OF HEALTH LINE SERVICE AND DESCRIPTION	CITATION	METHODS USED	SUMMARY OF FINDINGS	WEAKNESSES	QUALITY RATING
Ruralink **Southwest 24** SouthWest Area Health Service, Western Australia After hours and 24/7 mental health service provided to remote and rural populations using McKesson mental health package "First contact" mental health triage and case management program including provision for clinicians to leave standing orders, outcalls to patients and caregivers	Western Australia, 2004	Program utilization data, client and stakeholder surveys, case note review	Mental health line fills a service gap, promotes continuity of care, and generates high satisfaction rates Most clients had previous contact with mental health services	Assessment of impact limited to episode management, not linked to overall patient or health system outcomes	Weak

TABLE 2 STUDIES THAT MAKE ASSERTIONS ABOUT OR DESCRIBE HEALTH LINES THAT PROVIDE SUPPORT SERVICES TO THE PUBLIC FOR CHRONIC DISEASE MANAGEMENT

NAME OF HEALTH LINE SERVICE AND DESCRIPTION	CITATION	METHODS USED/DESCRIPTION	SUMMARY OF FINDINGS	WEAKNESSES	QUALITY RATING
McKesson	McKesson Health Solutions,2004	Summary of studies pertaining to McKesson Care Enhance Disease Management and Nurse Triage Services	Focus is on disease management programs. No information specific to HealthLines in chronic disease management.	Provides study highlights only No description of methods	Weak
McKesson	Case Management Advisor, 2003	Describes use of nurse triage line to identify callers at risk and direct them into disease management or case management programs	Process description		Not an evaluation
NHS Direct	Nursing Times, 2003	Description of asthma intervention involving telephone assessment and referral by nurse	Process description		Not an evaluation
McKesson CareEnhance℠ Diabetes Program	Disease Management Advisor, 2001	Methods not provided Description of : recruitment and enrolment practices Risk stratification and telephonic management Patient self management program includes management of co-morbidities	Claim up to: 33% reduction in hospitalizations 20% reduction in ED visits 9% reduction MD office visits and a number of behaviour change outcomes	No description of methods	Weak State forthcoming research project with OSF HealthPlans in Peoria, IL to look at clinical outcomes of participants in diabetes DM program vs non participants

TABLE 2 ….CONT'D

NAME OF HEALTH LINE SERVICE AND DESCRIPTION	CITATION	METHODS USED	SUMMARY OF FINDINGS	WEAKNESSES	QUALITY RATING
Humana CHF Program using **Cardiac Solutions Congestive Heart Failure Program** Integrated Disease Management Program based on Stanford's MULTIFIT program. Protocols based on Agency for Health Care Policy and Research and American Heart Association	Healthcare Benchmarks 1998	HMO Louisville KY 5,000 CHF patients over 2 years Nurse home assessment and self management support – consistent nurse:patient relationship Scripted format to calls-lab management, medication management, lifestyle management and symptoms, triage if necessary	Claim 58% decrease hospital days 49% decrease ER visits 34% decrease sodium intake 8% increase functional status 1st year of program	Descriptive article No description of methods	Weak
United Health Care's OPTUM NurseLine Golden Valley, NM National nurse call centre with 5 million clients Protocol driven software Expand service into CDM through patient education, support, counselling	Case Management Advisor, 1996	Description only	Claim products for Asthma Diabetes Congestive heart failure Low back pain	Promotional article	Not an evaluation

TABLE 2 ….CONT'D

NAME OF HEALTH LINE SERVICE AND DESCRIPTION	CITATION	METHODS USED	SUMMARY OF FINDINGS	WEAKNESSES	QUALITY RATING
Accessline **Greater Murray Area Health Service, NSW Australia** McKesson software "First contact" mental health triage and case management program for rural residents including provision for clinicians to leave standing orders, outcalls to patients and caregivers	Australasian Psychiatry, 2002 Powerpoint conference presentation	Service description and utilization data	Description of caller characteristics in a "first contact" mental health service pilot	N/A	Not an evaluation
Hometown Health Line Washoe County, Nevada McKesson Care Enhance Call Centre modules for Diabetes CHF Asthma With additional telemonitoring technology for CHF patients Nurse telemonitoring, education and information Able to do medication management for some CHF patients	Personal communication No formal evaluation available	Methods not provided Draw on Medical Centre health service utilization data	CHF impact on admissions, patient days, average length of stay (ALOS) and medical centre cost using "before-after" comparisons for 116 patients Claim CHF program resulted in following decreases Admissions 12% Patient Days 27% ALOS 20% Cost 67% ($1.85M)	"before-after" periods not specified	Weak

APPENDICES

APPENDIX 1 FRAMEWORK FOR ASSESSMENT OF PUBLISHED AND "GREY" LITERATURE

APPENDIX 2 LITERATURE SEARCH STRATEGIES

APPENDIX 1 FRAMEWORK FOR ASSESSMENT OF PUBLISHED AND "GREY" LITERATURE

INTRODUCTION

Scope: This literature review is limited to studies of health lines in non-clinical contexts in which members of the general public call in to seek information, advice or guidance regarding health.

Focus: Health lines that either do or could support chronic disease management in Canada as well as Health lines in United States, Australia, New Zealand and elsewhere (other developed countries) which do support chronic disease management and which may have applicability in Canada.

Purposes: (1) To identify and summarize literature on the use and impacts of health lines to support chronic disease management services which may be applicable in Canada; (2) To identify and describe models and modules for chronic disease management which are being used by health lines and which may be applicable in Canada.

DEFINITIONS FOR THE PURPOSE OF THE LITERATURE SEARCH

Health Lines: Telephone or web-based services which provide health information, information about how to navigate the health system and system-based nurse triage and referral to the general public on request. This literature review will not focus on systems which operate out of a clinical context, although review articles which do will be noted for future reference in relation to existing health lines in Canada.

Chronic Disease Management Services: Information, advice and support provided by health lines to assist the public in managing chronic conditions including cardiovascular disease and stroke, cancer, diabetes, arthritis, asthma and mental illness. For the sake of this literature review, other types of services provided by help lines will be excluded.

Models: Explicit or implicit conceptual approaches on which are used to guide the provision of services to support chronic disease management to the public though health lines. For the sake of this review, conceptual approaches which has other functions will be excluded.

Modules: Protocols and procedures (typically in the form of software support proprietary products) used or having the potential of being used by health lines to provide services to support chronic disease management to the public. This review will be restricted to products currently in use.

LITERATURE SEARCH

Selection Criteria: Published or unpublished articles or papers that :

1. Make assertions about or describe health lines that provide or may provide support services to the public for chronic disease management.

2. Are based on studies that involve primary data collection and in which the methodology used is described. These studies may address implementation, including factors such as customer satisfaction and utilization related to such health lines or client or health system outcomes related to the use of such health lines.

Disposition of Publications: Publications falling into group 1 will be noted and set aside for future use. Those falling into group 2 will be summarized using the attached Template (Appendix A).

Analysis: Where sufficient information is available, studies falling into group 2 will be classified using the following categories:

1. Strong Methodology (Use rigorously conducted RCT's, Quasi-experimental designs)
2. Moderately Strong Methodology (Use other rigorously conducted designs including qualitative ones)
3. Weak Methodology (Anything else)
4. Strength of methodology cannot be determined

Analysis would focus on studies falling into the first two categories. However, information from all four categories may be drawn on in the preparation of the draft and final reports with appropriate caveats.

APPENDIX 2 LITERATURE SEARCH STRATEGIES

OVID Database - Medline

File: C:\ . . . \Health Line Support\Search Strategies
Reference Manager 10 Database: Healthline1
Reference Manager Keywords: Medline, Healthline10 Strategy
OVID File: healthline10
Date: July 19, 2004

1. Telephone/
2. Hotlines/
3. Triage/
4. Remote Consultation/
5. "Referral and Consultation"/
6. or/3-5
7. or/1-2
8. 6 and 7
9. (hotline$ or hot line$).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
10. (telenurs$ or tele nurs$).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
11. (teletriag$ or tele triag$).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
12. (telehealth or tele health).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
13. (healthline or health line).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
14. (call adj5 center).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
15. (call adj5 centre).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
16. (telephone adj5 triag$).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
17. (advice adj5 tele$).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
18. (nurs$ adj5 triag$).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
19. (helpline or help line).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
20. Decision Support Systems, Clinical/
21. decision support software.mp. [mp=title, original title, abstract, name of substance, mesh subject heading]

22. decision support techniques/ and software/
23. (telecare or tele care).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
24. (teleconsult$ or tele consult$).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
25. or/1-2,8-24
26. or/2,8-24
27. Nurses/
28. Nursing Services/
29. exp Nursing Assessment/
30. (nurse or nursing or nurses).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
31. or/27-30
32. exp Diabetes Mellitus/
33. exp Neoplasms/
34. exp Arthritis/
35. exp Osteoporosis/
36. asthma.mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
37. Asthma/
38. exp Cardiovascular Diseases/
39. exp Mental Disorders/
40. Chronic Disease/
41. (chronic adj3 disease).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]
42. or/32-41
43. or/40-41
44. 25 and 31
45. 25 and 31 and 42
46. 26 and 31
47. 26 and 31 and 42
48. 26 and 31 and 43
49. 25 and 31 and 42
50. limit 49 to (human and english language)

OVID Database - CINAHL

File: C:\ . . . \Health Line Support\Search Strategies
Reference Manager 10 Database: Healthline1
Reference Manager Keywords: CINAHL, Healthline11 Strategy
OVID File: healthline11
Date: July 20, 2004

1. Telephone/
2. telehealth/ or telemedicine/ or remote consultation/
3. or/1-2
4. Triage/
5. 3 and 4
6. "Referral and Consultation"/
7. Telephone Information Services/
8. or/1,7
9. 6 and 8
10. Telephone Information Services/
11. Telenursing/
12. (hotline$ or hot line$).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
13. (telenurs$ or tele nurs$).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
14. (teletriag$ or tele triag$).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
15. (telehealth or tele health).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
16. (healthline or health line).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
17. (call adj5 center).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
18. (call adj5 centre).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
19. (telephone adj5 triag$).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
20. (advice adj5 tele$).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
21. (nurs$ adj5 triag$).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
22. (helpline or help line).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
23. Decision Support Systems, Clinical/
24. decision support software.mp. [mp=title, cinahl subject headings, abstract, instrumentation]
25. (telecare or tele care).mp. [mp=title, cinahl subject headings, abstract, instrumentation]

26. (teleconsult$ or tele consult$).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
27. or/5,9-26
28. exp Nurses/
29. Nursing Services/
30. exp Nursing Assessment/
31. (nurse or nursing or nurses).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
32. or/28-31
33. exp Diabetes Mellitus/
34. exp Neoplasms/
35. exp Arthritis/
36. exp Osteoporosis/
37. Asthma/
38. exp Cardiovascular Diseases/
39. exp Mental Disorders/
40. Chronic Disease/
41. (chronic adj3 disease).mp. [mp=title, cinahl subject headings, abstract, instrumentation]
42. or/33-41
43. or/40-41
44. 27 and 32
45. 27 and 32 and 43
46. 27 and 32 and 42
47. limit 46 to english

Updated: August 17,2004
48. "20040716".ew.
49. "20040723".ew.
50. "20040730".ew.
51. "20040806".ew.
52. "20040813".ew.
53. "20040820".ew.
54. or/48-52
55. 47 and 54

OVID Database - EMBASE

File: C:\ . . . \Health Line Support\Search Strategies
Reference Manager Database: Healthline2
Reference Manager Keywords: EMBASE, Healthline12 Strategy
OVID File: healthline12
Date: July 20, 2004

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3. (telenurs$ or tele nurs$).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
4. (teletriag$ or tele triag$).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
5. (telehealth or tele health).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
6. (healthline or health line).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
7. (call adj5 center).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
8. (call adj5 centre).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
9. (telephone adj5 triag$).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
10. (advice adj5 tele$).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
11. (nurs$ adj5 triag$).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
12. (helpline or help line).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
13. decision support system/
14. decision support software.mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
15. (telecare or tele care).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
16. (teleconsult$ or tele consult$).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
17. or/1-16
18. nurse/ or nurse practitioner/
19. exp nursing/
20. (nurse or nursing or nurses).mp. [mp=title, abstract, subject headings, drug trade name, original title, device manufacturer, drug manufacturer name]
21. or/18-20
22. exp Diabetes Mellitus/
23. exp Malignant Neoplastic Disease/

24. exp Arthritis/
25. exp Osteoporosis/
26. exp Asthma/
27. exp Cardiovascular Disease/
28. exp Mental Disease/
29. Chronic Disease/
30. or/22-29
31. 17 and 21
32. 17 and 21 and 30
33. limit 32 to (human and english language)

Updated: August 17, 2004.
34. "200430".em.
35. "200431".em.
36. "200432".em.
37. "200433".em.
38. "200434".em.
39. or/34-37
40. 33 and 39

OVID Database – EBM

File: C:\ . . . \Health Line Support\Search Strategies
Reference Manager Database: Healthline3
Reference Manager Keywords: EMBASE, Healthline13 Strategy
OVID File: healthline13
Date: August 17, 2004

1. telephone$.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
2. hotline$.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
3. triage.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
4. Remote Consultation.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
5. "Referral and Consultation".mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
6. or/3-5
7. or/1-2
8. 6 and 7
9. (hotline$ or hot line$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
10. (telenurs$ or tele nurs$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
11. (teletriag$ or tele triag$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
12. (telehealth or tele health).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
13. (healthline or health line).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
14. (call adj5 center).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
15. (call adj5 centre).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
16. (telephone adj5 triag$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
17. (advice adj5 tele$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
18. (nurs$ adj5 triag$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
19. (helpline or help line).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
20. decision support software.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
21. (telecare or tele care).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
22. (teleconsult$ or tele consult$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
23. or/1-2,8-22
24. (nurse or nursing or nurses).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
25. (cancer or neoplasm$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
26. diabete$.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
27. arthritis.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
28. Osteoporosis.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
29. Asthma.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
30. Cardiovascular Disease$.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
31. (mental disorder$ or mental disease$ or mental illness).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
32. (chronic adj5 disease$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
33. or/25-32
34. 23 and 24
35. 23 and 24 and 33