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Report on the policies, regulations and programmatic actions adopted by national and regional governments in connection with the recording, use and dissemination of reliable data for decision-making associated to comprehensive health care and mother and child care, reproductive health, HIV/AIDS and tuberculosis

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Acronyms

AUS	Universal Health Insurance
CIE10	Tenth revision of the International Classification of Diseases
CPT	Current Procedural Terminology
CS	Health Center
DIRESA	Regional Health Office
DNI	National Identity Card
EsSalud	Social Security of Peru
EI	Interoperability Standards
HIS	Health Information System
HL7	Health Level Seven
HMN	Health Metrics Network
MINSA	Ministry of Health
OGEI	Statistics and Information Office
RENAES	National Registry of Health Facilities and Medical Support Services
SEM	Admissions and Emergencies Statistics System
SIS	Comprehensive Health Insurance
SISMED	Integrated System for the Provision of Medicines and Medical-Surgical Supplies
SNIP	National Public Investment System
SUNASA	National Health Superintendency
TI	Information Technologies
USAID	United States Agency for International Development

Executive Summary

In the first year of implementation of the project, the information systems component has delineated and executed a general intervention strategy based on three master lines applied in the national and regional spheres.

The first strategy, aimed at designing, developing and implementing GalenHos as an application for entering and processing health care data, from the standpoint of the service provider. The activities of this strategy have mainly been focused on the Regional Health Offices and their related facilities. This line of work has enabled to reconcile the alignment of national and regional goals in terms of the definition of health policies, building of statistics on morbidity, mortality, production of services, use of medicines and supplies, and generation of information for the financing of services, - with local needs, for the operational management of the foregoing. In its hospital version, the GalenHos application is being implemented in eight hospitals in six regions. At its first level version, it is being implemented in four facilities in two regions.

The second strategy is aimed at updating and identifying new data recording standards. In that context, the project has actively participated in the preparation of the list of medical procedures required for implementing a social security reform. The activities of this strategy have mainly been focused on the Ministry of Health and the Statistics and Information Office. The list of medical procedures, based on CPT2010, considers a group of activities that allow recording no less than 90% of the public sector outpatient services. The project has also provided technical assistance to the MINSA to define interoperability standards, a new set of health care standards aimed at facilitating the exchange of information between service rendering, financing and regulating institutions. The general platform for the development of standards identified by the MINSA corresponds to HL7, and the preparation of a development plan for specific interoperability standards is still pending.

The third strategy has been aimed at strengthening the operation of regional information systems. Beyond specific developments, such as those referred to computer or IT applications or the development of new data recording and management standards, the project has provided technical assistance to three Regional Health Offices in the preparation of Regional Action Plans in Information Systems. These plans seek to strengthen the overall information system, by incorporating the recording, storage, management, data generation, and generation of knowledge and use of information stages. Critical activities have been identified in each one of the aforementioned categories within the DIRESAs' budgetary restrictions. These activities are aimed at improving the general performance of regional health information systems.

Introduction

This report describes the activities carried out during the first year of USAID Políticas en Salud, regarding the Information Systems component. Improvement initiatives in this area have usually been subject to skepticism, be it for the complexity of the topic itself, which covers a diversity of fields in health care work, for the multiplicity of information generating agents and information users, for the limitation of human and technological resources available to the health care system, or for the accelerated process of technological change which is constantly creating new possibilities for improvement.

Considering that the project execution general approach is aimed at integrating and implementing diverse contributions in terms of decentralization, financing, information systems, human resources and medicines, the activities of the information systems component have been linked to providing timely and reliable data that support the improvement of processes in the aforementioned key areas. The specific focus of the work has been towards the health care delivery data. We consider that the data generated at an operational level provide a direct and valid feedback of the consequences which different policy recommendations have on people's health.

This report has been divided into three chapters; the first one is targeted at reporting actions whose main execution is focused nationwide. This corresponds to the design, development and implementation of GalenHos as an information system for the provision of health services. It also involves the updating of the medical procedures catalogue to be used by health care providers. It also includes the technical assistance to MINSAs, to identify the platform for developing a new family of standards corresponding to interoperability standards.

The second chapter is about the technical assistance which the project has provided to three regions in which it has had comprehensive interventions, namely, in all components of the project. The intervention has represented the continuation of the work started with USAID Health Policy Initiatives project, which has provided an important background work through the preparation of a thorough situational diagnosis of regional health information systems.

The third chapter summarizes the technical assistance actions of the component and maps them with the formal commitments undertaken by the project, serving as a graphical and rapid guide to the contents of this document.

1. National quality standards are established or improved

1.1 First wave initiatives. Integrated Health Information Systems

Health information systems pose a permanent challenge due to their very close relationship with the technological innovation process. Resembling the epidemiological accumulation model documented in developing countries, there has been an accumulation of information technology (IT) solutions with regard to old and recent health information demands. This process has not been exempt from institutional tensions related to the manner in which MINSA has focused the technical solution to generate, store, process and use data from different institutional players of the Peruvian Health Care System.

A first wave of initiatives was related to the development of unique health information systems that were designed, tested, developed and implemented. This period corresponds to a big-bang in IT, in which varied and dissimilar applications were observed at public facilities, both at first level and at hospitals. An illustrative example of this situation is MINSA's HIS information system, developed by USAID in the 80s and aimed at recording data on outpatient health care services, mainly for statistical purposes. Other solutions, as in the case of *ad-hoc* IT applications for national health care programs, started their design and implementation process shortly after this development. In addition to the various institutional players who demanded and provided the solutions (with the expected misalignment between the management and use of generated health care information), there was a general tendency to develop unique and isolated solutions. These solutions provided a solution at a higher level than the *status-quo*, whereby statistics were generated more easily than before. Unfortunately, inconsistent health care reports were also generated at a higher speed.

Because of this problematic situation, in the mid-90s, the MINSA favored the design and development of integrated systems. However, the complexity of the initiative did not allow obtaining a tool of this type. Partial prototypes and developments were prepared instead, some of which are currently used by the institutions from the public sector. To a large extent, the global lack of success of the approach was justified by the insufficient weighting of the conditions for the sustainability of the initiatives, for example, from a permanent feedback with the health information system users. This gave rise to applications which depended on cooperation projects and their consultants, both at the financing level and also when readjusting the functionalities required by the end user of the health information system.

The intervention of the project in this year has taken into account these two lessons learned, in order to: 1) carry out a participatory approach with the users in the design and development of information systems; 2) strengthen the relationship with the users, as partners rather than recipients of technical assistance; and 3) promote financial co-responsibility in the development of the defined technical agenda.

In particular, the project has privileged the use of two information processing tools for the providers use: the integrated hospital information system (GalenHos Hospital) and the First Level (GalenHos First Level) information system. Both tools offer a mechanism for an integrated and local management of the information generated by providers, enabling the use of the following advantages:

- **Generate information for operational use**, to allow the improvement of service provision processes, contributing to enhance the quality of care rendered to the patient.
- **Support the information requirements from the government bodies and regulatory agencies**: GalenHos enables the recording of all information relevant for the generation of databases and reports required both regionwide and nationwide.
- **Manage the information from different operational areas in an integrated manner**: It is possible to articulate, in a single database the data required by all information users, thereby contributing to eliminate redundancies and inconsistencies in operational and management reports.
- **Help reduce the patients' waiting times at service delivery points**: Since data are entered only once by the institutional person in charge of recording of data, to be shared afterwards, the multiplicity and redundancy of clinical and non-clinical records is avoided. In turn, this eliminates the time when the operator and the machine come in contact, increasing the time when the operator and the patient come in contact.
- **Contribute to improve the quality of clinical records**: To the extent that each service provision datum is entered by the personnel generating the record, this favors the generation of an "appropriate" data quality by the corresponding operator. In turn, this is favored by eliminating the obligation of entering redundant records.
- **Favor an appropriate recording of quality data standards**: GalenHos uses all health data entry standards regulated by the MINSA (provider's identification, patient, medical procedure, medicine, service producing unit, medical act).
- **Link assistance processes with non-assistance processes such as the billing of services**: The provider's direct attention is complemented with and linked to the information on the financing source, affiliation, all of which allows improving the billing levels. This is important to reduce information under-recording levels, either at the administrative or health service level.
- **Increase safety standards favoring controls and audits**: GalenHos handles safety at the operating system, software and database levels. This is complemented with the option of making a close recording of the transactions made in GalenHos, which gives enough protection against attempts to maliciously adulterate the database.

These fundamentals of GalenHos are also contemplated in the applications aimed at the hospital sector and the first level of attention. With regard to development, both applications share the deployment of the following modules:

1. **Data affiliation management.** Incorporating not only MINSA's data recording standards but also those required by SUNASA.
2. **Appointment and medical scheduling management.** This module allows to properly manage and regulate the flow of patients preventing the generation of bottlenecks and helping reduce the waiting time, above all at outpatient care.
3. **Pharmacy record.** This module allows the comprehensive management of the logistics pharmacy process, including the dispensing of medicines. The module replicates MINSA's SISMED v 2.0 system, overcoming the deficiencies of the latter in terms of safety. It also considers an operational improvement in the integrated management of medicines, as the handling of medicines is not excluded from national health care strategies and neither from the medicines obtained from donations. In this case, GalenHos fills a void of adaptation to the operational reality that has not been foreseen by current SISMED standards.
4. **Clinical pathology record.** This module allows recording laboratory services, both in the billing and production record component as in the register of clinical results. It allows recording the history of services provided to the patients, thus contributing to generate the electronic clinical record. It also considers the entry of logistics data of clinical pathology supplies, to facilitate initiatives for improving the operational management in this area.
5. **Billing record.** This module allows integrating the production data of the facility originating from all other implemented modules, to the source of financing. Through this module the health care service component is integrated to the financial component, making it possible to analyze the production of the services in terms of the available financing sources.

GalenHos differentiating elements, either in regards to GalenHos Hospital or to First Level are shown in Table 1.

Table 1. GalenHos salient features, Hospital and First Level versions

GalenHos Hospital	GalenHos First Level
Clinical record module	
The clinical record file is focused on the administration and control of individual medical records, providing the conditions to reduce the volume of duplicated records,	The clinical record file is focused on the administration and control of individual and family medical records. This provides the features for handling the individual and

GalenHos Hospital	GalenHos First Level
and the loss of this medical-legal document.	family at local level, for instance, for the monitoring and/or control of health determinants susceptible of being handled by the service provider.
Module that helps the diagnostic imaging	
It considers the use of the following technologies, ultrasound, conventional radiology, computed tomography. It includes the recording of logistics data of key radiology supplies to facilitates initiatives to improve operational management	It is limited to the use of ultrasound and conventional radiology. It considers the recording of logistics data of key radiology supplies to facilitate initiatives to improve operational management.
Outpatient service module	
It considers the recording of diagnoses and handling of cases, using international standard CIE10 and national CPT standard to record procedures. It incorporates the register of medical notes, initiating, in this manner, the electronic medical record for the outpatient care field. The outpatient service record optimizes the operator's time, does not require the re-entry of data in the HIS system, and SIS system in the future.	Aside from the hospital application functionalities, it incorporates the healthy person's healthcare module, in correlation to the PEAS homonym insurable condition. The application has incorporated a customizable vaccination and anthropometry record, facilitating the follow-up on these health care priorities in the individual, family and population.
Hospitalization service module	
It incorporates the record of hospitalization care services and medical-surgical procedures carried out at locally configured rooms. The hospitalization care service record optimizes the operator's time and does not require re-entering data in the SEM system.	Implementation of the module not included, except in I-4 category facilities, with features similar to those described for the hospital application.
Emergency service module	
It incorporates the emergency service record, including the assisted register of external morbidity causes. The emergency service register fills this information void, providing detailed information, and does not require the re-entry of data in the SEM system as a contingency recording system.	Implementation of the module not included, except in I-4 category facilities, with features similar to those described for the hospital application.

GalenHos Hospital	GalenHos First Level
Billing module	
It incorporates the recording of all services provided during the contact of the patient with the service, including prescription of medicines. It incorporates the possibility of waiving payment, in whole or in part, as indicated by the Social Service area.	It is limited to recording billings for services with public financing (SIS), except for I-4 category facilities, with features similar to those described for the hospital application.

Status of implementation of GalenHos – Hospital as of Year 1

At the time this report was prepared, the agreements for the implementation of GalenHos – Hospital, signed with the following hospitals, were under way:

1. Ayacucho Regional Hospital from **Ayacucho Regional Government**
2. Belén Hospital from **La Libertad Regional Government**
3. Tumbes Regional Hospital from **Tumbes Regional Government**
4. Cajamarca Regional Hospital from **Cajamarca Regional Government**
5. Sicuani Support Hospital from **Cusco Regional Government**
6. Quillabamba Support Hospital from **Cusco Regional Government**

The implementation of GalenHos has started in two other hospitals:

7. Tarapoto Hospital from **San Martín Regional Government**
8. Moyobamba Hospital from **San Martín Regional Government**

The implementation process of these hospitals has followed a sequential process illustrated in Table 2.

Table 2. Status of progress made on the implementation of GalenHos at hospitals

Hospital	Basic training	Advanced training	Facilities	Database configuration	Training of operating personnel	Start-up	Monitoring	Maintenance
Ayacucho Regional Hospital								
Belén Hospital at Trujillo								
Tumbes Regional Hospital								
Cajamarca Regional Hospital								
Sicuani Local Hospital								
Quillabamba Local Hospital								
Tarapoto Hospital								
Moyobamba Hospital								

As the table shows, the start-up is still in process at most of the intervened hospitals.

To prepare the monitoring indicators, it was necessary to analyze the information recorded in GalenHos pharmacy module for the Ayacucho Regional and Belen hospitals, and with the information from SISMED v 2.0 for the Tumbes, Cajamarca, Sicuani, Quillabamba, Tarapoto and Moyobamba hospitals. Importantly, both databases are 100% comparable to the GalenHos standard, with the exception that the GalenHos database has better safety levels and quality of information.

New Developments of GalenHos – Hospital as of Year 1

Technical cooperation agreements have been signed with hospitals in year 1 to provide the institutional framework for the GalenHos implementation process. The signing of the agreement allows expanding the scope of GalenHos- Hospital beyond what was foreseeable, from the execution of USAID funding. It is projected that the design of these modules shall continue during a significant portion of year 2, in light of the limited availability of economic and technical resources by the hospitals which signed the agreements.

Table 3. Prospects of new GalenHos developments

Module	Foreseen functionality
Electronic outpatient consultation	<p>It allows the entry of detailed data on the medical consultation into the GalenHos database. This makes possible the implementation of a paper-free outpatient medical record. In turn, this contributes to improving waiting times, eliminating the possibility of losing medical records and allowing the redirecting of scarce clinical record staff to other critical activities within the department.</p> <p>Responsible: Tumbes Regional Hospital</p>
Operating Room	<p>It allows entering data on the service provided by the operating room, prior to and after surgery. At the pre-surgery stage: scheduling of surgeries, operating rooms, surgeons, operating room staff.</p> <p>At post-surgery stage: anesthesiology notes, surgical report, surgical diagnosis, supplies used, medicines used.</p> <p>Responsible: Cajamarca Regional Hospital</p>
Single dose	<p>It allows the customized prescription of medicines, to avoid over-prescription.</p> <p>Responsible: Belén Hospital - Trujillo</p>
Blood Bank	<p>It allows the record of health data before and after the process of obtaining and administering blood products.</p> <p>At pre-transfusion stage: indications, pre-transfusion tests</p> <p>At post-transfusion stage: responsible for the administration, post-transfusion tests, appearance of adverse reactions, supplies used.</p> <p>Responsible: Sicuani Hospital</p>
Outpatient and emergency consultations report cube	<p>It allows generating flexible <i>ad-hoc</i> reports, which are important but have a low frequency of preparation.</p> <p>Responsible: Quillabamba Hospital</p>

Status of progress in the development and implementation of GalenHos – First Level as of Year 1

Regarding GalenHos – First Level, in year 1 the design has been carried out and the development of the prototype version has started and is being validated in the field. With respect to the design and development of GalenHos – First Level, it is worth mentioning that the application is aimed to the health data management from the provider’s standpoint. This design perspective allows records to be focused on personal health care services, which differs from the conventional focus of statistical applications, which are primarily linked to nationwide programs or strategies. For this reason, one of the main features of the application, from the provider’s standpoint, is that it is possible to carry out a longitudinal follow-up of users’ key clinical information. According to this, it is possible to evaluate the effectiveness of specific health care interventions, such as for malnutrition, which San Martín Regional Government has foreseen to launch. The screen below shows a sample of the integrated manner in which the GalenHos prototype has structured the recording of data, favoring better registration levels and better quality recording of health data.

The screenshot displays the 'Modificar Admisión de Consulta Externa' window for patient HC: 492850 Ailcca HUAYLLA LUANA (Estado: Registrado) (Edad: 2 A = Años). The interface is divided into several sections:

- Triaje:** Shows vital signs: Presión 100/80 (Sist/Diast), Temp 38 °C, Peso 43 Kg, Talla 110 cm, Pulso 0 0-250, Frec.Respiratoria 0 0-70.
- 3.1 Anam/Ex.Físico:** Tab for patient history and physical exam.
- 3.2 Info.Atención:** Active tab, containing:
 - 3.2.1 Consulta Regular:** Lists immunizations (DPT, yellow fever, measles) and other procedures (integral advice, hematology).
 - 3.2.2 Información morbilidad:** Includes a growth and development control chart for the 2nd year, showing percentiles over age (0, 7, 14, 21, 28 years). It also has checkboxes for 'Estimulación temprana' and 'Lactancia materna complementaria'.
 - Diagnósticos - Desarrollo:** Section for developmental diagnoses.
 - Diagnósticos-Morbilidad:** Lists conditions like 'Absceso periamigdalino' and 'Amigdalitis aguda, no especificada'.
 - Tratamiento Recibido:** Table of received treatments:

Selección	Medicamento
<input checked="" type="checkbox"/>	ALBENDAZOL 200 mg TAB
<input type="checkbox"/>	ALBENDAZOL 20 mL 100 mg/5 mL SUS
<input type="checkbox"/>	FERROSO SULFATO HEPTAHDRATO 300 mg TAB
<input type="checkbox"/>	FERROSO SULFATO HEPTAHDRATO 180 mL 15 mg/L

The bottom toolbar contains icons for 'Filación', 'Cuenta', 'Imp.Atención', 'Aceptar (F2)', 'Cancelar', 'Imp.Ficha SIS', and 'Históricos'.

It is possible to note that the record of an individual's health care service integrates in the one and same screen the health services related to:

- Growth and development control
- Nutritional control
- Vaccinations
- Administration of medicines
- Record of frequent morbidity
- Record of procedures amenable of public funding

This prototype helps to disappear health data under-registration levels, while the nutritional diagnosis is automatically identified on the basis of anthropometric relations of weight, size, age, and body mass index. This allows saving the provider's time in searching anthropometric tables which many times are not available. In turn, the graphic presentation of the evolution of anthropometric information (based on percentiles), makes possible the individual follow-up and subsequent customized intervention of people who are at risk. From the standpoint of the local health care manager, it allows preparing risk maps of key situations, such as coverage of vaccinations, malnutrition levels, presence of developmental morbidity; all this by supplementing this information with the corresponding patient's personal data.

In addition to the integrated data registration in child population, GalenHos – First Level contemplates recording data on diagnoses, production of medical activities and prescription of medicines and supplies for the following nationwide strategies:

- Mother and child health
- Family planning
- HIV infection
- Tuberculosis infection

Another functionality that is being projected is the communication interface between the provider and SUNASA. Being aware that SUNASA has planned to implement the nationwide record of insured patients by year 2012, the relevant information exchange interface, which is shown below, has been prepared in advance:

Paciente (F10)		Cita (F11)		Atención (F12)	
Modificar Admisión de Consulta Externa HC: 492850 Allcca HUAYLLA LUANA (Estado: Registrado) (Edad: 2 A = Años)					
2.1 Atención			2.2 Sunasa		
Paciente	Allcca HUAYLLA LUANA DANIELA		Sexo	2 = Femenino	Nuevo Seguro <input type="checkbox"/>
Documento	N° Documento		País	Peru	SIN Seguro <input checked="" type="checkbox"/>
Datos del Paciente (Asegurado)			Datos del Titular		
Apellido Casada	Parentes con Titular		País		
Docum (ant)	N° Documento (ant)		Documento		
F.Nacimiento	28/06/2009	Ubigeo (Domicilio)	N° Document		
Datos del Seguro					
Régimen	Cod.Afiliación (SIS) 33		Cód.Establec	(adscripción IAFA)	
Producto/Plan	Tipo de Afiliación		Cód.Establec	(adscrip.RENAES)	
F.Inicio afiliación	F.Final afiliación		N° Carnet Ident		
RUC empleador	Validac.Reg.Identidad				
Estado Seguro	Código IAFA				
Datos del Encargado del Sepelio (SIS)					
Apell. Nombres			DNI Usuario	(realiza operación)	
F.Nacimiento	N° DNI		Tipo operación		
Sexo			Fecha Envío	/ / : :	

This screen will allow a substantial abbreviation of the time required to enter the data of the insured party's affiliation, as long as there is an appropriate Internet connection level with SUNASA. In turn, it makes it possible to reduce the waiting times for service users and increase the provider's availability of time. From the standpoint of the financing agent, the implementation of this data capture screen enables a true identification (in non-despicable computer slang) of the insured party, eliminating the risk of impersonations and, at the same time, it makes it possible to develop transactions of information and financial exchange and/or purchase and sale of health care services.

At the time this report was prepared, GalenHos – First Level is at a pilot stage at the following facilities:

1. Kimbiri Health Center, Network Head of the Kimbiri – Pichari Network from **Cusco Regional Government**
2. Las Nazarenas Health Center from **Ayacucho Regional Government**
3. San Juan Bautista Health Center from **Ayacucho Regional Government**

4. Santa Elena Health Center from **Ayacucho Regional Government**

The level of progress in the development and implementation of GalenHos – First Level is shown in Table 4.

Table 4. Status of progress of the implementation of GalenHos at health centers

Facility	IT Diagnosis	IT Strengthening	General prototype design	Identification of supplementary information	Design adjustments	Prototype development	Basic training	Advanced training	Installation	Database configuration	Operating personnel training	Start-up	Monitoring	Maintenance
Kimbiri Health Center														
Las Nazarenas Health Center														
San Juan Bautista Health Center														
Santa Elena Health Center														

 Technical assistance activities carried out in Lima
 Technical assistance activities carried out in the field

Maintenance actions

Maintenance activities have been exclusively focused on GalenHos hospital version. At the time this report was prepared, 57 maintenance activities have started, out of which 53 have been completed and 4 are in process. There are also a total of 33 maintenance activities that are pending implementation. Five (5) out of the total maintenance actions have been carried out due to errors incurred and the remaining 85 were improvements for the performance of the system. The institutions that have contributed to incorporate improvements to the system are: the Ayacucho Regional Hospital (51 initiatives), Tumbes Regional Hospital (17 initiatives), SUNASA (3 initiatives), Project (11 initiatives), Kimbiri (2 initiatives), Nazarenas Health Center (1 initiative).

1.2 Second wave initiatives. Development of data recording standards

In view of the difficulty in developing unique applications that may be implemented nationwide, MINSA committed to redefine the basis underlying the strategy of integration of the information system. The selected alternative was based on an information element prior to the generation of computer applications. This corresponded to the standardization of data that could allow recording the contacts between users, service providers, management and financing instances, and health care service governance. Moreover, a prioritization of standards subject to formalization and eventual compulsory sectoral implementation was carried out within the selected approach. As a result of it, eight health care data registration standards were identified in 2005. They are shown in Table 5, together with a comment on their status of implementation:

Table 5. Status of implementation of health care data registration standards

Standard	Status	Comment
1. Medical procedure in the health care sector	Developed but not implemented	A first version of the medical procedures catalogue was approved in 2006, not implemented at public or private providers level
2. Pharmaceutical product in the health care sector	Development pending	Several technical proposals have been formulated, but the sectoral standard has not yet been formalized. An abbreviated catalogue has been defined, but the specific code has not been defined.
3. Health services user in the health care sector	Not implemented	The norm for its formulation has been passed, but no plans have been carried out to follow-up on its implementation.
4. Health facility and support medical service facility	Implemented in the public sector	MINSA has published the standard on its Web page for general use. Nonetheless, there is no register of use within specific IT applications.
5. Service producing units at health care facilities	Developed and partially implemented	The norm for its formulation has been passed and it is used for calculating costs and planning investment, although not for the purpose of exchanging health services or generating statistical information.
6. Health care episode at the health care sector	Not implemented	The norm for its formulation has been passed, but no plans have been carried out to follow-up on its

Standard	Status	Comment
		compliance.
7. Health care staff at the health care sector	Implemented in the public sector	The norm for its formulation has been passed and the register has been implemented in administrative bodies from the public sector.
8. Health care financier at the health care sector	Partially Implemented	The norm for its formulation has been passed and the register has been implemented in the private sector and in administrative bodies from the public sector.

As shown in the table, the formulation process has been practically completed, but the implementation stage (training, migration of systems, adaptation of databases and information systems, among others) has had a very uneven execution level. This situation has implied that the standardization process has not led to tangible results about the generation of reliable and timely information for health care decision-making, both at an operational and the strategic level.

The contribution of the project has had two aspects. The first one, as from the incorporation of the standards applicable to the entry of data in GalenHos (in its two versions). This is verified in Table 6.

Table 6. GalenHos contribution to the implementation of health care data recording standards

Standard	Implementation in GalenHos
1. Medical procedure in the health care sector	Implemented. MINSA's table of medical procedures for 2006 is inserted and operative. This standard is used to record the production of services in outpatient, emergency ad hospitalization care, and for billing.
2. Pharmaceutical product in the health care sector	Complete implementation is pending. Within its database, GalenHos incorporates all the technical elements to define the standard, both in its abbreviated and specific versions. While an official coding is defined for the specific recording of medicines, GalenHos will incorporate a provisional coding compatible with the operational management of the pharmaceutical product at the health care facility.
3. Health care user in the health care sector	Implemented. The compulsory user identification is based on the National Identity Card (DNI), as

Standard	Implementation in GalenHos
	established by MINSA's norm. This standard is used to record the patient's affiliation in the service production record, and in the related billing process.
4. Health care facility and support medical care facility	Implemented. The table of public and private facilities prepared by MINSA (RENAES) is inserted and operative. This standard is used as general marker for all services registering and for billing at the health care facility.
5. Service producing units at health care facilities	Implemented. Each service is configured with the corresponding UPS. This standard is used to record the production of services in outpatient, emergency and hospitalization care.
6. Health care episode in the health care sector	Implemented. Each data transaction (and each contact between the patient and the provider) is duly recorded on the GalenHos database. This standard has not yet an operational use in GalenHos, although its use is foreseeable with the implementation of the exchange and/or sale of services to third parties.
7. Health care staff in the health care sector	Implemented. The provider's identification is based on the National Identity Card (DNI), as established by MINSA's norm. This standard is used to record the health care provided to the patient on the service production record.
8. Health financier in the health care sector	Implemented. The identification table of financial agents is inserted and operative. The recording features of said standard are homologated with what SUNASA prepared for the implementation of the AUS.

The second contributing option of the project is found in the support provided for updating MINSA's medical procedures catalogue. The prevailing catalogue was approved in 2006, although the basic document corresponds to CPT2004. The project has updated the work proposal prepared by the Health Policy Initiatives project and has worked a proposal to MINSA based on CPT2010.

MINSA submitted this document to a socialization process, to receive input and queries. After that it refocused its priority with respect to this standard. It was deemed more urgent the preparation and approval of a selected set of medical procedures that may be used to facilitate the implementation of universal health care insurance. The technical assistance of the project was requested to prepare a proposal for that document. In the submitted proposal, besides providing the list required by MINSA, the project also offered information

to facilitate the implementation, such as: 1) abbreviated name of the procedure; 2) description of the procedure; 3) rules of usage. A sample of the work carried out is illustrated in the insert below. The technical document is currently undergoing the formalization process.

Chart 1. Example of development of the description of a medical procedure

Code: 99234

Common name: Care provided in the observation room

Long or standard name: Assessment and subsequent handling of a patient hospitalized or under observation, including his admission and discharge on the same day.

Description: Health care is provided under observation by considering in its execution that: a) a detailed or thorough medical record is prepared; b) a detailed or thorough medical examination has been conducted; c) a quick and direct medical decision is made. It provides counseling and coordinates the health care with other providers and institutions, according to the nature of the patient's problems and the needs of his/her family.

Rules of usage: The code will be used when the procedure is carried out for: a) low complexity cases (99234); b) moderate severity cases (99235); c) high severity cases (99236). The provider may introduce the use of these codes in its corresponding information systems.

1.3 Third wave initiatives. Development of interoperability standards

The inefficacy observed in the insufficient implementation of data recording standards has been attributed, within and outside the sector, to the scarce value provided to the recorded health data. This idea is sustained by a basically utilitarian approach to information. That is, as long as the value of the usage of each data is marginal, as it does not generate evident positive or negative consequences, it is highly improbable that an appropriate environment to improve the level and quality of the recording (the latter includes the use of quality data recording standards) is going to be favored. This more recent concern dates back to 2006, even though it has been used to justify two interventions with diametrically opposed directions.

The first one has been to justify the return to the design and development of centralizing applications that primarily incorporate financial transactions and secondarily, transactions of health care data. In this model it was assumed that the incentives of the providers are exclusively economic. For this reason, the idea was to try to link a health data transaction with a financial transaction. This model was particularly promoted to strengthen financial recording systems, as has been the case of the Integral Health Insurance (SIS) recording system. The initiative allowed a substantial improvement at the information under-registration level in all those transactions of health care data linked to an economic exchange (i.e., a reimbursement) Nevertheless, it has not allowed to substantially improve the quality of recorded data, as providers incur in recording biases. As long as the recorded data has a concrete monetary value, providers have behaved as conventional economic agents, maximizing income, even at the expense of introducing the recording of erroneous diagnoses.

Another expected consequence has been the weakening of the HIS system, which also carries out the morbidity and health care service register, without having an economic incentive behind it. An information problem has finally occurred as there is no reliable software platform for the simultaneous recording and processing of on-line health care data from multiple nationwide health care facilities. To date, the solution prepared by the SIS has not had the desired stability, and it is being submitted to multiple improvement initiatives.

The second direction consisted in the exploration of new standards to document the exchange of primary data recorded at each point of contact of the service with the user. This approach is substantially different from the first one, as the homologation of the exchange language is not implicit as in the integrated applications. Conversely, it is necessary to make explicit the terms under which this exchange of information is carried out. This involves the following aspects:

Technical interoperability: with the purpose of allowing the transfer of data between two or more distant points.

Semantic interoperability: with the purpose of ensuring that the transferred data have the same meaning for the computational interface and for the end user of the information.

Interoperability of processes: with the purpose of allowing that distant units may work in coordination, on the basis of the information exchanged, to carry out their own work processes.

In this regard, MINSA's OGEI started the internal discussion of the technical possibilities to undertake this development, to which the project offered the corresponding technical assistance. As a result of it, standard HL7 was identified as potential platform for health care interoperability standards. This platform was suggested because it is the world's most widely used health care interoperability tool. Its stability over time extends to year 1987, when it was designed to facilitate internal hospital transactions, mainly in the areas of admission, discharges and transfers. Nevertheless, it evolved shortly afterwards to a tool that facilitates internal and external transactions. HL7 represents a family of interoperability standards abbreviated below:

1. Interoperability standards (EI) on the patient's administrative information: demographic data, admission, discharge, (internal) transfers (in other service);
2. The standard on the registration of medical consultations: Indications of clinical procedures and their results, indications for the pharmacy, on nutrition and supplies;
3. The standard on the interaction rules between information queries and the answers thereto;
4. The standard on financial transactions: patient's bills and payments;
5. The standard on the reporting of remarks and/or atypical cases;
6. The standard on the management of medical information and clinical files;
7. The standard on the management of appointments;
8. The standard on patient referral;
9. The standard on care provided to the patient;
10. The standard on the -management of the automated laboratory (including electronic reports from the equipment);
11. The standard on the management of administrative requests;
12. The standard on the management of personnel;
13. The standard on the handling of requests for reimbursements and reimbursements;

14. The standard on the handling of materials and supplies:

MINSA has approved platform HL7 as the official standard as regards interoperability of data in clinical records. Importantly, this resolution marks the beginning of an extensive and specialized work anticipated to be extended over the next years. The execution of this technical agenda requires the composition of a committee responsible for the implementation of the standard. For this purpose, the project has also provided the pertinent technical assistance to MINSA, particularly, by facilitating the coordination with academic, scientific and governmental organizations (EsSalud), to make them aware of the need of participating in the applicable committee. This committee is expected to be formalized as part of the technical agenda of the new MINSA administration.

2. Regional plans for the collection, analysis, dissemination and use of information by micro networks were approved and implemented in three regions

2.1 Approach used by the project to define regional action plans. The Health Metrics Network (HMN)

Considering the breadth of the scope that the strengthening of health care information systems may represent, a work tool consistent with such requirement was identified. The health metrics network was used for that purpose. This network has six components of analysis, as follows:

1. Information system resources. In relation to institutional or organic resources responsible for leading the operation of the information system. They also incorporate regulatory and legal resources to provide it support, as well as financial and human resources that allow the operation of the health care information system.
2. Information system indicators. In connection with the definition of those indicators that are the justification of the information system. In turn, this allows linking structural aspects (resources) of the information system with the direct needs of decision, for instance, to define specific health care strategies based on timely and quality information. These indicators necessarily have to involve national, regional and local levels, to the extent that the nature of the decisions adopted at each level is different.
3. Information system data sources. In regards to the identification of the set of data that will subsequently be susceptible of generating decision making at different governmental levels. The data sources considered include those generated at the health care services, together with those directly generated by the population served.
4. Information system data management. With regard to the procedures used to collect, store, process and compile data. In general, this is the most visible component of the whole system, to the extent that it corresponds to that which transforms the entire body of data into useful information for decision making.
5. Information products of the information system. With regard to the quality control of the indicators generated in the previous step. For such purpose, it takes into account evaluation criteria such as the data collection media, opportunity for collection and processing, regularity, consistency, representativeness (with regard to the health care phenomenon subject to analysis), the capacity of segregating the information, confidentiality, safety, data accessibility, and finally the adjustment methods.

6. Dissemination and use of the information generated. With regard to the use of the information generated to make decisions in the immediate term, but also to generate new knowledge, on which medium and long-term decisions may be based.

The project used the experience previously acquired with the assessment of the performance of the Regional Information System carried out by the USAID Health Policy Initiative project in 2008 and 2009 that allowed collecting information from 219 health care facilities from the DIRESAs in Ayacucho, Huánuco, San Martín, among other circumscriptions considered by this project. In the meantime, during this assessment, the technical personnel was made aware about the multiple dimensions of assessment of the health care information system, the work of the component was received as a continuation of the previously initiated process. For this reason, it was deemed relevant to take into consideration in each of these DIRESAs the previously prepared axes of analysis and results of the assessment. A sample of the global analysis is shown in Table 7.

Table 7. Assessment on the performance of the routine health care information system in 11 regions. Assessed aspect: System administration and technical quality

Item	Compliance with assessment standards
System administration	
Organization	42%
Planning	40%
Improvement in performance	50%
Training	27%
Finance	13%
Technical quality of the system	
Omission of data recording	7%
Omission of data coding	4%
Fields corrected by the statistician of the health care facility	43%
Fields with inconsistencies	3%
Error in diagnosis coding	15%
Register with discrepancy between the HIS and medical records	20%
Compliance with register of health care technical standards in the medical record:	69%

Item	Compliance with assessment standards
CRED: 73%, PF: 68%, CP: 65%	

Features of Ayacucho regional action plan

The Ayacucho regional action plan was proposed in 2010 and has a bi-annual scope. Actions are suggested in the areas of data collection, quality control, transmission, dissemination and documentation, storage, safety, handling of human and financial resources for the regional health care information system.

With regard to data collection, it emphasizes the importance of applying HIS as the basis of the regional information system, identifying the need for facilitating training, to ensure the best coding quality. It also incorporates the initiative for preparing a tool to improve the level of agreement between the data recorded in the HIS and the primary data recorded on the individual clinical record.

With regard to quality control, it prioritizes the performance of supervision actions, seeking that it has better rigorousness levels, becoming reliable over time. The subject of the supervision actions are the primary (medical records) and secondary report documents (HIS sheets).

As for data transmission, the time of delivery of the data was emphasized, so they may be subsequently transmitted from the service provision level to the level of the DIRESA. An outstanding element is the recognition of the need for improving the level of connectivity between service-rendering units, related networks and DIRESA.

With regard to the dissemination and documentation, it has been stressed the importance of strengthening the capacities of analyzing the information generated. The need of composing a committee responsible for analyzing health care information and regional scope indicators has been supplementarily identified.

With regard to the storage of health care data, the definition of a plan to optimize the physical data registration was identified as critically important. The implementation of GalenHos at the Ayacucho Regional Hospital was also deemed necessary, to have a magnetic backup of the information physically recorded on individual medical records.

As for the handling of human resources for the information system, it was deemed appropriate to rationalize human resources, so that the presence of personnel may be strengthened with competencies in handling information at network level. It also assigned priority to the definition of incentives for the development of projects for improving local performance of local information systems. The design and execution of a capacity building plan to handle information at the DIRESA was supplementarily deemed relevant.

With regard to the availability of financial resources for the management of the regional information system, it was deemed appropriate to develop a guideline that details the mechanism for assigning resources for regular operation and improvement in the development of the regional health care system.

Features of San Martín regional action plan

The San Martín regional action plan was formulated in 2010 and has a bi-annual scope. The technical strengthening actions are focused on the handling of management indicators, use of data register standards, data recollection and processing, and the management of human financial resources for the information system.

With regard to management indicators, DIRESA aims at favoring the use of local level indicators –networks and micro networks- for the analysis of the health care situation at service operation level. Training and awareness actions have been defined for this purpose.

With regard to data register, DIRESA had defined as priority for 2010 the strengthening of the HIS register as the data source for the generation of health care information. This register has been the basis for connecting the monitoring of the register quality and capacity building of human resources. To strengthen this aspect, DIRESA prioritized the use of a software that allows auditing the quality of the HIS register. The simplification and/or elimination of parallel register formats of national strategies was also identified as crucial. The strengthening of the vital statistics register system was also deemed relevant. DIRESA San Martín has declared the need for using the GalenHos by 2012 as an information recording system of the First Level of care. This migration is performed taking into account the need to have a longitudinal follow-up tool in malnutrition cases, as well as a tool that allows implying the data recording of national strategies, without detracting from the generation of reports for the operational management thereof.

With regard to data processing, DIRESA has defined a variety of actions that cover infrastructure support areas, improvement in connectivity capacities, execution of a maintenance plan for computer equipment, up to the use of a free software, to reduce the costs of operating the information systems. This category also includes actions to protect the indemnity of health care data, by generating backup copies of all data generated at operational levels. As it is to be expected, this also incorporates the corresponding investment component.

Finally, the definition of the profile required for the personnel that have the functions of administering and operating actions related to health care information systems has been defined as relevant in the human resources component. This includes on-the-job training, as well as the graduate training in the specialty of information systems. As for the management of financial resources, the inclusion of funds that allow the execution of all identified management activities has been deemed necessary. These activities are within the operational plan that corresponds to 2012.

Features of Huánuco regional action plan

The Huánuco regional action plan was formulated in 2010 and has a bi-annual scope. Technical strengthening actions are focused on data collection and processing.

With regard to data collection, DIRESA Huánuco deemed relevant to prioritize the data collection mechanism, both at the first and second health care levels. At the first health care level, it was deemed appropriate to strengthen the HIS system for the outpatient health care registration. Special emphasis was placed on strengthening this system because a system update was being prepared by MINSA, and that would contribute to better integrate the primary information recording from the providers' side. At hospital level, it was deemed appropriate to implement the GalenHos as a hospital information system at the Tingo María and Hermilio Varldizán hospitals in Huánuco.

As for the hospital information system, the Tingo María hospital formulated the corresponding IT strengthening plan. This plan was formulated taking into account the technical parameters of the SNIP, and under the technical assistance of the project. It has been carried out after its approval, and that hospital is currently ready to start implementing the GalenHos.

3. Summary table

Table 8. Summary table on the policies, regulations and programmatic actions carried out by the national and regional government with regard to the recording, use and dissemination of reliable data for decision making related to comprehensive health care, child-mother health care and reproductive health, HIV/AIDS and tuberculosis.

	Policies		Regulations		Programmatic actions	
	National	Regional	National	Regional	National	Regional
Register		Use of GalenHos as a data register tool at the first health care level in the San Martín region	Updating of (CPT-PEAS) medical procedures catalogue, so that it may be used by all operators of nationwide health care information systems	Regional action plan approved and under execution in Ayacucho, San Martín and Huánuco	Design and development of GalenHos First Level with optimized data register screen that incorporates the integrated data register in the following priority areas: mother-child health care, family planning, infection with HIV, infection with tuberculosis	Regional action plan approved and under execution in Ayacucho, San Martín and Huánuco
		Use of GalenHos as a data register tool at hospital health care level in the Tumbes, San Martín, Ayacucho, Cajamarca, Cusco, Huánuco and La Libertad regions	Maintenance of GalenHos to incorporate the insured party's accreditation screen, as indicated by SUNASA			
Use				Regional action plan approved and under execution in Ayacucho, San Martín and Huánuco		Regional action plan approved and under execution in Ayacucho, San Martín and Huánuco
						Use of Galen-Hos to send information on a regular basis regarding hospitalization and emergency health care.
Data dissemination	Definition of standard HL7 as health care data interoperability standard			Regional action plan approved and under execution in Ayacucho, San Martín and Huánuco		Regional action plan approved and under execution in Ayacucho, San Martín and Huánuco