

## **Acknowledgements**

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Many thanks to all.  
Dr. Edmund Harrison,  
Chair, Nova Scotia Integrated Stroke Strategy

## **Availability**

*Reorganizing Stroke Care in Nova Scotia* and the background documents developed by NSISS task groups will be available as of September 1, 2002 on the Internet at: <http://www.heartandstroke.ca>

Copies are also available from:  
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## Executive Summary

Stroke is a leading cause of death and disability in Canada. The cost to the health care system is estimated to be \$3 billion annually, mainly due to the high rate of disability and institutionalization that results from stroke. In human terms, however, the cost of stroke is immeasurable.

The incidence of stroke increases with age. More than three-quarters of all strokes occur in people over age 65, and about 10% of all seniors have survived a stroke. As baby boomers age, the incidence of stroke could increase proportionally. Action is required now to manage the current need and reduce the anticipated "epidemic."

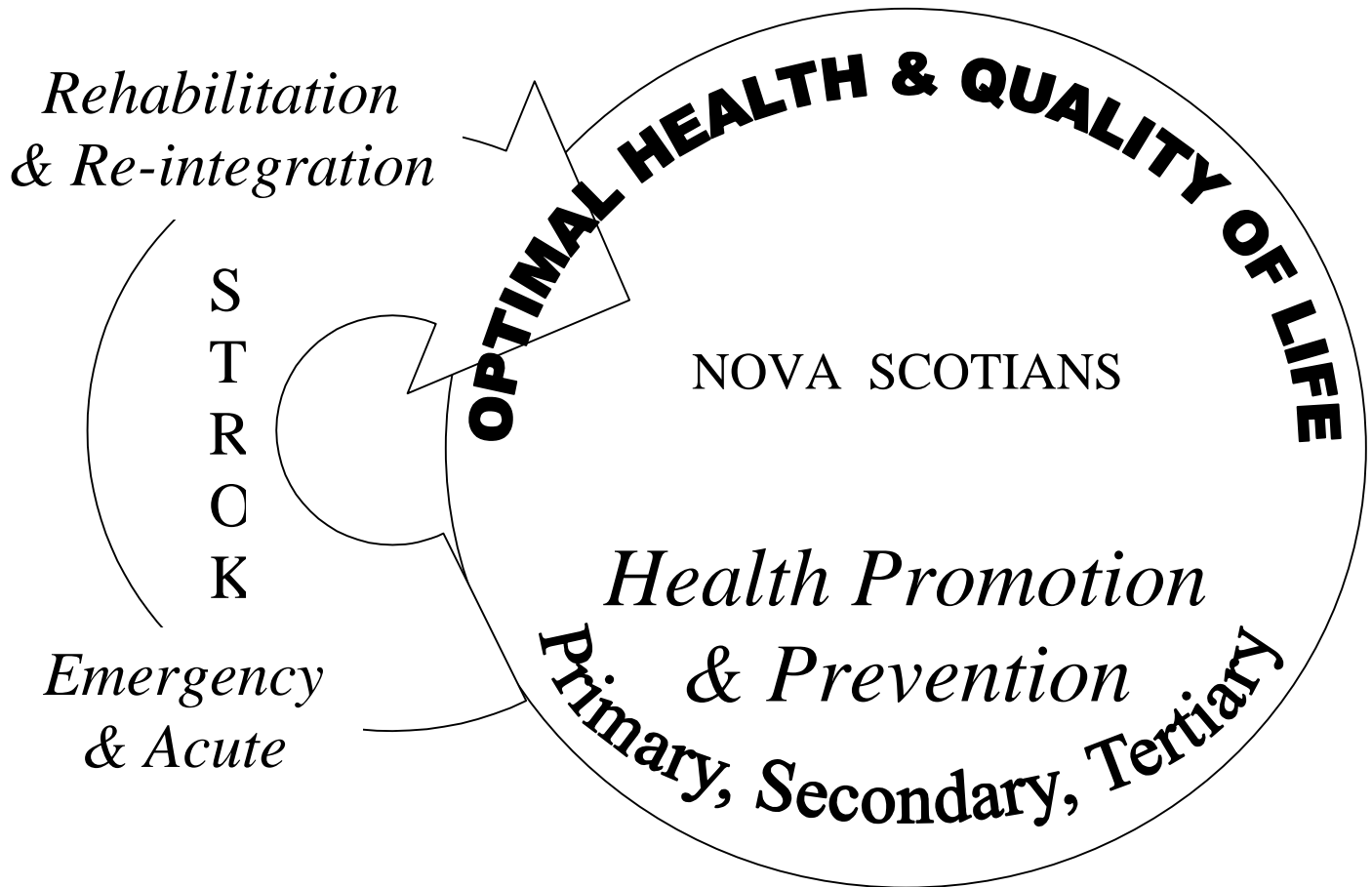
Nova Scotians are at particularly high risk of stroke. We have among the highest rates of smoking, obesity, diabetes, hypertension, physical inactivity and elevated cholesterol levels in Canada. More than 1,300 Nova Scotians experience a stroke each year. Of those who survive, more than half require ongoing assistance with daily activities. This additional impact of stroke on families and caregivers is largely unrecognized and their needs for support are largely unmet.

The complexities of stroke demand an integrated and multifaceted approach that spans the continuum of care from prevention to acute intervention, rehabilitation and community re-integration. There is now considerable scientific evidence that organized stroke care can significantly reduce death and disability and improve the quality of life of stroke survivors.

In November 2000, the Stroke Work Group of the Heart and Stroke Foundation of Nova Scotia established the Nova Scotia Integrated Stroke Strategy (NSISS) Committee to develop a model for organized stroke care in the province. *Re-Organizing Stroke Care in Nova Scotia* is a synthesis of the report of four NSISS task forces. It provides an overview of recent research and best practice guidelines in four areas: stroke prevention, acute care, rehabilitation and surveillance, as well as a template for integrating all of these into an Integrated Stroke Strategy for Nova Scotia. The Integrated Stroke Strategy includes primary prevention (community health promotion), secondary prevention and acute and rehabilitative care. This continuum of stroke care is to be delivered through a three-level system that consists of enhanced resources at the community level, a network of district stroke units and the existing provincial stroke programs. However, not every health district has a sufficient critical mass of stroke patients to provide optimal stroke care. In some cases, health districts will be required to share stroke services.

The proposed stroke care system will be integrated through the development of clear policies and navigation protocols, and the use of telemedicine technologies. The development of provincial standards and a province-wide monitoring system for stroke will ensure optimal care throughout the province. This Integrated Stroke Strategy is supported by both current research and expert panel consensus guidelines, and can be expected to achieve optimal health outcomes.

# A Model for Optimal Stroke Care



**Figure 1:** A Model for Optimal Stroke Care in Nova Scotia

If implemented as suggested, this Integrated Stroke Strategy will provide all Nova Scotians, particularly those in more rural areas, with a spectrum of health services currently available only in Halifax. Although the strategy will require new human resources and infrastructure, cost-benefit analyses suggest that additional costs can be successfully offset by savings that will result at all levels of government. More important are the human, family and community benefits that will be rapidly achieved by implementing the proposed strategy. Development of resources and services at the community and district levels, and integration with tertiary level programs at the Queen Elizabeth II Health Sciences Centre in Halifax, will improve collaboration, reduce duplication, and bring necessary health services to all Nova Scotians.

The chronic disability and dependency of cerebrovascular diseases exerts too high a human and financial cost on Nova Scotians. We feel it is essential to proceed urgently with this strategy to reorganize all aspects of stroke care in Nova Scotia. To do so, we put forward the following recommendations for action by the Nova Scotia Department of Health and the nine district health authorities:

### **Recommendations of the Integrated Stroke Strategy Committee**

- 1. Make stroke prevention and care a top priority in Nova Scotia.** Stroke is the third leading cause of death and the leading cause of adult disability. Unless strong measures are in place, population aging is expected to increase the incidence of stroke significantly.
- 2. Establish a provincial stroke working group.** A steering committee, monitoring or advisory group made up of district, community and provincial stakeholders, including both partners and experts, should guide the implementation of the provincial stroke strategy.
- 3. Implement a comprehensive and integrated provincial stroke care system.** This system must integrate services across the continuum of stroke care: health promotion, stroke prevention, emergency and acute care, rehabilitation, community reintegration and continued health promotion and secondary prevention. Related programs and services in the Department of Health and other government departments, District Health Authorities, communities and private sector providers must also be involved in a provincial stroke strategy (i.e. tobacco strategy, PACY, Chronic Disease Prevention, and Provincial Healthy Eating Strategy)

4. **Adopt a three-level (geographically-defined) service delivery model with protocols and guidelines for stroke prevention, acute care, rehabilitation and community re-integration.** The designation of sites for each of the three levels must be tailored to each community and district, based on critical mass imperatives. This model must incorporate support for interdisciplinary teams at district and provincial levels, and include strategies to coordinate efforts throughout the province and the continuum of care. Health professionals at all levels of stroke care will require ongoing training for optimal application of protocols and guidelines.
5. **Develop a comprehensive and effective provincial stroke prevention strategy.** The strategy should include increased support for primary health care providers and health promotion agencies in the public, voluntary and private sectors, and greater collaboration between these groups. Interdisciplinary district stroke prevention clinics, with community outreach services, would greatly facilitate expert diagnosis, secondary prevention and treatment of stroke risk factors.
6. **Develop an effective and coordinated provincial strategy for emergency and acute stroke care.** The strategy should include the infrastructure to provide 24-hour access to CT scanning (with immediate expert interpretation) and acute intervention for all Nova Scotians. All stroke patients must then have access to evaluation and treatment by specialized interdisciplinary teams on acute stroke units.
7. **Develop an organized, province-wide stroke rehabilitation strategy.** The strategy should include early access to inpatient rehabilitation on well-resourced rehabilitation units for all disabled stroke survivors who need it. These services should be linked with comprehensive ambulatory outpatient and in-home rehabilitation services available in every community.
8. **Support the development of a comprehensive stroke registry for Nova Scotia.**  
The registry should include both outcome and process measures in order to ensure effectiveness, efficiency and accessibility. It should also collect data on functional and quality of life outcomes. This registry will enable the evaluation of interventions in all phases of care and facilitate community-based research in health districts throughout the province. This is particularly important in a provincial program that serves both urban and rural districts.

**9. Develop a coordinated province-wide public education program.**

Public education is an essential component of this initiative. Messages should include: the seriousness of stroke-related mortality and disability, the warning signs of stroke, the need to treat stroke-related symptoms as a medical emergency, and the importance of both health promotion and chronic disease prevention.

**10. Develop and enhance information and diagnostic/evaluative technologies, including telemedicine technologies.**

## Introduction

*" ...a comprehensive service system does not exist to address the multiple impacts of stroke on the survivor and family. A systematic plan in Nova Scotia for treatment, rehabilitation and community service could reduce the negative impact of stroke considerably. Several facets of this potential system are already present in Nova Scotia and there are exciting pockets of activity in the Province; however, these examples are sporadic and inconsistent, leaving serious gaps and inequities in services.<sup>1</sup>*

Stroke is a leading cause of death and disability in Canada, and claims tremendous costs from individuals, families and the health care system. The health care costs are estimated to be \$3 billion annually, mainly due to the high rate of disability and institutionalization that results from stroke. In human terms however, the cost of stroke is immeasurable.

Unless strong measures are taken, the financial and human burden of stroke is expected to increase rapidly as baby boomers age. The incidence of stroke increases with age and more than three-quarters of all strokes occur in people over 65. About 10% of seniors are stroke survivors. Action is required now to prevent stroke and to manage this anticipated "epidemic."

Nova Scotians are at particularly high risk of stroke. We have among the highest rates of smoking, obesity, diabetes, hypertension, physical inactivity and elevated cholesterol levels in Canada. More than 1,300 Nova Scotians experience a stroke each year. Of those who survive, more than half require ongoing assistance with daily activities.

In November 2000, the Stroke Work Group of the Heart and Stroke Foundation of Nova Scotia established the Nova Scotia Integrated Stroke Strategy (NSISS) Committee to develop a comprehensive model for organized stroke care in Nova Scotia. To achieve this goal, the Committee established four task groups: Health Promotion and Prevention, Acute and Emergency Care, Rehabilitation and Community Re-integration, and Monitoring and Evaluation. Task groups included

recognized clinician experts and local leaders from every district health authority, as well as representatives of the Heart and Stroke Foundation of Nova Scotia and the Nova Scotia Department of Health.

*Re-Organizing Stroke Care in Nova Scotia* is a synthesis of the reports of the four NSISS task groups. It is a product of a multidisciplinary, province-wide collaborative process, and responds to the needs expressed by stroke survivors and their caregivers in a 1995 study conducted by the Heart and Stroke Foundation of Nova Scotia in collaboration with researchers at Dalhousie University.<sup>1</sup>

The report proposes an integrated, comprehensive state-of-the-art health care system for cerebrovascular disease and stroke in Nova Scotia. The proposed system is designed to ensure equitable care for all Nova Scotians by building on existing programs and services at the provincial, district and local levels.

The content is organized in five sections:

- 1) Health Promotion and Stroke Prevention,**
- 2) Emergency and Acute Care,**
- 3) Stroke Rehabilitation and Community Re-integration,**
- 4) Evaluation and Monitoring; and,**
- 5) An Integrated Stroke Strategy for Nova Scotia**

Each of the first four sections provides an overview of recent research and best practice guidelines, describes the current Nova Scotia situation and provides a model for optimal care. These sections all conclude with a list of specific priorities for action by the Department of Health in collaboration with the district health authorities. Building on the work of the four task groups, the concluding section proposes an integrated system of stroke care for Nova Scotia and ten overall recommendations for implementing the system.

## **Section I: Health Promotion and Stroke Prevention**

Stroke is both predictable and preventable. This section provides an overview of the entire spectrum of stroke prevention, ranging from population health efforts aimed at the whole population to efforts aimed at individuals who have already had a stroke.

Like other chronic diseases, stroke results from the cumulative effect of a number of risk factors. Most of these risk factors are lifestyle related and, for the most part are modifiable. Research to date has demonstrated that each additional risk factor multiplies the effect of the others, thereby compounding the risk for disease. Thus, even moderate elevations in risk factors may increase chronic disease risk considerably. A significant body of research worldwide suggests that risk factor reduction can prevent many chronic diseases.

Until recently, most stroke research and programming has been aimed at people who already have had a stroke, or who are at high risk of developing stroke. There has been far less attention paid to preventing stroke from occurring in the population as a whole. Primary prevention efforts aim to prevent a first stroke before it occurs. They focus on promotion of healthy environments and behaviours across the life course, and include both population-wide and individual approaches. Secondary prevention efforts are aimed at people who are at very high risk of developing stroke. They include screening, regular health examinations and early intervention. Tertiary prevention of stroke includes any measure undertaken to prevent or reduce the complications and disability resulting from stroke, and to prevent further stroke. At each of these points along the continuum of care, there are important opportunities for health promotion, through improving health literacy, patient empowerment and supporting self-care. The potential contribution of the health system as a whole to stroke prevention and health promotion is a significant and largely untapped resource.

The focus for primary stroke prevention is the set of behaviour-related risk factors for the disease. The known *behavioural* risk factors for stroke are similar to those for other chronic diseases, and include:

- Physical inactivity
- Smoking
- Excessive alcohol consumption
- Obesity (Risk factors for obesity, in turn are physical inactivity and poor nutrition.)

Research has shown that reduction in these behavioural risk factors across the population can significantly reduce stroke as well as other chronic diseases. Small reductions in risk factors across a large population have a larger impact than big changes made by a few high risk individuals. There is also a great deal of evidence that psychosocial factors (control, social support, resilience), early life factors (maternal health, birth weight, abuse and neglect) and socio-environmental factors (socio-economic status, social cohesion, working conditions and physical environments) play an important role in chronic diseases such as stroke. A population health approach to primary stroke prevention consists of taking action on these broader determinants of health and the behaviour-related risk factors for stroke listed above.

In addition, eight interrelated medical conditions are recognized as markers or *biological* risk factors for stroke:

- High blood pressure
- High cholesterol
- Atrial fibrillation  
(a heart rhythm disorder that increases the risk of blood clots)
- Coronary heart disease
- Diabetes

The control or reduction of these biological risk factors is the basis of clinical and secondary stroke prevention.

Smoking, physical inactivity and obesity are risk factors for several major chronic diseases. This commonality of risk factors suggests that reducing the risk factors for stroke will also reduce the incidence of other chronic diseases.

### **Risk Factors Among Nova Scotians**

Nova Scotians rate poorly in every one of the behavioural risk factors for stroke, signifying that we have much to gain from improving the risk factor profiles of individuals and the population as a whole. Compared to other provinces in Canada, Nova Scotia has:

- The third highest rate of physically inactive adults
- The highest percentage of smokers
- The second highest rate of heavy drinkers

**Physical inactivity**

The rate of physical inactivity in Nova Scotia is somewhat higher than in the country as a whole. The 1996/97 National Population Health Survey suggests that 60% of Nova Scotians are inactive based on reported participation in recreational and non-work-related physical activities. This compares to about 57% nationally.

**Smoking**

In May 2001, Health Canada released the results of the 2000 Canadian Tobacco Use Monitoring Survey. This survey ranked Nova Scotia as the number one province with the highest smoking rate in Canada. Nova Scotia's smoking rate is currently 30 percent. Our youth smoking rate (age 15-19) is 25%. The Nova Scotia Student Drug Use Survey (1998) showed a steady increase in use of tobacco by Nova Scotia teens from 1991 to 1998. The average age that Nova Scotians begin smoking is 12.7 years.

**Excessive alcohol consumption.**

The 1996/97 National Population Health Survey revealed that 12% of Nova Scotians over age 12 have 14 or more alcoholic drinks each week. This was the highest provincial rate, compared to 9% nationally. The same survey defined heavy drinking as five or more drinks per occasion. Results indicated that 26% of Nova Scotia drinkers drink heavily at least once a month. Only Newfoundland had a higher level of heavy drinkers, with the Canadian rate falling well below this level at 18%. One in 10 drinkers in Nova Scotia reported drinking heavily at least once a week. The Nova Scotia Student Drug Use Survey (1998) revealed that more than 56% of teens used alcohol at least once in the previous year, and this rate is increasing steadily from year to year.

**Obesity**

Obesity in Nova Scotia is prevalent across income and education groups. Rates of obesity have been rising steadily across Canada and around the world since 1985. The 1996/97 National Population Health Survey found that the proportion of adults who were classified as

overweight (body mass index  $\geq 27$ ) was substantially higher in Nova Scotia than in Canada as a whole. Close to 41% of respondents in the province were overweight, compared to 29% nationally. Nova Scotia ranked third among provinces for highest rates of obesity. Higher levels were most apparent among young adults, and young men were more apt to be overweight than women. The rates in young women, however, showed the greatest deviation from national figures.

## **Diabetes [EH1]**

Two [EH2]modifiable risk factors for diabetes are physical inactivity and obesity, so it is no surprise that Nova Scotia also ranks first for diabetes in Canada. While much diabetes remains undiagnosed, 4.6% of the Nova Scotians surveyed in the 1996/97 National Population Health Survey reported that they had been diagnosed with diabetes, compared to 3.2% nationally. Both nationally and in the province this figure has been increasing over time.

## **Stroke Prevention: What Works?**

Much is known about the prevention of chronic diseases such as stroke. According to the WHO<sup>2,3</sup>, the following lessons have been learned about chronic disease prevention:

- **Chronic disease is [EH3]preventable** - Through interventions against the major risk factors and their environmental, economic, social and behavioural determinants in the population, chronic diseases such as stroke can be prevented.
- **Preventing the occurrence of risk factors is the key** - A comprehensive long-term strategy for control of chronic disease must prevent the emergence of risk factors in the first place. Smoking, inactivity and poor eating habits begin early in life, therefore prevention must begin in early childhood, before young people have acquired these habits. More attention to promoting healthy food choices, regular physical activity and a smoke-free lifestyle throughout childhood and adolescence will lead to lifelong healthy behaviour.
- **Small, population-wide changes have a larger impact** - In any population, most people have a moderate level of risk factors, and a minority have a high level. Because of their numbers, those at moderate risk contribute more to the total burden of chronic disease than do those at high risk. Consequently, a comprehensive prevention strategy needs to combine synergistically an approach aimed at reducing risk factor levels in the entire population with one directed at high-risk individuals.

- **Sufficient intensity and duration** - Substantial reductions in the levels of risk factors and in disease outcomes require interventions of appropriate intensity sustained over extended periods of time. Successful programs have taken up to ten years to show measurable results. Campaigns to change a single behaviour require a series of strategies staged over time to support the transition through the stages of change from pre-contemplation to actual change and then maintenance.
- **Multiple approaches** - Successful campaigns use a combination of all the following approaches: community participation, supportive policy decisions, intersectoral action, appropriate legislation, health care reforms, and collaboration with non-governmental organizations, industry and the private sector. Education alone is unlikely to succeed. When combined with other strategies, however, education encourages and supports behavioural change and reduces the feeling that change is being imposed. Strong and widespread advocacy is another key feature of successful campaigns.
- **Intersectoral collaboration and shared responsibility** - Individuals are not the only ones who need to change. Governments, corporations and communities also need to make changes to support individuals' behaviour [EH4]changes. Decisions made outside the health sector often have a major bearing on elements that influence the risk factors. More health gains in terms of prevention are achieved by influencing public policies in areas such as trade, food and pharmaceutical production, agriculture, urban development and taxation policies than by changes in health policy alone.

An economic analysis of stroke care in Ontario<sup>4</sup> suggests that even a moderately successful stroke prevention program, including both health promotion and clinical prevention, could reduce health care costs by 25%.

#### **Clinical Primary Prevention[EH5]**

At the clinical or individual level, primary prevention is carried out by physicians, nurses and dietitians, who identify high-risk patients and treat their risk factors. Four risk factors are usually addressed:

- Smoking [0]
- High blood pressure
- High blood cholesterol
- Diabetes

A literature review carried out by the Ontario Joint Stroke Strategy Working Group<sup>5</sup> found strong evidence that pharmacological treatment of both high blood pressure and high cholesterol are effective in primary stroke prevention. Meta-analysis indicates that reducing the diastolic blood pressure of a population by 5-6 mm Hg can cause the number of strokes to fall by 42% in just three years,<sup>6</sup> and that treating high blood pressure can prevent strokes in both older and younger adults.<sup>7</sup> Diagnosis is the first and most critical step in the treatment of high blood pressure. The Canadian Heart Health Survey suggests that 22% of Canadian adults have high blood pressure, but nearly half (42%) do not know it.

#### **Secondary Prevention [EH6]**

People who have a very high risk of stroke, whether or not they have symptoms of a stroke-related problem, are candidates for secondary prevention. This includes people who have atrial fibrillation, atherosclerotic plaque in the carotid artery, and transient ischemic attacks (TIA) or "mini-strokes." In addition to smoking cessation and aggressive treatment of both high blood pressure and high cholesterol, randomized clinical trials have shown three effective strategies to prevent stroke in people with the above risk conditions:<sup>8</sup>

- Anticoagulation or "blood-thinning" therapy for people with atrial fibrillation
- Antiplatelet therapy to reduce the risk of blood clots formed by clumping of platelets
- Carotid surgery to remove atherosclerotic plaque build-up in the carotid arteries

Research suggests that clinical prevention efforts delivered through specialized stroke-prevention clinics can be more effective and offer more cost-efficient, comprehensive and interdisciplinary case management.<sup>9, 10</sup> Successful models for stroke prevention clinics include the Stroke Prevention Clinic at Ontario's London Health Sciences Centre and the cardiac MULTIFIT program in the United States. These clinics combine evidence-based

guidelines and case management to optimize both efficiency and compliance. Advanced practice nurses, the key to success of stroke prevention clinics, are trained in risk factor management and are responsible for triage, assessment, case management, community liaison and follow-up. They are also involved in patient education and counselling, together with dietitians, physiotherapists and psychologists.

## **Stroke Prevention in Nova Scotia**

Currently most efforts to prevent stroke in this province are aimed at high risk individuals in a clinical setting. There is no comprehensive or co-ordinated approach to stroke prevention. However, there is some activity in the area of risk factor reduction.[EH7] For over 12 years, Heart Health Nova Scotia has provided leadership in population-wide chronic disease prevention. Through capacity and coalition-building, programming and research, Heart Health Nova Scotia has built a solid foundation for health promotion and chronic disease prevention. This initiative completed its dissemination phase in March 2001. Recently, the province of Nova Scotia has initiated three processes to develop comprehensive strategies on smoking, physical inactivity and chronic diseases in general. In addition, an informal network has begun to advocate for co-ordinated action on healthy eating.

### **Chronic Disease Prevention Strategy**

In April 2001 Heart Health Nova Scotia became the Unit for Population Health and Chronic Disease Prevention at Dalhousie University and was mandated by the Nova Scotia Department of Health to develop a chronic disease prevention strategy for the province. This intersectoral strategy will be developed over a two-year period, building on and enhancing existing health promotion efforts in Nova Scotia.

[EH8]

### **Nova Scotia Tobacco Strategy**

In October 2001, the Department of Health announced a comprehensive long-term tobacco strategy that consists of the following elements: pricing and taxation, smoke-free legislation and policy, treatment and cessation, community-based programming, youth smoking prevention, media and public awareness, monitoring and evaluation. Over the past year, the Department has shown its commitment to tobacco reduction through:

- increased tobacco taxation for tobacco products
- a toll-free smoking cessation counselling line
- an additional one million dollars for tobacco reduction

The Department of Health has not yet made any commitment to fund the implementation of the strategy beyond the current year.

**PACY: Physically Active Children and Youth**

In 1998, the Nova Scotia Sport and Recreation Commission formed the Physically Active Children and Youth (PACY) Working Group, an intersectoral committee with representation from the following provincial departments: Education, Health, Community Services, Justice and the Youth Secretariat, as well as non-government organizations. PACY's mandate is to develop a co-ordinated strategy to reduce the number of inactive young people in the province. In December 2001, the group presented a three-year provincial strategy to increase physical activity among children, youth and families. The strategy, directed at homes, schools, communities and several government departments, has a government commitment of \$500,000 per year.

### **Provincial Healthy Eating Strategy**

The Nova Scotia Alliance for Healthy Eating and Physical Activity is an informal network of agencies and individuals interested in promoting healthy eating and physical activity for overall health and healthy body weight. The Alliances Healthy Eating Action Group is presently writing a rationale statement to advocate for a provincial healthy eating strategy. This first phase of activity is expected to be complete in September 2002.

### **Issues in Stroke Prevention**

While there is strong evidence demonstrating the potential for stroke prevention in Nova Scotia, there are many challenges to making good use of this knowledge.

#### **Integration**

Current work in chronic disease prevention, both clinical and population-wide, is fragmented and piecemeal. It is neither feasible nor desirable to launch risk reduction strategies for each chronic disease when the risk factors are in many cases the same. Integration of all chronic disease prevention programs will avoid development of "disease silos" and redundant initiatives that strain government-funded and non-governmental agencies.

#### **Societal and Systemic Changes**

Primary prevention of risk factors for stroke require systemic and social changes, and are beyond the reach of any one government department or sector. For example, a strategy to increase physical activity implies policy and program changes in school boards, municipal recreation departments and urban planning departments. Improving and increasing opportunities for active living at school will require additional facilities and physical education staff, who will require new skills to promote active living rather than competitive sport. Reorienting our systems and values to health and active living is a long-term challenge that will involve every sector.

#### **Long-term Commitment and Adequate Funding**

While Nova Scotians have often been cited for their leadership and innovation in health promotion, efforts have generally been short-lived due to lack of funding, reflecting a lack of long-term commitment and resources. A province-wide effort to reduce the behavioural risk factors for stroke and other chronic diseases will require a serious, long-term commitment of resources.

### **Human Resources for Action on Healthy Eating**

The field of nutrition is largely underdeveloped in Nova Scotia, and the public has very limited access to reliable nutrition information to counteract the volley of misinformation delivered through advertising and the media. There is a need for coordinated action to make healthier choices the easier choices, and increase access to reliable nutrition information in schools, stores and workplaces. The province does not have adequate numbers of trained professionals to do this work.

### **A System that Supports Clinical Prevention**

Evidence-based guidelines for risk factor detection and intervention in the clinical setting have been disseminated by the Canadian Task Force on the Periodic Health Examination. However, integrating these guidelines into busy medical practices requires supportive political and logistical processes.<sup>11</sup> Without this support, family physicians and general practitioners in Canada are less than satisfied with the preventive care they are able to provide.<sup>12</sup> Effective prevention cannot be delivered in clinical settings until the following issues have been addressed:<sup>13</sup>

- Reimbursement of physicians for the time spent in providing preventive care under fee-for-service payment schedules
- Reimbursement for advanced practice nurses who deliver prevention services and case management in established group practices
- Continuing medical education for health

### **Timely Diagnosis and Treatment**

Because stroke care in Nova Scotia is not well-organized there can be significant delays in accessing essential diagnostic services and treatment. During the wait period, people who have experienced a transient ischemic attack, and those who have been identified as requiring carotid endarterectomy are at high risk of stroke. The longer the wait times, the greater their risk. Wait times for diagnosis, treatment and risk factor management must be reduced.

### **Appropriate Settings for Clinical Prevention**

Currently in Nova Scotia clinical primary prevention is carried out in the family practice setting, generally by a primary care physician although other professionals may be involved. Secondary prevention may occur in a hospital clinic and is more likely to involve other health care providers such as neurologists, internists, neurosurgeons, neuroradiologists, dietitians and advanced practice nurses. Several issues confront all levels of clinical prevention:

- **Continuing Education**-maintaining and increasing knowledge of stroke prevention
- **Integration**-developing and maintaining an integrated, comprehensive, interdisciplinary approach to stroke prevention
- **Resources for Diagnostic Procedures**-availability of essential diagnostic tests and procedures such as carotid ultrasound, CT scanning, echocardiography, angiography and MRI, as well as co-ordination of waiting lists for these procedures
- **Follow-Up**-improved access to specialists for stroke prevention follow-up care.
- A **Provincial Network** of district stroke prevention clinics staffed by advance practice nurses and other professionals would make better use of limited resources and address the above issues.

### **A Vision for Coordinated Clinical Stroke Prevention in Nova Scotia**

The NSISS Health Promotion Task Group recommends a coordinated, three-level system of clinical stroke prevention with services available at the community, district and provincial levels (Table 1). Many of the resources required to create the proposed system are already in place. What is most lacking is a network of district stroke prevention clinics, and coordination and integration between services at each level. To be most effective, this system of clinical stroke prevention should also be fully integrated with the systems proposed in the following pages for acute care, rehabilitation and monitoring.

## **Priorities for Stroke Prevention**

The Health Promotion Task Group identified the following priorities for action to reduce stroke:

- **Develop and implement an integrated, well-resourced and long-term Chronic Disease Prevention Strategy.** This strategy should address all of the behavioural risk factors for stroke.
- **Implement the Nova Scotia Tobacco Strategy completely and without delay.**
- **Fund and implement the Physical Activity Strategy for Children, Youth and Families without delay.**
- **Establish a network of interdisciplinary district stroke prevention clinics to provide comprehensive, cost-effective, expert risk factor management for clinical and secondary stroke prevention.** To reduce redundancy and provide seamless care, these clinics should have close links with primary care, acute care and both stroke and cardiac rehabilitation programs. They should have the necessary resources for timely testing and interpretation.
- **Explore the use of advanced practice nurses for stroke prevention** in hospitals, community clinics and physician group practices.
- **Provide opportunities for continuing education** for health care professionals and community partners involved in health promotion and prevention after stroke.

	Setting	Type of patient	Services	Resources
C O M M U N I T Y	Primary care	High risk of stroke (TIAs, carotid stenosis or bruits, uncontrolled high blood pressure, atrial fibrillation)	<ul style="list-style-type: none"> <li>• Screening,</li> <li>• Referrals to stroke prevention clinics,</li> <li>• Follow-up care.</li> </ul>	Primary care physician
	Community hospitals and clinics	TIAs, non-disabling acute stroke (not eligible for t-PA or surgery)	<ul style="list-style-type: none"> <li>• Referral to family physician or district stroke prevention clinic</li> </ul>	Interdisciplinary prevention team (e.g. Clinical dietitian, Advanced Practice Nurse)
D I S T R I C T	District stroke clinics	TIAs, acute stroke, high risk patients	<ul style="list-style-type: none"> <li>• Case management,</li> <li>• Risk factor management (lipids, anti-coagulation, smoking cessation, blood pressure control, etc.),</li> <li>• Outreach to primary care (education, mentoring, auditing),</li> <li>• Outreach to community organizations.</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced Practice Nurse,</li> <li>• Administrative support,</li> <li>• Part-time data collection,</li> <li>• Access to CT scanner,</li> <li>• Carotid ultra-sound,</li> <li>• Echo-cardio-graphy,</li> <li>• Holter monitors.</li> </ul>
P R O V I N C I A L	Provincial stroke prevention clinic.	TIAs, acute stroke, high risk patients eligible for carotid endarterectomy or difficult to manage.	<p>As above and:</p> <ul style="list-style-type: none"> <li>• Incremental funds for operating room time and beds for carotid endarterectomy,</li> <li>• Systems and procedures to reduce waiting time for carotid endarterectomy to &lt; 1 month (goal of 1 week).</li> </ul>	<ul style="list-style-type: none"> <li>• As above and</li> <li>• Psychologist or behavioural modification specialist,</li> <li>• Angiography,</li> <li>• MRI (optional).</li> </ul>

**Table 1:** Levels and Settings for Clinical Stroke Prevention

## **Section II: Emergency and Acute Care**

Stroke strikes abruptly. Sudden interruption of the ability to walk or talk typically comes to medical attention quickly, and loss of functional independence usually results in admission to hospital. More than half of all stroke patients get to the hospital by ambulance, but not all are handled as emergencies. Recent clinical research findings call for refinement in the delivery of care to acute stroke patients, beginning in this pre-hospital phase.

### **Acute Care: What Works?**

Research in Nova Scotia and elsewhere has demonstrated that specialized stroke units and early treatment with aspirin significantly improve stroke outcomes, and that delays in discharging stroke patients after acute care are costly. Fibrinolytic/Thrombolytic therapy ("clot buster" [EH9]) benefits a small minority of patients.

Several national bodies,<sup>14</sup> including the Canadian Stroke Systems Coalition, now recommend interdisciplinary stroke-unit care because of its demonstrated superiority over conventional care on general medical wards. Stroke-unit care has been shown to result in 70 fewer dead or dependent patients for every 1000 patients treated (a "number needed to treat" of 14).<sup>15</sup> This benefit is durable,<sup>16</sup> reproducible in routine clinical settings,<sup>17</sup> and widely applicable to a broad range of stroke patients.<sup>15</sup> The effectiveness of organized stroke care has also been demonstrated in Halifax.<sup>18</sup> The Acute Stroke Program at the Queen Elizabeth II Health Sciences Centre (QEII) provides patients with rapid evaluation and intervention followed by interdisciplinary functional assessments and early rehabilitation therapy. Patient care information is gathered prospectively and maintained in a computerized database. Patient and family evaluations of the care provided by the Acute Stroke Program indicate high levels of satisfaction. During their time on the Acute Stroke Unit, disability for the majority of stroke survivors decreases and deep vein thrombosis is less frequent. Median length-of-stay has been reduced by two days, which translates into a cost saving of more than \$2.1 million per 1000 patients treated.<sup>18</sup>

Thrombolytic therapy with intravenously administered tissue-plasminogen activator (t-PA) is the latest

addition to stroke care. For the first time, physicians now have the ability to actually reverse a stroke; however t-PA must be given within three hours of stroke onset after a thorough clinical evaluation and CT brain scan. Research has shown that for every eight patients treated with t-PA, one more person attains independent survival than with conventional therapy.<sup>19</sup> This therapy is successfully used in Halifax. Over a five-and-a-half year period, 7.7% of all acute ischemic strokes patients at the QEII were treated with intravenous t-PA. Despite the expected increased risk of hemorrhage, treated patients had shorter stays on the Acute Stroke Unit and were less disabled at the time of discharge or transfer from the Unit.<sup>20, 21</sup> These benefits translated into annual cost savings of about \$32,000.<sup>20</sup>

Canadian guidelines advocate caution with t-PA therapy. The Canadian Stroke Consortium states that t-PA should only be used by physicians experienced in acute stroke management.<sup>22</sup> The Canadian Association of Emergency Physicians states that Antithrombolytic therapy for acute stroke should be restricted to use in the context of formal research protocols, or in closely monitored programs, until there is further evidence that the benefits of this therapy clearly outweigh the risks and that emergency physicians should not be the primary decision makers concerning the administration of thrombolytic agents to stroke patients.<sup>23</sup>

Thrombolytic therapy currently is appropriate for a small minority of stroke patients, and represents only one facet of the treatment provided by a comprehensive stroke program. Other aspects of care during the acute phase of stroke include prevention of complications and recurrence as well as palliative care for patients with catastrophic stroke. Acute care is best provided by a specialized acute stroke team that includes a nurse, a physician, a social worker, a physiotherapist, an occupational therapist, a clinical dietitian and a speech language pathologist. With this level of expert (to single out one discipline, doesn't depict interdisciplinary) care and early mobilization, complications can be minimized. For example, careful assessment and care of patients who cannot swallow safely can reduce pneumonia. Adequate hydration and the use of compression stockings can prevent secondary venous thromboembolism. Assessment of the patient's risk factor profile and special investigations to determine the cause of the stroke are necessary to tailor the efforts of secondary prevention to the individual. Antithrombotic drugs are used to reduce the risk of recurrent ischemic stroke. The operation

of carotid endarterectomy is highly effective for selected patients.

Rehabilitation begins as soon as the patient's medical condition is stable. For some people this is as early as the day after admission, others may require several days before they are ready to participate in therapy. Still others may be too severely affected to benefit from rehabilitation therapy. An important function of the multidisciplinary team on the stroke unit is to assess the patient's impairments, design a care plan, and work with the patient and family to make arrangements for discharge from hospital.

The majority of stroke survivors return home. Some require longer-term specialist rehabilitation. Others require placement in a long-term care facility. Research has shown that stroke survivors remain in acute care settings longer than necessary. An analysis of the QEII Acute Stroke Program showed that delays in discharging patients who are ready for transfer to an alternative level of care reduces access of acutely ill stroke patients and costs the Nova Scotia health system approximately \$1.5 million annually.<sup>24</sup>

## **Emergency and Acute Care in Nova Scotia**

Stroke care varies considerably throughout Nova Scotia. Emergency Health Services of Nova Scotia transports patients with a suspected stroke to the nearest emergency health care facility, whether or not it is equipped with a CT scanner.<sup>25</sup> Consequently, 31 Nova Scotia hospitals care for adults with stroke. According to Nova Scotia Department of Health statistics, about 1300 cases of stroke are hospitalized annually. Average annual separations per hospital range from 1 to 360. Over three-quarters (77%) of the 31 hospitals manage less than one case per week. These low caseloads make it difficult for health professionals to maintain expertise in stroke care, and for hospitals to establish stroke units. (Appendix 2)

Nine of the 31 hospitals (one in each District Health Authority) manage most stroke patients (78%). Each of these nine hospitals has or will soon have a CT scanner, though these are not all available for use at all hours. Thrombolytic therapy is used at some of these hospitals, but its use is not being tracked.

Local physicians who provide emergency care decide whether to offer thrombolysis therapy at their hospital, and the QEII Acute Stroke Program provides them with protocols, algorithms, standing orders and other guidance on request.

The degree of organization of stroke services varies considerably throughout the province. Only Halifax and Sydney have acute stroke units staffed with neurologists, and only the QEII has nurses certified in the care of patients with neurological disorders. Most stroke patients in the province are treated on general medical wards by a family physician in consultation with an internist. Other health professionals including dietitians, occupational therapists, physiotherapists, social workers, and speech-language pathologists are available in most hospitals although the composition and function of these stroke teams vary according to local resources. While some hospitals provide both acute care and rehabilitation, others stabilize patients then transfer them for rehabilitation. All hospitals report substantial delays in transferring patients to long-term care facilities and to the Nova Scotia Rehabilitation Centre.

### **Issues in Acute Care of Stroke Patients**

The wide variation in the delivery of care for stroke patients in Nova Scotia means that many patients receive less than optimal treatment. A provincial stroke program is necessary to provide equal access to coordinated interdisciplinary stroke-unit care and enhance the likelihood of successful community re-integration. Such a program would also provide the conditions for safe and effective use of thrombolytic therapy throughout the province.

There is still some controversy surrounding thrombolytic therapy, and this will be addressed by the Third International Stroke Trial (IST-3),<sup>26</sup> currently in its pilot phase. The QEII Acute Stroke Program is leading Canadian participation in this large, pragmatic, placebo-controlled, randomized trial of intravenous t-PA. All members of the Emergency and Acute Care Task Group have already expressed an interest in participating in IST-3. This is encouraging, as the experience with coronary thrombolysis<sup>27</sup> demonstrated that participation in clinical trials improves subsequent use of the therapy.

The need for more research should not, however, be an

excuse for inaction. The main requirements for thrombolysis in Nova Scotia are interest and expertise, 24-hour CT availability, and teleradiology links. Thrombolytic therapy is being used outside Halifax now, and there is much that can be done to enhance its effectiveness. By building on existing local initiatives and infrastructure the intent is to develop district stroke programs that provide enhanced acute and rehabilitation care and support re-integration into the community.

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### **A Vision for Co-ordinated Acute Stroke Care in Nova Scotia**

The NSISS Acute Care Task Group recommends a co-ordinated, three-level system to provide equitable access to optimal stroke care throughout the province (Table 2). As with the system for stroke prevention, many of the resources required are already in place, and the pieces most lacking are specialized services at the district level and co-ordination and integration between service levels.

### **Priorities for Emergency and Acute Care of Stroke Patients**

The NSISS Acute Care Task Group identified the following priorities for improving acute stroke care in Nova Scotia:

- **Designate one CT-equipped hospital in each District Health Authority as the district acute stroke hospital, and make CT scanning continuously available at each of these hospitals. This will facilitate consolidation of resources.**
- **Change Emergency Health Services Nova Scotia policy**

so that ambulances transporting people suspected of having had a stroke are directed to the nearest district acute stroke hospital. This will help bring caseloads to critical mass.

- **Ensure that all CT scanners are DICOM-compatible to enable the development of teleradiology links between hospitals.** These linkages will allow immediate expert interpretation of CT images in hospitals where there are too few radiologists to provide continuous coverage or when a distance consultation is required, and may reduce the need for transfer of acutely ill patients.
- **Establish an acute stroke unit and interdisciplinary stroke team at each district acute stroke hospital.** The stroke team should include a clinical dietitian, a nurse, an occupational therapist, a physician, a physiotherapist, a social worker and a speech language pathologist.  
[EH10]
- **Create electronic and video communication links between stroke teams.** This will enable distance consultations and sharing of evidence-based treatment protocols, algorithms, standing orders and other clinical management tools.
- **Develop navigation criteria for transfer of patients within the system.**

	Setting	Type of patient	Resources	Additional requirements
C O M M U N I T Y	Community		Written protocols for EHS, ER and acute care, to ensure emergency transfer of all stroke patients to district stroke centres.	
D I S T R I C T	District acute stroke centre	Acute stroke: <ul style="list-style-type: none"> <li>• Eligible for t-PA, but not in need of neurosurgery</li> <li>• All local stroke patients not in need of neurosurgery</li> </ul>	Around the clock access to: <ul style="list-style-type: none"> <li>• CT scan and interpretation</li> <li>• MD with acute stroke expertise</li> <li>• Interdisciplinary acute stroke team</li> <li>• Stroke unit</li> </ul>	<ul style="list-style-type: none"> <li>• Transfer protocols</li> <li>• Linkages to rehabilitation and secondary prevention</li> </ul>
P R O V I N C I A L	Provincial acute stroke centre	Acute Stroke: <ul style="list-style-type: none"> <li>• All patients who may require neurosurgery</li> <li>• CDHA patients</li> </ul>	All above and: <ul style="list-style-type: none"> <li>• 24/7 access to neurologist, neurosurgeon, neuroradiologist</li> <li>• MRI</li> <li>• Angiography</li> <li>• Stroke neurologist</li> </ul>	All above and: <ul style="list-style-type: none"> <li>• Neurosurgical interventions</li> <li>• Interventional radiology</li> </ul>

**Table 2:** Levels and Settings for Acute and Emergency Care of Stroke Patients

### **Section III: Stroke Rehabilitation and Community Re-integration**

Stroke is the leading cause of severe adult disability. Organized, coordinated stroke rehabilitation is the most important intervention in reducing death, disability and dependency after neurological damage has occurred. Virtually all patients benefit from early supportive care and rehabilitation interventions. Between thirty and sixty percent of stroke patients, however, benefit from specialized rehabilitation programs and 30% warrant a program of early intensive inpatient rehabilitation.

The goals of stroke rehabilitation are improved quality of life and re-integration of the stroke patient into the community. Rehabilitation is an integral aspect of stroke care. Once neurological injury has occurred, effective coordinated rehabilitation is the only means of improving function and quality of life.

Strong scientific evidence supports the efficacy of rehabilitation, including randomized controlled trials, well-performed large case-control studies and meta-analyses of these studies. Expert opinion and well-developed clinical practice guidelines further support the research findings. The strongest level of evidence supports early intensive rehabilitation. There is strong evidence for interdisciplinary ambulatory rehabilitation programs, and early supported discharge programs that combine both co-ordinated intensive ambulatory rehabilitation and in-home rehabilitation strategies.

#### **Rehabilitation: What Works?**

Four essential components of organized stroke care are early initiation, sufficient intensity, coordination and provision by a specialized interdisciplinary team. The scientific literature provides strong evidence that both intensive coordinated inpatient and ambulatory rehabilitation programs can significantly reduce disability, length-of-stay and institutionalization. The human benefits are clearly significant. To date, cost analyses suggest that increased care costs are more than offset by reduced institutional care costs. Long-term follow-up suggests significantly improved outcomes and quality of life for years after stroke.<sup>28</sup>

Early coordinated interdisciplinary rehabilitation has been clearly demonstrated to be the most important and potent treatment in improving outcomes after stroke.<sup>29, 30</sup> Acute thrombolysis, even when provided to the optimal numbers of acute stroke patients (possibly up to 10-15%) does not reduce the need, importance or impact of early intensive rehabilitation. These interventions should instead be considered complementary and integral components of optimal, modern, organized stroke care.

Rehabilitative measures must begin during the acute care phase. Generally optimal outcomes occur when stroke patients are transferred for intensive rehabilitation within 1-2 weeks of onset, when the patient is medically stable and able to tolerate 2-3 hours of therapy a day.<sup>31</sup>

Of those who survive a stroke, 20% will be mildly disabled and can be discharged to ambulatory or community-based interdisciplinary stroke rehabilitation programs. A further 60% will be moderately disabled and 20% will be severely disabled. Certain patients respond better to intensive specialized stroke care and warrant the intensive, acute specialized rehabilitation typically provided on rehabilitation units in North America.<sup>32, 33, 34, 35</sup> A recent evidence-based review<sup>36</sup> recommends that moderate and severe stroke patients be managed on specialized inpatient rehabilitation units. For these patients, outcomes are significantly better on acute rehabilitation units where they receive three hours or more of daily rehabilitation therapy than on subacute/restorative care units (1-2 hours daily), or on units with even less rehabilitation time.<sup>37</sup> A small percentage of stroke patients who are older and have multiple medical issues may benefit more from restorative or slow-stream rehabilitation than intensive acute rehabilitation.

Evidence shows that for moderately disabled stroke patients early intensive inpatient rehabilitation on a geographic unit is more effective than a mobile stroke team that delivers care to stroke patients scattered on different medical units. Discharging moderately disabled stroke patients from acute care to in-home management alone results in significantly worse outcomes than admission to a specialized stroke rehabilitation unit.<sup>38</sup> Both stroke-specific units and generic disability mixed assessment/rehabilitation units produce better results than conventional care in general medical wards.<sup>31</sup>

Clinical trials indicate that six beds are needed to achieve a critical mass of patients for an acute intensive stroke rehabilitation program. Staffing levels for stroke units have been recommended by Health Canada<sup>39</sup> and further supported by research published in 1998. Recommended staffing levels for a six-bed stroke rehabilitation unit are as follows:<sup>31</sup>

- A Core Team: physicians/residents (0.5-1.1 FTE), nursing (4-7 FTE), physiotherapists (0.6-1.2 FTE), occupational therapists (0.5-0.8 FTE), speech language pathologists (0.1-0.4 FTE) and social workers (0.2-0.4 FTE) with an interest and experience and/or training in stroke rehabilitation
- An Extended Team: clinical dietitian, clinical psychologist, psychiatrist, pharmacist, chaplain, etc.

For those who are moderately disabled, ambulatory rehabilitation following discharge from inpatient programs can further improve independence and quality of life.<sup>40</sup> Ambulatory rehabilitation is often the preferred option for people who are less disabled. As with inpatient rehabilitation, evidence demonstrates that improvement in function is proportional to the extent of treatment.

Early supported discharge programs combine coordinated in-home care and access to in-home, and/or community ambulatory rehabilitation. For higher functioning patients, these programs reduce inpatient hospital stays and significantly improve function and quality of life.<sup>41,42,43</sup> However, early discharge without dedicated support is less effective than inpatient rehabilitation.<sup>44</sup>

## **Stroke Rehabilitation in Nova Scotia**

Stroke rehabilitation in Nova Scotia lacks several essential components for effective care. Because the following elements are missing, Nova Scotians do not have timely access to the appropriate intensity and duration of rehabilitation services:

- Lack of designated rehabilitation beds
- Insufficient dedicated human resources for all rehabilitation disciplines for both inpatient and ambulatory care
- Lack of coordination along the continuum of care
- Lack of multidisciplinary in-home rehabilitation services
- Lack of accessible transportation, seriously limiting community re-integration and access to

These limitations, identified by the Rehabilitation and Community Re-integration Task Group, were also highlighted in a 1995 Nova Scotia stroke needs assessment<sup>1</sup> as shown in Table 1. In 2001, a follow-up survey of 36 stroke survivors and their caregivers suggests that these needs are still largely unmet.

<b>Unmet Needs of Stroke Survivors</b>	
<b>1995</b>	<b>2001</b>
<ol style="list-style-type: none"> <li>1. Counselling/support groups to deal with the emotional impact of stroke</li> <li>2. More therapy for physical functioning, speech and activities of daily living</li> <li>3. Adequate home care to enable early discharge</li> <li>4. More opportunities for useful and meaningful activities such as recreation and leisure</li> <li>5. Improved transportation options and physical accessibility in communities</li> <li>6. Opportunities for</li> </ol>	<ol style="list-style-type: none"> <li>1. Improved transportation to and from appointments, services, social events</li> <li>2. Better community access (accessible buildings and washrooms, and disabled parking places)</li> <li>3. More therapy (e.g. Physiotherapy, Occupational Therapy, Speech Language Pathology) and home care services</li> <li>4. More community education regarding stroke to facilitate understanding and acceptance</li> <li>5. Support and counselling for depression following stroke</li> </ol>

1995 and 2001

<b>Unmet Needs of Family Caregivers</b>	
<b>1995</b>	<b>2001</b>
<ol style="list-style-type: none"> <li>1. Enhanced services to allow stroke survivors to achieve worthwhile and productive lives</li> <li>2. Counselling and opportunities to talk with others in similar situations</li> <li>3. Respite for caregivers</li> <li>4. Improved access to therapies to increase levels of independence in activities of daily living (ADL's)</li> <li>5. Information about ways of dealing with changes in lifestyle, household accessibility financial</li> </ol>	<ol style="list-style-type: none"> <li>1. Need caregiver support: social and emotional respite</li> <li>2. There is a great lack of rehabilitation services in the hospitals on an inpatient and ambulatory basis, and in the community</li> <li>3. Services following discharge are generally difficult to access</li> <li>4. Need improved wheelchair accessible buildings</li> <li>5. Need accessible transportation</li> </ol>

### **Existing Resources for Stroke Rehabilitation and Community Re-integration**

A provincial stroke rehabilitation service currently exists at the Nova Scotia Rehabilitation Centre, in beds designated for rehabilitation. The service includes an interdisciplinary clinic for triage and follow-up of stroke patients and 18 beds dedicated to stroke rehabilitation. Video teleconferencing is used to provide consultation to other stroke care providers. This is the only service in the province with health care professionals dedicated specifically for stroke rehabilitation assessment and treatment. It is also the only unit with specialized neuropsychology, vocational counselling and orthotic services, and with inpatient staffing ratios approaching those recommended by scientific evidence and expert consensus.<sup>31,39</sup> The missing component at the NS Rehabilitation Centre is coordination along the continuum of care. Over the last five years, ambulatory and in-home rehabilitation services have become more limited at this site, thus impeding the provision of the full range of care along the continuum.

Elsewhere in this province, inpatient rehabilitation resources are much more limited. In most other districts, professionals work with multiple diagnoses and/or have caseloads comprised of both inpatients and ambulatory care patients. Staffing ratios for rehabilitation disciplines do not meet criteria for rehabilitation units.<sup>31,39</sup> Essential rehabilitation services, such as clinical dietetics, psychology, occupational therapy, physiotherapy, rehabilitation nursing, social work and speech language pathology are either absent or insufficient to provide the intensity of therapy needed for effective rehabilitation. Outside the Capital District, generic disability rehabilitation units exist in Antigonish and Sydney Mines, Cape Breton, and restorative care units exist in Springhill and Pictou. Only the Nova Scotia Rehabilitation Centre and the Sydney Mines rehabilitation units are specifically designated as having rehabilitation beds (52 beds and 15 beds respectively).

The Stroke Rehabilitation and Community Re-integration Task Group members report that acute medical care currently receives priority over rehabilitation. Few hospitals have beds or staff specifically allocated for rehabilitation even though in stroke care, rehabilitation is the critical factor in achieving optimal function and community re-integration.<sup>36</sup> Localizing stroke rehabilitation to a specific geographic rehabilitation unit with dedicated

rehabilitation beds and non-portable resources is considered essential.

Services to facilitate community re-integration of stroke survivors are limited. Inadequate resources for ambulatory, in-home and community care delay inpatient discharge. Research evidence supports the need for continued rehabilitation after discharge as a means of maximizing community re-integration, quality of life and resumption of family and financial roles.

Resources for ambulatory rehabilitative care are very limited at virtually all hospitals in Nova Scotia, including the Nova Scotia Rehabilitation Centre in Halifax, with long wait times for therapy and an inability to provide intensive rehabilitation. Wait times for ambulatory stroke care following discharge from hospital vary in each district. The wait time for occupational therapy varies from one week to more than 12 months. There is a wait of one week to four months for physiotherapy and from one to ten months for speech-language therapy. Wait times are much longer for chronic stroke patients needing to re-access the system. This dearth of dedicated resources makes early supported discharge programs impossible and interferes with the effectiveness of rehabilitation and coordination of services all along the continuum. It severely limits attainment of the rehabilitation goals of community re-integration and improved quality of life.

Effective in-home rehabilitation after discharge is not feasible with existing resources. Specifically, the services provided by Home Care Nova Scotia are not multidisciplinary. Publicly funded home-based physiotherapy is only available through the Arthritis Society. This service provides consultation only, and is not available throughout the province. In other disciplines such as occupational therapy and speech-language pathology, resources for in-home rehabilitation are virtually absent. Resources for stroke rehabilitation are also lacking in long-term care facilities.

Education regarding secondary prevention is an important component of stroke rehabilitation, and is an element that is not addressed comprehensively on general medical wards. The Heart and Stroke Foundation of Nova Scotia is the only source of written educational information on stroke in this province and currently attempts to distribute this information among stroke survivors. Unfortunately, as there is no

coordinated system of registration or care within the province, many do not receive this information.

Community-based rehabilitation resources that promote community re-integration and provide social and emotional support for stroke survivors and caregivers are also in short supply. In most parts of the province the lack of public and accessible transportation make it difficult for many stroke survivors to access health services and participate in community activities. Public facilities and recreation programs are not always accessible to people in wheelchairs, limiting access to services that could assist in maintaining mobility and functional skills and provide peer support, such as stroke clubs.

Vocational rehabilitation for young stroke survivors is also largely unavailable in Nova Scotia. Over one quarter of all strokes occur in people between 45 and 65 years of age.<sup>45</sup> Without effective rehabilitation services many of these people are unable to resume previous roles in the workforce and community. Vocational rehabilitation is a complex process. Our current continuum of care lacks the necessary resources to enable people to make the transition from the health care system to the labour force.

### **A Vision for Coordinated Stroke Rehabilitation in Nova Scotia**

The NSISS Stroke Rehabilitation and Community Re-integration Task Group has the following vision for stroke care in Nova Scotia:

*Individuals who experience a stroke will have timely access to the appropriate intensity and duration of rehabilitation services required to optimize their functional recovery,*

This vision can be achieved through a three-level system (Table 4) that provides more equitable access to care throughout the province. An organized stroke rehabilitation structure must be established with dedicated stroke rehabilitation professionals, dedicated inpatient rehabilitation beds, and dedicated ambulatory and in-home resources to enhance access to service for all Nova Scotians.

### **A Provincial Stroke Rehabilitation System**

Rehabilitation resources must be sufficient and specialized in stroke rehabilitation and include the following: a core team of physicians/residents, nurses, physiotherapists, occupational therapists, speech language pathologists and social workers with an interest in stroke rehabilitation. There should also be access to an extended team of clinical dietitian, clinical psychology, psychiatry, pharmacist, chaplain, Home Care Nova Scotia and the Heart and Stroke Foundation of Nova Scotia. These resources should be available at all three levels of the system.

**Level III- Provincial Stroke Rehabilitation Centre:** A level III centre already exists at the QEII Nova Scotia Rehabilitation Centre. It should provide assessment and treatment for complex stroke rehabilitation province-wide as well as early intensive rehabilitation (level II services) for its district (Capital Health), in order to achieve a critical mass of 15 stroke rehabilitation beds.<sup>36, 45</sup> This centre should continue to provide ambulatory rehabilitation treatment to local stroke survivors.

**Level II- District Stroke Rehabilitation Service:** The creation of district (level II) rehabilitation services is recommended to provide early intensive inpatient rehabilitation and to coordinate ambulatory rehabilitation for that district. A level II service must include a geographically located inpatient rehabilitation unit of at least six beds, with an average stroke occupancy approaching this level. Level II units should predominantly treat patients who are moderately impaired and stand to benefit the most from intensive rehabilitation, and these patients should have priority access to designated beds. The units must be fully wheelchair accessible and have access to necessary therapeutic and expert rehabilitation staff. They must have clear, accountable linkages with the provincial centre, including access to physiatry and expert interdisciplinary rehabilitation consultation. To achieve the critical mass of six beds some health districts will have to share a level II unit.

Some stroke patients may not tolerate intensive rehabilitation due to the presence of multiple medical issues. These patients may benefit from low intensity, long duration (slow stream) rehabilitation. Beds should be allocated in the system for slow-stream rehabilitation and this could be done at specified community hospitals. In combination with providing

ambulatory care services at these facilities, this could enable maintenance of the critical mass of patients to support rehabilitation resources in that community.

### **Level I- Local Community Stroke Rehabilitation**

**Services:** Level I stroke rehabilitation services include in-home, institution-based (outpatient department or long-term care facility), or community-based (fitness, volunteer and health promotion facilities) services. Level I services are appropriate for people who are mildly disabled, or who have been recently discharged from inpatient care. Family physicians play an important role in stroke management, and need to receive improved support in the form of educational, communication and coordination links with other health care service providers. The development of accessible public facilities and transportation systems should be a priority in smaller communities. There are many opportunities to partner with non-government organizations to improve service delivery at the community level, such as through equipment lending banks.

Community-based models for early stroke rehabilitation have not yet been fully evaluated to determine the admission criteria for such programs, or the optimum intensity of rehabilitation services needed. The province should consider establishing demonstration projects to identify best practices for flexible specialized stroke rehabilitation treatment at home and in long-term care.

The rehabilitation system must address the changing needs of the stroke patient, from early rehabilitation to the chronic or maintenance phase. There must be multiple access points into the system so that any needed rehabilitation intervention can be initiated promptly, with the aim to prevent hospital re-admission.

### **Why Three Levels?**

A comparison of the effectiveness and cost of a three-level approach with a two-level approach (a provincial centre with either district or community-based units) indicates that although the latter is less costly, it also results in reduced accessibility. In a two-level model early intensive rehabilitation is offered at one site only, such as is presently the case in Nova Scotia (although beds are

currently insufficient to meet the demand). The above comparison, based on Ontario data, suggests that the savings from reduced long-term institutional care would bring the cost of even a three-level rehabilitation system down to little more than the cost of present practices.

The Stroke Rehabilitation and Community Re-integration Task Group members strongly recommended the three-level approach. In their experience, stroke survivors in their districts prefer to receive rehabilitation close to home, and family physicians, knowing this, are often reluctant to refer patients to Halifax.

An organized three-level stroke rehabilitation system will also increase efficiency of bed utilization by decreasing the average length of stay. In this way, some of the expected increase in need for stroke care can be accommodated within existing hospital capacity.<sup>46</sup> Early supported discharge programs are also more feasible with a three-level system, as district staff are more aware of the services that are available locally to facilitate discharge. However, early discharge is feasible and cost effective only when resources are available in the community.

### **Coordination of Services**

Nova Scotian clinical guidelines for stroke rehabilitation and community re-integration are needed to facilitate seamless transition through this three-level continuum of care. These guidelines should be developed by a stroke coordinator working with local, district and provincial centres. Protocols and guidelines should be evidence-based and span the continuum to ensure that rehabilitation expertise and services are available at all times. The development of navigation points and policies is also needed, with subsequent monitoring and feedback to a provincial stroke steering committee.

Coordination and consultation among all levels of the proposed three-level rehabilitation system is also facilitated through telemedicine technologies. Stroke survivors, their caregivers and external care providers have expressed satisfaction with the Telemedicine consultations performed by the Ambulatory Stroke Rehabilitation Service of the QEII Health Sciences Centre. A 1997 pilot project by the NS Department of Health demonstrated that the Telemedicine program tested was educationally, clinically and technically viable.<sup>47</sup>

### **Quality Management and Monitoring**

A province-wide stroke rehabilitation information system, integrated into the provincial health information system, is necessary to ensure effectiveness, efficiency, accessibility, acceptability, quality assurance and outcome measurement. The Functional Independence Measure is currently the most widely accepted tool for this purpose. It is highly reliable and valid, endorsed by the Canadian Institute of Health Information (CIHI), and well-recognized across Canada and the United States. The CIHI Rehabilitation Pilot Study also incorporates a post-discharge quality of life measure, the Reintegration to Normal Living Index. This tool is also appropriate for a provincial stroke strategy. These outcome data should be integrated into existing and planned data collection initiatives such as the Department of Health's Meditech Health Information System. These data should be monitored by a provincial monitoring group that reports to a provincial stroke committee, and feedback provided to all district services on a regular basis.

The NSISS vision for coordinated stroke rehabilitation also includes an active research component that enhances professional development and assists in retention of expertise among physicians and other health professionals.

### **Priorities for Stroke Rehabilitation and Community Re-integration**

The Rehabilitation and Community Re-integration Task Group identified the following priorities for improving stroke rehabilitation in Nova Scotia:

- **Establish an adequately staffed and resourced, coordinated three-level stroke rehabilitation system with dedicated beds for stroke rehabilitation.**

Crucial to success is Department of Health support for and designation of dedicated stroke rehabilitation beds in each district or combination of districts, with appropriate numbers of dedicated rehabilitation professionals for effective stroke rehabilitation at each of the three levels.

A component of this three-level system is the development of a provincial triage and referral system that is evidence-based, relatively simple and transparent. There should be multiple, easily identified access points into the rehabilitation system that are clearly communicated and promoted to the public and to health and social service providers.

Appropriate staffing along the continuum of care will enable the intensity of rehabilitation that is key to community re-integration, resumption of productive roles in the family and society, and improved quality of life.

- **Develop a long-term global budget specifically dedicated to rehabilitation programs and services.** This will enable Nova Scotia to respond effectively and efficiently to the projected growth in stroke rehabilitation needs. The goal is to enable clear, accessible entry points for rehabilitation, timely service, improved transitions to community living and increased participation of rehabilitation clients in their care. This entails development of a rehabilitation navigation pathway to co-ordinate the transition between hospitals, and from hospital to community.

Rehabilitation happens both within and beyond the walls of institutions, and therefore rehabilitation services need to be built and funded around "places" along the continuum, rather than just on hospital beds.

- **Equip level II (District) and level III (Provincial) centres so that they can provide outreach education and consultation services.** This can be done through the development of a coordinated navigation system that moves stroke patients and caregivers efficiently through all levels of care. Telemedicine technologies will enhance the provision of outreach education and consultation in rural and remote areas of the province. Evidence-based stroke protocols will assist with professional education and facilitate equitable access to quality care.
- **Mandate provincial use of objective assessment tools for rehabilitation that are sensitive to the issues in stroke, and cross the continuum.** This will

enable continuous quality management, increase accountability and facilitate planning related to admission and outcome practices.

- **Develop demonstration projects to identify best practices for stroke rehabilitation at home and in long-term care facilities.** More research is needed to identify best practices for both in-home rehabilitation and co-ordination of stroke rehabilitation in the transition from hospital to community. Little research on rural strategies to deliver healthcare and rehabilitation services is available. An infrastructure to support this type of research may be timely.

	Type of patients	Resources	Additional requirements
C O M M U N I T Y	Stroke survivors living at home, in long-term care settings and in other community settings	<ul style="list-style-type: none"> <li>• Expertise in local ambulatory services</li> <li>• Continuing Care Nova Scotia</li> </ul>	Ambulatory services such as adult day programs, support groups, adapted housing, programs to overcome social isolation, appropriate physical fitness programs and return to work programs
D I S T R I C T	Patients who live in the district who require rehabilitation.	<ul style="list-style-type: none"> <li>• Local rehabilitation expertise</li> <li>• Minimum of 6 stroke rehabilitation beds</li> <li>• Inter-disciplinary stroke team</li> <li>• Stroke physiatrist (consulting)</li> <li>• Neurologist (consulting)</li> </ul>	<ul style="list-style-type: none"> <li>• In and outpatient programs</li> <li>• Consultation with providers in long-term care settings, and ambulatory care centres</li> <li>• Outreach and expert consultation to other providers in the district</li> <li>• Links with acute care services</li> <li>• Transfer protocols and care pathways</li> </ul>
P R O V I N C I A L	Patients from around the province who require the most specialized stroke rehabilitation (also level II patients who live in CDHA)	<ul style="list-style-type: none"> <li>• Specialized rehabilitation expertise</li> <li>• Minimum of 15 stroke rehabilitation beds</li> <li>• Inter-disciplinary stroke team</li> <li>• Stroke rehabilitation physiatrist</li> <li>• Neurologist (consulting)</li> </ul>	<p>All above and:</p> <ul style="list-style-type: none"> <li>• Affiliation with an academic health science centre</li> <li>• Comprehensive outreach services and expert consultations to other services</li> </ul>

**Table 4:** Levels and Resources for Stroke Rehabilitation and Community Re-integration

## **Section IV: Evaluation and Monitoring**

Measuring indicators and monitoring outcomes is critical throughout the continuum of stroke care. Without this information, it is impossible to analyze needs and determine the efficiency or effectiveness of interventions.

There is no provincial case reporting system for stroke in Nova Scotia. Routine administrative data collected by hospitals and physicians (mortality registries, physician billing claims, hospital discharge abstract data) provide limited information on stroke incidence and outcomes. The validity and comprehensiveness of these data for surveillance, monitoring and planning of stroke care is limited.

While some hospitals and stroke programs collect more comprehensive data on stroke care and its impact, these data are not collected provincially. As a result, the province is lacking important information about stroke, the people affected and the outcomes of their care and treatment.

This situation is in contrast to that of cancer and heart disease, also major causes of death in Nova Scotia. For these conditions, provincial and district systems monitor care outcomes and processes. Systems such as the Nova Scotia Cancer Care Registry and Improving Cardiovascular Outcomes in Nova Scotia (ICONS) monitor incidence, patient care and outcomes, and also promote standards for data collection and utilization. Similarly, the Diabetes Care Program of Nova Scotia, as part of the National Diabetes Surveillance System, is collecting and using diabetes-related data.

The Department of Health, in collaboration with district health authorities and other partners, should establish a comprehensive provincial data set for stroke. This data set should include: demographic and epidemiological data, outcome measures and mortality, complications, disability and quality of life measures. Process measures should also be collected to monitor cost, accessibility, efficiency and resource utilization.

A provincial stroke monitoring implementation team, with representatives from stroke prevention, acute care and rehabilitation, is needed to:

- Develop an appropriate data set
- Ensure timely review and interpretation of data
- Establish formal reporting policies to ensure accountability
- Identify opportunities for research and

## Evaluation and Monitoring: What Works?

A successful surveillance system meets the following criteria:<sup>48</sup>

- **Useful:** The system should be simple in both its structure and ease of operation, provide appropriate information to support delivery of clinical services, enable management decisions and facilitate policy formulation.
- **User-friendly:** The system must be accessible and acceptable to government, as well as to the individuals and organizations who provide care.
- **Cost-effective and efficient:** The system should provide timely and relevant information without duplication.
- **Comprehensive:** The system should provide information on the full spectrum of stroke care.
- **Coordinated:** There should be provincial consensus on content, with data coming from a variety of sources that are linked electronically.
- **Timely:** Information should be available to health service providers, funding agencies and planners soon after collection and analysis.
- **Integrated:** Data collection should be part of routine stroke management and routinely incorporated into policy and program decisions at all levels of care
- **Accessible:** Information should be disseminated in a variety of methods, in formats useful to various audiences.
- **Evaluated:** The measuring and monitoring process, impact and outcomes should be evaluated routinely.
- **Flexible:** The system should be designed to allow modification when information needs change.

There are three criteria for effective data collection tools:<sup>49</sup>

- **Sensitivity:** What proportion of cases are detected?
- **Positive predictive value:** What proportion of detected cases actually have the condition?
- **Representativeness:** Does it provide an accurate description of change over time and

The literature suggests a broad menu of indicators to choose from for evaluation. Selection of specific indicators will depend on priorities for measuring and monitoring, availability of required data in existing databases, and commitment to evaluation.<sup>50</sup> The Canadian Heart and Stroke Surveillance System has identified the following criteria for indicators useful to measure and monitor stroke:

- **Importance or relevance:** Seriousness of health impact, number of people affected, cost of care and potential for improvement.
- **Data quality:** Validity and reliability of data
- **Feasibility:** Availability of data at reasonable cost, in a timely manner and interest to support its inclusion

## Current Monitoring Initiatives

Stroke monitoring and measuring initiatives are underway in a limited number of locations throughout Nova Scotia. Many of these initiatives are in the planning stage and therefore may provide opportunities for collaboration in their development. In fact, although there appear to be various avenues for collecting data on stroke care, the current measuring and monitoring systems are selective in terms of the type of information collected.

At the hospital level, CIHI is moving rapidly to implement a national rehabilitation reporting system with significant support from health services management and clinicians in the field. This system

has been adopted for use at the Nova Scotia Rehabilitation Centre. In contrast, future systems such as the Canadian Heart and Stroke Surveillance System propose to be comprehensive and collect data across the continuum of care.

The Evaluation and Monitoring Task Group believes that a Nova Scotia-based initiative to monitor and evaluate stroke care should build on existing initiatives and should strive to aggregate comprehensive information on an ongoing basis. This integration will ensure that a provincial system to provide timely access to quality stroke services develops in a coordinated, efficient and cost-effective manner across the stroke care continuum.

### **A Vision for Stroke Measuring and Monitoring in Nova Scotia**

A provincial monitoring system for stroke would enable stakeholders to monitor and evaluate the provision of stroke care, as well as its impact on patients and the health care system. It would help assess waiting times and other barriers to care, and provide information on both quality of care and patient satisfaction.

A single provincial system to monitor and evaluate stroke care would facilitate accountability at both the system and clinical levels within the health care system. It would provide data and information to assess whether the stroke care system is providing quality care in a timely manner, whether services are readily accessible to patients and their families and providers, and whether service delivery and organization is effective and efficient.

An effective provincial stroke monitoring system would:

- Provide support for decision making regarding timely access
- Provide data on prevalence, incidence, morbidity and mortality, and utilization of health care resources, to facilitate planning and allocation of resources
- Provide information on implementation of organized stroke care along the continuum of care including stroke prevention, emergency, inpatient treatment and rehabilitation
- Ensure that interventions of proven efficacy are being used appropriately
- Provide data to stimulate enhanced health



## Challenges for Implementing a Stroke Monitoring System

To successfully establish a stroke monitoring system for Nova Scotia, the following issues need to be addressed:

- **Leadership:** A champion for stroke evaluation will be needed to facilitate consensus building.
- **Linkages:** Effective stroke surveillance requires linkages with the many stakeholders to facilitate effective data collection and dissemination. Linkages will also be needed to integrate data collection with other related activities.
- **Privacy and Confidentiality:** A framework is needed to ensure the privacy and confidentiality of the collection, use and dissemination of patient information. However, the need to ensure privacy must be balanced with the need for data to support clinical processes, facilitate management decisions, and assist policy formulation.
- **Research:** Data collected should be made available for research purposes to facilitate enhancements to stroke care.
- **Reporting Standards:** To ensure data quality and integrity, education programs will be necessary to inform service providers about reporting guidelines.
- **Collaboration:** The measuring and monitoring plan for stroke care must be implemented in collaboration with other initiatives to avoid duplication of effort, resources, and databases. Providers will be less inclined to participate in the process if there are multiple requests for the same data and information.
- **Human Resources:** Sufficient numbers of professionals trained in health information management to participate in the evaluation process.
- **Technology:** Centres participating in the monitoring system must have the technology required to support data collection and linkage, use and dissemination.
- **Finances:** A budget will be required to support the

implementation and development of the monitoring system.

Consequently, it is proposed that a stroke monitoring implementation team be established, and that this team:

- Review this report
- Identify priorities for measuring and monitoring
- Select indicators
- Identify data available in existing databases
- Identify and implement the most efficient and cost-effective process for data collection and dissemination
- Evaluate and analyze the data

### **Priorities for Evaluation and Monitoring**

The Evaluation and Monitoring Task Group has identified the following priorities for evaluation and monitoring of stroke in Nova Scotia:

- **Establish a stroke monitoring implementation team** to select indicators and identify data collection, analysis and dissemination processes for a comprehensive provincial database for stroke.
- **Collaborate with and build upon existing and developing data collection initiatives.** Where possible, some aspects of the stroke data system should be integrated into existing or proposed provincial, district and hospital databases.
- **Take into account increasing demands on service providers for detailed data collection,** such as current demands for data collection for cancer, diabetes and cardiac diseases.

## Section V: An Integrated Stroke Strategy for Nova Scotia

The work of each of the four NSISS task groups suggests that much can be done to reduce the human and health care costs of stroke in Nova Scotia, and that strong measures taken now can significantly reduce the impact of population aging on our health and social service systems.

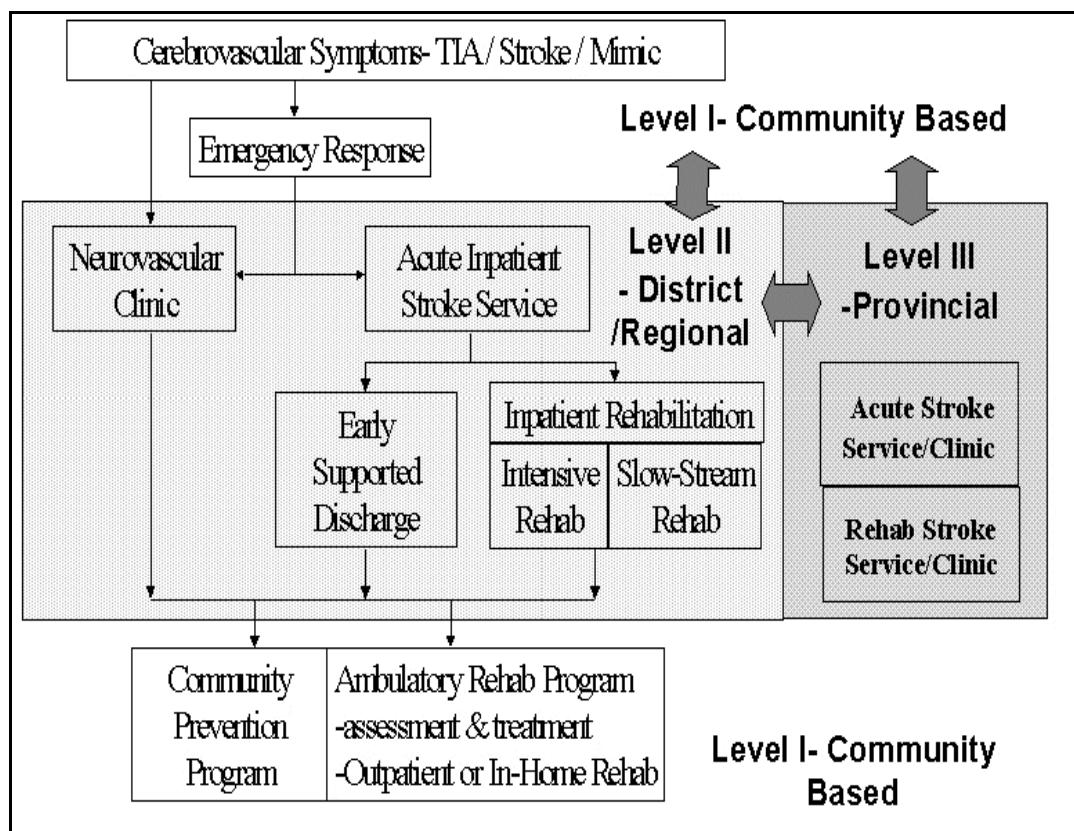
Taken together, the four sections of this report provide a powerful vision for stroke care in our province. While the priorities for action in each section are unique to that phase of care, several common elements stand out:

- Re-organization at the community, district and provincial levels
- Integration of these three levels as well as integration of the different phases of stroke care
- Navigation protocols that describe movement throughout the integrated system
- Standards and guidelines on stroke care, and education of health professionals in their use
- Monitoring and evaluation to inform decision making at every level
- Information technology to facilitate integration and monitoring

These common elements provide the foundation for a single comprehensive and integrated stroke care system for the province. Figure 2 illustrates the optimal organization for cerebrovascular disease care in Nova Scotia. This Integrated Stroke Strategy includes primary prevention (community health promotion), secondary prevention and acute and rehabilitative care. It is supported by both current research and expert panel consensus guidelines, and can be expected to achieve optimal health outcomes. We feel it is essential to proceed urgently with this strategy to reorganize all aspects of stroke care in Nova Scotia. The chronic disability and dependency of cerebrovascular diseases exerts too high a human and financial cost on Nova Scotians.

If implemented as suggested, this Integrated Stroke Strategy will provide all Nova Scotians, particularly

those in more rural areas, with a spectrum of health services currently available only in Halifax. Although implementing the strategy will require new human resources and infrastructure, much of these new costs will be offset through integration and collaboration with existing and proposed provincial programs.



Cost-benefit analyses suggest that even without such collaborations, additional costs can be successfully offset by savings that result at all levels of government. More important are the human, family and community benefits that will be rapidly achieved by implementing the proposed strategy. Development of resources and services at the community and district level, and integration with tertiary level programs at the Queen Elizabeth II Health Sciences Centre in Halifax, will improve collaboration, reduce duplication and bring necessary health services to all Nova Scotians.

**Figure 2:** An Integrated Stroke Strategy for Nova Scotia

**Community-Based Services (Level I)** [EH11][EH12]

Community-based services are the foundation for the Integrated Stroke Strategy. Family physicians and

their patients must have access to multidisciplinary professional consultation and follow-up and enhanced information services. Enhanced public education and emergency response to cerebrovascular diseases will ensure that patients arrive at designated acute stroke centres in a timely fashion. Enhanced ambulatory and multidisciplinary in-home community care teams will reduce longer-term disability and dependency on inpatient rehabilitation services. As new systems and services are developed, both processes and outcomes should be monitored to ensure optimal care.

**District Services (Level II)** [EH13]The Integrated Stroke Strategy will provide more specialized consultation and care on a district basis. To attain a critical mass of patients, some health districts will have to share acute care and inpatient rehabilitation services for stroke. An expert team of health care professionals will be available at district stroke prevention clinics to provide acute care, initial medical diagnosis and functional evaluation for patients with suspected or demonstrated cerebrovascular diseases. All acute stroke patients will be assessed at a district stroke centre and be evaluated for appropriateness of t-PA treatment if required. Patients likely to benefit from a more intensive inpatient rehabilitation program will be located on or transferred to a rehabilitation unit, preferably within two weeks post stroke. Slower stream rehabilitation beds will also be available in each district. Ambulatory and in-home services, coordinated with inpatient rehabilitation services, will reduce lengths of stay. All district or level II stroke services will be equipped with video-teleconferencing and broad-band neuroimaging technologies, which will provide access to provincial stroke expertise at the Queen Elizabeth II Health Sciences Centre.

**Provincial Services (Level III)**

The tertiary acute and rehabilitation stroke programs currently available at the QEII Health Sciences Centre will provide highly specialized support to all levels of the Integrated Stroke Strategy. Some of this can be achieved through improved navigation guidelines, information systems and broad-band teleradiology and teleconferencing technologies. To maintain a critical mass of clinical, educational and research expertise, these provincial services should also function as the district level (level II) services for the Capital Health District. Through collaboration with clinical care research groups nationally and internationally and enhanced recruitment and retainment of professionals with expertise in stroke care, maintaining this critical mass will ensure that Nova Scotians receive state-of-the-art clinical care.

**Integration, Monitoring and Evaluation**

Another critical component of the proposed Integrated Stroke Strategy is quality monitoring and management. The vision proposed by the Evaluation and Monitoring Task Group includes a comprehensive approach to online

evaluation and monitoring, and requires that provincial guidelines and navigation criteria be developed. The proposed monitoring system must be developed in collaboration with other provincial, national and private sector monitoring initiatives. A provincial stroke working group will therefore be necessary to guide and monitor the development of this provincial stroke strategy and to monitor ongoing quality management and outcomes.

These four areas of activity in an integrated stroke system are the basis for the following overall recommendations of the Integrated Stroke Strategy Committee.

## **Recommendations of the Integrated Stroke Strategy Committee**

- 1. Make stroke prevention and care a top priority in Nova Scotia.** Stroke is the third leading cause of death and the leading cause of adult disability. Unless strong measures are in place, population aging is expected to increase the incidence of stroke significantly.
- 2. Establish a provincial stroke working group.** A steering committee, monitoring or advisory group made up of district, community and provincial stakeholders, including both partners and experts, should guide the implementation of the provincial stroke strategy.
- 3. Implement a comprehensive and integrated provincial stroke care system.** This system must integrate services across the continuum of stroke care: health promotion, stroke prevention, emergency and acute care, rehabilitation, community reintegration and continued health promotion and secondary prevention. Related programs and services in the Department of Health and other government departments, District Health Authorities, communities and private sector providers must also be involved in a provincial stroke strategy (i.e. tobacco strategy, PACY, Chronic Diseases, and Provincial Health Eating Strategy)
- 4. Adopt a three-level (geographically-defined) service delivery model with protocols and guidelines for stroke prevention, acute care, rehabilitation and community re-integration.** The designation of sites for each of the three levels must be tailored to each community and district, based on critical mass imperatives. This model must incorporate support for interdisciplinary teams at district and

provincial levels, and include strategies to coordinate efforts throughout the province and the continuum of care. Health professionals at all levels of stroke care will require ongoing training for optimal application of protocols and guidelines.

5. **Develop a comprehensive and effective provincial stroke prevention strategy.** The strategy should include increased support for primary health care providers and health promotion agencies in the public, voluntary and private sectors, and greater collaboration between these groups. Interdisciplinary district stroke prevention clinics, with community outreach services, would greatly facilitate expert diagnosis, secondary prevention and treatment of stroke risk factors.
  
6. **Develop an effective and coordinated provincial strategy for emergency and acute stroke care.** The strategy should include the infrastructure to provide 24-hour access to CT scanning (with immediate expert interpretation) and acute intervention for all Nova Scotians. All stroke patients must then have access to evaluation and treatment by specialized interdisciplinary teams on acute stroke units.
  
7. **Develop an organized, province-wide stroke rehabilitation strategy.** The strategy should include early access to inpatient rehabilitation on well-resourced rehabilitation units for all disabled stroke survivors who need it. These services should be linked with comprehensive ambulatory outpatient and in-home rehabilitation services available in every community.
  
8. **Support the development of a comprehensive stroke registry for Nova Scotia.** The registry should include both outcome and process measures in order to ensure effectiveness, efficiency and accessibility. It should also collect data on functional and quality of life outcomes. This registry will enable the evaluation of interventions in all phases of care and facilitate community-based research in health districts throughout the province. This is particularly important in a provincial program that serves both urban and rural districts.

9. **Develop a coordinated province-wide public education program.** Public education is an essential component of this initiative. Messages should include: the seriousness of stroke-related mortality and disability, the warning signs of stroke, the need to treat stroke-related symptoms as a medical emergency, and the importance of both health promotion and chronic disease prevention.
  
10. **Develop and enhance information and diagnostic/evaluative technologies, including telemedicine technologies.**

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# Appendix 1 Members of the Nova Scotia Integrated Stroke Strategy Committee and Task Groups

## Nova Scotia Integrated Stroke Strategy (NHSS) Committee

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**Appendix 2 Average annual number of inpatient separations (1995-2000) with Most Responsible Diagnosis of Stroke<sup>51</sup> by District Health Authority**

	#	%		#	%
<b>Provincial Total</b>	<b>131</b>	<b>100</b>	<b>District 6 Hospitals:</b>	<b>69</b>	<b>100</b>
<b>District 1 Hospitals:</b>	<b>99</b>	<b>100</b>	Aberdeen	68	100
Health Services Assoc South Shore	75	75	Sutherland Harris	1	
Queens General	24	25	% of provincial total		<b>5</b>
% of provincial total		<b>7.5</b>			
<b>District 2 Hospitals:</b>	<b>112</b>	<b>100</b>	<b>District 7 Hospitals:</b>	<b>74</b>	<b>100</b>
Digby General	20	18	St Martha's Regional	43	58
Yarmouth General	74	66	Guysborough Memorial	8	11
Roseway	18	16	Strait-Richmond	17	23
% of provincial total		<b>8.5</b>	St Mary's Memorial	2	3
			Eastern Memorial	4	5
			% of provincial total		<b>6</b>
<b>District 3 Hospitals:</b>	<b>103</b>	<b>100</b>	<b>District 8 Hospitals:</b>	<b>260</b>	<b>100</b>
Soldiers Memorial	39	38	Cape Breton Health Care	219	84
Valley Regional	63	61	Inverness Consolidated	12	5
Annapolis Community Health Ctre	1	1	Sacred Heart	15	6
% of provincial total		<b>7.8</b>	Buchanan Memorial	4	1
			Victoria County Memorial	10	4
			% of provincial total		<b>20</b>
<b>District 4 Hospitals:</b>	<b>78</b>	<b>100</b>	<b>District 9 Hospitals:</b>	<b>465</b>	<b>100</b>
Colchester Regional	68	87	Dartmouth General	55	12
Lillian Fraser	10	13	Eastern Shore Memorial	9	2
% of provincial total		<b>6</b>	Hants Community	28	6
			Musquodoboit Valley Memorial	2	0.4
			QEII Health Sciences Centre	364	78
			Twin Oaks	3	0.6
			IWK Grace Health Centre	4	1
			% of provincial total		<b>35</b>
<b>District 5 Hospitals:</b>	<b>59</b>	<b>100</b>			
All Saint's Springhill	4	7			
Highland View	46	78			
North Cumberland Memorial	8	14			
Bayview Memorial Health Centre	0	0			
South Cumberland Community Care	1	1			
% of provincial total		<b>4.5</b>			



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[EH1]No need to separate or indicate that two exist. Both are risk factors.

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[EH2]Agree!

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[EH3]This is a much stronger statement; no waffling.

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[EH4]The fallacy is that we change the population but not the person. The beauty of this is that when people don't change it is their fault not that of the "population changer" (i.e. government)

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[EH5]"Primary prevention efforts aim to prevent a first stroke before it occurs. They focus on promotion of healthy environments and behaviours across the life course, and include both population-wide and individual approaches". The person who has had a TIA but receives ASA or Plavix is getting secondary prevention- they're at high risk. Although the person with hypertension is at higher risk of a cerebrovascular event, their risk of stroke isn't nearly as high as a TIA. Identification and management of modifiable risk factors is secondary prevention as defined in the Ontario document (page 17)

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[EH6]NO ONE describes this as "tertiary prevention", including us. Quote "Secondary prevention efforts are aimed at people who are at very high risk of developing stroke. They include screening, regular health examinations and early intervention. Tertiary prevention of stroke includes any measure undertaken to prevent or reduce the complications and disability resulting from stroke, and to prevent further stroke". For example.

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[EH7]Same confusion

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[EH8]Not sure what this means

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[EH9]tPA is defined below

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[EH10]I think we talk about care plans and training for staff elsewhere, including recommendations

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[EH11]I find it fascinating that the document was criticized for introducing jargon without explanation and another stratum of jargon is introduced here. My concern with introducing new terms is that they may not mean to everyone what I think they mean to me or others.

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[EH12]

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[EH13]definitely don't want to include this. As previous discussion highlights the terms "primary" "secondary" and "tertiary" care are difficult. Infact when it gets down to describing levels of care, they are more confusing than prevention levels. No one agrees on their use and they are even more different for each part of continuum than Level I, II, III.