

CANADIAN ASSOCIATION OF RADIOLOGISTS

Imaging the
Future



Final Report
Analysis Completed by
Lynn Curry, Ph.D
CurryCorp Inc.
Ottawa

November 29th, 2004

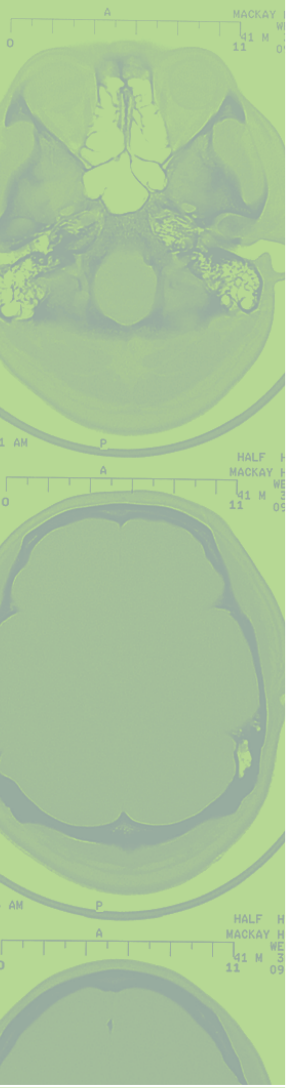


Table of Contents

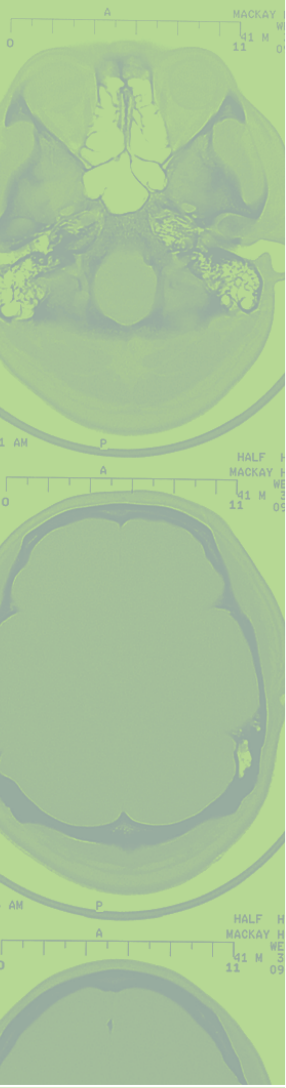
1. EXECUTIVE SUMMARY	5
2. PROJECT PURPOSE	6
3. SUMMARY OF PROJECT PROCESS	7
4. THE ENVIRONMENTAL SCAN	8
4.1 CONTEXT FOR HEALTH CARE AND MEDICINE IN CANADA	9
4.1.1 Overview	9
4.2.2 Drivers for Change in Canadian Health Care	10
4.2.3 Likely Pivot Points	12
4.2 CONTEXT AND ROLE OF MEDICAL IMAGING	12
4.2.1 Overview	12
4.2.2 The Technological Environment	17
4.2.3 Drivers Shaping the Future of Medical Imaging	19
4.2.4 Likely Pivot Points	20
4.3 THE LARGER ENVIRONMENT FOR CANADIAN HEALTH CARE	21
4.3.1 The Social Context	21
4.3.2 The Political Environment	24
4.3.3 The Economic Environment	25
5. IDENTIFYING THE MOST CRITICAL DRIVERS	28
5.1 BACKGROUND AND METHODOLOGY	28
5.2 APPLICATIONS FOR THIS ANALYSIS	28
5.3 RESULTS	29
5.4 COMPILED RESPONSES ACROSS EXPERT GROUPS	31
6. ALTERNATE SCENARIO DEVELOPMENT	34



This document has been prepared by
Lynn Curry, Ph.D. CurryCorp Inc.



7. TESTING SCENARIOS THROUGH FOCUS GROUPS	34
7.1 FOCUS GROUP METHODS	34
7.2 RESULTS FROM GROUP #1 (HOSPITAL-BASED RADIOLOGISTS)	35
7.2.1 On Cost Containment Scenarios	35
7.2.2 On the Workload Scenarios	36
7.2.3 On the Interventional Radiology Scenarios	36
7.3 RESULTS FROM GROUP #2 (CLINIC-BASED RADIOLOGISTS)	37
7.3.1 On Cost Containment Scenarios	37
7.3.2 On the Workload Scenarios	37
7.3.3 On the Interventional Radiology Scenarios	38
7.4 RESULTS FROM GROUP #3 (POLITICALLY EXPERIENCED RADIOLOGISTS)	38
7.4.1 On Cost Containment Scenarios	38
7.4.2 On the Workload Scenarios	39
7.4.3 On the Interventional Radiology Scenarios	39
7.5 RESULTS FROM GROUP #4 (POLITICALLY INEXPERIENCED RADIOLOGISTS)	40
7.5.1 On Cost Containment Scenarios	40
7.5.2 On the Workload Scenarios	40
7.5.3 On the Interventional Radiology Scenarios	41
7.6. FOCUS GROUP RESULTS TABLES	41
7.7 SUMMARIZED FOCUS GROUP RESULTS	43
7.7.1 On Cost Containment Scenarios	43
7.7.2 On the Workload Scenarios	43
7.7.3 On the Interventional Radiology Scenarios	43
8. TESTING SCENARIOS THROUGH MEMBERSHIP SURVEY	43
8.1 SURVEY METHODS	43
8.2 RESPONSE RATES BY DEMOGRAPHICS	44
8.2.1 Gender	44
8.2.2 Years in Practice	44
8.2.3 Province or Territory	44
8.2.4 Type of Practice	45
8.2.5 Leadership Experience	45
8.2.6 Practice Funding Type	45
8.3 NUMERIC RESULTS FOR SCENARIOS PRESENTED	45
8.3.1 Cost Containment Scenarios	45
8.3.2 Workload Scenarios	47
8.3.3 Interventional Radiology Scenarios	47
8.4 LIMITATIONS TO INTERPRETATION	48
8.5 INTERPRETATION OF QUANTITATIVE DATA	48



8.6	INTERPRETATION OF QUALITATIVE DATA	48
8.6.1	Comments on Cost Containment Scenarios	48
8.6.2	Comments on Workload Scenarios	49
8.6.3	Comments on Interventional Radiology Scenarios	49
9.	SUMMARY OF PROJECT RESULTS	50
9.1	RESULTS FROM THE ENVIRONMENTAL SCAN	50
9.2	SURVEY RESULTS	51
9.3	FOCUS GROUP RESULTS	51
9.4	COMBINING SURVEY AND FOCUS GROUP RESULTS	52
10.	LEADERSHIP DECISIONS TAKEN AS A RESULT OF THE PROJECT	53
10.1	PROFESSIONAL ISSUES	53
10.2	ASSOCIATION ISSUES	55
11.	APPENDICES	56
11.1	APPENDIX #1: INTRODUCTORY LETTER TO THE CAR MEMBERSHIP	56
11.2	APPENDIX #2: IMAGING THE FUTURE - THE CAR SURVEY	57

1. Executive Summary

The Canadian Association of Radiologists initiated the Imaging the Future project during the spring 2004 to provide methodological rigor to the identification and consideration of pending changes in diagnostic imaging in the context of the Canadian health care system.

The project began with an environmental scan to compile and analyse factors and issues in medical imaging and Canadian health care. Based on this review the CAR Executive, members of the industry and leaders of related organizations identified the most significant drivers for future change. Using these results the CAR leadership identified the three most significant issues over which the CAR could have direct influence. They were:

1. How costs are contained in health care services;
2. How to manage the growing radiology workload given a continuing manpower shortage, and;
3. The place of interventional radiology in medicine.

An invited group of experts debated likely possible scenarios for radiology and for CAR in each of these topics. The two most plausible scenarios in each topic, six scenarios in total, were presented to the full CAR membership in a written survey to collect opinions on directions preferred. A series of focus groups were also organized to provide additional information about the rationales for choices made in each topic and to see how malleable those positions were after group discussion. The focus groups also provided the opportunity to collect and debate suggestions for actions to be undertaken by CAR to achieve the preferred futures.

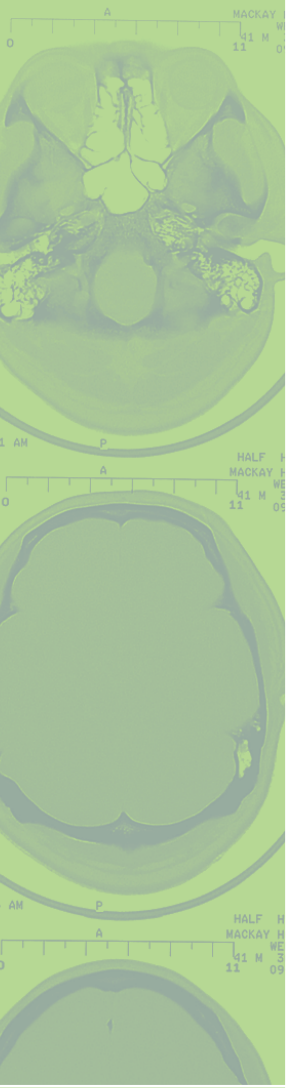
Initial analysis indicated a difference in direction suggested by the two information sources: the survey and the focus groups.

Conclusions from the Survey	Conclusions from the Focus groups
Even split on cost containment choices	Prefer active identification of less useful imaging
Even split on manpower choices	Prefer active delegation
Preference to find resources to support IR from within DI	No clear mandate, preference to NOT share DI resources with IR.

Analysis of survey comments brought results of the survey and the focus groups much closer together. The majority of survey comments on cost containment suggested active utilization control and the majority of survey comments on manpower focused on how to approach identifying appropriate acts for delegation, adequate training and radiological supervision.

Conclusions to be drawn from the survey and focus group results would be that:

1. The membership is divided on a preferred future in these three central areas;
2. There is support from a significant percentage of the membership for proceeding in any of the six directions outlined in the scenarios presented.
3. There is useful sub-group information from the survey that indicates potential ways to broaden the appeal of any chosen direction.



A planning session was held for CAR officers on September 11th, 2004 to consider all available information and to make recommendations for CAR. A series of provisional decisions were reached:

1. to actively participate in health system cost control through control of inappropriate utilization;
2. to bring about appropriate delegation of practice acts as part of the response to the radiology manpower shortages;
3. that IR is an integral part of DI and CAR commits to actively supporting a shared future.

A range of organizational issues were also identified for attention in this planning cycle:

1. resolving governance issues will be required to implement strategic directions;
2. re-branding of CAR will be required as part of needed solutions; and
3. identifying specific change targets will help focus strategic implementation.

2. Project Purpose

This project was initiated with the intention of assisting CAR leadership to actively shape the future of radiology in Canada by providing information on which to base strategic choice and action.

The project initiated the planning cycle for 2005-2010. Guiding principles were retained from the two previous strategic planning cycles, 2000-2002 and 2002-2004:

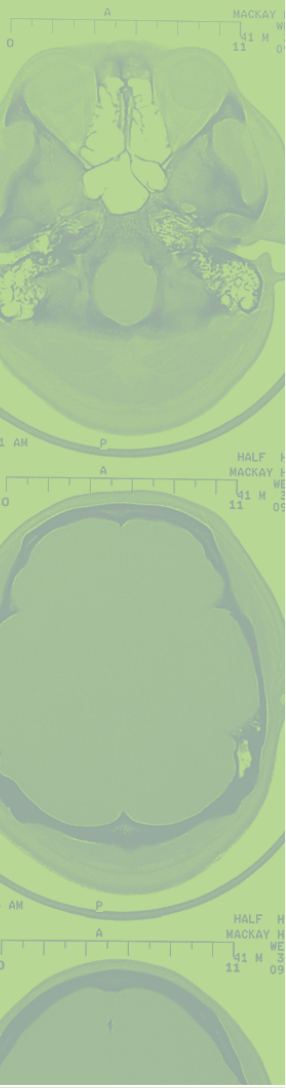
- ⊙ Moving beyond reflection and rhetoric into active participation; and
- ⊙ Becoming future oriented.

Organizational objectives set by the first planning cycle in 2000-2002 were:

- ⊙ improving organizational decision making
- ⊙ improving central office function
- ⊙ improving communication functions
- ⊙ improving provincial relations (membership)
- ⊙ improving government relations (equipment & HR issues)

The second planning cycle 2002-2004 focused on:

- ⊙ unifying radiologists (speak with one voice)
- ⊙ repositioning radiology (become a solution & an information source)
- ⊙ help with privatization issues (separate payment source from ownership issues)
- ⊙ improving equipment issues (replace outdated & improve access to high tech)
- ⊙ improving HR issues (physician extenders and numbers of radiologists)



The current planning cycle was necessitated by changes in the nature and make up of the radiology discipline. Two signal events pointed to the need to explicitly consider the future of diagnostic imaging (DI):

1. the 2003 Canadian Interventional Radiologists Association (CIRA) meeting which debated the future of interventional radiology (IR) with or without CAR; followed by
2. the 2003 CAR Presidents' Forum which came to a conclusion that the future of IR should remain linked to DI.

Lynn Curry, Ph.D. of CurryCorp Inc. Ottawa was retained to help guide the futures study which was titled, *Imaging the Future*. The new planning cycle began with a thorough study of the future of diagnostic imaging in Canada.

The futures project had to provide a range of critical information for CAR leadership to have confidence in making strategic choices and taking strategic action. The requirement was to produce sufficient reliable information to:

- 1 support understanding of the scope and dimension of change facing members and the society they serve;
- 2 identify key drivers behind the most critical change forces or phenomena;
- 3 identify the drivers that CAR can influence; and
- 4 explore support for futures likely to result from alternate possible CAR directions.

3. Summary of Project Process

The project was designed in a series of steps to provide both required information and time for CAR leadership to reflect on the information provided.

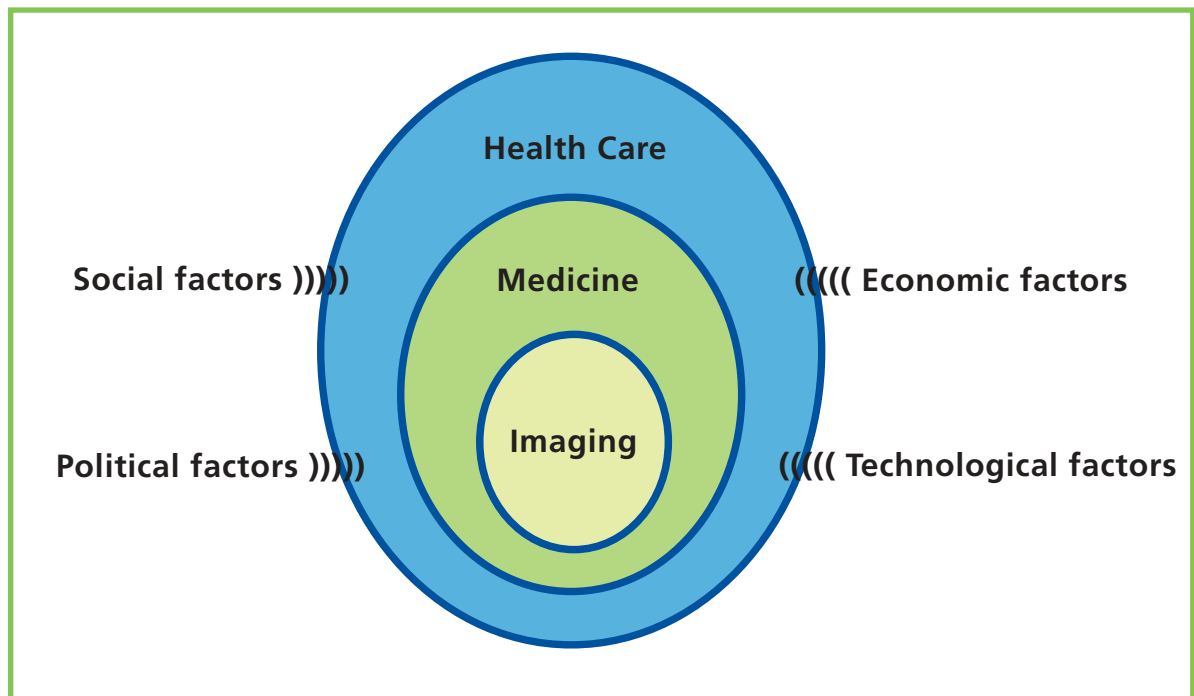
Information Needed	Project Step
Identify scope and range of change factors	Environmental Scan (April 2004)
Identify key drivers	Consensus among CAR Executive, industry members, leaders of related organizations (April 2004)
Identify drivers that CAR can influence	Futures group planning session (May 2004)
Explore alternate possible futures	Member survey (June - Sept 2004) and focus groups (June 2004)
Compile information and make leadership decisions on preferred future and general strategies to achieve that preferred future.	Planning session September 11 th , 2004

4. The Environmental Scan

The first critical step to foresight analysis is to scan the current environment for factors likely to drive change and then to identify pivot points that might indicate a significant change actually taking place. The drivers are observable or known phenomena that potentiate change. A pivot point, or tipping point, indicates that the change is already occurring.

A number of recent overviews have described medical imaging and its context in Canada in considerable detail. Notable among these are the 2003 CIHI report¹ and the CAR position paper on PACS². The intention in the environmental scan for the *Imaging the Future* foresight analysis was to present a critical review of these and other sources to identify drivers and pivot points for change in medical imaging in Canada.

This environmental scan presents information about the principle factors in the environment within which diagnostic imaging (DI) operates. As outlined in the following diagram, imaging is a particular component within the discipline of medicine. We are interested in the practice of medicine inside the Canadian health care system which we represent by the largest balloon in the diagram. Four types of external force impinge on the health care balloon: social forces, political forces, economic forces and technological forces. These external forces push and pull differentially on the health care balloon and all of the contents of that balloon, not just medicine and imaging. The task for the CAR project *Imaging the Future* is to discern which combination of all these forces has the most potential to change the future of CAR and radiology.



¹ Canadian Institute for Health Information (2003) *Medical Imaging in Canada*

² The Canadian Association of Radiologists (October 15, 2003) *PACS for Canadians*



4.1 Context for Health Care and Medicine in Canada

4.1.1 Overview

Health care and medicine are viewed by the public, politicians and most government planners as one complex interactive system. The daily evidence to the contrary is interpreted as system dysfunction to be corrected by varying degrees of usually uncoordinated intervention with a few features or variables at a time. Health professional bodies, academics and the frequent recurring governmental commissions studying health care systems know, or learn, that there is not one healthcare system in Canada but a series of systems: interacting providers loosely or wholly connected to health care facilities; facility and public health systems within regions; regional systems within provinces and territories all operating under changing interpretations of the federal role in health care. Messages periodically emerging from these bodies are often interpreted as self-serving, too esoteric or too sweeping for the real politic of implementation. That skittishness may be lessening due to the effects of repetition. All the provincial reviews in the 1990's, the National Forum on Health, the Fyke, Romanow, and Kirby commissions all agreed on at least the drivers for change in Canada's health care system listed below. Furthermore, they all agreed that systems level change is required to ensure the continued viability of Canada's method of health care provision.

There is wide spread agreement that access to appropriate care is the central and defining problem in health care, and not just in Canada. The available data support that conclusion. Over 94% of the Canadian population accessed primary health care services in 2001; 18% of whom (4.3 million people) reported access difficulties. Roughly 6.1 million Canadians accessed specialty services and a quarter of them (1.4 million people) encountered access problems³. An average of 12% of Canadians reported inability to obtain health services in 2000, up from an average of only 2% in 1989. An even higher percentage of 34% reported **difficulty** obtaining health services in 2000, up from an average of 18% in 1989⁴.

Governments are sensitive to this issue because it is close to the ground: access to health care affects voters directly and emotionally. In response there is too often a lot of rhetoric followed by very little sustained action which quickly dissipates in federal-provincial wrangling. An example of the rhetoric is the 2003 First Minister's Accord on Health Care Renewal that committed provinces to insure that at least 50% of Canadians will have access to appropriate health care 24/7 by 2011.

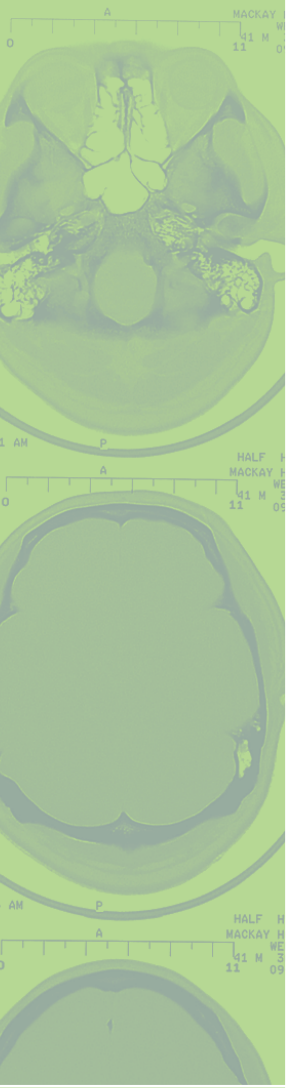
On the action side there have been a series of nationally funded programs to improve access to appropriate health care. In 2000 the federal government established the Primary Health Care Transition Fund with \$800 M to be dispersed to provinces over the period 2001-2006 as a mechanism to support provincially chosen pilot projects in primary care reform. One of the common expectations across these pilots is to restructure health care access away from physicians as gatekeepers and towards multi-disciplinary health care teams⁵. This trend is in keeping with observations in the U.S. over the past decade that noted rising numbers in training programs for non-physician clinicians, passage of legislation expanding their scopes of practice and proliferation of managed-care models that emphasized use of these non-physician providers as a strategy for containing costs⁶.

³ Statistics Canada. (2001) *Access to Health Care Services*

⁴ *Berger Health Monitor*. (March 2001)

⁵ Canadian Health Services Research Foundation. (2003) *Choices for Change: the path for restructuring primary health care services in Canada*

⁶ Druss, B.G et al. (2003) Trends in care by non-physician clinician in the United States. *NEJM*. 348 (2):130-137



Significant federal money has also been provided on a targeted basis to other health care reforms within the past few years. Canada Health Infoway (CHII) was established in 2001 to accelerate conversion to electronic health records and widen application of telemedicine. The 2003 First Minister's Accord on Health Care Renewal provided funds to improve access, \$1.5 B of which established a Diagnostic/ Medical Equipment Fund. On assuming the Prime Minister's role, Paul Martin immediately delivered over \$2 B to the provinces to support health care and indicated a willingness to inject significant further new money into the health care system if the provinces agree to some degree of system level change (the code word for this was 'transformative change' as of March 2004). What these proposed changes are, or even if there is a clear vision of a changed system, is not apparent at this point. It is instructive to note however that Pierre Pettigrew, federal Health Minister at that time was trying out the idea of opening the Canada Health Act for modification. Reception to this trial balloon was initially positive from most quarters pending further detail.

Additional urgency was brought to the situation by the acceptance on April 5th 2004 by the Supreme Court of Canada of a suit brought by Mr. Chaouilli of Québec claiming that his Section 7 Charter rights to protection of the person had been violated by a longer wait for hip replacement than medical guidelines suggest. Previous suits for damages due to delayed care have been brought and settled in a few provinces; but the Chaouilli suit is the first at the national level.

Governments at all levels are constrained in the proportion of their revenues that can be devoted to health care. There are other social services that citizens expect their taxes to support, notably education, police/ fire/ defence services, public health protections (i.e. safe water, access to vaccination) and access to transport (roads, mass transit). Health care budgets are soaring and crowding out all other areas of government spending activity. Provincial health care budgets have been growing in the past decade 35 times faster than all other provincial spending and twice as fast as revenues⁷. Even with the promises of federal transfer over five years of \$36.5 B of new money to the provinces for health care, the health care cost calculus is not sustainable⁸.

Throughout this period of upheaval health care professionals look with increasing urgency to their professional associations for guidance and leadership. Opportunities abound for these bodies to become loci of health care innovation and then to partner with governments and other stakeholders to implement, evaluate and adjust those innovations. CAR is in position to do just that.

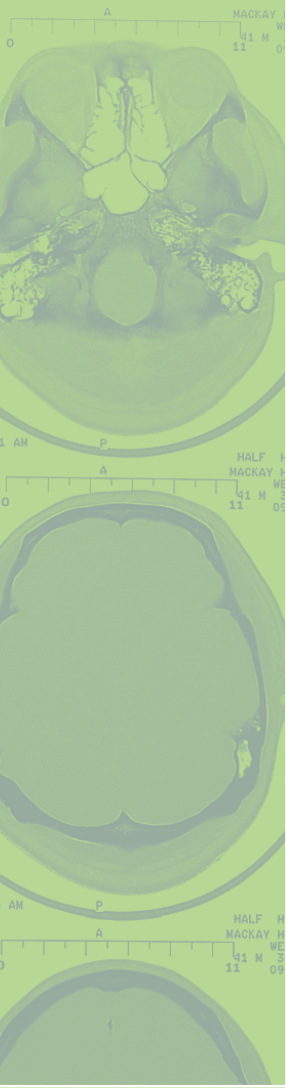
4.1.2 Drivers for Change in Canadian Health Care

(Note: drivers can exist in the environment without actually causing any change.)

1. The establishment of the Canada Health Council which is tasked to routinely issue performance reports on the functioning of Canada's health system.
2. Continued professionalization of health care management: better educated/ credentialed; more business orientation and therefore more interest in standardization of health care process, more focus on productivity and cost-efficiency.

⁷ Simpson, J. (2004) Who will start a frank debate on health care? Globe & Mail. April 1st page A15.

⁸ The Conference Board of Canada. (2000) The Future cost of Health Care in Canada 2000 to 2020.



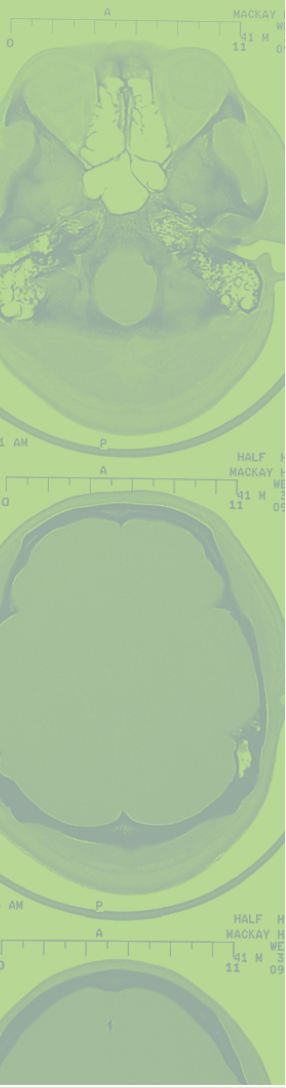
3. Growing evidence that lack of standardization in health care has deleterious effects on the quality of health care delivered^{9, 10}. Increased standardization of care through clinical pathways, clinical guidelines, systems and outcomes monitoring.
4. Increasingly these standards will be global best practice standards. This is seen as both a quality improvement issue and as a method to reduce waste by reducing unnecessary variation in practice.
5. Accelerated transformation to electronic health records.
6. Further consolidation, rationalization and integration of health care management, planning, administration and capital investment extending among provinces and across Canada. This will spill over to rationalization in health care delivery.
7. Decreasing opportunity for physicians to independently introduce and test new procedures or service levels into their practices.
8. More targeted federal monies made available in areas of provincial jurisdiction, particularly in health care, public health and education.
9. Increasing federal support for innovation in health care.
10. Increasing agreement at all funding levels that 'silo' funding for health care (delivery site, delivery mechanism and personnel) inhibits both innovation and cost recovery from substitution.
11. Continued emphasis on prevention as both cheaper than cure and preferable to the public even though costs of prevention are, at least initially, additional to costs of cure.
12. Continued emphasis on local accessibility to health care at community level (as opposed to tertiary hospital based centralized services).
13. Continued growth of telehealth and telemedicine to make examination and monitoring routinely available on a remote basis.
14. Continued emphasis on integration and coordination of care through 'team' approaches, cross-training and personnel substitution.
15. Continued shift in public attitudes toward health care consumption as a service with expectations for speed and demonstrated quality of interaction and outcome.
16. Increased consumer sophistication regarding electronic information, which has a range of effects:
 - ⊙ Diminished overall privacy concerns regarding electronic health records.
 - ⊙ Sharpened expectations regarding access to their own information and routine availability of that information across the breadth of the health care system.
 - ⊙ Reduced surface-level knowledge barrier between consumers and providers of health care allowing interested consumers to be more instrumental in their health care decisions.
17. Growing emphasis on patient and provider safety in order to decrease costs and to reduce health care misadventures¹¹.
18. Increased emphasis on appropriate care provided by the appropriate provider at the appropriate time. This is viewed as both a quality of care and a system efficiency issue.
19. Expectations that academic health centers lead and support innovation in health care education, organization and delivery¹².

⁹ Institute of Medicine (1999) *To Err is Human: building a safer health system*

¹⁰ McGlynn, E.A. et al. (2003) The quality of health care delivered to adults in the United States. *NEJM* 348(26): 2635-2645.

¹¹ Institute of Medicine. (1999) *To Err is Human: building a safer health system*.

¹² Institute of Medicine. (2003) *Report on the Future of Academic Medical Health Centers*.



4.2.3 Likely Pivot Points

(Note: a pivot point indicates that a significant change has already occurred.)

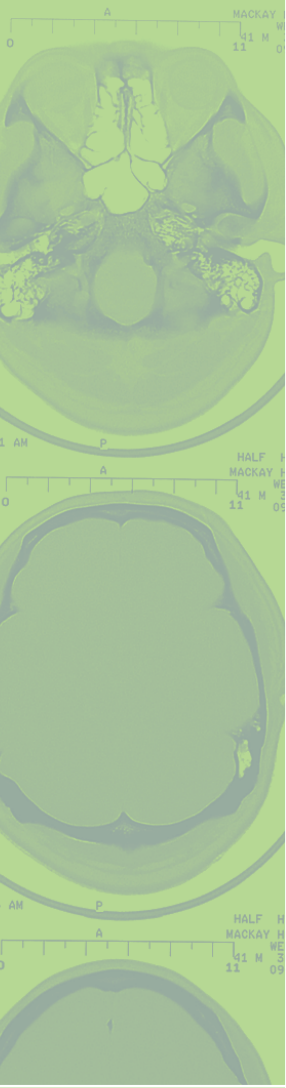
1. When the federal government commits to permanent funding of a significant proportion, a minimum of 30%, of public health care spending.
2. When there is a national, multi-year framework for health care funding to which the federal government and all (most) provinces agree.
3. When provinces plan and deliver health care on a cooperative basis across provincial lines. Look for this first in the Maritimes and on the prairies.
4. When there are federally funded programs in place, separate from health care funding, to directly support the capital costs of innovation in health care. This funding must be substantial to have impact, in the order of \$1B annually.
5. When at least one large-scale health care system is sufficiently converted to electronic health records to allow routine studies and corrections for efficiency, effectiveness and productivity within the system.
6. When the national media present findings from the Canada Health Council as their top stories.
7. When health professional schools including medicine rationalize training programs and positions to evidence-based societal need within each province and across the country.
8. When facility and individual provider reimbursement is linked to appropriate care provision (location, methods and personnel) as defined by the professions or as negotiated across professions and codified by the clinical pathways and guidelines.
9. When the health care cards carried by the public contain a microchip containing their complete health care record and that record can be read by the individual, all authorized local health care providers and anyone else allowed access by the card holder (i.e. family members, remote or alternative health care providers).
10. When the culture and organization of health care rewards reporting of safety issues.
11. When consumers are routinely educated about choices and consequent trade-offs available to them at each point in their interaction with health care systems.
12. When team-based care is accepted by patients and providers as a reasonable solution to problems with access and continuity of care.

4.2 Context and Role of Medical Imaging

4.2.1 Overview

For the purposes of this review medical imaging is understood to include all aspects of the development and use of products and systems that generate, capture, store, integrate, transmit, retrieve, display, enhance, visualize, analyze, and report human body images for diagnostic and therapeutic medical purposes¹³.

¹³ based on Sinclair, A. (1998) *Medical Imaging: a discussion paper* submitted to Industry Canada



That definition follows a functional analysis of the processes involved in medical imaging. The medical imaging sector can also be described by the principal modalities involved in image generation and by the energy source employed to generate the image. This distinction is becoming increasingly important with recent studies of cumulative cancer risks from diagnostic medical imaging^{14, 15}.

Energy sourced from ionizing radiation is used in the following medical imaging modalities:

1. X-ray
2. fluroscopy
3. CT or CAT (Computer Assisted Tomography)
4. PET (Positron Emission Tomography)
5. nuclear medicine

Modalities using other, non-nuclear, energy sources are:

6. ultrasound
7. MRI (Magnetic Resonance Imaging)

Historically medical imaging has developed in the interaction of two significant forces. The first of these forces has been the unrelenting pull of demand from clinicians to enhance or confirm their diagnostic abilities. The second equally steady push has been innovation from basic scientists and engineers employed by OEMs (original equipment manufacturers) to bring to market increasingly sophisticated imaging capabilities.

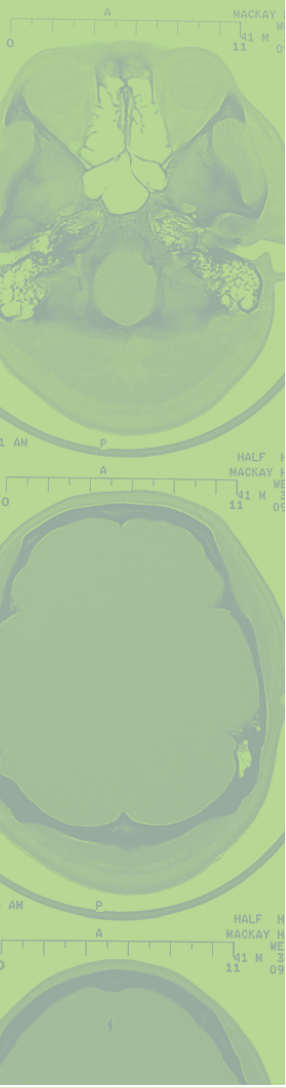
Until recently medical imaging was not a clinical discipline; it provided no therapy and only dealt with patients on specific focused referral from a front-line medical clinician. The service paradigm was a match to pathology and other laboratory sciences.

A series of events, notably improvement in catheter equipment and diminishing access to clinical specialists, provided the opportunity for the diagnostic imaging segment of the medical profession to take on a small, but growing number of therapeutic clinical tasks. These physicians, most are members of radiology departments, are being referred to in the U.S. as 'medical interventionists'¹⁶. In Canada a tactical decision was made to retain the term 'interventional radiology' and to seek acceptance of interventional radiology as a subspecialty by the Royal College of Physicians and Surgeons of Canada. This aim was achieved by the end of March 2004.

¹⁴ Gonzalez, A. & Darby, S. (2004) Risk of cancer from diagnostic X-rays. *Lancet*; 363: 345-51

¹⁵ Picano, E. (2004) Sustainability of medical imaging. *BMJ*, 328: 578-580

¹⁶ The Forbes Group. (April, 2001) *Finding a New Role for Interventional Radiology*



Beginning in 1960 with angiography the list of therapeutic interventions performed as interventional radiology has now grown to encompass at least 40 specific interventions grouped under the following major types:

- venous interventions
- biliary interventions
- portal hypertension
- peripheral vascular interventions
- thoracic and visceral vascular interventions
- genito-urinary interventions

These medical interventions are to be contrasted with the simultaneous development of minimally invasive surgery, which is developing as a replacement skill set within almost all surgery specialties¹⁷.

Interventional radiologists can now replace an increasing number of surgical procedures, particularly biopsies, drainages and exploratory surgeries. Interventionists can more accurately stage cancer growth making initial treatments more efficient and allowing more sensitive ongoing treatment adjustment. Interventionists can study drug effects in-vivo making monitoring of drug therapies more accountable and vastly improving the efficiency of new drug trials.

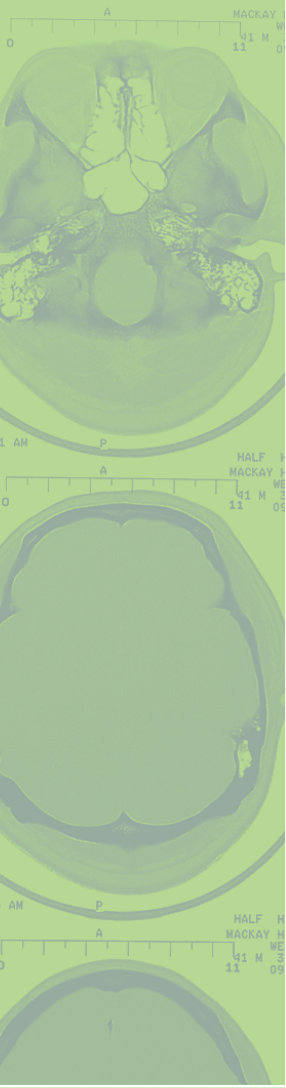
Nuclear medicine is separate discipline which has enjoyed a close working relationship with diagnostic imaging, many practitioners being certified in both fields. In classic radiology the energy source used to generate images is outside the body. Nuclear medicine places a radiation source inside the body and uses that source to produce an image. These techniques are useful for functional images such as monitoring flow through constricted blood vessels. Nuclear medicine has also developed a therapeutic role in oncology, specifically in radionuclide therapy.

In 1976 the Royal College of Physicians and Surgeons of Canada (RCPSC) recognized nuclear medicine as a separate specialty. However, at that time and since there have not been a sufficient number of certified nuclear medicine physicians to service demand; therefore a substantial minority of nuclear medicine cases are reported by radiologists who are trained in nuclear medicine, without an actual certification. Some radiologists interpreting nuclear medicine exams hold certification in both nuclear medicine and radiology.

Other providers have begun to perform tasks formerly considered the province of medically credentialed specialist radiologists. This 'scope encroachment' has occurred from both other physicians and from technologists. For example, some ER physicians read their own X-rays in response to perceived inappropriate time delays in getting an acute patient efficiently managed through the radiology department-based waiting list; obstetricians and gynaecologists perform ultrasound examinations in what they consider to be emergent situations; some neurologists, oncologists and orthopaedic surgeons use imaging equipment in their practices. Technologists in many locations, with formal or informal delegation, are generating images, capturing, displaying, analyzing images and preparing initial reports for review by associated diagnostic radiologists. Some of the catheter interventions created by radiologists have been adopted by other specialists who are increasingly claiming these acts as central to their own practice scopes (notably cardiology¹⁸).

¹⁷ Dominus, S. (January, 2002) *Surgery without Scars*. *New York magazine*.

¹⁸ Stokes, H. (June, 2002) *Canadian Cardiovascular Society Trends and Issues*



A somewhat different scope encroachment is occurring with the resurrection of thermography by chiropractors as an alternative, precursor or adjunct to X-ray for mammography¹⁹. This modality was abandoned by radiology thirty years ago for poor specificity and unacceptable rates of both false-positive and false-negative results.

Quite a lot of these role changes are responses to shortages in human resources. Diagnostic radiologists have estimated a continuing 20% shortage in their numbers in Canada as compared to recommended population numbers^{20,21}. The problem with these projections is that the denominator, the recommended ratio of radiologists to population, has no empirical basis and is not reflective of any evolution in demand, technology, training or capability of relevant providers. The felt shortage is real however, as the ratio of practicing diagnostic radiologists in Canada per 100,000 populations has not changed over the last decade²² while the volume of work has increased significantly in every modality²³, and new modalities become available almost every year. The supply of medical physicists and technologists has also held steady as compared to the Canadian population.

Medical imaging has responded to the central issue plaguing health care in Canada and elsewhere, lack of timely access, with the development of privately held for-profit imaging centers at some remove from public hospitals. Different provinces allow different variations in this mix producing a range of clinic types independent from hospitals: non-physician owned, physician owned and government owned. Some perverse effects have been noticed including self-referral to private machines²⁴ particularly among physicians without radiology training referring to their own imaging clinics²⁵. Over use is also perceived when radiologists refer to privately owned imaging clinics, as it is often the same pool of local radiologists who are paid to interpret images for these independent clinics. Growth in these independent health facilities has been controlled over the past decade in many provinces by technical fee reductions and claw-backs which have had the effect of significantly reducing profit margins.

¹⁹ Hunt, V. (December, 2003) Thermography: the first step in breast screening. *Hospital News*.

²⁰ Flowerdew, G. (October, 1998) *Projections of the Numbers of radiologists in Canada 1998-2017 based on the Canadian Radiology Human Resources Survey 1997-1998*.

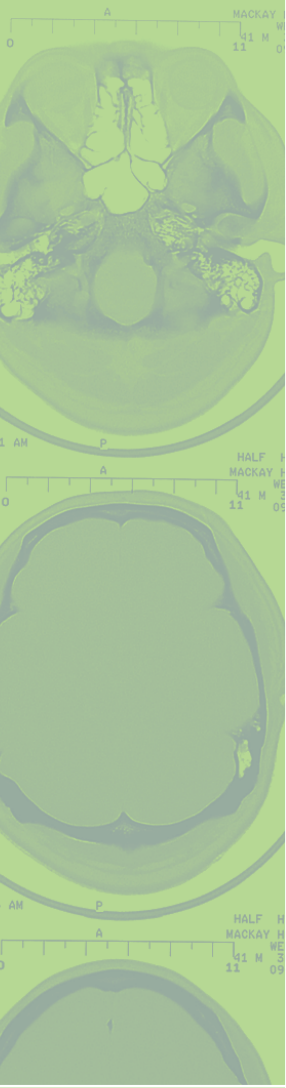
²¹ Canadian Association of Radiologists. (January, 2001) *Diagnostic Radiology Human Resources. Projections 2000-2021 Using the CMA Physician Resource Evaluation Template*.

²² Canadian Institute for Health Information. (2003) *Medical Imaging in Canada*

²³ *ibid*

²⁴ Abelson, R. (March 13th, 2004) An MRI Machine for every doctor? Someone has to pay. *The New York Times*, accessed through New York Times.com

²⁵ Levin, D.C. & Rao, V.M (March 2004) Turf wars in radiology: the over utilisation of imaging resulting from self-referral. *JACR*. Vol 1, No.3.



A variation on private imaging clinics is the recent exploratory announcement of a private, for-profit MRI clinic by the Muskeg Lake Cree Nation on presently unused reserve land within the city of Saskatoon, SK²⁶. Saskatchewan is a province that outlaws private MRIs, but it also has the longest waiting list for MRI scans in the country. Provincial laws governing health care have no jurisdiction on land controlled by First Nations' governments. Should this plan proceed, with or without a court challenge²⁷, the model will likely be replicated elsewhere producing even more strain on human resources in radiology and related technical roles. At present the concept has been referred to the Association of First Nations for further study in the context of improving access for First Nations people on a national basis.

Another response to improve access has been telemedicine and teleradiology. Early experiments in Newfoundland and northern Ontario proved very successful and are now supported by most provincial governments and medical schools in Canada. However, the regulation of telemedicine lags significantly behind the practice. There is no standard across medical licensing bodies in Canada. Some provinces (i.e. Québec) require a medically licensed physician to generate and capture the image at the remote site; other provinces (i.e. Nova Scotia) require a radiology credential at the receiving/ interpreting site; and others (i.e. Ontario) require a radiology credential at both sending and receiving sites and both sites must be within Ontario. The CAR position is similar to Ontario's (requiring a radiology credential at both sending and receiving sites) but does allow for sending and receiving sites to cross provincial borders. In practice however, technologists and nurses conduct much of the remote image generation, capture and storage. Images are shipped electronically to others, often non-radiologists and sometimes outside of Canada, for retrieval, integration, display and enhancement. The resulting image is then sent to a licensed radiologist for analysis and report. These reporting radiologists may be in the same province as the image source but not necessarily, particularly in border areas between provinces, in the Atlantic Provinces, and in the north of Canada.

A further reported problem in the diffusion of telemedicine and teleradiology is the nature and response to federal regulation of telemedicine and teleradiology as medical devices. Interpretations of the current regulations consider all the software for image capture, enhancement, storage and transmission to be separate 'medical devices' and therefore requiring formal federal review in order to protect the public. This review, like all other medical device reviews, takes a minimum of 75 days and is performed on a cost-recovery basis. Once licensed however, the license is applicable anywhere in Canada. This is an argument for standardization in software and industry cooperation in sharing costs for annual licensure and review of all upgrades and modifications.

Medical imaging enjoys a great deal of support within medicine for the contribution it makes to clinical management. An unusually credible survey (73% response rate) of leading U.S. general internists in 2001 indicated a clear consensus that MRI and CT scanning was the most useful clinical innovation in comparison with 29 others²⁸. Ultrasound ranked eleventh. Medical imaging is also well supported by public opinion. In a recent poll of Canadians' ratings for suggested health care investment priorities, medical and diagnostic equipment was the top-ranked item (34.4%) by a wide margin. Primary care reform was the second priority at a distant 19.2%²⁹ support.

²⁶ CBC News (April 21st 2004) Saskatchewan First Nation promises private, for-profit MRI. Accessed on line Wed, 21 Apr 2004 21:31:12

²⁷ Ehman, A.J. (April 13th 2004) First Nations' clinics: gateway to privatization? *CMAJ* 178(8): 1215

²⁸ Fuchs, V. & Sox, H.C. Physicians' views of the relative importance of thirty medical innovations. *Health Affairs*. 2001. 20; 5: 30-42

²⁹ IBM Business Consulting. (Spring/Summer 2003) *Health Insider*. Survey No. 9.



4.2.2 The Technological Environment

Canada has no significant manufacturing base in imaging related devices or products; however there are a number of niche companies particularly in software and computer design and support. The domination of multinational OEMs will continue but increasing global standardization will allow niche players to challenge for add-ons and in breakthrough technology in areas not economical for the OEMs to serve (mobile or disposable image capture, for example).

Breakthrough or “disruptive” technologies³⁰ have changed the nature of other industries and can do so in medical imaging. Examples of other disruptive technology breakthroughs include the invention and history of DOS. This first operating system software for personal computers was written by an engineer at IBM but sold for a pittance to Bill Gates in the early 1970’s. DOS was of no interest to IBM because they were the technology leader in the industry and they defined their market to be only large computer systems. IBM served that large system market very well, had no real competition in that market and made a lot of money for a while. Then the disruptive technology of small, cheap, mobile personal computing revolutionized the industry and stole the market from IBM.

Cost containment efforts in health care over the last two decades have targeted non-personnel areas, which included all physical plant services and technologies including imaging. This has had negative effects on Canadian innovation in imaging and other technology-based applications. A 2002 OECD report indicates that Canada has fewer CTs and MRIs per population than the median of OECD countries³¹. Moreover, some OECD countries (Spain and Australia) have been acquiring imaging equipment at a faster pace than did Canada over the past decade.

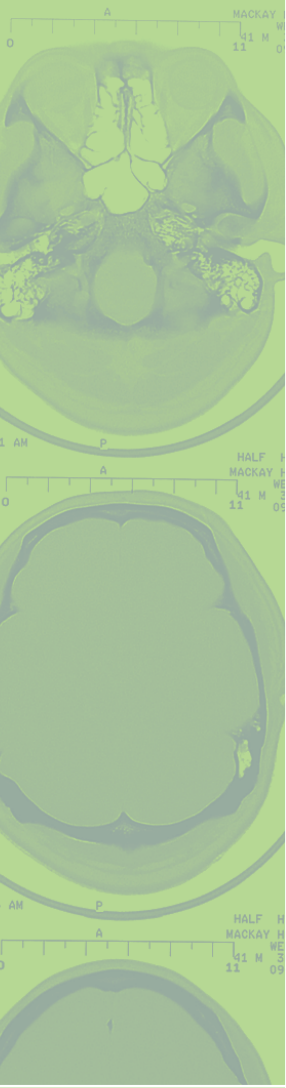
The 2000 Industry Canada report³² produced a list of general themes for likely technological change in medical imaging:

- 1) Integration in the presentation of information and images from multiple modalities (i.e. PET and CT);
- 2) Expansion of imaging to include functional, physiological, quantitative and dynamic information;
- 3) Integration with molecular biology technologies (i.e. detection of delivery of genetic probes, targeted delivery of genetic material);
- 4) Faster three dimensional volumetric imaging;
- 5) Faster imaging of all types;
- 6) Use of computers in image analysis and decision support.
- 7) In MRI and spectroscopy there is expected to be:
 - a. greater variety in equipment,
 - b. a broader range of magnets,
 - c. new contrast agents for dynamic and functional studies, and
 - d. use of molecular biologicals.

³⁰ Christensen, C.M. (2003) *The Innovator's Dilemma*. Harper Business: New York

³¹ OECD. (2002) *Health Data*.

³² Industry Canada (2000) *Future Needs for Medical Imaging in Health Care: report of Working Group 1, Medical Imaging Technology Roadmap*.



- 8) In ultrasound there is expected to be:
 - a. new contrast agents,
 - b. more specialized instruments using higher frequencies and more complex transducers, and
 - c. miniaturization for intravascular and interstitial imaging.
- 9) In CT there is expected to be:
 - a. faster imaging,
 - b. new X-ray tubes, detectors, image reconstruction and display,
 - c. special purpose machines for trauma,
 - d. low cost C-arms, and
 - e. mobile units.
- 10) In nuclear imaging there is expected to be:
 - a. development of radiopharmaceuticals for both diagnostic and treatment purposes, and
 - b. development of special purpose systems: economical PET imaging and high resolution gamma cameras.
- 11) Improvements are also predicted for X-ray in the areas of:
 - a. reduced radiation, and
 - b. flat plates.

Entirely new imaging systems are in active development and testing. Some of these were described in the Industry Canada study³³ and more recently in the CIHI review³⁴. These developments include:

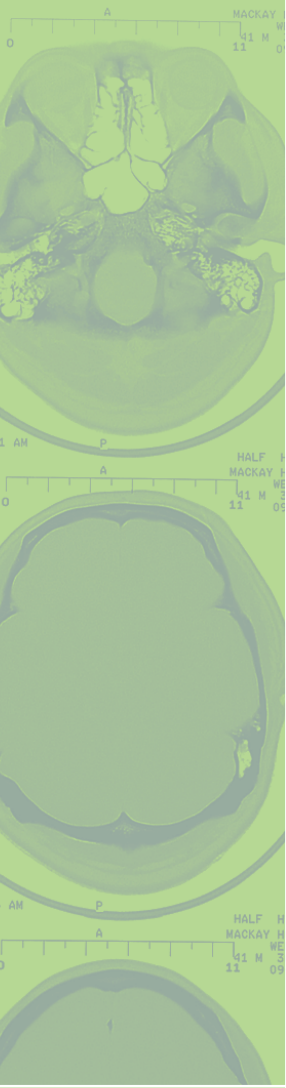
- 1) visible light techniques including ultraviolet and infrared. (Experimental imaging conducted at the University of Toronto with terahertz radiation was recently described. Medical, dental and security applications are expected³⁵.)
- 2) trans-illumination and optical computed tomography techniques,
- 3) improvements in molecular biology that will produce specific labels (i.e. fluorescent proteins) that can be detected with interstitial probes,
- 4) electrical impedance tomography, and
- 5) high-resolution optical imaging.

Evolution appears to follow the same trajectory regardless of the technology: costs and size diminish by half and capabilities double roughly every two years. All related technologies benefit from innovation in any application. For example, the vast increases in voice-activation sensitivity in video gaming are available for application in medical imaging and robotics. The 'Plug 'n Play' adaptabilities from computer components will allow interpretation modules to be added to remote imaging systems and allow wider use by less trained health care providers. Miniaturization will make imaging more mobile, available at the point of care and eventually make in-vivo robotic imaging routine.

³³ Industry Canada (2000) *Future Needs for Medical Imaging in Health Care*: report of Working Group 1, Medical Imaging Technology Roadmap.

³⁴ Canadian Institute for Health Information (2003) *Medical Imaging in Canada*

³⁵ Barss,P. (April 3rd, 2004) Better than X-Rays. *Globe & Mail*.



Diminishing costs will allow electronic health service delivery remote from health care providers, for example in homes and clinics, for monitoring and managing chronic health conditions. The large and growing telecommunication capacity offered to Canadians by CANARIE is a huge advantage to innovation in all these areas.

The genomic sciences have been slower to produce useful diagnoses and treatments than forecast by the original speculation and journalistic hyperbole. However the potential remains enormous for this growing set of interrelated disciplines to fundamentally re-make health care³⁶. Medical practice changes due to new knowledge of genomes are occurring at an accelerating pace. Geneticists are now predicting a healthy person's risk of common diseases such as cancer and cardiovascular disease. Analysis of the patterns of gene expression has become an adjunct to conventional diagnostic methods. The full potential impact on medicine will occur with improved understanding of the content of genomes and the physiological consequences of variation in their DNA sequences. The pace of this transformation will be affected by discovery and by the technology of detection, but also by the need to transfer that knowledge to health care practitioners, patients and the public.

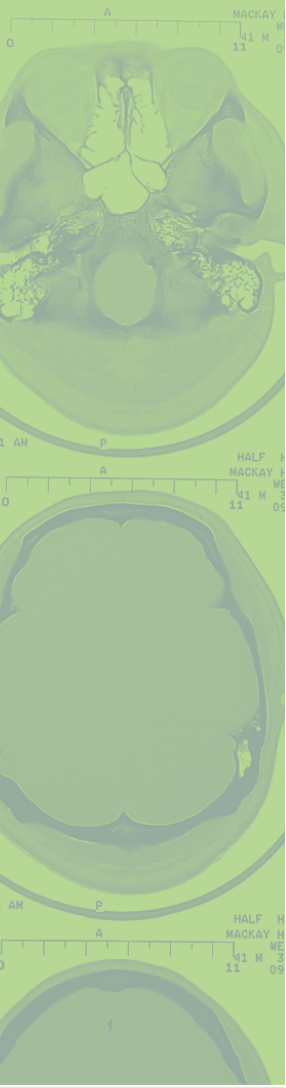
4.2.3 Drivers Shaping the Future of Medical Imaging

(Note: drivers can exist in the environment without actually causing any change.)

1. Continued functional shortages in diagnostic radiology producing perceived lack of access to imaging services.
2. Growing interest from technologists in assuming a wider scope of practice.
3. Sustained diffusion in medical devices including imaging devices beyond tertiary care facilities.
4. Growing ease and capabilities in information communication.
5. Merged PET and CT providing new opportunities for synergy between diagnostic imaging and nuclear medicine specialties
6. Evolution of interventional radiology within the present discipline of radiology or as a separate discipline.
7. Desire by established medical specialties to absorb the techniques of interventional radiology within their own organ-based scopes of practice.
8. Decision or development that will keep practice and training in interventional radiology within the traditional departments of radiology, create a totally new organizational entity or exist as a virtual department matrixed across departments with specified staff certified to use the techniques.
9. Decision or developments to restrict versus disperse the practice of interventional radiology. If restricted to tertiary care hospitals the provision and growth of interventional radiology will be constrained. If interventional practice is dispersed to community hospitals and/or specialty clinics the service becomes more available to the public as an alternative to surgery and institutionalized care.
10. Success in positioning interventional radiology as a 'disruptive technology'³⁷ within health care as a legitimate option to surgery and institutionalized care.

³⁶ Guttmacher, A.E. & Collins, F.S. (2002) Genomic Medicine: a primer. *NEJM*. 347(19): 1512-1520

³⁷ Christensen, C.M. (2003) *The Innovator's Dilemma*. Harper Business: New York

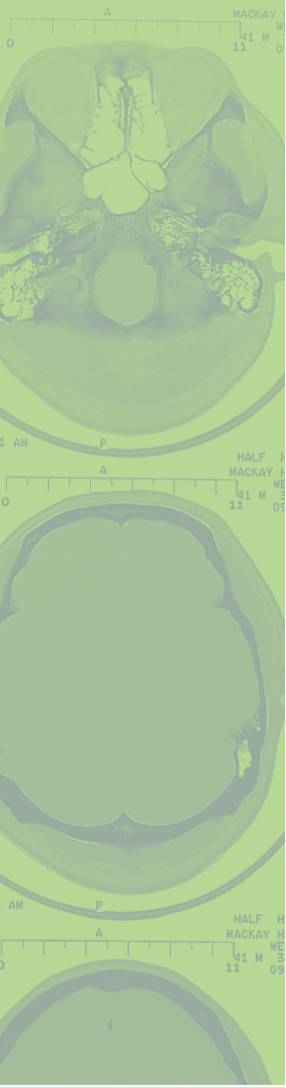


11. Continued technological innovation in miniaturization, cost control, capacity growth.
12. Continued development of new energy sources, contrast media and probes for imaging.
13. Continued development of computerized automated diagnosis (image interpretation)
14. Increased computerization of information, including all health information (electronic health records, smart cards).
15. Federal programs to support the capital costs of technological innovation to serve Canadian health care.
16. Genomics and molecular medicine
17. Telemedicine
18. Further use of robotics in health care.
19. Emergence of nanotechnology applications in medicine.
20. Growing demand for technological solutions to organ replacement.
21. Patient self-testing, self-diagnosis, self-treatment.
22. Further emphasis on prevention leading to increased demand for imaging-based screening programs (i.e. mammograms, bone densitometry).

4.2.4 Likely Pivot Points

(Note: a pivot point indicates that a significant change has already occurred.)

1. When funders (federal and provincial/ territorial governments and regional health authorities) support interventional radiology as an innovative solution to a range of access, safety and quality of care issues.
2. When large health care organizations offer interventional services in units separate from tertiary care facilities and staff these units for pre and post procedure care and community follow up (continuity of care).
3. When image generation and capturing equipment are well distributed among community hospitals and multi-disciplinary clinic sites with PACS links to teaching centers and global consults.
4. When medical licensing authorities accept flexible arrangements for delegated acts across the range of diagnostic and interventional radiology.
5. When access to technical careers is eased with support for re-training at any point in career; just-in-time training; adaptive credentialing and licensing systems; responsive umbrella national licensing with locally negotiated arrangements for oversight, supervision and quality control.
6. When venture capital returns to medical imaging to support application of innovations developed in other technologies.
7. When significant federal investment in medical technologies are part of health care renewal negotiations.
8. When the New England Journal of Medicine prints an article validating computer-automated diagnosis (CAD).
9. When use of artificial, transgenic and xenotransplant organs become common.
10. When direct-to-consumer advertising is allowed in Canada for medical equipment and supplies to support screening, self-diagnosis, self-monitoring and self-treatment.



The median income for single parents with children under 17 living at home was \$26,000, up from \$21,800 in 1990. Seventeen percent (17%) of non-institutionalized seniors were classified as having low-incomes in 2001, a drop from 20% in 1990⁴⁴.

A growing number of Canadians live alone. Over the past 50 years the proportion of Canadians over 15 years of age living alone changed from 2.6% in 1951 to 12.3% in 2002. Four in 10 senior women live alone. In 1971 39% of widowed seniors lived alone; by 2001 that proportion was 72%.

In recent years complementary and alternative medicine has become more widely used as well as socially and politically accepted in North America⁴⁵. Acceptance and use has been higher in Europe for some time and has been a part of the culture throughout Asia for millennia. Fully a third of Canadians use natural health products. The range is from 15% in Atlantic Canada to 41% in B.C.⁴⁶. A much higher percentage (60%) of Canadians has consulted at least one complementary and alternative health care provider (acupuncture, aromatherapy, chelation therapy, chiropractic, herbalists, homeopathy, iridology, massage therapy, reflexology and spiritual healing)⁴⁷. That is a lower percentage than Germany (65%) but higher than France and Australia (50%), the U.S. and Switzerland (40%), Belgium (30%), Sweden (25%) and the UK at 20%. Lower percentages of Canadians (19%) reported seeking the services of an alternative health practitioner to Statistics Canada⁴⁸, but that list of alternative practitioners was less extensive.

Social values have changed over the past decades towards placing much more emphasis on lifestyle choices. Younger workers of all types, including physicians, are willing to work fewer hours than were the 'boomer' generation. Non-work time is protected by both young men and women. More time is spent with families, in leisure pursuits and in exercise. Given the radical post-boomer drop in available workforce and the fewer work hours those following generations are willing to contribute, there will be significant competition for their attention and their careers. Within this context health care is perceived as a conservative and bureaucratic workplace⁴⁹. It is not clear that health care careers, particularly non-physician careers, will attract replacement numbers. Already above market wages are needed to attract and retain technicians, technologists, nurses and therapists. As the boomer generation moves into retirement the workload pressure on remaining personnel will force productivity, flexibility, multi-skilling, cross training and devolved responsibilities.

There are more than 1 million people of Aboriginal ancestry in Canada, over 4% of the population. Aboriginal people are composed of First Nations, Métis and Inuit. Life expectancy has improved for Aboriginal people but their health status is worse than for Canadians as a whole. Injury is the largest cause of death for First Nations people living on reserve⁵⁰. Although there is considerable variation among the three types of Aboriginal peoples, in general they all have higher rates of obesity, diabetes, arthritis and tuberculosis than other Canadians. They also smoke more. The social and economic status of Aboriginal peoples is lower than that of other Canadians by all the standard measures of education level attained, work status and income.

⁴⁴ Statistics Canada. www.gov.ca

⁴⁵ Institute of Medicine (2004) Study Committee convened on complementary and alternative medicine. See website at

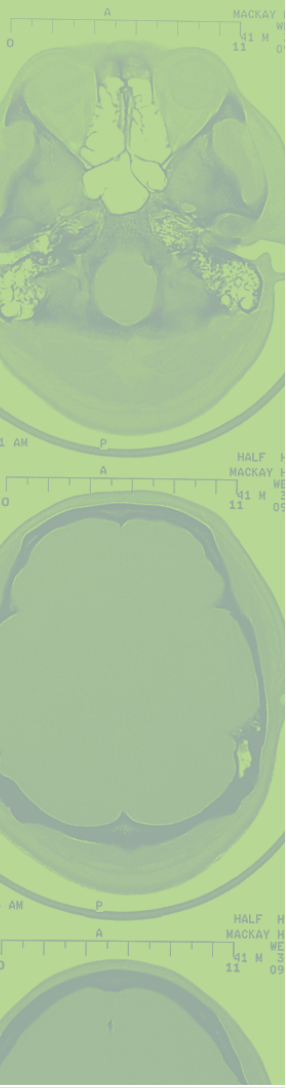
⁴⁶ Berger Health Monitor, March 2001

⁴⁷ Ernst, E. (2000) the role of complementary and alternative medicine. *BMJ*. 321: 1113-1135.

⁴⁸ as reported in CIHI's *Third Annual Review of Health Care in Canada 2002*

⁴⁹ PricewaterhouseCoopers. (2000) *HealthCast 2010*.

⁵⁰ Health Canada (2003) *A Statistical Profile on the Health of First Nations in Canada*



There has been an upswing in the immigrant proportion of Canada's population. In 1991 recent immigrants made up 17.4% of the population; in 2001 the proportion was 18.4%. The vast majority, 73%, of immigrants arriving in the 1990's live in three cities: Toronto, Vancouver and Montréal. Of those immigrating in the last decade, 58% were born in Asia (including the Middle East); 20% in Europe; 11% in the Caribbean/ Central and South America; 8% in Africa and 3% in the U.S. Chinese is the largest single visible minority group in Canada followed by South Asians and Blacks. Together those three groups account for 2/3 of Canada's visible minorities⁵¹. Since the birthrate in Canada is less than replacement at 1.3 children per female, immigration is used a tool for population growth by each province and by the nation as a whole. Efforts have been accelerated and targeted to professionals living in the U.S. and abroad as the climate in other countries turns increasingly insular.

4.3.1.2 Driving Change in the Canadian Social Context

(Note: drivers can exist in the environment without actually causing any change.)

1. Growing disparities in income levels fuelling polarization between those relatively richer and relatively poorer.
2. Work force and population aging.
3. Increasing numbers of single-parent and non-traditional families.
4. Decreasing family social support (including for health care).
5. Increasing use of complementary and alternative medicine.
6. Competition among professions and among work places within and beyond health care, for recruits at all levels of training and experience.
7. Continued difficulty attracting non-physician health care workers.
8. Aboriginal peoples' health and social issues.
9. Immigration, ethnic diversity, multiculturalism.

4.3.1.3 Likely Pivot Points

(Note: a pivot point indicates that a significant change has occurred.)

1. When health care is integrated into cultural and social supports such as day programs for seniors,
2. When health care integrated into specific culture maintenance events and facilities (i.e. the Chinese community in Vancouver owns and operates a culturally sensitive long term care facility)
3. When there is serious discussion at the federal level of guaranteed annual wage support systems.
4. When there is sufficient flexibility in health professional work to attract a higher proportion of recruits; flexible workloads; flexible job descriptions; job sharing.
5. When there is structural change in recruitment inducements and job structure in health professional careers: support for re-training at any point in career; just-in-time training; adaptive credentialing and licensing systems; responsive umbrella national licensing with locally negotiated arrangements for oversight, supervision and quality control.

⁵¹ Statistics Canada. www.gov.ca



4.3.2 The Political Environment

4.3.2.1 Overview

(NOTE: this section was written for the environmental scan section of the project in March 2004. Various predicted events have already occurred by the November 2004 preparation of the Final Report.)

Current speculation is that a federal election will be called in the spring or fall of 2004 under conditions that are not entirely favourable to the incumbent party. This may lead to a federal minority government, which may affect initiatives underway to renegotiate Canada's health care system. On March 26th 2004 federal Minister of Health Pierre Pettigrew indicated the depth of this review by suggesting that opening the *Canada Health Act* would be considered.

Increased accountability within health care will doubtless continue to be a requirement for renegotiation of federal-provincial funding in health care which will occur early in the new government's mandate. To that end the Canadian Health Council has been established, and the Canadian Health Infoway re-funded and extended. This emphasis will further process standardization within health care which will support improvements in software, communications and electronic health records to allow exchange, comparison and analysis of clinical and administrative data sets.

Political concerns about globalization of business have abated as increased scrutiny has forced countries to move toward establishing some level of worker's protections in wages and safety standards. The concern about outsourcing white collar jobs in the U.S. appears to have been absorbed in the recent upswing in U.S. employment figures. Global awareness has had the positive effect of making people aware of the variation in standards for technology, common process and outcomes. As a result there is growing interest in applying global standards throughout health care, such as ISO 9000 and International Health Enterprise (IHE) standards for information exchange. The move to standardization will also encourage national licensure for health professionals, including physicians.

There is also the very real opportunity to reap the rewards of a set of political decisions made a decade ago. The federal investments in R&D and higher education (Canadian Institutes for Health Research, Genome Canada, and the Canada Research Chairs) were designed to transform Canada from a resource based economy into a knowledge society. Those investments require translation of that new knowledge and capacity into innovation in processes and products. Medical imaging and interventional radiology should benefit from that emphasis.

4.3.2.2 Driving Change in Canada's Political Environment

(Note: drivers can exist in the environment without actually causing any change.)

1. Federal election, spring or fall 2004. *(NOTE: this has occurred)*
2. Growing consensus that the current health care funding formula is not fiscally sustainable.
3. Continued globalization of capital, goods, services and labour.
4. Potential for return on investment in supporting Canada's scientists.



4.3.2.3 Likely Pivot Points

(Note: a pivot point indicates that a significant change has occurred.)

1. A minority federal government (may slow health care reform). (*NOTE: this has occurred*)
2. When there is an announcement of a mechanism to suggest changes to the Canada Health Act.
3. When there is an announcement of programs to support or accelerate commercialization of results from Canada's science investments.
4. When there is are perceivable cluster effects (geographic concentrations of skilled labour, education, research, technology development) in Canada which are supported politically and economically.

4.3.3 The Economic Environment

4.3.3.1 Overview

Canada's economy is maintaining its positive growth despite recent national (SARS, avian flu, West Nile) and international challenges (the Iraq war, SARS and avian flu in the Far East). The Bank of Canada predicted economic growth at 2.5% for 2003, which was achieved. Inflation rates in Canada were controlled from 4.3% in March 2003 to 1.1% in March 2004⁵².

The slow recovery in the U.S. economy has continued to strengthen the Canadian dollar which stood at .76 cents at the close of trading March 31st 2004. (*NOTE: the Canadian dollar closed over .85 cents US on November 26th 2004*). This growing strength of the loonie benefits importers (such as those purchasing medical imaging equipment and supplies), but punishes exporters which form the basis of the Canadian economy. Central bank rate reductions would counteract this result. However there is not much room for further interest rate reductions and a 'race to the bottom' in global central bank rates is deflationary. (*NOTE: central bankers in both the US and in Canada have increased interest rates at every opportunity through the summer and fall 2004.*) Much depends on the rate of recovery in the U.S. economy and the management of the growing U.S. debt. Improved U.S. employment figures were released in the first week of April 2004 indicating a strengthening U.S. economy. (*NOTE: still showing strength, but weakening growth as of November 2004*).

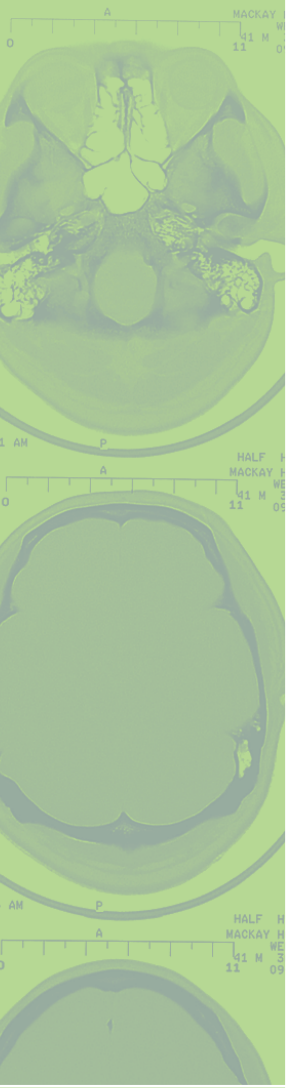
The costs of health care provision will continue to grow. Public health expenditures are projected to rise from 31% to 42% of total provincial and territorial government revenues between 2000 and 2020.⁵³ Public health care costs will grow an average 5.2% annually between 2000 and 2020. Of this growth 1.7% can be attributed to demographic changes (.9% due to population aging and .8% due to population growth). Private health care costs will rise on average by 2.2% annually over the same twenty years.⁵⁴ Adjusted for inflation, public per capita spending on health care is projected to increase by 58%, while public per capita spending on all other governmental services will increase by 17% over the forecast period.⁵⁵

⁵² www.bankofcanada.ca accessed April 1st, 2004.

⁵³ The Conference Board of Canada. (2000) *The Future Cost of Health Care in Canada, 2000 to 2020: balancing affordability and sustainability*.

⁵⁴ *ibid.*

⁵⁵ *ibid.*



Recent analysis produced for the federal Finance Department⁵⁶ projects “sizable increases in total health-care spending as a share of Gross Domestic Product (GDP) over the next 40 years”. The authors conclude that this will be affordable as long as the economy and private spending on health care continue to grow at a moderate pace. Private health care spending, which includes drug plans and user fees, are estimated to grow from 2.5% of GDP now to 5.5% of GDP 40 years from now. Governments’ share of total health care expenses is forecast to remain less than 10% of GDP. Currently 9.8% of the Canadian economy (GDP) is consumed by public and private health care expenses.

Health cost Canada far more than what is spent to treat disease. The economic burden of illness in Canada totalled \$159.4 B based on data collected in 1998. As tracked by Health Canada⁵⁷, costs are divided into direct (health care costs) and indirect costs (loss to societal productivity). **The top five diagnostic categories** accounted for 39% of all costs of illness in Canada, 36% of all hospital expenditures and 23% of total drug spending.⁵⁸

- | | |
|-----------------------------|----------|
| 1. cardiovascular disease | \$18.5 B |
| 2. musculoskeletal diseases | \$16.4 B |
| 3. cancer | \$14.2 B |
| 4. injuries | \$12.7 B |
| 5. respiratory diseases | \$8.5 B |

However, the top five diagnostic categories by direct costs of health care provided produces a slightly different list:

- | | |
|---------------------------|---------|
| 1. cardiovascular disease | \$6.8 B |
| 2. mental disorders | \$4.7 B |
| 3. digestive diseases | \$3.6 B |
| 4. respiratory diseases | \$3.5 B |
| 5. injuries | \$3.3 B |

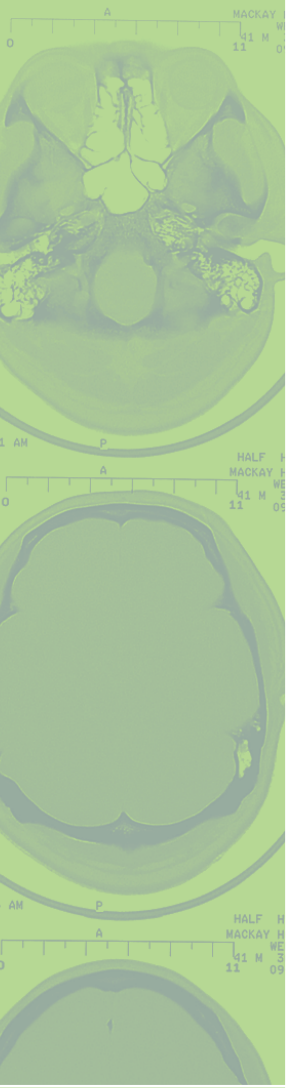
The top five for indirect costs (societal productivity losses) shows the missing demand:

- | | |
|-----------------------------|----------|
| 1. musculoskeletal diseases | \$13.7 B |
| 2. cancer | \$11.8 B |
| 3. cardiovascular disease | \$11.7 B |
| 4. injuries | \$9.5 B |
| 5. nervous system disorders | \$5.5 B |

⁵⁶ Scofield, H. (April 15th, 2004) Medicare study challenges crisis scenario. GlobeandMail.com

⁵⁷ www.hc-sc.gc.ca accessed March 15th, 2004

⁵⁸ Canadian Institute for Health Information. (2003) *Annual Report on Health Care in Canada*.



Economic studies of medical spending as a whole indicate that even the increasing cost of care is a worthwhile social investment in at least the following diagnostic areas: heart attacks, low birth weight babies, depression and cataracts⁵⁹. The study also concludes that the quality adjusted costs of health care are falling over time which is a contrast to the perception of ever increasing total costs for health care. The differential is often found in the increase in amount and type of care provided to more people⁶⁰. This perceptual discontinuity will only grow as the population increases, ages and the capabilities in medicine continue to expand.

The economics of health care will continue the pressure to reduce length of stay (LOS) in institutional settings. That will require faster diagnosis and treatment which in turn will drive increased standardization of practice and process. The action chain in health care pathways will increasingly be documented digitally allowing for detailed scrutiny of duplication, value-added and cost-benefit effects of each action along the care path. Care pathways and all component actions can be compared for differential outcomes. Clinical accountability will be traceable to individuals and individual actions through electronic tags and trails.

Interventional radiology has an opportunity to become a routine choice in target care pathways as an alternative to any procedure that requires any LOS. Telemedicine will be extended to improve access to care, especially access to specialist consults. Improved access will improve screening and diagnosis which will identify high-risk patients sooner and allow initiation of lifestyle and/ or medical management. This should, in turn, decrease demand for interventional radiology and surgery.

4.3.3.2 Driving Change in Canada's Economic Situation

(Note: drivers can exist in the environment without actually causing any change.)

- 1 Canadian economy slowing, but inflation remaining low.
- 2 U.S. economy showing signs of return to health
- 3 Massively growing U.S. debt
- 4 Inexorable growth rates in public and private spending on health care.
- 5 Public demand for access to innovative diagnoses and therapies.
- 6 Continued striving for cost containment in health care.

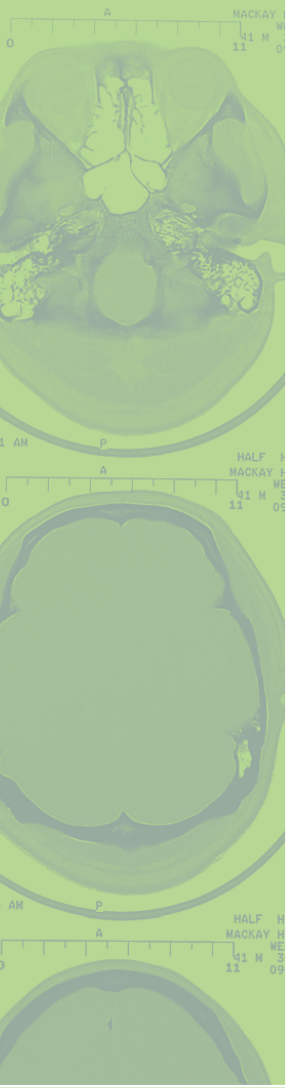
4.3.3.3 Likely Pivot Points

(Note: a pivot point indicates that a significant change has occurred.)

1. When there is a significant re-emergence of inflation in Canada.
2. When the U.S. Federal Reserve Bank raises interest rates for the first time since 2002.
(NOTE: this has occurred)
3. When health care costs escape to grow beyond 50% of provincial revenues.

⁵⁹ Cutler, D.M. & McClellan, M. Is technological change in medicine worth it? *Health Affairs*. 2001. 20 (5): 11-29

⁶⁰ Barer, M. et al. Beneath the calm surface: the changing face of physician-service use in British Columbia 1985/86 versus 1996/97. *CMAJ*. March 2, 2004: 170 (5). doi 10.1053/cmaj.1020460

- 
4. When there is a global disaster sufficient to alter international economies (i.e. destabilization of OPEC would drive the cost of crude oil up substantially and cripple all the industrialized economies).
 5. When there is a serious market destabilization or market correction larger than the 10 to 20% expected.

5. Identifying the Most Critical Drivers

5.1 Background and Methodology

The analysis presented here is the consolidation of expert opinion on the many possible drivers for change present in the complex environment within which CAR and the profession of radiology presently operate in Canada. The task is to select the most influential in shaping the future for CAR and radiology from among all the change drivers and pivot indicators.

Three groups of experts were identified to perform this task:

- The first expert group (N=6) was the CAR Executive representing the radiology profession.
- The second expert group was technology leaders (N=8) as represented by Canadian representatives of major diagnostic imaging hardware vendors.
- The third expert group was leaders of related organizations and other stakeholders (N=5).

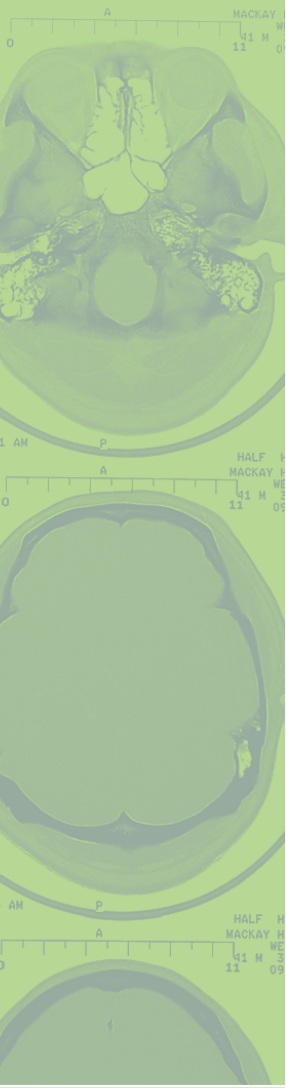
Membership of the second and third groups was determined by the CAR Executive acting as the steering committee for this project.

Each of these three expert groups was asked the following question: ***Which of these drivers and related pivot points will be the most significant in defining the future of CAR and radiology in Canada and why?*** Response sheets were provided to focus and standardize responses for comparability. Opinions from the CAR Executive were submitted individually by email or fax. The technology leaders participated in one of two group teleconferences. The other related stakeholders were individually interviewed.

The general membership of CAR has been informed of the “*Imaging the Future*” project through two electronic newsletters. They and others (CIRA Executive, CAR Provincial Presidents, the CAR Neuro-Radiology Section) interested in providing their views on most influential change drivers were invited to do so by responding to the same question. No responses were received from the general invitation.

5.2 Applications for this Analysis

There were two primary applications for the information contained in this analysis. The primary purpose was to provide instruction on focus to the invitational planning group convened May 1st and 2nd, 2004 to construct alternative plausible visions of the future for medical imaging in Canada.



There is a second utility to this information even in its present form. CAR can use this report as a snapshot outlining which issues are topmost in the minds of three types of stakeholders at this time: the radiology profession, industry and stakeholders in related organizations. Although the numbers of respondents was kept purposely low in order to be both manageable and affordable, examination of the pattern of concerns across the three groups indicates both blind spots and areas of agreement.

5.3 Results

In the area of **Canadian health care** and medicine the drivers chosen as most important by the expert groups were the following:

1. Increased standardization of care through clinical pathways, clinical guidelines, systems and outcomes monitoring. Increasingly these standards will be global best practice standards. This is seen as both a quality improvement issue and as a method to reduce waste by reducing unnecessary variation in practice.
2. Continued professionalization of health care management: better educated/ credentialed; more business orientation and therefore more interest in standardization of health care process, more focus on productivity and cost-efficiency.
3. Accelerated transformation to electronic health records.
4. Continued growth of telehealth and telemedicine to make examination and monitoring routinely available on a remote basis.

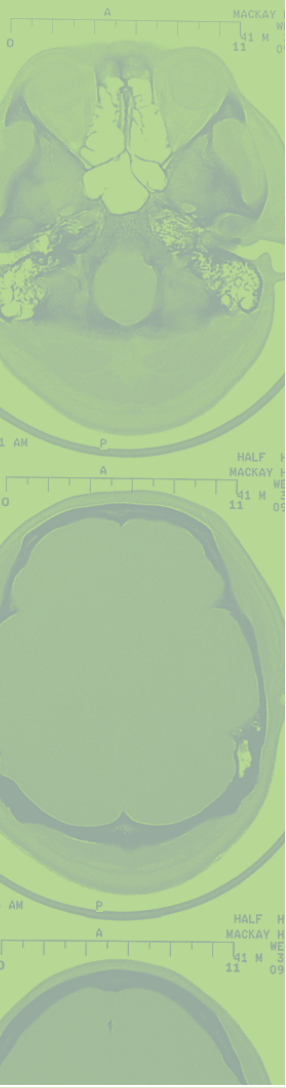
Shaping the future of medical imaging in Canada the following drivers were chosen as most important:

1. Success in positioning interventional radiology as a 'disruptive technology'⁶¹ within health care as a legitimate option to surgery and institutionalized care.
2. Continued interest from technologists in assuming a wider scope of practice.
3. Desire by established medical specialties to absorb the techniques of interventional radiology within their own organ-based scopes of practice.
4. Increased computerization of information, including all health information (electronic health records, smart cards).
5. Continued functional shortages in diagnostic radiology producing perceived lack of access to imaging services.
6. Telemedicine

In the **social context** the following were considered most important:

1. Work force and population aging.
2. Competition among professions and among work places within and beyond health care, for recruits at all levels of training and experience.
3. Continued difficulty attracting non-physician health care workers

⁶¹ Christensen, C.M. (2003) *The Innovator's Dilemma*. Harper Business: New York



Among the **political drivers** the following were considered most important:

1. Growing consensus that the current health care funding formula is not fiscally sustainable.
2. Continued globalization of capital, goods, services and labour.

The chosen **economic drivers** were:

1. Public demand for access to innovative diagnoses and therapies.
2. Continued striving for cost containment in health care.

There was considerable convergence across the three expert groups in their choices of important drivers in social, political and economic areas. There was considerably more divergence between the three groups in what they considered important in the change drivers for Canadian health care and for medical imaging in Canada.

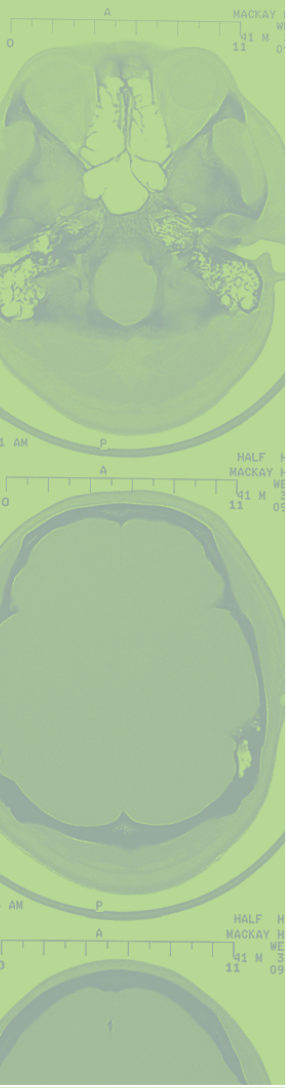
A number of “blind spots” could also be identified in the data. A “blind spot” is a topic that not chosen by a group that the other groups considered important. For example, no one in the industry groups considered professionalization of healthcare management an important driver, but a large majority of the other two groups did choose that factor as important. Again in medical imaging, industry was not impressed by the factor “desire of other specialties to absorb interventional radiology”, but the majority of the Executive and at least one of the other stakeholders considered that as important. Increased computerization of records was important to the Executive and to industry but not to the other stakeholders. Genomics and molecular biology got votes from industry and from the other stakeholders but not from the Executive. Complementary and alternative medicine was seen as an important factor in the social context by industry and by the other stakeholders but not by the Executive.

Only a few respondents indicated which pivot points they considered most indicative, so this data will not be reported here.

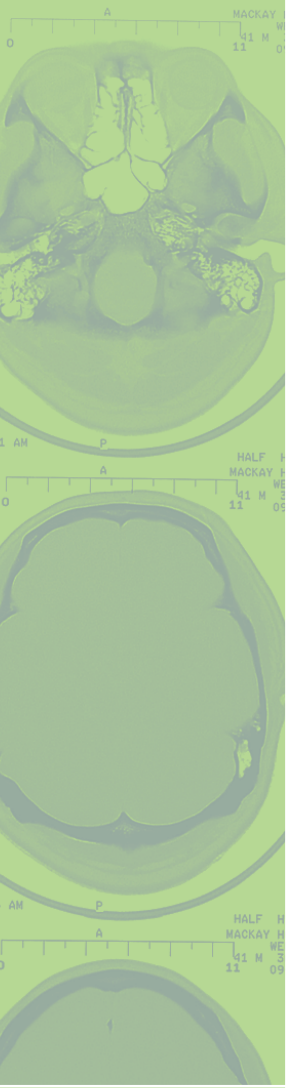
5.4 Compiled Responses across Expert Groups

(NOTE: consensus areas and blind spots are highlighted)

Drivers in CDN Health Care	Chosen by Exec	Chosen by Industry	Chosen by stakeholders	choice %ages
#4 increased standardization	chosen by 6 of 6	chosen by 2 of 8	chosen by 3 of 5	58%
#2 professionalization of health care management	chosen by 4 of 6	Significant blind spot	chosen by 3 of 5	37%
#5 electronic health records	chosen by 4 of 6	chosen by 2 of 8	chosen by 1 of 5	37%
#6 further rationalization of health care delivery including across provinces	chosen by 3 of 6			16%
#12 emphasis on local accessibility	chosen by 2 of 6			11%
#13 telehealth and telemedicine	chosen by 2 of 6	chosen by 1 of 8	chosen by 3 of 5	32%
#7 decreased opportunity for physicians to introduce variations	chosen by 1 of 6			5%
#8 targeted federal monies in areas of provincial jurisdiction	chosen by 1 of 6	chosen by 3 of 8	chosen by 1 of 5	26%
#14 emphasis on team delivery	chosen by 1 of 6		chosen by 2 of 5	16%
#15 public as consumer	chosen by 1 of 6		chosen by 1 of 5	11%
#17 patient/ provider safety	chosen by 1 of 6		chosen by 1 of 5	11%
#18 academic health centers as innovation leaders	chosen by 1 of 6		chosen by 2 of 5	16%
#1 Canada Health Council		chosen by 1 of 8	chosen by 1 of 5	11%
#10 change from silo funding		chosen by 2 of 8		11%
#11 prevention		chosen by 1 of 8		5%
#16 consumer sophistication		chosen by 1 of 8	chosen by 1 of 5	11%



Drivers in Medical Imaging	Chosen by Exec	Chosen by Industry	Chosen by stakeholders	choice %ages
#2 desire by other specialties to absorb interventional radiology	chosen by 4 of 6	significant blind spot	chosen by 1 of 5	26%
#5 positioning interventional radiology as an option to surgery	chosen by 3 of 6	chosen by 3 of 8	chosen by 2 of 5	42%
#7 wider scope for techs	chosen by 4 of 6	chosen by 1 of 8	chosen by 2 of 5	37%
#12 increased computerization of all records	chosen by 4 of 6	chosen by 1 of 8	significant blind spot	26%
#6 access to imaging	chosen by 2 of 6	chosen by 2 of 8	chosen by 1 of 5	26%
#11 communication capabilities	chosen by 2 of 6		chosen by 1 of 5	16%
#15 telemedicine	chosen by 2 of 6	chosen by 1 of 8	chosen by 2 of 5	26%
#1 energy of SCIR & CIRA	chosen by 1 of 6		chosen by 1 of 5	11%
#8 continued tech innovation	chosen by 1 of 6		chosen by 1 of 5	11%
#10 continued diffusion of imaging	chosen by 1 of 6			5%
#13 federal programs to support capital costs	chosen by 1 of 6	chosen by 2 of 8	chosen by 1 of 5	21%
#9 new energy sources		chosen by 1 of 8	chosen by 1 of 5	11%
#14 genomics/ molecular medicine	blind spot?	chosen by 2 of 8	chosen by 2 of 5	21%
#16 robotics		chosen by 1 of 8		5%
#3 IR inside radiology or not			chosen by 1 of 5	5%
#18 nanotechnology			chosen by 1 of 5	5%
#19 organ replacement			chosen by 1 of 5	5%



Drivers in Social Context	Chosen by Exec	Chosen by Industry	Chosen by stakeholders	choice %ages
#2 workforce & population aging	chosen by 5 of 6	chosen by 5 of 8	chosen by 5 of 5	79%
#6 recruitment competition for professionals	chosen by 4 of 6	chosen by 3 of 8	chosen by 3 of 5	53%
#7 difficulty attracting non-physicians	chosen by 3 of 6	chosen by 1 of 8	chosen by 2 of 5	32%
#1 income disparities	chosen by 2 of 6	chosen by 1 of 8	chosen by 2 of 5	26%
#4 decreasing family support	chosen by 1 of 6			5%
#5 complementary & alternative medicine	Blind spot?	chosen by 2 of 8	chosen by 1 of 5	16%
#3 increase in single parent and non-traditional families		chosen by 1 of 8		5%

Drivers in Political Context	Chosen by Exec	Chosen by Industry	Chosen by stakeholders	choice %ages
#2 health care funding formula not sustainable	chosen by 5 of 6	chosen by 6 of 8	chosen by 5 of 5	84%
#3 globalization	chosen by 4 of 6	chosen by 1 of 8	chosen by 2 of 5	37%
#1 federal election	chosen by 2 of 6	chosen by 1 of 8	chosen by 2 of 5	26%
#4 ROI from Cdn scientists	chosen by 1 of 6	chosen by 1 of 8	chosen by 1 of 5	16%

Drivers in Economic Context	Chosen by Exec	Chosen by Industry	Chosen by stakeholders	choice %ages
#5 public demand	chosen by 6 of 6	chosen by 6 of 8	chosen by 3 of 5	79%
#6 cost containment	chosen by 5 of 6	chosen by 6 of 8	chosen by 3 of 5	74%
#4 growth rates in HC funding	chosen by 4 of 6	chosen by 1 of 8	chosen by 2 of 5	37%
#1 slowing Cdn economy	chosen by 2 of 6		chosen by 1 of 5	16%
#2 US economy recovering	chosen by 2 of 6		chosen by 1 of 5	16%
#3 US debt	chosen by 1 of 6		chosen by 1 of 5	11%



6. Alternate Scenario Development

From the above consensus on most critical drivers, three were chosen as most likely to be influenced by CAR:

1. cost containment,
2. manpower and
3. interventional radiology

The scenario method was employed to develop choices for CAR in each of the critical topics. This method focuses debate on potential real futures. Alternate concrete scenarios are constructed to illustrate different possible approaches to each of the factors chosen as key drivers of the future. From among the many possible alternative scenarios, the most likely to occur are then presented to stakeholders for reaction.

The scenario brainstorming and development was initiated by a planning group meeting during May, 2004 and completed at distance by the same group during the subsequent weeks. The scenarios were presented in a written survey to all CAR members and to four focus groups of members for elaborated discussion.

7. Testing Scenarios through Focus Groups

7.1 Focus Group Methods

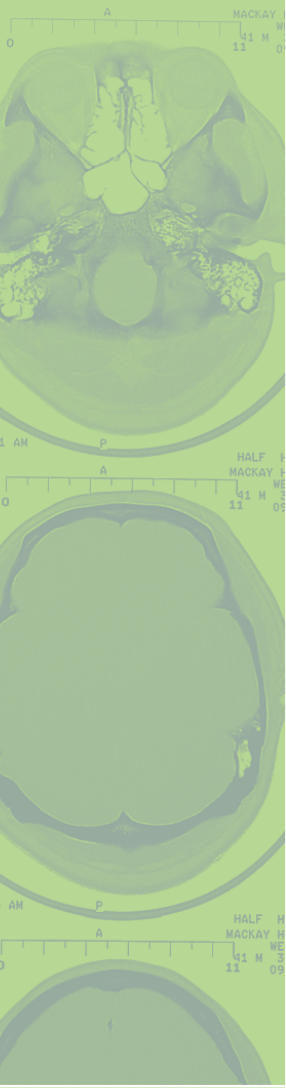
Thirty focus group participants were selected from among pre-registered attendees at the International Congress on Radiology held in Montréal at the end of June 2004. Participants were selected by N. Laberge, Chief Executive Officer of the Canadian Association of Radiology (CAR) and contacted by CAR staff.

Participants were grouped as follows:

- ⊙ Group #1: were all hospital-based radiologists (N=5)
- ⊙ Group #2: were clinic-based radiologists (N=7)
- ⊙ Group #3: were radiologists with considerable experience in volunteer leadership positions within the profession (N=13)
- ⊙ Group #4: were radiologists who were not usually involved in the professional leadership activities of the profession (N=5)

All groups were facilitated by L. Curry, Ph.D. who was not informed of the assignment to group or the group characteristics. The facilitator had no relationship with any participant and was not known to any participant.

Two groups were conducted on Saturday, June 26th 2004; one at 0800 hours and one at 1130 hours. Groups #3 and #4 were conducted on Sunday, June 27th in the same two time slots. All groups lasted 1.5 hours. Breakfast was served at the 0800 sessions and a boxed lunch at the noon sessions.



All groups followed the same protocol which introduced participants, reviewed the *Imaging the Future* planning project and reiterated the purpose of the focus groups in the project:

Participants were then distributed a copy of the *Imaging the Future* survey and introduction letter (please see Appendices) and invited to complete the survey individually. Once everyone had completed the survey, the facilitator guided discussion of each topic noting the spread of opinion on each topic, the rationales provided to support each opinion. After everyone's initial position was heard from, open discussion was encouraged and any changes of position noted. Discussion on each topic concluded with the collection of actions suggested to CAR to implement preferred futures. Votes and discussion were recorded in real time by the facilitator. Completed questionnaires were collected and turned over immediately to CAR staff.

7.2 Results from Group #1 (Hospital-based radiologists)

7.2.1 On Cost Containment Scenarios

The five participants were split with two supporting position 2 (leaning toward universality) and three supporting position 3 (leaning toward de-listing).

Rationales presented by those supporting the #2 position were:

- ⊙ this side is easier for physicians than is delisting
- ⊙ "people expect the government to pay for all illness related care"

Rationales presented by those supporting position #3:

- ⊙ "There is a disconnect between the growth of funding and the growth of technology. Something has to give."
- ⊙ "Universality is no longer practical."
- ⊙ "There is a lag in resources and equipment."

Suggestions to CAR on this topic:

- ⊙ "Work up guidelines for appropriate use".
- ⊙ "Use expert panels to provide scientific credibility to these criteria for use".
- ⊙ "Provide this info to referring docs, med schools and others to modify their utilization pattern".
- ⊙ Do a better job of informing the public about the cost/ benefit/ harm/ contra-indications and appropriate use.
- ⊙ Become the point of unbiased information on appropriate use.



7.2.2 On the Workload Scenarios

Four of the five participants supported position 3 (leaning toward re-defining DI) and one supported 2 (leaning toward setting standards).

The position 2 supporters wanted “to train techs to work under the supervision of a radiologist, but we must resist other doctors doing diagnostic imaging”.

Those supporting position 3 felt that “this is the most flexible response to the current manpower crisis”, and that “the workload requires more service with less manpower”. One felt “that diagnostic imaging will move to alternate funding and then it won’t matter who does what”.

In this topic the following suggestions were made to CAR:

- “lobby governments for more medical school and residency slots”.
- “play a leadership role in recruiting more techs”.
- “define the inter-professional turf issues: training and procedures”.
- “help diagnostic imaging services work out timely service patterns for their facilities”.
- “help diagnostic imaging build up partnerships with other specialties rather than be in the turf protection game”.

7.2.3 On the Interventional Radiology Scenarios

Four of the five participants registered a 5 (no opinion) and one voted for a 1 (no extra funding for interventional radiology).

The ‘no opinions’ were unanimous in their support for interventional radiology, but not at the expense of diagnostic imaging. They see the DI envelope as fixed and even if it does grow, they want the additional funds put to additional DI capacity.

- “I want to be proactive, but I do not want to take money away from DI”.
- “The money for interventional should come from services that it displaces, like surgery”.

Recommendations to CAR included:

- “Be proactive in supporting long term planning”. Governments and facilities must plan in order to redistribute funds from areas that interventional radiology will replace.
- “Work with governments and the Royal College on minimum standards for training and operations of interventionalists”.



7.3 Results from Group #2 (Clinic-based radiologists)

7.3.1 On Cost Containment Scenarios

At this point there were five participants in this group; split two for position 2 (leaning toward universality) and three supporting position 3 (leaning toward de-listing).

Supporters of position 2 felt that this would lead more quickly to private clinics across the country and that would allow private money to flow into DI both from investors in the clinics and the public willing to pay for immediate access.

Position 3 supporters believed that there was waste in the current operation of DI across the country and that should be eliminated before anything more drastic was attempted.

There was general agreement in the room that there was “some” to “a lot” of unnecessary DI testing but that the “demand” was growing. Initially this increase in demand was attributed to “patients” but on questioning that was modified to at least include referring docs.

Suggestions to CAR included:

- ⦿ “Suggest wait list guidelines” (acceptable lengths of time to wait for DI services). They believe was that this will hasten 2-tier system.
- ⦿ “directly support a 2 tier-system”.
- ⦿ “work up and publicize criteria for appropriate use of DI”.
- ⦿ “Communicate to the public the necessary standards for training and practicing DI”. This was felt to be a rationale for extended waiting times.

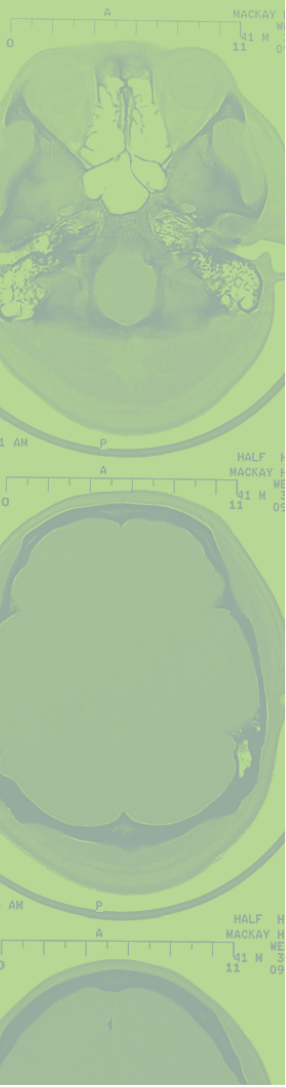
7.3.2 On the Workload Scenarios

The group had grown by this time to seven people. Three supported position 2 (leaning toward setting standards); two supported position 3 (leaning towards redefining DI) and two supported position 4 (redefine DI).

Those supporting position 2 wanted to indicate their opposition to other physicians doing DI work. They were particularly distressed with the potential for abuse of self-referral in these circumstances.

The position 3 supporters focused on the delegation to techs and were pleased to expand this, but were wary of “abandoning the field to other doctors”.

The position 4 supporters felt that this best reflects reality and puts radiology in a positive position “moving forward and not defending a long ago status quo”.



Suggestions in this area were:

- ⦿ “Insist that any DI work done on self-referral not be paid for”. So it would be OK for ER docs to take and read film and do ultrasound as long as these procedures were considered part of their basic diagnosis and not paid for in addition to their fee for diagnosis.
- ⦿ “Insure that the minimum training standards for others docs are serious” by which they meant “matched to the training requirements for radiologists”.

7.3.3 On the Interventional Radiology Scenarios

Three participants supported position 1 (no extra funding for interventional radiology) and four had ‘no opinion’ (position 5).

All seven participants are opposed to taking resources from DI for redistribution to interventional radiology.

Recommendations to CAR were:

- ⦿ “Leave the whole issue to the provinces to resolve”. (From one individual, an opinion that was not supported by anyone else in the room).
- ⦿ “Should not support redistribution of funding inside DI [to interventional radiology] even in the short term”.
- ⦿ “Promote interventional radiology but only with new money”.

7.4 Results from Group #3 (politically experienced radiologists)

7.4.1 On Cost Containment Scenarios

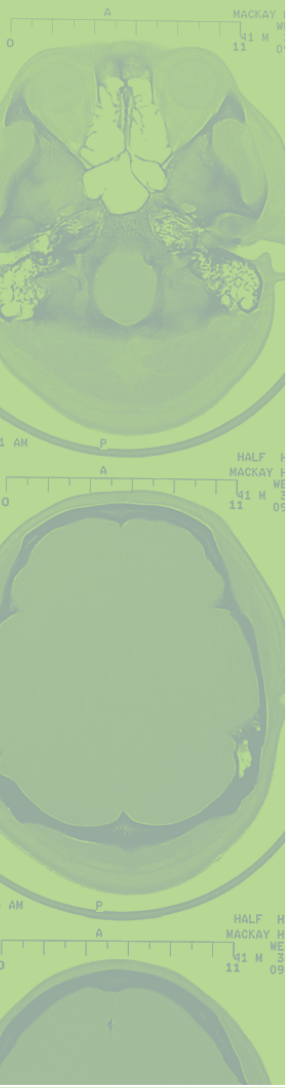
There were 13 participants in this group. They split their votes across positions with the majority (nine) supporting positions 3 (leaning toward de-listing) and 4 (de-listing). The split was as follows: two supported position 1 (universality); two supported position 2 (leaning toward universality); six supported position 3 (leaning toward de-listing) and three supported position 4 (de-listing).

Those supporting position 1 believed that there are sufficient resources available but that governments do not allocate enough to health care (and DI in particular). One believed that available resources could be managed better with private management.

The position 2 supporters announced themselves as “on the fence” but supportive of better management. Somehow they think that ‘better management’ would “cut out the excesses and misuse of DI”.

Many of the position 3 supporters saw this as a way to hasten privatization of DI, or a public-private mix. One participant thought that “careful choice of what is to be de-listed under what conditions would work to reduce costs significantly”. Others see this as a method to reduce patient demand.

One of the 4’s sees this choice as “pragmatic, but likely to cause a negative reaction from the public”. Two others see this choice as a way to increase “patient accountability and reduce demand”.



NOTE: when queried about the mechanism of ‘patient demand’ this group also changed the rhetoric to include referring physicians as a demand source.

Recommendations were:

- ⦿ “Review existing criteria for DI and use that as a base” [for de-listing].
- ⦿ “Consider how to put some teeth into de-listing. It can’t just be a suggestion”.

7.4.2 On the Workload Scenarios

Again this group split their votes, but the majority (ten) supported positions 3 and 4. Three supported position 2 (leaning toward setting standards); two supported position 3 (leaning toward redefining DI) and eight supported position 4 (redefine DI).

One position 2 supporter wants to retain radiologists doing the entire work spectrum “as a continuity of care issue”. Another insists that all other physicians doing DI work meet the same training standards as required for radiologists. The third is concerned about the effect of self-referral.

The position 3 and 4 supporters had the same rationales:

- ⦿ “it is OK to identify things to let go” (especially to ‘practice assistants’, or some new title given to techs with advanced training).
- ⦿ ‘Identify those areas where radiology adds value to DI and concentrate there”.
- ⦿ “these areas will be defined by what other specialties take away”.
- ⦿ “I want time and space to accommodate new technologies so I am happy to give away some low level stuff.”
- ⦿ “DI as a consultant.”
- ⦿ “It would trivialize the profession to attempt to hold on to everything”.

In this area the recommendations were:

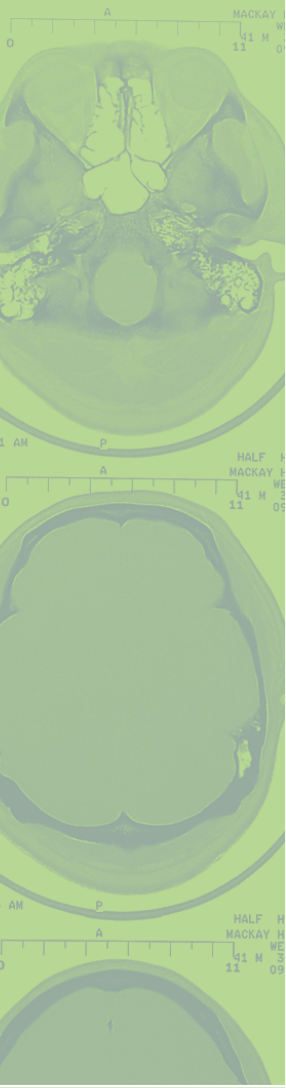
- ⦿ “Figure out how to control growth areas like CT”. (Perception of over use but also wider deployment of machines).
- ⦿ Work with the profession and with facilities to identify appropriate areas, acts, procedures and mechanisms to delegate.

7.4.3 On the Interventional Radiology Scenarios

One person advocated for position 1 (no extra funding for interventional radiology); three supported position 2 (leaning toward no extra funding); eight supported position 3 (learning toward more resources) and one supported position 4 (more resources for interventional radiology). One had ‘no-opinion’.

The position 1 supporters saw “this as the death of DI”.

The position 2 supporters want to “concentrate on the high end of interventional radiology,



areas that require skill” and devolve the lower end (i.e. “PIC lines to nurses and others”.) They believe that this will free up extra resources to support interventional radiology.

The position 3 and 4 supporters want to find “areas in DI with low yield or utility, then stop doing those and reinvest those savings in IR and other high end DI”.

The ‘no opinion’ wanted interventional radiology supported from outside the DI envelope.

Only one recommendation was made:

- “Find those areas with low yield and work [with facilities] to reinvest those funds in IR”.

7.5 Results from Group #4 (politically inexperienced radiologists)

7.5.1 On Cost Containment Scenarios

This group began with only four participants, all of whom chose position 3 (leaning towards delisting).

Reasons for the choice centered on the need to “cease non-required DI work”. De-listing was seen as “more effective than the educational approach” although two others favoured “educating referring docs to appropriate use of DI” and wanted “standardized practice guidelines to indicate appropriate use of DI” for both referring docs and the public.

Recommendations include:

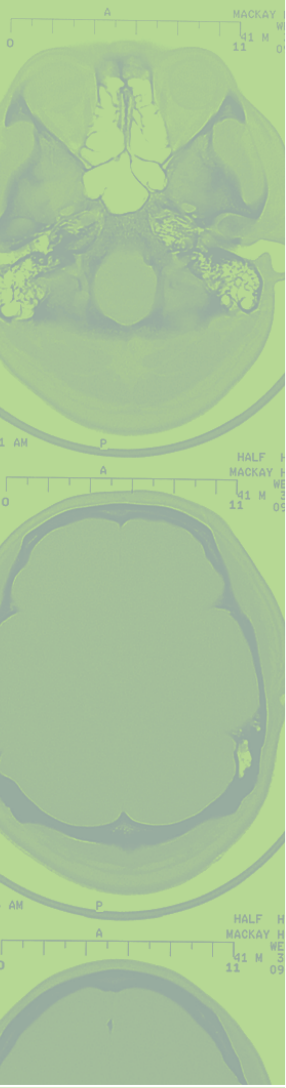
- “Educate the public and [referring] doctors on the appropriate use of DI and the safety concerns from overuse and misuse”.
- “Approach de-listing from an evidence-based perspective”.
- “This is the most important thing to do. This is necessary to make the other issues (in the survey) work”.

7.5.2 On the Workload Scenarios

By this point the group had five members. On this issue they split with one voting for position 1 (keep current standards) and the other four supporting position 3 (leaning toward redefining DI).

The position 1 supporter “wants to outlaw self referral” and is concerned that any devolution of practice scope “will accelerate total dissolution of the profession”.

The position 3 supporters believe that parts of the scope “will slip away whatever we do” but they “want to control the outflow”. One “doesn’t think that DI can set standards for any other profession that would be listened to seriously”.



Recommendations were:

- ⦿ Pressure governments for more med school and residency slots for radiologists (if there were more supply to meet demand, then there would be less pressure to devolve scope to others).
- ⦿ Pressure governments to allow communities to buy slots in radiology residencies with agreements to return to service the community for a specified period of time.
- ⦿ Pressure governments to allow foreign trained radiologists to meet standards and practice.

7.5.3 On the Interventional Radiology Scenarios

Votes split across the range of choices: one for position 2 (leaning toward no extra funding for IR); two for position 3 (leaning toward more resources for IR); one for position 4 (more resources for IR) and one 'no opinion'.

The reason for the 'no opinion' and the position 2 supporter was that any extra resources should come from outside DI.

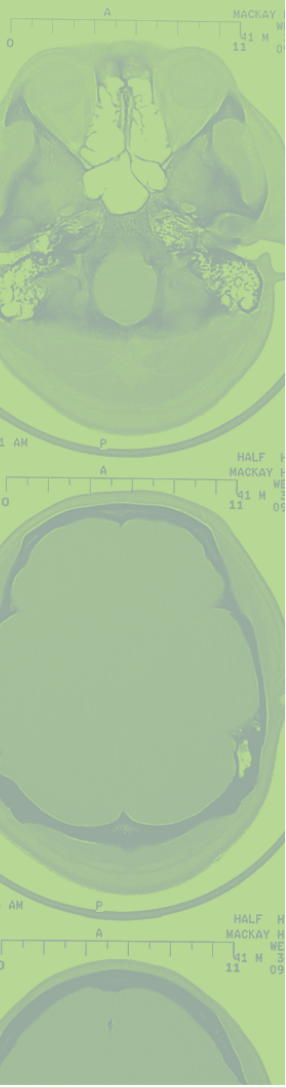
The position 3 and 4 supporters believed that resources to support IR could be recouped within facilities from replaced surgeries, medical management of vascular conditions and other areas that IR could replace more efficiently and effectively.

Recommendations were to:

- ⦿ Work with other specialties to identify those areas where the evidence supports IR replacing other current procedures/ processes and where they might (advocate for research in these latter areas to build the science base for decision making).

7.6. Focus Group Results Tables

The following section combines results across the four focus groups. Note that two additional members joined Group #2 and one more joined Group #4 after the discussion had begun on the first topic (cost containment). Therefore their votes on that first subject are not recorded.



		Groups				Total
Topics	choices	1	2	3	4	
		hospital based	clinic based	experienced volunteers	uninvolved	
		n=5	n=7	n=13	n=5	n=30
Cost Containment						
	1. universality	0	0	2	0	2
	2. leaning toward universality	2	2	2	0	6
	3. leaning toward de-listing	3	3	6	4	16
	4. de-listing	0	0	3	0	3
	5. no opinion	0	0	0	0	0
Work Load						
	1. keep current standards	0	0	0	1	1
	2. leaning toward setting standards	1	3	3	0	7
	3. leaning toward redefining DI	4	2	2	4	12
	4. redefine DI	0	2	8	0	10
	5. no opinion	0	0	0	0	0
Interventional Radiology						
	1. no extra funding	1	3	1	0	5
	2. leaning toward no extra funding	0	0	3	1	4
	3. leaning toward more resources for IR	0	0	7	2	9
	4. more resources for IR	0	0	1	1	2
	5. no opinion	4	4	1	1	10



7.7 Summarized Focus Group Results

7.7.1 On Cost Containment Scenarios

The clear message from the focus groups is their preference for proactive action from the profession through CAR to identify diagnostic imaging services with low yield or circumstances in which the information added does not justify the cost or hazard. This information about the relative utility of procedures should be provided both to referring physicians and to the public.

There is considerable interest in bargaining with government for resources 'saved' in the system by this 'de-listing' or elimination of low yield or inappropriate imaging. In this manner the cost savings to the system would not be entirely 'lost' to radiology. Some portion could be retained to reward the range of behaviour change required to sustain more efficient use of diagnostic imaging resources. For example, some fraction of these savings to the health care system could be reinvested in interventional radiology.

7.7.2 On the Workload Scenarios

The preponderance of opinion in the focus groups favoured devolution of selected practice acts. Everyone was comfortable with delegation to techs under the supervision of a radiologist. Not everyone was content to identify areas to delegate to other physicians. The most often repeated reason for this concern was the potential abuse that can come from self-referral for DI services.

7.7.3 On the Interventional Radiology Scenarios

There was no central tendency in choices across the focus groups in this topic. The only area on which almost everyone was agreed is that resources to support the growth of IR should not come at the expense of current or future resources for DI.

8. Testing Scenarios through Membership Survey

8.1 Survey Methods

The survey and an accompanying introductory letter from L. Stein, CAR President was mailed to all CAR members on June 15th, 2004. Members were instructed to complete the survey on-line through the CAR web-site or to fill in the hard copy and return it by fax. A total of 1388 surveys were mailed. Responses were tracked by unique identifier (the membership number) so that respondents could be eliminated from further follow up. Identifiers were stripped from responses before entering analysis.

Three followups were pursued during July and August 2004. These took the form of two email reminders sent to non-responders; one at the end of July and a second in mid-August. A third reminder was surface mailed to all remaining non-responders at the end of August 2004. As of the end of August a total response of 513 (37%) were received. In early September a decision was reached to extend the survey by another month and send out one last letter from the CAR President requesting responses from non-responders. Responses were closed off as of Friday October 8th, 2004 with a response from 676 members (46%).

Not all respondents replied to all survey questions. Any section completed on the survey was included in analyses however which leads to small variations in the total response to any one section.

8.2 Response Rates by Demographics

8.2.1 Gender

Responses were received from 545 (81%) men and 131 (19%) women, however, 77% of the CAR's membership is male and 23 % is female.

8.2.2 Years in Practice

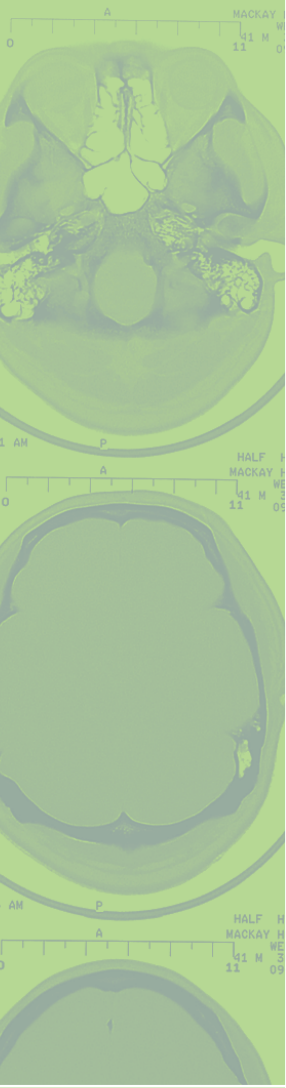
More responses were received from younger members than would be expected from their proportion in the membership (compare the third column versus the fifth column in the following table).

years in practice	number of responders	% responders	number in the membership	% in the membership
0 - 5	63	9%	69	5%
6 - 15	210	31%	375	27%
16 -25	179	26%	402	29%
more that 25	224	33%	542	39%

8.2.3 Province or Territory

Very good response rates were achieved for PEI and NS. Readers can have full confidence that the responses received are an accurate representation of opinion from within those provinces. The approximately 50% response rates for BC, MB, NB and SK allows reasonable confidence that the results obtained are a fair representation of opinion variance in those provinces. The remaining provinces, AB, NF, ON and PQ achieved response rates in the mid to high 40% area, which is considerably better than the 1/3 response rates achieved in most surveys of physicians. However, some caution should be exercised in interpreting results from these provinces.

	AB	BC	MB	NB	NF	NS	ON	PE	PQ	SK	totals
Total radiologists	188	169	50	43	30	72	389	6	495	35	1477
Responders	78	90	24	20	13	44	174	5	206	19	673
Non-responders	110	79	26	23	17	28	215	1	289	16	804
Percent response	41%	53%	48%	47%	43%	61%	45%	83%	42%	54%	46%
average of averages										52%	



8.2.4 Type of Practice

A majority (60%) of respondents have clinic experience as part of their current practice pattern. Most of these (90%) combine work in clinics with work in hospitals.

N =	676	100%
Hospital-based only	170	25%
Clinic-based only	58	9%
Teaching hospital-based only	102	15%
Hospital and clinic	168	25%
Teaching hospital and clinic	178	26%

8.2.5 Leadership Experience

Slightly more than a third of respondents report having recent leadership experience.

N =	676	100%
Yes	240	36%
No	436	64%

8.2.6 Practice Funding Type

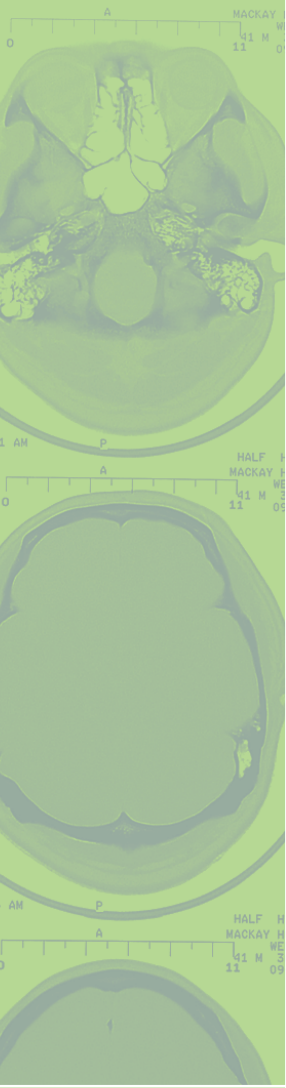
More than one third of respondents have at least part of their practices funded by other than public sources.

N =	675	100%
Yes	265	39%
No	411	61%

8.3 Numeric Results for Scenarios Presented

8.3.1 Cost Containment Scenarios

In the first topic, cost containment, pooled responses are almost evenly split between those favouring a universality direction (50%) and those favouring a de-listing direction (46%).



N =	676	100%	
Universality	164	24%	
Leaning toward universality	176	26%	50%
Leaning toward de-listing	173	26%	
De-listing	138	20%	46%
No opinion	25	4%	

Those with leadership experience were slightly more disposed towards maintaining universality (55%) than the pooled averages above.

There were some divergences by years in practice in this pattern of an even split between maintaining universality and de-listing. Among those in practice more than 25 years there was a slight preponderance of opinion favoured delisting (42% for universality versus 54% for de-listing). In contrast those in practice between 16 and 25 years preferred the scenario that maintained universality (58% to 40%).

	0-5 years	6-15 years	16-25 years	more than 25 years
Universality	17%	24%	30%	22%
Leaning toward U	33%	29%	28%	20%
Leaning toward de-listing	16%	27%	25%	28%
De-listing	29%	17%	15%	26%
No opinion	5%	3%	3%	4%

There were significant differences noted across provinces in this area. BC, MB, NB, NS, ON, PEI and PQ all had an even split in opinion between universality and de-listing. BC, NF and SK all preferred the universality options by 60% or better. An unusually large number (13%) of MB and 20% of PEI respondents indicated “no opinion” on this issue.

	AB	BC	MB	NB	NF	NS	ON	PE	PQ	SK
Universality	27%	16%	13%	30%	38%	27%	31%	0%	20%	37%
Leaning toward U	38%	28%	29%	20%	23%	27%	18%	40%	26%	32%
Leaning toward de-listing	17%	29%	33%	30%	23%	32%	26%	20%	26%	11%
De-listing	13%	26%	13%	20%	8%	11%	20%	20%	26%	21%
No opinion	5%	2%	13%	0%	8%	2%	5%	20%	2%	0%

There was no effect on this average pattern from gender or source of funding for practice.

8.3.2 Workload Scenarios

No clear direction was obtained on the second topic, approach to workload, with 56% favouring keeping the current standards and 42% wishing to redefine diagnostic imaging. This 14% observed difference was well within the margin of error likely due to the moderate overall response rate.

N =	676	100%
Keep Current Standards	269	40%
Leaning toward standards	109	16%
Leaning toward redefining	133	20%
Redefine Diagnostic Imaging	146	22%
No opinion	19	3%

Having some exposure to non-public sources of practice funding moves opinions toward keeping current standards (60%).

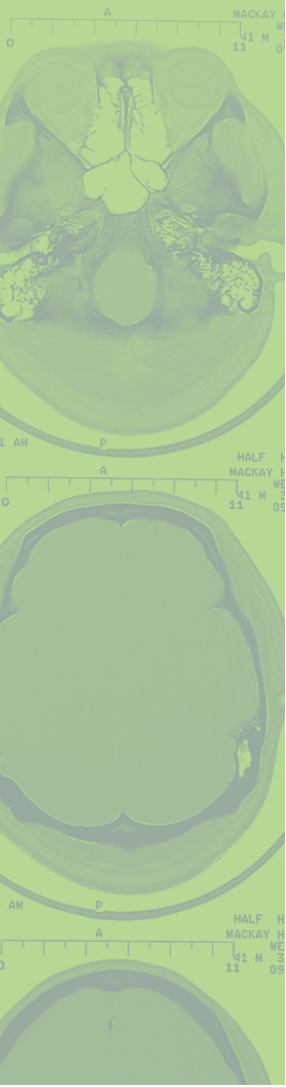
Maintaining current standards was well supported in AB (71%), NB (70%), NF (69%) and SK (65%) and less than average in BC (41%) and PEI (20%).

There was no effect on this average pattern from gender, leadership experience or years in practice.

8.3.3 Interventional Radiology Scenarios

The third topic regarding the role of interventional radiology was more clearly decided across respondents with 19% wanting to provide no extra funding for interventional radiology and 71% favouring redirecting resources from within diagnostic imaging to support interventional radiology. It is noteworthy that 11% of respondents reported that they had 'no opinion' on this issue, more than twice the number reporting 'no opinion' on the previous two issues.

N =	676	100%
No extra funding for interventional radiology	60	9%
Leaning toward no extra funding	65	10%
Leaning toward more resources for interventional radiology	169	25%
More Resources for interventional radiology	310	46%
No opinion	72	11%



There was no effect on this average pattern from gender, leadership experience and years in practice or source of funding for practice. There were no provincial differences in this pattern either with the exception of SK where respondents have more than average (84%) support for providing more resources to IR from within radiology allotments.

8.4 Limitations to Interpretation

Roughly half of CAR members responded to the survey. Because we have comparable total figures in the membership database we know that responses to this survey slightly under represent female members and members in Alberta, Newfoundland and Québec. We have no information on how responses represent the actual mix of practice types, leadership experience or practice funding mix among members.

As we have no opinion registered from half of the members it would be a serious error to assume that the responses to the three core issues are drawn equally from the full spectrum of opinion on these issues. Interpreting the response to presented issues must be hedged with caution that the reported tendencies might well be from one end, or the other, of the opinion spectrum rather than an accurate reflection of average, or even modal, opinion.

8.5 Interpretation of Quantitative Data

The survey provides little guidance to decision makers in two of the three key issues. In both cost containment and workload there is roughly as much support among survey responders for supporting the status quo as there is for initiating significant change. Only in the area of interventional radiology is there a clear preference among responders and that is to find resources to support interventional radiology from within diagnostic imaging.

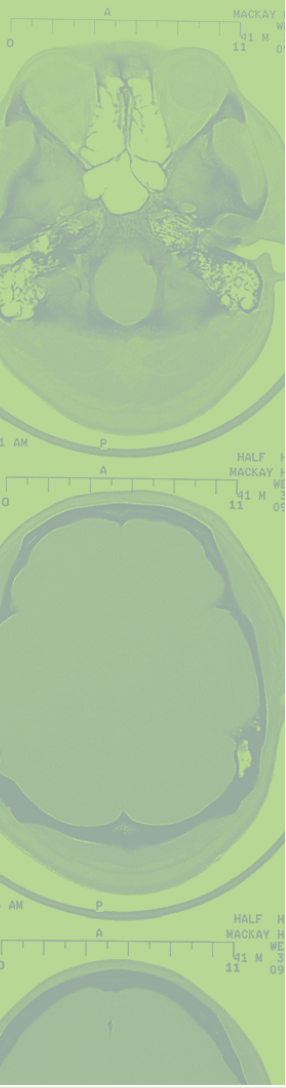
In each topic there is useful information about where different sub-groups vary from the aggregate average opinion. This information can be used in planning specific approaches to those sub-groups.

8.6 Interpretation of Qualitative Data

Responders were asked for specific advice to CAR for each of the issues questions. This section presents a content analysis of that advice.

8.6.1 Comments on Cost Containment Scenarios

The majority of commentators (N=104) recommended a compromise solution BETWEEN or IN PLACE OF the two presented scenarios. The position presented was to control costs through controlling utilization of diagnostic imaging. These responders indicated that significant savings could be accrued by eliminating a range of inappropriate and inefficient testing. Their suggestion was that CAR develops these standards of practice in conjunction with other medical groups. Some respondents went as far as suggesting the establishment of incentives and disincentives for referring physicians to help institute these practice standards.



Two groups of opinions shared second place. A group of 66 suggested that CAR advocate for an increase in the private provision of diagnostic imaging services as a method of avoiding cost containment in the public system. Another 60 respondents suggested that CAR get on with identifying tests to be removed from the insured list.

A definable group of 45 thought there was still potential for lobbying governments for increased funding for diagnostic imaging.

Thirty comments were pleas for and reminders of how important the principle of universality is to Canadians.

8.6.2 Comments on Workload Scenarios

The majority of these comments (N=158) focused on how to approach identifying appropriate acts for delegation, adequate training and radiological supervision.

The second largest group of comments (N=105) were instructions to vigorously defend the current standards, the present scope of radiology and the status quo.

A third group (N=75) coalesced around calls for and suggestions about how to augment the numbers of qualified radiologists.

8.6.3 Comments on Interventional Radiology Scenarios

The majority of comments (N=100) advocated lobbying for entirely new funding for interventional radiology from various levels of government.

The next largest group (N=63) suggested redirecting funding from services replaced by interventional radiology (medicine, surgery and ICU were listed).

Redistribution of resources from within diagnostic imaging was suggested by 45 respondents and opposed by 24 others.

Fourteen respondents were in favour of allowing interventional radiology to survive on its' own or be absorbed by other specialties.



9. Summary of Project Results

9.1 Results from the Environmental Scan

From the environmental scan we learned that there are:

- 19 specific drivers for change in Canadian health care and 13 pivot points
- 22 drivers shaping the future of medical imaging and 10 pivot points
- 9 drivers and 5 pivot points in Canada's social context
- 4 drivers in Canada's political environment and 4 pivot points (one of which, minority government, has already occurred)
- 6 drivers in Canada's economic environment and 5 pivot points (one has occurred: rising interest rates)

In Canadian health care the following were identified as the most critical drivers of change:

1. Increased standardization
2. Continued professionalization of management
3. Electronic health records and access systems
4. Telehealth and telemedicine

The drivers considered most important in shaping the future of medical imaging were:

1. Positioning interventional radiology
2. Technologist's scope of practice
3. Computerization of information and analysis
4. Continued manpower shortages
5. telemedicine

In Canada's social context the most important factors shaping the future were considered to be:

1. Aging of the work force and the population on average ('Boomer' effect).
2. Competition among professions and workplaces for recruits at all levels of training and experience.
3. Continued difficulty attracting non-physician health care workers.

Among Canada's political drivers two were considered critical:

1. Growing consensus that the current health care funding formula is not fiscally sustainable.
2. Continued globalization of capital, goods and labour.

9.4 Combining Survey and Focus Group Results

At surface levels there appears to be a difference in direction suggested by the two information sources: the survey and the focus groups.

Conclusions from the Survey	Conclusions from the Focus groups
Even split on cost containment choices	Prefer active identification of less useful imaging
Even split on manpower choices	Prefer active delegation
Preference to find resources to support IR from within DI	No clear mandate, preference to NOT share DI resources with IR.

These apparent differences could be due to a number of factors, the most likely being:

- ⦿ the groups had the opportunity to talk over their thinking and initial reactions.
- ⦿ there is not a full spectrum of opinion in the 46% of the membership that returned the survey.

The survey provided the opportunity for respondents to amplify on their forced choices among scenario directions. Analysis of those survey comments brings the results of the survey and the focus groups much closer together: the majority of survey comments on cost containment suggested active utilization control and the majority of survey comments on manpower focused on how to approach identifying appropriate acts for delegation, adequate training and radiological supervision.

In general the correct conclusions to be drawn from the survey and focus group results are that:

1. The membership is divided on a preferred future in these three central areas;
2. There is support from some percentage of the membership for proceeding in any, or all, of the 6 directions outlined in the scenarios presented.
3. There is useful sub-group information from the survey that indicates potential ways to broaden the appeal of any chosen direction.



10. Leadership Decisions Taken as a Result of the Project

A planning session was convened on September 11th, 2004 to review the project, its context, process and results and to consider two focal decisions:

1. Where does CAR leadership wish the profession of radiology to be in five years?
2. What general strategies are to be pursued to bring about that preferred future?

The discussion resulted in the following provisional strategic directions for CAR to follow 2005-2010. Planners considered it necessary to simultaneously address two types of issues in order to be efficacious in any one area.

1. Professional Issues
 - a. Cost containment
 - b. Manpower
 - c. IR
2. Association Issues
 - a. Address governance evolution
 - b. re-brand CAR
 - c. Identify high profile targets, outcomes

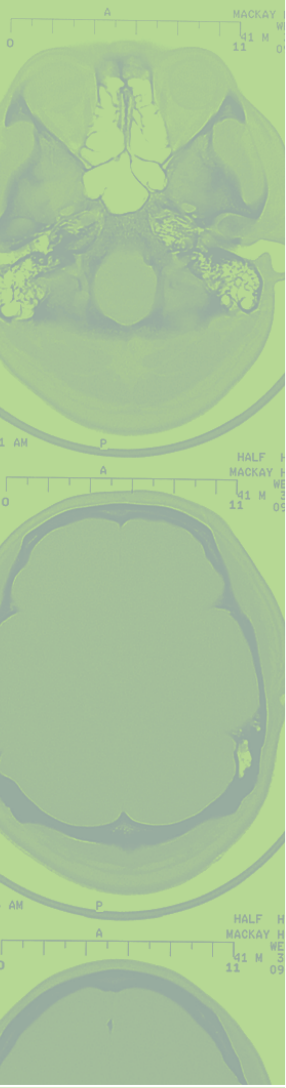
10.1 Professional Issues

Strategic decisions made in the professional area were as follows:

Provisional Decision 1: Actively participate in health system cost control through control of inappropriate utilization.

Potential Strategies:

1. Complete the guidelines project (appropriateness & timeliness)
 - ⊙ Promote use of order entry software
2. Education for:
 - ⊙ Radiologists
 - ⊙ Referring physicians
 - ⊙ Public



3. Promote the role, recognition & remuneration of radiologists as consultants and decision makers in utilization of imaging resources

- ⊙ Radiologists could:
 - Determine necessity of requested studies
 - Determine timeliness of requested studies
 - Identify 'best test first' and facilitate optimum resource utilization across regions and provinces

Provisional Decision 2: Bring about appropriate delegation of practice acts as part of the response to the radiology manpower shortages.

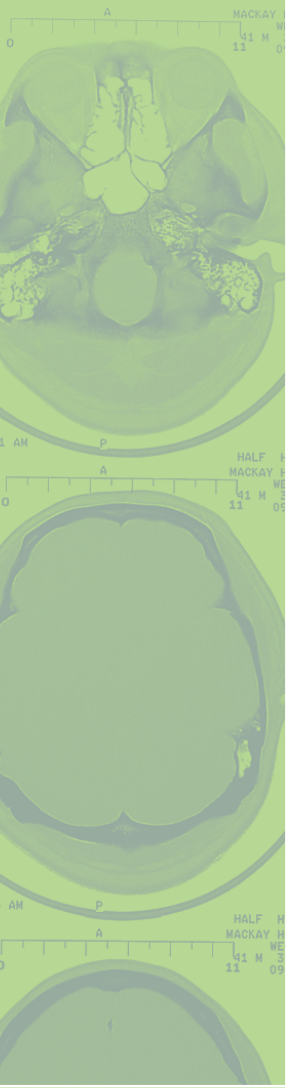
Potential Strategies:

1. Accelerate appropriate delegation to a range of physician extenders:
 - ⊙ Use info from the CAR study on physician extenders.
 - ⊙ Define appropriate standards
 - For training
 - For quality control and audit
 - For radiologist supervision
 - ⊙ Address remuneration issues/ liability issues/ training and others issues.
2. Develop strategies to improve efficiencies in the delivery of diagnostic imaging services.
3. Continue development of training standards for the performance of imaging studies.
4. Continue current efforts to improve numbers of radiologists in practice:
 - ⊙ Increase number of training positions
 - ⊙ Increase numbers where needed
 - ⊙ Increase efforts to repatriate CDN radiologists practicing out of country
 - ⊙ Address relevant IMG issues

Provisional Decision 3: IR is an integral part of DI and CAR commits to actively supporting a shared future.

Potential Strategies:

1. Education for
 - ⊙ Radiologists
 - ⊙ Other physicians
 - ⊙ Hospital and regional administrators
 - ⊙ Governments
 - ⊙ Public

- 
2. Cost effectiveness studies
 3. Investigate means to transfer resources to IR from replaced services

10.2 Association Issues

The planning group was in agreement that the following association organizational issues needed resolution in order to effectively and efficiently realize the desired effects from the strategies outlined as necessary to achieve the preferred future for radiologists.

1. Governance issues
 - ⊙ How does CAR relate to provincial radiology organizations?
 - Where do the provincial radiology organizations fit into the CAR decision making structure?
 - universal membership
 - ⊙ Organizing sub-speciality involvement in the CAR
 - Interventional radiology
 - ⊙ Work with CIRA to define and realize a shared future
 - Other sub-specialties
2. Re-Brand CAR (as part of solutions sought)
 - ⊙ Partly a clarity of concept problem, partly a communications problem
 - ⊙ Audiences:
 - Radiology
 - Medicine
 - Health care
 - Governments
 - Public at large
3. Identify Change Targets
 - ⊙ Identify desired outcomes
 - ⊙ Identify cooperative sites
 - ⊙ Identify success criteria
 - ⊙ Identify funding
 - ⊙ Identify monitoring /evaluation

11. Appendices

11.1 Appendix #1: Introductory letter to the CAR membership

June 15, 2004

Dear Colleague,

The Federal election has been called and the politicians have left the starting blocks. There will soon be a new Minister of Health and 10-year plan for health care, which will have a direct impact on radiology – a clear indication that our specialty is important to the public and that changes are on the way.

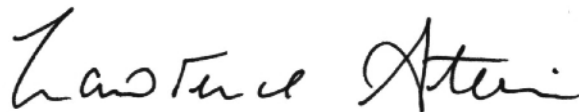
We have an opportunity to put ourselves ahead of the game by preparing for these changes rather than waiting for them to happen. This is why the Canadian Association of Radiologists initiated the Imaging the Future project, starting with a scan of the radiologic environment. It is available online at <http://www.car.ca/future>. Then the CAR executive, members of the industry, and leaders of related organizations indicated which factors would be most influential in shaping the future of the CAR and radiology. Three, which the CAR could influence, were used to create five potential scenarios of what the future of radiology could look like.

What do you want your future to look like? Your opinions on these scenarios are important for the future of radiology. In order for the CAR and radiology to grow and take its rightful place in the Canadian health care system of the future, **it is critical that each member of the association complete the attached survey**. To facilitate your participation, here is a print version of the survey. It is also available online at <http://www.car.ca/future>. The form can also be returned by fax at: **514-738-5199** or at the following address:

*“Imaging the Future” Project
Canadian Association of Radiologists
1740, Côte-Vertu Blvd
Saint-Laurent, Qc H4L 2A4*

I look forward to your responses as we walk towards the future we want.

Sincerely,



Dr. Lawrence Stein
President

11.2 Appendix #2: Imaging the Future – the CAR survey

NOTE: You can complete this survey online at www.car.ca/future

The Canadian Association of Radiologists has undertaken a project to look at factors affecting health care in Canada and their impact on diagnostic imaging. Some are forces that cannot be stopped, but the Canadian Association of Radiologists could influence how they affect radiologists.

The CAR executive, members of the industry, and leaders of related organizations have identified three significant factors over which the CAR could have a direct influence:

1. How costs are contained in health care services;
2. How to manage the growing workload of radiologists given a continuing manpower shortage; and,
3. The place of interventional radiology in medicine.

Each of the three sections below describes two possible scenarios of what diagnostic imaging could look like in 10 years. Please read them carefully and mark off a box along the continuum to indicate which scenario you would prefer to have happen for each of the three sections. A space is provided at the end of each question for your thoughts on what actions you believe the CAR needs to take to achieve your preferred scenario.

Your feedback will help the CAR leadership decide what actions it needs to take to best support radiologists in the future and guide the profession in the desired direction.

THANK YOU FOR TAKING THE TIME TO FILL THIS SURVEY.

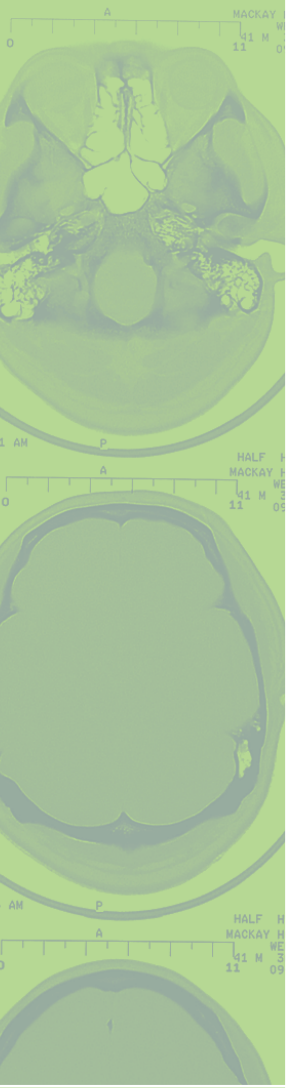
PLEASE RETURN THE SURVEY AS SOON AS POSSIBLE

- If you are completing the survey on-line, please click on the “submit” button below
- If you are working on a paper copy, please fax the survey back to 514-738-5199 or mail it to:
- “Imaging the Future” Project,
Canadian Association of Radiologists,
1740 Côte-Vertu Blvd., Saint-Laurent, Québec H4L 2A4

Cost Containment

There is a growing consensus that the health care funding formula is not economically sustainable. At the same time, the rates of public and private spending on health care have grown, as has the demand for access to imaging. This is bringing enormous pressure upon diagnostic imaging utilization rates, to which we can respond in one of two ways:

- a) The CAR advocates including diagnostic imaging in the Canada Health Act and therefore maintaining the principle of **universal** coverage of all diagnostic imaging services. In order to maintain universal coverage provincial authorities impose efficiency principles and a managed-care approach to contain the cost of health care. This restricts access for patients



and providers alike. Private insurance or patient payment provides continued access in some provinces that allow private clinics.

- b) The CAR decides that the best way to keep health care costs from spiralling is to involve the medical profession in choosing which diagnostic imaging services will no longer be provided under Medicare (**de-listing**). The CAR drafts guidelines that limit publicly funded coverage to the most appropriate diagnostic tests. This eliminates public coverage for some tests of less value, which are still available through private insurance plans or patient payment.

Please let us know which of these two scenarios you prefer by choosing the appropriate box along the continuum below. Please note there is a possibility for having “no opinion” (box #5) on this question.”

1	2	3	4	5
Universality	leaning toward universality	leaning toward de-listing	De-listing	No opinion

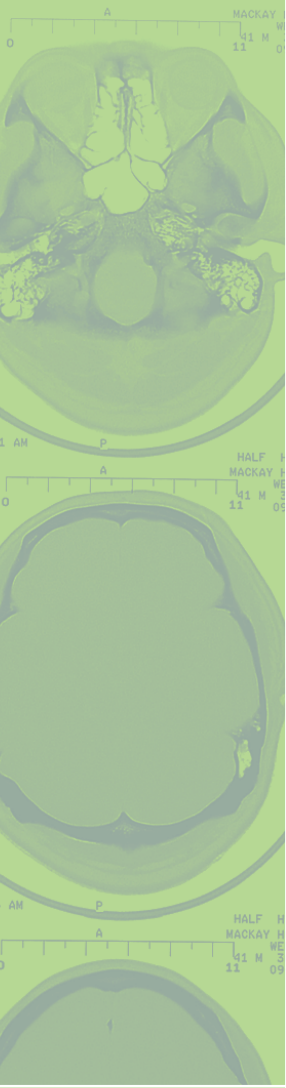
What should the CAR do to make your choice of scenario happen?

Workload

While it struggles with a manpower shortage, radiologists’ workload is growing because of an aging population and technological advances. Faced with the lack of capacity to perform all tasks and insure full coverage, the profession is challenged by other specialties and providers. The CAR can respond in one of two ways:

CAR decides to vigorously defend minimum training **standards** and defend the full scope of diagnostic imaging practice on the rationale that radiologists provide the best standard of care.

- a) In spite of this defence medical radiation technologists and other medical specialties continue to carry out some of the diagnostic imaging functions that radiologists have traditionally performed particularly in areas where the wait for diagnostic imaging services contribute significantly to patient wait times for diagnosis or treatment. As a result the practice of diagnostic imaging is fragmented and many different models of delivery co-exist.
- b) Since manpower limitations and growing demand prevent radiologists from performing all of the tasks that have belonged to their profession, the CAR decides to **redefine** diagnostic imaging. It determines which aspects of the discipline have the best value for the future and opts to let technologists under supervision and other physicians using minimum training standards take on the tasks that radiologists have decided to no longer perform. The practice is therefore coherent and the CAR vigorously defends the tasks that remain.



Please let us know which of these two scenarios you prefer by choosing the appropriate box along the continuum below. Please note there is a possibility for having “no opinion” (box #5) on this question.”

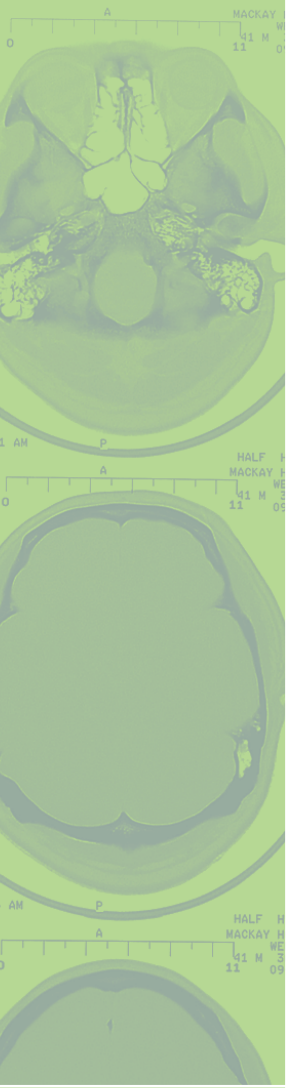
1	2	3	4	5
Keep Current Standards	leaning toward setting standards	leaning toward redefining	Redefine Diagnostic Imaging	No opinion

What should the CAR do to make your choice of scenario happen?

Role of Interventional Radiology

Interventional Radiology is a developing specialty looking for additional support. However, in a cost containment era and managed care philosophy, more public funding is not a possibility. The profession is therefore faced with two options:

- The CAR decides to keep interventional radiology as a sub-specialty, but protects funding for diagnostic imaging; therefore additional fees and resources for interventional radiology are limited. With **no significant extra funding** interventional radiology techniques are adopted by other medical specialties within their own practices. Interventional radiology is therefore fragmented and techniques shared with others.
- The CAR embraces interventional radiology and redirects funding from less valued diagnostic imaging procedures in order for interventional radiology to receive **more resources** in clinical time, funding and ancillary resources needed to fully realize its' service potential. This moves diagnostic imaging closer to being medical imaging.



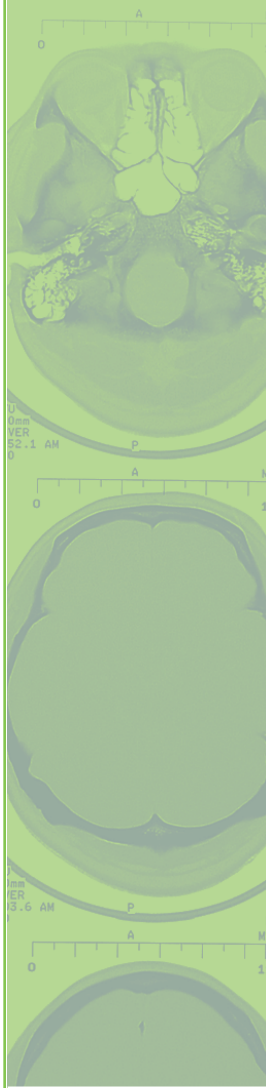
Please let us know which of these two scenarios you prefer by choosing the appropriate box along the continuum below. Please note there is a possibility for having “no opinion” (box #5) on this question.”

1	2	3	4	5
No extra funding for interventional radiology	leaning toward no extra funding	leaning toward more resources for interventional radiology	More Resources- for interventional radiology	No opinion

What should the CAR do to make your choice of scenario happen?

For sorting purposes please tell us about yourself:

- Gender: Male ____ Female ____
- Years of Practice: 0-5 ____ 6-15 ____ 16-25 ____ More than 25 years ____
- Province/Territory :
AB BC MB NB NF NWT NS ON PEI QC SK YT
- Type of Practice: Hospital-based only ____ Clinic-based only ____
Teaching hospital-based only ____ Hospital and clinic ____
Teaching hospital and clinic ____
- In the past five years, have you held a leadership position in a medical organization or association?
Yes ____ No ____
- Is there any part of your practice that is not publicly funded? (i.e. involvement in the private system)?
Yes ____ No ____



This document has been prepared by
Lynn Curry, Ph.D. CurryCorp Inc.