

BRITISH COLUMBIA CANCER AGENCY



BC Cancer Agency
CARE & RESEARCH

An agency of the Provincial Health Services Authority

Updated October 2006



*Province-wide solutions.
Better health.*



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October 1, 2006

Despite two decades of continuing improvement in age-standardized mortality rates (ASMR) – the impact of interventions on death from cancer – the population burden of cancer continues to rise as a result of the aging of a growing population. Thus, not only must the gains be consolidated, we must also learn more, apply more, and do it more quickly if we are to make a sustained impact on cancer control.

Currently the BC Cancer Agency (BCCA) is a population-based cancer control organization with a well-developed, stable platform for its service, education and research mandate. This strategic plan will sustain the provincial cancer control platform whilst transforming the BCCA into a translational research organization directed to enhancing cancer control outcomes.

The translational research organizational model links the pathway from discovery research to improved health outcomes, and vice-versa, by establishing a collective interdisciplinary resource across the domains of discovery research (basic), clinical research and population application. The model is critically dependent on establishing and nurturing the knowledge transfer environments linking these separate domains – the transfer of “innovation” and the transfer of “adoption”. To bring added focus to the translational research agenda, the organization’s direction and resources can be conceived in three broad areas – the discovery agenda of predictive and personalized cancer medicine, the “clinical” or validation agenda of interventional cancer management, and the population application agenda directed to population health and cancer.

The strategic plan has four key directions:

1. To sustain and advance the BC Cancer Agency’s system of cancer control.
2. To establish the knowledge generation and application paradigm within the provincial cancer control platform.
3. To support regional centres, regions and communities with the implementation of provincial cancer control programs and the integration of knowledge across the discovery -> clinical practice -> population application continuum.
4. To ensure the provision and deployment of resources to achieve maximal organizational effectiveness.

A critical factor for this plan will be the willingness, opportunity and success in establishing novel partnerships and relationships to enhance funding, resource allocation, infrastructure development and competitive advantage.

CONTINUED

Since receiving approval of its strategic plan in 2005, the BCCA has completed yearly environmental scans and in doing so, has not identified any potential risks i.e. apart from the challenge of securing ongoing operating resources for the Cancer Research Centre. Efforts are presently underway to ensure there is a clear understanding of the costs of operating the facility, possible cost recovery and revenue streams, and identifying sustainable sources of operating support. Notwithstanding this challenge, the BCCA remains wholly committed to the translational research agenda and our provincial cancer control mandate as outlined in the plan.

A handwritten signature in black ink, reading "Simon Sutcliffe". The signature is written in a cursive, flowing style.

Simon B. Sutcliffe
President, BC Cancer Agency

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The BCCA – Who We Are and What We Do

Mission

*To reduce the incidence of cancer;
to reduce the mortality rate of
people with cancer*

*To improve the quality of life of
people living with cancer.*

The BC Cancer Agency's (BCCA) principal business is to enhance the outcomes of cancer control. Despite two decades of continuing improvement in age-standardized mortality rates (ASMR) – the impact of interventions on mortality – the population burden of cancer continues to rise as a result of the aging of a growing population. In short, the incremental gains in ASMR are insufficient to offset the impacts of rising incidence. Thus, we must not only continue to consolidate the gains resulting from our current

knowledge of cancer control, but we must position ourselves to create and take advantage of the knowledge we need to make a greater, more sustained impact on cancer control.

It is *necessary* that the BCCA pursue a population-based, cancer control strategy through the application of evidence-based policy to clinical practice. This will not, however, be *sufficient* to effect the change in cancer control outcomes we wish to see. To be able to develop, assess and be on the forefront of knowledge, a strong intellectual and research culture and infrastructure must be established at the BCCA – a culture aligned to make a significant impact on the future of cancer control.

Now and the next decade, is a very appropriate time to re-think how we will improve cancer control outcomes. Genomics and molecular medicine have provided enormous insights into the process of cancer (carcinogenesis). Individual determination of predisposition, diagnosis, prognosis and targeted therapies is now becoming possible. More funding for research is available. There is greater public expectation that cancer research will be transferred expeditiously to enhance clinical practice.

The BC Cancer Agency has evolved to a population-based cancer control organization with stable, well-developed provincial cancer control programs supported by enabling infrastructure. From this position, the BCCA can now move in a new strategic direction – a further evolution – the cancer control organization as a knowledge platform for the translation of knowledge into clinical application that enhances cancer control at both personal and population level, and the economics and performance of the health system.

What we do

The BC Cancer Agency is a publicly governed and funded organization with a mandate to provide a cancer control program for the people of British Columbia.

The cancer control program comprises the provision of clinical (interventional) services across the spectrum of prevention, early detection, treatment and supportive, rehabilitative and palliative/end-of-life care; cancer research across the four pillars of biomedical, clinical, socio-behavioural and health systems; and education directed towards the public, persons with cancer, and health professionals, (continuing professional education), including training programs for several health professional disciplines. The BCCA's cancer control activities are extensively linked and integrated through regional cancer centres, community cancer centres and clinics, and provincial networks. The system is underpinned by a number of enabling services (Web site, Cancer Agency Information System, provincial practice standards and management guidelines, the cancer registry and surveillance and outcomes information).

The BCCA serves the population of British Columbia and provides health promotion and maintenance programs to the “well” and “at risk” public, as well as direct and indirect treatment and care services to persons with cancer through its cancer centres and community networks.

The BCCA is funded for its cancer control programs by the Ministry of Health through the Provincial Health Services Authority (PHSA). Virtually all of the funding for cancer research derives from the BC Cancer Foundation, research granting bodies and non-MoH provincial and federal grants.

The BCCA is a public hospital (Hospitals Act), a teaching hospital with affiliation agreements with UBC, SFU and UVic, a separate legal entity (Societies Act), and a Branch Society (one of the core institutions) of the PHSA. Each regional centre of the BC Cancer Agency relates to “host” institutions, whose catchment falls within the jurisdiction of a regional health authority (Vancouver Centre – Vancouver Coastal Health Authority; Vancouver Island Centre – Vancouver Island Health Authority; Fraser Valley Centre – Fraser Health Authority; Centre for the Southern Interior – Interior Health Authority; and the Abbotsford Centre – Fraser Health Authority).

The BCCA is a member of the Canadian Association of Provincial Cancer Agencies (CAPCA); a partner with Health Canada and the Canadian Cancer Society/National Cancer Institute of Canada (CCS/NCIC) in the Canadian Strategy for Cancer Control (CSCC); and is extensively linked to governance and advisory structures for the Canadian Institutes for Health Research – Institute of Cancer Research (CIHR-ICR), the Canadian Cancer Society, the National Cancer Institute of Canada, Genome BC, the Michael Smith Foundation for Health Research (MSFHR) and a number of other disease-site and discipline related foundations, associations and organizations.

The characteristics of the BC Cancer Agency

Population-based, outcome focused, and patient-centred	Providing services across the range of cancer control for the public of BC. The BCCA is population-based, outcomes-focused and patient centred.
Equity of services	Provincial standards for access and quality of care and provincial guidelines for cancer management.
Evidence-based care	The use of proven effective approaches demonstrated from peer-reviewed clinical studies, i.e. established through rigorous, methodically sound research. Such evidence-based approaches are provided in the context of efficient (measures of process and quality) and accountable care (measures of outcome/performance).
Integrated across sectors	Organized to ensure service across primary care, community, tertiary and quaternary levels through a co-ordinated system of cancer centres, community centres and clinics, and a series of provincial networks.
Technology-enabled	Active deployment of established and innovative health care technologies for clinical services, research and development, e.g.

electronic health record, diagnostic and therapeutic equipment, research and development interfaces with cancer imaging and pathology and lab medicine.

Research driven

Invested in cancer research across the biomedical, clinical, socio-behavioural and health systems domains as part of the principal “business” of the BC Cancer Agency.

Fiscally responsible

Fiscally stable, deficit-free, balanced budgets prior to, and through fiscal 2002/03 to 2004/05.

Looking Forward: Opportunities and Pressures

External influences (factors operating at a societal and health system level)

- The demographics of cancer**
- 1993 – 2002: number of new cancers in BC increased at a rate of 1.6% annually from 15,586 cases (1993) to 17,916 cases (2002).¹
 - 2003 – 2012: population of BC projected to increase by 1.4% annually with a 2.5% increase annually among people 65+ years.²
 - 2003 – 2012: number of new cancers in BC will increase by 2.6% annually from 18,600 (2003) to 23,540 (2012).³
 - 2003 – 2012: number of cancer deaths will increase by 2.4% annually from 8,350 (2003) to 10,320 (2012).³
 - Cancer was the leading single cause of death in BC in 2001.⁴
 - Cancer was the leading cause of premature death (before age 75 years) in BC in 2001.⁴
 - Of the 11,050 premature deaths in BC in 2001, 4,175 (38%) were due to cancer.⁵
 - Cancer causes more years of premature life lost – 53,154 - than any other cause – over twice that due to circulatory diseases (heart and stroke) combined.⁶

¹ Source: BC Cancer Registry

² Source: BC Vital Statistics Agency

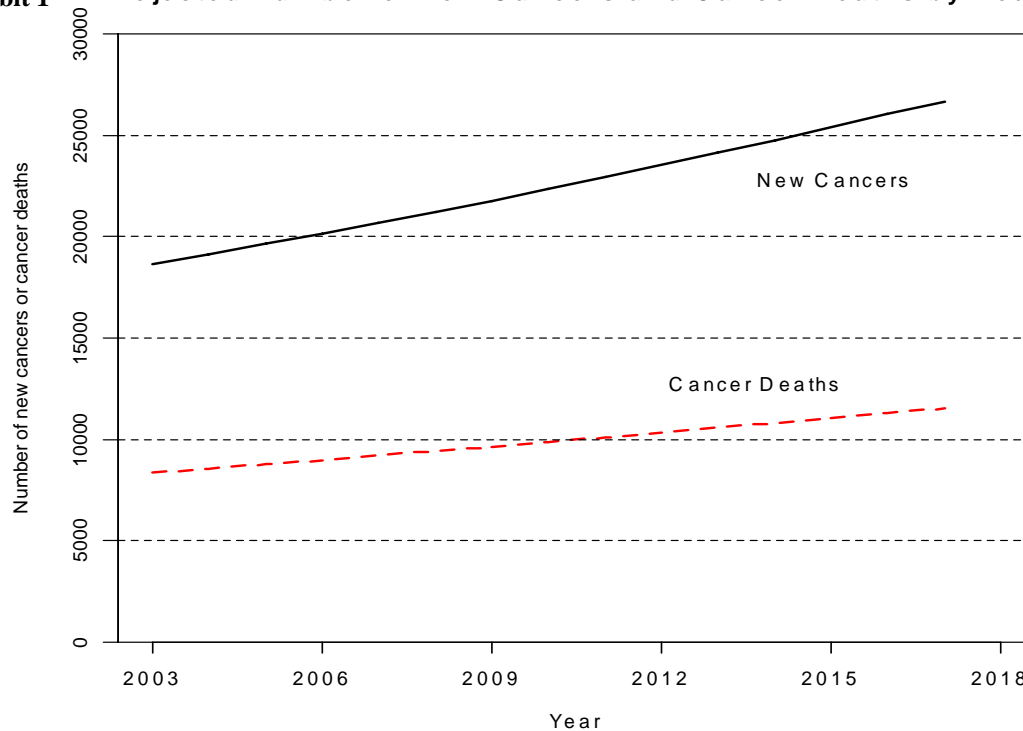
³ Source: BC Cancer Registry projections

⁴ Source: BC Vital Statistics Agency

⁵ Source: BC Vital Statistics Agency

⁶ Source: BC Vital Statistics Agency

Exhibit 1 Projected Number of New Cancers and Cancer Deaths by Year



Commonality of causes of chronic diseases – the linkage between determinants of health and health states/conditions

- The majority of factors known to influence mortality from cancer are also causally implicated in mortality and morbidity from other chronic, non-malignant health states, e.g.:
 - Tobacco: cardiovascular, respiratory
 - Alcohol: cirrhosis, tobacco use
 - Obesity: cancer, type 2 diabetes, cardiovascular disease.
 - Diet : cancer, type 2 diabetes, cardiovascular disease
 - Exercise: cancer, type 2 diabetes, cardiovascular disease

Using current epidemiologic evidence, a population with ideal behaviours and lifestyles might be characterized by:

body mass index <25; exercise >30 mins/day; alcohol <15 gm/day or <30 gm/day if folic acid intake >100 µg/day; red meat < 2 portions per week; folic acid intake >100 µg/day; non-smoking. By these criteria 3.1% of the population have an ideal profile. If the population as a whole had the ideal profile the population attributable risk for colon cancer, type 2 diabetes and cardiovascular disease would be reduced by 71%, 92%, and 82% respectively.

- Challenges of acute care health system**
- Costs of innovation and technology (equipment, drugs, diagnostics).
 - Allocation of resources across spectrum of health interventions and health states.
 - System changes as a consequence of health care reform (institutional mergers, culture “clash”, network management).
 - Maintaining the balance of service capacity in relation to service need.
 - Supporting patients and providers in remote areas – professional and technical issues.
 - Managing care across the tertiary – community interface(s).
 - Human resources training, recruitment, retention and compensation.
- Funding and allocation of fiscal resource**
- No incremental funding (other than ‘life support’ drugs) despite growth in incidence and prevalence.
 - Growth targets for screening mammography program of BC with no incremental funding.
 - Growth in all cancer control programs – competition within fixed funding.
 - Funding implications of extending cancer control further into the community.
 - New programs required with, as yet, no defined funding.
- Consumer expectation**
- The balance between the need to continuously develop the “informed consumer” (personal and societal responsibility for health management) and the ability to meet the needs of the informed consumer (service provision within a publicly funded health system).
- Managing multiple relationships and the obligations of agreements and affiliations**
- Affiliation agreements, e.g. UBC, UVic, SFU and implications for policy, ethics, intellectual property, etc.
 - BC Cancer Foundation – research funding, intellectual property ownership, fund-raising, commercialization of intellectual property.
 - Private sector partnerships – research funding, unrestricted grants, third party intellectual property and commercialization rights.
 - Other partners – academic, non-government organizations, etc.
- Internal influences** (factors over which the BC Cancer Agency can exert direct influence or choice)
- Recruitment and retention of oncology professionals**
- Inter-provincial and international competition for cancer professionals.
 - Training program outputs NOT commensurate with current vacancies, attrition and program growth.
 - Recruitment of clinical oncologists and scientists is highly dependent on competitive compensation.
 - Targeted recruits frequently require additional support for their academic/research program development.

- Space**
 - Clinical space constraints now evident in Vancouver Centre and Fraser Valley Centre (partial offset with proposed Abbotsford Cancer Centre).
 - New program space required (Functional Imaging).
 - Pressures within existing and new research space for current principal investigators.
 - Strategic plan looks to expand translational research.
- Capital equipment**
 - Radiation Services equipment plan (2003-2015) requires approximately \$200 million for hardware and software, both new and replacement, to maintain RT provincial service.
- hardware**
- software**
- drugs**
 - Provincial drug budgets have risen by >20% per year for the last five years.
- Culture change**
 - Changes of health care reform – health authorities, Board, management, shared infrastructure, contracting out, etc.
 - Organizational transformation – embedding the knowledge generation and application culture.
- Competitive advantage**
 - Maintaining an environment attractive for recruitment to enable achievement of vision.
 - Securing matching/leverage funding for competitive grant applications.
 - Securing the support for program development for targeted recruits.
 - Securing partnerships across the knowledge and business sectors based upon competitive “business plans” to enrich the science, economy and health system sectors.
 - Aligning the growth in translational research with the space required to support the research.
 - Maintaining the focus on cancer control, but sustaining a big vision and broadening the partnerships and funding support to function as an international leadership organization.

Our Strategic Directions

Where we have come from⁷:

1935 – 1974, the BC Cancer Foundation was established with the aims and objectives of collection and distribution of funds and the improvement of diagnostic and treatment facilities for cancer patients throughout the province of British Columbia. One fully equipped treatment centre was to be created, with ancillary consultative and follow-up clinics supported across the province. These actions stemmed from the perceived need for an organized effort “to meet a pressing medical emergency ... statistics show that the death rate from cancer in British Columbia is the highest in Canada”. An initial contribution of \$50,000 was received for the purchase of radium, BC and PEI being the only provinces at that time with no public supply of radium. The central institution of the BC Cancer Foundation – the BC Cancer Institute (BCCI) – was formally opened on November 5th, 1938.

1974 - 1995 – the Cancer Control Agency of B.C (CCABC) was established through the ‘tripartite agreement’ of the Province of British Columbia (Her Majesty, the Queen), the BC Cancer Treatment and Research Foundation and the CCABC. The Agreement amalgamated the cancer treatment operations (BCCI, Victoria Cancer Clinic and consultative clinics), to form one of the two basic operational components of the BCCA, the other being devoted to education, epidemiology, prevention regional programs and research. In addition, a permanent relationship was established between the Foundation and agency for the purpose of furthering cancer care and research. During this period, the BCCA was producing and circulating cancer management guidelines across BC, operating provincial screening programs (cervical cytology from 1950; screening mammography from 1988) and conducting fundamental and applied cancer research through its BC Cancer Research Centre.

1996 – the efforts in cancer control were redefined through organizational activities according to provincial “programs” rather than according to geographic location of regional cancer centres. Increasingly strategy, planning, policy and budgeting were performed centrally, provincial programs established province-wide standards to ensure equality of access and quality, and operations were decentralized to the regional centres and their communities.

Thus, over the history of the BC Cancer Agency to date, continuous evolution of cancer control activities has taken place:

1. “Geographic” centre approach (1939 – 1974): Cancer centres distributed according to population density, operating largely within a self-determined strategic plan, responsive to regional health care planning, operating within a “federation” to address population needs and providing service to the community through traveling clinics.

Advantages

- Centralizes treatment services within regions according to population density.
- Aligns centres to regional culture.

⁷ Radiation as a Cure for Cancer. The History of Radiation Treatment in British Columbia. Stewart Jackson, MD. ISBN 1-896624-08-1. BC Cancer Agency, 2002.

- Places cancer treatment services within regional mechanism for health care planning and delivery.

Implications

- Directed to regional population service rather than provincial population needs – thus subject to variations in provincial population access, measures of quality and outcomes according to determinants of health and health priorities determined regionally rather than provincially.
 - Variation across cancer system determined by degree of common policy and standards adoption within a “federated” system with varying degrees of autonomy between participating centres.
2. “*Provincial cancer control*” program approach (1974 – to date): a population-based model, planned according to provincial needs within a centralized planning, policy and budget structure, with implementation of provincial policy through a co-ordinated regional cancer centre/community network system. This model is consistent with current strategic models underlying national and international initiatives in cancer control at a population level.

Advantages

- Defines cancer control rather than cancer treatment/care as the operating paradigm.
- Defines the population of the province – the healthy, high risk well, acutely ill with cancer, chronically ill, cured and dying – as the population of interest for cancer control.
- Retains alignment to regional cultures and population composition.
- Is focused on the outcomes of cancer control – incidence, mortality and quality of life - for the population, rather than treatment or care – related outcomes for a subset of the population defined by residence or referral base.

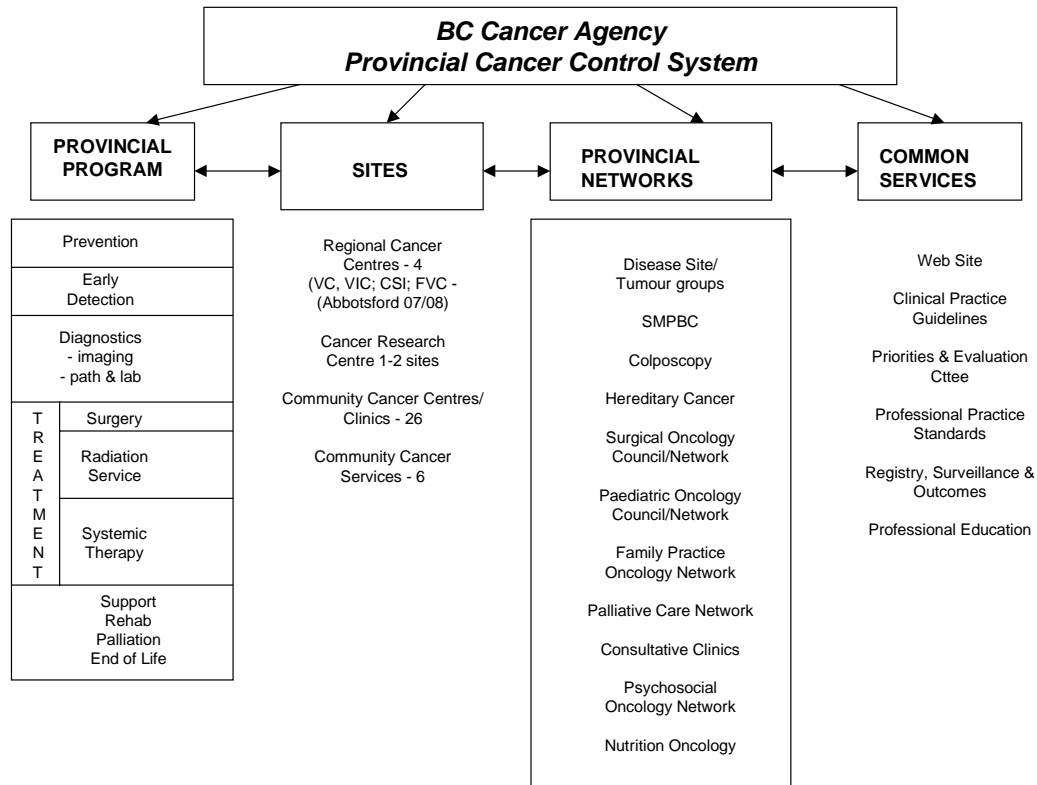
Implications

- Increases the populations of interest – aggregate of all regions, and the healthy at risk for cancer as well as those with cancer.
- Is impacted by the cost for cancer control for current and future generations, not just the costs of cancer treatment/care for today’s patients.
- Necessitates the development of partnerships and networks outside of the traditional “organized” cancer treatment system to reach the multiplicity of environments of the healthy, the ill and the dying.

The population-based, provincial program model is now well established as the BC Cancer Agency “platform” for cancer control. In essence, the BCCA is an organized network (Exhibit 2) hosting a common cancer control program across the network with roles, responsibilities and accountabilities appropriate to the clinical setting. A key element of the cancer control platform is the provincial disease site/tumour group structure. The tumour groups are the mechanism for establishing the content of the BCCA’s activities directed to cancer control. Initially focused around treatment policies and clinical management guidelines, the tumour groups are increasingly extending their activities throughout the translational research and education domains. Their membership is interdisciplinary and extends across regional centres and provincial networks.

They have a collective relationship within the Oncology Advisory Committee (OAC), are represented on the BCCA Executive Committee and are supported through a Tumour Group Office and Secretariat. The Tumour Groups are responsible for much of the content of the BC Cancer Agency Web site, for example, cancer management guidelines, protocols, and educational materials.

Exhibit 2: Population-Based, Provincial Program Model



Where we are going

Because of the widespread acceptance of the BC Provincial Cancer Control System, both within and outside of the BCCA, the stability of the programs for cancer control service delivery, and the wide acceptance of this planning model by other organizations, e.g. Canadian Strategy for Cancer Control, WHO, UICC (Union Internationale Contre le Cancer), the BCCA is now poised to take the next strategic step in its evolution: leadership and direction with respect to harnessing the cancer control system for the rapid translation of knowledge between the research, clinical and population environments for the purpose of achieving optimal population-based cancer outcomes (benefit, cost-effectiveness).

Accordingly, the BCCA now needs to move to a further evolution to be able to fulfil its future role and potential – retaining the best of the provincial model of delivery for cancer control while evolving to:

- The “knowledge generation and application (translational) model” – the cancer control program as the basis for translational research to enhance outcomes and redefinition of health systems design for population-based cancer control. (Exhibit 4)

If the cancer control program, as outlined in Exhibit 2, is secure and sustainable, the transition to a truly “translational research-driven” organization can take place if:

- A number of enabling “platforms” are established to underpin the research needs of clinicians and scientists across the range of tumour sites and professional disciplines (see Exhibit 3).

Exhibit 3: The “Knowledge Generation and Application” Organization in the Context of Enabling Platforms

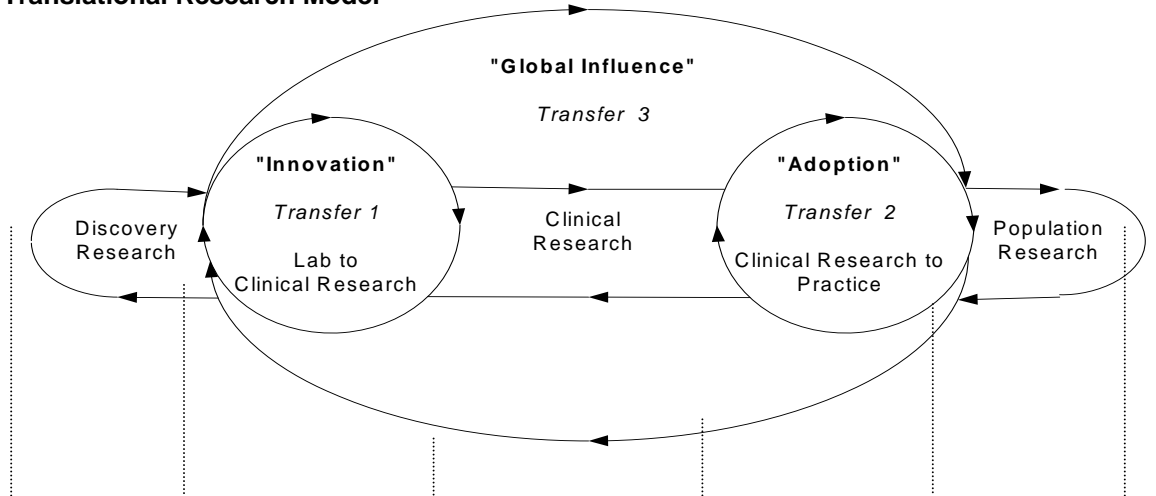
Enabling Platform	Discovery Domain(s)	Transfer Enabler(s)	Clinical Domain(s)	Transfer Enabler(s)	Population Domain(s)
Clinical trials	Advanced Therapeutics	GMP ¹ drugs biologics	Phase I/II clinical research unit		Phase III/IV trials
Epidemiology/ Population Risks; Outcomes & Economics	Cancer Control Research	Tissue Repository	Registry; Clinical Research		Risk profiles Surveillance, Outcomes; Economics
Structural and Functional Polyomics	Genome Sciences Centre Proteomics/ Bioinformatics	Tissue Repository	Molecular Pathology/ GPEC ⁴	Bio-informatics	Surveillance & Outcomes
Functional Imaging ⁶	Cancer Imaging GSC Research FI ⁶	Molecular pathology	Novel FI ⁶ Clinical research		Clinical FI ⁶ /Data link to surveillance/ outcomes
Socio-behavioural	SCRN unit. ²	Academic partnerships. SCRN ² , palliative care networks. Family Practice Oncology Network	Clinical research re Phase I/II		Population studies, e.g. “navigation”; palliative care research, health technology, cross cultural, intervention research, quality of life measurement.
Cancer Pathogenesis and Stem Cell Biology	Terry Fox Unit	Transgenics Immuno/flow GMP ¹ Biologics Core histo-pathology, IHC ⁵ , microdissection tissue array	Clinical Research Unit BMT Program ³ Molecular Path/ GPEC ⁴		

Key:

- | | |
|---|---|
| 1. GMP - Good Manufacturing Process (Unit) | 4. GPEC – Genetic Pathology Evaluation centre |
| 2. SCRN - Sociobehavioural Research Network | 5. IHC – Immunohistochemistry. |
| 3. BMT - Bone Marrow Transplant Program | 6. FI - Functional Imaging |

- A model for translational research is established, upon which the strategic directions for the BCCA can be framed, and the organizational structure redesigned to maximize success in knowledge generation and application. (Exhibit 4)

Exhibit 4: Translational Research Model



	<i>Science</i>	↔	<i>Practice</i>	↔	<i>Policy</i>
Federal/National funding agencies	+++++	++++	+++	++	+
Industry; Pharm.	+	++	+++	++++	+++++
Venture Capitalists	++++	+++++	++++	+	+
Research Foundations	+++++	+++++	++++	++	+
Hospital Operating Budget				++	+++++
Scientific 'case' for funding	+++++	++++	++	+	+
Business case for investment		++	+++	++++	+++++

Key elements of the model

- It looks at knowledge generation and application as processes within a system of knowledge transfer.
- It moves from the individual, the domain of interest and the execution of a task or project to teams, networks and partnerships.
- It requires that each piece or process pay attention to the drivers, the incentives, the funding sources, the performance expectations, timeframes of practical interest, accountability and organizational/operational structure.
- The system is, by definition, dynamic; regulated by “feedback” within the system, i.e. it is neither linear nor uni-dimensional, it is dependent on cooperation and collaboration across disciplines, practices and sectors, and requires that the “system” (in this case the BCCA) become a continuous learning organization.

It is important to note that the environments of research (discovery, clinical and population) are distinct in terms of their funding, funding sources and in the incentives for performance. Further, the transfer of knowledge between environments does not occur naturally or passively – it must be driven strategically through investigator collaboration and by provision of the appropriate incentives for success. (see Exhibit 5)

Exhibit 5: Characteristics of knowledge environments and incentives for knowledge transfer.

Domains	Partners	Funders	Drivers	Incentives	Capacity Building
Discovery	BC Cancer Foundation UBC/SFU/UVic Research Institutes Private Sector (Federal) (Provincial, e.g. KDF ²)	BCCF CFI ³ CIHR-ICR ⁴ NCI(C) ⁵ Other granting Genome BC MSFHR ⁶ Industry	Publication Promotion Profile	IP ¹ /Patents Commercialization Spin-offs Revenue	Connections. Research capacity. Employment. Training.
Clinical	BCCF UBC/SFU/UVic/UNBC Provincial Cancer Agencies Teaching Hospitals	BCCF NCI(C) Industry Other Foundations	Publication Promotion Profile	Revenue Fellows/Training	Infrastructure. Training positions. Networks.
Population Application	Regional Health Authorities Networks (community) UBC/SFU/UVic	NCI(C) Provincial Govt Regional Health Authorities	Health system advance	Quality of Care Standards of Care ↑cost:benefit	Primary care renewal. GP satisfaction. Health care professional work redesign.

Key:

1. IP – Intellectual property
2. KDF – Knowledge Development Fund
3. CFI – Canadian Foundation for Innovation
4. CIHR-ICR – Canadian Institute for Health Research/International Cancer Research
5. NCI(C) – National Cancer Institute (Canada)
6. MSFHR – Michael Smith Foundation for Health Research

Exhibit 6: Transfers

	Principal Purpose	Players	Funding	Incentives	Potential Impact
Transfer (1)	Innovation	Scientists Clinicians Health professionals	Indirect Informal	Personal	Translational research capacity. Health outcomes advance.
Transfer (2)	Adoption	Tertiary, Community professionals, Primary Care practitioners	None	Altruistic	Health system performance. Best use of resources. Highest standards of care.
Transfer (3)	Global impact	Oncology leaders Cancer Institutions National Cancer Control Strategies	?	?	Improved population based cancer outcomes

The proposed model is designed to facilitate the expeditious transfer of new knowledge into changed clinical practices that will favourably influence cancer control outcomes at the population level. However, this is not solely about how we organize ourselves to do our business ... it engages others in how we do our business of mutual interest ... and it requires us to think about our medical “business” in the context of “business case”, business relationships, commercialization of knowledge and sustainability (replenishment) of the clinical: research enterprise (Exhibit 4). It is not sufficient to drive the discovery -> clinical -> population application model to ensure knowledge gets transferred into application. The transfer of knowledge has, or will have, implications in terms of costs incurred or costs recovered. Successful application of the model requires that the “business case” of knowledge transfer is integral to the endeavour and that the partners in the model (funding agencies, federal and provincial governments, health authorities, universities and academic institutions, private sector investors/business partners and industry) each see the benefits of participation and collaboration.

Applying the model to the cancer control system

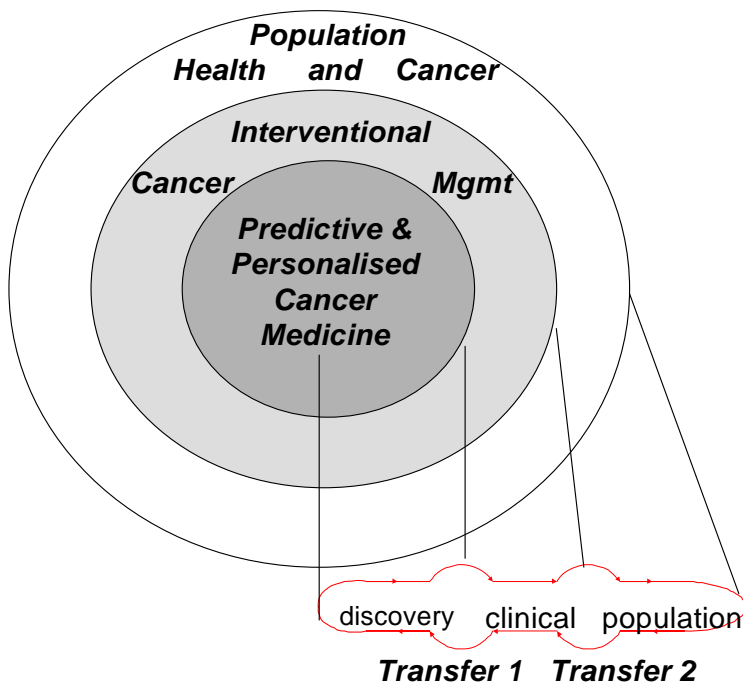
The “translational research” organization and the provincial cancer control system can be conceived as two systems of organizational activity within one overall enterprise (Exhibit 7).

The cancer control program is a large organizational network comprising corporate headquarters, regional centres, research centre(s), and networks supported by a common infrastructure. Its “business” is clinical service, research and education throughout its linked constituencies.

In the “translational research organization” mode, the underlying theme of the BCCA’s “discovery/ hypothesis-driven research” is **predictive and personalized cancer medicine**. This research agenda applies to all four pillars of research – biomedical, clinical, socio-behavioural

and health systems. The validation of discovery research within the clinical environment is undertaken through the BCCA’s **interventional cancer management** domain, i.e. the research that we conduct with patients with establishing cancer. The application of knowledge to address the health needs of the well population, high risk populations, those with pre-symptomatic cancer (early detection), those living and/or dying within the community, and those cured of cancer is through the **population application** component of the “translational research” paradigm. Importantly, knowledge flows in each direction in the “discovery – clinical – population application model. Furthermore, each domain is linked across the research centre – regional cancer centre – network architecture, and bounded at one pole by “question driven” research and at the other pole by population health outcomes – in essence, the linkage of all aspects of the cancer control platform to improved population health outcomes.

Exhibit 7: Core Translational Research Directions



How we will get there

Translating our strategic plan from concept to action is embodied in four over-arching directions.

1. Sustain and advance the BC Cancer Agency's system of cancer control - in short, to embed the best of what we have achieved and ensure its continuation as the bedrock for provincial cancer control.
2. Establish the knowledge generation and application paradigm within the provincial cancer control platform – essentially, to re-group ourselves and harness the cancer control program as a “knowledge generation, translation and transfer” resource through which improved health outcomes, be they clinical, health systems or economic, can be achieved.
3. Support regional centres, regions and communities with the implementation of provincial cancer control programs and the integration of knowledge across the “discovery - clinical practice – population application” continuum. For this strategic plan to be successful, the BCCA must not only ensure that the cancer control system is sustained and advanced across the province, but that the structures and networks are in place for knowledge to permeate all the environments in which cancer control is delivered (tertiary – community – primary care – palliative and end-of-life care).
4. Ensure the acquisition, provision and deployment of resources to achieve maximal organizational effectiveness. The ability of the Agency to deliver on the strategic plan as presented will require the commitment of provincial resources commensurate with the demographic challenge, new technologies including drugs and the introduction of new programs according to established evidence of benefit, and the willingness to foster and embrace novel partnerships to enhance funding and competitive advantage, resource allocation and infrastructure direction.

Sustain and advance the BC Cancer Agency's system of cancer control

(to sustain and enhance the BCCA's ability to effect the provincial cancer control program).

- Objective 1: To deliver the clinical programs and program enhancements as defined in operational plans 03-04; 04-05 and 05-06 to the degree possible with the resources allocated.
- Objective 2: To meet the requirements of PHSA – MoH service contracts, or at the highest level achievable within prevailing resource allocations.
- Objective 3: (a) To develop the physician/oncologist recruitment and retention plan with the health authorities in accordance with the need for regional and community oncology services according to the alternative payment plan (APP)/workload plan defining oncology practice as per BC Cancer Agency program standards.
- Objective 3: (b) To ensure continuous attention to all of the “hard to recruit” oncology professional disciplines (clinical physicists, radiation therapists, pharmacists, oncology nurses, social workers, nutritionists, etc) through recruitment, retention and competitive remuneration considerations.
- Objective 4: To ensure alignment of health professional staff levels with standards for clinical care as defined by program and professional standards.
- Objective 5: To develop community partnerships/networks to create capacity for clinical, education, supportive care and research activities.
- Objective 6: To enhance effective succession planning for leadership and management positions across the BCCA.
- Objective 7: To develop a responsive and effective administrative and organizational structure to support the strategic and operational requirements of the BCCA's strategic plan/key directions.
- Objective 8: To establish the Centre for Functional Imaging in Cancer Medicine and recruit a program leader for functional imaging.

Establish the knowledge generation and application paradigm within the provincial cancer control platform

(establishing the “intellectual” engine to enhance cancer control outcomes)

- Objective 1: To establish teams across the “discovery” (hypothesis driven) – “clinical” (validation) – “population application” spectrum to plan interdisciplinary, translational-research projects, both within the BC Cancer Agency system and with “partner” organizations in academic, community and private sector settings.
- Objective 2: To develop additional capacity to support competitive fund acquisition (a research support and development unit).
- Objective 3: Realign clinical environment to foster translational research (facilitated identification, process flow, consent tissue and sample acquisition – potential PHSA assisted/ supported endeavour).
- Objective 4: To establish a phase I/II clinical trials unit capability within selected BCCA Centres.
- Objective 5: To develop the “knowledge transfer” environments, forums, process and supports for “innovation” and “adoption”.
- Objective 6: To improve population-based cancer control planning and policy through the coordination and management of knowledge and information resources across the organization, including the establishment of a Translational Informatics for Health Outcomes and Evaluation capability, incorporating economic evaluation, decision support and performance measurement capacity.
- Objective 7: To establish academic Chairs as a focus for integration of discovery – clinical – population application research (disease site-based, discipline based or domain of science-based).

Support regional centres, regions and communities with the implementation of provincial cancer control programs and the integration of knowledge across the discovery -> clinical practice -> population application continuum

(enhancing population-based cancer control across the tertiary – community – primary care continuum).

- Objective 1: To collaborate with regions and communities to implement the Canadian Strategy for Cancer Control in BC and the Yukon.
- Objective 2: To provide leadership, analytical and administrative support, and coordination for provincial networks:
- The Surgical Oncology Council and Network
 - The Pediatric Oncology Network
 - The Family Practice Oncology Network
 - The Palliative Care Network
 - The Cancer Rehabilitation Network
 - The new emerging networks
- and to facilitate the deployment of network activity to other chronic disease conditions, and provide linkage of provincial networks to other national cancer initiatives, e.g. Canadian Strategy for Cancer Control and Canadian Association of Provincial Cancer Agencies.
- Objective 3: To provide leadership, analytical and administrative support to health authorities to assist their management of cancer control within their communities.
- Objective 4: To provide leadership and administrative support to advisory committees in partnership with health authorities.

Ensure the provision and deployment of resources to achieve maximal organizational effectiveness.

(ensuring the ability of the BCCA to effect its cancer control mandate).

- Objective 1: To develop novel approaches and partnerships to secure new and incremental resources to pursue the BC Cancer Agency vision, notwithstanding the limitations imposed upon operating budgets by the provincial health ministry.
- Objective 2: To ensure the human resources availability necessary to implement the provincial cancer control strategy:
- To create and maintain a high performance workplace with staff development, education, training and career development programs to maximize individual and collective skills development and performance.
 - To provide support to staff and an environment to optimize staff well-being, satisfaction and motivation.
 - To manage effective career progression for all staff throughout the BCCA provincial system.
- Objective 3: To build and manage knowledge assets:
- To create and maintain data and information access and availability to ensure current needs and future directions of the BCCA are met.
 - To identify and plan for the information technology and management needs to support the strategies and operational requirements of the BCCA.
 - To support the BCCA's commitments to national and international partners with respect to provision of data.
- Objective 4: To provide the expertise and information to obtain the operational funding necessary to sustain the provincial cancer control program at agreed levels and/or as defined by the performance contract.
- Objective 5: To ensure the provision of space adequate to host the BCCA provincial cancer control program.

Implementing our strategy

Linkage to outcomes

The translational research organizational concept must be linked to improved cancer control outcomes if it is to be of value. To put this into operation, the mission must remain paramount – “to reduce the incidence of cancer, the mortality from cancer and to improve the quality of life of people experiencing cancer”. From these three directions, the outcomes that we wish to improve require definition – both as ultimate outcomes, as well as surrogate outcomes to establish the validity of the process. An illustrative example might be as follows:

- From the mission – we wish to improve the quality of life of those experiencing cancer.
- Outcomes related to palliative care:
 - To increase the number of patients dying of cancer doing so within their home (if that is their preference).
 - To decrease the number of patients dying in acute care inpatient units.
 - To ensure that, to the degree possible, patients dying of cancer are pain-free or have their pain effectively managed.
 - To ensure that patients and families feel supported and are satisfied with managing a death at home.
- Key components of the translational organization:
 - Within the community
 - The Canadian Hospice & Palliative Care Network
 - The BC Palliative Care Network
 - The Family Practice Oncology Network
 - The domiciliary “pain and symptom control team”
 - The nutrition network
 - Local hospice/palliative care units
 - Psychosocial oncology network
 - With the regional centre
 - Access to palliative treatment(s)
 - Pain consultation services
 - Expert triage
 - Interventional pain management services, e.g.
 - Pumps, intrathecal catheters, etc
 - Patient and public education
 - Within the research environment:
 - Evaluation of “navigator” roles
 - Clinical trials of new drugs, procedures
 - Alternative modalities, e.g. acupuncture
 - Surveys to assess needs, satisfaction, etc.

In this model, the range of expertise and resources across the organization, from research centre to community network to the primary care setting are brought together in a team environment to plan the most effective deployment of knowledge and its application to address health outcomes of importance in cancer control. Clearly, this is but one example – the principles and the process can be applied to address a range of health outcomes of interest in cancer control.

Finally, it should be noted that outcomes will be at their best in a system where knowledge is synthesized based on the best performance of all the constituent parts:

- The practice environment providing current, evidence-based care.
- Knowledgeable and informed patients and families participating in the direction of care.
- Collection and analysis of accurate and timely data relating to surveillance, use and performance.
- An environment constantly seeking to enhance outcomes through acquired or newly generated knowledge.

In this scenario, all partners – professionals (both physician and non-physician health care providers), patients, families, and health administration – play a key role in achieving the highest level of system performance and hence, the best outcomes. Everyone can be a contributor to success within and through contributing their particular expertise.