Telehealth and Electronic Health Record :

A Guide to Sustainability

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Introduction

The *Canadian Health Infostructure Partnerships Program* (CHIPP) is an $80 million, shared-cost incentive program, aimed at supporting collaboration, innovation, and renewal in health care delivery through the use of information and communication technologies (ICTs). There are currently 29 CHIPP-funded model implementation projects across Canada focusing on two strategic areas: telehealth and electronic health records (EHR).

In anticipation of the end of CHIPP funding in March 2004, the objective of this document is to provide guidance to the 29 CHIPP-funded projects in planning for ongoing sustainability. For the purposes of this document sustainability is defined as "those activities and goals which are necessary to ensure the success of the project after the end of the CHIPP contribution".

While considerable time and effort is often spent on the planning and implementation of ICT projects in health, until recently, limited time and resources have been devoted to sustainability. This is reflected in the literature on telehealth and electronic health record projects, where implementation success factors are well documented[1], but little is written about project sustainability following implementation.[2] The lack of focus on sustainability explains, in part, why many ICT projects in health fail or falter after pilot project or grant funding ends.[3] Recognizing this, some funding agencies have begun to require recipients to submit strategic plans addressing sustainability,[4] and projects and health care organizations have initiated strategic planning activities to address the issues associated with sustainability.

Drawing on the best practices associated with the concept of sustainability that can be gleaned from the literature and anecdotal evidence from the authors' experience with long-standing ICT projects in health, this document outlines the key dimensions and common challenges of sustainability, and provides a framework, tools and strategies to assist with the transition from implementation to integration and ongoing operations.

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[1] Yellowlees, P. (1997)

[2] For example, in a keyword search of MEDLINE/PubMed, 4998 references were generated for "telehealth/telemedicine", and 560 references for "Electronic Health Record". When "sustainability" was added to the search only 10 telehealth/telemedicine references were generated and no electronic health record references were found.

[3] Alverson, D (2002)

[4] Office for the Advancement of Telehealth, Strategic Plan for Telemedicine Programs: Guidelines for the Submission of the Telemedicine Strategic/Financial Planning Documents for the class of 2000 grantees http://telehealth.hrsa.gov/pubs/stratplan-guidelines.htm

Key Dimensions of Sustainability

In order to be effective sustainability planning and activities need to occur at both the project level and local participant site/partner level.[5]   Each of the dimensions discussed below should be considered from both perspectives to ensure that there is the broad level commitment, activity and integration across the project necessary for true sustainability.   There should be an overall sustainability plan and framework for the project as well as individual participant site/partner plans that identify how the ongoing objectives of the project can benefit and be supported by the partners.   Governance and leadership structures will also need to be in place to ensure that the plans are executed and monitored over time.

The first step in sustainability planning is establishing a Sustainability Planning Committee, or similar structure, to provide direction and leadership to sustainability planning activities and to ensure key stakeholders remain involved and supportive of the project beyond implementation.   In most cases the Sustainability Planning Committee will be an existing project Advisory Board, Steering Committee, or Sub-Committee.   However there may be a need to create a distinct Planning Committee if there is not an appropriate structure already in place, or the existing Committee structure is too cumbersome for sustainability planning purposes.   All of the existing project partners should be represented and the Committee membership should consist of executive, clinical, technical, and operational leaders.   In addition, there may be some benefit to implementing rotating membership so that new ideas and perspectives are considered as part of the sustainability planning process.   A core project sustainability team, reporting to the Committee, should be established to coordinate planning activities, collect and analyse information, develop sustainability models, and execute the sustainability plan.   Internal partner/participant sustainability teams should also be established to support the overall project sustainability activities as well as to determine what measures will need to be in place to foster sustainability within each partner/participant organization.

The key dimensions of sustainability planning include:

- Validating the mission and vision and determining future direction
- Capturing and Communicating the Benefits
- Transitioning leadership and governance structures
- Increasing adoption and usage by focusing on clinical needs
- Defining human resource requirements and developing a Human Resources Plan
- Defining technical requirements and developing a Technical Development Plan
- Defining funding requirements and developing a Funding Strategy
- Identifying and Addressing Interoperability Issues
- Identifying and Addressing Policy, Legislation, and Regulatory Issues

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[5] Yellowlees, P. (1997); Office for the Advancement of Telehealth (2000); Australian New Zealand Telehealth Committee (2000)

Each of these elements should be addressed as part of the sustainability planning process with options and recommendations documented in the Sustainability Plan. Once agreement has been reached among the project partners/sites, a transition plan should be developed outlining the roles and responsibilities of each partner/site and tasks and timelines associated with executing the Sustainability Plan. There should also be formal documentation of the sustainability agreement among the project partner/sites in the form of a letter of commitment, contract or other legal agreement endorsed by each organization's CEO or other signing officer.

Validating the Mission and Vision and Determining Future Direction

Sustainable projects have a clear vision, mission and goals driven by health care needs and participant mandates and values. The mission, vision and goals of the project should be used consistently to guide internal decision-making and external promotion. The mission and vision provides a framework to identify strategic activities and to make decisions about resource allocation. Only those activities that contribute to the stated mission, goals and values should be pursued, ensuring that limited project resources are efficiently managed.[6]

Because telehealth and electronic health record projects are implemented in environments that do not remain static, it is important to revisit the objectives of the project throughout implementation and at regular intervals following. It is not uncommon for ICT projects in health to start out with a specified objective or mandate only to find during or after implementation that it isn't feasible, or the environment and/or needs have changed.[7] In many cases, the initial project is a pilot project and sustainability depends on analyzing what lessons have been learned and identifying how the project can evolve to the next phase. It is important to identify what areas may be strategic to the evolution and future sustainability of the project and assess how this impacts the mission, vision, and goals over the short and long-term. The mission and vision should be forward-thinking, reflecting how the project will evolve over the next 3-5 years.

Using lessons learned from the project to date, evaluation data, partner/site specific information, the initial project proposal or plan, and other relevant project information, the mission, vision, and goals of the project should be revisited to determine what elements of the project need to be maintained, what new elements need to be introduced following the project funding end date, and what issues need to be addressed to sustain the project outcomes. Projects should also conduct an external review of similar initiatives in their region, nationally and internationally to determine whether there are opportunities for collaboration and alliance. Once the mission and vision have been revised or reaffirmed it should be used as a framework and criteria to guide sustainability planning activities and assess options.

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[6] O'Malley, G. & Liebow, E. (2002)

[7] Watcher, G. (2001)

Capturing and Communicating the Benefits

Capturing and communicating the benefits of telehealth and electronic health records projects through benchmarking and evaluation is key to sustainability for a number of reasons: (1) it provides evidence to funding agencies, executive leadership, health care providers, patients and the community to justify ongoing support of the project; (2) it provides valuable information to inform decision-making; and (3) it contributes to the adoption of telehealth and electronic health records initiatives into mainstream health care practice. This third reason is especially relevant in the telehealth context where the lack of clinical, operational, and technical guidelines and standards have been a significant barrier to the routine use of telehealth. [8]

There are two elements that will need to be considered: (1) Evaluation and benchmarking of project outcomes; and (2) Ongoing communication of project results, progress and benefits. The outcome measures and evaluation methodology developed for implementation of the project should be assessed against the revised vision and goals to determine what elements of evaluation must be sustained and to identify any gaps in data collection and analysis. For example, integration with another project may be a sustainability goal, but may not have been identified as an outcome measure for project implementation. Conversely, technical feasibility may have been an outcome measure for implementation, but once proven, would not need to be measured on an ongoing basis. These kinds of changes will need to be reflected in the evaluation plan. As well, data collection methods may have to be changed in light of sustainability goals. For example, during implementation of a project there tends to be a higher tolerance for routinely completing evaluation forms or surveys as part of project activities. However this method of data collection may be too cumbersome in the context of ongoing operations and pose a barrier to sustainability by increasing workload and complicating process. A review of existing data collection, evaluation, Continuous Quality Improvement, and Benchmarking initiatives within the partner organizations should be conducted to determine where economies of scale and effort can be realized.

The project outcomes, progress and benefits need to be disseminated and communicated on an ongoing basis to ensure that support remains high and that participants have the information required to perform day to day functions. Each project and partner / site will need to develop a sustainability communications plan that details the following:

- Communication objectives (e.g. inform decision making, promote project, maintain/increase support, etc.)
- Key information and messages to be communicated
- Target audiences and what information each group requires
- Vehicles and methods for communicating information
- Timing and frequency of communication
- Roles and responsibilities for the capture, management and dissemination of information

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[8] Loane, M. & Wooton, R (2002).

- Costs associated with communication activities

While there are many different communication strategies employed by projects the key to success is frequent and consistent, two-way communication using vehicles that are effective for each target group. Examples of common mechanisms for sharing and disseminating project information include:

- Project, partner organization, or related agency websites
- Press releases and media events
- Town hall meetings and project awareness sessions
- Newsletters and regular status updates
- Committee and executive meetings
- Presentations and participation at local, regional, national and international conferences and forums
- E-mail broadcasts
- Transaction logs and help-desk reports
- Quarterly or annual reports
- Brochures and project documentation
- Internet forums and subscriber groups
- CME, CNE and other educational events
- Open house events
- Suggestions and comment boxes (electronic or paper)
- Orientation sessions
- Focus groups and retreats

Transitioning Project Leadership and Governance Structures

A critical factor in sustainable telehealth and electronic health record projects is developing and maintaining effective leadership and governance structures. In most cases, governance structures need to be distributed enough to be responsive to site or community specific needs, yet provide some level of coordination to ensure overall project objectives are met, knowledge is shared, and economies of scale are realized where possible.[9] The most successful leadership and governance models share common elements:

- Strong executive support and representation from all partners (e.g. government, health care organizations, community, etc.);
- A strong leadership role for clinicians, and specifically physicians;

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[9] An illustrative and useful citation of the importance of leadership is contained in Telehealth Projects - A Practical Guide, British Columbia Ministry of Health Planning and Ministry of Health Services, August 2001.
(http://www.healthservices.gov.bc.ca/bctelehealth/pdf/practicalguide.pdf)

- An oversight function which ensures participation in decision-making and representation from the various diverse partners required to make the project a success;
- Integration with existing organizational structures and functions;
- An ability to demonstrate the successes of the project; and
- A clear mandate and purpose.

Based on the mission and vision, the existing governance and leadership structures should be evaluated to determine whether or not a change is needed to meet sustainability objectives. Some of the factors that would necessitate change include:

- A need to add new stakeholders or partners that were not included during the implementation of the project, but who will play a strategic role in the sustainability of the project. This could be at an organizational level or an individual level. For example, interoperability with another network requires structuring a relationship at the organizational level with the other network, while expanding an application developed for diabetes management to another disease state such as cardiac problems requires cardiac management expertise be added to the project team.
- Existing structures are ineffective or too cumbersome
- A need to integrate operations with another project or projects
- A change in the level and nature of commitment to the project by one or more stakeholders / partners.

Deciding on a particular model will depend on what structures currently exist, what resources are available (human and financial), and the focus and scope of the project. There are a number of options that can be considered. Generic examples are described in the table below along with the benefits and limitations associated with each.[10]

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[10] A more specific example of sustainability governance is provided by Kevin MacNeill of the Arizona Telemedicine Program in the presentation *The Membership Model – One Approach to Sustainability*
http://aztel.radiology.arizona.edu/lectures/hesca2002/Membership%20Model%20-%20Winnipeg%20-%20Thurs.ppt

Table 1: Governance Models

Model	Description	Benefits	Limitations
Decentralized Governance	Each partner independently determines their own governance model, strategic direction, and what project elements need to be sustained. Each assumes responsibility for providing the necessary human, financial, and technical resources to sustain the project within their organization.	o High level of integration within partner organizations o High level of partner/participant ownership o Responsive to individual community and partner needs o No central administration and staffing costs	o Limited economies of scale and group purchasing / negotiating power o Little or no standardization between partners may limit interoperability o Little or no shared knowledge may lead to unnecessary duplication and varying levels of success
Distributed Governance	Partners/participants are organized in regional or other logical groupings that function as the main decision-making body. Each group determines strategic direction and project scope. Resources are usually shared and distributed within the group to support project objectives.	o Economies of scale and shared knowledge within groupings o Responsive to regional/group needs o High level of regional/group integration and ownership o Sustainability costs shared	o Less responsive to local community needs o Lack of standardization between regions/groups may inhibit interoperability
Shared or Partnership Governance	The Project Partners function as a central decision-making body with some staff in a central location and some distributed to other locations. There is usually a shared budget to support project staff and activities.	o Economies of scale and knowledge sharing among the project partners o Dedicated staffing to support project objectives o Sustainability costs shared among partners	o Less responsive to individual partner/participant needs o Decision-making function more complex

Model	Description	Benefits	Limitations
Centralized Governance	A designated central body (e.g. Ministry of Health) determines strategic direction and provides the resources necessary to sustain the project. There is usually dedicated core support staff located within the organization.	o Economies of scale and knowledge sharing across project o High level of standardization and interoperability o Simplified management and decision-making	o Limited partner and community ownership o More difficult to achieve high level of integration with existing structures and processes o Potential disconnect between local and central needs and goals o Cost of sustaining project responsibility of single organization / entity

Increasing Adoption and Usage by Maintaining the Focus on Clinical Needs

The role of clinical champions in the successful implementation of telehealth and electronic health records projects is oft cited and well documented in the literature. There is clear evidence to support the notion that a strong clinical champion can drive adoption and utilization of a particular telehealth or electronic health records application within an organization.[11] However, sustainability of telehealth and electronic health record projects beyond the implementation stage requires broad-based clinical support and a critical mass of adopters. Relying too heavily on early adopters and limited clinical champions makes sustainability vulnerable to the turn-over and loss of those champions.[12] Sustainability efforts need to focus on retaining, maintaining, and leveraging the initial enthusiasm of the early clinical champions, while at the same time engaging other clinical opinion leaders and staff to create the necessary depth of support for the project within the organization, or organizations involved. Increasing adoption and usage will require expanding the initial focus to other clinical areas and/or jurisdictions.

The key to engaging clinical staff at all levels and promoting buy-in is to ensure that clinical needs are the primary focus. Clinical information and understanding must inform decision-making and on-going activities should focus on the areas of greatest clinical need that have the highest impact on the health care process and outcomes for the population being served.[13] To ensure this happens:

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[11] Medical Records Institute Survey (2002)

[12] Alverson, D. (2002)

[13] Alverson, D. (2002); Smith, D. & Mancini Newell, L. (2002)

- Clinical leadership should be a core part of governance and organizational structures;
- New clinical needs that may be met through the use of the technology should be identified;
- New applications should be developed based on clinical needs and strategic priorities (this can be done by leveraging existing technology infrastructure or through research and development); and
- Clinical, technical, and operational interoperability issues should be addressed to facilitate integration with existing and new systems and initiatives.

Common clinical factors that drive the need for EHR systems include:[14]

- Improve the ability to share patient record information among health care practitioners and professionals within the enterprise
- Improve quality of care
- Improve clinical processes or workflow efficiency
- Improve clinical data capture
- Reduce medical errors (improve patient safety)
- Provide access to patient records at remote locations
- Facilitate clinical decision support
- Improve employee/physician satisfaction
- Improve patient satisfaction
- Improve efficiency via pre-visit health assessments and post-visit patient education
- Support and integrate patient healthcare information from web-based personal health records

Common clinical factors that drive the need for telehealth include:

- Improve access to health care education and services in rural and remote communities
- Improve patient care management through education, transfer of skills, and improved communication among health care providers
- Support retention and recruitment of health care providers in rural and remote communities
- Decrease travel for clinicians and patients

As part of sustainability planning, current and future clinical needs should be assessed at a project and participant/site level by examining referral patterns and volumes to identify gaps in clinical capacity and/or care, conducting focus groups and meetings, and reviewing project evaluation data and other relevant documentation. The needs identified should be prioritized based on urgency and scope as well as fit with the stated mission and goals. Once the clinical needs are prioritized, the next step is to identify what elements of the clinical infrastructure need to be maintained or developed to meet those needs, actual and anticipated benefits, associated costs/savings, and existing and potential funding sources.

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[14] Medical Records Institute (2002)

Developing strategies for engaging clinical staff should also be considered as part of the sustainability planning process. Examples of successful strategies for engaging and supporting clinical staff include:

- Technical support and training – Ensure that technical supports are in place to enable the technology to interface seamlessly in to the process of care and resolve issues in a timely manner. As well, provide flexible training in a variety of formats for new users, and when technology is upgraded or changed (For example, a successful strategy employed by an electronic health record project was to train health records staff to provide training to clinicians. As the health records department was staffed 24 x 7, training could be provided as required, when required).

- Communication – Utilize clinical champions to maintain a high project profile through peer to peer communication at existing clinical forums such as Medical Advisory Committees, CME and CNE events, Departmental Meetings, Rounds, etc.

- Workflow and technology improvement – In general, clinicians have two primary concerns, patient care and time. The most successful clinical applications are those that enable the clinician to spend more time with patients and deliver enhanced care. However, many ICT projects in health do not deliver on this promise and fail to increase productivity and decrease clinician workload.[15] In fact, the reverse is often true. The reasons for this include: (1) the technology requires users to enter more information than was previously necessary; (2) the new technology is not well integrated with clinical work and information flow; and (3) the technology is limited in its ability to emulate the clinical process. Sustainability requires that there be a sustained effort around workflow redesign and technology development to ensure that clinical needs are met. This can be accomplished in a number of ways: by integrating project activities with existing Continuous Quality Improvement (CQI) initiatives within the organization(s); documenting and monitoring workflow and technology issues and assigning responsibility for process improvement and technology development to dedicated staff; and ensuring clinical leadership and representation in operational and technical forums.

Defining Human Resource Requirements and Developing a Human Resources Plan

Human resource limitations are a significant risk to the ongoing sustainability of any ICT project in health. Loss of key resources and skill sets due to staff turnover, lack of funding, and burnout are one of the primary causes of project failure following implementation. An

[15] Fontaine et al (2000)

adequate human resources plan needs to be in place to mitigate the risk.[16] The human resources plan should address: (1) organizational structure; (2) job functions; (3) resource requirements; (4) recruitment; (5) retention; and (6) succession.

During implementation of a project an organizational structure is usually developed and discreet positions are created and paid for out of project funds. Most of these project organizational models are not sustainable following the end of project funding, however some of the functions performed by the positions created need to be maintained beyond implementation so that the project outcomes can be sustained over time. For example, in the telehealth environment, the literature identifies the Site Coordinator role as key to utilization and development of telehealth within organizations.[17] To the extent that it is possible, the ongoing commitment of the partner institution(s) to the project should include funding for at least some of the roles created as part of the project after implementation.

As part of validating the vision and mission, key elements of the project that must be sustained are identified. Using this as a framework, the first step in developing the human resources plan is to identify what job functions must be maintained or created to sustain the project.

Typical functions that must be maintained for sustainability include:

- Coordinate and manage project partners;
- Coordinate and manage project activities on a day to day basis (project and site level);
- Provide health services and information using the technology;
- Schedule project activities;
- Support technology integration by monitoring workflow and process. This includes working with clinicians to develop and revise processes as required;
- Respond to inquiries about the project;
- Ensure new users are adequately trained and training is provided when technology is changed or upgraded;
- Identify new clinical needs that may be met through the use of technology;
- Develop new applications based on clinical needs and strategic priorities, this may include technical infrastructure upgrades or development;
- Integrate with other systems and projects – address technical, clinical and operational interoperability issues;
- Conduct awareness and promotional activities;
- Regularly check and maintain/replace equipment and/or systems to ensure optimal functioning;

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[16] A useful human resources planning checklist is available at:
http://www.horizonmg.com/health.htm

[17] Campbell, T. Martel, R.F. (1999)

- Maintain transaction logs and equipment and/or system repair and maintenance records;
- Maintain security of equipment and/or system;
- Track, document and respond in a timely manner to user issues and problems;
- Monitor and revise policies and procedures (e.g. consent, privacy and confidentiality, etc.);
- Develop budgets and track and report expenditures; and
- Gather essential data for ongoing evaluation and strategic planning purposes.

Once the key functions have been identified and agreed upon, resource requirements and organizational models will need to be developed to support the various functions. The models developed will depend largely on the sustainability governance and leadership model identified, existing structures, and the resources available. Each model proposed should include an organizational chart, location of resources, job descriptions (job responsibilities, skills and qualifications), performance measures and requirements for each role, FTE requirements and compensation (salary, benefits, and incentives) for each role, overhead costs, contract requirements, funding sources for each position and total projected cost annually over 3-5 years. It is often a useful decision-making exercise to create and cost out an ideal model, with all of the desired elements, and a baseline model, representing the minimum requirements.

After the job functions to be sustained and the supporting organizational models are identified, resource capacity within partner institutions will need to be verified to determine if additional resources and skill sets are needed. A human resources "inventory" should be created identifying what individual skills and knowledge required to meet project objectives reside within the organization(s), what skills and knowledge are lacking, and the current capacity of resources to meet existing and future needs.

For identified gaps a recruitment strategy should be developed. Most healthcare organizations with a Human Resources department have existing recruitment and retention policies. These should be reviewed as a starting point so that the strategy developed is consistent with existing policies. The recruitment element of the human resource plan should outline the following:

- Identification of a search committee and description of roles and responsibilities
- A list of positions to be filled, associated job descriptions, and a profile of the "ideal candidate" for each position
- Identification of the target audience and how they will be reached (e.g. professional association web-sites, internal and external professional networks, placement agencies, advertisement in various media, etc.). In most cases the positions should be posted both internally and externally to ensure an adequate pool of candidates with the necessary skills.
- Description of the marketing strategy for each position - What would motivate a candidate to apply and how will these factors be communicated and addressed? (e.g. Salary, working environment, learning opportunities, benefits, etc.)

- Tasks and timelines associated with the search process
- Detailed description of the costs for recruitment activities

Recruitment and retention of human resources is an ongoing challenge in the healthcare environment as rates of unemployment are low, demand is high, and shortages are commonplace, especially in rural and remote communities.[18] One recruitment strategy that should be considered is formalizing links with higher educations institutions. Through residency and training program opportunities, projects can ensure a steady supply of individuals with necessary skill sets, identify and evaluate potential job candidates, and inform the education process to ensure that the skills acquired by students are relevant to the needs of the working environment.

While a recruitment plan will be required to address unmet resource needs, the primary focus should be on retention and succession planning wherever possible. Recruitment can be very costly in terms of both time and money and is no guarantee of a stable workforce if the underlying issues leading to high staff turnover and dissatisfaction are not addressed.[19] Although competitive wages, salaries and benefits are crucial, a good working environment is the most important factor. Aside from a reasonable salary, staff must be certain of job security, effective leadership, challenging and meaningful work, ongoing recognition and rewards, and a work environment that enhances each employee's quality of life in the workplace.[20] If the working environment is poor, and/or the sustainability of the project in question, personnel will begin to consider other opportunities. As core staff leave, a domino effect is created that exacerbates the problem of retention and further jeopardizes the sustainability of the project.

For ICT projects in health particular focus should be paid to the issue of job satisfaction and burn-out. In smaller organizations, project staff may be "one-of" resources who assume project responsibilities in addition to their existing full-time or part-time job. The sense of isolation and "having to do it all" that often results can contribute to burn-out and the loss of these key resources. Successful strategies to address this include:

- Using the technology to develop knowledge sharing and support networks among resources across organizations with similar job functions (e.g. email and internet forums, regular videoconferencing meetings or workshops, etc.)
- Supporting participation in regional and national telehealth and electronic health record groups and associations (e.g. the Canadian Society of Telehealth (CST), Healthcare Information and Management Systems Society (HIMSS), etc.)[21]

[18] Canadian Institute for Health Information (2001)

[19] London, M. (2002).

[20] Roederer, C. (2001).

[21] A list of relevant web-sites is provided in Appendix C.

- Sponsoring annual workshops or meetings that provide resources with the opportunity to network with peers and share knowledge and experiences.
- Identifying and training back-up personnel to allow for vacation, leave, and a shared call schedule (where required).

To secure those resources already engaged in the project, a retention strategy should be developed that addresses the following elements:

- Benefits and compensation – e.g. salary, vacation, leave, insurance benefits, etc.
- Rewards and recognition – e.g. employee recognition programs, incentives and bonuses, pay increases linked to job performance and skills development, etc.
- Formal and informal performance management and review mechanisms – e.g. regular meetings to assess goals and performance, annual performance reviews, deliverable reviews, etc.
- Work/life management – e.g. flexible working hours, call schedule, time off for caregiving responsibilities, etc.
- Training and development opportunities – e.g. individual training plans for each resource based on learning needs and job requirements, education allowances, participation in conferences and workshops, project assignments, coaching, time and/or monetary allowances for university and professional courses, etc.

As with recruitment planning, existing organizational policies will need to be reviewed to ensure the strategy adopted is consistent with existing policy. Budgetary limitations and organizational environment will also need to be factored in to the planning process. For example, options may differ in a unionized as opposed to a non-unionized working environment.

Finally, succession planning should be included as part of the human resources plan to mitigate the issues associated with staff turnover and transition. [22] Back-ups for each key resource should be identified and trained to ensure that there is resource redundancy and potential growth opportunities for promising individuals. Knowledge management in the form of project documentation, orientation and training manuals, a common filing system and electronic project file directories, policy and procedure manuals, contact databases, etc should also be considered as part of succession planning so that essential project knowledge does not reside solely with individuals, but is a shared resource.

Defining Technical Requirements and Creating a Technical Development Plan

The technical requirements for telehealth and electronic health records projects generally consist of a number of common elements: (1) Hardware (e.g. computers, switches, videoconferencing units); (2) Software (e.g. applications that allow for the capture of information and images, applications that enable the processing and analysis of information);

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[22] Useful succession planning tools and templates can be found at
http://www.multcolib.org/train/mentor/

(3) Network infrastructure (e.g. servers, telecommunications connections, firewalls); (4) Technical support (e.g. help-desk, equipment maintenance, repair and replacement); and (5) Training (e.g. training sessions, users manuals).

Sustainability requires that all of these elements be maintained following project implementation, and that the technical infrastructure continues to evolve to meet clinical needs.[23] Technical sustainability planning should start with an inventory of the existing resources (both human and technical) required to sustain the technical infrastructure for the project. Once the inventory is completed the costs associated with each element, including operating and maintenance/replacement costs for the next 3-5 years need to be calculated. Based on the strategic objectives identified earlier in the sustainability planning process, the next step is to identify what elements of the vision can be achieved by leveraging the existing infrastructure, and what elements require additional development (increased capacity, integration, or new technology). For those elements requiring additional development, a development business case should be drafted identifying the rationale, the strategic benefits that will be derived from the development activity, and the associated costs.

Defining Funding Requirements and Developing a Funding Strategy

Inadequate planning for the end of project funding is a key reason for project failure post-implementation. In order to identify the funding requirements for the project over the next 3-5 years, the costs and benefits associated with sustaining the project will need to be identified and calculated. In most cases, the end of project funding results in a significant shortfall that can be addressed in any number of ways. For example:

- Scaling back operations;
- Transitioning the project to a program and integrating with existing operations and funding mechanisms;
- Integrating operations with projects, programs, or organizations that are funded, securing additional funds, etc.

Developing a sustainable funding strategy requires that current and potential funding sources be identified for each element being sustained. It is not uncommon for different elements of the project to be funded in different ways. For example, clinical services and infrastructure are usually funded by a combination of government funding (fee for service), facility or partner organizational operating funds and alternative funding/sessional fees. Technical research and development however, is usually funded through foundation or grant funding. Common funding/revenue sources include:

- Government funding/support
- Facility or partner organization operating funds
- Other grant funding
- Alternative funding/payment for end-users
- Community or charitable donations
- Private/Public partnerships
- In-Kind contributions

[23] Fontaine et al (2000)

- Network membership fees
- Third-party fees for network use
- Subsidization from other revenue generating projects or initiatives
- Hardware or software commercialization and sales (unique products developed for project)

Projects should not rely heavily on grant funding as part of their sustainability funding strategy, but limit dependence on grant funding to expansion and development efforts. Sustainability should be demonstrated through the clear recognition of the current and anticipated future benefits and costs of the project and the commitment of the individual partners and/or sites to use reasonable efforts to maintain their projects and bear the identified and/or reasonably anticipated costs.

In defining funding requirements and developing a funding strategy it is important to not only consider costs, financial projections, and funding sources but also what financial functions need to be maintained. Functions to be considered include:

- Monitoring and seeking funding sources
- Developing and monitoring of operating and capital budgets
- Financial reporting
- Developing and maintaining partnership agreements, MOUs, contracts, etc.

These functions may be distributed among partners or centralized within one organization depending on the governance model and organizational model employed. In determining what functions will be maintained there are a number of key decisions that will need to be made:

- Funds will reside under what entity(ies)?
- Who will be responsible for financial functions?
- Who will finance report to i.e. who will endorse/approve annual budget?
- What will be the process for transfer of funds (from central body to facilities or organizations or from member organizations to central entity) for specific activities such as training, technical support, technology upgrades, staffing, etc?
- What will be the partnership funding model? (Identify appropriate model for partner contributions based on number of sites, utilization, or other factors)
- How will funding carryover be managed?
- How will financial reporting from multiple partners be managed?
- What will be the process for procurement and purchasing?
- Who will provide administrative support for the finance function, and what administrative support will be provided?

These decisions should be documented in the sustainability plan and addressed in any agreements among the partners to ensure that there is a common understanding of financial roles and responsibilities and procedures following implementation.

A financial analysis of the project should be conducted to define current and projected expenses (including capital and operating costs and potential network fees) over the next 3-5 years, benefits, cost savings and current and projected sources of funding. Utilizing the information generated at the site and project level in the other sustainability planning categories, the financial projections should include best-case, expected case, and worst case

scenarios, based upon a mix of alternative assumptions relating to growth and use of the system/network, the cost of operation and anticipated costs savings, benefits and sources of revenue and other receipts.

Costs are divided into two categories: (1) recurring (ongoing) costs; and (2) non-recurring (one-time or start-up) costs. Both recurring and non-recurring costs may be further subdivided into fixed costs and variable costs (those costs that change depending on the number of users and overall utilization).

Typical costs (current and future) to be considered include:

Recurring Costs:

- Personnel Salaries & Benefits, recruitment and training costs
    - Management team and regional/facility staff – clinical, operational, technical
- End-user reimbursement (if no fee-for-service plan in place)
- Telecommunications costs (fixed and variable)
- Hardware maintenance, upgrade and replacement
- Software licenses, maintenance and upgrades
- Ongoing training
- Technical Support
- Supplies and Miscellaneous Costs
- Marketing
- Travel

Non-Recurring Costs:

- Additional Staff or Consulting Fees for specific project/program enhancements
- Hardware, Software or Network Purchases – new equipment or infrastructure
- Training on new equipment or applications
- Product commercialization (unique products developed for project)

In addition to costs, benefits, both tangible (potential cost recovery) and intangible should be calculated and/or identified. Examples of common tangible benefits are provided below.

Telehealth tangible benefits:

- Travel costs savings for healthcare professionals
- Saved value of staff time
- Reduced FTE requirements
- Reduced bed stays
- Reduced costs associated with earlier patient repatriation
- Other administrative savings
- Additional indirect revenues retained in facility and community

Electronic Health Record tangible benefits

- Reduced costs of recordkeeping
- Saved value of staff time (record and data access, duplication, reporting, etc.)
- Reduced FTE requirements
- Other administrative savings (paper use, physical space)

To develop a successful funding strategy, projects will need to understand the objectives of each current or potential funding source and identify how the project will realize those objectives. A grid should be created that details the source of funding, what elements will be funded by that source, the objectives of the funding source, how the project will address those objectives and any evidence from the implementation phase that demonstrates how the objective has been or will be met, and what action is required to secure that source of funding. Depending on the source, securing funding could entail negotiating a letter of commitment, submitting a proposal or business case, developing a marketing plan and infrastructure to support cost recovery or revenue activities, negotiating a partnership agreement with public or private entities, or another project, or reallocating existing funds.[24]

Identifying and Addressing Interoperability Issues

The primary purpose of telehealth and electronic health records projects is to enable communication and the sharing of information over distances, creating expectations among users that they will be able to connect with the systems, organizations, and individuals they need to, when they need to. The early enthusiasm that accompanies the implementation of telehealth and electronic health records projects can quickly fade if users are unable to access essential services or information from systems and jurisdictions outside of the initial project scope because of clinical, technical, or operational interoperability issues. These issues can be internal to the organization and/or partners (e.g. a proprietary laboratory information management system that is incompatible with the electronic patient record system implemented, or existing ISDN-based videoconferencing systems that are unable to communicate with newly implemented IP-based videoconferencing systems), or external (electronic health records can't be shared between two jurisdictions because the unique patient identifiers are different or there is potential for different patients to have the same identifier). As the technologies begin to evolve to open standards, many of the technical interoperability issues will be resolved, however the clinical and operational barriers created between organizations and jurisdictions may take longer to resolve as it requires negotiating new relationships and reaching consensus on new ways of doing things.

While there are a number of organizations and initiatives in Canada addressing telehealth and electronic health record interoperability issues and standards,[25] this work is in the preliminary stages. In the interim projects will need to identify a process and strategy for addressing issues as they arise. As part of the sustainability planning process it is important to identify

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[24] Useful resources for developing business plans and proposals are provided at Bplans.com http://www.bplans.com/dp/ and Plan Ware http://www.planware.org/index.html

[25] The Canadian Society of Telehealth conducted a National Telehealth Interoperability Workshop in February 2001. A copy of the report is available at www.cst-sct.org. The National Initiatives for Telehealth (NIFTE) Guidelines Project is currently working on a framework for the development of National Telehealth Guidelines. The Advisory Council on Health Infostructure (ACHI) http://www.hc-sc.gc.ca/ohih-bsi/chics/achi_fpt_ccis_e.html commissioned a white paper on electronic health record interoperability and is working on policy and program issues that will have an impact on electronic health record implementation.

what systems and organizations outside of the project scope will be essential to the future growth and development of the project, what issues will need to be resolved in order to make interoperability possible, and what actions need to be taken to resolve or mitigate the issues. Clinical, technical, and operational interoperability committees should be established with representatives from the organizations involved to assess and monitor interoperability issues and provide recommendations to the Sustainability Planning Committee.

Identifying and Addressing Policy, Legislation, and Regulatory Issues

The political and legislative and regulatory environment can have a significant impact on project sustainability. For example in jurisdictions where there is no physician reimbursement scheme for telehealth services, projects must identify alternative means of compensation for services or focus on delivering services that do not require physician payment (e.g. allied health services, CME, etc.). [26] In the electronic health record environment, changes in privacy and policy, and health information legislation can mean that technology has to be adapted or changed to comply with the new legislation. For this reason, sustainability planning should include an assessment of the existing or potential policy, legislation, and regulatory issues and their impact on project sustainability. Any issues identified should be incorporated in to the sustainability planning process and mitigation strategies developed. Some common strategies to consider include:

- Including government or association representatives on Steering Committees, Advisory Committees and other project groups to ensure the project is informed of new developments and that policy making bodies are aware of the project
- Assigning responsibility for monitoring and analyzing policy and legislation to a member of the project team so that changes can be addressed proactively
- Participating in working groups, committees and agencies that inform ICT policy at the provincial and national level
- Forming partnerships and alliances with similar projects and initiatives to lobby government for policy and legislative change
- Delaying implementation of initiatives and program elements that are negatively impacted by the current envi ronment (e.g. where there is no reimbursement for physicians, focus on developing programs and project elements that are not physician-dependent, or do not require reimbursement such as rehab or lab services and CME)
- Mobilizing community support for change through media and awareness campaigns

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[26] The reimbursement schema is Canada is constantly evolving. A useful reference document is Fee-for Service Reimbursement for Telehealth Across Canada1999/2000 http://www.rohcg.on.ca/tao/docs/reimburse.pdf

Sustainability Framework and Checklist

The following table outlines a suggested sustainability planning process and activities. Additional sustainability planning tools and resources are provided in the Appendices.

Activity	Lead	Deadline
Confirm the desire to sustain the initiative and/or willingness to explore what is required for sustainability		
Establish a Sustainability Planning Committee: • Have each of the member/partner organizations appoint a representative (and alternate). • Members should be at an appropriate level in an organization to adequately represent the members' leadership and they should be subject matter experts in the areas of sustainability discussed • Identify need for participation of outside organizations – consultants, government, regulatory bodies, etc. • Develop terms of reference for the Committee and determine process for final approval of the Sustainability Plan Establish a Sustainability Planning Team: • Identify a core group of clinical, technical, operational and administrative resources to coordinate planning activities, collect and analyse information, and develop the sustainability plan • In addition to the core team, each partner organization should establish a small internal team to support the overall sustainability activities as well as determine what measures need to be in place to foster sustainability within their organization. • Define scope of activities for team		
Conduct a detailed project inventory to identify a baseline for sustainability. This should include a critical evaluation of the following: • technologies deployed • operational infrastructure established • utilization and acceptance • evaluation results to date • business agreements and partnerships • governance and reporting structure • funding and budgeting mechanism • summary of successes/failures and lessons learned		
Identify areas for improvement and elements that are strategic to the sustainability of the project not included in the original scope. Revisit the Project Vision, Mission, and Goals and revise as required		

Activity	Lead	Deadline

Conduct focus groups with key stakeholders and content experts to validate the project Vision, Mission and Goals and elements to be considered in developing the sustainability plan:
  ▪ Determine areas of consensus, areas of dissent, and outstanding issues to be considered
  ▪ Establish clarity on what it is that must be sustained
  ▪ Consider both the practical and visionary
  ▪ Address all the critical dimensions of sustainability
  ▪ Prioritize "wish lists"
  ▪ Maintain a focus on utilization, integration, and clinical outcomes, not just costs and funding
 	
Using the information gathered from the focus groups conduct a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis and identify risk management strategies		

Create different sustainability scenarios and options addressing each of the key elements and test on paper:
  ▪ Mission, Vision and Future Direction
  ▪ Clinical Needs and Objectives
  ▪ Leadership and Governance
  ▪ Human Resources and Operational Infrastructure
  ▪ Technology and Network Infrastructure
  ▪ Business and Finance
  ▪ Cost-Benefit Projections
  ▪ Evaluation and Communications
  ▪ Integration and Interoperability
  ▪ Legislation and Policy		

Activity	Lead	Deadline

Synthesize the scenarios into an overall best case scenario, mid-case scenario, and worst case scenario and generate costing models for each.
  ▪ Best case scenario – e.g. (ample or generous funding, potential revenue generating activities and good cost recovery); growing network, expanding applications, and dedicated staff.
  ▪ Create mid case scenario – e.g. (limited funding, limited cost recovery); some network/program enhancements; and limited dedicated staffing.
  ▪ Create worst case scenario – e.g. (no external funding); maintaining infrastructure, equipment, and tech support but no program or application evolution/growth; and no dedicated staffing.
 	
The level of commitment from partner organizations, sources of external funding (MOH, grants, revenue from network use by others, etc.), evaluation results, and public/provider demand will determine the model ultimately but project should be prepared for all three outcomes		

Create Sustainability Plan (Sample Outline Provided in Appendix A):
  ▪ Document scenarios and options
  ▪ Develop recommendations and suggested business relationships to satisfy the clinical needs identified
  ▪ Develop templates for MOUs, and other business agreements including vendor contracts
  ▪ Identify revenue sources and identify committee members that can proactively seek their support		

Present the draft Sustainability Plan to the Sustainability Planning Committee for discussion		
Revise the Sustainability Plan and prior to sign-off on the plan conduct a final environmental scan to determine funding sources, identify outstanding legislative/policy barriers, reassess utilization and results to date, and response to implementation strategies (communications, change management, etc.)		
Obtain Sign-off on Sustainability Plan from the Sustainability Planning Committee		

Activity	Lead	Deadline
Develop and execute communications plan to "sell" the sustainability plan to project participants ▪ E.g. presentations, sustainability forums, written materials, etc.		
Obtain Letters of Commitment from partner facilities or organizations ▪ Affirm commitment to strategic/financial plan as outlined and to sustainability of project within each organization		
Develop transition plan to implement the recommendations provided in the Sustainability Plan. Identify tasks and timelines and assign responsibility for each task. Responsibility for, and tasks associated with, ongoing monitoring of the plan should be addressed.		
Present transition plan to the Sustainability Planning Committee for approval and Sign-Off		
Communicate and "sell" the Sustainability Transition Plan within organizations throughout the project. Ensure that there is commitment to the tasks and timelines outlined.		
Execute the Sustainability and transition plans. Depending on the governance and accountability structures, execution may be coordinated centrally or by local partner/participant sites		
Monitor project sustainability and revise activities as required. ▪ Projects will require continuous monitoring for successes/failures and must respond to changing healthcare environment, changing clinical/operational needs, technology advancements, utilization demands, and integration challenges. At a minimum, sustainability outcomes should be reviewed and assessed on an annual basis.		

APPENDIX A - Sustainability Plan Outline

I. Executive Summary

II. Introduction
   a. Purpose of Document
   b. Background
   c. Methodology

III. Project Inventory
   a. Technologies and network infrastructure
   b. Operational infrastructure
   c. Programs and/or applications
   d. Utilization and acceptance
   e. Evaluation results to date
   f. Business agreements and partnerships
   g. Governance and reporting structure
   h. Funding and budgeting mechanism
   i. Successes/failures and lessons learned

IV. Sustainability Options and Recommendations
   a. Mission, Vision and Future Direction
   b. Clinical Needs and Objectives
   c. Leadership and Governance
   d. Human Resources and Operational Infrastructure
   e. Technology and Network Infrastructure
   f. Business and Finance
   g. Cost-Benefit Projections
   h. Evaluation and Communications
   i. Integration and Interoperability
   j. Legislation and Policy
   k. SWOT Analysis (Strengths, Weaknesses, Opportunities and Threats)
   l. Risk Management Plan

V. Summary and Conclusions

Appendices:

Financial Models with Assumptions

Letters of Support from Partner Organizations

APPENDIX B – Sample Template for Financial Projections

The following template is presented as a sample, however, you may wish to consult one of the following resources for additional examples:

1. The Office for the Advancement of Telehealth Sustainability Plan Template and Guidelines:

http://telehealth.hrsa.gov/pubs/stratplan/stratplan-guidelines.htm

2. The National Institutes for Health (NIH) Cost-Benefit Analysis Guide for IT Projects:

http://irm.cit.nih.gov/itmra/cbaguide.html

3. The U.S. National Archives and Records Administration (NARA) Guidelines for the Analysis of Costs and Benefits for ERM/ERK Projects:

http://www.archives.gov/records_management/policy_and_guidance/costs_and_benefits_erm_erk.html

Sample Template:

To be completed for Best Case, Expected Case & Worst Case Scenarios with accompanying assumptions.

Recurring Costs:

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Personnel Salaries & Benefits						
End-User Reimbursement						
Telecommunications						
Hardware Maintenance, Upgrade & Replacement						
Software licenses, Maintenance & Upgrades						
Ongoing Training						
Technical Support						
Supplies & Miscellaneous						
Marketing						
Travel						

Non-Recurring Costs:

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Additional Staff or Consulting Fees						
Hardware, Software or Network Purchases						
Training on New Equipment or Applications						
Product Commercialization						

Total Expenses =

Potential Funding/Revenue Sources:

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Government Funding/Support						
Facility or Partner Organization Operating Funds						
Other grants						
Alternative funding/payment scheme for end-users						
Community or charitable donations						
Private/Public Partnerships						
In-Kind Contributions						
Third party fees for Network Use Hardware or Software Sales						

Total Available Funding/Revenues =

Surplus/Shortfall:

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Gross Surplus/(Shortfall)						

Tangible Benefits:

Telehealth

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Travel Costs Savings						
Saved value of Staff Time						
Reduced FTE needs						
Cost Savings from Reduced Bed Stays						
Cost Savings from patient repatriation						
Other administrative savings						
Additional indirect revenues retained in facility and community						

Electronic Health Record

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Reduced Costs of Record Keeping						
Saved value of Staff Time						
Reduced FTE needs						
Other administrative savings						

Total Tangible Benefits =

Net Surplus/Shortfall:

Item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Net Surplus/(Shortfall)						

APPENDIX C – References and Resources

An extensive list of resources is available on the Office of Health and the Information Highway's virtual eHealth Resource Centre.

http://www.hc-sc.gc.ca/ohih-bsi/res/index_e.html