
POTENTIAL IMPACT OF TELEHEALTH ON SOCIO-ECONOMIC STABILITY AND SUSTAINABILITY IN THE PROCESS OF GLOBALIZATION

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Abstract

Sustainable socio-economic development depends upon a well-trained and healthy workforce. Family health also influences worker stability. Access to healthcare in both rural and urban settings is a world-wide challenge: No nation can afford to replicate comprehensive health care resources in every large and small community. On the other hand, as the potential for Internet access approaches universality, consumer access to health information potentially will cease to be a limiting factor, and this fact will change the role of healthcare providers. Previously the custodians of health information, providers are now becoming advisers about the use, specific relevance, and applicability of that health information in individual situations. Telenetworking may be the only economically viable way to make healthcare resources available to individuals throughout communities, regions, or nations. However, although clinicians in different settings will use the same information to address a problem, they will do so using perspectives modified by their local cultural, ethnic, and socio-economic environment. The broadband infrastructure required for cost-effective, sustainable telehealthcare has much in common with the infrastructure requirements for tele-education, tele-business, and tele-government: A unique healthcare telecommunication infrastructure is not necessary. Telehealth can leverage commercial telecommunications networks, but universal access to basic healthcare services and health information must be, at least in part, a governmental responsibility. Thus, it is essential that barriers to universal broadband access be overcome through combinations of commercial business activity and public policy. The resulting general access will contribute importantly to long-term economic and political

stability and sustainability. Tele-optimized population health is a nationally-, ethnically-, religiously-, governmentally-, and racially-neutral bonus that can result from coordinated application of medical and telecommunication resources and capacity.

Introduction

“Globalization” has been defined as the several processes leading toward a world relatively undivided by national, social, economic, environmental, technological, and cultural barriers (1, 2). There is general agreement that globalization has an impact on the socio-economic status of all countries. However, opinions differ as to whether globalization’s effects on individuals and societies are consistently positive or negative. One driving force that facilitates the processes of globalization is the ongoing revolution in both the technology and accessibility of telecommunications and information. Walker: “With astonishing speed, the Internet has evolved from an obscure communications environment for computer science researchers to an essential element of the communications infrastructure used by virtually all segments of society” (3).

In the healthcare arena, globalized advanced telecommunication capabilities facilitate both universal access to health-related information and enhanced service delivery across geographic, cultural, and socio-economic barriers. Universal access to health-related information makes it possible to (a) rapidly disseminate new discoveries, (b) enhance the diffusion and adoption of standards for diagnosis, treatment, and practice, (c) promulgate new healthcare-related tools such as pharmaceuticals and diagnostic/treatment equipment, and (d) enable new services. Beyond information access and sharing is “telehealth”, defined as “...the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and

health administration” (4).

Advanced telecommunication enhances global knowledge of what is possible in many areas of endeavor, including healthcare. That knowledge then drives both expectations and the identification of goals that target what can and should be achieved. Development and achievement of these goals depends upon overcoming a variety of barriers that encompass issues of policy, economics, law, education, culture, technology, and labor. Our purpose in this paper is to explore some of these issues, specifically in terms of the globalization of healthcare. Our perspective is that the process of globalization of healthcare will in balance be beneficial, but that complete global homogeneity in healthcare is neither achievable nor desirable.

Stage Setting: Healthcare of the Individual, the Community, and the Whole

Healthcare is comprised of two broad components: (a) care provided to an individual, including that individual’s personal responsibility for compliance and chronic self-care, and (b) maintenance of a community environment that is sanitary, safe, and health-promotional by means of active prevention, screening, and education programs.

The intimate interaction between a patient and a clinician is the core element in individual healthcare. It is initiated when an individual seeks medical services; it is paid for by the individual and/or the individual’s private or governmental insurer. Many argue that it is intuitively obvious that healthcare services are therefore locally provided activities. The historical evolution of healthcare and healthcare delivery systems appears to have affirmed

that view (5). Others identify this presumption that healthcare services must be provided locally as a root reason for the continual rise in the cost of medical care (6).

On the other hand, individual care occurs in the context of, and is greatly influenced by, the individual's health environment: clean water, sanitation and pollution control, health screening, immunization, workplace safety, and child and maternal health. This societal context requires socio-technical systems that are not individually initiated, but originate out of a collaboration among national and international health organizations that set minimal and optimal standards. These stakeholder organizations then work in collaboration with governments to implement those standards. To the extent that globalization of healthcare progresses, it is critical that developed nations share their experience in these contextual areas with the developing world, but do so respecting regional differences.

Stage Setting: The Advent of Advanced Telecommunication Technologies

With widespread adoption of the Internet and World Wide Web in the mid-1990's it became apparent that telehealth had the potential to distribute and make accessible health-related information and contribute to individual healthcare access by the geographically and socio-economically underserved as well as by the physically challenged. Further, telehealth offered the opportunity to develop and promote uniform world-wide expectations for basic community health. In 1996 Hoben proposed several areas in which the Internet could be used for healthcare including continuing medical education, on-line collaboration, broad distribution of standardized clinical practice guidelines, collection of disease

management outcome information and health care trends, health services planning, patient record access, and consumer access to health-related information (7). Each of these proposals is at least a partial reality today.

The Internet's communication power has the potential to globalize medical knowledge and best practices, increase research collaboration and sophistication, and facilitate rapid adoption of new medical discoveries. However, reaping the benefits of this potential will require core changes in individual attitudes, healthcare systems, and governmental policies (8) because of healthcare disparities based on socio-economic status, geography, gender, physical ability, race, and ethnicity that persist worldwide (9). Access to health information and services is critical for health promotion, disease prevention, and medical therapy, but the strongest predictors of population health are income levels, education levels, and gender equality (10), all of which can be strongly influenced in general by globalization and specifically by global communication capabilities.

Workforce Health Underlies Sustainable Socio-Economic Development

While the economic growth of developing countries outpaced that in developed countries during the 1960s, increased global market integration since 1980 reversed the trend in favor of the world's wealthiest nations (11). As a consequence, globalization of the world's economies is altering global health patterns. Where economic growth reduces poverty, health status improves because higher household incomes improve access to health-related goods and services (12). The reverse is also true. Social and economic disruption during the early 1990's in the countries of the former Soviet Union was associated with a

reduced life-expectancy for both men and women (13). Consequently, the ability of a country to achieve and sustain economic growth is impaired when there is increased morbidity and mortality (14).

When globalization accelerated in the late 20th century, labor markets in developed countries shifted from manufacturing to service-sector jobs. As a result, during the 1990's, many organizations in these countries were restructured and downsized, exposing service sector workers, including healthcare providers, to high unemployment rates, insecure job arrangements, and increased job-related skill requirements (5). Vantera et al summarized growing evidence linking restructuring to impaired employee health and adverse health outcomes (15), including depression, anxiety, hypertension, coronary artery disease, and increased physician visits, but paradoxically decreased self-reported health status (16).

Worker job insecurity and ill health also produce secondary family health consequences because part-time and irregularly employed workers often lack access to employer sponsored family health, dental, and pension benefits (17). Reduced income compromises the ability to make best choices in terms of food and housing, further compromising well-being. This cycle then accelerates with the consequent inability to obtain loans or credit (18), worsening stress-related poor health. In post-communist countries, market reform-induced structural and economic changes dismantled socialized mechanisms that had provided free universal access to healthcare services, leaving large portions of urban and rural populations without even basic medical services (19).

The effectiveness of health systems is founded upon the availability of capable healthcare providers (10). As the healthcare industry responds to globalization, healthcare workers as a labor class are not immune to globalization-related workplace stresses. For example, part-time employment among Canadian healthcare workers increased five-fold during the second half of the 20th century (5). In countries transitioning away from centrally planned and government-owned economies to market economies based on private ownership, globalization is producing even greater effects and stresses. Slow economic growth, increasing disparities of wealth, and disappearance of socialized mechanisms for financing healthcare have deprived both urban and rural residents of free universal access to health services, including the most basic services (19). In these countries, the effect has been felt by the poor and less educated as expected, but surprisingly by the employed, educated, and skilled as well (13,19).

Globalization, Telehealth, and Clinician Relocation

Globalization as it applies to the health workforce, and any other workforce that requires licensing and/or credentialing, potentially implies the absence of national and sub-national borders that can restrict clinical practice. Logically this potential absence of borders would require a globally accepted set of licensing requirements, a standard practice not yet achieved even among individual U.S. states. Universal adoption of licensing requirements would allow licensed healthcare workers to move more freely from state to state, province to province, and country to country, within the constraints of immigration law, just as a driver's license permits an individual to cross political borders so long as local laws of the road are obeyed.

Even without this freedom of movement, however, emigration of highly trained professionals currently occurs. Developed countries save time and money by recruiting foreign professionals rather than increasing domestic training capacity (20). Developing countries frequently cannot absorb all their trainees because of inadequate domestic development and industrialization (21). Thus, the flow of highly trained health professionals tends to be from developing to developed countries as these professionals first seek advanced training and then attempt to both improve their socio-economic status and reduce stress in their daily lives. For example, more than half the physicians graduating from the All India Institute of Medical Services from 1956-80 are currently employed abroad (6).

Further, national policies do not consistently acknowledge ethical obligations to return trainees to the developing country of origin (20). As a result developed countries become increasingly dependent on international medical graduates to deliver care in underserved areas that are unattractive to domestic graduates (21). Biviano and Makarehchi have questioned the wisdom of developed countries becoming dependent on clinicians emigrating from developing countries to supply the workforce they require to care for underserved areas, pointing out that in 2000, international medical graduates comprised 25% of the US workforce with clinicians holding J-1 waivers representing 60% of underserved area service commitments (21). Thus, in terms of the healthcare workforce and healthcare itself, the reality of globalization has been highly profitable to some while negatively impacting many others (22), particularly those in developing countries.

Human and Technical Healthcare Resources are Costly to Replicate

The existing healthcare infrastructure is continuously being expanded by new healthcare technologies and new medications that facilitate the diagnosis and management of clinical conditions. No state, province, or country can afford to replicate the human and physical resources required to deliver all available medical services in all locations where they might be needed. Telecommunication spreads awareness about these new developments and globalization increasingly makes them available worldwide. These new tools are expensive. Globalization efforts such as the Agreement on Trade-Related Intellectual Property Rights help to support that high cost, by exaggerating globalization effects that can undermine public health and favor developed nations (10). However, caution with regard to arguments surrounding the potentially negative effect of health care's high cost this complex point is necessary. Lack of sufficient financial resources is not the exclusive root of the problem: The United States spends more on healthcare than any country in the world (23), yet McGlynn et al estimate that Americans receive only about half the care recommended for common conditions (24).

The emergence of advanced telecommunications and information management technologies as tools for enhancing the delivery of healthcare information and services at a distance – telehealth – has been therefore touted as one solution to the problems of both access to healthcare and the cost of that access. In the 1990s, many land line-based consultative telehealth networks were initiated and successfully provided access to specialty services prior to the widespread use of the Internet.

However, other than prison systems where the high cost of escorted prisoner transport was avoided, few systems exhibited bottom line viability without grant or governmental subsidy. In addition, even when patients and clinicians accepted the technology and could afford to initiate it, the high cost of equipment replacement and maintenance, and the cost of telecommunication services were barriers to success, as were clinician reimbursement issues and the problem of clinician licensing across political boundaries.

Urban and Rural Access to HealthCare

Our view of healthcare embraces two perspectives, care of the individual and health status of the world population. From this vantage, our view of the globalization of healthcare resonates with the description of Amadio and Hathaway (25): Globalization is “...not...sophisticated communication technology and infrastructure connecting medical centers around the world. ...this...already exists. ...instead...the monumental improvements...that would occur for...millions of people...through better access to clean drinking water, nutritious food, and safe vaccinations. ...the basic healthcare needs of the entire world would be met. ...information...communication technology is...a necessary part of a more connected world. ...it alone is not sufficient to deliver radical change.”

Our view includes global access to universally accepted standards of care and increasingly global access to new and sophisticated healthcare diagnostic and management tools, both of which are being advanced by the progress of globalization. However, we view as more fundamental the need for globalization of a health

promoting socio-economic environment where fundamental health education, screening, and prevention resources and practices are standardized and universally accessible but grafted onto local regional, ethnic, cultural, and religious traditions (Figure 1). Further, while we believe that the information sharing and distributing capabilities of “telehealth” technologies are extremely valuable for accomplishing these goals, we recognize that at this time only a small portion of the world’s population can read and write and therefore access that information, even if the technological infrastructure were instantly to be made universal (26). As von Lubitz et al (27) point out, “...over 83% of the world’s population appears to have either limited or no direct...accessing [of] the wealth of health related information available on the Net.” Dramatic international efforts in education and technology access will be necessary to overcome this deficiency, especially for the Third World and for the socio-economically disadvantaged of the First World.

We also believe that the barriers to healthcare access and global health are not purely technical or educational. We believe that more fundamental barriers are to be found in the policy, legal, labor, economic, and governmental issues that must be addressed if any of the potentially beneficial aspects of globalization of healthcare are to be achieved (Figure 2).

The Business of Tele-HealthCare

Historically, the health care sector has invested far less in information technology and its development than have other major sectors of the business economy (28).

However, even if that fact were to change, simply investing in the physical deployment of technology that can create connectivity and access, disseminate information and best practices standards, and overcome geographic barriers is neither a local, regional, national, or global panacea. Government, insurance payers, providers, hospital systems, policy makers, credentialing organizations, and ultimately consumers will determine whether and how quickly these technologies will be employed and their benefits realized (25,29). Governments must align tax, tort, and insurance laws while ensuring safety nets, reconsidering entitlement programs, and realigning incentives (29). Policy makers and credentialing bodies must recognize the intensely personal and thus extremely variable nature of healthcare purchase decisions (23). W.H. First issued a fundamental challenge to all segments of the global healthcare industry when he pointed out that we have never fostered the kind of competition in the healthcare economy that has led to success in other industries (29).

Local Medical Practices, Local Traditions, and Alternative HealthCare

According to the World Health Organization, more than 80% of the world population uses traditional medicine (30), medicine that is largely based on cultural practices rather than the scientific principals and paradigms that are the foundation of specialty medicine. Solomons suggests that the cultural homogenization implied by globalization is a threat to traditional medicine, and that the persistent use of traditional medicine may be a symbol of resistance to that homogenization (31). Aggressive “bioprospecting” by pharmaceutical companies emphasizes their perception of the value of alternative/traditional medicine by

indicating their belief that these practices point to active natural principles whose efficacy is underscored by their persistent successful use over decades and even centuries (30).

Telehealth technologies are not a replacement for in-person health care, but rather a method for supplementing it and expanding the range of locally available services. This fact forms the base of the business plan for using telehealth technologies in rural communities separated from specialty care by only the inconvenience and expense of a few hours travel. It is the rationale for using the technology to import the services so that the patient is not inconvenienced and the local community shares in the economic benefit. It allows the traditionally more comfortable encounter between the patient and the local primary care physician to be more effective while still remaining local.

To the extent that healthcare is globalized through the use of telehealth technologies, cultures of vastly differing technological sophistication will be brought together, even if only for a brief medical encounter. Why should we think that the sense of security derived from maintaining one's confidence in the local, available provider will be any less important – in fact, it is likely that it will be more important. It has been suggested that by applying technology to healthcare, especially in less sophisticated cultures, the human dimension of care will be undermined (8). The challenge for anyone attempting to reap the potential benefits of telehealth-facilitated globalization of healthcare will be to take the time to address local issues, to integrate and preserve the positive aspects of the local system of care, and to maintain and

learn from the cultural knowledge that forms the core of the successful practice of traditional medicine (Figures 1 and 2).

Information Access and Infrastructure, Tele-Practice and the Internet

The Internet currently provides continuous access to health information for millions around the world. It has the potential for providing universal access. Increasingly, consumer access to health information ceases to be an issue. This fact already has changed, and will continue to change, the role of healthcare providers, patients, and the families of patients. Previously, clinicians were the custodians and exclusive source of both health information and the knowledge, experience, and wisdom concerning how to use that information. Now, the role of providers has expanded to include that of adviser about the use, specific relevance, and applicability of freely available information in individual circumstances. Patients are increasingly taking ownership of their own health records and searching for, acquiring, and using available information to participate actively in their own medical management. Family and other support persons are joining in (25, 32). By connecting “each-to-all” (33), “all-to-each”, and “all-to-all”, the emergence of the Internet was a transforming event beyond that of the telephone that connected one to one, or broadcast/cable that connected one to many.

Information access is an important result of Internet deployment and access, but true global telehealth will also involve patient-clinician interactions and clinician-clinician consultations. These are the direct practice of

telehealth/telemedicine. Many examples of these local, regional, and international medical tele-practices exist today. Their on-going experience contributes valuable lessons concerning operational imperatives and pitfalls, including topics such as scheduling, credentialing, record keeping, privacy, and regulatory compliance. Their universal experience is that smooth operation requires procedural standardization, staff training and regular re-training, and administrative buy-in to a shared vision and shared goals. However, These essentially human and local operational topics are intertwined with infrastructure issues that are very pertinent to globalized telehealth.

Successful telehealth practices, including home telehealth, whether “live” or “store-and-forward”, will require the bi-directional transmission of large multi-media files. For example, large data files must flow from the home (monitoring) or the rural site (specialty consultation) in order to supply the supervising or consulting provider with the information needed to make management decisions and recommendations. Further, large data files must flow from the provider/consultant to the rural site/home when live video interaction is necessary and/or when instructional material must be sent in order to implement recommendations or demonstrate techniques. When the exchange can be asynchronous, bandwidth limitations need not be critical if sufficient time is available for transmission. When the exchange must be synchronous, and when time is a critical factor, global telehealth is completely dependent on the least developed infrastructure of the participants.

Standardization: Technical and Clinical

Y.Lan's recent review (34) of these issues from the perspective of global business applications is applicable to telehealth. He points out that while data transmission speeds are adequate for operations such as e-mail, real-time delivery of large-sized files is unreliable. Network bandwidth availability is a critical part of any global telehealth information systems development strategy, and network bandwidth is dependent on the lowest level of information and communication technology adopted by any one of the participating nations. Further, congruent policies and practices must also be in place for privacy, security, authentication, authorization, and recovery. The technologies to enable these policies and practices, such as firewall, anti-virus, encryption, and biometrics must also be congruent and compatible. Technical standardization is essential.

Even when these technical issues are resolved, and even when the participants in the clinical encounter speak the same language, clinical barriers to data-sharing for globalized healthcare facilitation through telehealth practices arise because international standardization of many basic medical infrastructure issues has not been achieved, including the basic language of medicine (25). For example, while much of the world uses the World Health Organization's 10th Revision of the International Classification of Diseases (ICD-10-CM), the United States still employs ICD-9-CM, delaying the necessary change-over because of implementation costs and because of the anticipated disruption business of business processes.

Discussion and Conclusions

When the public Internet appeared on the scene it was regarded by many as a sophisticated special interest toy of computer aficionados. However, its transformational power in business, education, and communication rapidly became evident as was demonstrated by the number of organizations and individuals that came on line, creating Web sites with increasingly rich content. As these sites grew in content, demand for access grew. As these sites grew in the complexity of their content, demand for transmission speed grew. Initial patience with the time required to download files disappeared as users became more dependent upon the content of those files and as they grew to understand the power of that content in the workplace, the school, and the home. As a result, an important measure of the extent to which individuals, communities, businesses, and governments are seen as sophisticated participants in the modern world around them has become the degree to which they are “wired” and the degree to which they use that wired status to conduct their business. This perception persists and is now even more prevalent.

While use of the Internet was growing, the power of hard-wired video was being used to create a resurgence of telemedical activity. Concentration of medical specialists in urban areas had reduced rural access to specialty healthcare services. Many visionaries saw advanced telecommunications as an ideal way to assist in the reduction of this imbalance. Both small and ambitiously large telehealth projects arose across the nation and around the world. So long as their objectives remained focused, these projects enjoyed considerable success. However,

they were generally funded as pilots by government or grants. Although clinically successful, they usually were not incorporated into the business structure of healthcare in a manner allowing them to be sustained when subsidies were exhausted. The cost of telecommunication lines, system maintenance, and equipment upgrade overwhelmed the small rural facilities that were already in financial stress. Reimbursement regulations began to adjust insofar as clinician payment was concerned, but not in terms of facility support. Sustainable prison and veteran telehealth programs stood out as exceptions, largely because of the tremendous transportation savings that were realized.

As these developments converged, the power of the Internet, World Wide Web, and wireless communication changed telehealth scenarios. Previous telehealth systems had demonstrated the feasibility of healthcare at a distance and its acceptability to both patients and clinicians. The new telecommunication technologies reduced system costs, and through their use in the commercial world began to show the way for incorporating telehealth into the business of healthcare. It became understood that telehealth technologies are not tools to replace previous systems. Instead, they are tools to enhance the efficiency of those previous systems on the one hand, and on the other hand enable us to accomplish tasks that were previously inconceivable without advanced telecommunication technologies.

The possibility of reaching across geo-political, socio-economic, and other barriers to deliver healthcare services offers a tool for making healthcare services more universally available without the cost of replicating and maintaining them in numberless locations. Telehealth

offers a tool to continue the essentially local and personal nature of individual healthcare delivery while expanding the scope and depth of what is available locally, minimizing the cost of that service expansion. Telehealth also offers a tool for standardizing healthcare service approaches and delivery systems where those standards can be proven to improve outcomes, reduce long-term morbidity, reduce cost, and reduce medical errors. Once telehealth is implemented across a wired or wireless space, distance ceases to be an issue and the potential for global impact is obvious.

However, this potential for global impact exposes numerous barriers and problems. Ours is not an homogeneous world. Every language, socio-economic, cultural, and technological difference must be taken into account. For example, because of deficiencies of educational opportunity and differences in personal wealth/poverty, only a very small portion of the world population has realistic access to advanced telecommunications and telehealth services today. That telehealth could have an impact globally is clear, but as with many aspects of globalization, that impact risks widening the gap between residents of developed and under-developed countries. Telehealth already requires a re-thinking of the business parameters of local, regional, and national healthcare. If it is to re-design the business parameters of global healthcare telehealth will require a similar re-thinking of issues, but on a more massive scale.

The National Rural Health Association:
Telemedicine: "...is a...vehicle to connect patients in rural areas to urban medical centers and provide access to a wide range of clinical services...to underserved rural and urban

populations. ...has the potential to ameliorate geographical and socio-economic disparities in access to medical expertise and knowledge.” (35) “...evidence suggests that telemedicine is an effective and efficient means of delivering a broad spectrum of health services to medically underserved...communities.”(36) Tele-networking may in fact be the only economically viable and sustainable way to provide healthcare resources to whomever is in need wherever that need exists because healthcare needs are universal and ubiquitous and because it is inconceivable that any nation can afford to provide healthcare resources in close proximity to every need.

Participation in the economic benefits of globalization requires that one of the essential tools facilitating globalization, advanced telecommunication technologies, be brought to bear on individual and global health. Robust economies in communities, regions, and nations are driven by workers whose reliability depends upon both personal health and the health of their families. Absence from work because of personal health or seeking healthcare for family members undermines the economy.

“Whether telemedicine/telehealth will affect physician workforce needs globally...cannot be fully determined until a way is found around the barriers currently inhibiting...” its expansion (19). However, when that way is found, the time will be upon us when national identity among the health professions will be obsolete.

To the extent that telehealth technologies can transport specialty services to regions and populations where they are currently unavailable, and to the extent that

socio-economic barriers to that transport are overcome, telehealth service delivery will grow of its own accord based on locally relevant business models.

Today's global realities require that global telehealth be approached incrementally. We must leverage local healthcare systems and practices to accomplish immediately with global telehealth what is possible now (Figure 1). Simultaneously, energy must be focused upon the local, national, and international barriers that must be overcome before the larger potential advantage of telehealth can be realized (Figure 2). There will be local practices and advantages that are best left local (Figure 1) because even though telehealth will allow us to move toward globally homogenized healthcare, that goal is probably neither completely feasible, desirable, nor optimal.

A realistic short term view for the role of telehealth in globalization might be to state that to the extent that information sharing can focus the expenditure of available health resources to standardize public health measures such as sanitation, immunization, maternal and infant health, industrial safety, etc it should be undertaken immediately. Where necessary, developed nations should facilitate progress toward these goals in undeveloped nations.

Realizing the remaining potential for telehealth requires overcoming the geo-political, educational, and socio-economic barriers that grow from existing global imbalances between developed and under-developed countries. These imbalances are relevant not only to telehealth but to the entire vision for globalization. Health

needs can help stimulate efforts to remove these barriers, Global health needs will not be met, with or without telehealth technologies, until these barriers are overcome.

References:

1. Bettcher D, Lee K, Globalisation and public health. *J Epidemiol Community Health* 2002; 56: 8-17.
2. Spiegel JM, Labonte R, Ostry AS. Understanding “globalization” as a determinant of health determinants: A critical perspective. *Int J Occup Environ Health* 2004; 10:360-367.
3. Walker R, Dieter M, Panko W, Valenta A. What it will take to create new Internet initiatives in health care. *Journal of Medical Sciences*, 2003; 27(1): 95-103.
4. Office for the Advancement of Telehealth. <http://telehealth.hrsa.gov/jwgt/jwgt.htm> Accessed February 6, 2005.
5. Ostry AS, Spiegel JM. Labor markets and employment security: Impact of globalization on service and healthcare-sector workforces. *Int J Occup Environ Health* 2004; 10: 368-74.
6. Jain Sc. Globalization of medical services: Antidote for rising costs. *HealthcarePapers* 2003; 4 (No.2): 39-44.
7. Hoben J. The Internet: What does it mean for healthcare provider organizations? *J AHIMA*, June 1995. <http://www.ahima.org/search/results.asp?text=Hoben> Accessed February 6, 2005.

8. Cortinois AA, Downey S, Closson T, Jadad AR. The authors respond. *HealthcarePapers* 2003; 4 (No.2): 76-80.
9. Isaacs SL, Schroeder SA. Class – the ignored determinant of the nation’s health. *N Engl J Med* 2004; 351: 2635-45.
10. Schrecker T, Labonte R. Taming the brain drain: A challenge for public health systems in southern Africa. *Int J Occup Environ Health* 2004; 10:409-15.
11. Weisbrot M, Baker D, Kraev E, Chen J. The scorecard on globalization 1980-2000: its consequences for economic and social well-being. *Int J Health Serv* 2002; 32 (2): 229-53.
12. Diaz-Bonilla E, Babinard J, Pinstup-Andersen P. Opportunities and risks for the poor in developing countries. Working Paper No. 83. Indian Council for Research on International Economic Relations. 2002. New Delhi, India.
13. Shkolniklov V. The population crisis and rising mortality in transnational Russia. Socio-economic factors, perceived and self-reported health in Russia: a cross-sectional survey. *Soc Sci Med* 2002; 47:269-79.
14. Brundtland G. A call for health development. In WHO report on infectious diseases: Removing obstacles to healthy development. 1999. Geneva, Switzerland.

15. Vantera J, Kivimaki M, Pentti J. Effects of organizational downsizing on health of employees. *Lancet* 1997; 350: 1124-8.
16. Ferrie et al. The health effects of major organizational change and job insecurity. *Soc Sci Med* 1998; 46: 243-54.
17. Morris J. Injury experience of temporary workers in a manufacturing setting: factors that increase vulnerability. *Am Acad Occup Health Nurs J*. 1999; 47: 470-8.
18. Cascio WF, Young CE, Morris JR. Financial consequences of employment-change in major U.S. corporations. *Acad Management J*. 1997; 40:1175-89.
19. Collins T. Globalization, global health, and access to healthcare. *Int J Health Plann Mgnt* 2003; 18: 97-104.
20. Patel V. Recruiting doctors from poor countries: the great train robbery? *BMJ*. 2003: 926-8).
21. Biviano M, Makarehchi F. Globalization and the physician workforce in the United States. Sixth International Medical Workforce Conference, April 25, 2002, Ottawa, Canada.
22. Yassi A, Wickstrom GJ, Palacios M. Globalization and the health of the healthcare workforce: Overview. *Int J Occup Environ Health* 2004; 10 (No.4) 355-59).

23. Levit K, Smith C, Cowan C, Sensenig A, Catlin A. Health spending rebound continues in 2002. *Health Aff (Millwood)* 2004; 23(1): 147-59.
24. McGlynn EA, Asch SMJ, Adams J, et al. The quality of healthcare delivered to adults in the United States. *N Eng J Med* 2004; 351:2635-45.
25. Amadio PC, Hathaway M. Hospitals in a globalized world: A view from the United States. *HealthcarePapers* 2003; 4 (2): 57-63.
26. Layzell BR. Globalization and development: a brief perspective in relation to access to health information. Presentatin to IMIA WG9 Workshop, 4 September 2001. <http://www.globalisation.gov.uk/Forewords/KeyPolicyCommitments.htm>
27. von Lubitz DKJE, Levine H, Wolf E. The goose, the gander, or the Strasbourg pate for all: Medical education, world and the Internet, in *electronic Business and Education*, eds. W Chin, F Patricelli, V Milutinovic, Kluwer Academic Publishers (Amsterdam) , pp 189-210, 2002.
28. Bates DW. The quality case for information in healthcare. *BMC Med Inform Decis Mak* 2002; 2: 7
29. First WH. Health care in the 21st century. *N Engl J Med* 2005; 352: 267-272.
30. Nigenda G, Cifuentes E, Hill W, Knowledge and practice of traditional medicine in Mexico: A

survey of healthcare practitioners. *Int J Occup Environ Health* 2004; 10:416-420.

31. Solomons NW, Ethical consequences for professionals from the globalization of nutrition and health. *Asian Pac J Clin Nutr* 2002; 11, Suppl 3: S653-S665.
32. Ferguson T, E-patients, online health, and the search for sustainable healthcare. 2002 National Forum on Quality Improvement in Healthcare, Orlando FL.
33. Alliance for Public Technology. www.appt.org.
34. Lan Y-C, A Framework for an Organization's Transition to Globalization – Investigation of IT Issues, in Idea Group Inc., 2003.
35. The National Rural Health Association. The role of Telemedicine in Rural Health Care. On Line Publication. 1998.
36. Council on Graduate Medical Education: Physician distribution and health care challenges in rural and inner-city areas. COGME Tenth Report. Report to Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Service. 1998.

Figure 2.

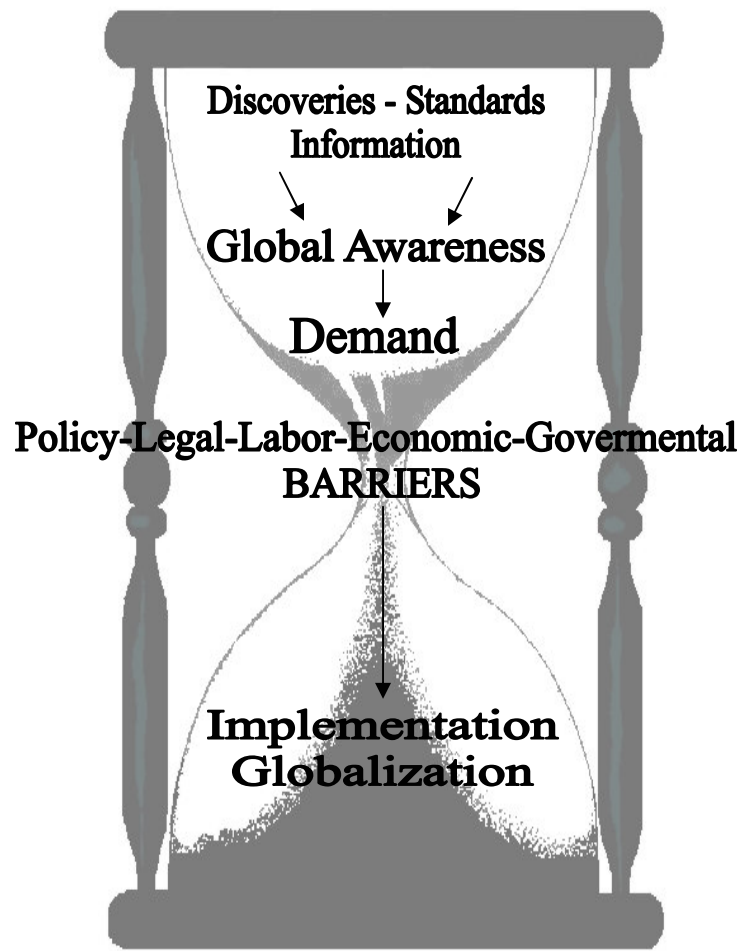


Figure 1.

