FOREWORD

ARTICLE BY GÉRARD VINCENT

With this second edition of its new yearbook – *International Hospital Federation Reference Book* – the IHF shows again its constant goal to facilitate the exchange of ideas, experience and best practices in hospitals worldwide.

In these first years of the 21st century, huge improvements in health coexist with extreme poverty. Innovation is visible with advanced therapies, new drugs, IT development and all sorts of new technologies. But at the same time life expectancies in some parts of the world have decreased. And if all countries are faced with “new” threats such as avian influenza, it is in some parts of sub-Saharan Africa that HIV/AIDS is taking its major death toll. Although there seem to be enough human, financial and technological resources in the international community to solve most problems, some health systems still cannot cope with maintaining the health of their population.

As a result, international organizations are drawing their attention now on what has always been obvious for us: worker numbers and quality are positively associated with the health of the population, be it in primary care or in hospital care. The workforce is of course at the core of a health system and the major contributor to advancing the health of the population. Health care is a labour-intensive sector. Health professionals embody our core values: preventing, healing, caring, easing pain and suffering. The development of health care professionals with up-to-date skills and strong motivation is clearly essential for overcoming difficulties in achieving our health goals.

On the other hand, the artificial separation that is made between public health services and medical services is no longer valid; this is why IHF does not stick to hospital care in the restrictive sense as shown in all its publications. Issues such as vectors and unsanitary environments, waste disposal and water systems for example, are among our main interests. IHF strongly believes that it is possible to improve what is already done at national level, with the help of international technical assistance, for the treatment and the prevention of diseases.

At the same time hospital care has entered a new era which would have been considered science fiction a few years ago. It is forecasted that it will not be long before complex operations could resemble an overnight stay in a hotel. The process would begin with the patient scheduling their operation online. In the weeks leading up to the procedure, a microchip embedded in the patient’s body would check a host of vital signs on a daily basis. Data would then be transmitted, in real time, to the patient’s electronic medical record (EMR) and health care professionals. The day before admission, software agents in the microchip would aggregate the patient’s data and send a complete report to his personal physician, care team and EMR. In the hospital, the patient would be admitted with a smart card containing up-to-the-minute medical data, laboratory reports, physician instructions and the vital signs report sent by the microchip the day before. At every point of care, information would be recorded via networked personal digital assistants and electronic patient charts using perfected speech recognition technology. During his short stay, the patient would be monitored via video, and would have continuous access to his care team, thanks to a robot orchestrating these details.

IHF therefore has a challenge to face with the International Hospital Federation Reference Book, as well as with all its activities; it has to reconcile these extremes.

Senior health service leaders, managers and professionals all over the world remain the target audience of this reference book, but it will certainly be of interest to all professionals working in hospitals and for hospitals.

Gérard Vincent
President
International Hospital Federation
INTRODUCTION
2006 IHF REFERENCE BOOK

ARTICLE BY PROFESSOR PER-GUNNAR SVENSSON

IHF is active in all regions of the world, a phenomenon attributable to the projects, events and networking among its members. As you will observe, the articles in this publication also cover most regions of the world, providing updates from Africa, Asia, Eastern Mediterranean and the transitional countries.

On topical matters, a wide range of issues of high relevance to health policy makers and managers of health services are covered in this edition. Architecture and design, migration of health workers, leadership, patient safety, quality of health services, telemedicine, etc, are such areas of high importance to leaders of hospitals and health services.

On patient safety, I am happy to report that IHF is now an official partner with WHO in the International Alliance for Patient Safety. Furthermore, together with partners such as WHO, International Council of Nurses and Health Research and Educational Trust (Publishers of the Health Services Research, journal of the American Hospital Association), we are organizing a conference on the migration of health workers in March 2007 (see advertisement elsewhere in this edition).

Also in this edition of the International Hospital Federation Reference Yearbook, you will find articles focusing primarily on medically-oriented themes, such as provision of blood in developing countries, diabetes, endomicroscopy, infection control, laboratories and proton therapy in cancer treatment. Many of these topics have been addressed as they are important sources of information for decision-makers in hospitals and health services, not least, in order for them to be better prepared to undertake informed decisions on investment in therapies and technologies.

I trust you will find many rewards in reading this Reference Yearbook and I wish you all a happy end to 2006 and a successful 2007.

Finally, I look forward to meeting you at forthcoming IHF events, advertised elsewhere in this publication.

September 2006, Ferney Voltaire (France)

PROFESSOR PER-GUNNAR SVENSSON
Director General
International Hospital Federation
REVITALIZING HEALTH SERVICES USING THE PRIMARY HEALTH CARE APPROACH IN THE AFRICAN REGION

ARTICLE BY DR L SAMBO

Abstract

THE IMPLEMENTATION OF PRIMARY HEALTH CARE (PHC) IN THE REGION INITIALLY LED TO IMPROVEMENTS IN THE HEALTH OF THE PEOPLE. THE SUBSEQUENT DECLINE IN PERFORMANCE OF PHC WAS ASSOCIATED WITH A NUMBER OF CONSTRAINTS IN RELATION TO INTERSECTORAL COLLABORATION, COMMUNITY PARTICIPATION, HUMAN RESOURCES DEVELOPMENT, MANAGERIAL CAPACITY, RESOURCE MOBILIZATION, INFORMATION BASE AND RESEARCH CAPACITY. HOWEVER, A REVIEW OF PHC 25 YEARS AFTER ALMA-ATA REVEALED THAT THE STRATEGY IS STILL RELEVANT.

UNIVERSAL ACCESS TO HEALTH REQUIRES WELL-FUNCTIONING DISTRICT HEALTH SYSTEMS THAT ARE ABLE TO DELIVER ESSENTIAL INTERVENTIONS TO COMMUNITIES, FAMILIES AND INDIVIDUALS AT THE RIGHT TIME AND AT AN AFFORDABLE COST. THE PRIMARY HEALTH CARE STRATEGY, ADAPTED TO THE CURRENT AND ANTICIPATED ENVIRONMENT, PROVIDES AN APPROPRIATE FRAMEWORK FOR UNIVERSAL ACCESS TO ESSENTIAL HEALTHCARE.

THE APPROACH PROPOSED IN THIS ARTICLE IS AIMED AT REVITALIZING HEALTH SERVICES USING PRIMARY HEALTH CARE BASED ON PRIORITY INTERVENTIONS TO ENHANCE COMMUNITY PARTICIPATION, STRENGTHEN MANAGERIAL CAPACITY, IMPROVE GENERATION AND USE OF EVIDENCE, STRENGTHEN COLLABORATION AND PARTNERSHIPS, AND IMPROVE QUALITY AND COVERAGE OF ESSENTIAL HEALTH SERVICES.

There is a global commitment to achieving internationally-agreed health-related goals, including the Millennium Development Goals, four of which are health-related. In the African Region, countries need to accelerate towards universal access to essential health interventions in order to achieve the goals. Such access will be facilitated by well-functioning district health services that can deliver essential interventions to communities, families and individuals at the right time and at an affordable cost.

The Thirtieth World Health Assembly in 1977 identified the attainment by all peoples of the world by the year 2000 of a level of health that would permit them to lead socially and economically productive lives as a main social target of governments, international organizations and communities. This was reaffirmed by the International Conference on Primary Health Care (PHC) at Alma-Ata in 1978 which adopted PHC as the strategy for attaining the target.

The ideology behind Primary Health Care is based on the recognition that health promotion and protection are essential for sustained economic and social development and contribute to better quality of life. PHC is a cost-effective approach and its principles include social justice, equity, human rights, universal access to services, community involvement and priority to the most vulnerable and underprivileged.

Since Alma-Ata, countries worldwide have made considerable efforts in trying to bring health to all through national health policies and plans based on Primary Health Care principles. Although countries in the African Region indicated their commitment to PHC implementation and adopted the health district as the basic unit for delivery of essential health services, they met with various problems. These included weak structures, poor attention to PHC principles, declining financial resources allocated to health, the impact of the HIV/AIDS epidemic, economic crisis and civil strife, and, in most cases, inadequate political will.

The commitment to global improvements in health was renewed by World Health Assembly Resolution WHA51.7 (1998) in which Member States reaffirmed their intent to ensure availability of the essentials of Primary Health Care as defined in the Alma-Ata Declaration and set out in the Health-for-All policy for the 21st century.

A meeting on future strategic directions for Primary Health Care held in Madrid, Spain (2003) called for a consideration of incomplete PHC implementation, new health challenges, social and political factors that influence health, and crises such as epidemics and emergencies that have reversed earlier gains. Consequently, with appropriate adaptation to the current and anticipated environment, the PHC strategy offers a good framework for universal access to essential health care.

This document analyses the health service situation in the Region, identifies challenges and proposes ways of revitalizing health services using the PHC approach to strengthen delivery of essential health interventions.

Situation analysis

Issues

A number of measures were undertaken in the 1980s to strengthen health systems. These included decentralization and establishment of health districts, training of personnel for PHC management, creation of health or social welfare development committees, and integration of programmes...
The simplicity and flexibility should allow an inexperienced user to make use of the system without further increasing the workload or being too complicated.

Health care systems based on Primary Health Care. A review of the national development plans of countries in the Region indicated that the countries had addressed most of the elements of PHC. Despite this effort, there was a discrepancy between the health-for-all policy and PHC implementation. Whereas all countries made considerable effort to integrate PHC principles and elements into their health systems, the broad approach with PHC as the central function and main focus of the health systems had been abandoned, in most cases, in favour of “selective PHC” in the form of vertical disease-specific programmes. However, these programmes provided important lessons for revitalizing health services.

A number of recent strategies and initiatives have led to increased service coverage. The implementation of Reach Every District has contributed to increased immunization coverage, for example regional average diphtheria-pertussis-tetanus 3 coverage increased from 54% in 1995 to 66% in 2004. Increased coverage of directly-observed treatment short-course services in 41 of the 46 countries in the African Region has led to remarkable improvements in case notification of tuberculosis. Antiretroviral therapy roll out programmes under the “3 by 5 initiative” and the multisectoral AIDS programmes have improved coverage of HIV/AIDS prevention, treatment and care in the Region.

Opportunities
Efforts to revitalize health services can build on the lessons and successes of on-going programmes and initiatives such as Integrated Management of Childhood Illness, Reach Every District, directly-observed treatment short-course, antiretroviral therapy, polio elimination and guinea-worm disease eradication, etc.

Decentralization to the districts, currently being implemented through health sector reform, provides an opportunity to promote bottom-up approaches and contribute to the mobilization of additional resources for Primary Health Care.

The Commission on Macroeconomics and Health has recommended an annual minimum per capita investment of US$ 34 for delivering an essential health package. This provides an avenue for advocacy for increased health financing in countries.

The on-going work of the Commission on Social Determinants of Health will provide useful information and recommendations to address challenges arising from social determinants. Implementing these recommendations will improve the effectiveness of health interventions.

The poverty reduction strategies currently being undertaken provide a favourable framework for integration and funding of health objectives and key health interventions in the context of national development agendas.

In the recent past, a number of global health initiatives have recognized the need for strengthening health systems to facilitate delivery of priority interventions. The Global Fund to Fight AIDS, Tuberculosis and Malaria and the Global Alliance for Vaccines and Immunization are providing significant resources to strengthen health systems.

The Fifty-sixth World Health Assembly requested WHO to continue to incorporate the principles of Primary Health Care in all of its programme activities in order to attain the Millennium Development Goals. This inclusion offers a springboard for re-introduction of PHC in health programmes. “Strategic orientations for WHO action in the African Region 2005–2009” is a document that presents five orientations, one of which is strengthening health policies and systems to improve capacity for delivering healthcare at local levels. This priority for the African Region for the five-year period will require adequate attention and resources.

Challenges
One of the major challenges is improving community participation. Participation of communities in planning, monitoring and evaluation of health services has diminished. Community management structures have broken down or are non-existent; the link between health delivery systems and the community they serve has disappeared. In most countries, community health workers and extension workers are no longer in place. There is a need to strengthen capacity of communities in improving the quality of health services.

Availability of resources is crucial to the provision of health services. Poor resource allocation; inadequate government health financing; personnel shortages; lack of basic equipment, logistics, essential (immunization, diarrhoeal diseases, essential drugs) within Primary Health Care.

However, coverage of services remained limited. For example, 12 out of 32 countries, representing 54% of the population, had less than 50% population coverage of medical services. Integration and application of research and resources in health development; performance, including planning for human resources in health development; mobilization of resources; managerial participation; intersectoral cooperation; evaluation of health services has provided important lessons for revitalizing health services.

Initially, improvements were noted in some health trends but the pace of improvement has slowed down, as shown by current infant and child mortality rates. There has also been a regression as shown by the high maternal mortality rates and declining life expectancy at birth in some countries. For example, the average maternal mortality rate in the Region is 1,000 deaths per 100,000 live births, while life expectancy at birth averages 40 years.

The gap between countries in the African Region and those in other regions has continued to widen. In 1960, for example, life expectancy (40–50 years) in sub-Saharan Africa was similar to that in China, the eastern Mediterranean region and India; by 2000, life expectancy in sub-Saharan Africa was still much the same, but it had increased to 60–70 years in the other countries.

Monitoring and evaluation of the implementation of national health-for-all strategies were carried out in 1988, 1991 and 1994. The findings revealed that the implementation of the strategy had achieved some significant results; however, there were weaknesses in community participation; intersectoral cooperation; mobilization of resources; managerial performance, including planning for human resources in health development; information collection and analysis; and integration and application of research and appropriate technologies into the health development process.

A review of Primary Health Care in the African Region showed that most countries made sizeable achievements in developing
medicines and other supplies; and poor infrastructure have contributed to the decline in Primary Health Care performance.

There is a need to improve managerial performance to overcome inadequate capacity at country level, especially at operational level, in planning and management, including financial management.

Strengthening capacity to generate and use evidence for decision-making will also revitalize health systems. National health information systems are weak in most countries, particularly at operational level. The capacity to generate evidence through operational research has tended to decline over the years.

Another major concern is increasing access to essential health interventions and improving the quality of health services. The coverage of health services has not kept pace with, among other things, the high rate of population growth, leading to declining population service coverage.

Strengthening coordination and collaboration between the various partners and stakeholders is essential. Intersectoral collaboration, though often discussed, has not happened. Involvement of the private sector and civil society remains limited. Very few countries have defined clear policies, mechanisms and procedures for collaboration with the private sector in health service delivery in general and in the application of Primary Health Care in particular.

Approaches to revitalizing health services

The approaches to revitalizing health services will focus on the challenges identified and on applying Primary Health Care principles in the process.

Objectives

The overall objective is to improve equity and access to quality health services in the context of PHC for better health outcomes. Specific objectives are:

- to strengthen community participation in health service delivery;
- to improve resource availability and allocation at operational level;
- to strengthen the managerial capacity of the district and subdistrict health teams;
- to strengthen capacity for generation and use of information for decision-making;
- to improve health service quality and coverage;
- to strengthen coordination and partnerships among all stakeholders, especially public-private partnerships.

Guiding principles

Revitalizing health services will be guided by a set of principles aimed at ensuring fair and appropriate health services to all in the context of Primary Health Care. They include:

- **Human rights.** All persons have the right to health, including access to basic quality care and services. Every person should have access (physical, financial, cultural, etc) to a defined minimum (essential) package of acceptable quality healthcare and services.

- **Efficiency and effectiveness.** All health interventions should be efficient and effective. The best possible use of resources should achieve the desired results of the given interventions.

- **Responsiveness.** The services should be tailored to the expectations of the clients, including social and human rights expectations.

- **Participation.** Primary Health Care depends very much on community participation and people’s involvement and ownership of health programmes.

- **Intersectoral collaboration and partnership development.** Given the multisectoral nature of determinants of health and the increasing number of stakeholders in health, it is critical to strengthen collaboration between health and other sectors and build partnerships with relevant stakeholders.

Priority interventions

Community participation will be enhanced through:

- establishing and strengthening community and health service interaction to enhance needs-based and demand-driven provision of health services;
- empowering communities and strengthening community management structures, consumer activities and links to health service delivery systems;
- providing guidelines for strengthening community participation;
- reorienting the health service delivery system, including health staff, to reach out and support communities.

Availability of human, financial and material resources will be improved through:

- increasing availability and skills of human resources for health for delivery of quality health services;
- incorporating community health workers into the human resources for health development agenda of the country, in general, and districts, in particular, and providing appropriate professional back-up through training, mentoring and support supervision;
- providing performance-based incentives and improving the work environment;
- mobilizing and allocating more resources at operational level to improve financing of health services delivery and thus respond to identified needs;
- developing and supporting health infrastructure development plans;
- strengthening estimation, procurement and supply of basic equipment, logistics, essential medicines and other commodities.

Managerial capacity will be strengthened through:

- assessing capacity-building needs in leadership and management within district and subdistrict health teams, and providing necessary skills and support;
- reviewing the functions of the different health structures, including hospitals and health facility management committees, in health service delivery at lower levels;
- establishing and providing support to multidisciplinary teams at the national and intermediate levels that will provide policy and technical guidance, support planning and implementation, monitor and evaluate the performance of the health services at the operational level (districts);
- providing technical and logistic support to enable effective monitoring and support supervision and quality assurance at all levels;
- building capacity of health service delivery structures at all levels in financial management, including budgeting and accountability.

Generation and use of evidence will be strengthened through:

- improving health information systems,
especially at the peripheral health facility and community levels;

- strengthening capacity of district and subdistrict health teams in operational research and utilization of research results in improving health service delivery.

Quality and coverage of health services interventions will be improved through:

- defining and updating essential health care packages;
- identifying health system requirements for expanded coverage of essential health services;
- assessing the capacity of the health system, particularly at operational level, to deliver the essential health services;
- promoting integrated and harmonized delivery of health interventions using existing programmes as entry points.

Collaboration and partnerships will be strengthened through:

- building mechanisms to strengthen coordination and partnerships, including intersectoral collaboration and public-private partnerships;
- developing regulatory frameworks to govern partnerships;
- reviving the network of community extension workers from relevant sectors;
- reviewing and strengthening linkages between central government and local governments.

Roles and responsibilities

Countries

Countries are primarily responsible for the revitalization of their district health services. They should:

- incorporate the priority interventions for revitalization of health services in their national and district health plans;
- ensure that an appropriate coordination mechanism is in place to harmonize the complementary roles of local, intermediate and central level structures and institutions;
- reorient their hospitals to function in support of district health services;
- mobilize and allocate resources, giving priority to health service delivery at the operational level;
- facilitate delegation of responsibilities and functions with commensurate resources;
- promote intersectoral collaboration and public-private partnerships;
- involve communities in resource mobilization, planning, implementation, monitoring and evaluation of health services.

WHO and partners

WHO should:

- provide technical guidance and support for the priority interventions aimed at revitalizing district health services;
- advocate for more resources for strengthening district health services;
- promote collaboration with other partners at global, regional and country level;
- monitor and report on district health service performance for the Region;
- promote intercountry exchange of experiences and dissemination of good practices.

Other partners, working with WHO, should:

- harmonize support for strengthening district health services;
- provide resources for strengthening district health services;
- participate in joint performance reviews of district health services with leadership from the national authorities at country level.

Monitoring and evaluation

At the country level, mechanisms will be put in place to promote technical peer review between districts and consumer evaluation of the health services within districts. Core indicators for district health performance will be adopted for the Region and used for routine monitoring and reporting on an annual basis. A regional consolidated report on performance of district health services in all countries in the Region will be made every three years.

A task force on Primary Health Care will be constituted in the Region to regularly review the progress made in the implementation of the key strategies for revitalizing district health services, identify major bottlenecks and advise the Regional Director, on an annual basis, on how to address them.

Conclusion

Success in achieving the Millennium Development Goals and the overall goal of universal access to prevention, care and treatment is based on effective and fully-functional health services at the local district level. The principles of Primary Health Care are still relevant for strengthening health service delivery for the populations in the African Region, but they need to be adjusted in a country-specific context and adapted to new global challenges.

The Regional Committee is invited to consider and adopt the orientations proposed in this document and the attached resolution.

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References

Towards the better performance of hospital systems in the Eastern Mediterranean

Article by Dr. Ahmed Ali Abdullatif

When applying a framework for assessing the effectiveness of a health care delivery institution such as the hospital, it is important to seek if there is a balance of emphasis on the external socioeconomic environment as well as the internal hospital environment. Furthermore, it is also necessary to consider in any organization such as a hospital both short/intermediate and longer-term performance. In the short run, the performance assessment often focuses on effectiveness in goal accomplishment and efficiency in resource utilization, productivity as well as stakeholder satisfaction – including customers, employees, owners, and society at large. Over a slightly longer time frame, the organization's ability to adapt to changing environmental conditions and its ability to develop people and systems to meet new challenges gain importance. In the long run, the primary criterion of organizational effectiveness becomes sustainability and survival under conditions of environmental uncertainty. Hospitals in WHO Eastern Mediterranean Region (EMR) are presently undergoing transformational changes and challenges. Some EMR countries are reforming their health systems including the hospital systems. These reform initiatives are trying to harmonize the external and internal environments. Hospitals thus can make use of such an opportunity to seek a more proactive comprehensive health care mandate. In order to achieve this role, hospitals should invest more in their internal environment.

The hospital system does not exist in a vacuum, but within a social, political and economic context which influences how the hospital responds to issues surrounding continuum of care and care pathways, equity, accessibility, quality, and social accountability.

The hospital system, generally speaking, has been subjected to serious challenges in the last two decades in Eastern Mediterranean Region of WHO (EMR) especially that the resource inputs of hospital have always been at the expense of Primary Care (PC) in most countries of the Region. Studies have shown that hospitals have the majority of Nurses, physicians and costly technology. The NHA studies conducted in EMR show on average that hospital care has the lion share of resources.

In this article I will review the hospital systems in EMR taking into consideration two types of environments. The external environment is about the external socioeconomic and demographic determinants prevailing in a country; rather how far the nation’s external environment is conducive to a better performance of health systems in general and to hospital systems in particular. It is to be noted that most countries of EMR are low and middle income countries. Table 1 shows the wide differences of GDP among countries of EMR. The total health expenditure in these countries has a wide spectrum, with US$ 6 in Somalia and US$ 862 in Qatar. (Table 1). Few examples of the features of the External environment will make the case clear. In Somalia a substantial proportion is nomadic population, the internally displaced population and/or refugees form a demographic phenomenon in Libya, Pakistan, Palestine, Somalia, Sudan, and Yemen. Conflicts, wars and violence as well as natural calamities are disrupting the health systems development in several EMR countries particularly the hospital systems.

Health care financing is an important external environment determinant. Generally speaking, the population of these countries has a high access to local health services with low levels of out of pocket payment, except Lebanon. As shown in (Table 1), for example, countries with higher GDP, have more physicians, nurses, and beds per population.

Thus external socioeconomic environment usually affects the capacity of the hospital system to obtain its resources inputs.

The second environment is about the internal hospital organizational culture: This is basically about the capacity of a hospital as an organization to chart its leadership style, its shared beliefs and values that influence the behaviour of hospitals organizations’ members. This environment also generates clear vision making it well developed and well communicated to all departments and staff. Other features of the internal hospital environment are about its emphasis on

Abstract

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The hospital system, generally speaking, has been subjected to serious challenges in the last two decades in Eastern Mediterranean Region of WHO (EMR) especially that the resource inputs of hospital have always been at the expense of Primary Care (PC) in most countries of the Region. Studies have shown that hospitals have the majority of Nurses, physicians and costly technology. The NHA studies conducted in EMR show on average that hospital care has the lion share of resources.

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inputs the internal environment affects mainly the processes of the hospital systems (Figure 1). I am arguing that much emphasis has been put so far on the external environment but few systemic well designed frameworks have been designed and put into operation to tackle the internal environment. To give an example on the importance of the internal environment let us take the health workforce. As mentioned earlier hospitals have succeeded in getting the lion share of the workforce with support from the external environment, yet the workforce diversity and its skill mix, which are crucial for hospital performance, will only be possible if the optimal internal environment is in place.

Box 1 | Features of the optimal internal hospital environment:

- Capacity of the hospital as an organization to chart its leadership style.
- Its shared beliefs and values that influence the behaviour of hospitals organizations’ members.
- Capability to generate clear vision making it well developed and well communicated in all departments and to all staff.
- Emphasis on innovation and on team work.
- High performance orientation, quality management and risk prevention
- Capacity for learning from failures.
- Clarity on scope of social accountability of hospitals.

To some extent the weak internal hospital culture is attributed to the weak national sociocultural environment. Whereas the external environment as mentioned earlier affects the resource innovation and on team work. An important aspect of this environment is also the hospital approach towards high performance orientation, quality management and risk prevention and its capacity for learning from failures. Embedded in the performance orientation should be of course the beliefs and values of social accountability of hospitals. In EMR this internal environment is still lagging behind and doing business as usual in most hospital settings. This is why I think most hospitals in EMR have not clearly placed themselves as institutions of health care so far. Rather they are still limiting their role as sick care facilities. But even this role has a limited quality reputation.16, 15

To some extent the weak internal hospital culture is attributed to the weak national sociocultural environment. The weak internal environment is still lagging behind and doing business as usual in most hospital settings. This is why I think most hospitals in EMR have not clearly placed themselves as institutions of health care so far. Rather they are still limiting their role as sick care facilities. But even this role has a limited quality reputation.16, 15

Table 1: Selected health indicator of EMR countries

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP per capita, Exchange rate in US$</th>
<th>Total health expenditure per capita, Exchange rate in US$</th>
<th>Out of pocket expenditure as % of total health expenditure</th>
<th>Physicians Rate per 10,000 pop</th>
<th>Nurses and midwifery personnel</th>
<th>Hospital beds per 100,000 population</th>
<th>PHC units and centres</th>
<th>Population with access to local health services</th>
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<tr>
<td>Afghanistan</td>
<td>163</td>
<td>11</td>
<td>46.3</td>
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<td>5.0</td>
<td>0.54 beds</td>
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<td>18.9</td>
<td>27.20</td>
<td>52.9</td>
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<td>1.80</td>
<td>8.0</td>
<td>16.1 beds</td>
<td>0.60</td>
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<td>55</td>
<td>53.5</td>
<td>14.30</td>
<td>33.5</td>
<td>22.00 beds</td>
<td>2.19</td>
<td>100.0 100.0 100.0</td>
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<td>2017</td>
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<td>50.0</td>
<td>8.90</td>
<td>14.1</td>
<td>17.20 beds</td>
<td>3.40</td>
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<td>48.2</td>
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<td>13.00 beds</td>
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<td>18.00</td>
<td>37.0</td>
<td>19.00 beds</td>
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A key feature of the District Provider Organization (DPO) approach is to have a considerable degree of autonomy granted to the managers of the district.

Initiatives to seek a coherent role of the District Hospital

Ministries of Health are experimenting and studying how to harmonize the hospital and making it more effective. Several initiatives are now in progress in EMR though still in their early stages. However three initiatives from Egypt, Iran and Oman could provide conducive environments for hospital systems. It is at this time that the internal hospital environment should be consolidated.

District Provider Organization initiative in Egypt

The Ministry of Health and Population (MOH&P) in Egypt, has taken an initiative to develop District Provider Organizations (DPO) as an approach of decentralization for the District Health Authorities (DHA), and to provide and manage effective and efficient delivery of family medicine-oriented primary health care. This includes public, preventive and curative services as defined in the Basic Benefit Package (BBP) prepared by MOH&P to individuals and families in defined populations through public, NGO and private providers. Availability of referral district hospitals is a requirement in the design of DPO.

Over the last two years, MOH&P Egypt has launched 30 DPOs. Each DPO is established in one district. The plan is to reach 40 DPOs (out of 262 health districts nation wide) by the internal half of 2006 in five pilot governorates.

A key feature of the District Provider Organization (DPO) approach is to have a considerable degree of autonomy granted to the managers of the district. This would be achieved by defining the responsibilities and duties placed upon the organization, the resources controlled by the organization and the authority to make decisions related to those resources. Steps for implementing DPO starts by reorganizing the structure and functions at the district level to include mapping of the district resources, developing a district health financing fund, stakeholders analyses, developing Business Plans, contractual arrangements between the district Health Authority (as an organization maintaining availability of providers) and Governorate Health Financing Fund (as purchaser of the health service on behalf of the district population). Contracted health facilities, whether hospitals or primary care, should first be accredited.

Hospital semi-autonomy under intersectoral collaboration in Iran

In the Islamic Republic of Iran four policies of “decentralization” have been introduced over the past decade: semi-autonomy for hospitals; contracted management; outsourcing; and provincial deconcentration. The hospital semi-autonomy measure was mainly that of a shift in the financing mechanism mainly through the expansion of the social health insurance. The main players for the new financing mechanism appear to come mainly from outside the health sector particularly the Management and Planning Organization, Ministry of Welfare and Social Security, Cooperatives, municipalities and the medical universities with a view to clarifying the new rules and regulations and space for the autonomy at the provincial and district levels. In the context of such Intersectoral collaboration a new form of hospital semi-autonomy is piloted in four hospitals where the processes of contracted management and outsourcing have been presented as a form of such semi-autonomy. This initiative of hospital autonomy is launched in two provinces with support from Ministry of Cooperatives where some 18 health cooperatives are run by general practitioners. There are contractual arrangements with these cooperatives based on an agreed upon package and capitation payment system. Such an initiative will influence the responsibilities, type and quality of health care provided by hospitals; equity and the access of users to health care; the technical efficiency of the hospital; and service accountability.

The Oman PHC-led health system is therefore to be oriented to a model which pursues an integrated community approach. This is appropriate given that the most recent evidence of cross national analysis supports the conclusion that PHC-led health care systems are associated with improved population health (Macinko, Starfield and Shi. 2003 and 2005).

As for the present policy intention by the MOH/Oman in relation to hospital care the following systemic interventions have to be taken into consideration:

- Strengthen the integrated referral mechanisms.
- Improve connectedness of PHC with autonomous public hospitals. A network of Autonomous Hospitals delivers a full range of specialist care, covering out-
patient, in-patient and Accident and Emergency services.

Continue investing in a PHC infrastructure and technology.

The Health Centre is the main vehicle for giving access to health care for local populations. Specialist secondary and tertiary care is accessed mainly through referral from Health Centres. There are complementary models of service delivery which are currently being developed and assessed. In particular, the “Extended Health Centre” model which is providing out-patient access to specialist clinics in a polyclinic setting, as an alternative to referral to hospital out-patient departments. The delivery of nursing care to patients in their own homes by community based teams is also being piloted.

This can, over time, change the orientation and role of some specialties which are traditionally seen as a part of secondary care. Examples are pediatrics and obstetrics. Following some highly developed systems, these specialties could be treated as part of the primary care model, with the relevant specialists operating as members of an extended primary care team at a local level, rather than spending their time predominantly in secondary care settings providing reactive health care. Such a strategic thinking would affect the future development for Hospital care in Oman or other countries adapting the Omani PHC lead approach.

Lessons derived from the EMR health initiatives.

The three initiatives discussed briefly above show that there is a tendency at present to redesign the organization of the health care delivery system; both the primary care and hospital care arenas. There are lessons derived from these three initiatives as well other ones in EMR. The first lesson is that there is a movement to enhance the power of primary care (PC) through redesigning the provider: purchaser: financier relationship at the district level. The district level is the building block of the national health system in most countries of EMR. This was clear in the cases of Egypt and Oman. The effect of such empowerment is on the Institutional development of hospitals demanding clarity of roles, functions and responsibilities of the hospitals at different levels of the health system. Thus hospitals should respond through developing flexible structures, organizational charts, lines of accountability, capacity building, leadership and coordination with PC level.

The second lesson derived from the experience of Iran is strengthening autonomy of hospitals and the purchasing power of PC cooperatives under the auspices of other interested sectors. The hospital in this context is accountable to a broader group of stakeholders. Again this relation of hospital with other sectors will influence the role and functions of hospital to respond to new requirements by the different stakeholders. The third lesson as shown by the initiative from Oman is to provide expanded scope of services at the primary care level. Thus services to patients would be in less costly settings, such as ambulatory care and community based approaches such as home based care. This new PC interventions intend to use hospital facilities more efficiently, reduce the waiting time and length of stay and thus improve the utilization of beds and services.

There are other important initiatives happening in the EMR. Afghanistan is embarking on core packages of services for hospitals; hospital-based health tourism is encouraged to contribute to national economy in Jordan and Lebanon as well as other countries such as Egypt, Tunisia, UAE etc.

There are other important initiatives happening in the EMR. Afghanistan is embarking on core packages of services for hospitals; hospital-based health tourism is encouraged to contribute to national economy in Jordan and Lebanon as well as other countries such as Egypt, Tunisia, UAE etc. performance. It is suggested that analysis of hospital performance could be addressed using the framework shown in Figure 1. It seems that hospitals in general have performed well in acquiring needed resources from the external environment (nation’s external conducive environment). As mentioned above, hospitals have the lion share of health resources. This means that hospitals were effective in obtaining resources though at times at the expense of primary care which is claimed to be more cost effective than hospitals. However hospital performance in how efficiently the resources are organized, managed and utilized to produce hospital services, is mostly ineffective, having low bed occupancy rates, and longer hospital stay in many EMR countries. When we examine the output domains (Figure 1), we face two time frames. One time frame tells us about short/intermediate outputs focusing on effectiveness and efficiency of hospitals and the impact of the hospital organization on key stakeholders, especially the community, and their

Conclusions

Hospitals are under scrutiny in how far they are responding to health needs. There are continuous efforts to assess hospital...
interests and satisfaction. Unfortunately there are no systematic user satisfaction surveys to inform us how stakeholders think of quality and quantity of care they receive. However the impression is that the quality of care leaves much to be desired in most hospitals.  

The other time frame (Figure 1), is about long term outputs informing us about ability of the hospital to adapt to changing conditions and its ability to develop its staff and systems to meet new challenges. In other words, it is about hospital’s survival under conditions of environmental uncertainty.

The EMR is undergoing a socio-political and demographic transition and in response to that, initiatives are undertaken by EMR countries to reform the health sector including hospital care. In such a new context, there are external and internal hospital environments. Both environments are vital determinants for putting hospitals in the right place and having the right role.

It is the aim of this article to balance focus on the two environments through investing more on the so far neglected optimal internal hospital environment.

References

4. Technical Report No. 9; A Reform Strategy for Primary Care in Egypt, August 1997
8. Technical report No. 49; Jordan National Health Accounts, PHR, 2000
14. WHO Regional Office for the Eastern Mediterranean; Report on the Expert group meeting on hospital accreditation, Cairo, Egypt 23-26 September WHO, Cairo, Egypt 2002
16. Ministry of Health and population, Egypt Health Sector Analysis and Future Strategies, Health Sector Reform Program, MOHP 2003
17. Ministry of Health and population, Egypt Service Provision Assessment. MOHP 2004
19. WHO Regional Office for the Eastern Mediterranean; Contracting for Urban PHC in IRAN: A Rapid Appraisal of the CO-OP Pilot Scheme, November 2005; Report to Ministry of Health and Medical Education., Cairo, Egypt 2005
PLACING PATIENT SAFETY AT THE HEART OF QUALITY IN HEALTH CARE IN SOUTH-EAST ASIA

ARTICLE BY DORIS SETA MUGRITCHIAN (PICTURED LEFT) AND SULTANA KHANUM

Abstract

IN THE 2005/2006 EDITION OF THE IHF REFERENCE BOOK, SIR LIAM DONALDSON, CHAIR OF THE WORLD ALLIANCE FOR PATIENT SAFETY, DESCRIBED PATIENT SAFETY AS A GLOBAL PROBLEM WHICH EXACTS AN ENORMOUS HUMAN AND FINANCIAL TOLL IN BOTH RICH AND POOR COUNTRIES. THIS PAPER DISCUSSES THE SCOPE OF THE PROBLEM IN SOUTH-EAST ASIA, A REGION WHICH PRESENTS SIGNIFICANT DIVERSITY IN HOW HEALTH SYSTEMS ARE ORGANIZED, FINANCED AND MANAGED. IT DESCRIBES INITIATIVES TO BUILD ON, CHALLENGES TO BE ADDRESSED AND OPPORTUNITIES TO BE HARNESSED IN ORDER TO MOVE THE PATIENT SAFETY MOVEMENT FORWARDS IN THE REGION.

WHO’s South-East Asia Region accounts for 25% of the world’s population. The 11 countries that make up the Region present a diverse socio-economic and cultural picture: Bangladesh, Bhutan, Democratic People’s Republic of Korea (DPR Korea), India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste.

Hospitals play a central role in the provision of health care in the Region and the number of hospitals has increased dramatically during the last decades, particularly in the private sector. In some countries such as India and Thailand, health care has grown into a multi-billion dollar industry that draws patients from neighbouring countries and all over the world. In contrast, many government hospitals are dilapidated, underfinanced and inadequately staffed. They often lack a reliable supply of essential medicines and access to clean water and sanitation. At least half of the health care equipment is said to be in disrepair at any given time.

Many countries in the Region rely on neighbouring countries for all but the basic level of health care. Countries such as Bhutan, Maldives and Timor-Leste, are also dependent on other countries to train their health care professionals.

How big is the problem in the Region?

Lapses in patient safety are not well documented in the Region. Thailand and Indonesia are leading the way by looking at the extent of adverse events in hospitals. In Thailand, a recent study at two major hospitals in Bangkok found that 10% of patients suffered an adverse event, 10% of which were fatal and roughly 50% were preventable. In Indonesia, a study conducted at 11 hospitals in Jakarta in 2004 found that 9.2% of patients had a hospital-acquired infection. The results of the Thai and Indonesian studies are similar to those in industrialized nations where it has been estimated that 10% of hospitalized patients suffer an adverse event and 5–10% acquire a health care associated infection. However, the Thai and Indonesian findings should not be used as national estimates or extrapolated to other countries in the Region. The incidence of adverse events is likely to be significantly higher in hospitals and in countries where services and accreditation programmes are less well developed.

Compared to industrialized countries, the risk of acquiring a health care-associated infection is estimated to be 5–20 times higher in developing countries and neonatal infections are 3–20 times higher. Over 50% of all medicines prescribed, dispensed or sold globally are not justified, and an estimated 50% of injections received in South-East Asia are unsafe.

In 2004, a nationwide assessment of injection practices in India found that every second prescription in outpatient clinics included an injection, over 60% of injections were unsafe, safety was poorest at immunization clinics, and only 51% of the disposal of injection-related waste was acceptable at health care facilities.

Furthermore, in South-East Asia:

- Only 61% of blood donations are from volunteers – the safest donors.
- An estimated 1,000 tons of health care wastes are produced and improperly disposed of each day.
- Medical devices may not meet international standards because they are produced outside of the regulatory framework.
- Counterfeit medicines are an area of growing concern.

What patient safety initiatives are underway in the Region?

WHO has been working closely with countries to help ensure the safety of health care products and services in the Region. These include safety of injections.
and immunizations, blood, procedures and equipment, and waste management. Efforts in these areas include improving the skills of health workers, introducing evidence-based norms and standards of care, promoting the rational use of drugs, and introducing safer technologies.

In the area of drug and vaccine safety, with the exception of Timor-Leste, all countries in the Region have the equivalent of a drug regulatory authority in place and have adopted national drug policies with a focus on essential medicines. Most countries are conducting national pharmacovigilance.

With regard to injection safety, with the exception of Thailand which uses standard disposable syringes, all countries in the Region have implemented a policy to use auto-disabled syringes for immunization. Many countries including Thailand, Maldives and Bhutan, have a policy to use disposable syringes in the curative sector.

All countries in the Region have endorsed WHO’s Strategy for Safe Blood which promotes nationally coordinated transfusion services, collection of blood from voluntary donors, quality testing for infectious agents through reliable laboratories, and rational use of blood. India, Nepal and Thailand have developed comprehensive national blood policies.

While countries in the Region have expressed concerns about the safety of medical devices, regulatory controls to prevent the use of substandard devices are lacking. As a first step, Bhutan has created a Health Technology Committee within the Ministry of Health to establish standard specifications for equipment and medical devices.

In order to improve the regional capacity to manage health care waste, WHO recently launched a six-month distance certification course at the Indira Gandhi National Open University (IGNOU) in India. A growing number of hospitals have established waste management committees and programmes.

What are the Region’s key challenges? Under-reporting
As in other parts of the world, health professionals are reluctant to register or talk publicly about adverse events and medical errors for fear of embarrassment, punishment and malpractice litigation. As a result, the health system does not have a true perception of the risks it generates. Failures are seen as the exception, root causes of incidents remain concealed, incident patterns go unnoticed, and weaknesses in the system stand uncorrected. Much of this resistance is embedded in the attitudes and behaviours of health care professionals, the culture of blame that prevails at health care institutions, and the nature of the doctor-patient relationship as discussed below.

Communication barriers
In South-East Asian cultures, doctor-patient interaction is dominated by the doctor and a culture of “not questioning the doctor” prevails. Because of social and educational barriers, doctors feel there is no point in attempting to explain tests and test results to patients as they would not understand anyway. Patients often sign consent forms without really understanding what they are consenting to. Such one-way communication and decision making disempowers patients who, as a result, rarely participate in their own care. Poor communication is linked with less accurate diagnoses, suboptimal patient compliance, over-treatment, undertreatment and “mistreatment”.

At the same time, an increasingly well-educated population has begun to challenge medical authority and the doctor-patient relationship is becoming more confrontational. This is reflected in the dramatic rise in the number of malpractice cases filed in the Region. For example, the number of litigation cases registered with the Thai Medical Council tripled between 1992 and 2002 from 32 to 105 per 10,000 medical doctors. Media coverage of incidents of physical violence against doctors by unsatisfied family members of patients and of overworked and underpaid doctors going on strike, are extreme reflections of an increasingly strained relationship.

Relationships between members of the health team tend to be highly hierarchical and non-confrontational. Nurses defer to doctors and junior staff defer to senior ones. The hierarchy of the system results in lots of one-way communication. Because the patient loads are extremely high in most settings and there is little time to talk, effective communication between health care professionals and their patients, and among members of the health care team, becomes more critical.

Limited resources
Limited resources have a negative impact on the performance of the health care system as a whole and ultimately on health outcomes. Beyond the prevailing poor state of the health care infrastructure and equipment, the unreliable supply and quality of drugs and other supplies, and shortcomings in waste management, clean water and sanitation, health care institutions in the Region are seriously understaffed. The greatest shortages are in Bangladesh, Nepal, Bhutan, and Indonesia who have less than one doctor, nurse and midwife per 1,000 population. WHO has identified 2.28 per 1,000 as the “threshold” density of doctors, nurses and midwives below which coverage of essential interventions is unlikely. Clearly, an overburdened, frequently under-skilled and inadequately supported workforce is more prone to making medical errors.

A largely unregulated private sector
One of the greatest challenges for governments in the Region is the regulation of the large and rapidly growing private health sector including the pharmaceutical and medical device manufacturing industries. For lack of policies and resources, governments have trouble fulfilling their core public function of stewardship and putting into place processes that ensure the quality of care in both the public and private sectors.

What are the key opportunities?
While the challenges are great, there are also many developments to harness and a range of partners to work with to make health care safer in the Region.

A clear mandate
On August 25 2006, the fifty ninth session
of the Regional Committee for South-East Asia adopted a resolution placing patient safety at the centre of the drive to improve the quality of health care in the Region. This resolution builds on World Health Assembly resolution WHA55.18 adopted by the World Health Assembly in 2002. The Regional Committee urged countries in the Region to assess the scope and nature of adverse events in the Region, strengthen monitoring systems, and establish national mechanisms to respond and learn from this information.

**Activities, structures and tools to build on**

As discussed previously, many quality improvement activities have already begun. Guidelines have been developed although compliance with their use is still low. Many hospitals have established risk management, infection control and waste management committees to oversee quality improvement processes. These structures and mechanisms can be used to institutionalize patient safety at the health care institutions in the Region.

Health care facilities in Bangladesh, India, Nepal and Myanmar have initiated maternal and perinatal death reviews to better understand the factors that contribute to unnecessary deaths and to identify what can be done to prevent them. Together with incident reports, such exercises can serve as the foundation to building adverse event reporting and learning systems.

Several countries have taken up accreditation as a useful instrument for quality improvement. Thailand and Indonesia, for instance, are integrating patient safety into national hospital accreditation goals. In 2006, the Institute of Quality Improvement and Hospital Accreditation of Thailand introduced national patient safety goals for hospitals. Sri Lanka is also taking steps to encourage hospitals to comply with the Patient Safety Goals set by the Joint Commission International Centre (JCI), a WHO Collaborating Centre for Patient Safety.

In 2005, the Indonesian Hospital Association (IHA) formed the Indonesian Hospital Patient Safety Committee (IHPSC) under the Ministry of Health. The IHA, the Hospital Ethics Committee and the Indonesian Commission on Hospital Accreditation (ICHA) are all members of the Committee. The IHPSC has published a

National Guide for Hospital Safety which is being promoted in hospitals in major cities around the country. The implementation of the guidelines will be piloted at 3–5 hospitals this year. The government has also drafted a Hospital Act that will make patient safety programmes compulsory in hospitals. To encourage reporting of adverse events by health care workers, the Act ensures that such reports are not subjected to disciplinary investigations or criminal sanctions by the courts.

**Potential for partnerships**

Most countries in the Region have medical councils to protect, promote and maintain the public interest. As in other parts of the world, medical councils in the Region have four primary functions: keeping up-to-date registers of qualified doctors; fostering good medical practice; promoting high standards of medical education; and taking disciplinary action against doctors whose fitness to practise is in doubt. In a growing number of countries mandatory re-registration is required every five years and there is an attempt to link this to the completion of a minimum number of qualified hours of continuing education.

Health professional associations, including medical, nursing and hospital associations, can also play an important role in advocacy and education in the Region through conferences, journals, training and continuing education programmes. The national medical associations of Bangladesh, India, Indonesia and Thailand are also members of the World Medical Association, a founding member of the World Health Professions Alliance (WHPA). The WHPA recently held a leadership symposium highlighting the critical role of health professionals in patient safety.

Organizations concerned with the accreditation of hospitals have been playing a more important role in the last decade. With growing competition, private sector hospitals see international accreditation as a means to differentiate themselves from the competition. Over time, accreditation is being recognized as a means to improve cost-effectiveness and protect against costly litigation. In a Region where government resources for regulatory enforcement are severely strained, this self-regulation is welcome.

Organizations concerned with the quality of health professional education and training such as the South-East Asian Regional Association for Medical Education (SEARAME) based in Bangkok and its umbrella organization, the World Federation for Medical Education (WFME), can help to ensure the provision of competent health care-service personnel and promote the highest ethical standards in medical and nursing education.

Consumer health groups are emerging in the Region that are ever more active and vocal in protecting patients’ rights. For example, the Voluntary Consumer Action Network, a consortium of consumer interest organizations in India, has called on doctors to prescribe drugs more rationally or be prepared to be sued in consumer courts for medical negligence.

The media has also emerged as a powerful player and potential ally in promoting patient safety. All stakeholders need to nurture a relationship with the media so that reporting is balanced, responsible and accurate.

**Rapidly expanding access and use of information and communication technologies**

Finally, the internet is giving consumers and health professionals in the Region access to a vast body of health information. As a result, though they are more informed, they should guard against being misinformed. The strong information technology sector in the Region has made long-distance learning and continuing health professions education possible. In addition, it is opening the doors for tools to support clinical and administrative functions of health services such as electronic records, patient information systems and national drug registries.

**Moving forward**

There are many initiatives underway in the Region that the patient safety movement can build on. However, it is important that these activities be consolidated into a response that tackles the safety of the health system as a whole.

The following principles should guide the movement forwards in the Region:

- Leadership and political commitment are essential at the national as well as the institutional level.
- Patient safety should be tackled as an integral component of quality of care in the Region.
- Patients must be at the centre of
patient safety initiatives and must be partners in all aspects of the process.

- A dramatic change in attitudes, behaviours and role models is needed to create a culture of patient safety. Working in partnership with health care staff and patients, the following actions can be taken at the institutional level:

- Implementing baseline studies to make the problem of adverse events and medical errors more visible to staff.

- Building reporting, learning and response systems based on incident reporting (both by staff and patients), clinical audits and any other sources of information.

- Introducing simple measures that can significantly reduce patient harm using existing guidelines and protocols.

- Establishing networks for sharing experience and expertise within and between institutions.

Simple measures might include the introduction of procedures such as hand hygiene; standardized treatment guidelines and essential drug lists; the creation of physical barriers such as the special handling and dispensing of potentially harmful drugs when they are delivered into clinical areas or the proper disposal of injection-related or other waste; ensuring ready access to pertinent information; and ensuring adequate training and supervision of health care staff to improve their decisions and clinical judgments.

At the national level, governments should work closely with national and international partners to make the following system improvements:

- Establishing national adverse event reporting and learning systems.

- Creating a legislative and regulatory environment that encourages more open and transparent reporting of adverse events.

- Strengthening and scaling up the national health workforce.

- Integrating patient safety concepts into medical and nursing education and training – students and providers need to learn how to anticipate mistakes and how to deal with them when they occur.

References


27. Mudur, G. “India’s consumer groups call for more rational prescribing”. BMJ 1996 Jan 13; 312(7023):76.
MEDICAL TOURISM AND SINGAPORE

ARTICLE BY DR JASON YAP CHIN HUAT

Abstract

MEDICAL TRAVEL, POPULARLY BUT INAPPROPRIATELY KNOWN AS “MEDICAL TOURISM”, IS CURRENTLY MUCH IN THE NEWS BUT IS A LONG-STANDING INDUSTRY IN SINGAPORE. THE ARTICLE DESCRIBES WHY AND HOW PEOPLE TRAVEL FOR HEALTH CARE, WHY SINGAPORE HAS BEEN AN ATTRACTIVE DESTINATION FOR PATIENTS, AND THE SINGAPORE MEDICINE INITIATIVE TO MAINTAIN AND FURTHER DEVELOP SINGAPORE AS A MEDICAL HUB. SINGAPORE WELCOMES INTERNATIONAL PATIENTS BECAUSE, BEYOND SIMPLY EARNING REVENUE, TO MAINTAIN ITS MEDICAL ECOLOGY AND (PARADOXICALLY) TO SERVE ITS OWN POPULATION SUFFICIENTLY.

G

oogle shows some 563,000 hits on a search for “medical tourism”, and newspaper articles appear regularly on the growth and potential, and the many new aspirants, in the industry. It is however not a new industry as many people have traveled for health care services in one form or another since the time of the Roman baths. On a personal note, my grandmother forced my mother, then living in a small town in Malaysia, to deliver her first-born (that is, me) in Singapore quite a few decades ago!

However, the popular term “medical tourism” is a misnomer. Patients seek health care in countries other than their own for many reasons and not just as “tourists”:

Deliberate: when the trip is made explicitly to seek healthcare, with other activities secondary to the primary purpose of health care.

Incidental: when the trip is made for other reasons (eg business, leisure) but healthcare is sought because of incidental illness or injury.

Emergency: when the trip is made under emergency conditions eg when casualties of man-made or natural calamities are evacuated.

Expatriate: when the foreigner is already resident in the country for reasons of work, though the presence of good health care services is often a consideration for the choice of country to work in, especially for those with families.

Of the four categories, an international health care industry is suggested by only the first one, and even then “medical tourism” carries the inappropriate connotation of some one on a “tour”. A high volume of incidental health care is actually not a good thing since it suggests a riskier tourist destination! Medical travel is not “tourism with a sprinkling of healthcare” but the extension of the age-old community of healthcare seekers and providers across international boundaries, and therefore more than just “sun, sea and surgery”. Just as we term those who travel for business “business travelers”, “medical travel” is the better term and will be used in this article.

There is much confusion today over the numbers of medical travelers, because some countries sometimes (but not always) report all foreign patients including expatriates (eg Thailand), others count just the deliberate health care seekers (eg Singapore), while only estimates exist for yet other countries (eg India). The following table shows some estimates of deliberate health care seekers for the key health care destinations in Asia.

Why do patients deliberately travel for health care?

Medical travel has always been around but previously only the rich could afford it. Today, it is much more accessible to ever larger proportions of populations for various reasons:

+ Increased access to information via the internet and international media has created a global mindset and people are increasingly aware of the possibilities in medical care. In the past, people tended to settle for the clinic next door and the hospital down the road and, when really sick, they go to the big city. Today, they are much more willing to seek such care beyond their borders. With increased access to information also comes the ability to compare prices. Prices are high in many countries because of the way their health care systems have evolved, and patients realize that Asian prices, even the relatively more expensive countries like Singapore, are still cheap compared to their own.

+ Access to air travel has improved tremendously despite the post-9/11 security concerns. The cost of air travel, especially with low cost carriers, is now much lower relative to the cost of medical care, and this has reduced a previous barrier to medical travel.

+ In response to the greater demand,
health care providers have internationalized their services. Hospitals now have international patient liaison centres, and retain marketing representatives in their source countries. Beyond the current main destinations in Asia of Thailand, Singapore, Malaysia and India, countries like the Philippines, South Korea, Taiwan and Hong Kong have announced their intentions to foster a medical travel industry.

Medical travel agencies have started in the past five years, in both destination and source countries, to support the travelling patient. In source countries, some are born out of the frustration of patients to get health care either within reasonable times (ie those with waiting lists) or with reasonable affordability (ie those with insufficient insurance or health care services).

There are now medical travel “packages” where trips are planned with both health care and leisure activities. These much-publicized forms of medical travel catch the public imagination although, in my experience, they form only a fraction of all such travel. Most patients, at least those to Singapore, come on their own, with mainly health care in mind, and other leisure activities (eg shopping, dining, relaxing) are incidental.

Singapore and medical travel

Singapore has long been the destination of choice for ASEAN countries. Before the Asian Financial Crisis and before the current wave of medical travel, Singapore was receiving well over 300,000 patients a year in 1997. These numbers dropped drastically during the crisis but has now recovered.

With limited natural resources, Singapore has always had to rely on an internationalized economy to survive, not least in health care. Singapore receives hundreds of thousands of visitors (specifically) for health care each year, and is a destination of choice for evacuees from natural and man-made disasters. Doctors come to Singapore for medical conferences and training (Singapore has more medical conferences than most other cities and even countries in the region) and our doctors travel to other countries to share knowledge and techniques. Pharmaceutical and other health care-related firms make their headquarters in Singapore, including Joint Commission International despite their having already accredited most of the available local health care facilities (Singapore has a quarter of all JCI-accredited facilities in Asia). There is also a strong culture of research and development, fostered in no small measure by the Biopolis, a purpose-built biomedical research hub for both public and private research groups.

Singapore is well-known internationally for efficiency and effectiveness, a city where “things work”. The country is cosmopolitan yet harmonious and accommodating of many cultures. Even visitors from cultures with relatively specialized needs (eg the Middle East) find their needs met (eg for mosques, halal food, social acceptance). Crime is so low that the police force in Singapore actually ran a campaign “Low crime doesn’t mean no crime” when the lax attitude towards personal security became a problem. In the event of an untoward medical outcome the legal system is reliable and trusted as corruption-free.

Ultimately, the combination of excellent health care services, a safe and reliable infrastructure and a welcoming community makes for a unique blend that gives patients peace of mind, something of great value in a time of stress.

SingaporeMedicine

Models for national leadership are quite different in different countries, with Thailand being led initially by the admirable Bumrungrad Hospital, and Malaysia by private sector hospital groupings like PenangHealth. Countries like South Korea and Taiwan have national initiatives fronted by their respective tourism authorities, possibly influenced by the “tourist” aspects of medical travel.

In its usual inimitable “Singapore Inc.” style, Singapore created Singapore Medicine in 2003, a government-industry partnership that seeks to develop and maintain Singapore’s position as an international medical hub, not just for medical travellers but also for clinical research and development, conventions and exhibitions, training and education, and regional and international head- quarters and operations. The inter-agency initiative is jointly driven by three statutory boards; the Singapore Economic Development Board (which promotes inbound investment and develops local capacity and capabilities), the International Enterprise Singapore (which promotes internationalization by Singaporean companies) and the Singapore Tourism Board (which manages international marketing and branding and develops the associated people-oriented services). Industry partners include health care providers and medical travel agencies. Two ministries (Ministry of Trade & Industry and Ministry of Health) provide overall supervision of the initiative.

Beyond tourism and health care revenue which drives many other countries, SingaporeMedicine has as its agenda additional, and more fundamental, goals. Singapore must maintain and further develop its position as a medical hub with its many mutually supportive spokes. International patients attract international health care providers and vice versa. A larger medical economy creates a larger medical community which provides a larger base for research and development, and for medical conventions and training. Medical travel is thus only one spoke of this hub though an important one.

In the past decades of good economic growth, Singapore has been sending its doctors to the best international centres for specific conditions through its Health Manpower Development Programme. After extensive training in highly specialized and subspecialized areas, they return to a population of a mere four million which is insufficient critical mass to sustain their skills, hence the need to serve an international clientele.

There is also the need to maintain robust health care services, with sufficient volume to support more than just one or two doctors in the rarer but critical services (eg liver transplants). Hence, for Singapore, providing international health care services is not simply an attractive option to earn revenue, it is an unavoidable necessity to sustain the current level of health care for Singapore’s own people.

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AN OVERVIEW OF HEALTH IN THE TRANSITION COUNTRIES

ARTICLE BY AKAKI ZOIDZE, GEORGE GOTSADZE AND STUART CAMERON

Abstract

SINCE THE EARLY 1990s, SOME 32 COUNTRIES IN ASIA, CENTRAL AND EASTERN EUROPE, AND THE FORMER SOVIET UNION – REPRESENTING ALMOST A QUARTER OF THE WORLD’S POPULATION – HAVE BEEN MAKING THE TRANSITION FROM A CENTRALLY PLANNED TO A MARKET-BASED ECONOMY. WHILE THESE COUNTRIES ARE DIVERSE IN TERMS OF GEOGRAPHY, WEALTH, HISTORY, CULTURE, POPULATION AND NATURAL RESOURCES, THEY ARE CONFRONTING COMMON CHALLENGES AS THEY RESTRUCTURE THEIR PUBLIC SECTORS AND ADAPT SOCIAL AND PUBLIC HEALTH POLICIES TO THE REQUIREMENTS OF THE NEW ECONOMIC MODEL. THIS CHAPTER PROVIDES AN OVERVIEW OF THESE ISSUES AND CONSIDERS POLICY RESPONSES TO THEM.

Many of the countries moving towards a market-based economy have faced significant problems of equity and access to basic health services during the transition years, as a result of diminishing public resources available for health care, increasing user charges and rising poverty levels. This chapter, based on an online dossier in the Health Systems Resource Guide (www.eldis.org/healthsystems), provides an overview of these issues and considers policy responses to them. Summaries and full text versions of all of the references, as well as further readings and other resources, can be accessed freely via the online version, at www.eldis.org/healthsystems/te.

Pre-transition health systems

Prior to transition, most transition countries shared similar systems based on the “Semashko model” developed in the Soviet Union in the 1920s. This model involved publicly funded, centralized and integrated health systems with universal or close to universal entitlement to free health care. The Semashko model placed an emphasis on in-patient and specialist care and on wide-scale public health interventions. The burden of financing the health system was evenly distributed across the population, there were few financial barriers to accessing services and geographical coverage was excellent.

From 1950 to 1970, many of these countries experienced a dramatic fall in early mortality and enjoyed better health outcomes than other countries with a similar level of average income. Major achievements included successes in controlling vaccine-preventable diseases, tuberculosis, leprosy and schistosomiasis, and the eradication of malaria.

However, the Semashko model was not without flaws. It tended to be inefficient and unresponsive to patients’ demands and needs. Investment decisions were politicized and often inefficient, leading, for instance, to an over-reliance on curative, in-patient and specialist care at the expense of health promotion, disease prevention and primary care. These flaws limited the system’s ability to deal with an ageing population and changing disease patterns, and the 1980s saw a decline in some of the major health indicators.

The transition process

Transition to a market economy has resulted in economic liberalization; privatization, deregulation and decentralization; and the introduction of market mechanisms designed to support competition and improve efficiency. However, these changes have had varying degrees of impact on people’s health. Some countries, and some groups of people within countries, have fared better than others.

A massive growth in poverty and the emergence of new forms of poverty and regional inequality have been major features of transition for some countries. Even in China and Vietnam, which achieved significant reductions in poverty, growing income inequality and rural-urban and regional disparities have posed serious challenges for access to essential social services.

Attempts to decentralize services and increase the involvement of the private sector and civil society have been hampered by institutional weaknesses, corruption and inadequate legal frameworks. In many countries, central government is still directly involved in the delivery of local services. Local governments have few sources of revenue and intergovernmental transfers often fail to address fiscal equity between regions.

Economic and political volatilities, public policy constraints and growing poverty and inequality have all made transition nations more vulnerable to global health epidemics such as AIDS and...
tuberculosis. Some infectious diseases which had been successfully eradicated have also re-emerged. In addition, lifestyle changes in many countries have included an alarming rise in cigarette smoking and alcohol intake\(^8\). Multinational tobacco companies have been accused of aggressively wooing consumers in the transition countries\(^8\).

The ability of health systems to respond well to these changes has itself been limited by the effects of economic and political transition. With the exception of some European states, countries have had difficulties maintaining the strengths – and mitigating the weaknesses – of the Semashko model\(^9\). Challenges have included declining public expenditure, changes to the structure of the workforce, the drain of skilled human resources from the public sector, and limited and overstretched capacities of institutions and governments to deal with multi-sectoral reforms. Combined with increased user charges for health services, the consequence for many countries has been significant problems of equity and access to basic health services during the transition years.

**Changes in health financing**

Most transition countries have shifted towards a decentralized, contract-based social health insurance system, resembling the Western European “Bismarck” model. It was hoped that this would generate more finances for health, improve efficiency and make health financing more equitable and sustainable in the long term. While most European transition countries move or less succeeded in achieving the desired outcomes, the experiences in the Commonwealth of Independent States (CIS) and East Asian transition countries so far have been less encouraging.

Implementation of social health insurance has been hampered by weak macroeconomic and institutional contexts, including corruption, the reliance of poorer countries on out-of-pocket payments, low formal employment, poor compliance and lack of transfers from tax or social security funds to health insurance. Purchasing of services tends not to be cost-effective, and performance-related payment systems for health providers have produced mixed results\(^10\).

Increasing attention is being given to private health insurance (PHI) as a way of making up for low public expenditure, increasing risk pooling, addressing escalating health care costs and improving quality of care. PHI currently plays only a marginal role, but is on the rise in many countries due to growing dissatisfaction with public health care, liberalization of markets and higher and more diversified consumer demand\(^12\).

**Restructuring delivery of health care**

One of the most challenging tasks has been to restructure health care delivery systems in order to improve efficiency and establish an optimum “continuum of care” – a range of services that best addresses the highest-priority needs, given resource constraints.

In the hospital sector, transition countries have tried to improve efficiency by closing down hospitals, reducing the number of beds, decentralizing, privatizing, introducing business-like management practices into public sector hospitals, and introducing performance-based pay. The results have been mixed and often disappointing – perhaps not surprisingly, given that hospital systems in all parts of the world have proved very difficult to change. Political economy factors, powerful vested interests and the political and economic turmoil of transition often prevented governments from putting plans – even well-designed plans – into action\(^13,14\).

Human resources issues, such as adjusting the mix of skills in the workforce and creating adequate motivation systems have also been significant. Most transition countries have too many overly specialized physicians and inadequately qualified nursing staff. Reforms often led to reductions in the workforce, contracting out of health services and increased short-term and temporary employment contracts.

Ineffective payment mechanisms and the resulting low motivation of medical professionals have led to the proliferation of informal payments. Dual working and a brain drain to other professions, other countries or the private sector. For those who remain in the public sector\(^14\), the consequences have been worsening working conditions, lack of employment security and dismantling of collective bargaining agreements for those who remain in the public sector. There is a perception that health personnel are underpaid, poorly motivated and increasingly dissatisfied\(^16\).

In China, growing income differences between the residents of rich and poor provinces, combined with radical devolution of financial management, have made it almost impossible for the government to maintain uniform pay levels for health workers. Individual facilities can pay bonuses from revenues generated from user charges and drug sales, and so employees in more successful facilities earn far more than colleagues working in less well endowed facilities or in poorer regions\(^17\).

**Equity and sustainability**

Overall spending on health has risen steadily in transition countries. But reforms have meant that the proportion coming from public spending has shrunk, and private out-of-pocket payments have become a major source of financing. There are two ways in which this has happened. In some cases, governments have introduced formal user charges and co-payments for health services which they were no longer able to cover. But in other cases, a mismatch between public expectations and government funding has led to resources being increasingly overstretched and proliferation of informal (“under the table”) payments – especially in lower income countries.

These informal payments may become major impediments to health care reform\(^18\). On the other hand, it has also been argued that all fees for health, whether official or not, are associated with major problems of equity and access, and that it is simplistic to focus only on informal payments\(^19,20,21\). Evidence from China and Cambodia has shown that both types of payment, particularly for in-patient care and management of chronic illnesses, can lead to impoverishment\(^22\). Evidence from the Soviet Union highlights the importance of a functioning system for referring patients to specialists, and also shows how access is particularly impaired in countries facing major problems such as economic collapse or civil war\(^23\).

**Lessons learned**

A number of specific lessons for carrying out health reform have emerged from the literature. These include the following.
Health sector management reform
Some authors have called for a clearer separation between purchaser and provider functions in the health system and for greater hospital autonomy. World Bank research on a range of public sector management reforms endorses managerial autonomy and stronger accountability as ways of improving services, while casting doubt on whether competition can improve efficiency. This research also suggests that decentralization is important, but should not be allowed to compromise the strength of central agencies. Decentralization in China has reduced funding levels and service quality, and increased the use of non-medical personnel in health centres. These experiences highlight the need to take local realities into account when deciding whether an SHI scheme will work. For many countries these factors tend to be unfavourable for the introduction of SHI as the main source of health financing. Private health insurance can be a valuable tool to complement existing health care-financing options, but a crucial challenge is to develop an appropriate regulatory framework.

Insurance
The level of national income, structure of the economy, population distribution, capacity to administer SHI, and levels of social solidarity are all critical factors to be taken into account when deciding whether an SHI scheme will work. For many countries these factors tend to be unfavourable for the introduction of SHI as the main source of health financing. Private health insurance can be a valuable tool to complement existing health care-financing options, but a crucial challenge is to develop an appropriate regulatory framework.

Pro-poor policy
Action is needed both outside and within the health sector. Sustained economic growth has been shown to be important in determining health outcomes, but is not the only important factor. More emphasis may be needed on reducing inequality and providing safety nets for the poor. Policies to address equity need to be based on evidence and political consensus, and the experiences of CEE and CIS countries provide lessons that are likely to be relevant for countries still struggling with this transition. These include exercising caution when bringing in institutions and laws from other cultures; and redirecting resources towards programmes which target the poor, even if targeting does not work perfectly.

Expanding coverage of public health services, particularly primary health care, could improve outcomes for the poor. However, the benefits of subsidized government health services often flow primarily to the better off. More realistic benefits packages are needed, targeted at the most cost-effective and pro-poor interventions. Community health financing schemes are being used increasingly in some transition countries, and may be particularly useful for expanding coverage of informal and agricultural workers.

Finally, Poverty Reduction Strategy Papers (PRSPs) may have an important role to play. Twelve transition countries have developed PRSPs — documents designed to set a comprehensive framework on poverty issues during transition. But it has been argued that PRSPs fail to look systematically at the specific health needs of poor people, or at ways in which improved health could play a role in poverty reduction. Better links between the health sector and the PRSP process could be key to addressing the inter-related issues of poverty and health in transition countries.

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International hospital perspectives: transition countries

References

1. The countries considered are:
   - (in Asia) China, Mongolia, Laos, Vietnam, Cambodia;
   - (in the former Soviet Union) Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan;
   - (in central and eastern Europe) Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Poland, Romania, Serbia & Montenegro, Slovakia, Slovenia;


27. Hongoro, C, McPake, B, Senggooba, F, Oliveira-Cruz, V. Human resource studies in health for poor and transitional countries. London School of Hygiene and Tropical Medicine (LSHTM), (2004).

28. Bloom, G, Leysa Han, Xiang Li. How health workers earn a living in China. Institute of

Bibliography

An online bibliography, linking to a summary and full text version of each document, can be found at www.elrn.org/healthsystems/e/bibliography.htm
SPECIAL FEATURE: GLOBAL HUMAN RESOURCES MANAGEMENT

THE IMPORTANCE OF HUMAN RESOURCES MANAGEMENT IN HEALTH CARE: A GLOBAL CONTEXT
STEFANE M KABENE, CAROLE ORCHARD, JOHN M HOWARD, MARK A SORIANO AND RAYMOND LEDUC
THE IMPORTANCE OF HUMAN RESOURCES MANAGEMENT IN HEALTH CARE: A GLOBAL CONTEXT

ARTICLE BY STEFANE M KABENE, CAROLE ORCHARD, JOHN M HOWARD, MARK A SORIANO AND RAYMOND LEDUC

This paper addresses the health care system from a global perspective and the importance of human resources management (HRM) in improving patient health outcomes and delivery of health care services.

We explored the published literature and collected data through secondary sources.

Various key success factors emerge that clearly affect health care practices and HRM. This paper will reveal how HRM is essential to any health care system and how it can improve health care models. Challenges in health care systems in Canada, the USA and various developing countries are examined, with suggestions for ways to overcome these problems through the proper implementation of HRM practices. Comparing and contrasting selected countries allowed a deeper understanding of HRM’s practical and crucial role in healthcare.

Proper management of human resources is critical in providing high quality healthcare. A re-focus on HRM in health care and more research are needed to develop new policies. Effective HRM strategies are greatly needed to achieve better outcomes from and access to health care around the world.

Within many healthcare systems worldwide, increased attention is being focused on human resources management (HRM). Specifically, human resources are one of three principle health system inputs, with the other two major inputs being physical capital and consumables.

Figure 1 shows the relationship between health system inputs, budget elements and expenditure categories. Human resources, when pertaining to health care, can be defined as the clinical and non-clinical staff responsible for public and individual health intervention. As arguably the most important of the health system inputs, the performance and benefits the system can deliver depend largely upon the knowledge, skills and motivation of the individuals responsible for delivering health services.

As well as the balance between the human and physical resources, it is also essential to maintain an appropriate mix between the different types of health promoters and caregivers to ensure the system’s success. Due to their obvious and important differences, it is imperative that human capital is handled and managed very differently from physical capital. The relationship between human resources and health care is very complex, and it merits further examination and study. Both the number and cost of health care consumables, such as drugs, prostheses and disposable equipment, are rising astronomically, which in turn can drastically increase the costs of health care. In publicly-funded systems, expenditures in this area can affect the ability to hire and sustain effective practitioners. In both government-funded and employer-paid systems, HRM practices must be developed in order to find the appropriate balance of workforce supply and the ability of those practitioners to practise effectively and efficiently. A practitioner without adequate tools is as inefficient as having the tools without the practitioner.

Figure 1 identifies three principal health system inputs: human resources, physical capital and consumables. It also shows how the financial resources to purchase these inputs are of both a capital investment and a recurrent character. As in other industries, investment decisions in health are critical because they are generally irreversible: they commit large amounts of money to places and activities that are difficult, even impossible, to cancel, close or scale down.

Figure 1: Relationship between health system inputs, budget elements and expenditure categories
In both government-funded and employer-paid systems, HRM practices must be developed in order to find the appropriate balance of workforce supply and the ability of those practitioners to practise effectively and efficiently.

Key questions and issues pertaining to human resources in health care

When examining health care systems in a global context, many human resources issues and questions arise. Some of the issues of greatest relevance that will be discussed in further detail include the size, composition and distribution of the health care workforce, workforce training issues, the migration of health workers, the level of economic development in a particular country and sociodemographic, geographical and cultural factors.

The variation of size, distribution and composition within a country’s health care workforce is of great concern. For example, the number of health workers available in a country is a key indicator of that country’s capacity to provide delivery and interventions. Factors to consider when determining the demand for health services in a particular country include cultural characteristics, sociodemographic characteristics and economic factors. Workforce training is another important issue. It is essential that human resources personnel consider the composition of the health workforce in terms of both skill categories and training levels. New options for the education and in-service training of health care workers need to ensure that the workforce is aware of and prepared to meet a particular country’s present and future needs. A properly trained and competent workforce is essential to a successful health care system.

The migration of health care workers is an issue that arises when examining global health care systems. Research suggests that the movement of health care professionals closely follows the migration pattern of all professionals in that the internal movement of the workforce to urban areas is common to all countries. Workforce mobility can create additional imbalances that require better workforce planning, attention to issues of pay and other rewards and improved overall management of the workforce. In addition to salary incentives, developing countries use other strategies such as housing, infrastructure and opportunities for job rotation to recruit and retain health professionals, since many health workers in developing countries are underpaid, poorly motivated and very dissatisfied. The migration of health workers is an important human resources issue that must be carefully measured and monitored. Another issue that arises when examining global health care systems is a country’s level of economic development. There is evidence of a significant positive correlation between the level of economic development in a country and its number of human resources for health.

Countries with higher gross domestic product (GDP) per capita spend more on health care than countries with lower GDP and they tend to have larger health workforces. This is an important factor to consider when examining and attempting to implement solutions to problems in health care systems in developing countries. Socio-demographic elements such as age distribution of the population also play a key role in a country’s health care system. An ageing population leads to an increase in demand for health services and health personnel. An ageing population within the health care system itself also has important implications: additional training of younger workers will be required to fill the positions of the large number of health care workers that will be retiring. It is also essential that cultural and geographical factors be considered when examining global health care systems. Geographical factors such as climate or topography influence the ability to deliver health services; the cultural and political values of a particular nation can also affect the demand and supply of human resources for health.

These are just some of the many issues that must be addressed when examining global health care and human resources that merit further consideration and study.

The impact of human resources on health sector reform

When examining global health care systems, it is both useful and important to explore the impact of human resources on health sector reform. While the specific health care reform process varies by country, some trends can be identified. Three of the main trends include efficiency, equity and quality objectives.

Various human resources initiatives have been employed in an attempt to increase efficiency. Outsourcing of services has been used to convert fixed labour expenditures into variable costs as a means of improving efficiency. Contracting-out, performance contracts and internal contracting are also examples of measures employed. Many human resources initiatives for health sector reform also include attempts to increase equity or fairness. Strategies aimed at promoting equity in relation to needs require more systematic planning of health services. Some of these strategies include the introduction of financial protection mechanisms, the targeting of specific needs and groups, and re-deployment services. One of the goals of human resource professionals must be to use these and other measures to increase equity in their countries. Human resources in health sector reform also seek to improve the quality of services and patients’ satisfaction. Health care quality is generally defined in two ways: technical quality and sociocultural quality. Technical quality refers to the impact that the health services available can have on the health conditions of a population. Sociocultural quality measures the degree of acceptability of services and the ability to satisfy patients’ expectations. Human resources professionals face many obstacles in their attempt to deliver high-quality health care to citizens. Some of these constraints include budgets, lack of congruence between stakeholders’ values, absenteism rates, high rates of turnover and low morale of health personnel.

Better use of the spectrum of health care providers and better coordination of patient services through interdisciplinary teamwork have been recommended as part of health sector reform. Since all health care is ultimately delivered by people, effective human resources management will play a vital role in the success of health sector reform.

Methods

In order to have a more global context, we
examined the health care systems of Canada, the USA, Germany and various developing countries. The data collection was achieved through secondary sources such as the Canadian Health Coalition, the National Coalition on Health Care and the World Health Organization Regional Office for Europe. We were able to examine the main human resources issues and questions, along with the analysis of the impact of human resources on the health care system, and the identification of trends in health sector reform, such as efficiency, equity and quality objectives.

**Results**

**Health care systems**

**Canada**

The Canadian health care system is publicly funded and consists of five general groups: the provincial and territorial governments, the federal government, physicians, nurses and allied health care professionals. The roles of these groups differ in numerous aspects. See Figure 2 for an overview of the major stakeholders in the Canadian system.

Provincial and territorial governments are responsible for managing and delivering health services, including some aspects of prescription care, as well as planning, financing and evaluating hospital care provision and health care services. For example, British Columbia has shown its commitment to its health care programme by implementing an increase in funding of CA$ 6.7 million in September 2003, in order to strengthen recruitment, retention and education of nurses province-wide. In May 2003, it was also announced that 30 new seats would be funded to prepare nurse practitioners at the University of British Columbia and at the University of Victoria. Recently the Ontario Ministry of Health and Long Term Care announced funding for more nurse practitioners within communities. Furthermore, most provinces and territories in Canada have moved the academic entry requirement for registered nurses to the baccalaureate level, while increasing the length of programmes for Licensed Practice Nurses to meet the increasing complexity of patient-care needs. Several provinces and territories have also increased seats in medical schools aimed towards students wishing to become family physicians.

The federal government has other responsibilities, including setting national health care standards and ensuring that standards are enforced by legislative acts such as the Canada Health Act (CHA). Constitutionally the provinces are responsible for the delivery of health care under the British North America (BNA) Act; the provinces and territories must abide by these standards to obtain federal funding for their health care programmes.

The federal government also provides direct care to certain groups, including veterans and First Nation’s peoples, via the First Nationals and Inuit Health Branch (FNIHB). Another role of the federal government is to ensure disease protection and to promote health issues.

The federal government demonstrates its financial commitment to Canada’s human resources in health care by pledging transfer funds to the provinces and direct funding for various areas. For example, in the 2003 Health Care Renewal Accord, the federal government provided provinces and territories with a three-year CA$ 1.5 billion Diagnostic/Medical Equipment Fund. This was used to support specialized staff training and equipment that improved access to publicly funded services.

The third group – private physicians – is usually not employed by the government, but rather is self-employed and works in a private practice. They deliver publicly funded care to Canadian citizens. Physicians will negotiate fee schedules for their services with their provincial governments and then submit their claims to the provincial health insurance plan in order to receive their reimbursement.

The roles of nurses consist of providing care to individuals, groups, families, communities and populations in a variety of settings. Their roles require strong, consistent and knowledgeable leaders, who inspire others and support professional nursing practice. Leadership is an essential element for high-quality professional practice environments in which nurses can provide high-quality nursing care. In most Canadian health care organizations, nurses manage both...
patient care and patient care units within the organization. Nurses have long been recognized as the mediators between the patient and the health care organization. In care situations, they generally perform a coordinating role for all services needed by patients. They must be able to manage and process nursing data, information and knowledge to support patient care delivery in diverse care-delivery settings. Workplace factors most valued by nurses include autonomy and control over the work environment, ability to initiate and sustain a therapeutic relationship with patients and a collaborative relationship with physicians at the unit level.

In addition to doctors and nurses, there are many more professionals involved in the health care process. Allied health care professionals can consist of pharmacists, dietitians, social workers and case managers, just to name a few. While much of the focus is on doctors and nurses, there are numerous issues that affect other health care providers as well, including workplace issues, scopes of practice and the impact of changing ways of delivering services. Furthermore, with health care becoming so technologically advanced, the health care system needs an increasing supply of highly specialized and skilled technicians. Thus we can see the various roles played by these five groups and how they work together to form the Canadian health care system. Canada differs from other nations such as the USA for numerous reasons, one of the most important being the CHA. As previously mentioned, the CHA sets national standards for health care in Canada. The CHA ensures that all Canadian citizens, regardless of their ability to pay, will have access to health care services in Canada. “The aim of the CHA is to ensure that all eligible residents of Canada have reasonable access to insured health services on a prepaid basis, without direct charges at the point of service.” Two of the most significant stipulations of the CHA read: “reasonable access to medically necessary hospital and physician services by insured persons must be unimpeded by financial or other barriers” and “health services may not be withheld on the basis of income, age, health status, or gender.” These two statements identify the notable differences between the Canadian and American health care systems. That is, coverage for the Canadian population is much more extensive. Furthermore in Canada, there has been a push towards a more collaborative, interdisciplinary team approach to delivering health care; this raises many new issues, one of which will involve successful knowledge transfer within these teams. Effective knowledge management, which includes knowledge transfer, is increasingly being recognized as a crucial aspect of an organization’s basis for long-term, sustainable, competitive advantage. Even though health care in Canada is largely not for profit, there will still be the need for effective knowledge management practices to be developed and instituted. The introduction of interdisciplinary health teams in Canadian hospitals is a relatively new phenomenon and their link to the knowledge management policies and agendas of governments and hospital administrations raises important questions about how such teams will work and to what extent they can succeed in dealing with the more difficult aspects of knowledge management, such as the transfer of tacit knowledge. The multidisciplinary approach tends to be focused around specific professional disciplines, with health care planning being mainly top-down and dominated by medical professionals. Typically there is a lead professional (usually a physician) who determines the care and, if necessary, directs the patient to other health care specialists and allied professionals (aides, support workers). There is generally little involvement by the patient in the direction and nature of the care. Interdisciplinary health care is a patient-centred approach in which all those involved, including the patient, have input into the decisions being made. The literature on teamwork and research on the practices in hospitals relating to multidisciplinary teams suggests that interdisciplinary teams face enormous challenges, therefore multidisciplinary teamwork will continue to be a vital part of the health care system. However, the goal of this teamwork should not be to displace one health care provider with another, but rather to look at the unique skills each one brings to the team and to coordinate the deployment of these skills. Clients need to see the health worker most appropriate to deal with their problem. Some of the issues regarding the Canadian public system of health have been identified in the Mazankowski Report, which was initiated by Alberta’s Premier Ralph Klein in 2000. Many issues have arisen since this time and have been debated among Canadians. One of the most contentious, for example, is the possibility of introducing a two-tier medical system. One tier of the proposed new system would be entirely government-funded through tax dollars and would serve the same purpose as the current publicly-funded system. The second tier would be a private system and funded by consumers. However, the CHA and the Canadian Nurses Association (CNA) are critical of any reforms that pose a threat to the public health care system. It should be noted that although...
Canada purports to have a one-tier system, the close proximity of private, fee-for-service health care in the USA really creates a pay-as-you-go second tier for wealthy Canadians. In addition, many health care services such as most prescriptions and dental care are largely funded by individuals and/or private or employer paid insurance plans. It is important to realize the differences between the proposed two-tier system and the current health care system. Presently, the public health care system covers all medically necessary procedures and the private sector provides 30% for areas such as dental care. With the new system, both public and private care would offer all services and Canadians would have the option of choosing between the two. The proposal of the two-tier system is important because it highlights several important issues that concern many Canadians, mainly access to the system and cost reduction. Many Canadians believe the current public system is not sustainable and that a two-tiered system would force the public system to become more efficient and effective, given the competition of the private sector. However, the two-tiered system is not within the realm of consideration, since the majority of Canadians are opposed to the idea of a privatized system. Proposals have not yet shown how a privatized system would force the public system to become more efficient and effective, given the competition of the private sector. The proposal of the two-tier system is important because it highlights several important issues that concern many Canadians, mainly access to the system and cost reduction. Many Canadians believe the current public system is not sustainable and that a two-tiered system would force the public system to become more efficient and effective, given the competition of the private sector. However, the two-tiered system is not within the realm of consideration, since the majority of Canadians are opposed to the idea of a privatized system. Proposals have not yet shown how a privatized system would provide an equal quality of services for the same cost as the current publicly funded system.

**United States of America**

The health care system in the USA is currently plagued by three major challenges. These include: rapidly escalating health care costs, a large and growing number of Americans without health coverage and an epidemic of substandard care. Health insurance premiums in the USA have been rising at accelerating rates. The premiums themselves, as well as the rate of increase in premiums, have increased every year since 1998; independent studies and surveys indicate that this trend is likely to continue over the next several years. As a result of these increases, it is more difficult for businesses to provide health coverage to employees, with individuals and families finding it more difficult to pay their share of the cost of employer-sponsored coverage. The rising trend in the cost of employer-sponsored family health coverage is illustrated in Figure 3. To help resolve this problem, health maintenance organizations (HMO) have been introduced, with the goal of focusing on keeping people well and out of hospitals in the hope of decreasing employer costs. HMOs are popular alternatives to traditional health care plans offered by insurance companies because they can cover a wide variety of services, usually at a significantly lower cost. HMOs use “networks” of selected doctors, hospitals, clinics and other health care providers that together provide comprehensive health services to the HMOs’ members. The overall trade-off with an HMO is reduced choice in exchange for increased affordability. Another problem to address regarding the American health care system is the considerable and increasing number of Americans without health coverage. Health care coverage programmes such as Medicare offer a fee-for-service plan that covers many health care services and certain drugs. It also provides access to any doctor or hospital that accepts Medicare. Patients with limited income and resources may qualify for Medicaid, which provides extra help paying for prescription drug costs. However, according to figures from the United States Census Bureau, the number of Americans without health coverage grew to 43.6 million in 2002; it is predicted that the number of uninsured Americans will increase to between 51.2 and 53.7 million in 2006. Those Americans without health care insurance receive less care, receive care later and are, on average, less healthy and less able to function in their daily lives than those who have health care insurance. Additionally, the risk of mortality is 25% higher for the uninsured than for the insured. Despite excellent care in some areas, the American health care system is experiencing an epidemic of substandard care; the system is not consistently providing high-quality care to its patients. There appears to be a large discrepancy between the care patients should be receiving and the care they are actually getting. The Institute of Medicine has estimated that between 44,000 and 98,000 Americans die each year from preventable medical errors in hospitals. It is also useful to examine the demographic characteristics of Americans more likely to receive substandard care. Research shows that Americans with little education and low income receive a lower standard of care. This finding may be explained by the fact that patients who have lower education levels tend to have more difficulty explaining their concerns to physicians, as well as eliciting a response because health professionals often do not value their opinions.

**Case studies**

As shown by the extensive literature, statistics and public opinion, there is a growing need for health care reform in the United States. There is a duty and responsibility of human resources professionals to attempt to elicit change and implement policies that will improve the health care system.

**Case one**

It is informative to examine case studies in which human resources professionals have enacted positive change in health care setting. One such case from 1995 is that of a mid-sized, private hospital in the New York metropolitan area. This case presents a model of how human resources can be an agent for change and can partner with management to build an
adaptive culture to maintain strong organizational growth\(^{16}\). One of the initiatives made by human resources professionals in an attempt to improve the overall standard of care in the hospital was to examine and shape the hospital’s corporate culture. Steps were taken to define the values, behaviours and competences that characterized the current culture, and analyze these against the desired culture\(^{19}\). A climate survey was conducted in the organization; it became the goal of the human resources professionals to empower employees to be more creative and innovative\(^{19}\). To achieve this, a new model of care was designed that emphasized a decentralized nursing staff and a team-based approach to patient care. Nursing stations were redesigned to make them more accessible and approachable\(^{19}\). Human resources management also played an important role in investing in employee development. This was achieved by assisting employees to prepare and market themselves for internal positions and if desired, helping them pursue employment opportunities outside the organization\(^{19}\). This case makes obvious the important roles that human resources management can play in orchestrating organizational change.

**Case two**

Another case study that illustrates the importance of human resources management to the health care system is that of The University of Nebraska Medical Center in 1995. During this period, the hospital administrative staff recognized a variety of new challenges that were necessitating organizational change. Some of these challenges included intense price competition and payment reform in health care, reduced state and federal funding for education and research, and changing workforce and population demographics\(^{19}\). The organizational administrators recognized that a cultural reformation was needed to meet these new challenges. A repositioning process was enacted, resulting in a human resources strategy that supported the organization’s continued success\(^{19}\). This strategy consisted of five major objectives, each with a vision statement and series of action steps.

**Staffing:** here, the vision was to integrate a series of organization-wide staffing strategies that would anticipate and meet changing workforce requirements pertaining to staff, faculty and students. To achieve this vision, corporate profiles were developed for each position to articulate the core competences and skills required\(^{19}\).

**Performance management:** the vision was to hold all faculty and staff accountable and to reward individual and team performance. With this strategy, managers would be able to provide feedback and coaching to employees in a more effective and timely manner\(^{19}\).

**Development and learning:** the vision was to have all individuals actively engaged in the learning process and responsible for their own development. Various unit-based training functions were merged into a single unit, which defined critical technical and behavioural competencies\(^{19}\).

**Valuing people:** the vision was to have the hospital considered as a favoured employer and to be able to attract and retain the best talent. To facilitate this vision, employee services such as childcare and wellness were expanded\(^{19}\).

**Organizational effectiveness:** the vision was to create an organization that is flexible, innovative and responsive\(^{19}\). The developments of these human resources strategies were essential to the effectiveness of the organization and to demonstrate the importance of human resources in the health care industry.

Both these case studies illustrate that effective human resources management is crucial to health care in a practical setting and that additional human resources initiatives are required if solutions are to be found for the major problems in the United States health care system.

**Germany**

Approximately 92% of Germany’s population receives health care through the country’s statutory health care insurance programme, Gesetzliche Krankenversicherung (GKV). GKV designed an organizational framework for health care in Germany and has identified and constructed the roles of payers, providers and hospitals. Private, for-profit companies cover slightly less than 8% of the population. This group would include, for example, civil servants and the self-employed. It is estimated that about 0.2% of the population does not have health care insurance\(^{11}\). This small fragment may be divided into two categories: either the very rich, who do not require it, or the very poor, who obtain their coverage through social insurance. All Germans, regardless of their coverage, use the same health care facilities. With these policies nearly all citizens are guaranteed access to high quality medical care\(^{21}\).

While the federal government plays a major part in setting the standards for national health care policies, the system is actually run by national and regional autonomous organizations. Rather than being financed solely through taxes, the system is covered mostly by health care premiums\(^{21}\). In 2003, about 11.1% of Germany’s gross domestic product (GDP) went into the health care system\(^{21}\) versus the United States, with 15%\(^{19}\) and Canada at 9.9%\(^{16}\). However, Germany still put about one third of its social budget towards health care\(^{11}\). The supply of physicians in Germany is high, especially compared to the USA, and this is attributed largely to the education system. If one meets the academic requirements in Germany, the possibility to study medicine is legally guaranteed\(^{19}\). This has led to a surplus of physicians and unemployment for physicians has become a serious problem. In 2001, the unemployment rate for German physicians of 2.1% led many German doctors to leave for countries such as Norway, Sweden and the United Kingdom, all of which actively recruit from Germany\(^{17}\).

Germany’s strong and inexpensive academic system has led the country to educate far more physicians than the United States and Canada. In 2003, Germany had 3.4 practising physicians per 1,000 inhabitants\(^{19}\), versus the United States, which had 2.3 practising physicians per 1,000 inhabitants in 2002\(^{24}\) and Canada, which had 2.1 practising physicians per 1,000 inhabitants in 2003\(^{25}\).

It is also remarkable that health spending per capita in Germany (US$2,996)\(^{15}\) amounted to about half of health spending per capita in the United States.
Accessing good-quality health care services can be incredibly arduous for those living in developing countries, and more specifically, for those residing in rural areas. For many reasons, medical personnel and resources may not be available or accessible for such residents.

(US$ 5,635)\(^{24}\), and slightly less than Canada’s health spending (US$ 3,003)\(^{25}\). This clearly demonstrates the Germans’ strength regarding cost containment. There are several issues that physicians face in the German health care system. In a 1999 poll, 49.9% of respondents said they were very or fairly satisfied with their health care system, while 47.7% replied they were very or fairly dissatisfied with it\(^{26}\). Furthermore, the degree of competition between physicians is very high in Germany and this could lead to a reduction in physician earnings. Due to this competition, many younger physicians currently face unemployment. German law also limits the number of specialists in certain geographical areas where there are issues of overrepresentation\(^{27}\). Thus, the oversupply of physicians in Germany leads to many challenges, including human resources management in the health care system.

In Germany a distinction is made between office-based physicians and hospital-based physicians. The income of office-based physicians is based on the number and types of services they provide, while hospital-based physicians are compensated on a salary basis. This division has created a separated workforce that German legislation is now working to eliminate by encouraging the two parties to work together, with the aim of reducing overall medical costs\(^{28}\).

**Developing countries**

Accessing good-quality health care services can be incredibly arduous for those living in developing countries, and more specifically, for those residing in rural areas. For many reasons, medical personnel and resources may not be available or accessible for such residents. Also, the issue of migrant health care workers is critical. Migrant health workers can be defined as professionals who have a desire and the ability to leave the country in which they were educated and migrate to another country. The workers are generally enticed to leave their birth country by generous incentive offers from the recruiting countries\(^{29}\).

Developing countries struggle to find means to improve living conditions for their residents; countries such as Ghana, Kenya, South Africa and Zimbabwe are seeking human resources solutions to address their lack of medically trained professionals. Shortages in these countries are prevalent due to the migration of their highly educated and medically trained personnel. Professionals tend to migrate to areas where they believe their work will be more thoroughly rewarded. The *International Journal for Equity in Health* (2003) suggested that those who work in the health care profession tend to migrate to areas that are more densely populated and where their services may be better compensated. Health care professionals look to areas that will provide their families with an abundance of amenities, including schools for their children, safe neighbourhoods and relatives in close proximity. For medical professionals, the appeal of promotions also serves as an incentive for educating themselves further\(^{30}\). As people become more educated, the ability and opportunity to migrate increases and this can lead to a further exodus of needed health care professionals. These compelling reasons tend to cause medical professionals to leave their less-affluent and less-developed areas and migrate to areas that can offer better opportunities. This has caused a surplus in some areas and a huge deficit in others. This epidemic can be seen in nations such as Nicaragua. Its capital city, Managua, holds only one fifth of the country’s population, yet it employs almost 50% of the medically trained health care workers. The same situation can be found in other countries, such as Bangladesh, where almost one third of the available health personnel are employed “in four metropolitan districts where less than 15% of the population lives”\(^{31}\). Clearly this presents a problem for those living outside these districts.

Other possible explanations put forth by Dussaualt and Franceschini, both of the Human Development Division of the World Bank Institute, include “management style, incentive and career...
structures, salary scales, recruitment, posting and retention practices”. Salary scales can differ quite drastically between originating and destination countries, which are shown in Figures 4 and 5. They also state that in developing countries the earning potential seen in more affluent or populated urban areas is much higher than could be expected in rural areas.

As more health professionals emigrate to urban areas, the workloads for those in the rural areas greatly increase. This leads to a domino effect, in that those in such dire situations of rural areas may be able to find more satisfactory and less demanding working conditions. Vujicic et al. (2004) summarizes numerous variables that influence the migration pattern and has created a formula to express their impact. It is possible to quantify the factors, and human resources professionals need to look at the costs and benefits of altering the factors so that the migration pattern is more favourable. This formula is expressed as the results shown in Table 1, which shows the reasons for migration in terms of the popularity of a given reason.

There is a tendency for developed countries faced with decreasing numbers of nationally trained medical personnel to recruit already-trained individuals from other nations by enticing them with incentives. Zimbabwe has been particularly affected by this problem. In 2001, out of approximately 730 nursing graduates, more than one third (237) of them relocated to the United Kingdom. This was a dramatic increase from 1997, when only 26 (approximately 6.2%) of the 422 nursing programme graduates migrated to the United Kingdom. This leads to the loss of skilled workers in developing countries and can be very damaging, since the education systems in developing countries are training people for occupations in the medical profession, yet are not able to retain them.

Countries that are able to educate more people than are needed to meet their own demand have tried to offset the problem by increasing training quotas. Vujicic et al. (2004) identify that “the Philippines has for many years trained more nurses than are required to replenish the domestic stock, in an effort to encourage migration and increase the level of remittance flowing back into the country”. Developed countries attract internationally trained medical staff for many reasons. To begin with, “political factors, concerns for security, domestic birth rates, the state of the economy and war (both at home and abroad)” influence the number of people that will be allowed or recruited into a country. Also, due to the conditions of the labour market compared to the demand in developed countries, governments may make allowances to their strict policies regarding the type of and number of professionals they will allow into their country. This can be seen in a Canadian example: Canada maintains a list of occupations within which employment vacancies are evident. Potential immigrants working in one of these listed occupations would have a much higher chance of being granted entry than if they worked in a non-listed occupation.

Though Canada attracts internationally trained medical professionals, those employment vacancies may not always be open. Although there may be up to 10,000 international medical graduates (IMG) in Canada, many are not legally allowed to practise. Many immigrants cannot afford the costs of retraining and may be forced to find a new job in a completely unrelated field, leaving their skills to go to waste. In 2004, Ontario had between 2,000 and 4,000 IMGs looking for work in medical fields related to their training and background. That year, IMG Ontario accepted 165 IMGs into assessment and training positions, which was a 50% increase over the last year, and a 600% increase from the 24 positions in 1999. Another appeal for developed countries with regard to foreign trained health care professionals is that they may be less of a financial burden to the host country than those trained domestically. This is because educational costs and the resources necessary for training are already taken care of by the international medical schools and governments. Though these reasons may make recruiting foreign medical professionals seem appealing, there are still ongoing debates as to whether those trained outside the host country are equally qualified and culturally sensitive to the country to which they migrate. Developing countries are addressing these concerns by establishing health professional training programmes similar to those in developed countries. These practices can be seen in, “the majority of nursing programmes in Bangladesh, the Philippines and South Africa [which] are based on curricula from United Kingdom or USA nursing schools”.

Though Canada attracts internationally trained medical professionals, those employment vacancies may not always be open. Although there may be up to 10,000 international medical graduates (IMG) in Canada, many are not legally allowed to practise. Because of these actions, those who are trained may be more likely to leave and use their skills where they will be recognized and more highly rewarded. There are also ethical considerations when examining the practice of recruiting health care professionals, particularly if they are recruited from regions or countries where health care shortages already exist. The rights of individuals to move as they see fit may need to be balanced against the idea of the greater good of those left behind.

Due to the shortages, it has been found that the level of health service in rural or poor areas has decreased, leading to lower quality and productivity of health services, closure of hospital wards, increased waiting times, reduced numbers of available beds for inpatients, diversion of emergency department patients and underuse of remaining personnel or substitution with persons lacking the required skills for performing critical interventions. The article “Not enough here, too many there: understanding geographical imbalances in the distribution of the health workforce” (2003), states that a reduced number of health care workers in a given area has a direct effect on the life expectancy of its residents. For example, in the rural areas of Mexico, life expectancy is 55 years, compared to 71 years in the urban areas. Additionally, in “the wealthier, northern part of the country, infant mortality is 20/1,000 as compared to more than 50/1,000 in the poorer southern states”.
Globalization – a common thread

While the issues raised in this article are common to many countries, the approaches taken to address them may not be the same in each country. Factors affecting the approaches that can be taken, some of which have been raised, include demographics, resources and philosophical and political perspectives. However, an overarching issue that affects not only health care but many other areas is that of globalization itself. Different countries have traditionally had different perspectives on health care that have influenced their approaches to health care delivery. In Canada for example, health care is considered a right; its delivery is defined by the five main principles of the Canada Health Act, which officially precludes a significant role for private delivery of essential services. In the USA, health care is treated more as another service that, while it should be accessible, is not considered a right. Therefore there is a much larger private presence in health care delivery the USA than there is in Canada. In other parts of the world, the approach to health care falls between these perspectives. As the move towards globalization for many goods and services increases, countries will have to consider how this will affect their approaches to health care delivery. As mentioned earlier, there is already a degree of labour mobility within a country that affects the quality and availability of health care services. There is also already a degree of international mobility of health care workers, as shown by the number of workers recruited by developed countries. While the international mobility of labour is generally not as unencumbered as that for goods and capital, that may be changing as more and more regional free trade agreements are considered.

Canada and the USA would initially be the two most likely to move towards a more integrated approach to health care delivery. There is already a trade agreement in place, many of the factors influencing health care are similar (demographics, training, level of economic development, geography, cultural factors) and they are currently each other’s largest trading partners. While the current agreement, which includes Mexico, does not cover health care, there is pressure to broaden the agreement to include areas not currently covered. If this happens, human resources professionals will have to increase their understanding of what the new health care delivery realities could be. For example, if the move is more towards the Canadian example of a largely not-for-profit, mainly publicly-funded health care delivery system, then it will be more of an adjustment for American professionals. However, the likelihood of the Canadian approach to health care being adopted in the USA is very slim. During the presidency of Bill Clinton, the government attempted to introduce a more universal health care delivery system, which failed completely. Even though there are over 40 million Americans with no health care coverage, the idea of a universal, publicly-funded system went nowhere. Also, within Canada there is increasing pressure to consider a more active role for private health care delivery. Therefore, it is more likely that Canadian health care and human resource professionals will have to adapt to a style more like the American, privately delivered, for-profit approach. If this is the direction of change, human resources professionals in Canada will need to adjust how they approach the challenges and new realities. For instance, there would likely be an increased role for insurance companies and health maintenance organizations (HMO) as they move towards the managed care model of the USA. In an HMO approach, financial rewards for their expertise. An insured patient would select from the range of services and providers that his/her policy covers and approves.

In Germany, where there is currently an oversupply of physicians, a move towards a more global approach to health care delivery, through increased trade agreements, could result in even more German health care professionals leaving the country.
Human resources professionals would need to work with a new level of administration, the HMO, which currently does not exist to any significant degree in Canada. As mentioned earlier, it is likely that developing countries would be receiving health care models and approaches from developed countries rather than the other way around. In particular, a country such as the USA that has a strong, private, for-profit approach already in place would likely be the source from which the health care models would be drawn. Therefore, health care, as well as human resources professionals in those countries, would also need to adapt to these new realities.

In Germany, where there is currently an oversupply of physicians, a move towards a more global approach to health care delivery, through increased trade agreements, could result in even more German health care professionals leaving the country. The challenge to be addressed by human resources professionals within the German health care system in this situation would be to prevent, or slow, the loss of the best professionals. Spending public resources in educating professionals only to have significant numbers of them leave the country is not a financially desirable or sustainable situation for a country.

**Discussion**

While examining health care systems in various countries, we have found significant differences pertaining to human resources management and health care practices. It is evident that in Canada, CHA legislation influences human resources management within the health care sector. Furthermore, the result of the debate on Canada’s one-tier versus two-tier system may have drastic impacts on the management of human resources in health care. Additionally, due to a lack of Canadian trained health professionals, we have found that Canada and the USA have a tendency to recruit from developing countries such as South Africa and Ghana, in order to meet demand.

Examination of the relationship between health care in the USA and human resources management reveals three major problems: rapidly escalating health care costs, a growing number of Americans without health care coverage and an epidemic regarding the standard of care. These problems each have significant consequences for the well-being of individual Americans and will have devastating affects on the physical and psychological health and well-being of the nation as a whole.

The physical health of many Americans is compromised because these factors make it difficult for individuals to receive proper consultation and treatment from physicians. This can have detrimental effects on the mental state of the patient and can lead to large amounts of undue stress, which may further aggravate the physical situation. Examining case studies makes it evident that human resources management can and does play an essential role in the health care system. The practices, policies and philosophies of human resources professionals are imperative in developing and improving American health care. The implication is that further research and studies must be conducted in order to determine extra resource practices that can be beneficial to all organizations and patients. Compared to the USA, Canada and developing countries, Germany is in a special situation, given its surplus of trained physicians. Due to this surplus, the nation has found itself with a high unemployment rate in the physician population group. This is a human resources issue that can be resolved through legislation. Through imposing greater restrictive admissions criteria for medical schools in Germany, they can reduce the number of physicians trained. Accompanying the surplus problem is the legislative restriction limiting the number of specialists allowed to practise in geographical areas. These are two issues that are pushing German-trained physicians out of the country, preventing it from taking advantage of its investment in training these professionals.

Developing countries also face the problem of investing in the training of health care professionals, thus using precious national resources, but losing many of their trained professionals to other areas of the world. Human resources professionals need to find and/or retain workers in areas that are most severely affected by the loss of valuable workers. Human resources management plays a significant role in the distribution of health care workers. With those in more developed countries offering amenities otherwise unavailable, the chances are that professionals will be more enticed to relocate, thus increasing shortages in all

**Figure 5: Ratio of Physician Wages (PPP US$), Destination Country to Source Country**


Figure 5 shows the difference between the wage in the source country and destination country for physicians.
areas of health care. Due to an increase in globalization, resources are now being shared more than ever, though not always distributed equally.

**Human resources implications of the factors**

While collectively the five main areas addressed here represent health care issues affecting and affected by human resources practices, they are not all equal in terms of their influence in each country. In Canada there are fewer health care issues surrounding economic development or migration of health workers, whereas these issues are much more significant in developing countries. In the USA, economic development is not significant, but the accessibility of health care based upon a person’s financial situation is, as evidenced by the more than 40 million Americans without health care coverage.

Germany’s issues with the size of its health care worker base have to do with too many physicians, whereas in Canada one of the issues is having too few physicians. Table 2 summarizes some of the implications for health care professionals with regard to the five main issues raised in the article. One of the main implications of this paper, as shown in Table 2, is that HRP will have a vital role in addressing all the factors identified. Solutions to health care issues are not just medical in nature.

**Policy approaches in a global approach to health care delivery**

As mentioned at the start of this paper, there are three main health system inputs: human resources, physical capital and consumables. Given that with sufficient resources any country can obtain the same physical capital and consumables, it is clear that the main differentiating input is the human resources. This is the input that is the most difficult to develop, manage, motivate, maintain and retain, and this is why the role of the human resources professional is so critical. The case studies described earlier showed how human resources initiatives aimed at improving organizational culture had a significant and positive effect on the efficiency and effectiveness of the hospitals. Ultimately all health care is delivered by people, so health care management can really be considered people management; this is where human resources professionals must make a positive contribution.

Human resource professionals understand the importance of developing a culture that can enable an organization to meet its challenges. They understand how communities of practice can form around common goals and interests, and the importance of aligning these to the goals and interests of the organization. Given the significant changes that globalization of health care can introduce, it is important that human resources professionals be involved at the highest level of strategic planning. By being actively involved at the strategic levels, they can ensure that HR issues are raised, considered and properly addressed. Therefore, human resources professionals will also need to have an understanding not only of the HR area, but of all areas of an organization, including strategy, finance, operations, etc. This need will impact on educational preparation as well as the possible need to have work experience in the other functional areas.

**Conclusion**

We have found that the relationship between human resources management and health care is extremely complex, particularly when examined from a global perspective. Our research and analysis have indicated that several key questions must be addressed and that human resources management can and must play an essential role in health care sector reform. The various functions of human resources management in health care systems of Canada, the USA, Germany and various developing countries have been briefly examined. The goals and motivations of the main stakeholders in the Canadian health care system, including provincial governments, the federal government, physicians, nurses and allied health care professionals, have

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<th>Country</th>
<th>For what reasons do you intend to leave your home country?</th>
<th>For what reasons did you leave your home country?</th>
<th>What would make you remain in your home country?</th>
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<td>Recruited (29%)</td>
<td>Salary (68%)</td>
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<td>Ghana</td>
<td>Gain experience (80%)</td>
<td>Gain experience (28%)</td>
<td>Continuing education (67%)</td>
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<td>Lack of promotion (80%)</td>
<td>Better pay (27%)</td>
<td>Work environment (64%)</td>
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<td></td>
<td>Living conditions (84%)</td>
<td>Living conditions (19%)</td>
<td>Health care system management (55%)</td>
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<tr>
<td>Senegal</td>
<td>Salary (89%)</td>
<td>Gain experience (86%)</td>
<td>Salary (81%)</td>
</tr>
<tr>
<td>South Africa</td>
<td>Gain experience (43%)</td>
<td>Lack of promotion (86%)</td>
<td>Work environment (64%)</td>
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<td></td>
<td>Violence and crime (38%)</td>
<td>Despondency (86%)</td>
<td>Fringe benefits (77%)</td>
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<td></td>
<td>Heavy workload (41%)</td>
<td>Living conditions, Economic decline (72%)</td>
<td>Resources in health sector (70%)</td>
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<td></td>
<td>Declining health service (38%)</td>
<td></td>
<td>Work environment (n/a)</td>
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<tr>
<td></td>
<td>Salary (72%)</td>
<td></td>
<td>Salary (n/a)</td>
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<tr>
<td></td>
<td>Living conditions (41%)</td>
<td></td>
<td>Better career path (n/a)</td>
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<td></td>
<td>Upgrade qualifications (38%)</td>
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<td>Benefits (n/a)</td>
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<td></td>
<td>Gain experience (34%)</td>
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<td>Salary (78%)</td>
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<td>All factor</td>
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<td>Work environment (68%)</td>
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<td>Fringe benefits (66%)</td>
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<td>Workload (59%)</td>
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<td>Salary (84%)</td>
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<td>Fringe benefits (94%)</td>
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<td>Workload (93%)</td>
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<td>All factors</td>
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</tbody>
</table>

**Table 1: Factors influencing health care professionals’ intent to migrate, reason for migrating and willingness to remain in their home country**

## Countries

<table>
<thead>
<tr>
<th>Factors</th>
<th>Canada</th>
<th>USA</th>
<th>Germany</th>
<th>Developing countries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number, composition and distribution of health care workers</strong></td>
<td>Human resources professionals (HRP) will need to assess needs throughout all regions of Canada. Given that health care delivery is a provincial and territorial responsibility, HRP will need to work with and through the 13 different provinces and territories in Canada. This will require a greater understanding of regional issues, practices, etc.</td>
<td>While not formally entrenched in legislation as it is in Canada, health delivery is more regional than national and therefore HRP will have many of the same issues as they have in Canada in terms of working at the state and local levels.</td>
<td>As cited in the research, Germany currently has an oversupply of physicians and other health professionals in certain regions. This imbalance will require HRP to work with the regional authorities to better understand the needs of specific regions and help plan for a better match between supply of and demand for health professionals.</td>
<td>Developing countries face significant challenges in all five areas discussed in this paper. Therefore, as described in reference to Canada, the USA and Germany, HRP will have an active role in all areas as well. It is not just a matter of more health resources for developing countries, since these resources must be managed efficiently and effectively. Since one of the largest and most complex health care inputs are the human resources, it is clear that as developing countries increase the number of workers, HRP will have an active and important role to play.</td>
</tr>
<tr>
<td><strong>Workforce training issues</strong></td>
<td>As shown in the research, a move towards a more interdisciplinary approach to health care delivery will require new skills on the part of health workers. HRP will have a significant role in helping to create a culture that encourages this type of health care delivery.</td>
<td>The case studies cited in this paper show that HRP will have a significant role in helping to develop the appropriate culture in health organizations to ensure that delivery is as effective and efficient as possible.</td>
<td>The United States also faces an ageing population, which will make significant and increasing health care demands. As in Canada, HRP will need to play an active role at the strategic levels.</td>
<td>With more limited resources available, workforce training issues can become challenging and HRP will have to help develop strategies that are appropriate and sustainable. These approaches could include an increased use of technology or a broadened role for different health workers such as nurses. HRP will have to work with existing health workers to integrate these other and new approaches to how workers are trained.</td>
</tr>
<tr>
<td><strong>Workforce training issues</strong></td>
<td>As with many countries, there are challenges in meeting the health needs of the remote areas of Canada. HRP will need to work with the provinces to develop programmes and incentives to encourage health workers to consider moving to these areas.</td>
<td>The United States faces similar situations to that of Canada in this regard and HRP will have to work with the state officials to develop programmes and incentives to encourage health workers to consider moving to these areas.</td>
<td>By addressing and helping to better balance the supply of health workers with the demand, there will be less migration of workers out of Germany. There are significant costs to a country in training a health care professional and if workers leave after being trained, the country will not receive any benefit from its training investment. HRP can help to ensure that there is less migration of workers out of Germany by working at the strategic planning levels to help better match supply and demand.</td>
<td>This is an especially challenging area in developing countries, not only because of the extreme differences between the rural and urban areas, but also because of the increasing pressure from other countries to “poach” health care workers. By helping to develop policies and strategies such as those described above in “Workforce Training Issues”, HRP can help reduce the migration of health workers from where they are needed.</td>
</tr>
<tr>
<td><strong>Level of economic development in a country</strong></td>
<td>Although Canada is an economically well-developed country, it, too, is facing financial pressures in the area of health spending. As discussed earlier in this paper, HRP will need to be involved at the strategic level of health planning in order to be able to influence discussions on spending priorities in this area. HRP should no longer be seen as just implementers of policies developed by others.</td>
<td>The USA faces similar situations to that of Canada in this regard and HRP will have to work with the state officials to develop programmes and incentives to encourage health workers to consider moving to these areas.</td>
<td>Germany is economically well-developed, but it, too, is facing economic realities and the pressures of increasing health care costs. HRP can contribute to the development of a more efficient and effective health care delivery system by being involved at the strategic level rather than just being implementers of policies developed by others.</td>
<td>This is a significant issue in developing countries where the resources for even the most basic health care needs may be difficult to obtain and sustain. By helping the health system to become more effective and efficient, HRP will help these countries make the most of their resources.</td>
</tr>
<tr>
<td><strong>Socio-demographic, geographical and cultural</strong></td>
<td>While there are not many significant geographical or cultural issues, Canada is facing an ageing population, which will make significant and increasing health care demands. HRP will need to play an active role at the strategic levels in order to ensure their skills, abilities and contributions are considered at this level.</td>
<td>The USA also faces an ageing population, which will make significant and increasing health care demands. As in Canada, HRP will need to play an active role at the strategic levels.</td>
<td>Germany also faces the challenges of an ageing population and therefore has to make the health care system as efficient and effective as possible. HRP have the opportunity and responsibility to play an active role at the strategic level.</td>
<td>Countries such as Canada and the USA are very similar in terms of these factors, so approaches that work in one country would not require much adjustment to work in another. Germany, while not being as similar as Canada and the USA are to each other, is a developed country and would be able to employ many of the human resource approaches to health care that would work in Canada and the USA. HRP have a great opportunity to identify and factor in the sociodemographic, geographical and cultural differences found in developing countries, since that is what they are trained to do. HRP will have a vital role in ensuring that these approaches that may work in other countries are not applied without consideration of these differences.</td>
</tr>
</tbody>
</table>

**Table 2: Human Resources Implications of the Factors**
been reviewed. The possibility of a major change in the structure of Canadian health care was also explored, specifically with regard to the creation of a two-tier system. The American health care system is currently challenged by several issues; various American case studies were examined that displayed the role of human resources management in a practical setting. In Germany, the health care situation also has issues due to a surplus of physicians; some of the human resources implications of this issue were addressed. In developing countries, the migration of health workers to more affluent regions and/or countries is a major problem, resulting in citizens in rural areas of developing countries experiencing difficulties receiving adequate medical care. Since all health care is ultimately delivered by and to people, a strong understanding of the human resources management issues is required to ensure the success of any health care programme. Further human resources initiatives are required in many health care systems, and more extensive resources initiatives are required in many health care programme. Further human resources initiatives are required in many health care systems, and more extensive resources initiatives are required in many health care systems.

Adequate medical care. Since all health care is ultimately delivered by and to people, a strong understanding of the human resources management issues is required to ensure the success of any health care programme. Further human resources initiatives are required in many health care systems, and more extensive resources initiatives are required in many health care systems.

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Competing interests
The authors declare that they have no competing interests. SK conceived the paper, worked on research design, did data analysis and led the writing of the paper. CO, JH, MS and RL all actively participated in data analysis, manuscript writing and review. All authors read and approved the final manuscript.

References
7. Canadian Health Coalition: The History of Medicare Shows that Canadians Can Do It [http://www.healthcoalition.ca/history.html]. Ottawa, ON.
WHAT ARE THE BEST WAYS THAT HEALTH CARE LEADERS CAN TRAIN MANAGERS TO TRAIN OTHERS?

ARTICLE BY AIDAN HALLIGAN AND DAVE GREWCOCK

Abstract

TRAINING MANAGERS WITHIN HOSPITALS AND HEALTH SERVICES DO NOT JUST RELY ON TRANSMITTING PACKETS OF KNOWLEDGE IN A FORMAL SETTING. THIS ARTICLE ARGUES THAT SUCCESSFUL TRAINING SHOULD CONTAIN AN EMOTIONAL ELEMENT TO ENSURE ENGAGEMENT WITH THE MESSAGE. IMMERSION IN REAL LIFE CIRCUMSTANCES IS ALSO IMPORTANT AND LEADERS MUST DEVELOP TRAINING AROUND SHARED OBJECTIVES AND TEAM BUILDING.

The person who stops to read an article with this title is either an eternal optimist, not as widely read as they think, or a staunch advocate of hope over experience! Whichever, at some stage, they will understand that it is a wise man who is reluctant to offer an answer. Let’s perhaps not answer the question immediately but, instead, tell a story – a story that is a metaphor for how the very best health care leaders train managers to train others:

It’s a busy London underground train station. A young woman hurries towards a downward escalator. With one hand she pushes a pushchair carrying her sleeping baby, with the other she cajoles along her daughter of five, maybe six, years old. Conscientious of obstructing the tide of commuters, she stops at the top of the escalator, lifts up the baby, folds the pushchair and steps onto the escalator, thinking her little girl will follow. She doesn’t. The mother is half way down the escalator when she turns to check her daughter is safely tucked in behind her, only to find that she is still standing nervously at the top of the escalator, afraid to step on. A woman at the top of the escalator, a mother herself, sees the look of panic on the mother’s face. She smiles, mouths the words “I will look after her” to the mother, and then turns to the little girl, saying “I don’t like escalators, would you mind holding my hand on the way down please?” The little girl looks up, hesitates slightly, then offers the woman her hand, and they step onto the escalator together. At the bottom, and about to rejoin her mother, the little girl looks up at the woman holding her hand and asks calmly “Do you think you will be alright now?”

This story, though beguilingly simple, offers a training insight that tantalises by surfacing a universal truth, instinctively understood but seldom practised.

“There is no greater delight in life than to do good by stealth and be caught out by accident”.

One way of answering the question in the title is to list the attributes of the many management and training philosophies that circulate around our organisations, philosophies which are often ardently believed and advocated, but only rarely applied with any success. Ultimately, the final expression of such principles is found in actions, not words. Training should be about setting the right example.

One way of answering the question in the title is to list the attributes of the many management and training philosophies that circulate around our organisations, philosophies which are often ardently believed and advocated, but only rarely applied with any success. Ultimately, the final expression of such principles is found in actions, not words. Training should be about setting the right example.

It should be about showing, not telling. So, a better way to the answer might be to describe the attributes and examples that characterize the best health care leaders and that, once exposed to, can become hardwired into those who need to learn to train others.

“Learning” is of course key to this issue. Accomplished leaders will, above all things, be alert to the way that people actually learn. The difficulty for most of us is that the model of education we all experienced as children has a powerful hold on our imagination, and we readily succumb to the notion that training is necessarily dominated by the need to efficiently transfer particular packages of knowledge and information. But the way we learn as adults is quite different; our needs are more sophisticated and we operate in an environment where there is intense competition for our attention.

Good leaders and trainers understand this and move beyond that whole paradigm. They know that training individuals that lack self-knowledge is a fruitless and wasteful task, and their focus moves to helping those they train to discover what they are good at. Fundamentally, they understand that there are many necessary lessons that must be learned, but cannot be taught – and it is no coincidence that the most accomplished trainers look increasingly to techniques such as immersive simulation training as their medium. It is only through experience...
Effective leaders will also ensure that the training effort grows directly from the experience of the organisation: training cannot be a wholly imported good.

that the courage, insight and judgement that we demand of our health care professionals can ever really be developed.

As adults we learn best when we have a hunger for knowledge. That is the explanation for why so much health service training fails to have impact: it fails to gain purchase in our imagination, and its connection to the reality of daily working life seems often tenuous or fleeting. Capable leaders will understand training as an exercise that is as much about communication and emotional engagement as it is about the transfer of understanding. Much as we might like to think that we revise our behaviour at work through careful and dispassionate analysis, we all know this to be fundamentally untrue. Our view of what is possible in the world, and what we are individually capable of is more often changed in those tangential, almost incidental moments that move us emotionally. Any training effort is wasted unless it acts, to some degree, at that emotional level.

Effective leaders will also ensure that the training effort grows directly from the experience of the organisation: training cannot be a wholly imported good. It must acknowledge local organisational truths and it must form part of an intervention that seeks to do nothing short of influencing the culture of the organisation; even, perhaps especially, when that involves surfacing some inconvenient truths about life in the workplace. They will do that with candour and authenticity, but never with anxiety – there is nothing more infectious or more corrosive to the training effort than shared but unspoken anxiety about organisational realities.

Medicine is changing at an accelerating pace, both technologically and organisationally and it will be impossible to anticipate, centrally, the training needs of every organisation and every profession, or to prescribe a particular model to deliver training. What we need is for our organisations to build local capacity to learn from its own corporate experience, and that of others, and to be agile in change. We need preparedness, and that is a state of mind, not a state of knowledge. It is incumbent on organisational leaders to make it clear that any and every training initiative should contribute to this ambition. This is no small challenge and it requires conviction from those leaders, not least because they must encourage others to exercise judgement and wisdom, and to be comfortable with accountability and decision making where information is incomplete – attributes that do not come naturally to our health care organisations.

Achieving that capacity requires constant re-iteration through good, local example, and astute leaders will appreciate that the wider impact of training is maximised if it initially targets those who have most influence in the organisation. The truth is that some individuals have a disproportionate influence on workplace culture. We see that most starkly in the negative, when even subtle or superficial non-compliance can de-rail a programme of change or disrupt the implementation of policy. But it can exist powerfully in the positive too, and what might be viewed sceptically as too ambitious or radical a change might become more widely accepted as feasible through the interest and approval of respected influencers, whether or not they have rank and status. Good leaders discover who these people are, and learn to enact training through them for maximum effect. Identifying those individuals seems like too nebulous a task, and again it is an approach that to some seems improper or impertinent. In truth, we all implicitly accept it as a reality, and the understanding of who these people are already exists tacitly in organisations; it is one of those many aspects of organisational life that are universally known but never discussed.

The effects of good leadership are felt in the magic of building a good team: recruiting busy people, drawing them into a shared vision of outstanding performance and giving them the responsibility and the freedom to fail. Good trainers earn respect through humility and determination, not arrogance, and the secret to a trainer’s success very often is the talent, intelligence and loyalty of the team. It is fundamental to successful training to foster a leadership culture that values expertise and intelligence above rank and title. Good trainers understand that consistency of actions lies at the heart of trust. They understand that while we all think in generalities, the world lives in detail and that more than anything else, there is a need to enable people to practice what they preach and to match their words with deeds.

Example is not the major thing, it is the only thing. The ultimate discipline is carelessness of self and a belief that perseverance in the face of rapidly worsening conditions does prove essential. The best example of all is living by the principles you profess to uphold – principles only mean something if you stick by them when they are inconvenient.

So what do people need to be trained in? What is clear is that even where guidance, information and well established, but orthodox, training practices are in place, catastrophic clinical and service failure can still occur. Often they are failures that would have been prevented were there a genuine sensitivity to the needs of patients and carers, and the courage to take individual responsibility and to act. In health care, the best leaders empathise with the patient and their vulnerabilities – if you have ever relied on the compassion of strangers, you will feel what a patient feels. What health care workers need to maintain more than anything is an acute
sense of the trust that is placed in them daily, by people who are fearful for their own health, or that of those they love. It is that, more than strategy and policy, that will ensure safe, high quality patient care. Of course, there are no training courses in courage, compassion and trustworthiness, but it is possible for influential leaders to create a workplace that values them, allows their natural expression, and creates a training environment that is sympathetic to those ideals.

The best trainers understand that the three qualities that underpin successful managers include the ability to create a vision and to communicate effectively; the ability to develop and maintain a high performing team and the ability, where possible, to ensure that when you leave an individual working in your team that they feel the better for having had contact with you.

The best way to train is to work like you train and train like you work.

Authors

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PSYCHOSOCIALLY SUPPORTIVE DESIGN: AS A THEORY AND MODEL TO PROMOTE HEALTH

ARTICLE BY ALAN DILANI

Abstract

THIS PAPER PROVIDES A CRITICAL VIEW OF THE CHALLENGES FACING THE FIELD OF HEALTH CARE DESIGN. THE PERSISTENCE OF INSTITUTIONAL AND NARROW FUNCTIONALLY ORIENTED APPROACHES IN WHICH HIGH PRIORITY IS GIVEN TO FUNCTIONAL EFFICIENCY HAS LARGELY NEGLECTED ENVIRONMENTAL QUALITIES THAT COULD BE CONSIDERED PSYCHOSOCIALLY SUPPORTIVE. MODERN DISEASE CONCEPTS ARE NO LONGER NARROWLY PATHOGENIC; RATHER DISEASE IS SEEN AS MULTIFACETED, ORIENTED TO SYSTEMS, WITH A VARIETY OF PSYCHOSOCIAL FACTORS IN WHICH THE QUALITY OF PHYSICAL ENVIRONMENT HAS GREAT IMPACT. PSYCHOSOCIALLY SUPPORTIVE DESIGN, AS THEORY AND A MODEL, PRESENTS A POSSIBLE PARADIGM FOR HEALTH PROMULGATION BY DESIGN WITHIN THE PHYSICAL ENVIRONMENT, GENERALLY AND IN PARTICULAR WITHIN HEALTH CARE FACILITIES. THE PSYCHOSOCIALLY SUPPORTIVE DESIGN APPROACH IS OFFERED AS A USEFUL THEORY AND FRAMEWORK TO GUIDE HEALTH CARE DESIGNERS AND PLANNERS WHO CONSIDER HOW THE PHYSICAL ENVIRONMENT IMPACTS WELLNESS FACTORS IN ORDER TO PROMOTE HEALTH. THE MAIN ISSUE HERE IS TO EMPHASIZE THAT THE QUALITIES OF THE PHYSICAL ENVIRONMENT REQUIRE BOTH FUNCTIONAL EFFICIENCY AND PSYCHOSOCIALLY SUPPORTIVE DESIGN, AIMED AT ENHANCING AND CREATING CONDITIONS FOR HEALTH PROCESSES TO EvOLVE. IN ORDER TO DEFINE THE CHARACTERISTIC OF PSYCHOSOCIALLY SUPPORTIVE DESIGN, WE NEED A CLEARER UNDERSTANDING OF HEALTH DEFINITIONS AND TO DETERMINE THE DISTINGUISHING CONNECTION BETWEEN THE PHYSICAL ENVIRONMENT AND HEALTH PROMOTION.

In the 1930s it was discovered that something in the mind could lead to somatic diseases, revealing that some diseases are psychosomatic and that exposure to surroundings, as positive distraction, has great impact on human health (Antonovsky, 1996). Human distress is highly affected by an integrated organism that has psychological, social and somatic aspects. Health promotion, as a conceptual platform for health, has been developed by the World Health Organization (WHO); its vision states: “Health is a state of optimal physical, mental and social well-being, and not only the absence of disease”. WHO has emphasized a range of recommendations for people to engage in practices and behaviours which promote health, all leading to a decrease in human suffering and an increase in human happiness. The consequences will be crucial for disease prevention. WHO contends that successful promotion of health would have a major economic impact, because it would decrease the need for disease care expenditures and consequently allow people to be more economically productive, reducing absenteeism, and increasing work efficiency.

The concept of health promotion as championed by WHO is very attractive. The organization advances original ideas about how health promotion should be developed and implemented in broader fields. Unfortunately the economical consequences with respect to cost saving of health promotion have not been well documented. Presumably, people who are healthy are people who will live longer and might well have secured more years of economic independence.

According to Aaron Antonovsky, the best arguments for health promotion lie in value rather than in market oriented terms. He cites the paragon of museums in which no one challenges that the museum experience pays off in cash. Health promoters have not confronted the question of lifestyle and the creation of appropriate social conditions that promote health. As a target for health promotion policy, “lifestyle” refers, for some, to the consciously chosen personal behaviour of individuals as it may relate to health. Another interpretation of “lifestyle” is as a composite expression of the social and cultural circumstances which condition and constrain personal behaviour (McKinlay, 1993).

Environmental solutions that affect urban space and access to urban structures have great impact on lifestyle and human behaviours. The quality of urban space can support health promotion by providing wellness factors that stimulate social and mental well-being. There is a lack of empirical knowledge about the effect of more appropriate physical environments on health promotion, despite the fact that scientists continue to emphasize the environmental quality of disease prevention.

It is because there are good theories, a world of empirical knowledge, complex techniques and methodologies, and of course most importantly evidence that many problems can be understood and
managed. If the same efforts were used to address the causes of health and towards developing empirical knowledge with evidence, we could develop the concept of health promotion much further in a broader field. According to the WHO European Regional Office, “Health promotion is the process of enabling people to increase control over, and to improve, their health”. “Health promotion” is often understood as disease prevention in the community that encourages individual measures to help people develop lifestyles that maintain and enhance the state of well-being.

The concept of lifestyles as it appears in the literature is well documented. It includes a list of risk factors such as smoking, other substance abuse, over and under nutrition, drinking and driving, unsafe sex and exposure to injuries. The focus remains on the realm of disease prevention. However, lifestyle is somewhat broader-band, because it identifies risk factors that are often precursors to a variety of diseases. The physical environment provides a context for lifestyle and thereby affects our behavioural and, in consequence, our health condition. Salutogenic orientation as a basis for health promotion mandates both research and action towards developing psychosocially supportive design as a context for a healthy lifestyle and positive distractions. Design factors such as wellness that actively promotes health, rather than only seeks to prevent risk factors aimed at preventing injuries, should be developed.

The salutogenic perspective which was developed by Aaron Antonovsky’s concern for health promotion factors emphasizes wellness factors rather than risk factors. Antonovsky founded the concept of “salutogenesis”. He describes health as a continuum and an incessant process in which the extremes are health and disease. The factor that determines where on the continuum a person finds himself is a question of high or low sense of coherence. The stimuli bombarding us from inner and outer environments were perceived as information that affects our behaviours. This stimuli and thought led to the emergence of the sense of coherence (SOC).

In the following text, I will describe my observations regarding the salutogenic principles in a health promotion approach for the physical environment. My point of departure includes the factors which, in various ways, affect the sense of coherence in the physical environment that may stimulate our behaviour in a positive way. According to Antonovsky, the decisive factors driving the sense of coherence are comprehensibility, manageability and meaning.

The strength of everyone’s sense of coherence is a significant factor in facilitating the recognition of health promotion and confronting the stressor. People with a strong sense of coherence will believe that a challenge is understandable (comprehensibility), believe that resources to cope are available (manageability) and finally wish to be motivated to cope (meaningfulness).

**Design that stimulates healthy behaviour**

Within the context of psychosocially supportive design, its implementation supports the coherence that stimulates and engages people, both mentally and socially. The basic function of psychosocially supportive design is to start a mental process that, by attracting a person’s attention, may eliminate or, at least, reduce anxiety, bringing about positive psychological changes. Design from a salutogenic perspective defines, not only the causes of stress, but introduces wellness factors that strengthen health processes. Psychosocially supportive design should challenge our mind in order to create pleasure, stimulation, creativity, satisfaction, enjoyment and admiration (Dilani, 2001).

My hypothesis, based on the sense of coherence, is that there is a decisive link between psychosocially supportive design that creates healthy environments which then promote healthy behavioural responses that result from this creative health process. In this case, we need powerful, comprehensive and systematic theoretical guidelines for the research and implementation of psychosocially supportive design.

Within this point of view, I do not wish to dismiss those whose concern for design addresses the prevention of risk factors in which the efforts are limited to functional factors rather than issues essential to design. These issues address functionality and our senses, both providing positive stimulation.

We need more longitudinal studies regarding the evidence to support such a hypothesis and to measure the salutogenic model approach in designing our daily environments. These studies could demonstrate the efficacy of such an approach in design towards producing significant health related change outcomes. We need to structure a programme based on an intellectually systematic organizing framework that answers questions about how to define wellness factors in the design process, supporting our behaviour to strengthen the sense of comprehensibility, manageability and meaningfulness. There is an important relationship between a sense of coherence and the characteristics of the physical environment.
environment that strengthen people’s emotional well-being. What movements in the daily life of a person, acting within the physical environment, could activate his or her emotion and strengthen his or her collective experience? Do the characteristics of a designed environment affect our behaviour and thereby our emotional state? These characteristics will lead us to the science of psychoneuroimmunological effects of the environment on the immune system and neuroscience, and to research about how the brain perceives design qualities related to the central nervous system in relation to the effect of exposure from the surroundings. During my past 15 years of research, I focused on the effects of design on health and well-being, finding a more profound understanding of the problem through the theoretical approach of the salutogenic model for creating a healthy environment. Assuming the need for social support, a core problem of elderly persons living alone who are socially isolated, it is through the physical environment that we could provide more access to social support. For example, we could build a central setting that facilitates part of a social structure for the community or, close to other settings, we could facilitate social interaction. Within the local community, it would be desirable to provide places where elderly persons could easily socialize – by attraction and stimuli from other activities such as at a children’s school close to elderly housing, as in the photograph below (Norling, 2001). With an ageing population and an increase in the incidence of neurodegenerative diseases, the medical costs of Alzheimer’s disease will increase steadily in the coming decades. It would be useful to know exactly how much care will cost, who will pay for it, and to what extent the issue is likely to grow. However, the specific medicosocial costs of Alzheimer’s disease are difficult to distinguish from other costs because of physical dependence and multiple disorders that may affect elderly people generally. Currently, it is almost impossible to obtain reliable financial data. Through the physical environment, there are options to reduce the social costs, anxiety levels and depression that accompany the consumption of drugs (Zeisel, 2005).

The quality and character of the built environment has a profound influence on our health. During the last 30 years, architecture and design have been influenced by our industrial society. Public buildings like airports and hospitals were designed to function like factories. In hospitals, clinical practice formerly focused on treating illness while neglecting the psychological, social and spiritual needs of patients. Entering one of today’s older hospitals, you may find that signs that are difficult to interpret and the corridors, with people rushing about, appear endless. It makes you feel lost and anxious. If you were not ill before, you certainly might be after waiting for hours in a crowded, stuffy, featureless waiting room (Dilani, 2000). Contrast that with the welcoming environment of some of the best new hospitals where you may encounter water features, an orchestra playing pleasant music, natural daylight and works of art. Such an environment stimulates our senses, soothes our nerves and makes the hospital experience comprehensible, manageable and meaningful.

The importance of design for our senses

Aesthetic enjoyment through well-being – of the eyes, the ears, touch, taste or smell – is a fundamental human need. Like other abilities, the senses need stimulation and practice to thrive. Sounds, for example, contribute to enlarging and reducing an architectural experience. Rooms and materials reflect sound in
Hospital management and development: architecture and design

various ways. There are pleasant sounds and unpleasant sounds. Designers and architects sometimes spend a great deal of effort on the sound of environments, independent of their designing concert houses and theatres. One goal is to reduce or filter unwanted sound; another is to highlight beautiful and serene sounds such as rippling water and clicking sounds, informing us that a box or a door is closed. To find the right sound for a product has become an increasingly more important job for designers. If the sensory appeal is heightened with a pleasing handle, pleasurably tactile and smelling materials etc., it will increase people’s inclination to make the most of these environmental qualities. Personal insight is awakened, reflecting well on the value of a good environment. Medical research has shown how these sensory qualities stimulate patient recovery; the environment has a great positive influence on elderly patients, in particular.

Care and maintenance is often neglected in public environments; a worn and unattractive environment contributes to a sense of hopelessness and recklessness. Lack of administrative and caretaker sensibility becomes a vicious circle. A scruffy environment lowers the inclination to care for this environment, thus increasing wear and tear and littering. A beautiful environment increases the will to keep up maintenance. Durable materials which age in a beautiful way contribute, therefore, to long-lasting aesthetics and a more sustainable society. By design I also mean form and architecture; that the built environment consists of components which together make up the architectural whole. Size and variation affect aesthetic and physical qualities toward the final architectural result. The same can be said for colours, wallpaper, lamps and rugs, furnishing the building, floor and wall materials, interior products, bathroom and kitchen equipment, use of materials such as ceramic design, textile design, interior design and industrial design, all skills of the design professions. Products for the outside environment, such as bus stop booths, public telephones, signs and other typographical items, materials for groundcover etc., all have a shape which someone needs to make a decision about. If all of these factors do not function well or do not have the qualities which correlate to the need for a suitable purpose, good architecture will not be achieved. Details and the whole are interdependent. It is not unusual that furniture which the furniture designer developed and tiles and washbasins which the ceramicist designed, specifically for a particular interior, turned out so well that they thereafter were produced on a big scale for a larger market.

**Research and action**

Despite the fact that people spend more than 90% of their time in man-made indoor environments, the existing knowledge of how these environments affect human health is still insufficient (Evans, 2003). Earlier research in environmental psychology has shown that architectural parameters such as stimulation (intensity, variety, complexity, mystery, novelty, noise, light, odour, colour, crowding, visual exposure, proximity to circulation, adjacencies), coherence (legibility, organization, thematic structure, predictability, landmarks, signage, pathway configuration, distinctiveness, floor plan complexity, circulation alignment, exterior vistas), affordances (ambiguity, sudden perceptual changes, perceptual cue conflict, feedback), control (crowding, boundaries, climatic and light controls, spatial hierarchy, territoriality, symbolism, flexibility, responsiveness, privacy, depth, interconnectedness, functional distances, focal point, sociofugal furniture arrangement), and restoration (minimal distraction, stimulus, shelter, fascination, solitude) are closely linked to the perception of positive and negative stress.

The question is: can the positive architectural characteristics required to reduce stress, as mentioned previously, be concretized and implemented in current workplaces and the overall built environment, thus strengthening the sense of coherence and its consequent promotion of health? We need to go one step further in order to pursue this concept that links health promotion and
design – that is, how to reduce stress through architectural design.

It is of critical importance that the field of design, as the creator of the physical context for health promotion, lacks a theoretical approach. As a basic foundation, the salutogenic approach should be considered to be the crucial point of departure in an attempt to develop a theoretical approach for psychosocially supportive design. It should be developed further as a common ground for a design theory to promote health. This theory has been proposed as a direction and focus, allowing the field to commit to its concern about all aspects of the human encounter in relation to the physical environment. The theory suggests that we not only design for stress reduction, but focus on salutary rather than risk factors. Designers and planners should always focus on stimulating and rejuvenating the entire person’s mind and body, rather than only addressing risk and prevention factors. As one methodology, the sense of coherence linked to this design approach is a respectable way to apply health promotion by design. I have discussed a comprehensive source and guide for research and action. I believe that the salutogenic approach in design provides a common objective and is a particularly appropriate model for psychosocially supportive design.

Conclusion
The salutogenic approach, as a link and model to a design approach for health promotion, provides a basic theoretical framework for Psychosocially Supportive Design. It provides a model and theory to promote health by design. There is a need to systematically investigate and conduct more empirical studies that verify this model. It is a model that posits that health outcomes are not only linked to stress reducing factors but are linked to environmental qualities that could measure the positive effects of health outcomes. Furthermore, this effort requires informed leadership to guide the organization through the salutary approach process.

The issue of psychosocially supportive design is not only the task of designers; it requires that the entire organization should understand the meaning of salutary organization. Designers could support the effort by quantifying the benefit of such an approach. The organization should measure the sense of coherence; the staff should comprehend it and act on it. We believe that the staff resources to cope are available (manageability), waiting to be motivated (meaningfulness). Design qualities that could be included as wellness factors should be identified follow: access to nature; art; colours; sound of music and nature; lighting; access to pets; use of culture; familiarity; creating landmarks and references in buildings; aesthetics; harmonious and cheerful colour; social interaction and neighbourhoods; spatial composition and articulation; provision of inviting spaces for social support, all of which seek to engage mentally with positive stimulation that could strengthen people’s sense of coherence. This approach emphasizes both psychological and social components that are crucial for health outcomes.

In this nascent stage of scholarship about design and health promotion, the most pressing need is for a better understanding of the psychological and social components that could link a sense of coherence to quality of wellness factors within the designed environment. Psychologically Supportive Design provides the theory, knowledge and models to advance health care design. 

Author
Alan Dilani is a founder and General Director of the International Academy for Design and Health (IADH). He has been engaged worldwide in several universities in the field of Design and Health developing “Psychosocially Supportive Design Programmes”, both in Medical and Design Institutions. He holds a PhD in Health Facility Design from the Royal Institute of Technology, Stockholm and a Master of Architecture in Environmental Design from the Polytechnic of Turin, Italy. His research at the Karolinska Institutet, Medical University, based on a multidisciplinary approach, leads to the new definition of design that not only fosters functional efficiency, but also improves health processes. He is the author of numerous articles and books in the field of Design and Health including: “Design and care in hospital planning” and editor of the book “Design and health – the therapeutic benefits of design”. Professor Dilani is Head of the Research Centre for Design and Health in Stockholm.

References
Dilani, A. “A new paradigm of design and health in hospital planning”, World Hospitals and Health Services, International Hospital Federation, Volume 41, Number 4, 2005.
UPDATE ON THE WORLD ALLIANCE FOR PATIENT SAFETY

ARTICLE BY SIR LIAM DONALDSON

In May 2002, the Fifty-Fifth World Health Assembly adopted WHA Resolution 55.18 which urged WHO member states to pay the closest possible attention to the problem of patient safety and to establish and strengthen science-based systems necessary for improving patient safety and the quality of health care.

The World Alliance for Patient Safety was launched in October 2004. The Alliance aims to fulfill the requirements of WHA Resolution 55.18 through international leadership and by creating an over-arching strategy, action programmes and a coalition of nations, stakeholders and individuals to transform the safety of health-care worldwide. Here, we provide an update of the major priorities of the World Alliance.

Global Patient Safety Challenge

Every two years the World Alliance will formulate a Global Patient Safety Challenge to galvanize global commitment and action on a patient safety topic which addresses a significant area of risk for all WHO Member States. In the period 2005–2006, the Global Patient Safety Challenge is focussing on health care-associated infection with the theme ‘Clean Care is Safer Care’.

At any given time, 1.4 million people worldwide are estimated to be suffering from an infection acquired in a health facility. The risk of health care-associated infections in developing countries is 2–20 times higher than in developed countries.

Launched in October 2005, the Global Challenge comprises three major elements:

+ The development and testing of new WHO Guidelines on Hand Hygiene in Health Care. More than 200 experts from 20 countries have been involved in developing these guidelines which are available in Advanced Draft form at the following link http://www.who.int/entity/patient_safety/information_centre/ghhad_download/en/index.html. Pilot testing of the hand hygiene guidelines and regional workshops will commence in summer 2006.

+ Global and national “Clean Care is Safer Care campaigns”.

+ An invitation to all Member States to pledge to take action on health care-associated infection. Twelve countries and autonomous regions have already signed pledges, Malaysia and Slovenia being the most recent. Our vision is that in the life of the Global Challenge improvements for cleaner and safer care will have been initiated for over half the world’s population. For more information, go to http://www.who.int/patientsafety/challenge/en/

Patients for Patient Safety

Patient safety is not only about statistics but involves damage to the lives of real people – patients and families – who are harmed and sometimes die as a result of unsafe care. We need to do much more to harness the wisdom of these patients in our efforts to make care safer and better for future patients. The action area, Patients for Patient Safety will ensure that patients are at the heart of everything the Alliance does.

Our vision is to grow an international network of 100 patient champions for patient safety drawn from all WHO regions working in partnership with Member States and other key players to improve patient safety. Our first regional Patients for Patient Safety Workshop took place in the Pan American Health Region in early May. Countries participating included Canada, Costa Rica, Mexico, Argentina, Peru and the United States. For more information, click on http://www.who.int/patientsafety/patients_for_patient/en/

Reporting and Learning

Safety cannot be improved without a range of valid reporting, analytical and investigative tools that identify sources and causes of risk in ways that promotes learning and preventative action. Draft WHO Guidelines on Adverse Event Reporting and Learning Systems developed in conjunction with Professor Lucian Leape are being widely
Improving patient safety requires better information sharing about the number, types, causes and consequences of errors and adverse events.

Research is essential for understanding the extent and causes of patient harm and developing appropriate solutions. The Alliance has a particular concern with how to translate research findings into practical outcomes which influence policies, programmes and practices.

The Alliance has convened a Governing Council for Research on Patient Safety to provide high level guidance to the research programme of the Alliance. The Council comprises high level representatives from commissioning and funding institutions of research on patient safety, senior policy makers from both, international organizations and developing and developed countries, representatives from patients’ groups and leading specialists on safety.

Work is ongoing on country level research projects on adverse events using methodologies for medical records review. Participating teams to date include Egypt, Jordan, Morocco, Sudan, Tunisia and Yemen and Kenya and South Africa. Country teams included clinical nurses and medical records specialists, clinical physicians, epidemiologists, research specialists and ministry officials. For further information go to http://www.who.int/patientsafety/research/en/

**Safety solutions**

No adverse event should ever occur anywhere in the world if the knowledge exists to prevent it from happening. Translating knowledge into practical solutions is the ultimate foundation of the safety solutions action area of the World Alliance. Patient Safety Solutions are defined as any system design or intervention that has demonstrated the ability to prevent or mitigate patient harm stemming from the processes of health care.

WHO has designated a Collaborating Centre on Patient Safety (Solutions) through the Joint Commission on Accreditation of Health Care Organizations and Joint Commission International. The work of the Collaborating Centre will involve a range of patient safety experts, policy makers, consumers and health care leaders from across the world who will determine priorities for international solution developments.

Solutions disseminated by the Collaborating Centre will be evidence-based, presented in a standard format and will describe in simple terms what to do to address the risks associated with a particular safety problem. In the first instance the Alliance is aiming to for six field-tested safety solutions to be disseminated internationally in the first half of 2007.

**Future priorities**

In addition to continued work in existing action areas, new areas of work planned for 2007 and beyond include:

- technology for patient safety;
- patient safety and the care of acutely ill patients;
- a second Global Patient Safety Challenge;
- spreading best practices from exemplar hospitals.

Much is happening but much remains to be done. There is a continued need to build and maintain strong political will and commitment to comprehensive and sustained action. As exemplified by other high-risk industries, such as aviation, commitment is needed over the long term. Engagement of front-line health care workers and managers is also vital in building a more open safety culture.

The World Alliance for Patient Safety looks forward to continued close collaboration with the International Hospital Federation to make safer care a reality everywhere health care is provided. Without strong and committed leadership, the patient safety movement cannot succeed.

For further information about the World Alliance for Patient Safety, please click on this link to our website: www.who.int/patientsafety.

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**References**

ICT DEVELOPMENTS

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ELECTRONIC HEALTH RECORDS AS A FOUNDATION STONE FOR HEALTH CARE IN THE UNITED STATES

ARTICLE BY JOYCE SENSMEIER (PICTURED), MS, RN, BC, CPHIMS, FHIMSS AND PATRICIA B WISE, RN, MSN, MA

Abstract

THE QUEST FOR ELECTRONIC HEALTH RECORDS (EHR) AS A FOUNDATIONAL CORNERSTONE FOR HEALTHCARE IN THE UNITED STATES BEGAN QUIETLY WITH THE 1991 RELEASE OF THE INSTITUTE OF MEDICINE’S THE COMPUTER-BASED PATIENT RECORD. WHILE NOT ACCOMPLISHING THE GOAL OF WIDESPREAD ADOPTION OF INTEROPERABLE EHR, THE REPORT STIMULATED HOSPITAL AND CLINICIAN INTEREST AND INVESTMENT IN ELECTRONIC CLINICAL SYSTEMS TO IMPROVE PATIENT SAFETY, QUALITY CARE AND CLINICAL OUTCOMES.

In 2004, US President George W Bush outlined a plan whose goal is to ensure better delivery of health care in the USA. President Bush asserted that “Most Americans will have electronic health records within the next 10 years”, a proclamation that set in motion a series of events and initiatives that are driving unprecedented industry collaboration towards EHR adoption. Heeding the call of the private sector for federal leadership, President Bush appointed Dr David Brailer and established the Office of the National Coordinator (ONC). A call for action was issued, a strategic framework was established and key public and private stakeholders were engaged.

Three key themes emerged: the development of a project to harmonize standards; a certification programme for EHR products; and network prototypes which will inform the national health information network (NHIN). The nation has been energized and forward progress has begun. This paper will provide an overview of US national initiatives and challenges, visions and barriers.

Framework for strategic action

The Office of the National Coordinator for Health Information Technology (ONC) announced the Framework for Strategic Action at the Cornerstones for Electronic Health care conference in July, 2004. This Framework outlines 12 strategies to achieve four major goals:

- Inform clinical practice:
  - Incentivize EHR adoption.
  - Reduce risk of EHR investment.
  - Promote EHR diffusion in rural and underserved.

- Interconnect clinicians:
  - Foster regional collaborations.
  - Develop a nationwide health information network.
  - Coordinate federal health information systems.

- Personalize care:
  - Encourage use of PHRs.
  - Enhance informed consumer choice.
  - Promote use of telehealth systems.

- Improve population health:
  - Unify public health surveillance architectures.
  - Streamline quality and health status monitoring.
  - Accelerate discovery and dissemination.

These goals have provided the needed focus to guide industry efforts, incentivize EHR adoption and to enable the health information exchange necessary for optimal patient care delivery.

Interoperability is the ability of two or more systems or components to exchange information (functional interoperability) and to use the information (semantic interoperability) that has been exchanged. Globally recognized standards are needed to support this interoperability by establishing a common terminology, creating structured information models for data structure and interchange; and enhancing security and privacy.

American Health Information Community (AHIC) and breakthroughs

The American Health Information Community (AHIC) was launched in 2005 by Michael Leavitt, Secretary of the US Department of Health and Human Services (HHS). This “Community”, composed of public and private sector leaders guides the nation forward in interoperable health care information technology by setting priorities and direction for ONC. The Community (1) advises the Secretary and recommends specific actions to achieve a common interoperability framework for health IT; and (2) serves as a forum for participation from a broad range of stakeholders to provide input on achieving interoperability of health IT. The Community serves as the hub for
The Community serves as the hub for identifying breakthrough opportunities that will produce a tangible and specific value to the health care consumer within a two- to three-year period.

The national priorities are being described by the Community in the form of the following four breakthrough scenarios. Use cases will evolve from the breakthroughs and will serve to coordinate the work of the different projects.

- **Biosurveillance**: transmit essential ambulatory care and emergency department visit, utilization and laboratory result data to authorized public health agencies within 24 hours.

- **Consumer empowerment**: deploy a pre-populated, consumer-directed and secure electronic registration summary.

- **Electronic health record exchange**: deploy secure solutions for accessing current and historical laboratory results and interpretations.

- **Chronic care**: widespread use of secure messaging between clinicians and patients about care delivery.

HHS awarded three contracts totalling $17.5 million to public-private groups that will accelerate the adoption of health information technology and the secure portability of health information across the USA. These groups will form strategic partnerships to develop the building blocks necessary for achieving the President’s goal of widespread adoption of interoperable EHR within 10 years. The Certification Commission for Health care Information Technology (CCHIT) announced the first certified ambulatory EHR products. A total of 22 products have received certification to date with more in the queue. It is hoped that these independent evaluations of vendor products will accelerate the adoption of information technology throughout the USA. Founded in 2004, and the recipient of an HHS grant in 2005, the CCHIT’s goals include reducing the risk of HIT investment by physicians and other providers and ensuring interoperability of HIT products.

In 2007, CCHIT plans to start certifying ambulatory products for basic interoperability utilizing criteria that will initially focus on the exchange of laboratory data and e-prescribing capabilities. Additionally, the CCHIT will initiate certification for in-patient EHRs with an emphasis on the medication cycle. Yearly, the CCHIT publishes a three-year roadmap for future efforts providing key indicators for the public and private sectors and ultimately resulting in ambulatory systems achieving interoperability with each other as well as hospital systems.

### HITSP and standards harmonization

Standards harmonization is a critical element of interoperability. The task of developing a process for standards harmonization to support each specific vision has been contracted to HITSP. The HITSP was formed under the sponsorship of the American National Standards Institute, CCHIT, and HISPAC established by RTI and the National Governor’s Association.

#### Certification Commission for Health care Information Technology (CCHIT)

One of the first challenges facing a nation determined to advance the quality and safety of health care was to define the functional capability of an EHR. Building on the breakthrough HL7 standard, the Certification Commission for Health care Information Technology (CCHIT) announced the first certified ambulatory EHR products. A total of 22 products have received certification to date with more in the queue. It is hoped that these independent evaluations of vendor products will accelerate the adoption of information technology throughout the USA. Founded in 2004, and the recipient of an HHS grant in 2005, the CCHIT’s goals include reducing the risk of HIT investment by physicians and other providers and ensuring interoperability of HIT products.

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### Collaboration (HISPC) will address variations in business policy and state law that affect privacy and security.

The Nationwide Health Information Network Architecture Projects (NHIN) are focusing on interoperability pilots starting in 2006. The contracts were awarded to four consortia to move the nation towards the President’s goal of personal electronic health records by creating a uniform architecture for health care information that can follow consumers throughout their lives. The consortia will share ideas and information about the architecture and prototypes with each other and with the public in order to accelerate secure and seamless exchange of health information across the nation. The NHIN consortia will work closely with other HHS partners, including the HITSP established by the American National Standards Institute, CCHIT, and HISPAC established by RTI and the National Governor’s Association.

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Institute (ANSI), coordinator of the US voluntary standardization system. The Health care Information and Management Systems Society (HIMSS), the Advanced Technology Institute (ATI) and Booz Allen Hamilton serve as strategic partners with ANSI in this initiative to prototype and evaluate a nationwide standards harmonization process.

The HITSP brings together a wide range of stakeholders into a formal “panel” to identify, select and harmonize standards for communicating data throughout the health care spectrum. Formation of the panel was endorsed by a number of industry groups and has the oversight and backing of the ONC. HITSP members and experts have committed themselves to setting and implementing standards that will ensure the integrity and interoperability of health data. A standard specifies a well defined approach that supports a business process and has been agreed upon by a group of experts, has been publicly vetted, provides rules/guidelines/characteristics, helps to ensure that materials, products, processes and services are fit for their intended purpose, is available in an accessible format and is subject to ongoing review and revision process. Harmonization is required when a proliferation of standards prevents progress rather than enables it.

The HITSP charters technical committees to address each breakthrough and sets out to:
- Identify a pool of standards for a general breakthrough area.
- Identify gaps and overlaps for a specific context.
- Make recommendations to the HITSP for resolution of gaps and overlaps.
- Develop instructions for using the selected standard for a specific context.
- Test the interoperability specifications for using the standard.

**Disparate vendor systems, applications and connectivity suites**

Historically, “unique” market needs within the health care community were addressed with customized systems, applications and standards. More than a dozen standards-setting organizations – from ANSI-accredited bodies to industry consortia and other forums – have developed a plethora of standards to meet the needs of specific sectors within the health care IT market. However, disparate messaging systems, data elements and vocabulary now prevent the cross-system exchange of health information. Content, structure and transmission methods are all in HITSP scope.

A framework for interoperability

Despite the emerging consensus on the need for local, regional and national interoperability, the task is daunting and the barriers are many. Barriers to achieving this vision include lack of effective standards, incompatibility among different IT solutions, failure to align technology solutions to process and workflow requirements of the end user, and policies that are only now emerging related to the ownership of, access to and the use of data.

One notable initiative that has the ability and capacity to mobilize essential health care entities towards interoperability is “Integrating the Health care Enterprise” (IHE). IHE is a major multi-year global interoperability initiative including the USA, Canada, Asia and Europe. Leadership in the USA is provided by HIMSS, the Radiological Society of North America (RSNA) and the American College of Cardiology (ACC), which collectively represent over 250,000 health care professionals. In pursuit of its mission, IHE brings together care providers and other health care professionals with representatives of the health care IT industry and releases its work into the public domain. IHE’s primary sponsors and domain sponsors are organizations of medical professionals who provide clinical and operational domain expertise in identifying critical integration priorities to be addressed. They oversee the work of more than 20 volunteer committees of thousands of industry professionals who define solutions to address these issues based on already established information technology standards.

IHE has developed a unique process and culture for producing its framework for interoperability combining the collaboration of the primary stakeholders in an efficient and focused manner. This process has the effect of eliminating ambiguities, reducing configuration and interfacing costs, and ensuring a higher level of practical interoperability. Key features of the process include: operating on a yearly cycle to ensure rapid and immediately applicable steps; providing practical testing tools and information resources; employing a use-case based methodology; and analyzing standard domains to identify where overlaps and gaps exist, requiring reconciliation and/or definition.

At the micro-level, the IHE process and framework enables health care entities and vendors to improve access to information incrementally. At the macro-level, IHE has the potential to accelerate the migration of providers, vendors, health plans, researchers, RHIOs and others towards the goal of an interoperable NHIN through the development of an interoperability roadmap in conjunction with the development of RHIOs and NHIN. An example of such an interoperability roadmap is proposed by the EHR Vendor Association. Already, the impact of the IHE process on interoperability is notable. Currently, IHE is being implemented by most EHR and HIT vendors representing over 90% of the EHR market.

IHE participants promote interoperability by building systems that conform to an industry-wide framework for implementing standards. More than 200 health care vendors worldwide offer ready-to-integrate products to benefit health care enterprises of all sizes. CIOs and clinicians appreciate the positive impact IHE has made on radiology, cardiology, laboratory and enterprise infrastructure as well as powerful cross-enterprise health care infrastructures.

**National Health Information Network (NHIN)**

The establishment of the ONC focused the industry’s attention on how to best exchange health care information between providers. Greeted with great enthusiasm and immediate community calls to action, the NHIN reminded industry veterans of the Community Health Information Networks (CHINs) of the 1990s. The widespread adoption of CHINs failed due to high costs, local and regional competition between hospital and health care systems, and issues surrounding data ownership, privacy and security.

Despite the interoperability setbacks of
Despite the emerging consensus on the need for local, regional, and national interoperability, the task is daunting and the barriers are many.

The 1990s, the ONC believes that health information exchange (HIE) on a local, regional and national level is absolutely imperative to obtain the patient safety and quality outcomes gains. The national health information network, envisioned by ONC will rely on regional health information networks (RHIOs). Based on interoperability standards not available to the CHINs of the last decade, RHIOs should reflect the needs of the region it serves. Consequently RHIOs will not be carbon copies of each other; they will vary in governance models, organizing principles, and systems and policies.

In 2005, HHS released four contracts to study prototype RHIO development. Each of the four prototypes has taken a different approach. Regardless of whether the architecture of the RHIO reflects the UK National Health model featuring a “spine”, the Regenstrief model which features a centralized database or a distributed model accessing data in place, the RHIOs will be challenged as they address differing types of transactions, retrieval methods, granularity of the data, user access authorization, and shared directories and registries. It is hoped the four prototypes result in lessons learned and practical options.

Success depends on collaboration

Clinicians and providers need confidence that the EHR will consistently support clinical information. Patients need confidence that the most current information is available and reusable. Vendors need confidence that providers will be satisfied. Health care policymakers and payers need confidence that quality and efficiency will improve. Stakeholders from public and private industry can work together to enable the health information exchange necessary for optimal patient care delivery.

Authors

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Joyce Sensmeier is the Vice President of Informatics at the Health care Information and Management Systems Society (HIMSS). She became Board Certified in Nursing Informatics in 1996, achieved the Certified Professional in Health care Information and Management Systems (CPHIMS) credential in 2002 and achieved Fellowship status in HIMSS in 2005. Current areas of responsibility at HIMSS include professional certification, professional practice, nursing and clinical informatics, Integrating the Health care Enterprise (IHE), interoperability, privacy and security and standards-related initiatives of the Society. Ms Sensmeier is an adjunct faculty member at Loyola University, Chicago and Johns Hopkins University, Baltimore. A nationally recognized speaker on the topic of nursing informatics and the author of several book chapters, articles and white papers, Ms Sensmeier was a member of the expert panel that revised the Scope and Standards of Practice for Nursing Informatics published by the American Nurses Association in 2001. She has recently assumed the position of co-chair of the Alliance for Nursing Informatics, a collaboration of 20 distinct regional and national nursing informatics organizations. In her previous position, Sensmeier was the clinical team leader for the implementation of the IDX LastWord system at Palos Community Hospital in Palos Heights, Illinois.

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References

5. www.himssehrva.org
IMPLEMENTING TELEMEDICINE IN SOUTH AFRICA “A SOUTH AFRICAN EXPERIENCE”

ARTICLE BY JILL FORTUIN ABRAHAMS AND M MOLEFI

Abstract

SOUTH AFRICAN CITIZENS HAVE EXPERIENCED MANY INEQUALITIES AND THESE HAVE EXTENDED TO THE HEALTH CARE SETTING. ONE OF THE MAJOR CHALLENGES THAT NEEDS TO BE ADDRESSED IS THE ACCESSIBILITY AND AVAILABILITY OF HEALTH CARE AND SPECIALIZED MEDICAL SERVICES IN RURAL AREAS IN SOUTH AFRICA.

TELEMEDICINE IS A POTENTIAL SOLUTION TO ADDRESS SOME OF THE CHALLENGES WITHIN HEALTH CARE IN A DEVELOPING COUNTRY LIKE SOUTH AFRICA. THIS ARTICLE LOOKS AT THE EXPERIENCES OF DEVELOPING AND IMPLEMENTING A TELEMEDICINE SOLUTION.

U ntil 1991, South African law divided the population into four major racial categories: Africans (black), whites, coloureds and asians. The post-apartheid Government of South Africa has made remarkable progress in consolidating the nation’s peaceful transition to democracy. Programmes to improve the delivery of essential social services to the majority of the previously disadvantaged population are underway. Access to better opportunities in education and business are becoming more widespread.

The vision of the National Department of Health of South Africa is a caring and humane society in which all South Africans have access to affordable, good quality health care. The South African Chief Directorate of Information Evaluation and Research, Department of Health (2001) stated that “the challenge for us lies in reaching all our people, especially in the rural areas and being mindful of not increasing the development gap between the “haves and have-nots”.

Kuntalp and Akar (2004) reported that people living in underserved areas struggle to access timely and quality medical care. Residents of these areas often have substandard access to speciality health care, primarily because specialist physicians are more likely to be located in urban areas of concentrated population. Because of recent innovations in computing and telecommunications technology, many elements of medical practice can now be accomplished even when the patient and health care provider are geographically separated.

The Census (2001) reported that South Africa has a population of 44.8 million people, with 43% of this population living in rural areas. Residents living in rural communities are confronted with significant inequities in access to health care compared with residents living in urban and suburban communities. Rural residents face a relative shortage of speciality and sub-speciality physicians and show several inferior measures of health status (Marcin et al. 2004).

The current health care service delivery situation has resulted in many health professionals seeking alternative solutions to delivering health care in South Africa. The solutions included telemedicine applications which could vary from the store-and-forward to the interactive video mode. The health needs and situations will vary and this also provides the specification for the type of telemedicine application and the mode in which it is delivered.

The aim of this study was to develop and implement a workable telemedicine solution for South African Primary Health Care, after which a report would be submitted. The outcomes would be used to guide further research and development in this area to help implement a sustainable Primary Health Care Telemedicine network.

Methods

The study focused on a rural clinic in Western Cape, one of the nine provinces of South Africa. Observations were made about the daily operations of the clinic and telemedicine workstation over a period of four weeks. The monthly statistics were perused to determine baseline information about Grabouw Community Health Centre. An informal discussion took place with the health professionals at the site and they shared their experiences regarding the current working conditions and experiences with the telemedicine workstation. Grabouw
The simplicity and flexibility should allow an inexperienced user to make use of the system without further increasing the workload or being too complicated.

Community Health Centre (CHC) has a staff compliment of 30 persons.

**Results**

The observations revealed that Grabouw CHC is situated in a valley about 120km outside of central Cape Town. The CHC has running water, intermittent electricity supply, POTS connectivity, ISDN connectivity, and the exterior and interior of the building was in a reasonably well maintained condition. The area surrounding the clinic included people from the low socio-economic group. The majority of the Grabouw residents live in informal settlements and use communal ablution facilities. The main source of income is agriculture farming and this is seasonal. Grabouw is renowned for its fruit farming and is responsible for 65% of South Africa’s export in apples.

Grabouw CHC offered a range of services which included:
- immunization;
- family planning;
- 24 hour maternity unit;
- 24 hour trauma unit;
- fully stocked pharmacy;
- ARV treatment site;
- counselling;
- day clinic; and
- mobile clinic.

The staff included 16 people, who could be further subdivided into; four professional nurses, five nursing assistants, two part-time medical doctors, one dentist, one dental assistant, two administrators and one cleaner. The total patient head count included 300–500 patients per day.

Approximately 10–15 patients on average are referred each day to the regional hospital, Hottentots Holland Hospital (HHH), which is about 40 km away. HHH does not provide a range of specialist services so often patients are referred to Tygerberg Academic Hospital. Tygerberg Academic Hospital is about 100 km away from Grabouw CHC. The waiting period for referrals could be anything from three days to three months or longer for chronic conditions (e.g. asthma, hypertension etc.).

Clients presenting with acute conditions, such as stab wounds or injuries resulting from motor vehicle accidents, are referred immediately to the nearest regional hospital using the ambulance service. Clients are stabilized prior to transportation and in most cases may wait hours before being transported.

None of the CHC staff (n=30) were computer literate and 90% (n=27) had not used a computer previously. At the start of the project none of the participants had been exposed to telemedicine and were not aware of its capabilities.

The workflow from the time the patient entered the clinic included:
- presenting at reception;
- locating an existing folder or opening a new folder, if the patient is within the first 500 patients. If not they are told to come back the following day;
- all patients are screened and then sent to the relevant section;
- the patient is seen by a health professional and exits the clinic after this unless required to collect medication at the pharmacy or referred to the specialist. If the patient is referred to a specialist the waiting period for this appointment can be anything from three days to three months or longer for chronic conditions.

**Discussion**

Based on these results the first step was to procure a simple low cost telemedicine workstation. The simplicity and flexibility should allow an inexperienced user to make use of the system without further increasing the workload or being too complicated. The system should allow for local service and maintenance.

An investigation was conducted to procure a telemedicine workstation that incorporated the specifications as mentioned above but the process was futile as no telemedicine products were found that met the health care needs of clients in a developing country. In addition many of the available systems required specialized training and could not be maintained/supported locally. University of Stellenbosch, Electrical and Electronic Engineering was approached to design and manufacture a primary health care telemedicine workstation together with the Medical Research Council and Ukwanda Centre for Rural Health. The first phase involved desktop research, drafting user specifications and conducting market research. Health professionals and the development team engaged in discussions about the user specifications of a telemedicine system.

Once a specification was approved and signed off, the engineering team built the primary health care telemedicine workstation. The key features of the telemedicine workstation developed included:
- no operating system interaction;
- integrated and intelligent video control;
- familiar consumer type user interface use and
- clinic adapted capturing.

The system utilized ISDN connectivity. Testing of the system was simulated in the laboratory before any actual testing in the field. The primary health care telemedicine workstation was piloted over staggered periods for two years at Grabouw CHC. After a period of testing in the field, a feedback session was held where corrections, additions and changes were discussed and either implemented or discarded.

Some of experiences and feedback from the health professionals were that they felt that the system was easy to use and
was well integrated into the workflow. The training took approximately 15 minutes initially and three post training sessions were implemented to facilitate the process. The time to capture the cases took 10 minutes and the turn-around-time for specialized medical response was one to five days. The videoconferencing option of the telemedicine workstation was a specification that had not yet been developed. It will be added in due course.

A good example of a success for telemedicine is the case of a 10 month old baby presenting with multiple abscesses on the body. The child had previously been given antibiotics and ointment by a nurse. The child returned to the facility with a high temperature and the multiple abscesses had not been reduced. The consulting doctor was unsure about the cause of the abscesses and the treatment option. The case was referred to two specialists using the primary health care telemedicine workstation. The consulting doctor requested blood tests and continued treatment. The specialists had recommended that:

- the patient be tested for HIV;
- intravenous antibiotics be administered; and
- that the abscesses be lanced and the patient referred to hospital for further observations.

The patient tested HIV-positive. The telemedicine consultation possibly saved the life of young child and provided excellent care and support to the health professional.

Conclusion
Telemedicine has tremendous potential in a resource poor country like South Africa. Despite the lack of infrastructure and the limitation of funds to purchase such equipment the telemedicine workstation has demonstrated its ability to improve the quality of life and health care among South African citizens. Further investigation is required to determine the impact of the telemedicine workstation on the quality of health care. In addition research should be done to investigate the feasibility and sustainability of telemedicine in a developing country like South Africa.

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References
RECOGNISE AND TACKLE INTRAVENOUS INFUSION RISK

ARTICLE BY DAVID R UPTON

Abstract

In recent years most hospitals have made great strides towards enhancing the safety of intravenous (IV) therapy. For some, however, the nettle has yet to be grasped. In this short review David Upton of Cardinal Health Alaris Products® describes the major risks inherent in the systems supporting the administration of IV therapy in a typical general hospital and outlines some of the solutions that are currently available.

Of all the therapeutic interventions practised today, IV therapy poses the greatest magnitude of safety risk to both patients and the professionals involved in care delivery. The globally unique National Reporting and Learning Scheme established by the UK National Patient Safety Agency has collected data which indicate that incidents attributed to injectable therapy account for over 60% of medication related reports. A recent review of litigation claims made against the UK National Health Service has also shown that claims arising from IV therapy are significant and their frequency is rising.

Factors contributing to risk

Poor equipment purchasing strategy

Historically, equipment in healthcare has been poorly managed. Too often, individual ward managers were given the freedom to spend their devolved equipment funding or charitable donations in an uncoordinated manner. Clinical staff have been known to fight hard to retain this freedom for their units in spite of the obvious negative impact on standardisation and safety across the hospital. This situation has applied to intravenous infusion devices as much, if not more, than other forms of equipment and the lack of central control resulted in many hospitals employing a bewildering variety of devices.

Ironically, in some centres where centralised purchasing control has been introduced in the past the experience has been far from satisfactory. Key decisions have been made by individuals who are remote from the clinical situation and with inadequate involvement of the potential equipment users.

Inadequate equipment availability

Many hospitals simply have not invested in an adequate number of infusion devices. However, in others, despite adequate investment audits of equipment utilisation have demonstrated high levels of “downtime”. One survey found that infusion devices owned and stored by certain wards were out of use 80% of the time while in the same hospital patients were receiving uncontrolled infusions due to lack of equipment.

Lack of standardisation of equipment

For some a lack of standardisation has arisen from a lack of purchasing control. For others it has actually been a deliberate policy. A fear of dependence on one manufacturer has given rise to an approach which aims to avoid putting “all the eggs in one basket”. One large teaching hospital was reported as believing it had a duty to expose its trainee nursing staff to as many different types of infusion device as possible!

Ineffective training

21% of reported infusion device incidents in the UK have been found to be attributable to user error. In a further 53% of incidents no cause could be identified. User errors with infusion devices are three times more prevalent than with any other form of medical equipment. When hospitals have audited their equipment, many have found over 40 different types of pump in use which clearly makes it virtually impossible to deliver anything resembling a quality training programme for staff.

Extravasation

Extravasation, the leakage of fluid through the damaged wall of the vein into the surrounding soft tissue, seems to be almost accepted as an inevitable consequence of intravenous therapy. The injury and pain that results has been found to be responsible for 56% of the IV therapy related litigation claims against the UK National Health Service, the average cost per claim being £45,000.

Inappropriate targeting of safety investment

Has there been an emphasis on Intensive Care areas at the expense of safety on the general wards? Historically, investment on new IV infusion equipment tends to be focussed towards intensive care areas as nearly all therapy in these units is delivered intravenously. However, it could be argued that the nurse practitioners here are in fact the IV drug administration experts, patients are intensively monitored and adverse effects are quickly detected and that the greater risk of a serious medication error lies in general ward areas where staff are...
less familiar with IV therapy. This argument is supported to some extent by UK data which shows that the most likely source of an infusion related litigation claim against the NHS is a general ward rather than a critical care area.\footnote{Opposition from nurse managers accustomed to owning their own equipment is rapidly forgotten as the benefits of a centralised resource become apparent.} The highest risk areas are within paediatric care and there has been inadequate investment in safety in these areas.

**Lack of documented evidence**

One reason that investment in medication safety has not been realised or has been misdirected has been the lack of supporting evidence. Only in the last ten years or so have health care organisations begun to adopt a culture of openness around medication errors and actively encouraged reporting and learning from critical incidents and near misses.\footnote{Solutions available Centralisation of purchasing control In order to achieve rationalisation of IV equipment and to combine the purchasing power across the hospital in order to get the best deal from suppliers it is imperative that control of purchasing is moved from ward level to a central structure. Procurement Departments or Medical Physics have successfully fulfilled this role in the UK NHS. This intervention is key to achieving standardisation of infusion equipment.}

**Pump programming errors**

It is far too easy to make an error when programming an infusion pump, just as easy as dialling the wrong number on a telephone keypad, and the consequences of an extra zero or a misplaced decimal point in the infusion rate can be catastrophic. Infusion devices have not been designed to be fail safe and have not possessed the ability to recognise an erroneous dose that has the potential to harm a patient.

**Needlestick injury**

The risk of needlestick injury to practitioners involved in the delivery of intravenous therapy is still unacceptably high. Needlestick injury carries a high cost to healthcare providers in terms of infection, psychological distress and time away from work for the victim. The organisation must also bear the cost of compensation which can be considerable.

**Solutions available Centralisation of purchasing control**

In order to achieve rationalisation of IV equipment and to combine the purchasing power across the hospital in order to get the best deal from suppliers it is imperative that control of purchasing is moved from ward level to a central structure. Procurement Departments or Medical Physics have successfully fulfilled this role in the UK NHS. This intervention is key to achieving standardisation of infusion equipment.

**Infusion device libraries**

A centralised facility for the management of infusion devices has many advantages. Hospitals that have taken this initiative have quickly found that by increasing the utilisation rate of devices the hospital requires a considerably lower level of equipment than was previously thought. A devices library facilitates the battery charging, cleaning and planned preventative maintenance of equipment and its staff commonly provide a valuable contribution to the intravenous administration training programme. Opposition from nurse managers accustomed to owning their own equipment is rapidly forgotten as the benefits of a centralised resource become apparent. A reduction in nurse time spent simply trying to find a suitable infusion device is a very quickly realised benefit of such a service.

**Incident reporting**

An in-house medication incident reporting system should be developed to identify priority areas for action. One safety strategy does not fit all situations and while it is, of course, positive to learn from the experience of others, policy should be informed by local incident data as well as national initiatives.

**Smart pumps**

The latest generation of infusion pumps have adopted design for safety and now have the capacity to run software and to record data. Thus, the push button keypads that made programming errors too easy are being replaced by scrolling functions and the pumps are now able to be made “smart”. Smart pumps are equipped with safety software such as the Alaris Guardrails system which confers the ability to recognise and intercept infusion rates of drugs that are either subtherapeutic or potentially toxic. The hospital builds a catalogue of drugs, concentrations and agreed infusion rate limits that is uploaded onto the devices. This process in itself has many spin off benefits and has been found to facilitate discussions regarding standardization of practice, rather akin to the debate that accompanies the compilation of a drug formulary. In addition, the use of standardised drug concentrations facilitates pre-production commercially or by the hospital pharmacy service.

The implementation process provides a platform for retraining and the fact that the safety software records all the potential events intercepted provides an audit tool on IV administration practice that was hitherto unavailable. Compared to other safety systems such as electronic prescribing and pharmacy automation, safety software on infusion devices is a low cost and quick to implement option. An independent review of the various safety software systems available has been carried out by the Medicines and Healthcare devices Regulatory Agency in the UK.\footnote{The implementation process provides a platform for retraining and the fact that the safety software records all the potential events intercepted provides an audit tool on IV administration practice that was hitherto unavailable. Compared to other safety systems such as electronic prescribing and pharmacy automation, safety software on infusion devices is a low cost and quick to implement option. An independent review of the various safety software systems available has been carried out by the Medicines and Healthcare devices Regulatory Agency in the UK.}

**Variable Pressure Monitoring**

The use of infusion devices with a variable pressure monitoring facility provides valuable early warning of the onset of venous phlebitis and extravasation that can lead to the avoidance of serious complications and injury.

**Needle free systems**

Needlestick injury is avoidable. Hospitals have a duty of care to their employees as well as their patients and should do everything possible to minimise the risk of needlestick injury. There are now needle free injection systems available that can help considerably in this objective, such as the Alaris Smartsite system.

**References**

CLINICAL CARE FOCUS

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TREATMENT OPTIONS IN THE MANAGEMENT OF HEMOPHILIA IN DEVELOPING COUNTRIES

ARTICLE BY MAMMEN CHANDY

Abstract

This monograph highlights the various options available when treatment products are extremely scarce, supplementing an earlier WFH monograph entitled The Treatment of Hemophilia Bleeding with Limited Resources, by Dr Shelby Dietrich. The three major problems with regard to hemophilia care in developing countries are:

• INADEQUATE KNOWLEDGE;
• LACK OF FACILITIES FOR A PROPER LABORATORY DIAGNOSIS; AND
• INADEQUATE SUPPLY OF AFFORDABLE, SAFE FACTOR.

However, even with a limited amount of coagulation factor, it is possible to improve the lives of people with hemophilia in the developing world using some aspects of “ancillary care” that are discussed in this monograph.

In the Western world today, it is possible for a child with hemophilia receiving adequate treatment to live a near normal life. An accurate diagnosis is quickly established, the family is educated on the management, and the child is put either on prophylactic factor replacement or on-demand replacement given at home. 

With this type of treatment most children with hemophilia (apart from the small number who develop inhibitors) can go to school, enjoy sports, and expect to have minimal or no joint bleeding. This level of treatment is expensive. In Sweden, for example, it costs US$ 100,000 per year to provide prophylactic factor replacement for one child with hemophilia. However, the cost of providing prophylaxis for all children with hemophilia in the country represents only 0.2% of the national health budget.

This is not the case in most developing countries where the government does not have the resources to buy the necessary quantities of coagulation factors in the face of more urgent health priorities and hardly any patients can afford to pay for their own treatment even for on-demand home therapy.

In this situation hemophilia is managed by using every available option that does not require expensive treatment products.

This monograph highlights the various options available when treatment products are extremely scarce, supplementing an earlier WFH monograph entitled The Treatment of Hemophilia Bleeding with Limited Resources, by Dr Shelby Dietrich.

The three major problems with regard to hemophilia care in developing countries are:

• inadequate knowledge;
• lack of facilities for a proper laboratory diagnosis; and
• inadequate supply of affordable, safe factor.

However, even with a limited amount of coagulation factor, it is possible to improve the lives of people with hemophilia in the developing world using some aspects of “ancillary care” that are discussed in this monograph.

Education

When resources are scarce, education is the cornerstone of hemophilia care. This should be the first major emphasis when organizing hemophilia services in developing countries. This includes education for the person with hemophilia and his family, as well as health care providers and the population in general. It is not expensive to do and much of the morbidity related to hemophilia in developing countries can be reduced if the person with hemophilia, his family, and his physician know enough about the disease.

The World Federation of Hemophilia (WFH) website, at www.wfh.org, is a good source for information both for health care providers and people with hemophilia and their families.

Educating the family

After a child is diagnosed with hemophilia, the family should be given a detailed explanation of the nature of the disease and its genetic basis. The WFH publication Hemophilia in Pictures is a good resource for this. The news that their baby has a genetic disorder with a lifelong risk of bleeding for which there is ‘no cure’ is devastating for parents, and the family requires a great deal of support and counselling. After the child has been diagnosed, parents should look at their home anew to see what could be new dangers for their child.

When the child is under three years old the parents should:

+ Have the child sleep on a mattress on the floor rather than in a bed when the caregiver is busy in another part of the house;
Most doctors in developing countries do not have enough information on the management of a child with a bleeding disorder.

- in a two-storey home, make sure the stairwell is blocked at the top with a locked half door or safety gate, when the child is upstair;
- check that toys have no sharp edges and ensure that there are no sharp instruments, such as scissors, accessible to the child; and
- use helmets as well as protective pads for knees and elbows to help avoid bleeds.

A child with hemophilia must not receive injections into a muscle. Immunizations are usually given in this way, but can also be given under the skin (subcutaneously). Children with hemophilia should receive all immunizations subcutaneously using a 26-gauge needle with firm pressure applied to the injection site for 3-5 minutes.

When the child is over three years old:
- use support struts or stabilisers with wheels on either side of the bicycle so that the child can keep his balance, and have the child always wear a helmet.
- avoid contact sports, encourage the child to take up swimming, badminton, or table tennis instead.

When the child starts school, remember to:
- always tell the principal and class teacher that the child has a bleeding disorder; and
- arrange for appropriate activities during the games period.

Living with Haemophilia, by Dr Peter Jones, is an excellent source of information about hemophilia and its management. It should be essential reading not only for people with hemophilia and their families but also for teachers, health care workers, and doctors.

Educatiing health care workers and doctors

Most doctors in developing countries do not have enough information on the management of a child with a bleeding disorder. This can be improved by:
- including a module on hemostasis and the prevention and management of bleeding in the undergraduate curriculum in all medical schools.
- having guidelines for management of hemophilia, such as the WFH Guidelines for the Management of Hemophilia.

Hematologists in developing countries should use every opportunity (seminars, conferences) to educate other medical personnel on hemostasis and the diagnosis and management of bleeding disorders.

Key points for health care workers to remember:
- Treat bleeds quickly (within two hours if possible) to recover more quickly and prevent permanent damage later in life.
- Avoid intramuscular injections, difficult phlebotomy, and arterial punctures.
- Patients should avoid drugs that affect platelet function, particularly acetylsalicylic acid (ASA) and non-steroidal antiinflammatory drugs (NSAIDs) except certain COX-2 inhibitors.
- Bleeding episodes in the head, neck, chest, and gastrointestinal and abdominal regions are life-threatening and should be treated with clotting factor concentrates immediately if available.

Laboratory diagnosis

Correct diagnosis of a bleeding disorder can be provided at a cost of US$20 in developing countries if basic laboratory services are available. These services can be developed on a regional basis with limited investment, but training of technical staff and quality control are essential. The WFH offers laboratory training workshops and runs an external quality assurance scheme to help improve laboratory skills. The WFH lab manual Diagnosis of Haemophilia and Other Bleeding Disorders is a useful resource that outlines the basic methods and techniques of various coagulation tests and assays.

Prothrombin time (PT), activated partial thromboplastin time (APTT), and platelet count are the basic screening tests in anyone suspected of having a bleeding disorder. If these are abnormal, the patient should be referred to a hemophilia treatment centre that can make a complete diagnosis with factor assays, inhibitor screens, and, where necessary, platelet function studies.

Carrier detection and prenatal diagnosis

In developed countries, where hemophilia care has progressed to such an extent that a child can live a near normal life with safe and effective therapy, the need for carrier detection and prenatal diagnosis may be less important. However, these services are necessary in developing countries so that individuals and families can be evaluated, informed of their carrier status, and be allowed to make an informed choice on whether they will risk having a baby with hemophilia or not.

If there is an affected family member and the molecular defect can be easily confirmed by DNA studies in the person with hemophilia. This information is used to determine whether the female family member is a carrier. If a carrier is keen to have prenatal diagnosis because she is sure that she does not want to have a baby with hemophilia then a chorionic villous biopsy is performed at 8-10 weeks of gestation and DNA tests are performed on the tissue to confirm whether the baby is normal, a carrier, or affected. If the baby is affected then the pregnancy is terminated. It is possible to provide a molecular diagnosis of the genetic defect in hemophilia A and B by polymerase chain reaction (PCR) testing and conformation sensitive gel electrophoresis and sequencing at a cost of US$50.

Reference centres which can provide genetic services for hemophilia must be established in developing countries and services must be extended to other rare bleeding disorders.

Treatment and care

Since factor replacement therapy is
Ice: Data from sports medicine and an experimental study in rats show that ice therapy helps to decrease inflammation and swelling by decreasing leukocyte-endothelial interactions. Ice must be applied over a wet towel intermittently for periods of 5 minutes to achieve a 10-15°C lowering of temperature in the deeper tissues. Ice should not be applied directly to the skin as it can “burn” the skin.

Compression: Joints can be wrapped in a tensor bandage or elastic stocking. This gentle pressure may help limit bleeding and support the joint. Use compression carefully with muscle bleeds if a nerve injury is suspected.

Analgesics
Acetaminophen (paracetamol) can be used at home to relieve acute pain. If the pain is not relieved with acetaminophen alone then any one of the following can be added: propoxyphene, codeine, buprenorphine, or tramadol. See Table 1 for dosage.

Aspirin and NSAIDs should be avoided. Where some factor is available, a single dose of factor VIII or factor IX (10 IU/kg) may be adequate to stop the bleed. If concentrates are not available then two bags of cryoprecipitate can be given for factor VIII deficiency or one unit of plasma (250 ml) for factor IX deficiency.

Preventive care
Prevention of bleeding should be the goal. Staying healthy also helps prevents bleeds. This includes:

- getting regular exercise to promote strong muscles, protect joints, and improve fitness;
- wearing protection (helmets, protective padding) that is appropriate for the sport or activity;
- getting regular checkups that include joint and muscle examinations;
- getting all vaccinations is recommended, including hepatitis A and B;
- maintaining a healthy body weight to avoid extra stress on joints; and
- avoiding contact sports, but swimming and cycling with appropriate gear should be encouraged. See the WFH publication Go for It for recommended sports.

Physiotherapy to develop strong muscles and thereby prevent bleeding into the joints is an important component of hemophilia care in developing countries. All patients and their families should have a book of simple exercises and the child as he grows should learn that regular exercise, even when there is no bleeding, is the best prevention. Detailed information is provided in Physiotherapy in Hemophilia – Exercises to Do at Home by Genny Dwyer and Alicia Hosking.

These exercises do not require any expensive equipment, are very simple to do, and if done regularly can make all the difference.

Management of joint and muscle bleeds
When factor replacement therapy is not an option, bleeds can be treated with first aid (rest, ice, and compression) and analgesics. First aid should be started as soon as possible to limit the amount of bleeding and damage.

First Aid
Rest: Rest in the position of function (a sling for any upper limb bleeds and bed rest for lower limb bleeds). The person should not move the bleeding joint or walk on it.

<table>
<thead>
<tr>
<th>Drug adult</th>
<th>Dose</th>
<th>Pediatric dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen (Paracetamol)</td>
<td>500mg – 1 g every 4–6 hours</td>
<td>10-15 mg/kg every 4–6 hours (available as syrup)</td>
</tr>
</tbody>
</table>

If the pain is not relieved with acetaminophen alone then add any one of the following:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Pediatric dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propoxyphene</td>
<td>65 mg every 4–6 hours</td>
<td>Not recommended for children</td>
</tr>
<tr>
<td>Codeine</td>
<td>180-200 mg every 4–6 hours</td>
<td>0.5 –1 mg/kg every 4 hours</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>0.8 mg every 6 hours Sub-lingual</td>
<td>Not recommended for children</td>
</tr>
<tr>
<td>Tramadol</td>
<td>50–100 mg every 6 hours</td>
<td>Not recommended for children</td>
</tr>
</tbody>
</table>

Rehabilitation
Once pain and swelling have subsided it is very important to start physiotherapy initially with static exercises. Muscle wasting leads to joint instability and recurrent bleeding in the joint, which can lead to chronic hemophilic arthropathy with synovial thickening and later destruction of the joint surface. In many patients, this can be prevented by physiotherapy.

The use of walking aids (crutches, cane) can also help speed recovery. Daily
exercise to improve muscle strength and maintain joint motion can greatly reduce the frequency and damage caused by joint bleeds.

**Chronic joint bleeds**

Once a patient develops recurrent bleeding episodes in a particular joint, permanent damage begins and worsens with each bleeding episode. In the early stages, the synovium becomes chronically inflamed and eventually hypertrophies, causing the joint to appear grossly swollen. If recurrent bleeding continues and is not controlled by other means, synovectomy should be considered. Radioisotopic synovectomy is the most effective and least invasive procedure. It has the fewest side effects and is done in an out-patient setting.

It also requires minimal, if any follow-up physiotherapy. Minimal clotting factor is required.

Management of life-threatening bleeds

Bleeding episodes in the head, neck, chest, and gastrointestinal and abdominal regions are potentially life-threatening and should be treated with factor concentrates immediately.

**Management of mucous membrane bleeds (gum bleeding and nose bleeds)**

Whenever a clot forms, the body attempts to break it down within the vessel so that blood flow can be restored. This process of clot breakdown called fibrinolysis is very active on mucous membrane surfaces. In people with hemophilia this process can prevent a bleed from stopping. Fibrinolysis can be inhibited by drugs, and of these tranexamic acid is the most widely used. Most mucous membrane bleeds can be controlled with the correct use of this agent. Since the drug is absorbed from the buccal mucous membrane and then secreted into the saliva, hemostasis is better achieved with a mouthwash than if the tablet is swallowed. Where the mouthwash is not available, tablets can be dissolved in 10 ml of water and the solution kept in the mouth for as long as possible and then swallowed. For an adult 1 g is administered every 6 hours and the dose for a child is 20 mg/kg.

Nose bleeds can be controlled by gently packing the nostril with gauze soaked in a solution of tranexamic acid made from the tablet as for gum bleeding. When the nasal bleeding has stopped the gauze must be thoroughly soaked with saline and gently removed. Bleeding will start again if the gauze is removed forcibly so it must be so well soaked with saline that it literally falls out on its own.

**Dental hygiene and extractions**

Patients with hemophilia in developing countries must recognize very early that dental hygiene is extremely important. Regular brushing of teeth twice daily, even if there is mild bleeding, will help to prevent dental caries.

Dental extractions can be performed with a single dose of 15 units/kg of factor VIII and tranexamic acid (see dose above) administered before and for 5 days after the extraction. Fibrin sealant can prevent bleeding after tooth extraction, reducing the need for clotting factor administration.

**Pharmacologic Options for Controlling Bleeding**

**Tranexamic Acid**

Tranexamic acid is an antifibrinolytic agent that inhibits the activation of plasminogen to plasmin. It promotes clot stability and is useful as adjunctive therapy in hemophilia. It is valuable in controlling bleeding from mucosal surfaces (eg, oral bleeding, epistaxis, menorrhagia) in hemophilia. (see ‘Management of mucous membrane bleeds’ section for dosage.) In a study by Sindet-Pedersen et al, 29 patients on oral anticoagulants following cardiac surgery were randomized: 19 received treatment with a 4.8% solution of tranexamic acid as a mouth wash and 20 received a placebo prior to dental extraction. There was only one episode of bleeding in the treated group compared to 10 episodes in the placebo group.14,15

**Fibrin sealant (glue)**

Fibrin sealant has hemostatic, sealing, and healing properties. It is made by mixing fibrinogen and thrombin, which mimics the last step in the blood coagulation cascade. A semirigid to rigid fibrin clot consolidates and adheres to the application site and acts as a fluid-tight sealing agent able to stop bleeding.16 Fibrin sealant can be used for dental extraction,17 circumcision,18 and to stop bleeding from mucous membranes. Commerciaaly available fibrin sealants (Tisseel – Baxter, Beriplast – Aventis) are prohibitively expensive at around US$130 for a 1-ml kit. However, it is possible to manufacture fibrin sealant in a local hospital.

**Box 2 | Cost-effective use of tranexamic acid to control oral bleeding in hemophilia**

1. Crush two 500-mg tablets in 10 ml of water.
2. Keep the solution in the mouth for as long as possible (approximately 5 minutes).
3. Swallow the solution.

For very young children the tablet can be made into a paste and applied directly to the site of bleeding.

**Box 3 | Cost-effective method for local manufacture fibrin sealant**

1. Seven ml of wet cryoprecipitate is taken with 3 ml of a 500 mg/10 ml solution of tranexamic acid in one syringe.
2. Bovine thrombin in 10 ml of water for injection concentration of 50–1000 units/ml is taken with 6 ml of calcium chloride and 100 mg of gentamicin in the other syringe.
3. The two syringes are fixed onto a dual delivery system which simultaneously injects the contents of both syringes to the bleeding/surgical site.
devise a simple delivery system and use cryogel precipitate and ‘manufacture’ fibrin sealant at a much lower cost.19

Calcium alginate
There are several hemostatic agents in the dry form. Sailors and seaweed collectors have known for ages of calcium alginate’s ability to stop bleeding and heal wounds. Calcium alginate is a polysaccharide that can be extracted from brown seaweed and made into fibers for swabs. When this material comes into contact with biological fluids, calcium alginate exchanges its Ca++ ions with Na+ ions from the blood and gels. Several studies have shown a hemostatic effect of this material, which can be used for epistaxis.

Desmopressin (DDAVP)
DDAVP is a synthetic analogue to the natural hormone arginine-vasopressin 1-deamino-8-D-arginine vasopressin (desmopressin). It causes release of von Willebrand factor (vWF) from endogenous stores in the endothelial cells and is effective in mild/moderate hemophilia and Type 1 von Willebrand disease (vWD) but is not effective in Type 2 and Type 3 vWD as there is no functional vWF. It is contraindicated in 2B and pseudo vWD. The main advantage is that it is inexpensive and there is no risk of blood-borne viral infections. The effect lasts for 6–8 hours and in a given patient is consistent on different occasions. It is available in intranasal or intravenous (IV) forms. IV preparation strength is 4 lg/ml and this can also be given subcutaneously with the same effect. There is a two- to sixfold increase in the vWF activity and factor VIII level within 15–30 minutes after administration. The usual dose is 0.2–0.3 lg/kg IV in a volume of 50-100 ml over 30 minutes. For subcutaneous injection it is given at the same dose with a volume of <1.5 ml/site. Two intranasal preparations are available: 100 lg/ml used for Diabetes Insipidus (no significant increase in vWF) and 1.5 mg/ml used in vWD (dispensed as 2.5 ml which contains 25 doses of 150 lg). The intranasal dose for patients <50 kg is 150 lg (one spray) and for patients over 50 kg ~ 300 lg (two sprays). Thirty minutes after administration, the bleeding time or closure time is to be checked to document the effectiveness. The intranasal dose produces an effect which is equivalent to the IV preparation. The main side effects of DDAVP include: flushing, fluid retention, hyponatremia, seizure activity in infants, thrombocytopenia in Type 2B and platelet type vWD, palpitations, and abdominal cramps. Tachyphylaxis may occur on repeated dosing. DDAVP should not be administered in people with coronary artery disease, elderly persons, and pregnant women. DDAVP can be used to control minor bleeds and to control menorrhagia in vWD. Tranexamic acid should be administered concomitantly since plasminogen activators are also released from the endothelial cells by DDAVP. The platelet closure time (PCT) may be a good way to monitor response to DDAVP in Type 1 vWD.20,21

Coagulation factor
Provision of some safe and affordable coagulation factor concentrates is essential for major bleeding and surgery. Life-threatening bleeds in the central nervous system, upper airways, etc. cannot be adequately managed without coagulation factor concentrates. Low dose strategies for surgery in developing countries have been shown to be effective with acceptable rates of bleeding. When the purchase of large amounts of factor is negotiated by governments in developing countries, it is possible to procure intermediate purity concentrates at a cost of US 10-20 cents per unit.

Cryoprecipitate and plasma
Cryoprecipitate, fresh frozen plasma (FFP), and cryo-poor plasma are the only affordable treatment options in many developing countries. However, they are usually not treated to eliminate blood-borne viruses. (It is possible to apply some forms of virucidal treatment to packs of FFP, and the use of treated packs is recommended.) Because of the risk of transmitting disease, the use of plasma and cryoprecipitate which has not been virally inactivated should be considered a temporary measure until adequate amounts of safe concentrates can be procured.

Danazol
In a study by Gradnik et al, 200 mg of danazol was administered three times daily to 4 adults, 2 with hemophilia A and 2 with hemophilia B. In those with hemophilia A, their factor VIII level rose from 1-3% to 3-8% and in those with hemophilia B the factor IX level rose from 5% to 14%. The level rose within 5-7 days and peaked at 7-13 days.22 This agent may be useful for short-term administration following a central nervous system (CNS) bleed when recurrence risk is high and for a target joint with recurrent hemarthrosis. It is also useful to control intractable uterine bleeding in females with vWD.

Prednisone
Macroscopic upper hematuria, i.e. originating from the kidneys, can be resolved with corticosteroids. This was shown in a series of cases in 1965, and there are also anecdotal positive experiences from other centres, however a more recent study failed to show any benefit of adding steroids to treatment with factor concentrate. Treatment can be given as prednisone 0.5 mg/kg bodyweight daily for 5 days, then 0.25 mg/kg for another 5 days. The advantages of prednisone compared to factor concentrates are the much lower cost and absence of renal colic from blood clots passing down via the ureter.

Aminoglycosides
Clinical severity of hemophilia depends on the nature of the underlying mutations. Nonsense mutations account for about 11.5% of all hemophilia A and B, resulting in a premature stop codon. In addition, 5% of the mutations are frameshifts that can possibly lead to a premature stop codon. A slight increase in factor level (>1% of normal coagulant activity) can result in marked clinical improvement. Aminoglycosides, such as gentamycin, can increase factor levels in patients with point mutations, especially those with nonsense/frameshift mutations due to premature stop codons. Aminoglycosides act by incorporation of alternative amino acids at stop codons, thereby producing some normal functional protein. The efficiency of ‘read through’ depends on the type of stop codon (TAA, TAG, TGA). Aminoglycosides have been proven effective in cystic fibrosis and Duchenne’s muscular dystrophy. At present they are being tried in hemophilia at a dose of 7.5 mg/kg/day for children and 5 mg/kg/day for adults for 14 days. Side effects include colonization with resistant organisms and renal and auditory toxicity. These have to
be monitored closely. These drugs may elevate factor levels in the short term to cover specific periods like physiotherapy after joint surgery. The use of aminoglycosides and similar small molecules is still experimental, only tested in mouse models and in limited clinical trials, and cannot be recommended for use outside of a clinical trial.

Conclusion
Even with a limited amount of coagulation factor concentrates, it is possible to improve the lives of people with hemophilia in developing countries through education, prevention, and ancillary care. National hemophilia societies in developing countries have a great role to play in increasing awareness, education, and family support of patients with hemophilia. Doctors and other health care providers can maximize care by coordinating a national plan for hemophilia services that emphasizes education, physiotherapy, laboratory diagnosis, and simple measures to manage bleeds, along with a supply of safe concentrates. This will go a long way to improving the lives of people with hemophilia in developing countries.

References
USING ICT TO PREVENT CARDIOVASCULAR DISEASE IN DEVELOPING COUNTRIES: THE ProCOR PROGRAMME

ARTICLE BY CATHERINE COLEMAN AND BRIAN BILCHIK

Abstract
CARDIOVASCULAR AND OTHER CHRONIC DISEASES THAT WERE ONCE SEEN AS DISEASES OF THE WEALTHY AND NOW MOVING INTO DEVELOPING COUNTRIES AND EIGHTY PERCENT OF CHRONIC DEATHS NOW OCCUR IN LOW- AND MIDDLE-INCOME COUNTRIES. THE ProCOR PROJECT IS DESIGNED TO SPREAD INFORMATION ABOUT CARDIOVASCULAR DISEASE TO HEALTH PROFESSIONALS WORKING IN THE DEVELOPING WORLD.

Cardiovascular disease (CVD) and other chronic diseases that were previously considered diseases of the wealthy have reached epidemic proportions in many developing countries and are rapidly emerging and escalating in others. Globally, the total number of people dying from chronic diseases is double that of all infectious diseases (including HIV/AIDS, tuberculosis and malaria), maternal and perinatal conditions, and nutritional deficiencies combined. Eighty per cent of chronic disease deaths occur in low- and middle-income countries. CVD affects people at a younger age in developing countries, adding to the already unaffordable burden of disease in countries whose economies are struggling to grow, decimating the workforce upon which development depends, straining inadequate health care budgets, and increasing poverty and disability.

Eighty per cent of cardiovascular disease is preventable
The causes of the current cardiovascular disease epidemic in developing countries are the same as in industrialized countries: decreased physical activity, increased tobacco use and consumption of processed foods that are high in salt, sugar and fats. As economies grow and as cultures are affected by globalization, fast food replaces traditional cuisine, people use cars rather than bicycling or walking, and tobacco is skillfully marketed to the most vulnerable populations.

The knowledge necessary to address the global CVD crisis has been amassed over the last several decades in regions where it emerged much earlier as the primary cause of death, and many countries have demonstrated that CVD can be successfully addressed. In the USA, UK, Australia and Canada, deaths from heart disease have decreased by 70% in the last 30 years. Finland reduced cardiovascular deaths by 65% between 1969 and 1995 through community-based interventions and policies that addressed risk factors. In Poland, deaths from CVD decreased by more than one third between 1991 and 2002.

A recent survey of global health by the Disease Control Priorities Project (DCPP) recommends several cost-effective interventions for low- and middle-income countries. Their key recommendations, called “Best Buys for Global Health,” include increasing taxes on tobacco products and regulating salt and saturated fat in manufactured foods. These strategies have been implemented and their effectiveness has been proven in many settings – they are ready to be adapted and adopted in others. But often health care providers and policy makers in developing countries are unaware of the toll that CVD is taking on their countries’ health, or what they can do to prevent it.

The time for prevention is now
Olusegan Obasanjo, President of the Federal Republic of Nigeria, recently stated, “We cannot afford to say ‘we must tackle other diseases first – HIV/AIDS, malaria, tuberculosis – then we will deal with chronic diseases.’ If we wait even 10 years, we will find that the problem is even larger and more expensive to address. Prosperity is bringing to our nation many benefits, but there are some changes that are not positive. As our diets and habits are changing, so are our waistlines. Already more than 35% of women in Nigeria are overweight; by 2010 this number will rise to 44%.”

‘A Race Against Time’, the landmark study on the health and economic consequences of cardiovascular disease in developing economies, provides compelling evidence for the need to take immediate effective steps to prevent “catastrophic” levels of CVD in the near future.
future. By 2020, mortality from ischaemic heart disease and stroke is expected to triple in Latin America, the Middle East, and sub-Saharan Africa; the rate of increase for Asian and Pacific Island countries is projected to be even higher.9

Sharing information is the first critical step

The first step in preventing cardiovascular and other preventable diseases is to communicate the latest knowledge and most accurate information to health professionals, policymakers and the public. Information is essential in order to raise awareness, shape intervention and strategy design, and motivate people.

ProCOR, a programme of the Lown Cardiovascular Research Foundation in Brookline, Massachusetts is a global health communication network that promotes knowledge-sharing to prevent cardiovascular disease in developing countries and other low-resource settings. ProCOR (www.procor.org) uses low-cost information and communication technologies to provide a forum in which health workers, public health professionals, community planners and policy makers around the world can share knowledge, experiences and questions to support each other in taking action to promote heart health in their own neighbourhoods or countries.

Access to relevant, accurate health information is potentially the single most cost-effective strategy for the prevention of cardiovascular disease, but most developing countries are cut off from advances in knowledge that can guide and inspire successful efforts to prevent CVD. Providers in developing countries practise health care in conditions of “information poverty” while health care professionals in rich countries are inundated with so much information they experience “information anxiety.” By the end of 2004, 14% of the world’s population was using the internet but a large digital divide separates developed and developing regions. Only 7% of the population in developing regions has internet access; the figure is less than 1% in the 50 least developed countries. (In contrast, more than 50% of people in developed countries have internet access.) Where internet access does exist, it is slow, expensive or unreliable. Few medical schools or hospital libraries can afford the high cost of journal subscriptions. Textbooks are out of date or simply don’t exist.10 Cost and international travel issues prohibit attendance at international and regional conferences. The little information that may be provided through presentations or printed material is generally provided by pharmaceutical or medical technology companies seeking new markets.

To address this lack of information and bridge the digital divide, ProCOR uses email to facilitate a “global dialogue” among network members from 100 countries who share information and experience. In addition, an international team of editors contributes expertise in preventive cardiology, women’s health, tobacco-related diseases, nutrition, diabetes and epidemiology. But ProCOR is not an electronic newsletter – it is an exchange through which information is offered, successes are shared, challenges are posed, sparks are struck and voices are heard.

For those who lack access to the web, email is an easy, quick and inexpensive way of obtaining information. ProCOR sends messages in plain text, without attachments, so file size and download time are minimal. Emails can be accessed at a public internet café or on a shared hospital computer in just a few seconds. Relevant information is selected, saved, printed, sent on to colleagues and incorporated into lectures and presentations. One of ProCOR’s email network members reported, “Now I am able to store and forward messages most relevant to particular groups of interest who may not have internet access.” Through this multiplier effect, ProCOR reaches people in other electronic networks as well as those who have no access to technology. A recent survey by SatelLife11, which administers ProCOR’s email database, estimated that each message that is sent ultimately reaches between 5,000 and 30,000 people. Where a telephone service is unavailable or unreliable and web access nonexistent, email makes it possible to connect with colleagues regardless of location and offers the opportunity to make one’s voice heard globally, as well as to listen to other global voices.

Subscribing to ProCOR’s news and discussion forum is free and open to anyone interested in promoting heart health by sending an email message to procor-join@healthnet.org.

Information and discussion are simultaneously posted on ProCOR’s website (www.procor.org), which is a repository for all email postings as well as a wide range of documents and resources. The website serves an average of 16,000 visitors – approximately 150,000 hits – each month. Online visitors can post content and comments, which are simultaneously distributed to the email network. This provides a bridge between people who only have email and those who primarily utilize the web or who use both equally. ProCOR is interactive and omni-directional. Anyone can contribute content. ProCOR is a way for researchers whose work is too localized or too new – research that’s invisible among the major medical journals – to share their discoveries. People can pose questions or debate issues, and discussion is moderated and guided by a policy that ensures integrity of purpose as well as a high standard of relevant, reliable and timely content.

In addition to providing access to information about cardiovascular disease, ProCOR offers access to a community of practitioners who are committed to prevention, often in environments where prevention is not on the agenda. As one physician recently noted, “Through ProCOR I gain not only important knowledge and connectedness with peers around the world but also a sense of hopefulness that far-reaching and necessary health policy reforms can be achieved”.

Meeting information needs with emerging communication technologies

The potential of communication technology continues to grow, although it is as yet mainly untapped. Compact,
affordable technologies such as mobile phones and wireless devices are being adopted in developing countries in lieu of fixed-line telephones and desktop computers. Informational resources, many of them free, are being developed and published in a range of electronic formats such as PDFs and CD-ROMs. An international community of health communicators continues to grow, and access to health care information has become a key international development issue.13

ProCOR is launching a four-year project to assess new ways of increasing health professionals’ access to information about cardiovascular disease that they can translate into action in their local clinics and neighbourhoods. Working collaboratively with physicians, community health nurses, medical students and health information providers in Kumasi, Ghana, ProCOR will identify barriers to accessing information as well as factors that motivate busy health workers to seek and apply new knowledge and incorporate prevention into their practice. Based on what is learned, a communication strategy will be developed that will facilitate knowledge sharing among local, regional and global colleagues. The appropriateness of emerging communication technologies such as PDAs (personal digital assistants), mobile phones, and wireless connectivity will be assessed together with the relative merits of traditional channels of access, such as print materials, CD-ROMs and direct personal communication.

ProCOR is also joining with other international, national and local organizations to support the Health care ‘Information for All by 2015’ (HIFA2015) campaign13 which is being launched by the Global Healthcare Information Network14 and the Association for Health Information and Libraries in Africa (AHILA)15 to promote coordinated, collaborative efforts “towards a future where every person has access to an informed health care provider”. HIFA2015 will bring together health care providers, producers of health reference and learning materials, librarians and information professionals, health researchers, policy makers, development workers and the general public. The HIFA2015 Campaign will be launched at the 10th biennial AHILA congress in Mombasa, Kenya, 23–27 October 2006.

One of the key recommendations of WHO’s World Report on Knowledge for Better Health is that “both published and unpublished research and information should be accessible and shared with a range of potential decision makers in an appropriate format”.16 Networks filter and organize information, increase the visibility of critical issues, and provide relevant resources in cost-effective and accessible ways.17 They play a critical role in connecting people and, equally important, in linking research, policy and practice. ProCOR is a network that strives to link to countless other networks, large and small, localized and international, that are similarly committed to promoting health.

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References

13. See http://www.ghi-net.org/campaign
15. See http://www.ahila.org
UNITE FOR DIABETES: THE CAMPAIGN FOR A UN RESOLUTION

ARTICLE BY MARTIN SILINK

IN 2003, A 16-YEAR-OLD GIRL WITH DIABETES HAD AN IDEA WHICH LOOKS SET TO CHANGE THE FACE OF DIABETES. NOT LONG AFTER HIS ELECTION AS PRESIDENT-ELECT OF THE INTERNATIONAL DIABETES FEDERATION, MARTIN SILINK WAS APPROACHED BY CLARE ROSENFELD, WHO SPOKE OF HER DREAM OF A UNITED NATIONS RESOLUTION ON DIABETES. INSPIRED BY CLARE’S DREAM, MARTIN SILINK SPENT THE SUBSEQUENT TWO YEARS GAUGING THE OPINION OF THE DIABETES STAKEHOLDERS AND GARNERING WORLDWIDE SUPPORT FOR A UN RESOLUTION. HE APPROACHED SENIOR FIGURES FROM THE DIABETES WORLD IN MORE THAN 30 COUNTRIES. THE SUPPORT WAS OVERWHELMING AND THE FEELING WIDESPREAD – NOW IS THE TIME FOR THE RESOLUTION.

THE OUTCOME OF A KEY STAKEHOLDER’S MEETING IN DECEMBER 2005 WAS A DECISION THAT THE CONCEPT WAS REALISTIC AND THE CAMPAIGN ACHIEVABLE. THE AUTHOR OFFERS THIS UPDATE ON THE IDF CAMPAIGN TO BRING DIABETES OUT OF THE SHADOWS AND FOR THE GLOBAL COMMUNITY TO RECOGNIZE THE ENORMITY OF THE DIABETES PANDEMIC.

Abstract

Diabetes is a global epidemic. Since the turn of the new millennium, the number of people with the disease has doubled. More than 230 million people worldwide are living with diabetes. Within 20 years, this number is expected to rise to a staggering 350 million. But despite the warning signs, governments have been slow to act. If steps are not taken to constrain the diabetes pandemic, the number of people living with the disease will soon be greater than the current populations of the USA, Canada and Australia combined. Left unchecked, this will bring devastating human and economic consequences.

Each year, more than 3 million people die from diabetes-related causes – diabetes kills every 10 seconds. Whilst the greatest rise is in type 2 diabetes, all types of diabetes are increasing. The diabetes burden is particularly harsh in the developing world, where poverty, environmental factors and the scarcity of services conspire to worsen access to healthcare. In low-income countries it is depressingly common for children with diabetes to die because they lack access to life-saving insulin. Most families in developing regions pay for their healthcare out of the household budget. In many cases, the cost of caring for a loved one with diabetes drives families into poverty.

In low-income countries, many children die because they lack the insulin they need to live.

Indeed, diabetes threatens to undermine economic development worldwide as a consequence of the spiralling costs of medical care. In 2007, the world will spend an estimated US$215 to 375 billion on care for people with diabetes and its complications. This figure is set to rise to between US$234 billion and 411 billion over the next 20 years. It has been estimated that over the next 10 years China alone will lose US$558 billion as a result of premature deaths from diabetes, heart disease and stroke.

Diabetes is growing fastest in low- and middle-income countries; soon, almost 80% of all people with diabetes will live in developing countries. These emerging economies will therefore bear the brunt of the rising costs. Already, seven out of the 10 countries with the highest number of people living with diabetes are in the developing world.

IDF believes that to do nothing in the face of the emerging crisis, to ignore its seriousness, or to dismiss its impact would be foolhardy and irresponsible. It is time for governmental, non-governmental and commercial agencies to tackle the educational, behavioural, nutritional and public-health issues that are driving the diabetes epidemic.

To dismiss the impact of the diabetes epidemic would be irresponsible.

“Unite for Diabetes”

Concerted action is needed now; to do nothing is not an option. We have the cost-effective strategies to prevent or delay the onset of diabetes complications. It is time for governments to act. IDF has therefore initiated a worldwide campaign, “Unite for Diabetes”, to have the United Nations and its Member Nations recognize the global burden of diabetes.

This global campaign, which was launched recently at the Scientific Sessions of the American Diabetes Association in Washington DC, USA calls on governments to pay immediate attention to the enormity of the problem and take action to reverse the current trends. IDF will release new European diabetes data to support the campaign at the meeting of the European Association for the Study of Diabetes
Copenhagen, September 2006.

IDF is working to bring together the entire global diabetes community – people living with diabetes and their families, diabetes associations, aligned organizations and industry partners – to raise awareness of diabetes and the need for action. Together, we are calling for a United Nations Resolution on diabetes as a way to attract the attention of all potential agencies of change.

The “Unite for Diabetes” campaign seeks a UN Resolution on diabetes to be proclaimed on World Diabetes Day (November 14) 2007.

A UN Resolution on diabetes

An increased focus on diabetes by the global community has the potential to change the face of the disease. But reversing the current trend is not just a health issue. In order to tackle the global diabetes epidemic it will be necessary to take action that goes beyond the scope of national healthcare authorities or even single states. It will require a whole-of-government approach and the attention of the international community. A UN Resolution on diabetes will raise awareness among policy decision makers of the global public health challenge at their door.

But the declaration of the Resolution itself will be ‘just the beginning’; the outcomes will include:

- increased global awareness of diabetes;
- greater recognition of the human, social and economic burden of diabetes;
- the repositioning of diabetes as a health priority in individual nations;
- the implementation of cost-effective strategies to prevent diabetes complications;
- affordable public-health strategies for the prevention of diabetes itself;
- recognition of ‘special needs’ groups (children, pregnant women, elderly people, indigenous groups, migrant people from developing nations);
- increased research towards a cure.

Working towards a Resolution

A UN Resolution requires the support of at least one UN Member State as a sponsoring country. This country will draft the Resolution. The proposed Resolution then requires 45 supporting UN Member States to act as signatories. It will then be tabled as an agenda item for discussion at the UN General Assembly and dealt with by the Assembly’s Third Committee, which convenes to discuss matters related to humanitarian issues and health. If there is enough support for the Resolution at this point, it can be passed without the need for a vote in the General Assembly. Otherwise a formal majority vote of the UN’s 191 Member States would be required.

A dual approach

The strategy to ensure sufficient support for the Resolution combines a top-down approach and a bottom-up approach. The top-down approach seeks to use diplomatic means to approach each UN Member State and secure a majority vote in the General Assembly or a consensus vote in the Third Committee.

The diplomatic efforts have already yielded results: support for attaining a UN Resolution on diabetes is widespread and a number of strategically important countries have expressed their interest in supporting the Resolution. One country recently translated its support into a commitment to act as sponsoring Member State for the Resolution. Appeals are being made to others to formally join the initiative.

The bottom-up approach consists of an awareness-raising campaign that will reach one billion people worldwide and draw attention to the seriousness of diabetes, its complications and the need for a UN Resolution to reverse the growing diabetes epidemic. This bottom-up approach will work through existing diabetes networks and the global media.

We are engaged in an awareness-raising campaign that will reach one billion people worldwide.

At international level, governments are urged to join the “Unite for Diabetes” campaign by publicly declaring their support for the UN Resolution on diabetes, thereby recognizing the human, social and economic burden of the disease, particularly on low- and middle-income countries. At regional level, governments are encouraged to take concerted action with other like-minded states to build up strong regional alliances to combat the diabetes epidemic and improve diabetes care.

A blue circle of life

The “Unite for Diabetes” campaign, the most significant global diabetes awareness campaign ever undertaken, will be represented by a simple blue circle. The icon, which is designed to be easily adapted and widely adopted, represents unity in diabetes and symbolizes support for the campaign for a UN Resolution.

The significance of the circle is overwhelmingly positive. Across cultures, the circle can symbolize life, mother earth and health. Most significantly for the campaign, the circle symbolizes unity. Our combined strength is the key element that makes this campaign so special.

The blue border of the circle reflects the colour of the flag of the UN – in itself a symbol of unity amongst nations. Indeed, the UN is the only organization that can signal to governments everywhere that it is time to fight diabetes and reverse the global trends that will impede economic development and cause so much suffering and premature death.

Our combined strength makes this campaign so special.

Inform, motivate, mobilize

A critical factor in our success will be communications. IDF will inform, motivate and mobilize the global diabetes community in the campaign for the UN Resolution itself, and target the general media soon thereafter. Press kits and advocacy kits have been produced and are available for organizations wishing to join the global campaign. An IDF UN Resolution website has gone live. Visit www.unitefordiabetes.org and find out what you can do to support the campaign.

Through public debate, the media and educational campaigns, awareness of the seriousness of diabetes and its complications can be raised among civil society. IDF calls on everyone to unite for diabetes and join the campaign to secure a UN Resolution on diabetes that will provoke multi-governmental action to improve the prevention and treatment of diabetes and will inspire medical science in its quest for a cure.

Authors

Martin Silink is Professor of Paediatric Endocrinology at the University of Sydney and the Children’s Hospital Westmead, Australia. He is President-Elect of IDF and leads the campaign for a UN Resolution on diabetes.
A REVIEW OF CONFOCAL LASER ENDOMICROSCOPY

ARTICLE BY RALF KIESSLICH AND MARKUS F NEURATH

Abstract

CONFOCAL LASER ENDOMICROSCOPY IS A NEWLY INTRODUCED ENDOSCOPIC TOOL, WHICH ENABLES CONFOCAL MICROSCOPY OF THE MUCOSAL LAYER DURING ONGOING ENDOSCOPY. DIFFERENT TYPES OF TISSUE AND DISEASES CAN IMMEDIATELY BE DIAGNOSED AND WILL FACILITATE EARLY DIAGNOSIS OF GASTROINTESTINAL CANCER. THIS REVIEW SUMMARIZES THE CURRENT TECHNICAL STATUS AS WELL AS DEVELOPED AND DEVELOPING INDICATIONS OF ENDOMICROSCOPY.

Gastroenterologists still rely on the results of histological diagnosis. Suspicious areas identified during endoscopy should be targeted, biopsied or endoscopically removed. However, white-light endoscopy with biopsies can be associated with several disadvantages, including bleeding or infection. Non-representative biopsies can miss relevant portions and may result in an underestimated diagnosis. Furthermore, random sampling of biopsies can be time consuming. Recently, confocal laser endomicroscopy was developed which enables online, in vivo microscopy of the mucosal layer. Here, a miniaturized confocal microscope is integrated into the distal tip of a conventional endoscope. In vivo histology at high resolution becomes possible and changes in vessel, connective tissue and cellular-subcellular structures can be evaluated during ongoing endoscopy.

Principles of confocal microscopy

Confocal microscopy allows a better spatial resolution compared with conventional fluorescence microscopy, because images are not contaminated by light scattering from other focal planes. A low power laser is focused to a single point in a defined microscopic field of view and the same lens is used as both condenser and objective folding optical path. Thus, the point of illumination coincides with the point of detection within the specimen. Light emanating from that point is focused through a pinhole to a detector and light emanating from outside the illuminated spot is rejected from detection. Illumination and detection systems are at the same focal plane and termed as “confocal”. All detected signals from the illuminated spot are captured and measured. The created greyscale image is an optical section representing one focal plane within the examined specimen.

Recently, a unique miniaturized design employing a single optical mode fibre acting as both the illumination point source and the detection pinhole became possible (Optiscan, Notting Hill Australia). The confocal laser microscope (EC-3870CIFK; Pentax, Tokyo, Japan) integrated in the distal tip of a conventional video endoscope enables in addition to standard video imaging...
Confocal imaging at high resolution is possible using exogenous fluorescence technique. Potentially suitable agents are fluorescein, acriflavine, tetracycline or cresyl violet.

Confocal imaging at high resolution is possible using exogenous fluorescence technique. Potentially suitable agents are fluorescein, acriflavine, tetracycline or cresyl violet. The most common contrast agents are acriflavine hydrochloride (0.05% in saline; topical use only) or fluorescein sodium (5–10 ml of a 10% solution; intravenous application). Confocal imaging following the staining with acriflavine hydrochloride and fluorescein sodium shows the characteristic morphology of mucosal layer at high resolution (see Figure 1). During laser endoscopy a compact, solid state laser delivers an excitation wavelength of 488 nm. The confocal image data are collected at a scan rate of 0.8 frames/sec (1024x512 pixels) or 1.6 frames/sec (1024x1024 pixels). The optical slice thickness is 7 µm with a lateral resolution of 0.7 µm (field of view 475x475 µm). The range of the z-axis is 0–250 µm below the surface layer.

**Contrast agents**

Confocal imaging at high resolution is possible using exogenous fluorescence technique. Potentially suitable agents are fluorescein, acriflavine, tetracycline or cresyl violet. The most common contrast agents are acriflavine hydrochloride (0.05% in saline; topical use only) or fluorescein sodium (5–10 ml of a 10% solution; intravenous application). Confocal imaging following the staining with acriflavine hydrochloride and fluorescein sodium shows the characteristic morphology of mucosal tissue. Whereas topicaly used acriflavine hydrochloride strongly labels the superficial epithelial cells including nuclei, intravenous applied fluorescein sodium distributes throughout the entire mucosa with a strong contrast within the connective tissue and the capillary network (see Figure 2).

**Confocal imaging of colon pathology**

In a recent published study using the newly developed endomicroscopic system, 42 patients with indications for screening or surveillance colonoscopy after previous polypectomy underwent in vivo endomicroscopy with the confocal laser endoscope. The aim of the study was to assess in vivo histology during ongoing colonoscopy in order to diagnose intraepithelial neoplasias and colon cancer. Fluorescein-guided endomicroscopy of intraepithelial neoplasias and colon cancers showed tubular, villous or irregular architecture with a reduced number of goblet cells. Furthermore, irregular vessel architecture with leakage of fluorescein characterizes neangiogenesis in neoplasms.

A simple confocal pattern classification based on the initial experience with confocal endomicroscopy was developed for differentiation between neoplastic and non-neoplastic tissue. Macroscopic and microscopic images were taken together to immediately predict histopathology. Finally, a total of 13,020 confocal images from 390 locations were compared with the histological data from 1,038 biopsies. It was possible to predict the presence of neoplastic changes using the newly developed confocal pattern classification with a sensitivity of 97.4%, specificity of 99.4% and accuracy of 99.2%, respectively (see Figure 3).

**Ulcerative colitis**

It is impossible to examine the whole surface of the colon in the endomicroscopic mode. Thus, it is important to combine endomicroscopy with chromoendoscopy in patients who have ulcerative colitis (UC). Panchromoendoscopy with either methylene blue or indigo carmine is a valid diagnostic tool to improve the diagnostic yield of intraepithelial neoplasia by using the SURFACE guidelines. Chromoendoscopy unmasks circumscript lesions and chromoscopic guided confocal laser endomicroscopy can be used to predict intraepithelial neoplasias with high accuracy. Thus, targeted biopsies of relevant lesions can be performed and rapid confirmation of neoplastic changes by confocal laser endoscopy during colonoscopy may lead to significant improvements in the clinical management of UC patients.

In the first randomized trial concerning endomicroscopy 153 patients with long-term ulcerative colitis in clinical remission (SURFACE guidelines) were randomized at a 1:1 ratio to undergo conventional colonoscopy or panchromoendoscopy using 0.1% methylene blue in conjunction with endomicroscopy to detect intraepithelial neoplasia or colorectal cancer. Circumscript lesions in the colonic mucosa detected by chromoendoscopy were evaluated with endomicroscopy for cellular and vascular changes according to the confocal pattern classification to predict neoplasia. Targeted biopsies of the examined areas were performed and
Histologically graduated according to the WHO and new Vienna Classification.

In the standard colonoscopy group randomized biopsies every 10 cm between the anus and caecum and targeted biopsies of visible mucosal changes were performed. Primary outcome analysis was the histological diagnosis of neoplasia. Using chromoendoscopy in conjunction with endomicroscopy (80 pts; average examination time: 42 minutes) significantly more intraepithelial neoplasia could be detected (19 versus 4; p=0.007) as with standard colonoscopy (73 pts; average examination time: 31 minutes). Endomicroscopy revealed different cellular structures (epithelial and blood cells), capillaries and connective tissue limited to the mucosal layer. 5,580 confocal images from 134 circumcision lesions were compared with histological results from 311 biopsies. The presence of neoplastic changes could be predicted with high accuracy (sensitivity: 94.7%; specificity: 98.3%; accuracy: 97.8%)19.

Confocal imaging of upper GI tract

Barrett’s oesophagus

An established premalignant condition in patients with gastroesophageal reflux disease is Barrett’s oesophagus and most adenocarcinomas of the distal oesophagus have been shown to arise in this condition. Endomicroscopy offers the possibility to macroscopically identify columnar lined lower oesophagus (CLE) in the distal oesophagus and microscopically identify goblet cells within the distal oesophagus. Thus, an immediate reliable diagnosis of Barrett’s oesophagus becomes possible.

In an endoscopic study with 63 patients, different types of epithelial cells could be distinguished and cellular and vascular changes could be detected by fluorescein-guided endomicroscopy20. According to the comparison of in vivo and conventional ex vivo histology a classification for the graduation of confocal images for the diagnosis of Barrett’s epithelium and Barrett’s associated neoplasias was developed distinguishing three types of epithelium (gastric epithelium, Barrett’s epithelium with or without neoplastic changes).

In a recent published study21 156 areas (3,012 confocal images) within distal esophagogastroduodenoscopy (EGD) were re-assessed according to a newly developed Confocal Barrett Classification and compared with histological results of the targeted biopsies (411 biopsies). This comparison showed that Barrett’s oesophagus could be predicted by the help of confocal endomicroscopy with a sensitivity of 98.1% and a specificity of 94.1%, respectively (accuracy: 96.8%; positive predictive value 97.2%; negative predictive value 96.0%). Moreover, Barrett’s associated neoplastic changes could be predicted with a sensitivity of 92.9% and a specificity of 98.4%, respectively (accuracy: 97.4%; positive predictive value 97.2%; negative predictive value 96.0%).

Endomicroscopy can be used to diagnose goblet cells within CLE (C, D, arrows). Goblet cells can be identified due to black dots (mucin) incorporated into single columnar cells. Endomicroscopic guided biopsies can be performed, because of the closeness of the working channel and the confocal microscope at the distal tip of the endoscope.

**Figure 4: Barrett’s oesophagus**

Helicobacter pylori

Endomicroscopy allows for the first time in vivo diagnosis of Helicobacter pylori in humans22. Single as well as accumulated white dots could be observed within the gastric mucosa after topical application of acriflavine onto the gastric surface. The distinct shape and size including the flagella could be identified. Helicobacter pylori infection was proved by histology and culture. Further, ex vivo examination of cultures showed an active uptake of acriflavine by Helicobacter pylori.

**Conclusion**

In vivo confocal laser endomicroscopy is a newly developed diagnostic tool enabling virtual in vivo histology of the mucosal layer during ongoing endoscopy. The quality of new detailed images seen with confocal laser endomicroscopy are unequivocally the beginning of a new era where this optical development will allow a unique look on living cells and cellular structures at and below the surface of the gut. It is tempting to speculate, that...
endomicroscopy will play an important diagnostic role in the future during gastrointestinal endoscopy for early diagnosis of gastrointestinal cancer.

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References
HOW TO AVOID NEEDLESTICK INJURIES

Article by Lutz Buchholz

Abstract

More than 750,000 employees of the health care system in Germany working in hospitals are prone to the risk of cuts and needlestick injuries. Their risk of coming into contact with infectious patients is also increased. There is no doubt that employees of the healthcare system are in danger of contracting an infection because of their work (e.g. nursing, laboratory work, medical services) and that they may come into contact with germs which are transmitted via blood because of the increasing use of invasive methods. Each year about 500,000 needlestick injuries occur in Germany although the legislation concerning health and safety at work (Arbeitsschutzgesetz ARBSCHG) demands that health and safety regulations according to the latest practices, occupational medicine and hygiene must be applied. But only 13 to 50% of all cases are reported. The affected persons who did not report their injury argued frequently that they thought the injury was unimportant or that there was a lack of time.

Needlestick injuries are stab, cut and scratch injuries of the skin caused by pointed or sharp objects (e.g. needles, knives etc.) polluted with potentially infectious material which may cause severe infectious diseases.

Infectiousness

Infectious material may enter the body of an employee through a puncture wound caused by a sharp or pointed object during work (see Figure 1). The risk of an infection via blood depends on the amount of transferred blood and the concentration of viruses in the blood. Blood volumes of about 1µl are usually transferred during a typical needlestick injury. Latex gloves (as used for transdermal administration) protect against blood and body fluids on the outside of a needle, but not against blood inside the needle or the risk of infection!

One ml of blood from a patient infected with hepatitis B may contain up to 1,014 viruses. Theoretically 1 µl of blood from a patient infected with hepatitis B might infect several thousand people!

Serological studies in hospitals showed that the patients (who are the source for germs transferred by needlestick injuries) possessed significantly more relevant germs (HBV, HCV, HIV) in their blood. Thus, quick and decisive action is absolutely necessary after contact with blood caused by a needlestick injury (this is an “immunological emergency”).

Who is in danger?

Needlestick injuries in the health care system can be divided in two groups: in the area of residential care (mainly injuries with needles) and in the area of dentistry and surgery (not only injuries with needles but also injuries caused by pointed, sharp and rotating instruments).

We should bear in mind that not only persons with direct contact to patients (like physicians and nurses) are in danger, but also medical technicians and cleaners (see Figure 2).

Although information about the source of infections and injuries may reduce the risks in clinical everyday life, the risk of an infection via blood (HBV, HCV, HIV) depends mainly on the number of infected patients within an institution, on the type of germs and on the frequency of blood contact with these germs (dependent on the working conditions). Although several precautionary measures such as gloves,

70% of all needlestick injuries (NSI) are in:
• the surgery
• the internal clinic
• the head clinic

Main risk of application: venous blood drawing (38%)

Only 20–50% of all NSI are reported

Most NSI are in patient rooms (54%)

Figure 1: Clinical risk of infection
Values in health are ubiquitous. They frame European debates and shape evidence that informs health policy and goals.

**Figure 2: Who gets needle injuries**  
(Heidelberg University Clinic 2002)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors</td>
<td>40%</td>
</tr>
<tr>
<td>Nurses</td>
<td>34%</td>
</tr>
<tr>
<td>Cleaners</td>
<td>6%</td>
</tr>
<tr>
<td>Others</td>
<td>15%</td>
</tr>
<tr>
<td>Lab personnel</td>
<td>4%</td>
</tr>
</tbody>
</table>

Protective masks, goggles and a safety needle box could minimize contact with blood and body fluids, the number of accidental contacts remains unchanged. Needlestick injuries are usually not caused by inappropriate behaviour. More important are working conditions, working practices and equipment. The practice of putting needles back into their cap (recapping) is very risky, as is the disposal of pointed or sharp objects into bin liners or vessels which may be punctured. Needlestick injuries and stumble injuries are the most common injuries in the health service in Germany. Thirty-six cases of hepatitis B, 93 cases of hepatitis C and three cases of HIV were classified as occupational diseases in 2004 by the professional association Hauptverband der gewerblichen Berufsgenossenschaften (HVBG).

**Preventive measures**

Protective measures against needlestick injuries are:

- medical check-ups in occupational medicine including vaccinations (e.g. hepatitis B vaccination) for all employees;
- technical measures such as instruments with needle protection and appropriate waste bins which can’t be penetrated;
- organizational measures such as optimizing working techniques (e.g. avoiding recapping) or giving instructions and establishing an internal report system.

The best protection is to avoid the possibility of pricks and cuts. For most applications a technique without needles is not possible so the main goal must be to protect people from needlestick injuries. To reach this goal a compulsory and reliable separation of the tip of the needle and the person is necessary.

Almost all needlestick injuries outside the area of surgery (and so almost all nosocomial infections caused by germs transmitted via the blood) can be avoided by the use of safety products. A variety of instruments for transdermal interventions with a significantly lower risk of stab and cut injuries are available now. These so-called safe instruments use very different mechanisms, such as foldable shields, retractable needles (springs retract them inside the housing) and de-sharpening mechanisms that render a used instrument innocuous immediately after use.

In many hospitals and other health care facilities the method of dealing with needlestick injuries and the use of safe instruments is not sufficiently arranged. In Germany a system for reporting needlestick injuries was not established until autumn 2003. Any blood and mucosa contacts and all transdermal injuries should be reported as accidents at work, but in practice these reports are not made because of a subjective estimation of the danger. Prospective studies showed that 40 to 90% of accidents at work (depending on the area of work) are not reported. Furthermore, many reported cases do not appear in accident statistics (provided by insurance companies) in Germany because the statistics include only accidents which prevent attendance at work for more than three days. But with most needlestick injuries this is not the case. In 2002 in Germany, 978 cases of occupational infection diseases were reported to the professional association for health services and social work (Berufsgenossenschaft für Gesundheitsdienst und Wohlfahrtspflege) and 643 cases to public insurance companies for accidents (Unfallversicherungsträger der öffentlichen Hand).

**Legal position**

On 6 November 2000 the “needlestick safety and prevention act” was signed in the USA. Several studies in the USA showed that the number of needlestick injuries greatly decreased (80% and more) after the introduction of safe instruments (Gartner 1992; Yassi et al. 1995; Lawrence et al. 1997). The legal position for corresponding health and safety regulations in Germany are the legislation concerning health and safety at work (Arbeitsschutzgesetz ArbSchG).

![Figure 3: Reported NSI in Heidelberg clinics (%)](image)
Employees who were trained before and during the interventional study had a much better opinion about safe needle protection systems than employees with little or no training (who had no training because of official or private reasons).

of examinations and the loss of working hours. The costs of a reported needlestick injury are about 300 € at the University Clinic Heidelberg. The costs for insured employees in the health care system (according to model calculation) lie between 300 to 600 € dependent on the rate of hepatitis B vaccination (Wittmann et al. 2005). There are about 500 cases of needlestick injuries at the University Clinic Heidelberg and this produces costs of about 150,000 € a year. In Germany the main part of these costs (mostly serological tests) is nowadays refunded by accident insurance, but about one third of the costs (inability to work, medical services) remain with the clinic. The only way to reduce the costs of occupational nosocomial infectious diseases (in terms of the national economy) is the general use of safe needle protection systems according to the results of the Heidelberg and international studies.

Prospect

Two data sources are available in Germany to estimate the number of occupational HBV, HCV and HIV infections within medical employees: reports according to infection protection regulations (Infektionsschutzgesetz IfSG) and reports about suspected occupational diseases according to the seventh social welfare statute book (7. Sozialgesetzbuch). In the late 20th century many preventive measures were established to avoid or reduce needlestick injuries. Their main objectives are better instruction on “recapping” (by accident insurance companies) and improvement of protection by vaccination (by company doctors for employees in the health service sector). These preventive measures have been improved mainly by the 1999 introduced biological safety regulation (Biostoffverordnung BioStoffV) according to which employees who work with blood must be offered a free vaccination against hepatitis B.

In addition to this the employer must take preventive measures according to the state of practices when working with blood. In Germany the main source for preventive measures since autumn 2003 has been the technical regulation for biological working material (Technische Regel für Biologische Arbeitsstoffe TRBA 250). It offers obligatory guidelines and regulations about the compulsory registration and the disposal of pointed, sharp and breakable instruments. Furthermore it demands that needles, indwelling devices etc. in dangerous areas must be replaced by safe instruments with less or no danger of stab and cut injuries. The basis of this requirement to acquire safe instruments are the good experiences in the USA following the introduction of the “needle act” in November 2000 and the results of current national and international studies.

At present the European Commission is developing new directives about the dangers of infections. Measures for improving safety at work will only succeed if the concerned persons are conscious about avoiding dangers and if safe needle protection systems which do not hinder working routines are available and affordable.

Measures to reduce the danger of needlestick injuries should be understood as an employer’s obligation to provide for the welfare of his employees and should be applied independently from the actual legal position! In the USA and the UK it could be shown that the number of accidents decreased significantly after the introduction of “safe instruments”. Also in Germany a one-year intervention study (starting in June 2003) – a cooperation between the University Clinic Heidelberg and the department of occupational medicine of the regional health agency of Baden-Württemberg – showed a significant reduction in needlestick injuries. Through the use of safe needle protection systems which fulfil the NIOSH criteria and which are available on the national and international market already, the amount of nosocomial infectious diseases can be minimized or avoided. In the future the most important factor for cost reduction and prevention of occupational diseases caused by needlestick injuries will be the widespread provision of safe needle protection systems. Ultimately, in this area of medicine the following sentence (not only under the point of quality management) is true: PRECAUTION is cheaper than AFTERCARE.

Author

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From 1975 to 1982 he was Scientific Assistant in the Department of Social Medicine/Myocardial Infarction Centre in Heidelberg. Research skills during this time were prevention of risk factors for cardiovascular diseases in communities.

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**HOSPITAL LABORATORIES AT THE CROSSROADS: TIME FOR REBRANDING**

**ARTICLE BY CHRISTOPHER P PRICE**

**Abstract**

Research has contributed a wealth of knowledge and innovation in the laboratory services that healthcare services are now challenged by how to use them effectively. The contrasting opportunities of laboratory automation and miniaturization for point-of-care testing mean that testing services can be provided anywhere. The challenge for the future is to ensure that the right test is provided to the right patient, at the right time, and that the right clinical action is taken.

The radical changes that are taking place in the ways that health care services are being managed, and delivered, apply equally to “laboratory services”. In looking to the future it is worth briefly looking back at the way services have evolved.

**What are “laboratory services”?**

All diagnostic services began at the bedside and as our understanding of the science of disease developed, so did our knowledge of how to study and measure constituents of the body that appeared to change with the development, and healing, of disease. Pathology, often regarded as the face and name of “laboratory services” became a laboratory subject or service as health care evolved away from the home environment, with the development of hospitals – and laboratories. Laboratories became synonymous in their existence with hospitals.

However, it would be quite wrong, especially today, to consider “laboratory services” as solely being involved with the analysis of body tissues and fluids for the diagnosis of disease. Firstly, it is claimed that 70–80% of a patient’s record comprises laboratory results, but a high proportion of these results are not involved in making a diagnosis but in managing the subsequent treatment of the condition e.g. diabetes mellitus and heart failure. Furthermore, and increasingly, many of these results come from primary care physicians i.e. outside the hospital setting. Secondly, an increasing proportion of “laboratory tests” are performed outside the laboratory e.g. in the Emergency Department, in the Operating Room or on one of the Intensive Care Units, as well as in the community environment. Thirdly, as the number of tests available increases, along with the associated knowledge of their relevance to patient care so clinicians become more dependent on the laboratory professional to support the clinical team by advising on the appropriate choice of test, on the meaning of the result, and sometimes on what action to take. Thus the laboratory professional has become a member of the clinical team caring for the patient; laboratory professionals are now involved in direct patient care.

**Is the laboratory a core service and where is it best provided?**

Many of the non-clinical services are now outsourced e.g. payroll management, facilities management. In the case of “laboratory services” there has been a trend for outsourcing over the past few years, with the USA and Australia leading the way, whilst the pace of change is increasing in many other countries as well. There are two aspects to this (i) having the service provided and managed by another organization, and (ii) having parts of the service provided at an offsite facility. To take the second point first, it is impossible to provide all the hospital laboratory services offsite because some of the test results are required quickly to facilitate rapid clinical decision making. On the other hand, it is often thought that primary care work can be sent to an offsite facility, not necessarily the local hospital, with the results being returned 24 hours later, seen as adequate for most primary care physicians’ needs. There are perceived advantages to this approach, but also disadvantages, but in neither case is there good information to strongly support either view. The advantage of the offsite laboratory approach, is that it takes advantage of the economies of scale, makes maximum use of automated analytical technology and of lower building costs. One of the strengths of the commercial laboratories has been the strong emphasis on the logistics aspects with good access for patients to...
phlebotomy centres, automated request and sample recognition and tracking, rapid transport and information technology. The downside of this approach is the delay in obtaining results, and the fragmentation of services between primary and secondary care with the possibility of different methods being used (producing different results), as well as tests having to be repeated when patients move from primary care to secondary care. There is also a financial down side to this approach as it is often the bulk, inexpensive, easily automated tests that are outsourced, resulting in the overheads of the hospital service being shared across a smaller number of tests, thereby increasing their cost. In the United States this has resulted in the development of “outreach programmes”, where the hospital laboratory has gone out to attract the work back from the commercial laboratories. The pattern however, is now beginning to change, with the large commercial laboratories seeing the opportunity to undertake more specialist, high premium work, the economic argument being that it is less cost effective for hospital laboratories to set up new tests until the number of requests reach a certain figure, again the economy of scale argument coming into play.

The alternative approach to the organization of services is the creation of a network of laboratories. This is the approach that has been favoured in the United Kingdom in recent years, in the public sector in Australia, and also in certain provider organizations in the USA e.g. Kaiser Permanente. There is greater integration between primary and secondary care, use of common methodologies across the whole health economy of the provider network, greater equity of access to specialist expertise, and still the opportunity to take advantage of the economies of scale by creating a core laboratory if appropriate, for routine or specialist services.

It is clear from much of the foregoing discussion that the considerations on how to organize and manage a “laboratory service” are heavily driven by financial incentives. This is often the case because of the way that health care is managed, with “silo management” or “silo budgeting”. Each silo performs efficiently as a silo, but little effort is made to look across silos – taking the patients needs into consideration. As a result there can be many perverse incentives driven by the earning capacity of the procedure to the silo. In this respect the approach being taken in the United Kingdom, whereby the local Primary Care Trust commissions the secondary care services, and the “laboratory services” for both primary and secondary care sectors is interesting. A recent review of “laboratory services” has suggested that management of laboratory services should be separated out from hospital management because the financial status of the latter has been shown to exert an undue influence on the financial management of the laboratory – with funding being totally disconnected from workload expectations. Thus the concept of independent commissioning of laboratory services offers a means of identifying those services that bring a real benefit to both patient and provider; this defines the laboratory as a core service.

Efficiency or effectiveness?

There is no doubt that investing in information technology, logistics support and automation of analytical techniques can improve the efficiency of “laboratory services”. However there is little point in providing reliable results quickly if the wrong test was requested, or if the results are not used correctly. Correct usage means making the right clinical decisions and implementing the right course of action. As analytical technology matures, ensuring the effectiveness of the service will increasingly become the most important challenge. This challenge can be met by the use of decision support systems, which can help to guide clinicians in the choice of test, as well as in the interpretation of results. In the case of the management of some long term conditions, decision support systems have already been integrated into telehealth care systems.

Looking at effectiveness from the economic perspective, there are many examples where investment in laboratory investigations ensures the more effective use of resources elsewhere in the health system with benefits to the wider health economy (see box for examples).

**Patient safety and reducing errors**

The fragmentation of many health care services has resulted in an unacceptably high level of errors, as has been pointed out in a number of publications; these include errors involving laboratory tests. Information connectivity from the requesting of a test to the reporting of the result, both to the clinician, and into the patient record are an essential first step to reducing errors. This has to be complemented by ensuring that the knowledge with which to make correct decisions is accessible to the clinician – which goes beyond basic decision support, and opens up issues of proper knowledge management. As patients now have access to such knowledge there will be an increasing demand for decisions to be evidence-based, and for which there will be demonstrable accountability.

**Point-of-care testing**

This is one of the major growth areas, both from a technological innovation standpoint and increasing utilization. In the situations where laboratory tests are

<table>
<thead>
<tr>
<th>Test</th>
<th>Benefit</th>
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<tbody>
<tr>
<td>Screening for Chlamydia by PCR</td>
<td>Reduces infection rate and associated cost of complications</td>
</tr>
<tr>
<td>Brain natriuretic peptide</td>
<td>Reduces demand for echocardiography</td>
</tr>
<tr>
<td>Point of care testing for HbA1c</td>
<td>Reduces clinic visits, improves outcomes</td>
</tr>
<tr>
<td>Glycaemic control in Intensive Care</td>
<td>Improves morbidity and mortality, reduces length of stay</td>
</tr>
<tr>
<td>Point of care testing in ED</td>
<td>Improves speed of triage</td>
</tr>
<tr>
<td>INR testing in the community</td>
<td>Reduces hospital clinic visits</td>
</tr>
</tbody>
</table>

**BOX 1: BENEFITS TO THE WIDER HEALTH ECONOMY**
being performed offsite, point-of-care testing is seen as the only means of providing rapid turnaround of results. This is important to support long term disease management devolved to a community setting. The latter has the added advantage of involving the patient more in their own health care, which has been seen to produce many benefits, both clinical and economic. Additionally it supports the trend of bringing care closer to home.

Point-of-care testing by reducing the number of steps required to obtain the result, also offers the opportunity to reduce the potential for errors.

**Time for rebranding?**
The hospital laboratory is now an outdated concept, just as pathology or laboratory services is an outdated descriptor. Laboratory medicine is probably the best alternative, and is already the “brand name” used in some countries. The important concept to put across in today’s practice of medicine is that laboratory medicine is not practised in a laboratory, but at the bedside, on the ward, or in the clinic – with the laboratory medicine professional being a member of the clinical team caring for individual patients.

**Laboratory medicine – the longer term view**
Much of the work of the laboratory service today is concerned with the diagnosis and management of disease. Much of the research, especially that emanating from the human genome project, is directed towards early recognition of predisposition to a disease, and earlier presentation of disease. This will shift the emphasis towards monitoring of well-being and lifestyle changes to reduce the risk of development of disease. The tools that have been outlined above will all play their part, but the focus will be more patient-centred than it is now, and full involvement of the patient will be vital to its success.

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**References**

**Some further reading**
PROTON BEAM THERAPY

ARTICLE BY WP LEVIN, H KOOY, JS LOEFFLER AND TF DELANEY,

CONVENTIONAL RADIATION THERAPY DIRECTS PHOTONS (X-RAYS) AND ELECTRONS AT TUMOURS WITH THE INTENT OF ERADICATING THE NEOPLASTIC TISSUE WHILE PRESERVING ADJACENT NORMAL TISSUE. RADIATION-INDUCED DAMAGE TO HEALTHY TISSUE AND SECOND MALIGNANCIES ARE ALWAYS A CONCERN, HOWEVER, WHEN ADMINISTERING RADIATION. PROTON BEAM RADIOThERAPY, ONE FORM OF CHARGED PARTICLE THERAPY, ALLOWS FOR EXCELLENT DOSE DISTRIBUTIONS, WITH THE ADDED BENEFIT OF NO EXIT DOSE. THESE CHARACTERISTICS MAKE THIS FORM OF RADIOTHERAPY AN EXCELLENT CHOICE FOR THE TREATMENT OF TUMOURS LOCATED NEXT TO CRITICAL STRUCTURES SUCH AS THE SPINAL CORD, EYES, AND BRAIN, AS WELL AS FOR PAEDIATRIC MALIGNANCIES.

Abstract

Conventional radiation therapy, which utilises photon (X-ray) beams, is frequently used in the locoregional treatment of cancer. Tumour control is achieved by radiation-induced damage to DNA, which ultimately causes tumour cell death. In vitro, even the most radioresistant cancers can be eliminated. In vivo, however, lethal tumour doses are not always achievable because of radiation-induced morbidity in normal tissues.

Radiation is currently delivered with substantially more precision than in the past because of advances in imaging and treatment planning. To date, the most advanced photon beam delivery method is intensity-modulated (IM) radiation therapy (IMRT), which can deliver higher doses of radiotherapy to tumour targets while reducing the dose delivered to selected normal tissues. With IMRT, high doses to these selected normal tissues can be avoided by applying numerous radiation fields of varying intensities from different directions. But this requires increasing the volume of normal tissue that is irradiated (ie a higher integral dose); hence, one of the concerns of IMRT is that, over time, this exposure of more tissue to low-dose radiation will cause a second malignancy or other unwanted late normal tissue effect. This is especially concerning with regards to paediatric patients receiving IMRT (Miralbell et al, 2002). If these children are cured of their primary cancer, they should have a relatively long lifespan, during which time they may manifest a radiation-induced malignancy. Of course, the risk of second malignancy is also a risk in adults, but the fact that the median age of adult cancer patients at diagnosis is in the seventh decade, that second malignancies after radiotherapy are uncommon in adults, and that they usually manifest 10–15 years after treatment make them less of a concern. It is also worth mentioning that intensity modulation using a scanned pencil beam has also been applied to proton radiotherapy; dose distributions are superior to those achievable with the more commonly employed passively scattered proton beams (Weber et al, 2004), and there is also less total body neutron dose from beam-shaping devices (Miralbell et al, 2002).

Interest in the use of charged particle radiotherapy has been primarily stimulated by the superior dose distributions – already recognised by Wilson (1946) – compared to those produced by photon therapy techniques. Protons, as do all charged particles, have a very rapid energy loss in the last few millimeters of penetration. This results in a sharply localised peak of dose, known as the Bragg peak. The penetration depth of the Bragg peak is directly related to the initial energy of the charged particle. The Bragg peak, and hence desired dose, can thus be precisely placed anywhere in the patient (see Figure 1). For irradiation of a tumour, the proton beam energy and intensity are varied in order to achieve the desired dose over the tumour volume. A single clinical proton field, in contrast to a single photon field, can achieve dose conformation to the target volume. In general, a set of proton fields achieves significant dose reduction to uninvolved normal tissues compared to a matched set of photon fields. Passively scattered proton fields have a slightly higher entrance dose at the skin (B75%) compared to megavoltage photon beams (B60%); more than one port may be required with protons if adequate skin sparing is to be achieved in patients being treated to high doses with only protons.

Protons have comparable biologic effects in tissue relative to high-energy X-rays used in conventional radiation therapy. Evidence of this comes from the fact that the relative biological
The development of hospital-based cyclotrons with higher energy beams capable of reaching deep-seated tumours (up to B30 cm), field sizes comparable to linear accelerators, and rotational gantries have greatly facilitated proton radiation therapy effectiveness (RBE) of protons is approximately 1.1 (Paganetti et al, 2002). The RBE of a proton beam is the ratio of the dose required to produce a specified effect using a reference radiation, usually 60Co photons, to the dose required to produce the same effect. A generic RBE factor of 1.1 has been used at the Harvard Cyclotron, Northeast Proton Therapy Center, Loma Linda University, Paul Scherrer Institute in Switzerland, Orsay in France, and Faure in South Africa, while Tsukuba in Japan and Uppsala in Sweden have used 1.0. It is important to contrast these biologic and physical properties of protons with those of neutrons and heavier charged particles. Fast neutrons have a higher RBE in tumour cells, but lack the physical dose advantages of charged particles; the latter proved disadvantageous in the clinic (Wambersie and Menzel, 1996). Heavier charged particles like carbon ions combine a higher RBE with an improved physical dose distribution; they may offer additional advantages for hypoxic and other radioresistant tumours and clinical studies are in progress at NIRS in Japan (Kamada et al, 2002; Tsujii et al, 2004) and GSI in Germany (Schulz-Ertner et al, 2004). Many clinical studies with protons have employed a combination of photons and protons; the combination is facilitated by the similar biologic effects.

Proton beam radiotherapy

The majority of patients receiving charged particle therapy have been treated with protons. As of July 2004, over 39 000 patients have received part or all of their radiation therapy (RT) by proton beams (Sisterson, 2004). Table 1 lists the currently operational proton beam treatment facilities worldwide. Initially, patients were being treated at facilities designed and constructed for basic high-energy physics research, often resulting in very cumbersome treatments, as the proton beams were limited to a fixed (often horizontal) position, which meant that the patient had to be moved to align the tumour on the trajectory of the beam. This technique was in contrast to the isocentric capabilities of the modern linear accelerator that rotates around a point in space and can effectively target any site in the body. In addition, for many of the proton machines, the energy of the beam (which defined the depth of the Bragg peak) was only sufficient to treat superficial lesions (such as those of the eye) or intermediate-depth lesions (such as the base of skull). Owing to these technical factors and the interests of the involved physicians, the clinical sites that had initially received the most attention were uveal melanomas in the eye and base of skull sarcomas. The major emphasis for proton therapy clinical research initially was dose escalation for tumours adjacent to critical normal structures that constrained the doses that could be given with photons and for which local tumour control with conventional radiotherapy was thus poor. One of the pioneers in proton radiation therapy was the research facility at the Harvard Cyclotron Laboratory (HCL) in Cambridge, Massachusetts, operating in conjunction with the Massachusetts General Hospital. Patient treatment commenced in 1961 and ended in 2002, after the clinical programme was transferred to the Northeast Proton Therapy Center at Massachusetts General Hospital. In total, 9,116 patients were treated at the HCL. The development of hospital-based cyclotrons with higher energy beams capable of reaching deep-seated tumours (up to B30 cm), field sizes comparable to linear accelerators, and rotational gantries have greatly facilitated proton radiation therapy. The first of these hospital-based facilities opened at Loma Linda University in California in 1990. Increasingly, there is interest in protocols aimed at morbidity reduction in those tumour sites in which tumour control with
photons is good, such as many paediatric tumours.

**Ocular (uveal) melanoma**

Uveal melanoma is the most common primary ocular tumour. Episceral radioactive plaques and proton beam radiation are alternatives to enucleation with the intent of preservation of sight. The latter is not always achievable due to the proximity of the cornea, lens, retina, fovea, or optic nerve. Typically, a total of 70 Cobalt Gray Equivalent (CGE) (1 CGE represents the physical dose of protons multiplied by an RBE factor and should thus have similar biologic effects in the system of interest as 1 Gray (Gy) of photon dose) is administered over five treatment sessions. As of December 2002, over 3000 patients with uveal melanoma had been treated with protons at the MGH in collaboration with MEEI (Munzenrider, 1999). The 5-year actuarial local control rate was 96% for all sites within the globe, with an 80% overall survival.

The probability of eye retention at 5 years was estimated to be 90% for the entire group and 97, 93, and 78% for patients with small, intermediate, and large tumours, respectively. Egger et al (2003) recently reported long-term results of eye retention after treatment of uveal melanoma with proton beam therapy. A total of 2,645 patients were treated at Paul Scherrer Institute in Switzerland, between 1984 and 1999. The overall eye retention rates at 5, 10, and 15 years after treatment were 89, 86, and 83%, respectively.

**Sarcomas of the skull base and spine**

Treatment of patients with sarcoma of the skull base is very challenging because of the proximity of critical structures, notably the brain, brainstem, cervical cord, optic nerves, and optic chiasm. Accordingly, surgery and conventional photon therapy has not been very successful at controlling these tumours. Owing to the necessity to deliver dose in a precise manner, the use of proton therapy is becoming the treatment of choice for these tumours.

At the Harvard Cyclotron (HCL), MGH physicians used a combination of protons and photons to treat patients with tumours of the skull base and cervical spine (Munzenrider and Liesch, 1999). A total of 169 patients with chordoma and 165 patients with chondrosarcoma were treated. Local control (10-year) for skull base tumours was highest for chondrosarcomas, intermediate for male chondromas, and lowest for female chordomas (94, 65, and 42%, respectively). For cervical spine tumours, 10-year local control rates were not significantly different for chordomas and chondrosarcomas (54 and 48%, respectively), nor was there any significant difference in local control between males and females. Actuarial rates (5-year) of endocrinopathy in patients with base of skull lesions were as follows: 72% for hyperprolactinaemia, 30% for hypothyroidism, 29% for hypogonadism, 19% for hypoadrenalism, and no incidence of diabetes insipidus (Pai et al, 2001), reflective of the proximity of the pituitary to the sarcoma. Treatment of spinal and paraspinal tumours is complicated by the proximity of the spinal cord. Radiation tolerance of the spinal cord is generally quoted at 45 Gy, well below that necessary to reliably control most sarcomas, which require doses of approximately 60 Gy for subclinical microscopic disease, 66 Gy for microscopically positive margins, and in excess of 70 Gy for gross residual disease. Proton radiotherapy, with its ability to spare adjacent tissues, offers advantages for treatment of tumours in this location. Hug et al (1995) presented results on combined photon/proton treatment of 47 patients with osteo- and chondrogenic tumours of the axial skeleton. Actuarial local control (5-year) and survival for patients with chondrosarcoma were 100 and 100%, and with chordoma were 53 and 50%. Actuarial 5-year local control for patients with osteosarcoma was 59%.

**Benign meningioma**

Complete surgical resection of meningiomas is difficult to achieve in selected locations such as the sphenoid ridge, parasellar area, and posterior fossa. Likewise, radiation therapy for these intracranial tumours is complicated by the proximity of critical neural structures, such as the visual pathways or the brain stem. Proton beam radiation, with its high degree of conformality, therefore would

<table>
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**Table 1: Operational proton therapy centres**

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Clinical care focus: oncology
seem to be an attractive treatment modality. Between 1981 and 1996, 46 patients with partially resected, biopsied, or recurrent benign meningiomas were treated with combined proton/photon radiation at the HCL/MGH (Wenkkel et al, 2000). The median dose to the tumour was 59 CGE. Overall survivals at 5 and 10 years were 93 and 77%, respectively, and the recurrence-free rates at 5 and 10 years were 100 and 88%, respectively. Three patients presented with local tumour recurrence at 61, 95, and 125 months. One patient died of focal brain necrosis at 22 months. Neurologic complications, including memory deficits and hearing loss, were also seen. Four patients developed ophthalmologic toxicity. In all of these cases maximum dose to the optic structures was greater than 58 CGE. Endocrine abnormalities following treatment were also seen. Investigators from Paul Scherrer Institute recently reported on the treatment of 16 patients with recurrent, residual, or untreated intracranial meningiomas (Weber et al, 2004). The median prescribed dose was 56 CGE (52–64) at 1.8–2 CGE per fraction. Cumulative 3-year local control, progression-free survival, and overall survival were 91, 91, and 92%, respectively. No patient died of recurrent meningioma. Radiographic follow-up (median, 34 months) revealed an objective response in three patients and stable disease in 12 patients. Cumulative 3-year toxicity-free survival was 76%. No radiation-induced hypothalamic/pituitary dysfunction was observed. Encouraging data with stereotactic external beam radiotherapy and IMRT, however, have also been reported (Uy et al, 2002; Zabel et al, 2005) and comparative studies need to be conducted to assess whether there is any demonstrable difference in tumour control or complications between these techniques and proton radiotherapy.

Paranasal sinus, nasal, and nasopharyngeal tumours
Fitzek et al (2002) performed a prospective study incorporating chemotherapy, surgery, and combined proton–photon radiotherapy for treatment of malignant neuroendocrine tumours of the sinonasal tract. In all, 19 patients with olfactory neuroblastoma (ONB) or neuroendocrine carcinoma (NEC) were treated with two courses of cisplatin/etoposide chemotherapy, followed by highdose proton–photon radiotherapy to 69.2 CGE using 1.6–1.8 CGE per fraction twice daily in a concomitant boost schedule. Two further courses of chemotherapy were given to responders. The 5-year survival rate was 74%. The 5-year local control rate of initial treatment was 88%. Acute toxicity of chemotherapy was tolerable, with no patient sustaining more than grade 3 haematologic toxicity. One patient developed unilateral visual loss after the first course of chemotherapy; otherwise, the precision of delivery of radiation with stereotactic setup and protons resulted in visual preservation in all patients. Four patients who were clinically intact developed radiation-induced damage to the frontal or temporal lobe by magnetic resonance imaging criteria. Two patients showed soft tissue and/or bone necrosis, and one of these patients required surgical repair of a cerebrospinal fluid leak. The authors concluded that this was a successful treatment approach for these patients. Thornton et al reported encouraging results with treatment of paranasal sinus tumours with combined photon–proton radiotherapy. At the Loma Linda University in California, 16 patients with recurrent nasopharyngeal carcinoma were treated with conformal proton radiation (Lin et al, 1999). Patients had initially been treated with photon therapy using doses of 50–70 Gy. An additional 59–70 CGE was administered using conformal proton radiation. With a mean follow-up of 23 months, 24-month actuarial local control and regional progression-free survival rates were both 50%. No central nervous system complications were observed.

Carcinoma of the prostate
Photon beam radiation dose escalation was studied in a randomised trial at the MD Anderson Cancer Center (Pollack et al, 2000). For patients with a pretreatment PSA of more than 10 ng ml–1, an increase in total dose from 70 to 78 Gy with conformal photons improved the biochemical disease-free survival. A French trial in which patients were randomised to receive either 70 or 80 Gy with conformal photons reported no statistical difference in acute toxicity between the two groups; they noted, respectively, 6 and 2% acute grade 3 urinary and rectal toxicities (Beckendorf et al, 2004). Intensity-modulated radiation therapy has also been used for dose escalation to the prostate while attempting to minimise toxicity by limiting radiation dose to the bladder and rectum. Investigators at the Memorial Sloan Kettering Cancer Center (Zelefsky et al, 2002) treated over 700 patients with IMRT to a dose of at least 81 Gy. Only 28% of patients experienced grade 2 urinary symptoms and one patient experienced urinary retention. Late grade 2 rectal bleeding was experienced by 1.5% of patients and four patients required transfusion or laser cauterisation (grade 3). The 3-year actuarial PSA relapse-free survival rates for favourable, intermediate, and unfavourable risk groups were 92, 86, and 61%, respectively. Investigators at MGH completed a phase III trial comparing 67.2 Gy of photons vs 75.6 CGE using a conformal perineal proton boost for patients with advanced prostate cancer (Shipley et al, 1995). From 1982 through 1992, 202 patients with T3–T4 prostate cancer received 50.4 Gy by four-field photons. Patients then received either 25.2 CGE with conformal protons or a 16.8 Gy photon boost. No differences between the two groups were found in overall survival, total recurrence-free survival, or local recurrence-free survival. The local recurrence-free survival at 7 years for patients with poorly differentiated (Gleason 9 and 10) tumours, however, was 85% on the proton arm and 37% on the photon arm. Grade 1 and 2 rectal bleeding was higher in the proton arm (32 vs 12%), as was urethral stricture (19 vs 8%). In conclusion, dose escalation to 75.6 CGE by conformal proton boost improved local recurrence-free survival in a subset of patients, but also increased late low-grade radiation sequelae; no increase in overall survival was seen in any subgroup. Investigators at the Loma Linda University Medical Center used proton beam radiotherapy to treat patients with localised prostate cancer. Between 1991 and 1997, over 1200 patients received either all or part of their treatment by proton radiation (Slater et al, 2004). With a median duration of follow-up, overall 5- and 8-year actuarial biochemical disease-free survival rates were 75 and 73%, respectively. Acute grade 3 gastrointestinal and genitourinary...
Paediatric malignancies

Investigators in Switzerland looked at the potential influence of improved dose distribution with proton beams compared to conventional or IM X-ray beams on the incidence of treatment-induced secondary cancers in children (Miralbell et al, 2002). This model allowed estimation of absolute risks of secondary cancer for each treatment plan based on dose-volume distributions for nontarget organs. Proton beams reduced the expected incidence of radiation-induced secondary cancers for a rhadomyosarcoma patient by a factor equal to or greater than 2, and for the medulloblastoma cases a factor of 8–15 (because of the larger target volume) when compared with either IM or conventional X-ray plans. This study underscores the concern with using radiation therapy in the treatment of paediatric malignancies. It is the goal of clinicians not only to eradicate the primary tumour but also to minimise the risk of radiation-induced malignancies over the lifetime of these patients. It also underscores the fact that the advantages for protons may be greater with larger rather than smaller target volumes. Owing to technical limitations on field size and depth imposed by some of the modified physic research laboratory facilities employed for treatment in the past, some of the most notable early clinical achievements with protons were with small, superficial targets (i.e. ocular melanomas), leaving the mistaken impression with some clinicians that the advantages for protons were confined to small target volumes. In a study performed by the MGH group, treatment plans utilising standard photon therapy, IMRT, or protons for craniopharyngeal axis irradiation in the treatment of paediatric medulloblastoma treated with craniospinal irradiation using the proton beam technique (Yuh et al, 2004). Loma Linda investigators also evaluated proton beam irradiation in the treatment of paediatric patients with intracranial low-grade astrocytoma (Hug et al, 2002a). Between 1991 and 1997, 27 patients underwent fractionated proton radiation therapy for progression of recurrent low-grade astrocytoma. In all, 25 of the 27 patients (92%) were treated for progressive, unresectable, or residual disease following subtotal resection. Mean target dose was 55.2 CGE (50.4–63.0) and fraction size was 1.8 CGE. At a mean follow-up period of 3.3 years (0–6.8 years), six out of 27 patients experienced local failure within the irradiated field and four out of 27 had died. Local control and survival were 87 and 93%, respectively, for centrally located tumours, 71 and 86% for hemispheric tumours, and 60 and 60% for tumours of the brainstem. All children with local control maintained their performance status, except one, who developed Moyamoya disease. All six patients with optic pathway tumours and useful vision maintained or improved their visual status. Four paediatric patients presenting with aggressive giant cell tumours of the skull base were treated with proton irradiation with protons is shown in Figure 2.) LLL investigators reported a reduction in acute toxicity with the treatment of three children with medulloblastoma treated with craniospinal irradiation using the proton beam technique (Yuh et al, 2004). Loma Linda investigators also evaluated proton beam irradiation in the treatment of paediatric patients with intracranial low-grade astrocytoma (Hug et al, 2002a).
As discussed, the main benefit of proton therapy over photon beam radiotherapy is the absence of exit dose, which offers the opportunity for highly conformal dose distributions, while simultaneously irradiating less normal tissue with a combination of proton and photon beam radiation at MGH (Hug et al, 2002b). Combined proton and photon radiation therapy was based on 3-D planning. Target doses of 57.6–61.2 CGE were given in daily fractions of 1.8 CGE. With observation times between 3.1 and 5.8 years, all four patients were alive and well and remained locally controlled without evidence of recurrent disease. Except for one patient with partial pituitary insufficiency following radiotherapy for recurrent sellar disease, no late effects attributable to radiotherapy to date have been observed. Protons offered a preferable dose distribution to photons in two patients treated for orbital rhabdomyosarcoma (Hug et al, 2001). Dose-volume histograms were obtained for target and nontarget regions, including the lens, bony orbit, pituitary gland, optic chiasm, optic nerves, lacrimal gland, and ipsilateral frontal and temporal lobes. Doses to 90, 50, and 5% of lens volume were kept at less than 1%, less than 2%, and less than 8%, respectively. At a mean follow-up of 3 years, visual acuity for both patients was excellent and there was no evidence of cataract formation. Furthermore, pituitary function was normal; cosmetically, only mild enophthalmos was noticeable. The steep dose gradient beyond the orbit minimised irradiation of normal brain parenchyma, with almost sparing of the pituitary gland. Ongoing clinical trials of proton beam radiation therapy are in progress at the Northeast Proton Therapy Center (MGH) for paediatric patients with medulloblastoma, rhabdomyosarcoma, other paediatric sarcomas, and retinoblastoma. Protons are also used for treatment of paediatric malignancies at the Loma Linda University Proton Center, and the groups at Orsay in Paris and Paul Scherrer Institute are using proton radiotherapy for paediatric tumours. Protons are also approved for use in patients undergoing radiation therapy as part of treatment on Children’s Oncology Group protocols.

Other tumours
Encouraging results with proton beam radiotherapy have also been reported for hepatocellular carcinoma (Chiba et al, 2005) and medically inoperable, early-stage lung cancers (Bush et al, 2004).

Conclusions
As discussed, the main benefit of proton therapy over photon beam radiotherapy is the absence of exit dose, which offers the opportunity for highly conformal dose distributions, while simultaneously irradiating less normal tissue. This technology therefore reduces irradiation to normal tissue, while permitting dose escalation to levels not achievable with standard techniques. Dose escalation with protons has been shown in a randomised clinical trial for prostate cancer to improve local tumour control; clinical experience with proton radiotherapy in phase II studies in other anatomic locations suggests that dose escalation in other sites results in improved local control. With reduction of normal tissue dose, proton therapy has been shown to allow for better acute tolerance of combined chemotherapy and radiation therapy; this has been reported for medulloblastoma (Yuh et al, 2004). Ongoing clinical studies are expected to demonstrate similar gains with other tumour types. Improvements in acute tolerance can be expected to minimise interruptions in both chemotherapy and radiotherapy in patients receiving combined modality treatment, with the potential for simultaneous improvement in local and systemic treatment. Equally important is the potential for a decrease in the appearance of late normal tissue effects including radiation-induced malignancies. The importance of this issue cannot be overemphasised when considering the irradiation of paediatric patients. As noted above, there is also clinical interest in heavier ions, carbon in particular, which have a similar finite range in tissue as protons, a very sharp lateral penumbra, but also have a higher RBE than protons. There is some encouraging preliminary experience from the facility in Chiba and from GSI in Germany (Schulz-Ertner et al, 2004; Tsujii et al, 2004). Further follow-up on these patients, in particular for potential late effects with the higher RBE particles, will be needed before their potential role with respect to protons and IMRT photons can be fully assessed. Carbon ion facilities, however, because of the 12-fold heavier mass of carbon ions compared to protons, are currently more costly than proton facilities, so that appropriate indications will need to be defined. The expense of proton therapy per patient is expected to decrease as more facilities are built and greater numbers of patients are treated. Current estimates place the relative cost of proton radiation therapy compared to IM photon beam radiation therapy in the range of 2.4, but might come down to 1.7–2.1 over the next 5 years (Goitein and Jermann, 2003). A recent publication from Sweden actually projected lower health-care expenses using proton beam radiotherapy when compared to conventional radiation therapy in the treatment of a child with medulloblastoma, because of the substantial health-care burden in managing the late effects of conventional radiotherapy (Lundkvist et al, 2005). At the present time, we believe that all paediatric patients should be considered for referral, as well as all cases where the proximity of tumour to critical structures prohibits the administration of adequate radiation doses using photon techniques. Rapid advances in photon radiotherapy with image-guided IMRT, stereotactic radiotherapy, and brachytherapy are, however, competing technologies for adult patients and appropriate clinical studies will be important to define the relative benefits and indications for these different technologies.

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