

PAHO and Health Development Goals in the 21st Century: Science, Technology, Strategic Inputs, and Health Information

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1 - INTRODUCTION

One notable characteristic of health systems in the countries of the Region of the Americas, as paradoxical as it may seem, is the enormous scarcity of data in the areas of science, technology, strategic inputs, and health information. This problem is due to a lack of systematic data collection on resources, the irregularity of surveys and studies, the absence of common standards for technology and the presentation of data for the different countries of the Region, which further complicates grouping of the limited existing data.¹

However, evidence points to some situations that the countries have in common:

- Major differences in the countries' development, the distribution of needs, institutional organization, and the capacity of respond to needs;
- Lack of policies in the areas of science, technology, strategic inputs, and health information that are compatible and associated with health policies in the countries;
- Lesser involvement by the ministries of health in managing policy on science, technology, strategic inputs, and health information; and
- Isolated, uncoordinated initiatives in different stages in the countries to address the problem, yielding different results at the national level.

Accordingly, the countries of the Region also view quite differently the objective of generating, circulating, and applying knowledge in search of universality, comprehensiveness, equity, and quality health care for the population.

Given these differences stemming from the countries' different stages of development, their different ways of addressing health needs, and their different stages of institutional organization, charting priority actions in the fields of health science and technology, strategic inputs, and health information should be based on structural guidelines for public policies that are capable of producing short-, medium-, and long-term impacts. Consequently, the formulation and implementation of such policies should focus on intersectoral coverage.

International cooperation should therefore consider the need to pinpoint gaps and identify the inherent challenges in the different countries, in order to develop guidelines that promote the advancement of scientific knowledge in the field of health, promote technological advances in the drug industry, vaccine

¹ *Pan American Health Organization. Health in the Americas*; 2002 edition. Volume I. Washington. D.C.: PAHO, 2002. (Scientific and Technical Publication No. 587). pp. 373-420.

technology, equipment, and other basic health inputs, and foster greater convergence among “national policies on science, technology, and innovation in health” and the health needs of the respective populations.

It is therefore critical for **multilateral** efforts to promote **the development of national health science and technology policies as a component of national health policy, thus underscoring the need for interaction among the respective health systems, science and technology components, and human resources education policy as part of intersectoral relations**. This policy should be deeply rooted in a clear ethical and social commitment to improving the health conditions of the population in the short, medium, and long term. It is therefore necessary to consider regional differences and the search for equity.² These considerations are directly linked to the need to promote public policies based on sustainable national development, with support for the generation of technical and scientific knowledge suited to the economic, social, cultural, and political needs of each country.

Consequently, the primary concerns of such a national policy, geared to the health needs of the population, are the development and optimization of the production processes and the assimilation of scientific and technological knowledge by health systems, services, and institutions, by human resources training centers, companies in the productive sector (public and private), and other segments of society. National policies on science, technology, and innovation in health therefore serve as guidelines and components of industrial, educational, and other social policies.³

Understood in this way, this catalytic action and multilateral cooperation also involve the impact of public policy in science, technology, and innovation in health on the development of the health production complex, with significant results in terms of the population’s access to health care interventions, products, and inputs.

Since prescription drugs, pharmaceutical products, and other health inputs are considered important technologies, the incentives to formulate, implement, and enforce national policies in this area require guidelines and actions that guarantee the availability of, access to, adaptation, and acceptability of these technologies, as well as sufficient purchasing power on the part of the countries. In terms of regional action, these guarantees call for the formulation of commitments to implement the principles of the Doha Declaration of 14 November 2001, signed by the Member States of the World Trade Organization (WTO). This Declaration states that public health takes precedence over industrial property rights⁴The Doha Declaration concedes that there is a problem associated with the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPs) and public health that has yet to be resolved: the mandatory of patents in countries with little or no drug

² Final Report of the First National Conference on Health Science and Technology, Brasília, 1994.

³ Final Report of the Twelfth National Health Conference, Brasília, 2003.

⁴ Gontijo, C. I. F., *Propriedade industrial no século XXI. Direitos desiguais (Industrial Property in the 21st Century: Unequal Rights)*. Rio de Janeiro, 2003.

manufacturing capacity or insufficient market demand.⁵ This problem poses a challenge to the efforts of the countries of the Region to overcome this problem through political and institutional guidelines based on the principle of solidarity among nations.

Summarizing the considerations made thus far, priority initiatives appropriate for a multilateral cooperation agenda in science, technology, strategic inputs, and health information between the health systems of the Region of the Americas and PAHO include:

- Supporting multilateral efforts to promote the development of specific national health policy components in the areas of science, technology, strategic inputs, and health information:
 - based on structural public policy guidelines;
 - capable of producing short-, medium-, and long-term impacts;
 - with intersectoral coverage (e.g., health systems, science and technology components, human resources education policy);
 - with a clear ethical and social commitment to improving the health conditions of the population, taking regional differences and the search for equity into account;
 - geared to the development and optimization of productive processes and the assimilation of scientific and technological knowledge by the health systems, services, and institutions, human resources education centers, productive sector companies (public and private), and other segments of society;
- Promoting the adoption of public policies grounded in sustainable national development, with support for the generation of technical and scientific knowledge suited to the economic, social, cultural, and political needs of each country;
- Strengthening and channeling the impact of a public policy in science, technology, and innovation in health, with a view to developing the health production complex, with significant results in terms of the population's access to health interventions, health care products, and inputs;
- With regard to international cooperation, take into account the need to pinpoint gaps and identify the inherent challenges in each country, with a view to generating policy guidelines that advance scientific knowledge in health;
- Making efforts to reduce the dependency of national health systems in terms of the procurement of health care inputs, products, and technologies by encouraging multilateral policies to take advantage of regional biodiversity; these policies should be geared to interests/needs of the countries' health systems, emphasizing such priorities as research activities, the

⁵ CORREA, C.M., Repercusiones de la Declaración de Doha relativa al Acuerdo sobre los ADPIC y Salud Pública. Organización Mundial de la Salud, Geneva, 2002.

development of phytotherapeutic approaches, open information technology, and free software applications;

- Establishing multilateral programs and actions geared to the development of joint country efforts, both public and private, in science, technology, and innovation in health, based on the priority needs of the respective health systems;
- Including health research as a basic item on the agendas of international organizations and ministries of health responsible for organizing the promotion of research;
- Putting proposals and activities on the multilateral cooperation agenda that specifically target the “health industry complex”. In the countries of the Region, this care will depend on the organization of the industry, and, in some sectors, on competition and the significant academic research capacity that has been built, as well as the need to make use of the main industrial inputs for health; and
- Implementation of policies that promote efforts to modernize public and private pharmaceutical laboratories, pursuant to the drug policy guidelines of the countries of the Region.

2 - ROLE OF INTERNATIONAL ORGANIZATIONS IN HEALTH SCIENCE AND TECHNOLOGY

In September 2000, the Member States of the United Nations established the *Millennium Development Goals*.⁶ Attaining these goals will be no easy task, especially in regions and countries attempting to battle “neglected diseases” and “most neglected diseases,” against which current health interventions—vaccines, drugs, diagnostic or prevention methodologies—are either nonexistent, inefficient, or are economically unviable for the populations in question.⁷ This paints a disturbing picture, particularly in view of recent studies that demonstrate health’s key role as a requirement for, and not simply a consequence of, economic and social development.⁸

These Goals have been criticized by a number of organizations and institutions. For example, *The Economist* of 09 September 2004 featured an article entitled, “Ends without means. The United Nations has set benchmarks for progress in poor countries. Are these any use?”⁹ Or, as the former director of the John E. Fogarty International Center for Advanced Study in the Health Sciences

⁶ United Nations. UN Millennium Development Goals (MDG). <http://www.un.org/millenniumgoals/> . 2002.

⁷ Médecins sans Frontières. Access to Essential Medicines Campaign and the Drugs for Neglected Diseases Working Group: *Fatal Imbalance: The Crisis in Research and Development for Drugs for Neglected Diseases*. Edited by Berman D, Moon S. Brussels: MSF Access to Essential Medicines Campaign; 2001.

Morel CM: **A pesquisa em saúde e os objetivos do milênio: desafios e oportunidades globais, soluções e políticas nacionais.** *Ciência e Saúde Coletiva* 2004, 9:261-276.

⁸ WHO Commission on Macroeconomics and Health.: *Macroeconomics and Health: Investing in Health for Economic Development. Report of the Commission on Macroeconomics and Health.* Geneva: World Health Organization; 2001.

⁹ Anon.: **Ends without means. The United Nations has set benchmarks for progress in poor countries. Are these any use?** *The Economist* 2004, Sep 9th 2004.

put it, "It is also clear that global disparities in health will not be eliminated by simply applying the knowledge we currently have. Without new knowledge generation across the wide spectrum of fundamental, translational and applied biomedical and behavioral research, **we will always be applying yesterday's solutions to tomorrow's problems.**"¹⁰

Consequently, the international agencies, especially WHO/PAHO, should strengthen their initiatives to promote the prioritization of health research activities or to support national health research systems aimed at helping the afflicted countries and needier populations that make up what has been called "the 10/90 gap."¹¹ In fact, some initiatives have already been launched—for example, the Special Program of Research, Development and Research Training in Human Reproduction (HRP), the Special Program for Research and Training in Tropical Diseases (TDR), and the PAHO program on biotechnology support.

The scant human and financial resources allocated for health research have led some organizations to carefully pursue strategic prioritization in this regard. This has occurred despite budget constraints and has been observed in institutions of the developed world, including the U.S. National Institutes of Health,¹² WHO special programs such as the TDR,¹³ and even Brazil's own Ministry of Health (e.g., the National Agenda of Health Research Priorities – Second National Conference on Science, Technology and Innovation in Health¹⁴). These studies considered:

- The different reasons preventing the population of endemic countries from having access to health interventions: market deficiencies (e.g., the drugs exist, but countries lack the financial resources to purchase them), scientific deficiencies (e.g., no vaccines for parasitic diseases), or public health deficiencies (e.g., little interest or support from countries or development agencies).
- The types of research necessary to fill each gap: basic or strategic research if the deficiency is due to a lack of scientific knowledge; applied or operations research if a new drug recognized as effective is to be introduced into a new health system; or access campaigns if the issue is purely financial.

¹⁰ Keusch GT. Preâmbulo a documento base do encontro que discutirá "REACH: Research Agency Collaborative for Global Health", New York, 26-29 September 2004. 2004. Personal communication

¹¹ Global Forum for Health Research: The 10/90 Report on Health Research 2003-2004. Edited by Currat L. Geneva: Global Forum for Health Research; 2004.

¹² Committee on the NIH Research Priority Setting IoM: *Scientific opportunities and public needs. Improving priority setting and public input at the National Institutes of Health*. Edited by Institute of Medicine. Washington: National Academy Press; 1998.

¹³ Remme JH, Blas E, Chitsulo L, Desjeux PM, Engers HD, Kanyok TP, Kengeya Kayondo JF, Kioy DW, Kumaraswami V, Lazdins JK, Nunn PP, Oduola A, Ridley RG, Toure YT, Zicker F, Morel CM: **Strategic emphases for tropical diseases research: a TDR perspective.** *Trends Parasitol.* 2002, **18**:421-426.

¹⁴ Internet: http://dtr2001.saude.gov.br/sctie/decit/consulta%20publica/Proposta_agenda_nacional.pdf

2.1 Importance of Health Research

A number of factors come together to demonstrate the urgency of including health research as a basic item on the agendas of the international organizations and ministries of health responsible for organizing the promotion of health research:¹⁵

- a) Growing awareness of the key role of health, science, and technology as requirements for economic and social development, and not merely its consequences;
- b) Need to improve the health conditions of poor and marginalized populations, which is essential for attaining the UN Millennium Development Goals (MDGs);
- c) Disconnect between the burden of the diseases affecting disadvantaged populations and the concentration of global investment in health research on problems affecting the industrialized countries. Less than 10% of resources for health research are allocated for the diseases or conditions responsible for 90% of the global disease burden;
- d) Few resources for health research on the diseases of poverty, requiring financing agencies to prioritize and select programs;
- e) Acceleration of discoveries and scientific advances in the biomedical field, notably in genomic science and the immense potential of its applications for human and animal health;
- f) Growing participation of the private sector and philanthropy in the financing and conducting of health research through public-private partnerships;
- g) Little participation by the least developed countries in the global production of scientific and technological knowledge;
- h) The “brain drain.” which siphons off the limited human health resources of the poor countries, thereby increasing inequity;
- i) Limited access by the most disadvantaged populations to drugs, vaccines, and diagnostic tools, due to patent protection;
- j) Recent international emphasis on the areas of bioterrorism and biodefense, relegating urgent public health issues to the back burner; and
- k) Need to study the various national health research systems.

¹⁵ Morel, C. M. A pesquisa em saúde e os objetivos do milênio: desafios e oportunidades globais, soluções e políticas nacional. (Health Research and the Millennium Goals: Global Challenges and Opportunities) *Ciência & Saúde Coletiva*, 9(2):261-270, 2004

2.2 PAHO and Health Research

With respect to the WHO Regional Offices, PAHO has been a very avid supporter of health research, as illustrated in the work of the aforementioned biotechnology committee and the mobilization and coordination efforts of a large number of WHO Collaborating Centers in the Region of the Americas. Thus, in contrast to other WHO Regional Offices, PAHO interacts with excellent local health research centers in both the industrialized and developing countries.

The beginning of a new administration can and should also signal the beginning of a new policy at PAHO on science, technology, and innovation in health, based on:

- Leadership, initiative, and joint efforts, acting as an advocate and supporter of efforts to launch new interventions and search for the new knowledge required for this purpose;
- Partnerships with recognized institutions specializing in health research throughout the Hemisphere;
- Raising the awareness of partners with the capacity to furnish new human and financial resources for health research and institutional strengthening;
- Raising awareness of the countries with the greatest need for investment in technological innovation and the development of new health interventions/solutions for current and future problems;
- Encouraging countries to collect and disseminate key data and statistics for decision-making; for example, investment in science, technology, and innovation in health;
- Studying the characteristics and performance of the *national health research systems*¹⁶ of PAHO's member countries; and
- Mobilizing countries to adopt a prioritized health research agenda and financial and operational systems capable of implementing it.

Among the most striking examples of the diversity and inequality among PAHO member countries are their efforts in scientific and technological research and innovation. Consequently, we have the world leader in this field, but at the same time, countries in which there is virtually no such activity.

Moreover, the main international forums dealing with the problem of health research (e.g., WHO, Global Forum for Health Research, COHRED) have determined that health research is critical for developing "healthy" health systems and is important for reducing poverty and disparities between and within countries.

Hence, in discussing PAHO's prospects in the current century, we cannot afford to omit this issue from the agenda of priorities. Other than the United States and Canada, there are no more than seven or eight countries with ongoing

¹⁶ World Health Organization: *National health research systems. Report of an international workshop, Cha-am, Thailand, 12-15 March 2001*. Edited by Pang T. Geneva: World Health Organization; 2001.
Chunharas S: **National health research system: Concept and reality**. *Research into Action. The Newsletter of the Council on Health Research for Development*. 2002, 27:2-4.

health research activities. It is therefore essential to lay the foundations for action that will: a) coordinate and buttress the role of health science and technology in these countries; and b) create the conditions for horizontal cooperation between these countries and the rest of the countries of the Region.

One approach that could be explored in this regard is the creation of one or more subregional programs where “subregionalism” is defined not in geographical terms, but in terms of identifying groups of countries with specific needs. Certainly, science, technology, and innovation in health are one such need.

2.3 Foundations and Guidelines of a Policy on Science and Technology in Health

In most Latin American countries, the constitutional authorities responsible for formulating and implementing health policy are the ministries of health. However, they play only a peripheral role in constructing a national policy on science and technology in health. The experience of the developed countries strongly suggests that the ministry of health should have a central steering role in structuring a national health research policy. This effort should be consistent with the national and regional health needs of the population, as expressed in the nation’s health policy.

The National Health Research System [*Sistema Nacional de Pesquisa em Saúde*] is defined as a system for planning, coordinating, monitoring, and managing health research activities and resources, with a view to promoting the research necessary for effective and equitable development of national health. It is a concept that covers and coordinates the goals, structures, actors, processes, cultures, and products of health research to facilitate equity in health and in the national health system.¹⁷

In the countries of the Region, all the advances made over the generations collide in a framework of inequality. This also holds true in the field of health. Regional indicators, as well as those referring to different social groups within each region or country, show profound social discrimination in health, whether in morbidity or mortality patterns, access to services, quality of care, or availability of health infrastructure—in short, in any aspect of public or private health interventions.

If we are to raise standards of health system equity, our commitment to combat disparities in the field of health, must include as the first basic tenet the formulation of a health science and technology policy for the Region.

According to Bhutta (2002), “If a country’s health research system could be regarded as the “brain” of its health system, then ethics would constitute its “conscience”. It is imperative that such health research systems function to the highest aspirations of ethics and distributive justice.”¹⁸ There can be no doubt that the growing number of restrictions observed in the developed countries in terms of

¹⁷ Bhutta, Z. A.—*Bulletin of the World Health Organization*. 2002. Vol 80(2):114-120.

¹⁸ Op. Cit.

conducting *in anima nobile* experiments within their borders has prompted the export of health research projects, especially clinical trial protocols, which are carried out instead on the populations of the developing countries, under conditions that would be illegal in the developed world on ethical grounds. Strict respect for ethical standards in research should be the second basic tenet of a regional health science and technology policy.”

This policy would have the challenge of improving the effectiveness and the efficiency of national health systems and health services, and of promoting the advancement of scientific knowledge in the health sector, especially in fields that are neglected by the most developed scientific centers. Similarly, at least in the countries of the Region with some installed industrial capacity, this policy would promote technology development and innovation in health care equipment, pharmaceuticals, vaccines, and other essential health supplies. In a word, a health science and technology policy for the 21st century should be completely focused on transferring the knowledge acquired to industry and to society as a whole.

This approach suggests that health science and technology policy should be comprehensive, involving a wide variety of actors, working in many areas of knowledge and not only in the health and biological sciences. This extensive, comprehensive nature on the one hand, and its social commitment on the other, suggests that health science and technology policy for the 21st century in the Region should follow a model of complementarity. In the fulfillment of its mission, according to the principles underlying national health policies, its priorities and general objectives are linked to the health care needs of the population and to attaining higher standards of equity in health. However in practice, the underlying principles of the practices and methods of scientific research and technology development can often be different from those governing health policy.

2.4 Priorities in Health Research

A basic principle of health science and technology policy should be the need to increase the motivational capacity and selectivity of the system for promoting science and technology. For this policy to work in an environment that promotes the rational use of resources, it is necessary to develop an agenda of health research priorities.

In developing this agenda of priorities, care should be taken to make it consistent with national health policy. However, it will not mesh perfectly with the agenda of health needs of the population. On the one hand, meeting health needs is not always a dependent variable of health research. On the other, concerning knowledge and practices in science and technology, adequate concepts, methodology, or tools are not always available to arrive at solutions through research.

Moreover, research priorities should not simply be subordinated to short-term goals. Health and health research are both urgent. However, the time frame, methodologies, and strategies involved are different. The idea of

inclusiveness—or incorporating all stages of the chain of knowledge into the policy—should be expressed when setting priorities. Accordingly, the main health problems whose solutions depend on research will be identified, and these problems will require different research approaches. Short-term operations research, basic research, and even strategic research will be considered. The research agenda will also witness the development of new products and processes for the health system by the private sector and the health services themselves.

Based on the international knowledge amassed in setting research priorities, we know that there can be more than one possible agenda of priorities, depending on the orientation of the health research policy, which should obey the principles and guidelines of that policy. Also, the agenda should be based on the available state-of-the-art scientific and technological knowledge, whose technical underpinnings should involve the best tools and most up-to-date evidence.

Several methodologies can be used in setting research priorities. However, it should be understood that determining the agenda and its implementation is basically a technical and political process, whose main challenge is facilitating the participation of different actors—e.g., researchers, managers, health workers, organizations of service users—with different experiences, interests, visions, and languages, in terms of both research and health. The ability to hear all the voices of these actors and to coordinate them to select the contents of the agenda is the most important aspect, and this essentially involves building a political consensus around that agenda.

It is therefore necessary to view the agenda of priorities as a tool subject to ongoing discussion and updating, capable of staying ahead of the needs of local realities and the new knowledge demanded by the fast-paced, ever-changing modern world.

2.5 Health Industry Complex

A science and technology policy should pay special attention to technology development and innovation. Thus, it should include proposals and actions specifically geared to the health industry complex. In the countries of the Region, this will depend on the structure of the industry and, in some sectors, the structure of competition and the important academic research capacity that has been built up. It will also stem from the fact that the countries have a great need for primary health industry inputs—prescription drugs, vaccines, sera, blood products, diagnostic kits, and equipment—and that adequately addressing these needs requires the highest level of technical training and, in several areas, technological autonomy and self-sufficiency.

Each of these health inputs includes specific industry and marketing characteristics, but what they all have in common is that they are part of a very dynamic and highly profitable global industry. With respect to drugs and vaccines, we have witnessed a real technology revolution in recent decades. In terms of industrial organization, this revolution has prompted a movement toward the concentration of capital and technology, resulting in gigantic multinational

conglomerates that compete for and divide up the global market for pharmaceuticals and vaccines. In this context, there is a need to draft a policy on technology and innovation in health, which, in itself, suggests the magnitude of the difficulties to be faced.

Without a doubt, the most challenging and difficult area is drugs and pharmaceuticals, where the concentration and dividing up of the global market is very advanced. Some countries of the Region need to resume a competitive stance with regard to developing countries such as China and India. The internationalization of the drug market suggests that partnerships with multinational companies that include mechanisms for technology transfer are also contemplated.

In the field of vaccine and sera production, perhaps the most important challenge is preventing the producer countries that use technology for developing new generations of vaccines to far outdistance the producer countries of the Region.

In building the technology component of health research policy, it is important to use reliable information on the market, the technology potential available nationally, and, primarily, national needs. Thus, there is a need for prospective studies that use information to shape policy, mobilizing the principal actors and public and private decisionmakers.

One of the main characteristics of a health technology and innovation policy is its flexibility. The setting of priority targets, the most suitable institutional arrangements for each objective, and the promotion mechanisms used should be based on an evaluation of each specific situation. Whenever possible, institutional arrangements should give special preference to public and private enterprises, key agents in technology development, and, primarily, innovation. Concerning promotion mechanisms, these should range from direct financial support for project development in the companies, to financing arrangements coupling research institutions and companies, to commissioning research institutes and universities for specific projects.

3 - DRUGS AND INPUTS

Given that drugs, pharmaceutical products, and other health inputs are considered important technologies, incentives to formulate, implement, and enforce national policies should include guidelines and actions to guarantee the availability of, access to, adaptation and acceptability of such technologies, as well as adequate purchasing power of the countries. In terms of regional action, these guarantees are directly related to commitments to adhere to the principles agreed upon in the Doha Declaration, which states that "public health" should take precedence over industrial property rights. A multilateral cooperation agenda structured to make it compatible with the guidelines established thus far should facilitate joint action by the countries of the region to overcome the problems in countries in terms of little or no capacity to manufacture drugs or insufficient market demand. Such efforts would be based on political-institutional guidelines based on

the principle of solidarity among nations. Other issues should also be included in this priority agenda:

- Promote the adaptation of national legislation in order to make the maximum use of flexible areas in international agreements on patents, with a view to facilitating bilateral agreements for the procurement of drugs and inputs, and to expand and improve the productive capacity of the countries of the Region, which can effectively ensure the full exercise of internationally negotiated safeguards;
- Strengthen the regional exchange of initiatives that fortify the governments' capacity for managing access to drugs and inputs, involving the processes of research and development, production, distribution, dispensing, and rational use, with emphasis on generic drugs and antiretrovirals;
- Encourage national policies and multilateral relations aimed at acquiring and developing technologies for the production of drugs and other costly inputs for the health systems of the countries of the Region;
- Promote regional development and harmonization of clinical protocols and therapeutic guidelines as a cost-effective way of incorporating technologies in the health services and expanding access to drugs and other health inputs; and
- Develop cooperative systems to conduct drug feasibility (cost) studies and assessments with a view to incorporating technologies into the health systems of the countries of the Region.

4 - HEALTH INFORMATION

In the globalized system, information assumes a strategic function as an essential input for decision-making and social participation in all fields of knowledge. This change in paradigm imposes new forms of information management and ways of using technology on government institutions and national and international agencies. This shift in paradigm, which ushers in a new information management process, should be preceded by an agreement on a visible component for this area in the national health policy, with the construction of an inclusive agenda.

Information assumes strategic importance in the scientific interface between health and society in terms of the impact of policies and their results on the health situation of individuals and populations. Issues concerning the link between health and society have been raised in discussions on health system management, especially in regard to social control and participation, health promotion policies and programs, and reducing disparities. In this regard, in keeping with internationally observed trends, documents setting out guidelines for national science and technology policies have emphasized the role of mediation between science and society. This has been especially true for joint action in the

areas of communication, education, and scientific information dissemination, with a view to building a collective science and technology culture and to establishing processes for its participatory management and effective social controls.

In Brazil, these issues have increasingly drawn the attention of managers and representatives of the population, as evidenced in the deliberations of recent health conferences. The creation of a national public health communication network and initiatives such as the Radis, Museu da Vida (Museum of Life), VideoSaúde Distribuidora programs, as well as “telecenters,” are testimony to efforts to make information available to all and to increase opportunities for public discussions about science and technology. Moreover, they demonstrate that the ongoing circulation of knowledge, experiences, and information should be geared to expanding the capacity to make judgments and providing opportunities for participation by sectors historically excluded from the public policy-making, management, and evaluation processes. These experiences can be shared, and similar initiatives can be expanded to other countries of the Region and adapted to local/regional cultures.

With a view to improving information, another strategic component to be considered is the need to provide training for health information professionals, with emphasis on post-graduate programs. In most countries, there is an acknowledged lack of teaching initiatives in this area. In fact, health information has become a specific field of intervention, diversified in terms of phenomena and processes, which is constantly changing and has increasingly called for specialized professionals. This deficiency consists of a lack of research, especially operations and applied research, and the development of solutions. In addition, a shortage of skilled and mid-level professionals has been identified, while the expansion of technical training initiatives has posed a continuing challenge. Bearing in mind that this is an emerging area of growing importance on public science/technology and health agendas, investments in this regard should be strategically oriented. In addition, a broad-based digital literacy project will be required to bring a major segment of the population of the Region on board that is still excluded from the so-called information society.

In the field of information, both internationally and in local settings, collaborative networks have historically been one of the most successful strategies and have really taken off in recent years thanks to the Internet. **The work of PAHO can increasingly be seen through the BIREME network—a national and international scientific and technical information network.** BIREME’s role is to promote, strengthen, and expand the flow of health information in Latin America and the Caribbean through technical cooperation between producer institutions, intermediaries, and users of scientific and technical information in health, through the construction and operation of the Virtual Health Library (VHL). BIREME has ensured ongoing development and management of products, services, systems, methodologies, and technologies in the information field and has helped to increase the visibility, access to, and quality of scientific output in most countries of the Region. For the past 37 years, Brazil, as the largest producer and user of

health information in the Region, has been a partner of PAHO/WHO in creating and maintaining BIREME.

Development of the VHL, coordinated by BIREME, aims to promote, via the Internet, a **cooperative, decentralized network of scientific and technical information sources in health, providing integrated, efficient, and universal access, and promoting the use of up-to-date, relevant information**. Launched in 1998, the VHL was consolidated as a PAHO strategy and model of equitable access for the cooperative management of information and knowledge in health in Latin America and the Caribbean. It has become a nexus for cooperation, bringing together producers, intermediaries, and users of scientific and technical information in health.

BIREME has played an active role in major initiatives and international networks in the area of scientific information, including:

- Rede SciELO ><http://www.scielo.org>< “Scientific Electronic Library Online” – a selected collection of scientific journal articles published on the Internet, which is being expanded progressively in Latin America, the Caribbean, Portugal, and Spain;
- INASP/ICS ><http://www.inasp.org.uk>< – International Network for the Availability of Scientific Publications, participating on the International Advisory Committee;
- SHARED ><http://www.sharingpoint.net>< – Scientists for Health and Research Development. BIREME participates on the Advisory Committee and is responsible for SHARED development in Latin America and the Caribbean;
- ScienTI ><http://www.scienti.net>< – International network of information sources in science, technology, and innovation, representing an expansion of the Lattes platform (of the Executive Secretariat) for Ibero-American countries;
- Scidev.Net ><http://www.scidev.net>< – International scientific outreach site geared to the socioeconomic development of the developing countries, and Advisory Committee participant;
- Research initiative of the European Community, involving the national science and technology councils to develop an information support system for scientific research. BIREME participates on the Advisory Committee;

The expansion of access to and the exchange of information in the Region of the Americas through the BIREME network is an important area of work for PAHO. This can be done by linking national production in specialty areas of the network, and also by facilitating collective and cooperative access to and use of scientific information.

The recent national and regional policy-making processes in science, technology, and innovation have significant implications, given the deteriorating outlook, unresolved problems, new global threats, an environment of widespread

competition, the need for selectivity in research and development investments, combined with competitive needs, opportunities, and advantages, not excluding long-term investments. This selectivity should be based on systematized information to aid researchers and managers in decision-making. Policy-making should consider the structural function of information and its technologies in coordinating health care services with the national science, technology, and innovation systems. This function is also essential in management, research, development, and innovation processes, as is the exploration of its potential for introducing, implementing, and evaluating this policy and its results.

Consequently, it is essential that health information policy take ongoing activities into account and that it include the **development of projects for the socialization of scientific and technical knowledge, integrating local and international initiatives for disseminating information, and above all, providing for the exchange of and access to knowledge and the availability of local/regional information.** This policy needs to include a **strong, mandatory research and problem-solving component.** This component should include information-related and information science activities, as this will be the vehicle for developing and consolidating conceptual, methodological, technological, and managerial training. Specifically, the agenda should stimulate investment in research and problem-solving, with an attractive cost-benefit ratio and the use of “open” technologies and/or technologies developed from free software, geared to the automation of information in health services units, and it should consider aspects associated with management, research and development of new products and processes, and new information-based intervention methodologies, *inter alia*.

Besides issues related to the circulation and use of information of interest in the field of health for research and the development of technology solutions, for training, and for promoting the use of information to support decision-making, the capture and processing of data is also an area that should be targeted for multilateral cooperation efforts. We have already discussed the problems facing national systems and the regional integration process with respect to the lack of information and standards for harmonizing the existing limited databases. As mentioned above, in this case, research and technical problem-solving can employ a complimentary strategy, since some countries of the Region are at different stages in the development of their own solutions. **The use of information-sharing and cooperation methodologies that PAHO is already testing, such as its observatory program, may prove important tools for the Region of the Americas.** Initially, health information observatories would be implemented with PAHO’s active participation in subregional blocs that are already taking shape, with a view to identifying technologies and successful experiences for dissemination to other countries, taking into account their respective stages of development, operating capacity, and specific policies in this area. Methodologies to identify and share experiences through PAHO Collaborating Centers also appear to be suitable for this purpose.

In addition to cataloging solutions and successful experiences, one confirmed need, which is being addressed in the MERCOSUR¹⁹ countries, has proven to be relevant and may be addressed even faster with help from PAHO. It is an initiative to identify users being developed by Brazil for its entire population and by other countries for population segments identified in national projects. This initiative appears critical for setting up national information systems and may prove essential for integrating the information systems and even the health systems of the countries of the Region. Similarly, **the idea of introducing technology and information standards could receive a significant boost if PAHO were to take on a more visible role.** Another mechanism that the Organization has already employed with positive results could be used to promote an international mechanism to discuss these standards: the Interagency Health Information Network (RIPSA). This network was created through cooperation between PAHO and the Ministry of Health of Brazil, as a means of consolidating cooperation among national agencies in the production, processing, and dissemination of health information in order to assess and expand its appropriate use for decision-making. This network, in coordination with PAHO's Regional Core Health Data Initiative for the harmonization of indicators used in the various countries of the Region, could be used as a forum to discuss these standards--not only for use in information systems with regular data collection, but also for sample surveys and studies.

These health information initiatives will facilitate major progress in the field of information in the countries of the Region, which will no doubt result in benefits for the health systems themselves and for the health of the peoples of the Region of the Americas.

Finally, it is important to emphasize that this document is a preliminary proposal, presented as a contribution to the debate of the Working Group on PAHO in the 21st Century, inasmuch as it was prepared on the basis of limited experience and should be enriched with contributions from the other Member States of the Organization.

¹⁹ Gallo, E.; Costa, L. (Org.). **Sistema Integrado de Salud del MERCOSUR / SIS-MERCOSUR: una agenda para integración.** Brasília: Pan American Health Organization, 2004.