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BIREME / PAHO / WHO

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Abbreviations used

- **DeCS.** Health Sciences Descriptors
- **IAH.** Interface for Access of Health Information
- **LILACS**. Latin American and Caribbean Health Sciences Literature
- **MEDLINE**. Medical Literature Analysis and Retrieval System Online.
- **MeSH**. Medical Subject Headings
- **NLM**. National Library of Medicine.
- **PAHO**. Pan-American Health Organization
- **SCAD**. Cooperative Service for Accessing Original Documents
- **SciELO** Scientific Electronic Library Online
- **ScienTI** International Network of Information and Knowledge Sources for Science, Technology and Innovation Management
- **VHL.** Virtual Health Library
- **WHO** – World Health Organization

1 Preface

1.1 About BIREME

Year after year, BIREME has been following its mission of being a center dedicated to scientific and technical health information for the region of Latin America and the Caribbean. Founded in Brazil in 1967, under the name of Regional Medicine Library (which the acronym BIREME comes from), it has always met the growing demand for up-to-date scientific literature from the Brazilian health systems and the communities of healthcare researchers, professionals and students. Then, in 1982, its name changed to Latin-American and Caribbean Center on Health Sciences Information so as to better express its dedication to the strengthening and expansion of the flow of scientific and technical health information across the region, but kept the acronym.

Networking, based on decentralization, on the development of local capacities, on sharing information resources, on developing cooperative products and services, on designing common methodologies, has always been the foundation of BIREME's technical cooperation work. It has been like this that the center established itself as an international model that fosters professional education with managerial and technical information with the adoption of information and communication paradigms that best meet local needs.

The main foundations that gave origin and which support the existence of BIREME are following:

- ✓ access to scientific and technical health information is essential for the development of health;
- ✓ the need to develop the capacity of Latin American and Caribbean countries to operate their sources of scientific-technical health information in a cooperative and efficient manner;
- ✓ the need to foster the use and to respond to the demands for scientific-technical health information from governments, health systems, educational and research institutions.

BIREME, as a specialized center of the Pan-American Health Organization (PAHO)/ World Health Organization (WHO), coordinates and conducts technical cooperation activities on the management of scientific information and knowledge with the aim of strengthening and expanding the flow of scientific health information in Brazil and in other Latin American and Caribbean countries as a key condition for the development of health, including its planning, management, promotion, research, education, and care.

The agreement that supports BIREME is renewed every five years by the members of the National Advisory Committee of the institution (PAHO, Brazilian Ministry of Health, Brazilian Ministry of Education and Culture, Secretary of Health of the State of São Paulo, and Federal University of São Paulo – Unifesp). The latter provides the physical infrastructure necessary for the establishment of the institution.

In 2004 the institution took on the responsibility of becoming a knowledge-based institution.

2 Presentation

The VHL 2010 Guide assembles and systematizes information and knowledge that express the state of the art of the Virtual Health Library Network (VHL) in its 12 years of evolution. The Guide is organized into two sections:

1. About the VHL - where it is presented the conceptual framework that supports the network;
2. Operation of the VHL – set of procedures, methodologies and applications for management and operation of the VHL. This section is supplemented by references to manuals of sources and flows of information that make up the VHL model.

This Guide, built collectively by the VHL Network, aims to share with all the producers, intermediaries and users, in an equitable way, the experiences, results and best practices that constitute the knowledge accumulated in these 12 years of the VHL Network.

3 About the VHL

The Virtual Health Library (VHL) is a network of information management and sharing of knowledge and scientific evidence in health, which establishes itself through cooperation between institutions and professionals in the production, intermediation and use of sources of scientific information in health, in open and universal access on the Web.

Consolidated as a strategy of technical cooperation in scientific information in health in the region of Latin America and the Caribbean, and extensible to other developing regions, the VHL is promoted and coordinated by the Pan American Health Organization – World Health Organization, through the Latin American and Caribbean Center on Health Sciences Information (BIREME/PAHO/WHO).

The VHL is a result of the evolution of technical cooperation in information on health sciences run by BIREME since its creation in 1967. Initially, this model of technical cooperation was based on essential functions of a regional biomedical library, promoting the strengthening and shared use of collections and services among libraries. At the end of years 1970 this model was expanded, adding to the library the function of information and indexing center, a moment when BIREME took over the coordination of the bibliographic control of scientific and technical literature in health, published in Latin America and Caribbean (LA&C) journals. This action was crucial to start the movement of the systematic promotion of the regional and international visibility of scientific and technical production in health (LA&C).

In the late of the 80s, the functions of the bibliographic control of the scientific production and bibliographic research services began to be operated in a decentralized way under the responsibility of countries in the region, strengthening the national capacity in infrastructure and human resources for management of health information. In this period, the LILACS database started to be produced in a cooperative way, receiving contributions from all countries. The controlled vocabulary of Health Sciences Descriptors (DeCS) had its translation into Spanish and Portuguese, and expansion with new categories, and it was also adopted in indexing and multi-lingual search of the scientific and technical literature of LA&C and international. The cooperative operation of the bibliographic control as well as other products and services of the technical cooperation was conducted by means of the Latin American and Caribbean System on Health Sciences Information, coordinated by BIREME and shaped by national systems which were set up using a network of libraries and documentation centers.

From the years 1990 the model of information management and knowledge sharing in health converged to the new paradigm of the Internet as a mean of production of sources and flows of scientific and technical information where an intensive process of disintermediation and direct operation of the online information sources by users prevails. The VHL is then launched in 1998 at the IV Regional Congress on Health Sciences Information (CRICS4) held in San Jose, Costa Rica through the Declaration of Costa Rica “Hacia la Biblioteca Virtual en Salud”.

The evolution in the technical cooperation in health information of PAHO/WHO through BIREME represented a gradual process of assimilation of new paradigms, without any break with the models previously used. The successive information management and scientific communication models have always been oriented to the promotion of the cooperative work and in network which is the common point present in all these models.

With the construction of the VHL, also in a cooperative way and in network, the development of capacities and infrastructures to facilitate wide access to information for health are gradually strengthened.

After 12 years of having been launched, all the countries of Latin America and Caribbean contribute or use, directly or indirectly the cooperative products and services promoted through VHL. Its network is formed by more than two thousand institutions distributed in 30 countries, including countries of the southern hemisphere, of other regions of the world, which are also adopting the model.

As principles, the VHL seeks equity in access to information in health; the promotion of alliances and consortia to maximize the shared use of resources; the promotion of cooperative work and exchange of experiences; its decentralized development and operation at all levels; the development based on local conditions; and the establishment and application of integrated mechanisms for assessment and quality control.

Among the advances in the processes of information management nationwide stand out: the adoption of VHL as an element of public policies on health information; the investments in improvement of the information infrastructure as the increase of connectivity and expansion of the Internet access; the continuous training of human resources in technology and methodology related to the VHL; the collaborative development of sources of information and knowledge sharing through collaborative spaces.

The VHL, as strategy, model and operational framework of technical cooperation represents notable innovation in information management, knowledge and scientific evidence to the strengthening of the processes of formulation and decision making on policies, planning, management, research, education, services and health care, introduced according to the social, economic and cultural conditions of the region.

3.1 The VHL as strategy to equity in health

The VHL network is oriented to create, strengthen and develop capacities and national infrastructures of technical and scientific information, with the aim of providing equitable access to knowledge, and updated scientific evidence.

The significant increase of the international positioning indicators of scientific production of Latin America and Caribbean and the access to global information flows confirms the strategic character of VHL to promote equity in health in the region. These indicators show the progressive use of information and knowledge by the increasingly wide and diverse publics of the health area, including managers and decision makers, professionals of health care services, researchers, teachers, students and the general public.

The VHL exceeds the limits of Latin America and the Caribbean region and consolidates as a global model of technical cooperation in health information, being adopted particularly in south-south cooperation in order to contribute to the integration between partners in developing

countries located in the southern hemisphere. Likewise, it collaborates with developing regions through its association with other initiatives and information networks in those regions

The network cooperative work for the production of information sources through the systematic cooperation among local, global and national institutions added to the decentralization of management mechanisms result in a collective construction of the VHL. This collective character ensures that the VHL operates autonomously being preserved in relation to political and institutional changes of the different national contexts, constituting a public good.

The VHL aligned to the mission of PAHO of information democratization to achieve the goal "Health for all", is a strategic element for the promotion of equity in health and improving of living conditions of people in the Americas.

3.2 VHL as a model of information management and knowledge sharing

The model of information management adopted by the VHL is based on the premise that the access to information and scientific and technical knowledge are social determinants for health development.

The processes of decision making in health area are more efficient and effective when subsidized by quality information sources. The action capacity of the actors involved in these processes including managers, professionals, researchers, students and citizens, increases directly and proportionally with the level of quality information and knowledge available. The challenge is to establish links between knowledge production and the use of this knowledge to strengthen the relationships between science and society.

This consciousness about the importance of information as raw material to action passes through the different dimensions of health, from the spaces of definition of public policies by planners and managers, until the adoption of healthy behaviors and defense of the constitutional right to health by population. The dissemination of scientific knowledge is therefore an essential prerequisite to make actions and effective changes in health practices and to establish social and health policies.

As a general plan, the centrality that VHL attributes to the access and use of information is aligned with the paradigm of the Information or Knowledge Society. Initiatives included in this context, such as the Open Access movement, digital and informational inclusion, social use of technological

resources, among others, represent the challenges with which the VHL contributes in a determinant way to overcome them.

In Latin America and Caribbean the situation on health is aggravated due to the profound socioeconomic inequalities, the extreme poverty and inequity in access to basic health services. To use the information and knowledge for the development of the health of people of the Americas requires the adoption of approaches that are constantly renewed in a dynamic process of innovation.

The more general view of the Information Society as well as the particularities of the region demonstrate the relevance of the adoption of mechanisms for sharing quality information in order to allow the countries to exchange accumulated experiences and adapt them to the circumstances and local needs. The network cooperative work in the production of the information sources ensures the shared use of standards and quality control criteria that give reliability to the information assembled in the VHL, unlike the other search mechanisms that operate on the internet.

This model is conforme through the contribution of different areas of knowledge, specially information science, scientific communication, library science, scientometrics, computer science, health sciences among others.

3.3 VHL as an operational framework of cooperative work networks

The operational framework that structures and guides the execution and development of the VHL is based on cooperative work network, which is operationalized in three dimensions, different among themselves and intrinsically related and complementary: the social networks, content networks and the networks of learning and informed environments (AAI). The VHL is the virtual space for which these three dimensions converge resulting in a single network. The meaning of network used here refers to the structure and shape that represents the dynamics of interrelationships set up among the institutions, people, systems, information and knowledge, that constitute and go through each of these dimensions.

The social network is constituted by public or private institutions, nongovernmental organizations and instances of government of management, researches, teaching and services on health, and

professionals who act in the VHL as producers – agents of production information , knowledge and scientific and technical evidences; intermediaries – information professionals working in many different institutions of information and documentation, such as libraries, archives and documentation centers, and users including managers, professionals, researchers, students and citizens in their right to information and health.

The social network is a critical factor for the sustainability of the VHL in the achievement of its goals to provide scientific and technical information in health and promote the knowledge sharing network. The actors that constitute it, reorient its production activity and the information and knowledge organization to a new work mode based on the commitment of network production and cooperative operation in products network - the VHL information sources, such as collections of full texts, evidences and others; services – express by the different contexts of presentation of the products, according with the information needs of the potential users, for example, language option, thematic searches, photocopies and others; and events – represented by the flows of information generated on time and dynamically in the meetings, conferences, forums and other channels of communication and knowledge sharing.

By integrating the VHL, the social health networks strengthen the visibility of the scientific production, increase the capacity to exercise its practices with more information and potentiate the communication and knowledge exchange among its pairs

The greater the level of articulation and socialization of the social network, the greater is the capacity of the VHL to act as a space of convergence and products, services and events reference for health information. The set of all these products, services and events forms the sources and promotes the information flows in health forming, in turn, the dimension of the content network of the VHL.

An information source is any resource that responds to a need for information of the users. In this conception, the VHL extends and enriches the traditional collections of the libraries, mainly constituted by bibliographic documents, and aggregates new types of materials to these collections, as full texts, evidences, learning objects, news, collaborative spaces, search engines, manuals, factual information such as directories of institutions and events, among others.

The institutions that compose the social network of the VHL, share the responsibility to the production and operation of the content networks. The adoption of the cooperative work in network is determinant to the increase of the accessibility and visibility of scientific information in health in the region.

For the institutions and the contents to be structured and operated as cooperative networks it is necessary to create mechanisms that potentiate and strengthen the ties and exchange relationships between these agents. The environments, both actual and remote – training events, participating institutions of the VHL, virtual collaborative spaces and others – are strengthened with functionalities and practices – publication of news and reports, socialization of agendas and sharing of organizational information – increasing continuously and increasingly their learning capability. In the VHL, these mechanisms constitute the dimension of the learning and informed environments networks (AAI).

Thus, the institutions and people that participate to the VHL are stimulated to share information, experiences and knowledge to solve problems and creation of innovative processes, completely exploring its capacity to act as learning and informed environment. The learning and the social participation help to create the necessary connections between the knowing and doing and the collaborative spaces promote approaches to get around the various knowledge gaps.

The dynamics of networking cooperative work proposed by the VHL in line with the paradigm of the Internet, enables new ways of relationships based on the collaboration, characterizing an important resource to collective achievements. The force of the VHL is to potentiate the interconnections between the knots of the social networks, of the contents and of the learning and informed environments, contributing to the collective construction of an identity and a common public good.

4 Operation of the VHL

4.1 Social Networks

The social actors of health and information, which are an inherent part and constitute the dimension of the social network of VHL, represent one of the pillars for the success of the network, acting as agents of the actions of cooperation in scientific and technical information. (See 3.3. VHL as an operational framework of cooperative work networks)

The first step to the development of a VHL instance is the identification and the articulation of the social network and definition of responsibilities for the cooperative work. The composition of this network should seek the greatest possible degree of representativeness of the producing institutions, intermediaries and users of information reference in its field of knowledge, and can be expanded gradually and continuous to others social actors. The social network of a VHL is, therefore, a dynamic dimension which is remodeled in consonance with the reality of scientific practices.

Normally, one or more institutions take the leadership in this articulation process. The union of heterogeneous groups that are interconnected by common interests is a contribution of the VHL to strengthen and extend the capacity for dialogue and integration between the actors of the same social network.

Each of the integrated initiatives of the VHL develops in the geographic institutional and thematic scopes, in a complementary way.

- Regional Thematic Instances – In the regional thematic instances a set of countries assumes the responsibility of mobilization and coordination of the institutions that are producers, intermediaries and users of information of a particular thematic area for operation in the VHL.
- National Thematic Instances – In the national thematic instances, a set of the institutions that are producers, intermediaries and users of information about of a specific country meets to ensure the representativeness of a particular subject in a certain area in a national context in the VHL.
- National Instances – In the national instances of the VHL, the set of more representative institutions producers, intermediaries and users of health information of a particular country meet to ensure the development of the VHL in a national scope, accompanying the development of national thematic initiatives in the country.
- Institutional Instances – The institutional instances of the VHL are linked to relevant and numerous scientific and technical production health institutions that adopt the VHL model as policy and operational framework for information management produced institutionally.
- Biographical Instances – The Biographical instances of the VHL are dedicated to register professional trajectories of personalities that marked the history of health and biomedicine. Therefore their social network has the compromise to assemble contents and develop the VHL, considering the person and its realization and production as main subject.

The participation in the instances of the VHL is always institutionalized; therefore, network members are integrated as legitimate representatives of institutions which are linked to them. This characteristic preserves the continuous participation of the institutions on the network, even though their representatives can be changed. The participation of institutions in the network is formalized through document commitment and of justificative institutional, as an adhesion term, cooperation protocol or minutes of meeting.

In this sense, the adoption of the model by leaders of the areas related to the instance is strengthened, as well as hold up the support of the related authorities, manifested inclusively in the elaboration of a positioning document on behalf of VHL.

The VHL proposes a change of paradigms of work of the social network, since it requires the use of methodologies and technological tools of collaboration in network. This change of paradigm increases the abilities and competences of social subjects in the production and application of knowledge in health, also increasing the participation of these social subjects as producers, intermediaries and users of scientific and technical information in health.

4.2 Content Networks

The VHL, in its dimension of library, is expressed through its collection of sources and information flows, defined as any resource – including products, services, researchers, professionals, and communities of practice, news, and others – which respond to a information need of the users of the VHL.

As we have seen, the management and production of information sources is one of the pillars of the VHL (see 3.3. VHL as an operational framework of cooperative work networks, to fulfill its purpose of promotion of the access to and use of information and of scientific and technical knowledge in health, in an equitable manner by managers, researchers, teachers, students and professionals of the research teaching and health care systems and to the general public.

The responsibility for the management and operation of collections of information sources of the VHL is shared by participating institutions. It is for these institutions the definition of their mode of introduction and participation in the development of the VHL. The definition of these different roles is explicited and consolidated in the Responsibility Matrix, a document that is part of the development plan of the VHL, and that indicates for each source of information of the VHL, which is the institution that coordinates and what are the cooperatives. (See 4.5.1 Network Instances Management)

Among the activities of management of the information sources, stand out the definition of scope, quality control of information, updating and validation of registers, accompaniment of decentralized and shared operation by different institutions, and others. (See 4.5.1 Network Instances Management)

The producers, intermediaries and users of information sources of the VHL, in consonance with the paradigm established by Internet, interact with each other and with the content networks in a dynamic context. Thus, the functions and activities related to the production, intermediation and use of the information sources are operated and converge to the VHL space on the internet.

Therefore, the VHL, as space of convergence of producers, intermediaries and users of scientific and technical information in health on the internet, contributes to reduce the high dispersion of information resources on the Web and to generate reliable and qualified contents. The adoption of the cooperative work also results in optimization of resources through network with the use of patterns and standards that impact positively in the reduction of inconsistencies in information, decisively contributing to increase the visibility and access to health information.

The scientific character and the quality control of the information, published the commitment to the preservation of the collections and guarantee of access to the complete documents, either in electronic format or paper are some of the characteristics of the information sources of the VHL, which distinguish them from other contents available on the Internet. It is worth stand out that unlike the Internet search engines, VHL promotes the generation and production of information sources and not only the retrieval of contents already available on the Internet.

Thus, VHL is conceived as a network of information sources produced in a decentralized manner, by means of technical cooperation among countries and institutions of Latin America, The Caribbean and the global South. The decentralization of network management and operation based in the development of local capacities, is a crucial issue aspect for the political sustainability of the VHL, being a determinant factor for the preservation of its character of public domain and common property of health systems at national and regional range. The VHL as a resource of free access ensures by democratic means the participation of all in its production, management and use.

To make possible the management and operation of information sources through network cooperation, BIREME promotes the strengthening of the capacities of countries and institutions in adoption of methodologies, technologies, parameters of interoperability and quality, besides cooperative services, information events and programs of permanent education, presented as follow.

4.2.1 Typology of Information Sources

The organization of the information in VHL gathers and structures the information sources according to the nature and specific features of each one of them, resulting in virtual shelves of the library, which brings together the different collections.

The adoption of a standard organization by all instances of the network creates a common language that facilitates the identification, operation, recovery and association among the different sources of information. The classification of information sources according to a typology is also a relevant factor for the establishment of cooperation between institutions, because it is used both for defining the division of responsibilities as for the integrated operation.

The scope of information sources in the VHL enlarges the composition of the traditional collections of libraries, allowing the inclusion and interoperation of scientific literature with

collections of other kinds, as full online texts, scientific evidences – in the form of systematic reviews, technological evaluations, multimedia, instruction policies – learning objects, collaborative spaces and factual information – as the directories of institutions and events, news websites and blogs. The information sources of the VHL are organized and classified into six types: 1) secondary sources, 2) primary sources, 3) tertiary sources, 4) informational inclusion and dissemination services, 5) communication and collaboration 6) Integration components.

1. Primary Sources: are those related with the products originated by scientific research – scientific articles, theses, essays, monographic documents, governmental or from international organizations, congress annals, legislation and non-conventional documents – such as the research reports that constitute the gray literature – published in full text by electronic means. It also includes numerical databases of research and statistical census. Examples: SciELO collections and institutional repositories of full texts.
2. Secondary sources: they are records of reference from primary sources systematized in indexes, referential databases and directories. The databases that adopt the LILACS methodology and the directories of researchers, institutions and projects are examples of secondary sources in the VHL.
3. Tertiary sources: they refer to contents organized for instructive purposes, such as learning objects of the Virtual Campus in Public Health (http://portal.campusvirtualsp.org/virtualcampus/drupal/) and as support to decision making, such as systematic reviews of scientific evidence. Example: Cochrane Library (http://cochrane.bvsalud.org/).
4. Informational inclusion and dissemination services: a set of services of informational inclusion and promotion of VHL access, both to users connected to the internet as communities without connection, for example, the installation of collective and public spaces such as VHL Stations – (see item 4.5.2 Dissemination and Promotion). Also include update services and user service, such as the service of bibliographic commutation SCAD (Document Access Cooperative Service) and the services of personalized access, such as “my library”, seeking to satisfy the needs for information of each user individually.
5. Communication and Collaboration: information sources oriented to socialization of information and the exchange of knowledge through online collaboration. Examples: Newsletter / VHL News Network VHL Collaborative Spaces, blogs, bulletins, forums, online meetings, chats and virtual communities.
6. Integration components: norms, standards, methodologies and common applications adopted through all instances of VHL for its integration into a single network. Include the terminologies, for example, the Health Sciences Descriptors (DeCS), manuals and software for the management and operation of sources and information flow in the VHL.

This typology represents a notable advance in relation to the traditional collections of libraries based almost exclusively on scientific literature. Thus, VHL meets widely, through the development of products, services and events of information, the needs for information of geographic and thematic instances. With this objective a set of methodologies and applications covers the information sources of the VHL model. Described as follow.

4.2.2 Methodologies of VHL's Information Sources

One of the types of information source that comprises the VHL is the set of components integrators (type 6, See in 4.2.1 Typology of Information Sources), constituted through methodologies that define the function and purpose of the sources – such as definitions of the structure of fields, standardization of data description, among other aspects, expressed in the different manuals, guides and procedures. It also makes part of this set of methodologies, technological resources –applications, language protocols, among others – associated with each source of information. The technological resources in VHL are developed and adopted in a coherent manner and consistent with the function of information sources, with the objective of allowing its implementation and operation.

All the methodologies and applications that comprise the VHL, aim to promote and support the management and operation of the information sources in a decentralized way through network cooperation, expanding the visibility and accessibility of the content network.

The development of methodologies and applications is shared through the network, in a decentralized and collaborative manner, under BIREME coordination, seeking to involve and use the different competences installed in institutions in the creation processes from the information sources. The sharing of good practices in the use of methodologies and technologies in the VLH scope valorizes the transparency of interactions between all participants of the network, especially the intensive use of collaborative spaces.

The Developers Network (RedDes), for example, aims to strengthen the social network constituted by the developers of networks VHL, SciELO and ScienTI, promoting the development and innovation of services and products of information collaborative way in the network.

The information sources of VHL include collections of different kinds, according to the typology described in 4.2.1 Typology of information sources, which comprise referential information, full texts, directories, and others. The geographic and thematic instances of VHL decide upon the adoption of these sources, according with its demands and needs for specifics information.

Considering that the development of information sources is a dynamic process and is in constant evolution, the content network of VHL enlarges through a continuous process of innovation that seeks to meet the demands of the thematic areas and countries.

Following, the description of methodologies and applications that constitute the information sources of type 6 - Integration components, adopted by VHL instances and that integrate it into a single network:

- LILACS methodology, created for the development of the index of Latin American and Caribbean Literature in Health Sciences (LILACS): to collect, organize and provide a network of bibliographic information about the scientific-technical health literature in the countries of Latin America and Caribbean. As a methodology, it comprises a set of manuals and technologies.
- LILACS Bibliographic Description and Indexing Web (LILDBI-Web): a software that operates the supply tasks, maintenance and quality control of the information sources referential that follows the methodology LILACS in a decentralized way and online. The applicative is described on http://metodologia.lilacs.bvsalud.org > Methodology and Technology > Guides, manuals and technical notes or http://bvsmodelo.bvsalud.org > Methodology and applications > LILACS
- Scientific Electronic Library Online (SciELO): Provides scientific newspapers on the Internet cooperatively in full text and free access through a set of policies, standards, guidelines, procedures and tools for execution of the functions of assessment and selection of magazines, as well as, for the preparation, storage, publication, preservation, control of use and impact of scientific journals operated by SciELO websites. The methodology is one of the components of the SciELO model available in details at http://www.scielo.org/php/level.php?lang=en&component=42&item=5
- Collaborative Spaces or Virtual Communities: facilitate and make possible the use of formal channels of communication through social networks that record, recover and expand the dissemination of its ideas and knowledge among its members asynchronously, without restriction of time and location. These web spaces have as main feature areas for insertion and sharing news, documents, images, discussion forums, chats and blogs, and others. The applicative and set of functionality to instantiate these spaces are available at http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=27&item=21
- Directory of Events (DirEve): methodology that allows it to collect, organize and make available data of scientific events about health, such as congresses, seminars and conferences promoted mainly in countries in Latin America, the Caribbean and in the global South. The technological platform for the DirEVE is described on http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=27&item=2
- Health Information Locator (LIS): methodology that allows it to collect, organize and make available metadata for description of sites and information sources available in the Internet, selected and catalogued according to quality criteria and international patterns. The set of manuals and computer programs LIS, are available at http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=27&item=4
- Health Legislation (Leyes) methodology that allows to collect, organize and make available a network of bibliographic information of health legislation in countries in Latin America and the Caribbean. Contains legal rules related to healthcare. Also it covers economic and social determinants that influence in health and are incorporated into international treaties and agreements.
- Serials on Health Sciences (SeCS): it records and organizes collections of serial publications allowing the creation of a collective catalog of the cooperating libraries of VHL, enabling your access to publications via Portal of Health Sciences Journals and instances in cooperation with VHL. Its contents of reference are available at http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=27&item=8

- Graphic Design and Navigation: the interface graphic model and navigation of the VHL facilitates and increases efficiency of the operation of the VHL and the interoperation with associated instances, that is described on http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=16&item=180
- Health Sciences Descriptors (DeCS): structure the indexing of articles of scientific periodicals, books, congresses annals, technical reports, and other kinds of material in three languages and the form of vocabulary, also allows searching and recovering subjects of scientific literature in the databases LILACS, MEDLINE, and others. The DeCS follows the tradition of classification systems and respective list of headers of subjects which had been transformed into specialized vocabularies without, however, abandoning the structures of classification systems from which were originated. Its hierarchical structure is based on the division of knowledge into decimal classes and subclasses respecting the conceptual and semantic links. Its terms are presented in a hybrid structure of pre and post coordination. Its methodologies and components are available on: http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=27&item=1
- VHL-Site: Manager of interface that allows creating and managing the portal of an instance of VHL, associated with others methodologies and technologies of VHL. Described on: http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=27&item=10
- Family ISIS: The platform of systems ISIS, stores and recovers information from textual sources of bibliographical kind, operating full texts and directories, with high flexibility to generate and operate indexes of recovery and information. With a history of more than 20 years, it's widely used in Latin America, Europe, Africa and Middle East, the platform has an important role in the expansion and enriching of the set of solutions for libraries, information centers or in other global areas.
  http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=31

  The BIREME maintains and provides applications based on technology ISIS, available on at http://bvsmodelo.bvsalud.org and http://reddes.bvsalud.org that are: XISIS, Wxis-modules / Wxis-php, CISIS, WWWIsis e ISIS-DLL - CDS/ISIS.
- Interface for Access on Health Information (iAH): retrieves the information from databases in the Internet or Intranet in an integrated manner and, as one of the integration components, allows the operation, between different instances of VHL. The application counts on manuals and reference guides, available on: http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=27&item=3 and has been evolved together with WWWISIS for support new functionality with iAHx denomination.
- iAHx: it improves the mechanism iAH of presenting search results in the VHL instances, allowing the visualization of the information sources in a integrated manner, individualized, ordered by pre-determined criteria and selected according to user interest. The component description, in details, can be accessed at http://wiki.reddes.bvsalud.org/index.php/IAHX#Motiva.C3.A7.C3.A3o
- mBVS: it enlarges the availability and portability of the national, thematic and regional instances of the VHL network, allowing access via mobile phones and mobile devices. The initiative coordinated by BIREME is developing with action lines that are being disseminated, but with not yet available technology for the VHL network. More information on http://espacio.bvsalud.org/boletim.php?articleId=05130730201047
- Timeline: it records events chronologically organized, and presented graphically in form of a timeline, highlighting key dates and/or periods. The component is recorded in the guides and manuals on http://bvsmodelo.bvsalud.org/php/level.php?lang=en&component=27&item=20

This set of methodologies and technologies aims to incorporate different networks of sources and information flows, promoting the convergence of social networks, of contents and of learning and

informed environments by various geographical and thematic instances in an VHL only network. For this, the VHL network, as a cohesive structure with its participants instances of an organic gear, adopts the central concept of interoperability in organizing its information sources, this subject will be detailed in the next section.

4.2.3 Interoperability of Information Sources

The VHL increases progressively the interoperability, understood as the integration and communication between sources and information flows, both among its instances as among these and others associated networks. Thus, the set of methodologies and applications of information sources of VHL (See 4.2.2. Methodologies of Information sources of VHL is developed in accordance with this premise).

The interoperability between sources and information flows is crucial for the convergence of data and contents produced and operated by geographic and thematic instances of VHL in a decentralized manner in a single an only network. The interoperability is therefore, a strategic guideline for the sustainability of the operational framework in the networking of the VHL (See 3.3 The VHL as network operational framework).

Following this conceptual model, VHL integrates and interoperates methodologies and technologies, through information systems collaboratively. The systems are arranged in layers, or levels of processing, schematized as follow:

- Data level – it contains the files or databases with records of the contents. The data files are accessible based on protocols of free access, which allows its indexing by search mechanism or indexers.
- Index level – it contains the index files for retrieval of data, arranged in the systems or databases. Different indexers applied to the same data files represent this layer.
- Interface level – set of different interfaces, mostly Web pages, but also including mobile telephones, digital TV, among others, accessing the indexes for retrieval and navigation in the contents. The interfaces are, therefore, unlimited numerically and in presentation formats.

What characterizes this organization in layer is the independence between the three levels, making possible the operation of the systems and information sources of VHL in different servers, computer systems, application of designs and conception of different interfaces, etc. This organization defined as architecture based in service, parcel up the contents of the VHL and offers different products and information services.

Besides expanding the visibility and accessibility of content network, the progressive adoption of the architecture based in services in the development of VHL and its associated networks is priority for the consolidation of social networks of learning and informed environments, because it gives instruments to network with interoperable, scalable and interactive tools

VHL and the networks which are associated (See 4.4 Associated networks) use open protocols of interoperability and collaborative tools that promote the interaction of social network, such as RSS, OAI, wiki pages, blogs, forums, chats, feedback of users and ranking of documents, personalized services based on profile of preferences, social bookmarking, folksonomy, mashup applications, and others.

The expression of social networks on the Internet has been related to the term Web 2.0, associated with the concept of using of the technologies in promotion sharing of information and knowledge and collaboration between users. This term, however, does not represent an update to Web technical specifications, but a new way to use its potentialities both for end users as for developers of applications.

In this sense, VHL is state-of-the-art in this trend and meets these new demands. The perspective of VHL to the Web is understood as a platform based on services provided by different applications, originated in different spaces and produced by different institutions. In line with this approach, the software, for example, is no longer seen as a product, but as a service.

The Use of interoperability standards is inexorable to the development of applications organized according to the architecture based in services, since these developments are built from local Web services that are distributed and used by all network.

The conceptual, analytical and implementation models of the Web services, and consequently the architecture based in services, has as example a searching service in any database. In the conceptual model, this Web service can be originated from an application that will retrieve a list of results according to the search executed. At the same time, this application can be integrated into a portal to make available to provide for users the list of corresponding search results. It's about, respectively, web services, widgets and portals.

According to this conceptual model and analyzing the possibilities of using a Web search service, the service can be used or reused in different ways, for example, for a free or advanced search. Thus, a free search service can be performed by an application responsible by the availability of a

search box and this, in turn, integrated into different portals. The same applies to the service of advanced search and a formulary of advanced search integrated into a portal.

Whereas both of the conceptual and analytical models can be implemented, for example, in the collections of the SciELO network, it is possible to develop a set of Web services available on each of the instances SciELO and from these, develop various applications, involving those services. The applications can be used in the development of new portals or integrate into existing portals to make available to provide new information services to users.

The explanation and application of these models in architecture based on service the context of VHL and its associated network, promote the interoperability of the network of information sources network through the availability in open access of repositories/directories of Web services and applications (widgets), which can be invoked or reused by other applications and developers involved in these networks.

The platforms of personalized services, with its feature of unique identification of the user, work like as a passport that is valid for all instances of the networks VHL and SciELO. The record, as well as the use of personalized services, is free. The passport and a management of the personalized services will be valid in the future for the networks CVSP, ePORTUGUÊSe and others associated networks.

The expectation is that the number and type of services offered will increase progressively in the future, as the share of documents from my collection and my interest profiles; the functionality of Single Sign-On, which will enable the automatic recognition of the user in both networks, with only one login in any of the networks, among others.

The need for interoperation among the applications and information systems is facilitated progressively by increasing the portability, reuse, creation of components with low dependency between them and the use of pattern. The incorporation of these mechanisms through VHL establishes a new governance of Web services, resulting in the use of this model by its associated networks.

4.2.4 Quality of Information Sources

The VHL, as a mechanism for health development through equitable access to information and to scientific and technical knowledge, takes an absolute commitment with the pursuit of quality and reliability of the information sources that integrate its network.

This commitment is present in all of its dimensions – in the constitution of social networks representing the producing institutions and intermediaries of reference in its geographic and thematic instances, as well as, in the adoption of criteria for quality control of management and production of networks of contents.

The reach and maintenance of this quality standard is guaranteed by the adoption of policies, criteria and procedures for the production of the information sources, which will vary according to each type of source. With the adoption of VHL model for information management and scientific, technical and factual knowledge in health, the universe of information sources expands enormously. This expansion contributes directly to the increase of volume and typology of scientific and technical information indexed by different information sources of the VHL.

Many publications contained in the VHL information sources are not submitted to review between partners. This doesn't mean that they have inferior quality. Often, these publications don't require this evaluation process because are institutional documents such as reports, formless, and others. Other variables must be considered in this evaluation, as the institutional affiliation of the document, the indexing in national and international databases, reliability and significance of the published data, etc.

As a characteristic of science, the scientific publications have criteria consolidated internationally for assurance and quality control. Between these criteria stand out, review two by two, editorial committee, regularity of publication, periodicity, among others. In VHL, the periodics indexed in the information sources LILACS and SciELO, obey the criteria for selection and permanence in the collections. (See: Criteria of selection and permanence)

Aiming at contributing to the improvement on quality of publications and scientific periodics from Ibero-American region, one of the action lines of technical cooperation is the capacitation of the actors involved in the flow of scientific communication. The capacitation destined to publishers and people involved in editorial flow include information about all the management stages, from submission until final publication of the magazine. Scientific societies or institutions that want to create a new scientific periodic, are also instructed about the best practices on how to do it.

Considering the importance of language and format suitable for writing scientific articles, the academic community receives training aiming to improve the quality of the manuscripts that will be submitted for publication. This action contributes so that good results of researches aren't invalidated because of an inappropriate writing.

The metrics used for assessment of scientific publications (impact indices, quotation, access and download data, database, and so on), its uses and limitations are part of the knowledge related to the scientific communication that is shared with the VHL network. The bibliometric and scientometric evaluation comprises quantitative analysis of the production, dissemination and use of information. Based on indices and metrics, such as citations, downloads and others, these studies provide data and rankings, that allow to attribute quality criteria to journals, articles, books and others.

Given the complexity of these methodologies, these studies aren't applied systematically in the VHL information sources. Some associated databases, such as a SciElo network, make available a great variety of bibliometric data. These data can be used as a subsidy to support decision-making, policies public formulation, as well as, provide users with tools to assess a certain source of information.

4.2.5 Cooperative services of information

The cooperative services of information aim maximizing the attendance and satisfying the information demands and needs of VHL users. For this purpose different action lines centralized on promoting the use of information sources are implemented, such as development and update of the interfaces and search mechanisms of the VHL, capacitation of users, promotion activities and dissemination of the VHL and operation of Cooperative Service for Accessing Original Documents (SCAD)

The SCAD is the service of provision and exchange of copies of scientific documents, especially those referenced in the VHL information sources that aren't accessible in full text and in electronic format. It was the first cooperative service that was operated by the Latin American network of health information and is in operation operating since 1967, date of creation of BIREME. Its operation occurs in a decentralized way in the Internet, being integrated with the collection of information sources of VHL. Use the collective catalog Serials on Health Sciences (SeCS) for automatic location of documents in libraries participants of VHL's service.

Coordinated by BIREME, it has the participation of most countries in the region. The SCAD is accessible in portals of national and thematic instances of VHL, as well as, from bibliographic references of retrieved documents in the different sources of information. For more information about SCAD see http://scad.bvs.br.

4.2.6 Events of Scientific and Technical Information

The events of information are directed to learning and exchange of information and knowledge among VHL social networks, strengthening the collective creation building of instances and operation capability by shared way. As one of information sources of the VHL, specifically as integrator component – source type 6, with the products, services, methodologies and technologies of information.

The main objective of the events of information is to promote meeting among people, involving them in specific objectives that contribute to the development of geographic and thematic instances of the VHL. In this sense, the events can be understood as a creative action of exchange of information and knowledge, impacting positively on the evolution of social networks, of contents and of learning and informed environments of VHL.

The carrying out of events of information promoted by VHL has developed increasingly, as much in quantitative terms as in the different modalities (congresses, forums, workshops, online meetings, training, and so on and others) resulting in benefits, from among which, stands out:

- Strengthening and deepening of the relations of social networks, making possible the interaction between all instances of the VHL and these with BIREME.
- Sharing of good practices developed in the VHL scope.
- Monitoring the state-of-the-art scientific production in health information and related subject.
- Methodological updates of professional participants of the VHL.
- Dissemination of the model of VHL management of information, knowledge and scientific evidence.
- Establishing of new partnerships and convergence of competence to development of new initiatives and projects.

In the governance model of VHL, the events are integrated in the learning and informed environments dimension (AAI) (see item 4.3 Networks of Learning and Informed Environments) by fomenting and potentiating the capacities of participation of social networks in the production, intermediation and use of information sources. In the processes of AAI, the events promote the interaction of individuals and groups of individuals, face to face or on the Web, comprising

communities that are connected and also those that are not connected. These are opportunities for the instances to update itself through sharing experiences, progress and results achieved. The events also have enormous relevance to monitor the international state-of-the-art information management and exchange of scientific and technical knowledge in the VHL.

The model of the contents network of VHL, as we saw, (4.2.3 Interoperability of Information Sources) has its information sources in online operation, as web services using open protocols, that facilitate their interoperability with others systems and services. In line with this perspective adopted by all information sources, the events are organized and structured by means of methodologies and applications such as VHL Agenda that enables the exchange of contents with other VHL information sources.

Thus, the agendas of specific events published online, given the interoperability among the information sources, can be organized together with other agendas related and published in the portals of different instances. The agendas of both priority events of the network – Regional Congress on Health Sciences Information (CRISS) and the series of Meetings of Regional Coordination of the Virtual Health Library http://regional.bvsalud.org/php/level.php?lang=en&component=112&item=56 for example, are published in all geographic and thematic VHL instances.

The Regional Meeting of Coordination of VHL, which is held every two or three years, is the main regional instance of coordination, exchange of information and experiences, assessment and recommendation for the development of VHL. It is also the most important forum of exchange face-to-face of cooperative network of institutions producers, intermediaries and users of scientific and technical information in the VHL. Thus, the objective of Regional Meetings of Coordination is to socialize and train all integrators of the network about the state-of-the-art of VHL and the challenges to their continuous and dynamic evolution.

For complementing this debate about the practices and experiences developed in the VHL scope, is held sequentially the Regional Meetings, Regional Congress on Health Sciences Information (CRICS), which favor the updating of social networks of VHL in the state-of-the-art and scientific production in information management, knowledge and scientific evidence.

The events promoted by the network are mapped and are registered and documented in http://regional.bvsalud.org/php/level.php?lang=en&component=112&item=27

4.2.7 Permanent Education

By means of action line of the permanent education, the knowledge with regard to VHL model is socialized with the professional members of the network. These have the opportunity of prepare and to support the strength of the cooperation for development of the networks of information sources of VHL. It seeks also updating the skills of these professional and to disseminate new versions or updates of the methodologies and applications of the VHL model.

The permanent education, therefore, is to promote the technical cooperation through the development and strength of human capacities within the VHL framework and its associated networks. In that scope enlarges the capacities of participants of the networks through actions of methodological development, education and face-to-face and remote learning in the context of apprentice and informed environments.

The actions of permanent education, on local the scopes of the VHL instances, can make possible, implement and strengthen the development of capacities of the participants professionals through promotion actions, education and mandatory learning for the development of skills. As a consequence of the development of “local capacity” strengthens also the “local production”. The model of permanent education of VHL recommends still the reproducibility and applicability in others institutions of VHL and complementary network.

Already in the regional scope, the permanent education actions can make possible the implementation and strengthening of the technical cooperation in the context of VHL, by representing mandatory actions for the development of skills appropriate to the methodologies and technologies for operation of products, services and network events.

- Promote the mobilization and strengthening of technical cooperation in social networks through actions for feasibly organize, promote and carry out face-to-face and to distance courses, forums, traineeship, technical meetings, workshops, seminars and so on.
- Implement and strengthen the flows of information, communication and knowledge generated in described scopes, through the organization and publication in virtual spaces, including documentation in general of the permanent education program, chronogram and corresponding methodology.
- Organization, indexing and making available, with quality control of VHL information sources, generated as: database of learning objects, documentation generated in collaborative spaces and with quality control.
- Development and publication of methodologies, in order to complement the other VHL methodologies, documenting the used processes and technologies of information and communication.

- The development of remote education programs according to systematized methodology, at project of sustainable character to medium and long term; to promote investigative studies with regard with the feasibility of certification of this activity together with other institution of teaching and research.

4.3 Networks of Learning and Informed Environments

Learning and informed environments (AAI) are defined as a set of virtual or physical elements – spaces, meetings, events, virtual communities, among others – which aggregate the people and institutions in contexts that stimulate the share, the socialization and the exchange of knowledge. The relations established in learning and informed environments express the intellectual capital of social networks of VHL, in other words, the knowledge accumulated by institutions and individuals which participate of collective construction of network, in its institutional and professionals trajectories.

The main goal of learning and informed environments is to aggregate this dimension of collective construction of knowledge in VHL. In consonance with the operational framework of VHL, the AAI's are integrated with social networks and of contents at the same time that promote the linkages between them, making these three dimensions converge to a single network. (See 2.3. The VHL as operational framework of work in network)

In the VHL, the sustainability of content networks is directly related with the intensity of the dynamic of interactions established among social networks in the process of management and operation of the information sources. From the premise that knowledge is constructed socially, the social relations take a fundamental role in its generation. Therefore the approach and implementations of the AAI's extend the capacity of overcoming what is called "know-do gap", that is, exceed or reduce the gap between what is known and what is practiced, or even, between knowledge and action. In this perspective, AAI are strategic for the development of VHL, promoting the capillarity and supplying between the social networks and the contents.

The learning and Informed environments are developed in the contexts of the instances geographic and thematic of VHL, from the moment it is appropriate as a means and space for the share of information and knowledge. Initially, the adoption of AAI is given by social networks which are participating in the construction of VHL, for example, exchanging ideas to integrate and search for support of the participants, realigning events of information or any other information source in this space.

This general understanding about the AAI shows the importance of fomenting and potentiating the exchanges and interactions among social networks, strengthening continuously its capacity of production and management of the information sources in VHL.

Progressively, the VHL is incorporated as a resource of information and knowledge by institutions represented in social networks, promoting the evolution and transformation of these institutional spaces in apprentice and informed environments. The institutions are stimulated to incorporate and promote continuously mechanisms that aim at the exchange and knowledge transfer.

The dimension of the AAI subsidizes the formal creation of conditions and infrastructures for that the institutions operate their local flows of information of integrated manner with the sources and flows of information of the VHL. Like this, the AAI's tend to expand and gain forms more and more inter-rectum related.

In the organization environments, practices of interaction between individuals and mechanisms of knowledge transfer, as the transparency of the processes and flows of work, management of projects in net, adoption of policies of information management, among others, extend the individual and collective capacity of learning and acquiring new knowledge.

The solution of problems that demand innovation of processes, practices, methodologies or technology, mostly are developed in "black-boxes", without mechanisms that promote the exchange of information and knowledge. The AAI's equip the organizations; environments and network, with greater ability to register and to systematize information, as well as, with mechanisms for the creation of new knowledge, potentiating the innovation processes on health.

In this sense, promote access and use of information and scientific knowledge with the effective participation of people and institutions, as well as the development of its capacities and infrastructures through the VHL contributes to the strategy of the World Health Organization (WHO) of reduction and overcoming of the gap between what is known and what is practice to advance towards health equity

The management and operation of apprentice and informed environments is based on a set of lines of action, oriented to development of individual competences and collective strengthening, described as follow:

4.3.1 Lines of action of Learning and Informed Environments (AAI)

In the VHL model, the methodology of apprentice and informed environments has as a base a set of six action lines that are adapted and enriched according with local capacities:

- Humanized environment that stimulates the continuous learning, the mutual confidence and appropriation of the history, culture and organization mission.
- Operation online of the information sources of scientific, technical and factual nature,.
- Collaborative Spaces (ECOs) and Communities of Practices (CoPs)
- Internal and external communication.
- Operation in network of the projects and the processes identified, formalized with automation in network.
- Programs of human resource development, as priority in learning processes in the network and guided to increase the capacity of action of the collaborators.

Functionalities, events of information and integrative activities, in the form on line or face-to-face, to make possible the lines of action, as presented in detail in the document “Functionalities and elements of communication and social interaction in the context of Learning and Informed Environments (AAI) in VHL”1

The VHL, as information and knowledge space, acts as extension of individual and collective memory, supporting the individuals and institutions in its function of producers, intermediaries and users of information.

4.4 Associated networks

The interoperability of VHL with networks, systems, products and information services is a priority line of action in the globalization process of VHL. In AL&C, the main complementary networks are the Scientific Electronic Library Online (SciELO), the Virtual Campus of Public Health (CVSP), and the Iberian American Cochrane Collaboration. In the global scope and under the concept of cooperation south, stand out the networks and initiatives of scientific and technical information in health, led by WHO, as well as the networks GHL, ePORTUGUÊSe, the EVIPNet and the TropIKA.net. These networks are described as follow:

- SciELO Network (Scientific Electronic Library Online)
  Network of institutions to support the research and the scientific communication, involving publishers of the main scientific journals published in Latin America and Caribbean. The countries account for more than 80% of the Iberian American scientific production already operate national and thematic collection of quality scientific journals with approximately 600 titles in open-access modality, with more that 15 million articles visited by month. The SciELO

collections are among the most visited scientific and technical portals in Iberian America. It's certainly one of the most important world collections of open-access scientific journals. Working together with the VHL, Network SciELO contributes decisively with continuous innovations in information and communication scientific.

- ScienTI Network (International Network of Information and Knowledge Sources for Science, Technology and Innovation Management.
- Network of national counsels of science and technology with the participation of the OPAS, OAS (Organization of American States) and UNESCO (United Nations Educational Scientific and Cultural Organization), and research and development groups.

  It operates directories of researchers, institutions and projects. Adopted by the majority of South American countries, Mexico and Portugal, should expand it to the Central American and Caribbean in the next years. The BIREME exercised the Executive Secretariate of the ScienTI Network, until the year 2006 when the Secretariate has become of responsibility of COLCIENCIAS, in Colombia.
- ePORTUGUÊSe Network (The Network of Sources of Information and Knowledge on Health for the Portuguese Language Countries)

  Led by the WHO, and having as one of its main action lines the adoption and implementation of Virtual Health Libraries (VHL) in eight Portuguese-speaking countries in the world: Angola, Brazil, Cape Verde, Guinea-Bissau, Mozambique, Portugal, Sao Tome and Principe and East Timor.

  The ePORTUGUÊSe Network has the formal support of the Community of the Portuguese Language Countries (CPLP) and should consolidate itself in the next two years with the operation of its global portal and the collections and the national portals in all of the eight countries.
- GHL - Global Health Library

  The Global Health Library is an initiative led by WHO which relies on BIREME support for its development. The GHL aims at organizing, indexing, inter-relating and making available international, national and local sources of information, including those sources available in the Regional WHO offices' libraries. GHL will be based on regional initiatives. Thus, in Latin America and the Caribbean, the VHL will be GHL regional instance.
- TropIKA.net (The network Tropical Diseases Research to Foster Innovation and Knowledge Application)

  Initiative led by Tropical Diseases Research (TDR) of WHO, aims to operate a portal oriented update of researchers and authorities on scientific advances, in the control programs and in policy publics related to infectious diseases and poverty. The portal shows contents in form of news, reviews and comments on scientific articles, blogs, etc.. and systematization and indexing of secondary sources with emphasis on scientific and technical literature on infectious diseases.
- EVIPNet (Evidence-informed Policy Networks)

  It is a program led by WHO for promote the use of results of scientific research on health in the policies, processes of decision-making and practice. BIREME will collaborate with PAHO and WHO in development of EVIPNet and will operate the contents in Evidence Portal VHL. It is in development a national instance of EVIPNet to Brazil.

  Adopts Platform International Clinical Trials Registry Platform (ICTRP – International Clinical Trials Register Platform) of WHO in countries of Latin America and the Caribbean through development and operation of a regional platform based in network of national registers, according to management and operation model of VHL.

The collective construction of VHL is, therefore a wide, intensive, permanent and dynamic operation that advances continuous and decisively based on cooperative work in the production and use of sources and flows of scientific information and technical in health.

4.5 Instances Networks of the VHL

The VHL is constituted by the union of its instances, represented by the networks developed in geographic thematic or institutional scopes, The Regional Portal of VHL <http://regional.bvsalud.org/php/index.php?lang=en> is the space of convergence of all these instances that are represented on this Portal in the left column. Thus, in the VHL network each instance or network is part of it all.

It promotes the quality of the participanting instances of VHL network in the management of scientific and technical information on health is one of the objectives of BIREME / PAHO / WHO in the role of coordination of network.

4.5.1 Network Instances management

The Regional Coordination VHL is exercised by BIREME and includes the following attributions/tasks:

- to promote and disseminate the VHL;
- operate the regional multilingual portal of VHL <http://regional.bvsalud.org/>, that brings together, regional information sources and associated networks;
- promote the exchange among producers, intermediaries and users of VHL;
- accomplish technical cooperation for the development of national capacities in the management and operation of VHL;
- coordinate in regional scope the networks of institutions producers, intermediaries and users of VHL;
- certify the national, thematic and institutional instances;
- coordinate the development of VHL conceptual model;
- coordinate the development of methodologies and technologies for management and operation of producers networks; intermediaries and users, even as the networks of sources and flows information of VHL.

In the national scope, countries assume responsibility by coordinating national networks of institutions as an essential mean to promote and ensure visibility and accessibility to information and knowledge on health of the region. The coordination of VHL in the countries is done by one or

more institutions, following the same principles and functions guiding of the action of BIREME in the regional scope.

Of the institutions specializing in information management, national and regional the networks, integrants of VHL has increased systematically the last 12 years. One aspect that contributes to this expansion is the inclusion of all actors of the process production and operation of the information sources, expanding cooperation technical for others institutions besides of the libraries and information centers.

The VHL offers common and standardized mechanisms for the management of cooperative working in network, adopted by all VHL instances – geographical, thematic or institutional, described following:

- Advisory Committee – forum for deliberation of VHL. It's responsible for the strategic decisions for the development and continuous assessment of VHL, definition of quality criteria of information sources and social network promotion. Constituted equitably by representatives of institutions who have as function the elaboration of the project and the work plans that define the VHL priority action lines. It is recommendable that the different profiles of institutions which comprise the social network are represented in the Advisory Committee, for example, research, academy, government, scientific societies that represent the users and so on.
- Coordination or Executive Department – is represented by an institution which has human resources, political, economical and technologically favorable conditions to take the leadership in the operation of the VHL instance. It is responsible for monitoring of the deliberate actions by the Advisory Committee, expressed in its project and plans of action, mainly with regard to promotion of cooperative work in operation network of information sources. It is also up to executive coordination to promote the effective functioning of the Advisory Committee, including the organization of periodic face-to-face meetings and distance meetings.
- Technical Committee or operational – comprised by professionals related to institutions of Advisory Committee which act as responsible for operation of information sources. They are represented in this forum, in general, by professionals of information and information technology.

The Matrix of responsibility, instrument that determines the share of each institution in the operation of Information Sources, is an important instrument for following up with the decentralized management. The collective construction of VHL promotes and strengthens equitably the inclusion of institutions and individuals in the shared management of sources and flows of information. From these structures of management, each instance VHL has its development oriented by a macro project that defines and leads the actions related to operation of social networks, of contents and of apprentices environments and informed. The thematic scope, the definition of target audience, selection of information sources that will be operated, maintenance of VHL's portal, communication actions and exchange of knowledge, activities of the technical cooperation inter-institutional of VHL promotion, organization and participation in

events of capacitation, and others, are examples of actions that must be defined in the action plan of each VHL instance.

Besides its Project of initial conception (action plan), each VHL instance develops specific projects periodically, valid for a period of 2 to 5 years. These projects should be formulated to plan and guide the implementation of the lines action priority that corresponds to necessities, interests and available resources.

The projects or action plans should be personalized and can contain, among other, actions of maintenance and update of information sources or of the portal, actions of communication and spread, activities of technical cooperation inter-institutional, and so on. The projects must set priorities in accordance with necessities and available resources, as well as the distribution of responsibilities and the work in the network.

The Project management in VHL follows methodology developed based on the framework logical adopted by Pan American Heath Organization (PAHO) for planning and follow up of its biannual work program, enriched with the concepts PMBOK ® - Project Management Body of Knowledge, the PMI - Project Management Institute and with adaptations to satisfy the specific demands of projects the VHL Network and network correlated to the operation of networks of source and flows of scientific information, technical and factual on health.

In the last 5 years the Projects management in the VHL Network were developed in sense of improving and socializing the methodology, tools and models adopted and developed to support the evolution of projects from their conception, development and closure.

As a starting point of Projects management to guide the planning of the intended goals and register the necessary efforts to achieve them, the proposal of Project must be drawn up to facilitate understanding of the project by stakeholders. The project proposal must answers the following questions:

- What can be done?
- Why should the project be initiated?
- What are your goals?
- What are your results?
- How to assess whether the results are being achieved?
- What activities will be developed?
- How long will it be?
- How much will its development cost?

The model used for the construction of proposal projects of VHL network and networks related are published on http://bvsmodelo.bvsalud.org, together with its guides of work, which orients the development of each item of the proposal.

To facilitate the management, each VHL can define its action plan (recommended drawing up a plan for the period 2 to 5 years) and from the same, draw up specific projects of shorter duration between various institutions involved in its construction, detailing necessary activities, resources and execution periods in accord with the demands existing.

Once that the projects are formalized, it is recommend the use of a system of management of project online. The system of projects management should facilitate follow up and record of the advances of actors involved in the project development, speeding up the reports formulation and the process of making-decision during the project.

At the finish of the execution of project, all information accumulated, supports its Accountability to funding institutions and creates a repository of information with the lessons learned during execution, and that will support a planning of future projects. The planning, drawing up of the project, its execution with constant follow up and closure with documentation of activities developed, are important tools to strengthen the VHL, positioning it in favor in actions of technical cooperation and funding opportunities together the fomentation bodies, ensuring its sustainability.

4.5.2 Dissemination and Promotion

The communication and marketing, specifically the actions to spread and promoting are considered an integral part of the VHL development. These actions promote the VHL as an updated space, and of reference in information access, knowledge and scientific evidences. Sensitize the target audience about the strategic importance of VHL and work the convergences. Strengthen of technical cooperation for foment of VHL as national policy and institutional for information management and knowledge, besides expand partnerships with others networks.

Broadly speaking the ways to promote and spread the VHL also contribute to make possible the purposes of apprentices environment and informed in the VHL, as showed in 4.3 Networks Learning and Informed Environments. These actions facilitate the social processes of transfer of knowledge, exchange of information, experiences and ideas, as much between colleagues is in network events, of the graphic materials informative or in the team through capacitation of the

communities and social networks or still through blogs, newsletters, and others means of spread and promotion.

In this sense, the action lines of promotion or fundamental dissemination are:

- Events: participation in the major events on the health area librarianship and information science carried out in the country and abroad. The promotion of VHL in fairs, exhibitions, congresses, conferences, seminars, forums, workshops, and other types of events, are opportunities to demonstrate the information sources and resources of VHL, through own spaces like stands and the programming of fast courses or in partnership with institutions linked to the network.
- Courses of Access and use of information sources: in partnership with institutions of network in the face-to-face and remote modalities, these activities are aimed at health professionals and of the information area, in geographic and thematic ranges of VHL. Courses, training, sharing in experiences and best practices expand access to the information relevant in VHL and qualify the process of decision-making based on evidences in attention and health management

  The capacitating meet the demand of the countries in the region promoting VHL in universities, research institutes, hospitals, departments and others bodies public aimed at heath care and training of professionals. Even the face-to-face activities must count on support of a virtual environment with open Access where are deposited Learning Objects that are at network disposal for consulting. Also video-conferencing or other means of interaction can be used to allow the capacitation of VHL users remote
- Communication and social interaction: the various functionalities or tools of communication and social interaction also are means for promotion and dissemination of VHL such as newsletters, hotsites, blogs, microblogs, among other showed in scope of learning and informed environments (See http://newsletter.bireme.br/doc/AAI_doc_base3.pdf). At the same time, are fundamental to the operation of the VHL in networks, both for connected communities as for the non-connected.
- Graphic Products: communicate visually, a concept or an idea expressed in pieces of paper among other products (ex. pamphlet, banners, and so on...), as part of the proposal of promotion and dissemination of the VHL instances.
- Special projects of promotion and dissemination:
- Stations VHL: promote, disseminate and bring together users of the access to information sources of VHL. These units, areas with equipments and trained staff to support the access to VHL, are installed in environments where are the target audiences of VHL, maximizing the informational inclusion of members of institutions, organizations and communities, including those not connected. At the same time, promote the permanent actualization of technical professionals, responsible for Stations VHL.

The projects of the Stations VHL are available through the technical cooperation with instances linked to health systems, considering the public hospitals as priority locals. The expansion of the project is given by means of partnership articulated with the public and private universities, community centers, public library, and representative entities of categories of health professional, among others.

Installed locally, the stations VHL foment still the integration in global scope, forming a network of stations between c thematic ountries and areas of VHL, as they have been strengthened in Brazil. http://estacaobvs.saude.gov.br/php/index.php?lang=es and Cuba, which led to the development of VHL stations.

The process of democratization of access will be expanded significantly to the extent that the stations VHL are adopted as promotion points or info-centers for access to VHL.

4.5.3 Scenarios for the evolution

The scenarios for the evolution help in understanding different stages of development of a VHL instance. This definition is based on indicators and quality criteria that express the maturity degree of the same.

The definition of the scenario or stage is determined through an assessment evaluation seeking to support the planning stages and development of VHL instances, therefore future projections, critical success factors and alternatives for the strengthening. Currently each VHL instance is classified into three distinct scenarios of evolution – the pilot, in development and certified, described as follow:

- Scenario 1:"Pilot or start up march of VHL" – Comprise the initial step of articulation and debate among social actors who participate as producers, intermediaries and users of sources and flows of information, aims to promote the full adoption of the paradigm of VHL, of cooperative network to management of scientific and technical information. This change of paradigm may entail many times in adaptation and realignment of products and services of information existent to operate in VHL space. The elaboration of the Project and of the Action Plan is important for the evolution of VHL in this stage, as well as the establishment of collaborative spaces or virtual communities
- Scenario 2: "VHL in Development" – This scenario has as main feature the conformation and/or strengthening and the expansion of social networks and of contents. The VHL seeks the strengthening of cooperative and decentralized work, besides of publication and update of network of contents and information sources. Stage of consolidation of VHL, including the definition of information architecture and visual identity.

  In this context, the establishment of promotion activities and dissemination of VHL, as well as of training, are determinants for its strength.
- Scenario 3 – "Certified" – the highest degree of maturity of a VHL instance is reached when it is recognized as reference space for access to information and exchange of knowledge in the area. The fundamental feature of this scenario is the consolidation of virtual space VHL as a common space, adopted completely by producers, intermediaries and users of scientific information and technical in heath. In this context, the VHL instances achieve high degree of autonomy in relation to methodologies and applications VHL, working in a decentralized and cooperative way and acting as a multiplier of actions of technical and capacitation cooperation, as much for expansion of its own social network and of contents, as for others VHL instances.

These scenarios evolve in accord with the conditions of different contexts, signaling the way to follow for the development of VHL instances. The perspective is always the to achieve the scenario in which the VHL is recognized and used as a convergence space for organization, indexing, preservation, accessibility, assessment and use of sources and flows information of scientific and technical in health (certification).

Although the definitions of these scenarios signalize the intentionality of a continuous and progressive evolution of VHL instances, these are always approximations of reality and in this sense, limited in relation to the complexity of elements involved in the process. Thus, the search for evolution and reach of different scenarios never is a linear and sequential practice where there is the guarantee of its achievement against the attendance requirements. More than closed settings, the drawing of these scenarios contributes to that of the analysis about the development of the VHL is not devoid in context where this process is inserted. Following is described how the assessment process of VHL instances is realized.

4.5.3.1 Indicators for instances assessment of the VHL

To support the VHL Network on its evolution, quality and suitability to the VHL Model BIREME/PAHO/WHO develops an Assessment Process based on indicators and quality criteria that orient the VHL instances in its update and generate feedback with positive points and improvement. Moreover, this process classifies VHL in its different stages of development. Certified, In Development or Pilot.

These stages are dynamic and not linear. Thus, the assessment of VHL instances configures itself as a continuous process. Even the instances already certified are re-evaluated, and can keep or not the certified stage of an initiative. The purpose of re-evaluation is to strengthen and increase value of fulfillment of the objectives proposed by VHL expanding the capacity of the instances operation.

Indicators of evolution of a VHL:

- Advisory Committee established and in function;
- Plan development;
- Matrix of division of responsibilities;
- Portal and information sources operating in up-to-date mode, and
- Infrastructure and technological resources.

The assessment process is headed by an Assessment Committee, which considers several factors such as organization of the contents of the portal, the understanding and application of the three

dimension of VHL (social networks, contents network and learning and informed environments) also the Technologies, interface, up-to-date of information sources, products and services, among other components. Moreover, the assessment also contributes to identify and recommend improvements and necessary adjustments related to governance, organization, technological platform, design and navigability.

Based on analysis the evaluators have conditions to point out what should be improved and in which aspects. The result of the assessment process is an assessment report that besides indicating the development stage of VHL also orients the institutions of Advisory Committee with suggestions and recommendations related to model adoption. The report allows also to identified strengths and weakness and the next steps that will enable the evolution of the VHL, always aiming Certification. If necessary, a Re-evaluation of VHL is done, which has the objective of assisting in access to the status of Certified.

More than to assess and certify the VHL instances, the reports guide them in adoption of the model. The leader institutions (executive department) are contacted and the results are shared for the continuous development in the network.

The VHL instances also can do its self-assessment before requesting the assessment to BIREME, using the Base Document of the Assessment of Instances VHL available in the portal of the Model of VHL. This self-assessment contributes with the VHL developments, enabling its coordinators to identify critical factors and need for suitability to methodology before request the certification. See also: Base Document of the Assessment of Instances of the VHL and the Life Cycle of the VHL

4.5.4 VHL Portals Network

The Portals of the VHL instances reflect and express the operation of the three dimensions that integrate the operational framework of cooperative networking of VHL, which are: social networks, of contents and of learning and informed environments.

The portal of a VHL instance integrates the information sources, which are operated in a decentralized way in network represented through the formation of its contents network. In the same manner its social network is represented in the portal through information about the participating institutions of the instance, the advisory committee as well as through the publishing of documents produced by the network: meeting report, projects, work plans, matrix of responsibilities, and others. The learning and informed environments for interaction and

exchange of knowledge among the actors of social network is represented in the portal, mainly in the incorporation of functionalities and communication resources in the network as well as by the record of information flows that are generated by social network, for example, by the news and debates in forums in the collaborative spaces.

The development of portals of VHL instances is based on patterns that aim enable the interoperability, the integrality and the convergence of the instances among themselves and among these with the regional portal of VHL. These patterns are applied to different elements that compose a portal: information architecture (navigation structure and organization of information sources), accessibility patterns (access to the largest possible number of people, independent of their physical conditions), drawing of interface (formatting contents for different accesses devices), visual programming and technological implementation.

Conceptually the portal VHL tends to be expressed as an aggregator environment of applications (widgets) developed by network web services of information sources. From this concept and considering that the spaces of collaboration in the Web should permeate its own environment of the portal, ensuring mechanisms and collaborations tools among the users in contents development published in its information sources, the aggregator concept (mashup) can be extrapolated for the development of these collaboration spaces and personalized spaces of users: “my spaces”. In this analysis in the context of VHL and its associated networks, the Regional Portal of VHL became more and more integrated to collaborative spaces of the user, be them related to context of regional information sources of VHL, or of a thematic VHL, other associated network and so on.

To facilitate the construction of VHL aligned to these patterns, the VHL Model offers an application for construction and management of the portal (main Page) of VHL, as well as the integration of its information sources. This application is the VHL Site (See item 3.2.2 Methodologies of Information sources of VHL > VHL Site)

The adoption of a same pattern of graphic design and navigation following the patterns and international standards is used to facilitate the access of users, increase the efficiency of VHL operation and with the intention of offer a well architected and structured environment. The interfaces presuppose the adoption of international patterns and set of standards and to create and interpret web contents (web standards). The separation between content and layout for example is what enables the production of access interfaces and publication of contents in different formats suited to various media, such as computer screens, printers, aural devices, handhelds, among

others. The definitions of navigation and graphic design are detailed in the Guide of Graphic Design VHL <http://cvirtual-usuariobvs.bvs.br/tiki-download_wiki_attachment.php?attId=2 >.

The VHL instances can also develop Hot Sites e Knowledge Hubs as actions of communication related to commemorative dates and specific events in its thematic areas and regions promoting and disseminating selected and relevant content. The contents of these sites follow having the VHL as repository, from which they offer a showcase of highlights from strategies and researches pre drawn up.

Thus, the patterns applied to the portals of the VHL instances, are one more of the mechanisms that integrate the parts into a whole, giving the VHL the fullest realization of its network sense.

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6 Glossary

- **Application**. Program used to perform tasks directed to an application, such as creating or editing texts, drawings, diagrams, etc. Ex.: word processor, database manager, Internet browser, etc.
- **Bibliographic database**. Electronic version of a catalog or bibliographic index.
- **Bibliographic description**. Description of a bibliographic item by means of attributes, such as authorship, title, edition, dimension, etc.
- **Browser**. Internet navigator, such as Internet Explorer and Netscape Navigator.
- **CDS/ISIS – Micro ISIS**. Software developed and maintained by UNESCO to store bibliographic data.
- **Cochrane Library**. Database collection on medicine based on evidence from Cochrane Collaboration.
- **Controlled or structured vocabulary**. Collection of organized and related terms used to index and recover documents. Used as an interface between documents and users.
- **Cooperating Center**. Institution that is a participant at a VHL and/or contributes with bibliographic records to Bireme.

- **Database**. Collection of data structured to be easily accessed and manipulated. It comprises units called records, whose several attributes are represented by fields. For example, in a "quot; customer file" each customer represents a record, which has several fields, such as "NAME", "CUSTOMER CODE" and "TELEPHONE" etc.

- **Descriptor**. Represents a concept accepted in a controlled vocabulary (as thesaurus).

- **Directories**. In the VHL architecture, directories are considered a secondary source of information, because database records refer to primary sources, such as institutions, professionals, events, and courses.

- **Electronic format**. Any form of storage, recovery and presentation of information that can be transmitted online or recorded in magnetic or optical media.

- **Field**. See Database

- **File**. In computing, it is a set of data that can be recorded in some storage device. Data files are created by applications, such as a word processor, for example.

- **Glossary**. Vocabulary of specific or controlled use, used in publications to clarify the meaning of terms that are seldom used, as well as technical or restricted terms.

- **Guide**. Defines the processes necessary to produce an information source or phases of a methodology.

- **Information Sources**. In the VHL architecture, information source is any resource that responds to user demand for information, including information products and services, people, or networks of people, computer programs, etc.

- **ISO Format** (file). Standard established by ISO for data exchange among institutions, networks, and users.

- **LILACS Format**. Bibliographic description format established by BIREME, based on UNISIST Reference Manual for Machine-readable Bibliographic Descriptions.

- **LILACS**. Cooperative database of the BIREME System that comprises Health Sciences related literature, published in the region's countries as of 1985.

- **LILDBI-DOS**. DOS version of the & quot; LILACS Bibliographic Description and Indexation" system.
- **LILDBI-Web**. Web version of the "LILACS Bibliographic Description and Indexation" system".
- **Macro**. Sequence of logic commands in human-readable language to perform repetitive processes.
- **Manual**. Set of automatic or manual steps and operations needed to guide users in a determined application, program or methodology process.
- **MEDLINE**. Database of international literature in medical and biomedical areas produced by the NLM (National Library of Medicine, USA)
- **Metadata**. Information structured on information resources.
- **Methodology**. Set of norms and conventions used to with the purpose to standardize a process or production of an information source.
- **Model or template**. File that has the basic definition of the type of document one intends to use, containing styles, predefined texts, etc.
- **National Coordinating Center**. Institution that cooperates with the VHL whose core function is to coordinate the cooperating centers of a region.
- **PAHO**. Database that has bibliographic references and summaries of the Library of the Pan American Health Organization headquarters in Washington, D.C., USA.
- **Publishing Committee**. Group of professionals and specialists in the area of publication of a journal, whose objective is to establish publishing norms and conventions and assess the contributions received by the publication so as to ensure a quality standard.
- **Quotation**. Abstract produced by a third party and mentioned between inverted commas, with indication of the author.
- **Record**. See Database.

- **Responsibility matrix**. Document integrating the VHL development plan that indicates, for each information source of the VHL, which is the coordinating institution and which are the cooperating institutions.

- **ScienTI Network**. Public network of information sources and knowledge, with the objective of contributing to the management of scientific, technological, and innovation.

- **Scientific Production**. Collation (gathering and analysis) of all literature about a specific theme or author, generally for analysis quantitative purposes.

- **Specialized Center**. Institution specialized in a certain topic in health.

- **Style sheet**. File that brings the definition of styles of a publication. Also see model.

- **Technical cooperation**. Exchange between developing countries, or between developing and developed countries, for mutual collaboration in certain sectors, such as exchanging experts and teachers, creating or transferring technology, exchanging information and experiences to improve sanitation conditions.

- **Template**. See model.

- **Thesaurus**. Structured vocabulary that shows the hierarchical, associative, or preferential relationships of terms (descriptors). Also see Controlled vocabulary.

- **VHL-Site**. Interface manager that enables to create and manage a VHL.

- **Web standards**. Set of norms and standards to create and interpret the web content.