Chapter One: Public Health Models

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Introduction

In their October 2003 report to the federal Health Minister, Dr. David Naylor and the National Advisory Committee on SARS and Public Health called on the Federal/Provincial/Territorial governments to take decisive joint action to renew capacity within public health in Canada.

More than this, however, the committee called for a new approach – organizationally, in the proposed Canadian Agency for Public Health; and philosophically, in a resounding plea for more coordinated, collaborative, and effective work between different levels of government.

We call on Ontario to be an active participant in helping to realize the vision it sets out and in using its influence and support to ensure the National Committee Report is not allowed to gather dust.

This call to action by the National Advisory Committee was recently echoed by Senator Kirby and the Standing Senate Committee on Social Affairs, Science and Technology.[1] Our Expert Panel concurs with the direction provided in the National Report. We call on Ontario to be an active participant in helping to realize the vision it sets out and in using its influence and support to ensure the National Committee Report is not allowed to gather dust.

Successful public health renewal in Canada can only benefit from a similar renewal effort within Ontario. The two must proceed in tandem. By taking clear steps and actions toward a more consistent and coordinated approach to public health, Ontario will strengthen its own capacity and by doing so become a strong partner in a new national framework.

While clearly there are responsibilities and obligations that fall solely within the provincial domain that will require purely provincial solutions, SARS underscored for many, the need for an effective, responsive, and well-resourced public health infrastructure across Canada; a framework that is lacking today and that we must have in place for tomorrow.

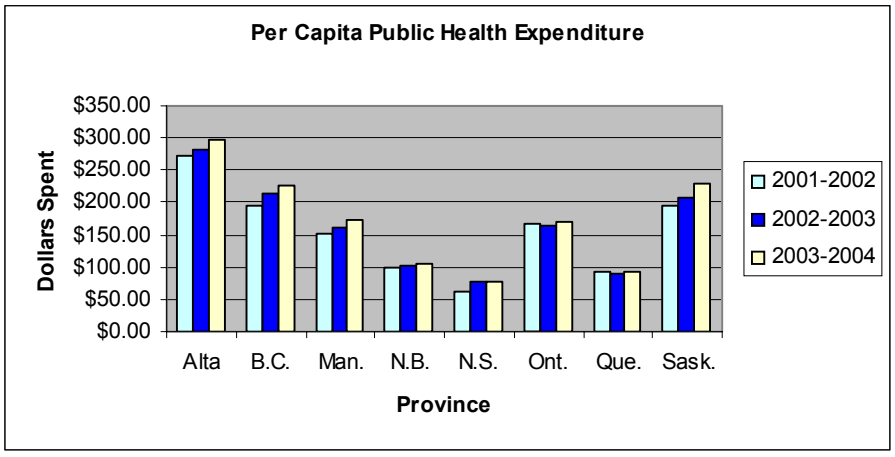
Public Health Renewal in Ontario

There is, at the heart of the current discussion on public health capacity in Ontario, an obvious disjuncture between profile and practice. Public health has been at the forefront of a number of the most significant healthcare events in Ontario over the past decade. In fact, the decade has been a tumultuous one for public health. At the same time this profile has been matched by relative scarcity of policy and analytical thought on the issue of overall public health capacity and structure. Questions of provincial vs municipal responsibility have dominated much of the discussion, but core capacity questions have not.

Attention to public health capacity where it has occurred, has typically been reactive, usually in the aftermath of one crisis or another, as in the work of the Krever Commission and the Walkerton Inquiry. As one prominent public health official with long experience rightly commented: "There is a grave concern that interest in Public Health will quickly wane when the SARS crisis is over. Past experience suggests that governments pay lip service to commitments in public health but after an emergency is over, the focus of attention returns to the acute care sector."

The following chart shows the disparities in public health funding across the country between 2001 and 2003-2004. Although per capita comparisons are not perfect and public health service levels vary significantly from one province to another, this quick view demonstrates the variation of investment both across the country, and across the last three years.

Figure 1: Per Capita Public Health Expenditure Estimates



Source: Preliminary Provincial and Territorial Government Health Expenditure Estimates, Canadian Institute for Health Information, 2003

The 2003 Report of the Provinical Auditor for Ontario has also raised questions around the per capita funding of mandatory health programs and services in Ontario and the apparent inequities in the province.[2]

Limited capacity has been added in certain areas, and a number of investments have been made in recent years, though they have typically been incremental, targeted to a specific disease or program. For example, several million dollars were targeted toward West Nile Virus strategies in 2002/2003 and 2003/2004. The Universal Influenza Immunization Campaign was funded as a separate program in 2000/2001.

While these infusions of resources have been welcomed, they have not addressed the issue of core capacity across the public health system. By system, we refer to the resources and capacity of public health planning and management at the provincial level, public health laboratory capacity, and overall local delivery capacity. If anything, new program funding in targeted areas may well have inadvertently concealed the weakened system foundations upon which these new initiatives were built.

The overall issues of provincial organization, capacity, and mandate for public health have not been comprehensively scrutinized at the provincial level for a number of years. Ontario is far from alone in this regard. With a few exceptions, such assessments have been largely absent across Canada.

Numerous reports have documented this growing risk. The Chief Medical Officers of Canada in the Report for the Federal/Provincial Advisory Committee on Population Health in 2001[3] issued what can only be termed an alarm call for public health capacity, and the earlier still Lac Tremblant Declaration of 1994[4] highlighted the increased strains on the public health system and the urgent need for investment in the core capacity of the system, particularly in infectious disease control. But as the National Advisory Committee rightly observed, even in the aftermath of these reports the public health systems still received little or no attention, no prominence, in the First Ministers Accords on Health Care,[5] and was barely addressed in the Royal Commission on the Future of Health Care in Canada.[6]

Perhaps this lack of serious attention within the policy sphere over the past decade reflects the place that public health had occupied within the circles of influence in health care, and perhaps also some unspoken assumptions. Assumptions that the basic core capacity to protect Canadians was already in place and relatively effective; that vaccinations and antibiotics had successfully warded off the threat of emergent infectious disease; that in an era of genetic screening, telemedicine, and robotic surgery, public health was just a little old-fashioned; that it was a necessary component,

but not a major priority in a relatively wealthy country and with limited exposure to the traditional hazards.

Walkerton began to challenge these assumptions in Ontario, and SARS has subsequently shattered them. We have collectively, if belatedly, recognized that public health is not a peripheral part of our healthcare system but a key foundation of it. We now understand that 21st century health care requires well-resourced and coordinated public health capacity. It is a lesson that we have learned the hard way, by virtue of a health emergency that could have had catastrophic impacts on many more people. Moreover, we had been warned of the perils that would come from ignoring this truth, and fairly specifically at that.

In his April 2002 presentation to the Commission on the Future of Health Care in Canada, Dr. John Frank, Scientific Director of the Institute of Population and Public Health (part of the Canadian Institutes of Health Research), countered the perception of public health as a somewhat old-fashioned field by stating:

"It is public health services that identify and control hazards in a whole population such as Toronto's. Several lines of evidence strongly suggest that we are now truly living in a global village. International travel is at higher levels than ever before – bringing new opportunities for exotic (and ordinary) disease transmission… new forms of 'flu' that nature produces every year are now transmitted across continents each winter by air travelers, requiring complex surveillance measures and new influenza vaccines annually – a core public health function."[7]

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Within a year, a new coronavirus arrived by air in Toronto, and spread undetected through several hospitals. SARS had arrived – and the only thing that Dr. Frank failed to foresee was that this virus had no vaccine.

In the aftermath of the SARS outbreak, the Panel heard loudly and clearly from all sectors of healthcare about the need for a comprehensive review of public health capacity and structure in the province. Based on what we have been told, we believe that it is critical for Ontario and the Ministry of Health and Long-Term Care to immediately begin to review and address the following areas.

Recognize and Revitalize Public Health as a Career

SARS placed immense stress on an already strained public health system and on the people that work within it.

We heard clearly through interviews and discussions with Medical Officers of Health, their associates and staff about the emotional and psychological impact of SARS on their lives. More than this, we heard directly from both veteran medical officers and relatively new recruits working in the public health field, who are asking themselves a difficult question – Is it worth it anymore? Many are tired of working in what they see as a constantly under-resourced and undervalued field; one that has moved from the Walkerton crisis, through the West Nile Virus scare, to SARS. Many could earn significantly more money by simply moving back to clinical medicine, and it is clear that more than a few are examining this option.

Yet these individuals have so far remained at their posts because of a genuine commitment to public health. For how much longer? Ontario risks a great deal by relying on that personal commitment as a guarantee for the future. It is a thin line of defence that could become much thinner post-SARS.

Unless it is urgently addressed, the human resource challenge at the Medical Officer of Health and Associate MOH level in Ontario will worsen, perhaps rapidly. A number of pending early retirements of Medical Officers of Health, will add to the significant number of unfilled positions that already exist. Moreover, we also heard concern expressed that without concrete action at the provincial level, there is a risk that the proposed Canadian Public Health Agency – as positive as this move is seen by many – may, in fact, make recruitment tougher by drawing valuable skills away from the local level.

This urgency was highlighted by the very first recommendation of Justice O'Connor:

> The *Health Protection and Promotion Act* should be amended to require boards of health and the Minister of Health [sic], acting in concert, to expeditiously fill any vacant Medical Officer of Health position with a full-time Medical Officer of Health.[8]

It is now 2 years since the Walkerton report. We cannot stress strongly enough that Ontario must stabilize and strengthen its existing core capacity. That is the number one immediate need. Building for the future requires strong foundations; we must not allow these foundations to further erode.

Earlier in this paper, we outlined – as did the National Advisory Committee – that public health has been low on, or even missing from, the health agenda at the national and provincial levels. This lack of attention is not without effect; it sends a message to those whose lives are invested in this work – a message that can easily be heard as 'you are not valued.' Ontario must change that message, through meaningful progress and not simply through words.

Any new models that are built, either nationally or provincially, are built on people. The prospect of the impending retirements of a number of key Medical Officers of Health, if coupled with resignations, will make the rebuilding process even more challenging than it already is. The urgency of addressing the human resource challenges in public health cannot be underestimated.

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The Ministry cannot afford to delay reinforcing the leadership of public health at both the local and provincial level. The Panel therefore strongly suggests that the Ministry begin immediate development of an integrated health human resource revitalization plan for public health.

Core components of such a plan should include:

- Developing an enhanced **ongoing training and education program for existing staff**, with the Ministry establishing a training grant and sponsorship initiative. This program should actively promote and encourage cross-training and partnership-based training approaches with the broader health sector.

- Developing **a comprehensive campaign to promote public health careers** in the province (in conjunction with appropriate partners, and coordinated with work through Human Resources Development Canada).

- Developing a **public health re-entry program** to offer incentives and bridging training and mechanisms to recruit back to public health those who have left the field in recent years or whose existing skills and training made them potential candidates for a career in public health.

- Finally, the plan should address mechanisms to ensure that **Medical Officer and Associated Medical Officer pay scales** reflect the

skill sets required, and are benchmarked against appropriate comparator medical sub-specialties and the remuneration levels in family practice.

Some of these issues are discussed in further detail later in this report.

The panel heard valuable advice from the Ontario Medical Association concerning successful models used in other fields to rejuvenate and revitalize both recruitment, recognition, and retention of needed healthcare resources.

A collaborative health human resource strategy for public health is an achievable, cost-effective and necessary project that can have an immediate revitalizing effect.

The Municipal Role

Of all the provinces, Ontario is the only one to extensively cost-share public health programs with municipalities. A significant number of submissions to the Panel indicated a belief that this shared responsibility and shared funding is the Achilles heel of public health in Ontario. As one submission by an acute care hospital succinctly put it: "Reconsider the Public Health governance issues. Does it make sense for them to belong to the municipal structures when the rest of the healthcare system is governed provincially?" Other commentators were even more harsh: "Public health is far too important to be downloaded to the municipal level; there is too much knowledge and expertise associated with it to leave it with Municipal councils and Public Health Boards."

"Reconsider the Public Health governance issues. Does it make sense for them to belong to the municipal structures when the rest of the healthcare system is governed provincially?"

To be sure, splitting the jurisdiction in public health may impose additional barriers to a consistent level of protection for Ontarians. A case in point appears in the response to the West Nile Virus. The Panel heard that certain Public Health Units were unable to benefit from the additional resources provided by the province in 2002 for West Nile containment, because of difficulties obtaining matching funding from the municipal level. In the case of SARS, some units may have to not hire staff and/or give up staff hired under the province's short-term action plan for SARS when the funding for these positions reverts to 50/50 cost sharing after March 31, 2004. The Panel strongly suggests that the recently funded positions linked to the SARS short-term action plan be made 100% provincial on an ongoing basis. As a condition, these positions should also clearly be made

available for re-deployment by the province if needed.

We were also told that introducing new or changed programming on a co-funded basis can involve extended negotiation, and pose additional organizational and coordination challenges. In a widescale infectious disease outbreak such as SARS, the most essential and challenging requirement for an effective response is coordination across jurisdictions. We must ask ourselves how a consistent response might have been hampered by the fact that public health staff find themselves answering to municipal councilors as well as de-facto to the province. This was a major frustration experienced by the Medical Officers of Health.

For these reasons alone, the future role of municipalities in public health requires serious external scrutiny. To our knowledge, no full independent evaluation of the impact of the transfer of responsibilities for public health to the municipal level, and of subsequent co-funding, has been undertaken. Given the importance of public health and the fact that no other jurisdiction in Canada has pursued this model, at a minimum the impact of this arrangement must be documented.

The municipal component of funding is certainly an issue. Yet that alone cannot explain the difference in organization and capacity between Emergency Health Services (EHS), also municipally funded, and public health during SARS. The difference is marked.

Like all healthcare providers, EHS faced multiple challenges during SARS. EHS, however, had the clear benefit of: a) a structure and mandate designed precisely for emergency response (including a clear and effective command structure); and b) routine day-to-day interaction with a broad range of health sector agencies and bodies outside of their own domain.

This functional integration is an organic part of the role of an emergency health service, forcing it – unlike much of health care in Ontario – to engage laterally across different healthcare settings. While there were problems with information flow to paramedics, by and large these problems did not appear to flow from the structure and function of EHS, but from confusion in terms of overall leadership.

The municipal role, therefore, is only one factor in assessing public health. The essence of public health is local, as numerous individuals told the Panel. Effective capacity, understanding, and links to the community must exist at the local level for public health to work. These strengths cannot be created or replaced by a new national or provincial agency or structure.

Furthermore, we were told that real public health gains in certain areas – in

controlling tobacco use, for example - have proceeded more rapidly and successfully at the municipal level in Ontario than at the provincial level. The balance between local linkages/impact and provincial and national capacity must therefore be carefully weighed. One cannot and should not come at the expense of the other.

In the immediate term, it is clear that the province lacks the staffing centrally to provide anything but limited surge capacity support to the Public Health Units and there is clear consensus that this must change.

Critical Mass

Ontario has 37 Public Health Units, whose catchment areas range in population size from millions (in the case of Toronto) to a few thousand. Based on the Panel's analysis, local public health capacity is significantly more broadly distributed in Ontario than in any other jurisdiction in Canada.

Many observers have commented on Ontario's diffuse public health

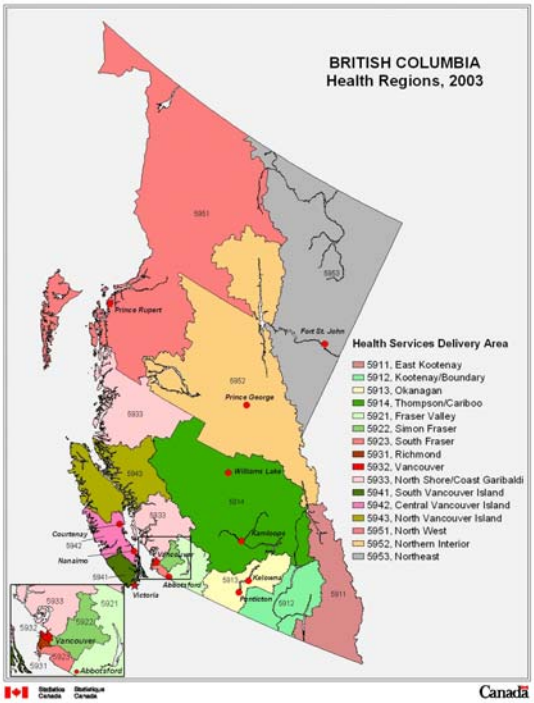


Figure 2: Public Health Regions in British Columbia

Figure 3: Public Health Regions in Quebec

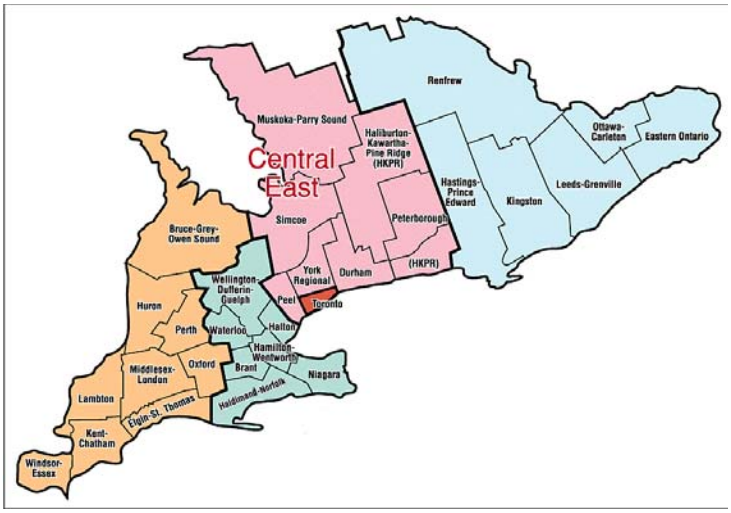


Figure 4: Public health regions in Ontario (south)
Source: Association of Local Public Health Agencies, 2003

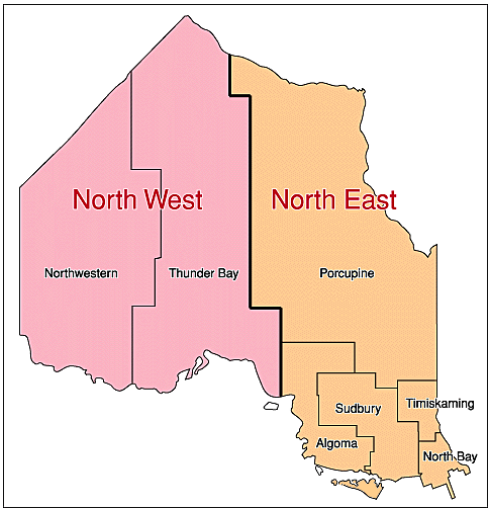


Figure 5: Public health regions in Ontario (north)
Source: Association of Local Public Health Agencies, 2003

Province	Health regions	Units	Population* (thousands)
Newfoundland and Labrador	Community Health Regions	6	519.6
Prince Edward Island	Health Regions	4	137.8
Nova Scotia[1]	Health Regions (Zones)	6	936.0
New Brunswick	Health (Hospital) Regions	7	750.6
Quebec	*Régions sociosanitaires* (RSS)	18	7,487.2
Ontario	Public Health Units (PHU)	37	12,238.3
Manitoba	Regional Health Authorities	11	1,162.8
Saskatchewan	Regional Health Authorities	13	994.8
Alberta	Regional Health Authorities	9	3,153.7
British Columbia	Health Service Delivery Areas	16	4,146.6
Yukon Territory	Entire territory	1	31.1
Northwest Territories	Entire territory	1	41.9
Nunavut	Entire territory	1	29.4

Figure 6: Public Health Regions in Canada Compared

Source: 2003 Population Data from Statistics Canada CANSIM II, table 051-0001

organization. A June 2003 report of the Canadian Institute of Health Research (CIHR), *The Future of Public Health in Canada* made the following observation about critical mass:

> Public Health is a system based on populations. There needs to be a sufficient population base for a critical mass of technically expert public health staff to be effective. In the U.S. many states have public health locked into county boundaries. This creates too many local health departments and spreads resources too thinly. This leads to isolation and a decrease in multi disciplinary interactions critical to effective public health delivery of services. This situation is further compounded by a reliance on local funding sources.[9]

Following Walkerton, Dr. Richard Schabas, a former Chief Medical Officer of Health for Ontario, noted:

> Modern public health requires increasing specialized expertise. Small health units simply lack the resources to accommodate this. They are becoming as anachronistic as the cottage hospital. A population base of at least 200,000, and ideally considerably more, is necessary to support a truly up-to-date public health department.[10]

Dr. Schabas could have gone further. In the event of a significant emergency requiring a health sector-wide response, we face another challenge. Not just the number and spread of Public Health Units across the province, but the alignment of planning boundaries between Ministry planning regions, Public Health Units, and district health councils.

For example, the East Region planning area covers nine separate Public Health Units, one of which (Renfrew County) also finds itself in the North Ontario planning region of the Ministry. The same area is covered by two district health councils. The Southwest region is covered by nine Public Health Units, and straddles the boundaries of four district health councils. These observations are not meant to suggest the notion that public health capacity at the local level is unimportant. Indeed, the Panel feels it is vital.

However, the Ministry must urgently examine the layering of boundaries and functions between planning regions, Public Health Units and district health councils. This complete lack of alignment is a systemic barrier to improved coordination. The Ministry must also look at the need for a coordinated critical mass of public health and infection control expertise to be constructed on a regional basis, with appropriate central coordination support.

Full alignment will take time. But efforts to create regional infection control networks – resourced with appropriate coordination capacity and skill sets to move between healthcare sectors – would be a clear and positive step in that direction.

The Panel does not hesitate to acknowledge that many smaller Public Health Units have performed exceptionally well and have developed effective links with the communities that they serve. However, what is of some concern – and certainly worth more comprehensive analysis – is the question of core critical mass.

To what extent does the relatively diffuse organization of public health across Ontario, combined with overall staffing challenges at both the local and provincial level, impede the capacity to re-direct staff and other resources during emergencies? To what extent does the current model mitigate against system-wide response and effective multi-sector collaboration? And at what stage is a Public Health Unit too small to house rationally the breadth of expertise that it should have to function effectively?

Public Health Interface with Ontario's Healthcare System

Another area requiring detailed examination is how to significantly improve the links between Public Health Units and the rest of the healthcare system. As one larger Unit stated: "The outbreak showed how great the divide is between public health and the clinical sector. The two for the most part work in isolation of each other and this lack of integration interferes with cross-sector communication and collaboration…collaboration has to continue even after the crisis is over. Otherwise walls will be erected and once more different sectors will once again work independently of each other."

Many acute and community-based care providers and Public Health leaders repeatedly told the Panel of their desire for more effective and lasting partnerships between Public Health and other core components of the healthcare system. As far as the formal components that are in place to support this, Ontario does not compare well with other jurisdictions.

Ontario is unique in Canada with regard to its basic organizational structure for the broader management of health care. It has even been called the 'control group for regionalization.' The province does not have in place an established structure through which public health formally and routinely engages with the broader health system management structures at a

senior level. In addition, as outlined above, the existing planning regions of the Ministry do not formally incorporate public health in a meaningful way, and do not, in most cases, easily align with the structure and distribution of Public Health Units in the province.

For comparative purposes, in the British Columbia and Alberta regional models, public health leadership, at the Medical Officer of Health level, is effectively linked into the decision structures of the regional health authority.

The relationship of public health within a regional model is far from perfect. As the CIHR report stated: "The regionalization reforms in many Canadian provinces and the attempted downloading of funding responsibilities in Ontario appear to have given little attention to the impacts on the public health system."[11]

While certain regionalization efforts may not have addressed in a very comprehensive manner the potential impacts on public health, one clear benefit certainly occurred – whether by accident or design – public health interests ended up sitting alongside the acute-care sector within an overall governance framework. Few would argue, however, that this proximity resulted in large re-allocations of funding away from the acute sector. That said, the two components of the system are at least within the same tent and, for the most part, operate within the same regional boundaries.

The Panel is not implying that Ontario should move quickly to establish regional health authorities – although a number of commentators have clearly stated that this model could have provided a significantly greater operational cohesion to the SARS containment efforts in Toronto. The purpose of the comparison is to illustrate the lack of comparable formal vehicles by and through which public health, at the local or regional level, can intersect with the broader health sector and management structures.

The absence of effective regional networks is amply demonstrated by the following submission from a multi-site facility straddling organizational boundaries: "Our facilities fall within the [catchment] of different jurisdictions of providers. For example, we needed to be in regular contact with the Durham and Scarborough Public Health Units, the Durham and Scarborough CCACs, and at least three Ambulance Services – Durham, Toronto, and York. All of these agencies were interpreting directives and communicating their requirements slightly differently. As the receiving organization of these various nuances in protocols, it contributed to some initial confusion."

While roles and responsibilities in Ontario Public Health are relatively well-

defined vertically, such as. local Medical Officer of Health to Chief Medical Officer of Health, they are much more poorly defined horizontally, for example local Public Health Unit to local healthcare delivery agents and hospitals. The primary reporting lines to the local board of health often sits uncomfortably with the de-facto reporting to and responsibilities of the Chief Medical Officer of Health. A review and modification of this relationship may be required to optimize central coordination in the context of an outbreak.

Despite the difficulties, different Public Health Units across Ontario have moved to create formal and informal networks with other components of the healthcare sector. While these efforts are commendable, the degree of interconnection between Public Health and, for example, the hospital sector, remains highly inconsistent. And the absence of direction or formal organizational structures remains.

This theme emerges clearly in the views of many non-public health service providers. The experience of many healthcare providers dealing with local Public Health Units during SARS varied considerably from unit to unit. Some units outside of the GTA played a major role and received high praise; others were seen as disconnected and lacking the skills and understanding to navigate the hospital system: "I am in long-term care and generally our Public Health inspectors from our local Public Health Department were our contacts and I found that our Public Health Department seemed to be left out of the information loop and were often unaware of new directives, etc. until we informed them."

We recognize that in any emergency, there will always be varied local responses, and that the capacity will always be heterogeneous. That said, formal structures and approaches linking public health to the broader health system with expectations and roles defined and a solid central link, are important enablers for an effective response in an outbreak. This issue requires significant and ongoing attention. On the positive side, the Panel heard how other components of the health system have, post-SARS, a heightened appreciation of the role and need for public health, and a strong desire to formalize and build more effective, respectful, working partnerships.

One necessary support to developing a more effective and coordinated working relationship between acute care and public health is a clarification by the Ministry of the precise expectations of local Public Health Units regarding facility-based infection control. Respondents from both public health and the acute care sector called for a detailed review of the existing *Mandatory Health Programs and Services Guidelines*[12] for public health as they pertain to facility-based infections. Such a review should reflect what

has been learned to date, and it should be refined and clarified in partnership with both public health and acute care expertise. The Panel heard that at this stage, the hospital-based responsibilities of public health contained in the mandatory guidelines are insufficiently detailed and inconsistently applied. The resulting update should be broadly disseminated.

Regional Infection Control Networks

If Ontario is not going to proceed in the near future with developing any new regional delivery/authority system for health care, then it is absolutely imperative to create new formal structures at the regional level to link the hospital, community, and public health expertise. Initially, these regional networks should be formed around infectious disease control and health emergency preparedness.

The Panel endorses the call by the National Advisory Committee to create regional networks on a national level. However, we urge the Ministry to consider this approach not only as part of a national response, but also as part of a provincial system. Recognizing that the links and focus of such networks will need to be very clear, the Panel has been speaking directly to providers and organizations to obtain input on how best to operationalize this concept.

...there appears to be broad agreement with the development of regional infection control networks.

Based upon what we have heard to date, there appears to be broad agreement with the development of regional infection control networks. The panel heard clearly that for these networks to succeed a number of factors will have to be in place. These include:

- Coordinated resourcing and support: Given existing staffing pressures at Public Health, additional support and coordination resources will clearly be required to draw together the required partners for an effective regional network system. Ideally support should also be available for a lead hospital to work in partnership with public health lead in this process.

- Rational regions: The primary challenges in establishing any regional networks are the boundaries and the degree to which these correspond to organizational and patient flows. Regional Networks would also need to be broad enough to allow for a certain core critical capacity (ideally, access to Academic Health Science Centre Resources).

- Clear roles and responsibilities: Any regional networks developed will need clear and well-defined relationships between the parties – with roles, responsibilities, and appropriate linkages defined at the outset. The panel envisages a proposed Health Protection and Promotion Agency with a Division of Infection Control, acting as both an anchor to the networks and a resource to coordinate and enhance their development.

A Question of Independence

Who public health officials answer to and to what extent this is perceived as influencing their actions, are questions that have been prominent in responses from the field. These questions have permeated, in a variety of forms, numerous interviews and submissions to the Panel. Underlying these questions is a perception that the lines between public health management and political considerations during certain stages of the SARS outbreak appeared blurred – we are ill-equipped to definitively challenge or confirm this perception. However, perceptions matter.

One physician submitted the following comment: "A centralized, adequately resourced epidemiologic capacity needs to be immediately developed. This is clearly not a function that the present Public Health Division is fulfilling, especially given the degree to which the Division can be/was hampered or obstructed by bureaucratic imperatives and/or political interference."

Certainly, these concerns are not universal. Indeed, some praised the honesty of communication; as one submission stated: "The honest and open approach taken was helpful in allaying public fears and maintaining public trust."

Yet questions of independence run deep. For instance, individuals pointed out that at the local level, a board of health – to whom the local Medical Officer of Health and staff must answer – may, under the existing *Health Protection and Promotion Act* (HPPA),[13] consist solely of the municipal councilors and provincial appointees. Here, the potential for a lack of transparency, or at least a perception of conflict of interest, might well arise.

The question of how much of an activist a Medical Officer of Health can be on potentially contentious issues involving other aspects of council business with health implications, while at the same time anticipating the next budget request from the same council, is a live question.

While public appointees clearly bring perspectives to the table that may not

always align with the opinions of the Council, the City of Toronto, among others, has wisely elected to include public representation on the board of health. This facilitates greater transparency and independence to public health decision making – a measure that Ontario should examine in conjunction with municipal partners as possibly worthy of support.

The principal barrier to potential conflicts rests in part on the degree to which the province is prepared to monitor and enforce aspects of the HPPA and, at the end of the day, largely on the integrity of our Medical Officers of Health. We are fortunate that this integrity is solid, but we should not be complacent that integrity alone is sufficient. We urge that an assessment be done of the overview and monitoring process at the provincial level and the potential need for additional resources and rigour in this area to ensure compliance in word and spirit with the HPPA and the *Mandatory Health Programs and Services Guidelines*. Indeed, the Provincial Auditor for Ontario has raised the need to ensure compliance with these guidelines in the 2003 report.

It has long been the practice (far from unique to Ontario) that the Chief Medical Officer of Health reports to the Minister of Health. Dr. Richard Schabas, who served in that role, has spoken forcefully on the issue of independence. Following the Walkerton Inquiry, he wrote: "Public health officials must always be free to speak and act in the interests of public health. Unfortunately, public health in Ontario and across Canada is too enmeshed in with politicians and bureaucrats to ensure this…[they] must serve two masters: the government and the public."[14]

Dr. Schabas went on with much foresight to issue a call for the creation of an arm's length agency based on the US Centers for Disease Control for Ontario and potentially for the nation.[15]

The twin themes of independence and capacity permeate discussions on a national and/or provincial Center for Disease Control model and the proposed Canadian Public Health Agency. As one healthcare association suggested "A key factor is that these outbreaks need to be handled by people who do not report to government. Politics played too important a role in the handling of the outbreak. What is needed is an agency that is arm's length from government (e.g. a CDC)."

Senator Kirby, in discussing the proposed Canadian Public Health Agency, rightly indicates that independence must be weighed against the need for any public health body to function alongside other areas of health care and "people, agencies and government departments…other levels of government and health professionals inside and outside of government."[16]

The Panel is aware that a balance between operational independence and functional connectivity with both the broader healthcare system and the Ministry is not an easy one to find. The solution we believe lies neither in full isolation nor the opposite.

Given the cumulative nature of the high profile issues that Ontario's public health sector has dealt with over the past five years – Walkerton, West Nile, and SARS – and the tremendous economic and political ramifications of SARS, Ontario needs to reinforce that we have in place appropriate distance between public health and the political process.

Over time, any doubts about the source, timing, or motives of public health information have a corrosive effect on confidence, not only in the structure but the information itself. Addressing this perception, and reinforcing the centrality of an independent voice for public health, is a key early step in promoting public health renewal in Ontario.

In the short term, several legislative or procedural approaches can be taken. The National Advisory Committee has cited that B.C. and Manitoba have appropriate provisions, whether through legislation or contract, that allow the Chief Medical Officer of Health certain latitude to issue information independently of the Minister of Health. In the medium term, the proposed Canadian Public Health Agency creates opportunities for Ontario to explore agency models for public health. Ontario has both an opportunity and a responsibility.

This area is extremely complex, given the existing funding structures and levels of government involved. However, it is an area that the Panel is giving serious and detailed consideration to, with informed advice forthcoming in our final report in February.

Public Health Laboratory Capacity

The need for renewal in the public health laboratory sector was a core component of the National Advisory Committee report. The Panel wholeheartedly supports the call for establishing an enhanced national Public Health Laboratory network as a rational approach to maximize existing expertise in the system and to provide much needed surge capacity beyond our existing frameworks. However, for Ontario to maximize its contribution to any national model, a number of critical factors must be addressed.

It is clear to the Panel, from the submissions and interviews on this topic, that the public health laboratory capacity, and overall structural and

organizational linkage with the public health system, requires major work.

As one submission stated: "In Ontario, a lab with no surge capacity to deal with even limited outbreaks (for example the West Nile outbreak in 2002) was forced to try to cope with hundreds of SARS specimens submitted per day, no way to determine which cases were legitimate, and no way to prioritize testing – until we were able to come up with our own solution during phase 2, this also meant that the Winnipeg lab was trying to cope with the hundreds of specimens we shipped to them daily through the outbreak."

After examining the organizational structures and functions of public health laboratory systems throughout Canada and internationally, we have identified three main areas as critical markers of an effective public health laboratory system: scientific capacity; organizational alignment; and, partnerships with academic health centres.

1) Scientific Capacity

The Panel commends the work of the Medical Microbiologists and staff at the Ontario Public Health Laboratories, who the Panel has heard performed superbly in the face of a volume of testing for which they were clearly unprepared. We also acknowledge that in recent months Ontario has taken steps to hire an additional Medical Microbiologist at the provincial public health laboratory and add new specialized testing capability.

However, the submissions to the Panel from the laboratory sector and beyond indicate an ongoing and significant concern that the existing core scientific medical and research capacity at the Ontario Public Health laboratory is far short of what is needed for a province with a population of over 12 million. The Panel heard that the level of medical leadership and microbiologist capacity in Ontario is considerably below that of British Columbia – a province with a population of slightly over 4.1 million.

The lack of a critical scientific mass presents an immense challenge in the face of emergent diseases, or health emergencies resulting in large volumes of testing. The resulting delays – particularly acute during the first West Nile Virus outbreak – are partly understandable given the available capacity. That said, the delays, some measured in months, are not simply a lab issue but have impacts system-wide on our collective capacity to respond, monitor, and treat infectious disease outbreaks.

Therefore, we must challenge the thinking that staffing for new diseases and outbreaks is either anomalous or wasteful duplication. In the past five years, the Ontario Public Health laboratory has dealt with huge testing

volumes for SARS, West Nile Virus, E.coli 0157, and anthrax scares. Surge capacity in public health labs must become day-to-day capacity. The past decade has clearly taught us that outbreak can follow scare can follow outbreak. This is the business reality for the labs sector, and staffing and resourcing should reflect it. Early action in this area is both vital and relatively low-cost. A first step would clearly be to proceed, as recommended, with the immediate addition of increased Medical Microbiologist capacity – a minimum of two additional positions are required.

In addition, in order to provide more comprehensive advice to the Minister in this area, the Panel has commissioned an independent review of Ontario's Public Health laboratory capacity, comparing it to eight other jurisdictions in Canada, the U.S., and Europe. We anticipate being able to provide more detailed direction in this area in our final report.

2) Organizational Alignment

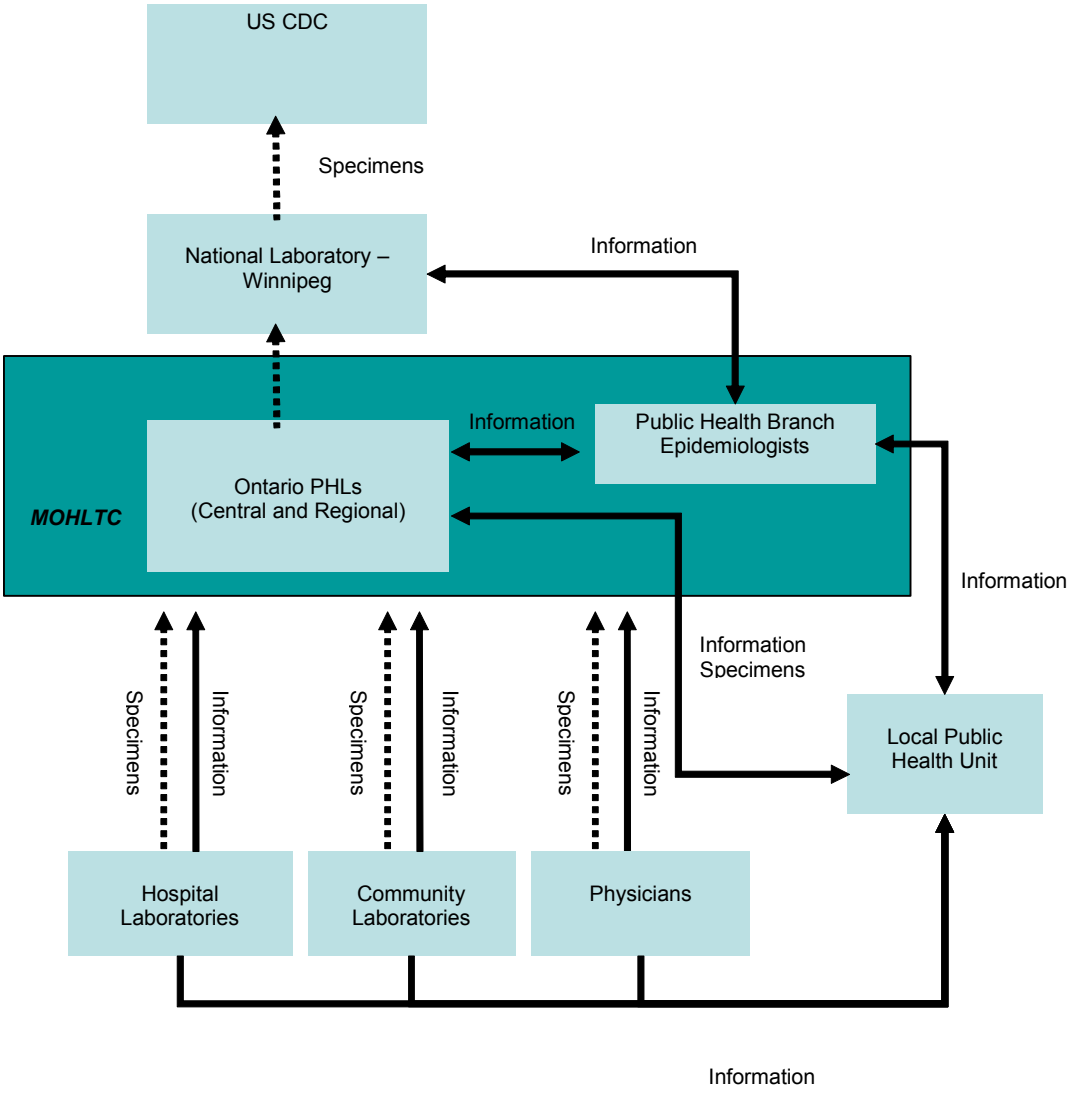
The experience of the Panel members, submissions from the lab sector, and the work of Dr. Naylor and the National Advisory Committee have all indicated a defining characteristic of effective public health laboratories – the alignment of scientific, testing, epidemiological, and analytical skills under a single organizational framework, preferably in a single location. This is the case in Quebec, British Columbia, the United Kingdom and the US CDC.

The rationale for this model is clear. The elements of surveillance laboratory, testing analysis, and epidemiologic investigation can operate functionally within a single framework. Housing a critical mass of scientific and analytical capacity within a single entity allows for more rapid information exchange, analysis and follow-up and across functional lines. Unfortunately, this is not the case in Ontario.

The Ministry has an operational separation between laboratory testing and epidemiological analysis capacity under two distinct organizational structures. This is a clear challenge to information flow and potentially to timeliness of disease control measures.

Indeed through interviews, we heard that this functional split did in fact cause significant problems under the strain of SARS. At one stage the Ontario laboratory was using Health Canada guidelines to determine testing protocols for SARS, while Public Health Units sent different guidelines to physicians. This breakdown of normal processes caused some chaos. Regardless of how it happened, the schematic below shows the nature of the problem, and how in a crisis it could easily happen again.

Current Ontario Public Health Laboratory Model



3) Partnerships with Academic Health Centres

In British Columbia and many U.S. states, it is routine for the public health laboratory system to be aligned formally or informally with academic institutions and health science centers. This offers several advantages:

- **Fostering a community of interest and knowledge**: Affiliate or partnership type models do not replace the need for core central public health lab capacity. But they have the potential to broaden the depth and range of expertise that the lab can draw upon. In its ongoing work, the Panel will address this issue and the possible options for Ontario in greater detail.

- **Potential for research partnerships and a vibrant environment for recruitment**: Linkages with academic institutions bring a range of potential opportunities that may serve the public health laboratories well. In an era when many skilled professionals are eager to maintain an involvement in academic health research, developing a vibrant and engaged scientific critical mass will, in the long term, rest partly on the ability to recruit and retain professionals. Creating effective and supported links with research for public health laboratory staff should, even in an era of fiscal restraint, be regarded as a necessity for building capacity, not a luxury.

- **The potential for surge capacity through affiliate organizations**: Ontario is blessed with some of the most advanced laboratory capacity in Canada at a number of the major Ontario hospitals. The National Advisory Committee clearly recognized this fact when they referenced the roles played by both Mount Sinai and the University Health Network and the Hospital for Sick Children labs in assisting during the SARS outbreaks. The Panel will be exploring the potential for creating more formal partnerships between Public Health laboratories and the hospital sector in the final report. It remains an area where we believe Ontario can draw upon expertise within the province to contribute greater weight to a national framework.

Public Health Staffing and Organization

In a public health system as complex and dispersed as Ontario's – covering a population mass comparable to some smaller European countries and operating a major public health laboratory– strong central capacity to lead and shape the system is vital. The nature of the skills required at the central level are as diverse as the challenges facing public health in the 21st Century. In this way, as an operational service, public health is clearly distinct from many of the functions carried out by the Ministry. Public health is one of the few direct health services that the Ministry provides to the people of Ontario.

Dr. Naylor and the National Advisory Committee have shone a spotlight on certain aspects of the limited public health capacity at the provincial level. The Committee was critical of the epidemiological and analytical capacity at the Public Health Division of the Ministry. The Panel's submissions and interviews have echoed this concern.

One public health physician was extremely clear in this regard: "The lack of outbreak response and control tools such as standardized and centralized line-listing of all cases involved in an outbreak,…mechanisms for shared access, the ability to generate key analytic products to aid in understanding and response, especially real-time epidemic curves. [This lack] was embarrassing, shameful and dangerous. This cannot be allowed to happen again! This will require mandate, capacity, training, standards, agreed-upon policies and procedures, and more leading edge information systems than public health presently possesses either provincially or regionally."

Other concerns emerged in interviews again reflecting the absence of sufficiently robust central capacity in place to manage an outbreak. These pertained to skill mix, recruitment and hiring difficulties, as well as tensions between the central Public Health Division and the field.

As Dr. Naylor and the National Committee noted, the challenges faced during SARS revealed four basic weaknesses: lack of information technology; lack of scientific/epidemiological capacity; confused lines of accountability; and lack of surge capacity.

In a number of these areas, the Panel has heard that the Public Health Division made several unsuccessful attempts to secure resources, particularly in the area of information technology. The Panel is also aware that as a result of the SARS experience, progress is being made in certain areas, such as improved epidemiological capacity and a better communicable disease information system.

In other areas, however, the challenges appear greater than simply funding. The high vacancy level that has existed in Public Health Division appears indicative of other potential problems. It is hard for us to say whether these problems are in the areas of competitive remuneration, skill shortages in certain fields, perceptions of public health as a career in the public service or bureaucratic barriers, such as ongoing staffing freezes. Therefore, the Panel suggests that a comprehensive external capacity review be undertaken of Public Health Division. By gauging what is in place now, what barriers are faced, and what challenges need to be overcome, Ontario will be far better positioned to know what needs to be in place and can start building toward that goal. The Panel strongly believes that this review should not be used to impede but rather to complement the strengthening and recruitment process currently under way.

Ideally, this review would be comparative and draw upon interviews, documentation and the experience of other jurisdictions in establishing and maintaining core central capacity in public health. This work is important to address not only what is in place now, but to identify what needs to be

in place centrally for the province, regardless of structure.

While the Panel anticipates bringing forward more comprehensive recommendations on potential future models for public health capacity in Ontario, an external review of Public Health Division can only assist in providing direct and practical information to support whatever steps are taken to enhance public health renewal.

At the local level, the difficulty in recruiting and retaining qualified Medical Officers of Health and appropriately qualified staff for Ontario Public Health Units, has been a persistent issue for a number of years, particularly in rural areas. The Walkerton Inquiry was forceful on this issue.

Despite ongoing efforts by the province and municipalities themselves, the issue remains current. The Panel has heard that the problem is partly a symptom of the overall shortage of public health physicians – "an increasingly rare commodity," as one interviewee put it.

The Canadian Public Health Association has indeed identified this shortage as an increasing national problem:

> Health human resources are integral to public health; the shortages and limitations of the current workforce are many. The shortage of public health professionals including doctors, nurses and managers, in epidemiology, public health, infectious disease control and surveillance is problematic. Retention of current professionals in all areas, and recruitment of new professionals is key to the success of the public health approach. Funding and policy changes are required to deal with this critical human resource challenge.[17]

Senator Kirby also identified a core concern regarding the limited support for community medicine in many jurisdictions, "compared to other high-tech specialties in medicine," thereby constraining the supply of physicians who might choose to move into public health roles.[18] The Panel acknowledges this fact and recognizes the need for ongoing work to change the perception, remuneration, and promotion of community medicine as a career.

It has been suggested that consideration also be given to creating and implementing a public health equivalent to the Underserviced Area Program (UAP). This program provides supplementary incentives to practitioners to work in areas deemed by the Ministry to be underserviced in terms of per capita staffing physician ratios. While the UAP has certainly not solved the shortage of physicians in many areas, it is a vehicle that is already in place, and could potentially be modified to provide an additional incentive to

clinicians prepared to serve in Public Health Units that face persistent difficulties in filling positions.

Another approach to strengthening capacity in the short term is for Ontario to examine what additional roles the federal field epidemiology program might play within the province. As has been pointed out to the panel, the federal field epidemiologist program may be worthy of further use and potential emulation by Ontario. These are addressed more fully in Health Human Resources strategies.

Accountability – Measuring Progress

The Panel members recognized – even before the submissions and interviews made the same point – that the vast majority of the problems identified in the SARS crisis actually pre-existed SARS, and had been highlighted in previous studies. Dr. Naylor has described this phenomenon as "Canada needing to learn the lessons today because it failed to learn them in the past."[19] This phrase is equally valid for Ontario.

How then is Ontario to ensure that it is not forced to repeat, yet again, those same experiences when the next crisis or outbreak? One component of the solution rests with monitoring and regular reporting on progress made in the area of public health to the legislature and to the public.

Senator Kirby, in his recent report, has provided a good model. He has clearly indicated the timeframe and deliverables to which the federal government should be held with regards to the implementation of the key aspects of the national report.

A Public Health Report Card, or annual performance report, concept has been raised with the Panel as an approach with considerable merit. Regular public reports could be made with key indicators specific to the public health sector, including progress made on staffing, information technology, facility-acquired infections, mandatory program compliance, and various measures of population health.

There are real opportunities to examine existing research consortiums such as the Hospital Report Card Project, the ICES Atlas series and others, to develop a rigorous and independent mechanism for providing information on progress in the realm of public health and the impacts, where measurable, over time on key health indicators. This approach would be compatible and should complement any broader work on health system performance measurement at either the national or local level.

Towards a Public Health Agency

In assessing the wealth of information that has come to the panel and attempting to come to clear forward-looking recommendations the Panel is convinced of the need for a new organizational model – a fulcrum around which the renewal process can cohere. In this regard, the Panel recommends the establishment of an Agency for Health Protection and Promotion. Such an agency would be an anchor and foundation to a renewed public health and infectious disease control system in Ontario, drawing together core provincial public health resources and newly creating a critical mass of expertise in facility based infection control.

In work to-date, the Panel sees the benefits of an operational agency (reporting directly to the legislature through the Chief Medical Officer of Health) in the following areas.

- Coordinated expertise in both public health and facility-based infection control. In our view, it is logical to establish a single body with a dedicated division of infection control. This co-housing of expertise has the potential to provide a supporting, monitoring, and training role in facility-based infection control for both public health, hospitals and other institutions, including long-term care facilities.

- Co-located responsibility, control, and expertise for both the public health laboratory system and the provincial requirements of surveillance, epidemiology, monitoring and compliance.

- While the creation of a federal agency is not a pre-requisite for the establishment of a provincial one, Ontario should clearly consider the benefits of designing its agency while the national agency is under development in order to maximize opportunities for synergy and collaboration.

Considerable conceptual and developmental work will be required to effectively operationalize this concept. The panel is undertaking a detailed examination of the available models to this end. In undertaking this work, the Panel is also aware of the critical need to ensure that any model developed does not wholly replace the need for some centralized public health capacity, voice, and awareness at the Ministry. For any agency of health protection to succeed, it will require an effective link to both the Ministry and the broader health sector – while having sufficient operational independence. It will also be essential that the Ministry retains a core public health policy and strategic capacity within the ministry as a point through which the new agency can intersect with broader ministry issues.

Recommendations

Health Protection and Promotion Agency

1. The Ministry should immediately proceed with developmental work to establish a Health Protection and Promotion Agency in Ontario. The Agency should be required to report annually to the legislature through the Chief Medical Officer of Health and include the following core components:

    a. The Ontario Public Health Laboratory.
    b. Relevant existing Public Health provincial resources.
    c. A Division of Infection Control, whose mandate would include research, training, monitoring and best practice dissemination.

    The Agency should also be designed to enable linkages with the proposed Canadian Public Health Agency, the proposed National Public Health Laboratory Network, and appropriate research centres.

Independence

2. The Ministry should immediately amend the *Health Protection and Promotion Act* to provide clear authorization to the Chief Medical Officer of Health to:

    a. report to the legislature
    b. issue public comment on matters of significant public health importance independently of the Minister of Health and Long-Term Care.

    Such a provision should be enacted at the earliest possible opportunity.

Public Health Human Resource Revitalization Strategy

3. It is recommended that Ontario immediately initiate discussions with the Association of Local Public Health Agencies (alPHa), Association of Municipalities of Ontario (AMO), and existing F/P/T processes, to design a Public Health Human Resource revitalization strategy. The strategy should contain the following components:

    a. The development, through the Ministry of Health and Long-Term Care and the Ministry of Training, Colleges and Universities, of an increased capacity for the education and training of public health professionals. This could include increasing enrollment numbers at educational institutions as well as increasing post-graduate training positions or residencies.
    b. The development and support of a provincially funded training and education program for existing public health staff, with a focus on

infection control. This should build upon the existing Public Health Research, Education and Development (PHRED) program. Special emphasis should be placed on promoting cross-training opportunities between public health, acute care, long-term care, and other sectors.

c. The development, in partnership with HRDC and educational institutions, of a comprehensive campaign to promote public health careers in Ontario.
d. The development of re-entry training positions in community medicine such that practitioners currently practicing in other specialties can become qualified to work in public health.
e. The development of bridge training programs intended to update the skills and qualifications of skilled individuals with previous public health experience. This should be offered together with incentives to recruit back such individuals currently practicing in other fields.
f. A review of recruitment and retention strategies for Medical Officers and Associate Medical Officers of Health, including remuneration.

The Ministry should provide a progress report on this strategy to the Minister by June 1, 2004.

Provincial/Municipal Funding

4. Ontario should immediately dedicate 100% provincial funding beyond March 31, 2004 for the 180 positions committed to Public Health Units as part of the Ontario SARS Short-Term Action Plan.

   Ontario should further develop an independent process and establish timelines for the establishment of 100% funding of all communicable disease programs in public health. This should be completed by December 31, 2004.

   All such funding should be conditional on the Public Health Units supporting re-deployment of these communicable disease resources in the event of a public health emergency, as part of constructing province-wide public health surge capacity.

5. Ontario should immediately re-structure the existing cost-sharing agreement for public health with the municipalities to move to between 75% and 100% provincial funding of public health. Programs, including communicable disease programs funded at 100% by the province should be protected at 100%.

   Implementation of the new cost-sharing agreement should be phased in within two to five years.

Public Health Units

6. The Ministry should review, in conjunction with the Medical Officers of Health, the Association of Local Public Health Units and the Association of Municipalities of Ontario, the existing number of public health agencies in the province. Within two years, the Ministry should act on the results of the review to consolidate the number of Public Health Units to between 20 and 25 units, retaining local presence through satellite offices.

Health Protection and Promotion Act – Compliance

7. The Ministry should immediately examine approaches to strengthen compliance with the *Health Protection and Promotion Act* and associated *Mandatory Health Programs and Services Guidelines*, in particular with regard to the resourcing and provision of mandatory health programs and services.

Public Health Division Capacity Review

8. The Ministry should immediately undertake a comprehensive external review of existing provincial Public Health Division capacity. The Ministry should act on recommendations arising from this review to revitalize provincial public health capacity within the context of public health renewal.

Performance Review for Public Health

9. Ontario should establish an annual performance report for public health in Ontario to be tabled to the legislature and disseminated to the public. This report should be prepared by appropriate third-party research organization body and should indicate the status of the following areas:

    a. Human resources
    b. Information technology
    c. Facility-acquired infections
    d. Mandatory program and service compliance
    e. Health of the population
    f. Central epidemiological capacity

References

1. The Standing Senate Committee on Social Affairs, Science and Technology, Kirby M. *Reforming health protection and promotion in Canada: time to act*. November 2003. [Online] Available at: http://www.parl.gc.ca/37/2/parlbus/commbus/senate/Com-e/SOCI-E/rep-e/repfinnov03-e.htm. Accessed November 5, 2003.

2. Office of the Provincial Auditor of Ontario. *2003 Annual Report. Chapter 3: Report on value for money (VFM) audits: Section 3.09; Public health activity*. 2003. [Online] Available at: http://www.auditor.on.ca/english/reports/en03/309en03.pdf. Accessed November 6, 2003.

3. Council of Chief Medical Officers of Health. *2001 Chief Medical Officers of Health Report*. 2001. Draft.

4. Anonymous. Proceedings and recommendations of the Expert Working Group on Emerging Infectious Diseases: Lac Tremblant Declaration. *Can Commun Dis Rep.* 1994;20(Suppl 2): 1-21.

5. *2003 First Ministers' Accord on Health Care Renewal*. February 05, 2003. [Online] Available at: http://www.hc-sc.gc.ca/english/hca2003/accord.html. Accessed October 23, 2003.

6. Commission on the Future of Health Care in Canada, Romanow R. *Building on values: the future of health care in Canada – final report*. 2002. [Online] Available at: http://www.hc-sc.gc.ca/english/pdf/romanow/pdfs/HCC_Final_Report.pdf. Accessed October 25, 2003.

7. John Frank. Presentation to the Commission on the Future of Health Care in Canada. Open public hearings - Day 1. April 2, 2002. Toronto. Summaries of hearings available at: http://www.hc-sc.gc.ca/english/pdf/romanow/pdfs/Toronto_Day_1_notes.pdf. Accessed September 23, 2003.

8. O'Connor DR (Hon.). *Report of the Walkerton Inquiry. The events of May 2000 and related issues. Part 1. Chapter 15 – Summary of Recommendations*. Toronto, Ont: Ontario Ministry of the Attorney General; 2002, p 499.

9. Canadian Institutes of Health Research, Institute of Population and Public Health, The Ad Hoc Committee on the Future of Public Health in Canada. *The future of public health in Canada: developing a public health system for the 21st century*. June 2003. [Online] Available at: http://www.cdpac.ca/content/pdf/Future_of_Public_Health_in_Canada_June2003.pdf . Accessed September 9, 2003.

10. Schabas R. Public health: what is to be done? *CMAJ*. 2002;166 (10):1282-3.

11. Canadian Institutes of Health Research, Institute of Population and Public Health, The Ad Hoc Committee on the Future of Public Health in Canada. *The future of public health in Canada: developing a public health system for the 21st century*. June 2003. [Online] Available at: http://www.cdpac.ca/content/pdf/Future_of_Public_Health_in_Canada_June2003.pdf . Accessed September 9, 2003.

12. Ontario. Ministry of Health and Long-Term Care. *Mandatory health programs and services guidelines*. December 1997. [Online] Available at: http://www.health.gov.on.ca/english/providers/pub/pubhealth/manprog/mhp.pdf. Accessed September 14, 2003.

13. *Health Protection and Promotion Act*, R.S.O. 1990, c. H.7.

14. Schabas R. Public health: what is to be done? *CMAJ*. 2002;166 (10):1282-3.

15. ibid.

16. *The Standing Senate Committee on Social Affairs, Science and Technology, Kirby M. Reforming health protection and promotion in Canada: time to act*. November 2003. [p.23] [Online] Available at: http://www.parl.gc.ca/37/2/parlbus/commbus/senate/Com-e/SOCI-E/rep-e/repfinnov03-e.htm . Accessed November 5, 2003.

17. Canadian Public Health Association. *Public health in public interest: a contribution from the Canadian Public Health Association to the National Advisory Committee on SARS and Public Health*. July 4, 2003. [p. 10]. [Online] Available at: http://www.hc-sc.gc.ca/english/protection/warnings/sars/learning/reports/cpha_brief.html. Accessed October 29, 2003.

18. The Standing Senate Committee on Social Affairs, Science and Technology, Kirby M. *Reforming health protection and promotion in Canada: time to act*. November 2003. [Online] Available at: http://www.parl.gc.ca/37/2/parlbus/commbus/senate/Com-e/SOCI-E/rep-e/repfinnov03-e.htm . Accessed November 5, 2003.

19. Naylor D. *SARS and public health*. Presentation at the Department of Public Health Sciences, Faculty of Medicine, University of Toronto. Toronto, Ont. September 26, 2003.