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R2019-0011/1

January 11, 2019

Closing Date: Thursday, January 31, 2019 at 6:00 p.m.

FROM: Vice President and Corporate Secretary

Peru - Integrated Health Networks Project

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed loan to Peru for the Integrated Health Networks Project (R2019-0011), which is being processed on an absence-of-objection basis.

Distribution:
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The World Bank

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Report No: PAD2517

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$125 MILLION

TO THE

REPUBLIC OF PERU

FOR A

INTEGRATED HEALTH NETWORKS PROJECT

JANUARY 9, 2019

Health, Nutrition & Population Global Practice
Latin America And Caribbean Region

CURRENCY EQUIVALENTS

Exchange Rate Effective November 30, 2018

Currency Unit =	Peruvian sol (PEN)
US$1.00 =	PEN3.38

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Jorge Familiar
Country Director:	Alberto Rodriguez
Senior Global Practice Director:	Timothy Grant Evans
Practice Manager:	Daniel Dulitzky
Task Team Leader(s):	Carlos Marcelo Bortman, Christel M. J. Vermeersch

ABBREVIATIONS AND ACRONYMS

AGREE II	Appraisal of Guidelines Research and Evaluation, Release II
ARFSIS	Registration Application of the Comprehensive Health Insurance System (*Aplicativo de Registro del Seguro Integral de Salud*)
BPA	Good Storage Practices (*Buenas Prácticas de Almacenamiento)*
CPF	Country Partnership Framework
CPG	Clinical Practice Guideline
DALY	Disability-Adjusted Life Year
DICOM	Digital Imaging and Communications in Medicine
DIGEMID	Directorate General of Medicines (*Dirección General de Medicamentos*)
DIRESA	Regional Health Directorate (*Dirección Regional de Salud*)
DIRIS	Directorate of Integrate Health Networks (*Dirección de Redes Integradas de Salud*)
DLI	Disbursement Linked Indicator
EMH	Electronic Medical History
ENAHO	National Household Survey (*Encuesta Nacional de Hogares*)
ENDES	Demographic and Health Survey (*Encuesta Demográfica y de Salud*)
ENSUSALUD	National Satisfacción Survey of Health Service Users (*Encuesta Nacional de Satisfacción de Usuarios en Salud*)
ESA	Environmental and Social Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
EsSalud	Social Security Health Insurance (*Seguro Social de Salud*)
FFAA	Armed Forces (*Fuerzas Armadas*)
FFPP	Police Corp (*Fuerzas Policiales*)
GDP	Gross Domestic Product
GERESA	Regional Health Administration (*Gerencia Regional de Salud*)
GoP	Government of Peru
GORE	Regional Government (*Gobierno Regional*)
GRS	Grievance Redress Service
HIS	Health Information System
HL7	Health Level 7
HVAC	Heating, Ventilation and Air Conditioning
IAAS	Infrastructure-as-a-Service
IADB	Interamerican Development Bank
IBRD	International Bank for Reconstruction and Development
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th revision
ICT	Information and Communication Technology
IDA	International Development Association
IEDS	Health Data Identifier Standard (*Identificador Estándar de Datos en Salud*)
IFC	International Finance Corporation
IFR	Interim Financial Report
INEI	National Institute of Information Technology and Statistics *(Instituto Nacional de Informática y Estadística)*
INFORHUS	National Register of Health Personnel (*Registro Nacional del Personal de la Salud*)

IPP	Indigenous Peoples Plan
IPPF	Indigenous Peoples Policy Framework
IPRESS	Health Facility (*Institución Prestadora de Servicios de Salud*)
IRR	Internal Rate of Return
MEF	Ministry of Economy and Finance *(Ministerio de Economía y Finanzas)*
MEP	Project Execution Module (*Módulo de Ejecución de Proyecto*)
MINSA	Ministry of Health *(Ministerio de Salud)*
MS	Microservices
NCD	Noncommunicable disease
NPV	Net Present Value
OGTI	General Office of Information Technology (*Oficina General de Tecnología de la Información*)
OP/BP	Operational Policy/Bank Policy
PAD	Project Appraisal Document
PAAS	Platform-as-a-Service
PDO	Project Development Objective
PER	Public Expenditure Review
PIDESalud	Health Sector Interoperability Platform (*Plataforma de Interoperabilidad del Sector Salud*)
PIU	Project Implementation Unit
PNUME	Unique National List of Essential Medicines (*Petitorio Nacional Único de Medicamentos Esenciales*)
PPSD	Project Procurement Strategy for Development
PRONIS	National Health Investment Program (*Programa Nacional de Inversiones en Salud*)
RENHICE	National Registry of Electronic Medical Histories (*Registro Nacional de Historias Clínicas Electrónicas*)
RIS	Integrated Health Network (*Red Integrada de Salud*)
SAAS	Software-as-a-Service
SCD	Systematic Country Diagnostic
SIAF	Integrated Financial Management System (*Sistema Integrado de Administración Financiera*)
SIASIS	Integrated Insurance System of the Comprehensive Health Insurance System (*Sistema Integrado de Aseguramiento del Seguro Integral de Salud*)
SIGA	Integrated Administrative Management System (*Sistema Integrado de Gestión Administrativa*)
SIS	Comprehensive Health Insurance System *(Seguro Integral de Salud)*
SISMED	Integrated Medicine and Medical Input Supply System (*Sistema Integrado de Suministro de Medicamentos e Insumos Médicos-Quirúrgicos)*
SMA	Medical Support Services (*Servicios Médicos de Apoyo*)
SORT	Systematic Operations Risk-Rating Tool
STEP	Systematic Tracking of Exchanges in Procurement
SUIS	Single Health Information System (*Sistema Único de Información en Salud)*
SUSALUD	National Health Superintendency (*Superintendencia Nacional de Salud*)
TVM	Time Value of Money
WB	World Bank

BASIC INFORMATION

Country(ies)	Project Name	
Peru	Peru Integrated Health Networks	
Project ID	Financing Instrument	Environmental Assessment Category
P163255	Investment Project Financing	B-Partial Assessment

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Disbursement-linked Indicators (DLIs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
31-Jan-2019	31-Jan-2024

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The objectives of this Project are to (i) improve the resolutive capacity and quality of public First-Level Health Services in Lima Metropolitan Area and Prioritized Regions; and (ii) increase the capacity of the Single Health Information System and the public sector's pharmaceutical products and medical supplies provision system.

Components

Component Name	Cost (US$, millions)
Improving the Organization and Supply of Health Services Using an Integrated Health Networks Model in Lima Metropolitan Area and Prioritized Regions	38.74
Improving the Capacity of the Single Health Information System at the National Level	60.73
Improving the Management of Pharmaceutical Products and Medical Supplies in Lima Metropolitan Area and Prioritized Regions	25.52
Project Management	0.00

Organizations

Borrower:	Republic of Peru
Implementing Agency:	Ministry of Health

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	157.83
Total Financing	157.83
of which IBRD/IDA	125.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	125.00

Non-World Bank Group Financing

Counterpart Funding	32.83
Borrower/Recipient	32.83

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2019	2020	2021	2022	2023	2024
Annual	1.61	9.16	14.52	29.28	43.68	26.76

Cumulative	1.61	10.77	25.28	54.56	98.24	125.00

INSTITUTIONAL DATA

Practice Area (Lead)

Health, Nutrition & Population

Contributing Practice Areas

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

Gender Tag

Does the project plan to undertake any of the following?	
a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF	Yes
b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment	Yes
c. Include Indicators in results framework to monitor outcomes from actions identified in (b)	Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Substantial
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Moderate
8. Stakeholders	Moderate

9. Other	
10. Overall	Substantial

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04		✓
Forests OP/BP 4.36		✓
Pest Management OP 4.09		✓
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10	✓	
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

Loan Agreement, Schedule 2, Section I.A.1(a). The Borrower through MINSA/PRONIS shall maintain, throughout Project implementation, a structure with functions and responsibilities acceptable to the Bank, and staffed with adequate fiduciary, administrative and technical personnel as set forth in the Operational Manual.

Sections and Description

Loan Agreement, Schedule 2, Section I.A.1(b). The Borrower through MINSA/PRONIS shall not later than 90 days

after Effective Date, ensure that a procurement and a financial management specialist are hired to work full time with PRONIS all under terms of referenceacceptable to the Bank.

Sections and Description

Loan Agreement, Schedule 2, Section I.B.1(a). Prior to the carrying out any activities of the Project in the Prioritized Region under the jurisdiction of a Regional Government, the Borrower through MINSA shall enter into an agreement with the pertinent Regional Government.

Conditions

Type	Description
Effectiveness	Loan Agreement, Article V 5.01. Adoption by PRONIS of the Operational Manual in a manner acceptable to the Bank.

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1 STRATEGIC CONTEXT

A. Country Context

1. **Peru's sound macroeconomic and structural policies, supported by favorable external conditions have rendered significant growth.** Income per capita at market exchange rates more than tripled over the past fifteen years, reaching US$6,571 in 2017 from US$2,059 in 2002. Countercyclical fiscal and monetary policies during the commodity boom (2004-2013), underpinned by reforms, led to an increase in domestic savings. This increase, complemented with Foreign Direct Investments to the tune of 4.7 percent of Gross Domestic Product (GDP) on average between 2003 and 2017, transformed the landscape in mining, agribusinesses and commerce.

2. **GDP growth slowed between 2014-2017 but is expected to reach 4 percent over the medium term.** Average annual GDP growth was 3.1 percent between 2014 and 2017, mainly owing to the decline in international commodity prices. This decline led to a fall in investment and a slowdown in consumption, which were attenuated by the reduction in fiscal savings and by the surge in mining production, as projects implemented during the boom years matured, thereby increasing exports. Growth is expected to slightly rebound in 2018 and remain close to 4 percent in the medium term. This growth is supported by a partial recovery in commodity prices that has already translated into new mining investments and is expected to increase formal job creation and underpin consumption.

3. **Between 2001 and 2016, Peru's growth resulted in a drastic lowering of (national) poverty rate from 54.8 to 20.7 percent**[1] **and a substantial increase in the public budget for health.** Government health expenditure grew from 2.3 percent to 3.2 percent of GDP between 2000 and 2015, while per capita Government expenditure on health grew from US$123 to US$414.[2] [3] In this context, Peru launched a public health insurance system for the poor, the Comprehensive Health Insurance System (*Seguro Integral de Salud* - SIS) that covered 44 percent of the population as of 2015.[4] Nevertheless, with the drop in commodity prices and the resulting fall in revenues, Peru is under pressure to maximize efficiency in the allocation of public expenditure while continuing to improve equity and service quality for the poor and vulnerable.

B. Sectoral and Institutional Context

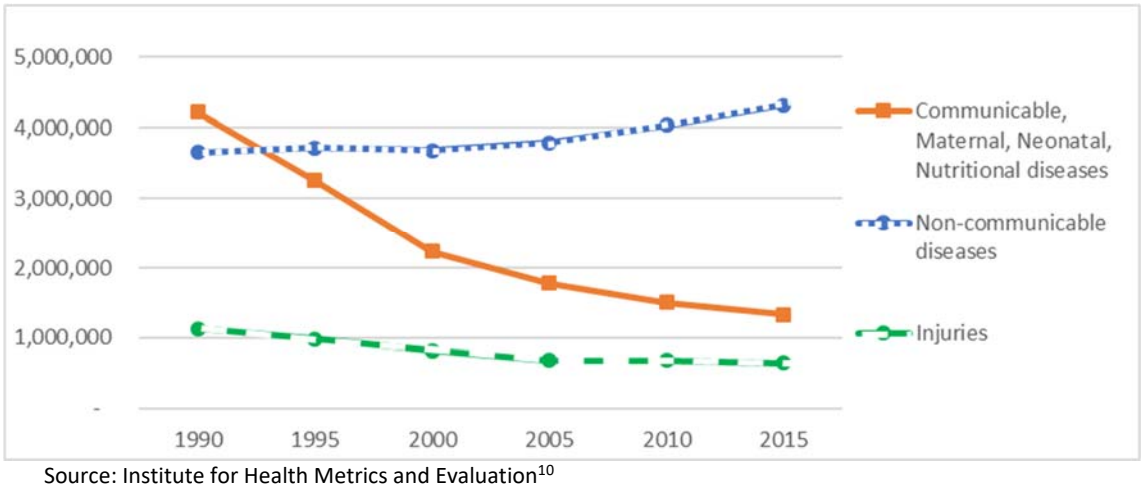
4. **Peru made solid progress in maternal and child health outcomes under the Millennium Development Goals.** In particular, Peru reached the goal of reducing infant mortality by two-thirds between 1990 and 2015:

[1] For 2001, the national poverty line was 205 Peruvian soles per month per capita, equivalent to 168 USD (2011 PPP), or 5.6 USD per day per capita (2011 PPP). For 2016, the national poverty line was 328 Peruvian soles per month, equivalent to 177.2 USD (2011 PPP), or 5.9 USD per day per capita (2011 PPP). (Instituto Nacional de Estadística e Informática, "Evolución de la Pobreza al 2010" (Lima, Peru, 2011); Instituto Nacional de Estadística e Informática, "Evolución de La Pobreza Monetaria 2007-2016" (Lima, Peru, 2017); World Bank, "World Development Indicators | DataBank," 2018.)

[2] World Bank, "World Development Indicators | DataBank."
[3] Purchasing Power Parity, current international $
[4] WB calculations based on Instituto Nacional de Estadística e Informática, "Perú - Encuesta Nacional de Hogares Sobre Condiciones de Vida y Pobreza 2015" (Lima, Peru, 2016).

in 2013, the national average was 17 deaths for every 1,000 live births, down from 55 in 1992.[5] At the same time, the rate of chronic child malnutrition in children under five fell from 34 percent in 1991[6] to 14.4 percent in 2015.[7] Per national estimates, maternal mortality fell from 265 to 157 deaths per 100,000 live births between 1997 and 2011.[8] However, these achievements are now followed by renewed challenges. Peru's demographic transition is characterized by greater life expectancy and an aging population in tandem with an epidemiological transition. Between 1990 and 2015, noncommunicable diseases overtook, by a large margin, communicable, maternal, neonatal, and nutritional diseases in terms of burden of disease[9] (**Figure 1** and Annex 1, **Figure A1- 1**). The concerns associated with the ongoing epidemiological transition are twofold: (i) a greater number of priorities could dilute attention to maternal and child health; and (ii) responding to the new health needs of the population will require a significant adjustment in the current service delivery and financing models.

Figure 1: Disability-adjusted life years lost, by type of cause, Peru, 1990-2015



Source: Institute for Health Metrics and Evaluation[10]

5. **The poor continue to face challenges in gaining effective access to health services.** They are less likely to use health services when they need them and more likely to pay out-of-pocket for services and medications. For example, according to the 2014 National Household Survey (*Encuesta Nacional de Hogares* – ENAHO), only 37 percent of the poor that had an illness or accident in the four weeks preceding the survey received medical attention without paying out-of-pocket. For the non-poor/non-vulnerable population, the corresponding figure was 65 percent.[11] [12] At the same time, there are great disparities in the availability of

[5] World Bank, "World Development Indicators | DataBank."
[6] Instituto Nacional de Estadística e Informática, "Informe Principal Encuesta Demográfica y de Salud Familiar 2000" (Lima, Peru, 2001).
[7] Instituto Nacional de Estadística e Informática, "Perú: Encuesta Demográfica y de Salud Familiar 2015 - Nacional y Departamental" (Lima, Peru, 2016).
[8] World Bank, "World Development Indicators | DataBank."
[9] Institute for Health Metrics and Evaluation, "GBD Compare," 2017, http://www.healthdata.org/data-visualization/gbd-compare.
[10] Ibid.
[11] Banco Mundial, *Financiamiento de la salud en el Perú: Análisis de la situación actual y desafíos de política al 2021* (Washington, DC, 2016).
[12] In the referenced study, the non-poor/non-vulnerable are those populations whose consumption is above 1.41 times the poverty line.

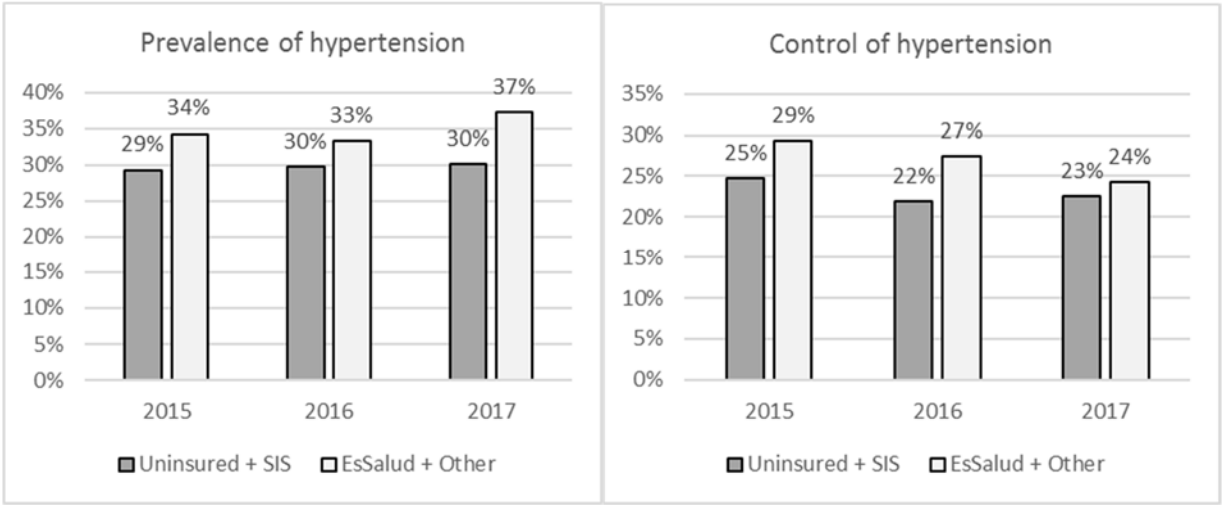
health services by geographical area: in general, human resources for health are scarce precisely where poor SIS members are located.[13]

6. **The public sector is the main provider of health services among poor segments of the population.** Similarly to other Latin American countries, Peru's health system is fragmented between the public, social security and private sectors. The Ministry of Health (MINSA) is the governing body of the Peruvian health system, responsible for the sector policy design and its implementation. The National Health Superintendency (*Superintendencia Nacional de Salud* – SUSALUD) is responsible for supervision of health providers and insurers, as well as enforcement of the legislation for the whole sector. A multiplicity of institutions administer health financing including the public insurer (SIS), MINSA, social security health insurance (*Seguro Social de Salud* - EsSalud), separate systems for the Armed Forces and Police (*Sanidades de las Fuerzas Armadas y Policiales* – FFAA and FFPP) and private insurers. This fragmentation is mirrored in the supply of health services. In general terms, EsSalud provides services through its own separate network of providers, the public sector provides services through health facilities (*Instituciones Prestadoras de Servicios de Salud* – IPRESS) administered by MINSA (in the Lima Metropolitan Area) and regional governments (in all 25 regions), and the private insurers are associated with private providers. MINSA facilities are mainly used by the uninsured and SIS subscribers, which together account for 71 percent of the population.[14] With average per capita incomes of US$2,372, this population is poorer than EsSalud members whose average per capita income is US$5,209.[15] The capacity of MINSA to effectively regulate and oversee health services is limited by the autonomy of Regional Governments (*Gobiernos Regionales* - GOREs), as GOREs are the official owners of the IPRESS in their respective regions.

7. **The gap in health services and outcome indicators between those that depend on the public sector and those that have access to private or social security health insurance has closed in a number of dimensions although some differences remain.** On the one hand, according to SUSALUD, the average waiting time (time between reaching the health facility and being seen by a care provider) is 135 minutes in public facilities compared to 80 minutes in EsSalud facilities.[16] In terms of health outcomes, EsSalud and private insurance members are more likely to have hypertension (37 percent) than SIS members and the uninsured (30 percent). (Figure 2) On the other hand, control of hypertension among those with hypertension is no longer much higher among EsSalud and private insurance members (24 percent) than among the uninsured and SIS members (23 percent). Over the last few years, the gap between the two groups has reduced, although this appears to be due to a decrease in hypertension control for the population with EsSalud or private health insurance rather than an increase in the control rates among the uninsured and SIS members.

[13] Banco Mundial, *Financiamiento de la salud en el Perú: Análisis de la situación actual y desafíos de política al 2021*.
[14] World Bank (WB) staff calculations based on ENAHO 2017: Instituto Nacional de Estadística e Informática, "Encuesta Nacional de Hogares Sobre Condiciones de Vida y Pobreza 2017," 2018, https://webinei.inei.gob.pe/anda_inei/index.php/catalog/613.
[15] WB staff calculations based on ENAHO 2017: Ibid.
[16] Instituto Nacional de Estadística e Informática, "Encuesta Nacional de Satisfacción de Usuarios en Salud 2016: Informe Final" (Lima, Peru, 2016).

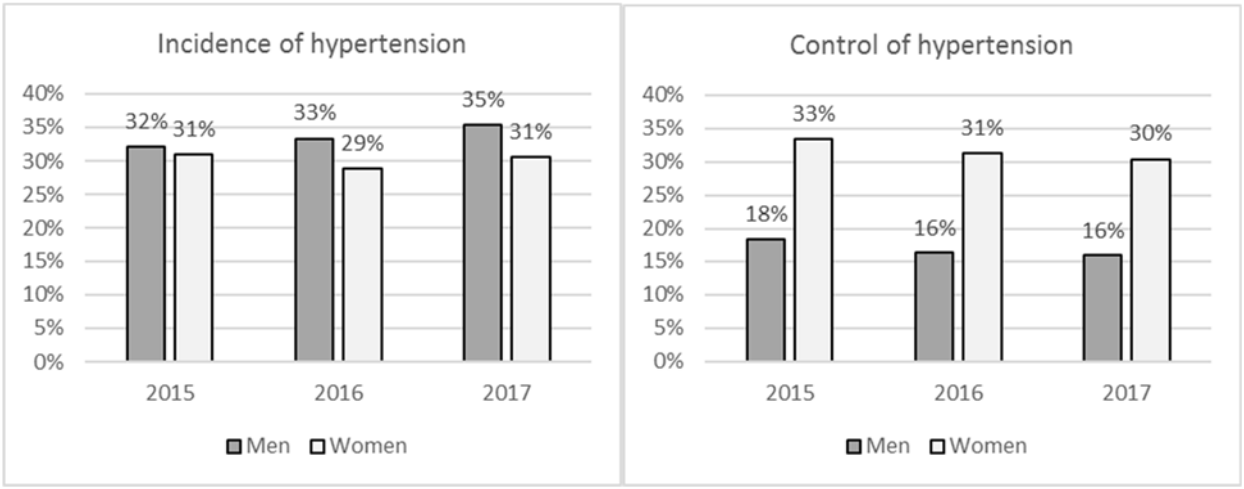
Figure 2: Incidence and control of hypertension, by insurance status



Source: World Bank staff calculations based on Demographic and Health Survey (*Encuesta Demográfica y de Salud Familiar* - ENDES) 2015-2017. Prevalence of hypertension is calculated as the percentage of population that had measured blood pressure at the time of the survey or that reported having been diagnosed with hypertension. Control of hypertension is a measurement of blood pressure within the normal range, conditional on having hypertension (either measured or self-reported).

8. **There is also a gap between men and women in terms of care for noncommunicable diseases, as evidenced by a striking gender gap in hypertension control.** While women are only slightly less likely than men to have high blood pressure (31 percent compared to 35 percent), at national level the rate of control of hypertension is 30 percent in women but only about half of this (16 percent in men), evidencing especially poor access to and/or use of quality care for men. (Figure 3) In the Lima Metropolitan Area among the target beneficiaries of this Project (see below), the difference is even starker: while women achieve 31 percent control of hypertension, men only reach 8 percent. The difference in hypertension control rate disproportionately increases the risks for acute strokes, myocardial infarctions, death and disability among males. This directly impacts the socioeconomic status of the families of the impacted males.

Figure 3: Incidence and control of hypertension, by gender



Source: World Bank staff calculations based on Demographic and Health Survey (*Encuesta Demográfica y de Salud Familiar* - ENDES) 2015-2017. Prevalence of hypertension is calculated as the percentage of population that had measured blood pressure at the time of the survey or that reported having been diagnosed with hypertension. Control of hypertension is a measurement of blood pressure within the normal range, conditional on having hypertension (either measured or self-reported).

Health service delivery model: current situation and challenges

9. **Health services in facilities owned by MINSA and the GOREs[17] are currently organized in three levels of care**.[18] The first level of care includes four types of IPRESS ranging from basic health posts (level I-1) up to maternal/child health centers that offer 24-hour service and attend normal deliveries (level I-4). The second level of care includes three types of hospitals that offer the basic specialties and services (deliveries, surgery, diagnostic imaging, pathology, blood bank, rehabilitation, hospitalization) and some offer intensive care services. The third level of care includes hospitals with a higher concentration of technology, all medical specialties, and some subspecialties. Third-level hospitals may also offer cancer treatment such as radiotherapy, hemodialysis and other specialized services. The public sector currently includes 7,830 first-level IPRESS and 175 second- and third-level IPRESS (hospitals) nationwide.[19] In the Lima Metropolitan Area, these services are organized in four Integrated Health Network Directorates (*Dirección de Redes Integradas de Salud* - DIRIS) that fall directly under MINSA's authority; in the remainder of the country service delivery is organized in 25 Regional Health Directorates (*Dirección Regional de Salud* – DIRESA or *Gerencia Regional de Salud* - GERESA) that fall under each regional government, in line with the country's administrative decentralization.

10. **The first level of care is still focused on maternal and child health issues which, although important, leaves an unmet but increasing demand for care of chronic and noncommunicable diseases.** Most first-level IPRESS do not offer services for prevalent chronic and noncommunicable diseases such as diabetes and hypertension. Hospitals face a disproportionate demand for services that should be provided at the first level of care: prevention, secondary prevention and curative care for noncommunicable diseases such as diabetes, hypertension, and cancer screening. This results in inefficient use of resources, as care for prevalent chronic conditions is provided in high-cost, low access environments (hospitals) instead of lower-cost, higher-access environments (first-level facilities). With proper infrastructure, equipment, clinical practice guidelines, medical support services and training, first level health facilities should be able to progressively expand the range of services to include care for adult diseases. On the other hand, many first-level facilities in urban areas continue to devote a substantial amount of physical space and human resources to labor and delivery care, although many women already choose to deliver in hospitals and the actual number of deliveries in many first-level facilities is relatively low. Of the approximately 160,000 births occurring annually in Lima, only about 2,000 occur in health centers. (see Annex 1, **Table A1- 1**) Yet MINSA owns an estimated 35 health centers that attend deliveries in Lima, averaging less than 60 births per year per center. To improve quality and safety, in urban areas these services should be gradually concentrated in locations with greater resolution capacity such as hospitals or maternity clinics.

11. **The first level of care faces many challenges to be able to provide a wider range of high-quality services.** In terms of infrastructure, most first level IPRESS have grown in a disorganized manner, without due

[17] The responsibility for providing health services in the public sector has been devolved to GOREs in all Regions except Lima Metropolitan Area, where they remain the responsibility of MINSA.
[18] Ministerial Resolution Nº 546-2011.
[19] SUSALUD, "Registro de IPRESS - RENIPRESS | SUSALUD Datos Abiertos," 2018.

consideration to the safe and efficient flow of patients. Much of the existing infrastructure is vulnerable to environmental risks such as earthquakes, extreme temperatures or precipitation. Many IPRESS do not have safe entrances or internal and technical corridors, adequate ventilation, or safe water. Patient restroom facilities are often non-existent, non-functional or unhygienic. Infrastructure that was deemed unsafe and decommissioned due to damage endured in the 2007 earthquake continues to be used for outpatient services. Management of IPRESS tends to be weak and lack patient focus. Systems for management of solid and hazardous waste and cleanliness standards are deficient. Another challenge is the absence of effective patient appointment systems. Medical support services such as laboratories and diagnostic imaging centers are not organized effectively or efficiently. Many first-level IPRESS operate individual, low-volume laboratories staffed by dedicated personnel but with a limited range of diagnostic tests and a lack of quality control mechanisms. This dispersion, even in urban areas, does not allow the system to benefit from economies of scale and improvements in accuracy and safety (for both staff and patients) made possible by modern automatic laboratory technology that can process hundreds of samples in each batch. Finally, the incompleteness of clinical practice guidelines (CPGs) and inexistence of standardized patient care pathways (specific algorithm of care by level of complexity) limits the options for improving and measuring the quality of care.

12. **To effectively respond to the population's health needs, Peru needs to build and implement a new service delivery model.** The model should include a strengthened and optimized network of first-level IPRESS that can respond to a wider range of health needs, refocused hospitals, efficient medical support services and strong relationships between providers that facilitate continuity of care for patients. To provide services in a continuous and efficient manner, providers at all levels should have clarity about the expected content and location of care for the specific condition of the patient. Also, first-level providers must be able to refer patients up to the next level when required by the patient's condition (referral). Second- and third-level providers should focus on cases that require their services as specified in the patient care pathways or complicated cases and should be able to confidently return patients to the first level of care for ongoing follow-up (counter-referral). Also, medicines and medical supplies need to be selected, purchased and distributed in effectively and efficiently to ensure adequate access and quality of care. To make all this possible, clinical and administrative management needs to be modernized using modern information and communication technology.

Health Information System: current situation and needs

13. **For a health system to function effectively and efficiently, it must be able to rely on an information system (or systems) that provide(s) both health care providers and local, regional and national health system administrators with the information they need to make timely and appropriate clinical, administrative and organizational decisions.** Notwithstanding the efforts made, Peru's fragmented health information systems are not able to support effective local management of health care processes. In first level IPRESS, the patient medical information is not recorded in a digital information system. On the other hand, the statistical information about IPRESS is recoded in digital information systems with a view to generate public health indicators as opposed to supporting clinical management decisions. As far as health care is concerned, the current systems do not allow health providers to exchange the information needed to ensure continuity of care (e.g. referrals and counter-referrals, prescriptions, lab results, medical imaging results) or efficient management of facilities, staff and inputs (e.g. pharmacy management, appointments, shift management, billing).

14. **The main investments required to upgrade Peru's Single Health Information System (*Sistema Único de Información en Salud* – SUIS) fall in four categories**: (i) adopting standards for healthcare processes and data; (ii) adopting a more integrated, robust, secure, and modern software platform based on standards; (iii) migrating to a data center as the basis for private cloud storage and computing; (iv) building a secure and reliable network that connects all health facilities with data processing and storage centers.

15. **Since 2016, MINSA has made significant progress towards adopting a more integrated, robust, secure, and modern software platform that is based on standards.** MINSA was able to leapfrog into developing a new health information system platform and modules using open-source code, international standards for data, and the HL7 interoperability standard. The development of the modules of the SUIS registers significant advance. Some of the application modules are already fully developed and tested, including admission and management of appointments (one-stop shop, programming, references and counter-references, social service, online appointments), pediatric services (growth and development monitoring services and immunizations), and HIV screening and care. Other modular applications currently under development include outpatient services (outpatient services by age groups, ophthalmology, telemedicine, emergency care), maternal health and family planning, and pharmaceutical products and medical supplies management.

16. **Modern health information systems do not store health information in health facilities but rather use a data center as the basis for private cloud storage and computing**. The data center is the physical location of the main servers and communication equipment including the core switch. It must be protected from risks such as unauthorized physical access, earthquakes, floods, fires, electric shocks, and blackouts. The data centers must comply with good practices and implementation standards for data centers. Data centers must be distributed between distinct but interconnected locations, so as to generate a private cloud. MINSA currently has only one data center that does not comply with the minimum requirements in terms of earthquake resistance, access conditions, cooling or electrical safety.[20] The data center is located on the second floor of MINSA's main building in Lima. The current situation makes the health information system vulnerable to information loss and cyber-attacks.

17. **Finally, Peru's modernized information system will require a secure and reliable network that connects all health facilities with data processing and storage centers.** MINSA estimates that 46 percent of health facilities in rural areas already have internet access. Restrictions on access are concentrated in the Amazonian geographical area, although the access levels observed on the Coast and the Mountain geographical areas also need to be improved. To overcome this limitation, the Telecommunications Investment Fund (*Fondo de Inversión en Telecomunicaciones*) is expected to provide broadband internet and intranet access as well as computer equipment to health facilities in 24 prioritized regions.[21]

***Status of provision of pharmaceutical products and medical supplies:*[22]**

18. **Access to pharmaceutical products in the first level of care in MINSA and GORE health facilities is inadequate and generates discontent and mistrust on the part of the population.** In theory, members of the SIS health insurance may obtain medicines free of charge in public health facilities – however, low availability of medicines in those facilities often compels patients to pay out of pocket for essential medicines in private

[20] MINSA, "Proyecto de Inversión Pública: Mejoramiento y Ampliación Del Sistema Único de Información En Salud a Nivel Nacional" (Lima, Peru, 2018).
[21] Supreme Decree No. 024-2008-MTC.
[22] Includes medical devices.

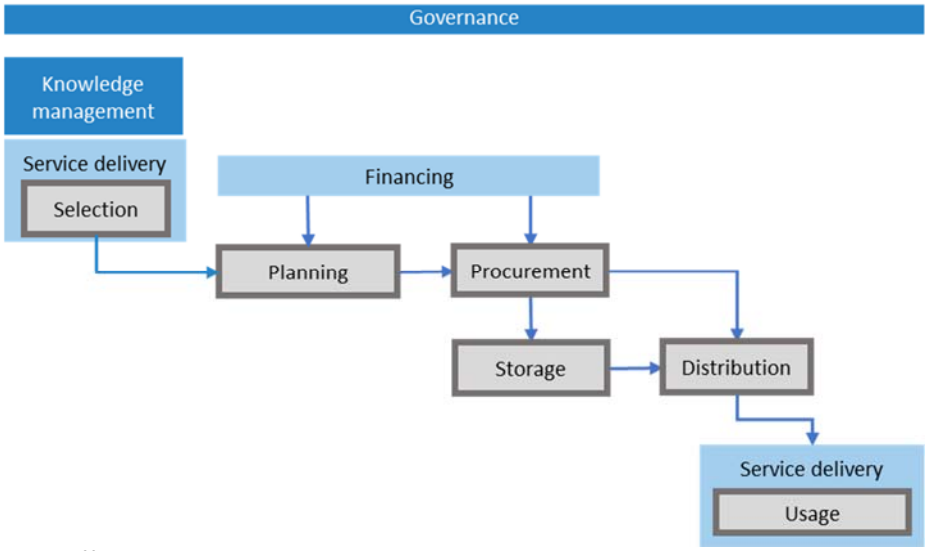
pharmacies. The Directorate General of Medicines (*Dirección General de Medicamentos* - DIGEMID) estimates that, at the national level, 33 percent of first-level facilities had low availability (defined as less than 70 percent) of drugs listed in the Unique National List of Essential Medicines (*Petitorio Nacional Único de Medicamentos Esenciales* - PNUME). The situation in Lima Metropolitan Area is extreme, in the sense that 96.1 percent of health facilities in the first level have low availability of essential medicines.[23] [24] The availability of drugs at higher complexity facility is also not ideal. The National Health Service User Satisfaction Survey (*Encuesta Nacional de Satisfacción de Usuarios en Salud* - ENSUSALUD) conducted in 2015 showed that, of the total number of patients who received an ambulatory care consultation in health facilities of level I-4 and higher and who attempted to obtain prescription drugs at the pharmacy of the facility, only 70 percent obtained all prescribed drugs. 3 percent of the patients received none of the prescribed medication, 11 percent received only a few, and 16 percent received the majority.[25]

19. **The entire supply chain is affected by problems in its information systems. Each of the processes in the supply chain (Figure 4) also presents specific problems that impair adequate access to medicines and medical supplies in the facilities of the first level of care.** The **selection** of essential medicines listed in the PNUME is not updated in a timely manner. In the case of medical devices and supplies, to date, there is no list of essential items, even though DIGEMID has recorded some progress in its elaboration. The **planning** process is mainly based on historical behavior. Because of the gaps between historical consumption and real need, in addition to problems in information systems, the planning does not reflect the real needs of health facilities. The **procurement** process is affected by the inadequate estimation of needs, and as a consequence, there is a large gap between the goods that are needed and those that are bought. This includes both over- and under-purchasing. Also, the standardization of items is still limited, and therefore the available procurement methods are not used optimally. To date, the framework contract/electronic catalog procurement method has not been used. In 2017, 45 percent of pharmaceutical products and 64 percent of medical devices were purchased at the regional or institutional level (i.e., hospital or health network executing unit),[26] which implies higher unit prices for lack of economies of scale, lack of standardization of products and inequity of care.[27] The current performance of the **storage and distribution** processes is also inadequate: Following a devastating fire in its central warehouse in Lima in 2016, MINSA no longer owns a warehouse for the storage of pharmaceutical products and medical supplies in Lima. As a transitory measure, MINSA is renting two warehouses and the Lima DIRIS are using temporary storage locations that do not comply with Good Storage Practices[28] (*Buenas Prácticas de Almacenamiento* – BPA) (See Annex 1, **Table A1- 4Error! Reference source not found.**). Storage and distribution is done without considering a health network approach and the options for managing stock between warehouses are limited. Therefore, shortages and oversupplies of the same product may appear at the same time without options for relocating the resources in the right place. Finally,

[23] MINSA, "Proyecto de Inversión Pública: Mejoramiento de La Gestión de Productos Farmacéuticos y Dispositivos Médicos a Nivel Lima Metropolitana" (Lima, Peru, 2018).
[24] See Annex 1,**Error! Reference source not found.**.
[25] MINSA, "Proyecto de Inversión Pública: Mejoramiento de La Gestión de Productos Farmacéuticos y Dispositivos Médicos a Nivel Lima Metropolitana"; Instituto Nacional de Estadística e Informática, "Encuesta Nacional de Satisfacción de Usuarios en Salud 2016: Informe Final."
[26] Ibid.
[27] There is little information on prices for decentralized procurement since the information systems do not allow to easily extract such information.
[28] For more information, see World Health Organization, "Guide to Good Storage Practices for Pharmaceuticals," WHO Technical Report Series, 2003.

the **usage** process presents challenges, in that the prescription and dispensing practices for medicines and medical supplies are inadequate, their use is not monitored, and pharmacy operating procedures are not standardized.

Figure 4: Provision of medicines and medical supplies: Supply value chain processes



Source: MINSA[29]

Government Program

20. **The Ministry of Health of Peru is preparing an investment program denominated "Integrated Health Networks" (*Redes Integradas de Salud* - RIS).**[30] This program aims to contribute to the provision of timely, appropriate, efficient and high-quality services in first level IPRESS owned by MINSA and the GOREs. The ultimate goals of the program are to improve the health of the Peruvian population that does not have access to health services through social security or private insurance, and to strengthen the health sector's governance, efficiency, and equity.

21. **The Government of Peru (GoP) plans to reorganize service delivery in Integrated Health Networks** that would include strengthening first-level IPRESS, providing them with improved clinical guidelines and clear patient pathways, stronger communication and information systems, an articulated network of medical support services (including laboratories, emergency transportation, diagnostic imaging, blood bank), and an optimized logistics system for pharmaceutical products and medical supplies (Table 1). The Government's US$315.65 million program is to be financed by the US$125 million World Bank Project, a parallel US$125 million project financed by the Interamerican Development Bank (IADB), and US$65.65 million from the public budget. The IBRD and IADB projects and the Government funds will support the implementation of the GoP model. The results chain of the Government Program (Annex 1, Table A1- 5) shows how desired changes are expected to happen including mid- and long-term goals.

[29] MINSA, "Proyecto de Inversión Pública: Mejoramiento de La Gestión de Productos Farmacéuticos y Dispositivos Médicos a Nivel Lima Metropolitana."
[30] MINSA, "Programa de Inversión Pública: 'Redes Integradas de Salud': Estudio a Nivel de Perfil" (Lima, Peru, 2018).

Table 1: The GoP's Organization of Integrated Health Networks Program: Objective and Structure

Objective: Contribute to the adequate provision of timely, appropriate, efficient and high-quality services in first-level IPRESS owned by MINSA and the GOREs.

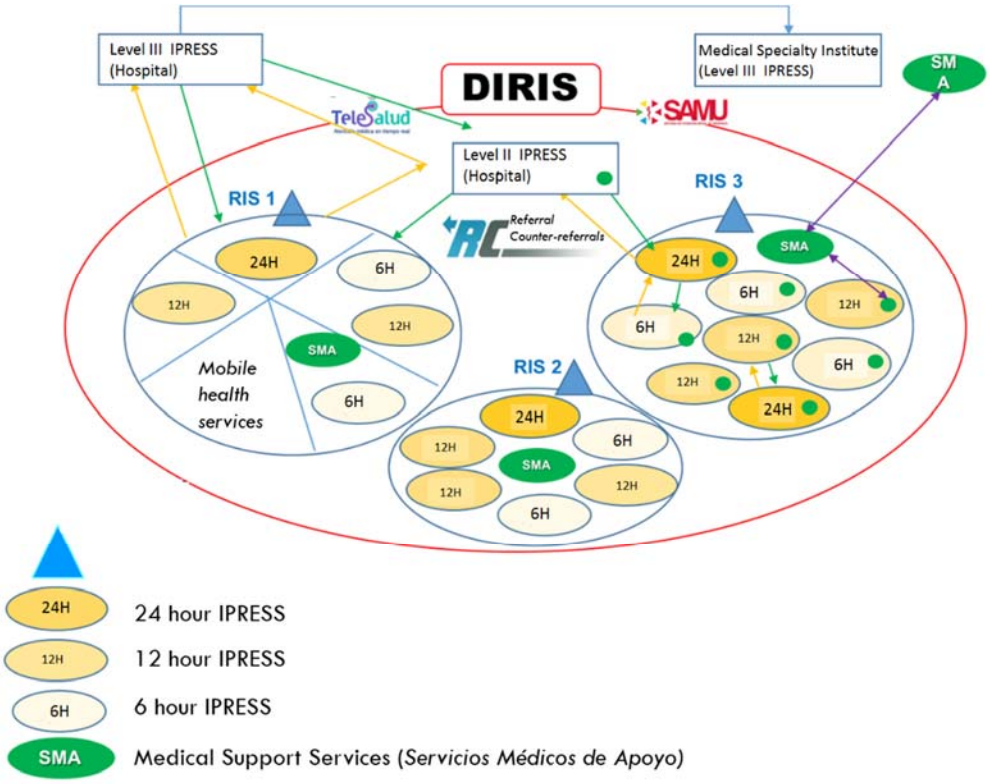
Vision: Integrated Health Networks consist of first-level IPRESS with higher resolutive capacity that are articulated through improved clinical guidelines and standardized patient pathways, stronger communication and information systems, an efficient network of medical support services (including laboratories, emergency transportation, diagnostic imaging, blood bank) and an optimized logistics system for pharmaceutical products and medical supplies.

GoP program components and subcomponents	**External financing**
I. Improving the model for organizing IPRESS in Integrated Health Networks in Lima Metropolitan Area and prioritized regions 1.1 Redesign of the model of care with an emphasis on the new disease burden pattern 1.2 Adjustment of the organization, management, and financing models 1.3 Strengthening clinical guidelines and management 1.4 Plan for development of competencies of human resources in health	WB Component 1 and IADB
1.5 Coordination and management of the Project	WB Component 4 and IADB
II. **Improving the capacity of first-level IPRESS in Lima Metropolitan Area and prioritized regions.** 2.1 Investment in first-level IPRESS in Lima Metropolitan Area and prioritized regions, using the RIS model approach	WB Component 1
2.2 Investment in first-level IPRESS in Lima Metropolitan Area and prioritized regions, using the RIS approach	IADB
III. **Improving the capacity of the Single Health Information System at the national level** 3.1 Governance and standards for data and Information and Communication Technology (ICT) processes 3.2 Technological and network infrastructure suitable to support the roll-out of the SUIS 3.3 Strengthening of human competencies for the registration, management, and use of information 3.4 Integrating user engagement as a fundamental axis in the development and implementation of the SUIS.	WB Component 2
IV. **Improving Medical Support Services in Lima Metropolitan Area** 4.1 Establishment of centralized support services for the RIS: central laboratory, diagnostic images reading center, central blood and tissue bank, coordinated prehospital medical emergency care system. 4.2 Equipment for first-level IPRESS	IADB
V. **A. Improving the management of pharmaceutical products and medical supplies in Lima Metropolitan Area**	WB Component 3
V. **B. Improving the management of pharmaceutical products and medical supplies in prioritized regions**	WB Component 3

22. **Improving the model for organizing IPRESS in Integrated Health Networks in Lima Metropolitan Area and prioritized regions (Component I of GoP Program)**: Under this component, the GoP will develop a more appropriate organizational model for first-level IPRESS. The model will encompass a management structure,

definition of the level of resolution of IPRESS, definition of the adequate location of care, quality standards, and standards for resource allocation. The new RIS model will have the following characteristics: (i) First-level IPRESS will be organized in RIS, which will constitute the new basic "cells" of the public health system. (ii) Each RIS will include several "Up-to-12-hour" IPRESS that will provide ambulatory care using an appointment system, as well as at least one 24-hour IPRESS. (iii) The population will be assigned to a RIS. (iv) Human Resources in Health will be assigned to a RIS. (v) The DIRIS (in Lima), DIRESAs/GERESAs (in Regions) and equivalents will be in charge of the RIS and second and third-level IPRESS in their areas of jurisdiction. **Figure 5** illustrates the organization of the RIS model.

Figure 5: The RIS model



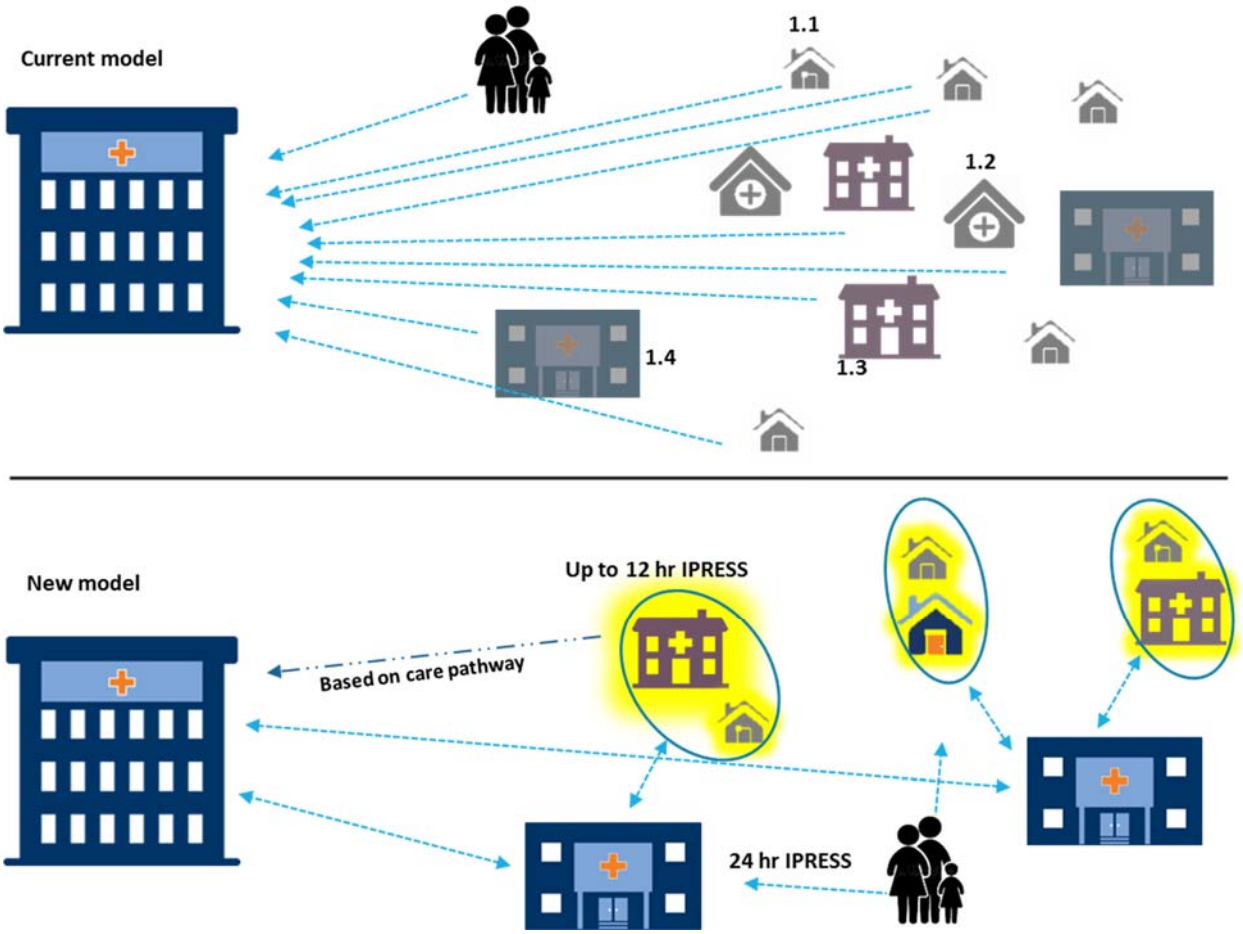
Source: MINSA[31]

23. **The RIS model would promote the concept of health networks in which the primary level acts as the coordination center for care**, providing routine diagnostic services and treatment, referring complex cases to specialist services either at hospitals or through teleconsultation, and ensuring the continuity of care. Second, the new model would expand the range of first-level services beyond the current focus on maternal and child health to include outpatient prevention, control, and treatment of chronic and non-communicable diseases and adult care. The model will take into account the different service needs and usage patterns of men and women. A strong referral system between the RIS and the assigned referral hospital will allow providers to refer patients to specialist services when needed, while a counter-referral system that returns patients to the first level when appropriate. A set of clinical practice guidelines and patient pathway guidelines will specify

[31] Ibid.

appropriate care and roles and responsibilities for each level of care. Figure 6 illustrates how the referral system will operate in the network.

Figure 6: Health Network Referral System



Source: WB elaboration

24. **Improving the capacity of first-level IPRESS in Lima Metropolitan Area and prioritized regions (Component II of the GoP Program):** The objective of this component is to reach an adequate level of infrastructure, equipment and human capacities for the adequate delivery of services using the RIS approach. To be able to fulfill its new role, the first level of care will require a strong investment to bring its facilities in line with the new standards and processes that will be applied to the organization of health services, clinical management, and the technical and administrative management of the RIS. Overall, many first-level IPRESS would need to be rebuilt from the ground up using better standards of construction and standardized modular designs that would allow more efficient flows of patients and adaptation to future needs in each health center. Given Peru's vulnerability to climate (change) hazards and geophysical hazards including extreme precipitation and flooding, earthquakes, tsunamis, torrential rains, and landslides (stone avalanches), it is critical for health facilities to have earthquake-resistant structures and to be located away from identified flood and landslide-prone areas. Facilities also need safe and effective means of disposing of medical waste.

Under this component, the GoP will strengthen the capacity of first-level health facilities in the Lima Metropolitan Area and other prioritized areas. Investments in infrastructure will consist of renovation, rehabilitation, expansion, tear-down or reconstruction depending on the current state of health facility infrastructure. In cases where there is no health facility, or a health facility needs to be relocated due to an unsuitable current location, the Government may decide to construct a first-level IPRESS in a new location. The first-level IPRESS will also need to be equipped with medical and non-medical equipment to allow them to provide an expanded range of services.

25. **Apart from the needed upgrades to infrastructure and equipment, first-level IPRESS need to be able to rely on a strong system of medical support services, logistics, and management tools.** This includes reliable laboratory and diagnostic imaging systems that feed information back to the provider, a teleconsultation system that is available for second opinions, an information system that facilitates the collection, analysis, and use of patient-level information, and systems that provide pharmaceutical products and supplies where and when they are needed.

26. **Improving the capacity of the Single Health Information System at the national level (Component III of the GoP Program)**: The objective of this component is to achieve adequate access and management of information for administrative and clinical decision making. To achieve this objective the GoP wishes to increase the share of health facilities that have access to health information systems that are adequate for their level of care. The Component will finance investments in the modernization of health information and communication technology to support the RIS model. The modernization would include: (i) Investment in a data center and information management center that will generate synergies, economies of scale and efficiency in information management; (ii) Moving from physical waiting lines to (online and other) appointment management systems; (iii) Migration from paper to electronic records and archives, including Electronic Medical Histories; (iv) Institutionalization of Telehealth systems.

27. **Improving Medical Support Services in Lima Metropolitan Area (Component IV of the GoP Program):** The objective of this component is to provide the RIS with the necessary medical support services while improving the cost-effectiveness of those services. Medical support service delivery will be modernized and integrated using a network approach: blood and other samples and medical images will be collected in strategically placed locations in the RIS, but their processing, reading, and interpretation will be cost-effectively centralized. The planned investments include: (i) A medical support service center in Lima that will house a centralized laboratory for processing of samples, a centralized digital medical image reading center, a centralized blood bank, and an emergency service dispatch center; (ii) Supply of technological and other equipment to enable first-level IPRESS to tap into the services of the medical support service center.

28. **Improving the management of pharmaceutical products and medical supplies in Lima Metropolitan Area and prioritized regions (Components V-A and V-B of the GoP Program)**: The objective of this component is to improve access to pharmaceutical products and medical supplies in MINSA and GORE IPRESS in the Lima Metropolitan and other select areas. The investments will include: (i) A state-of-the-art central warehouse for pharmaceutical products and medical supplies in Lima, to replace currently dispersed and inadequate warehouses; (ii) Upgrading of several regional warehouses; (iii) Provision of IT equipment, tools and traceability technology to improve the planning, storage, and distribution of pharmaceutical products and medical supplies; (iv) Improved management of the procurement and logistics chain.

29. **The Government program for renewal of the model of care is currently limited to the public provision of services and does not include the service delivery of EsSalud or system-wide changes in health financing arrangements.** With respect to information systems, EsSalud currently has its own information system, and this Project does not propose to change or replace it. Still, EsSalud would be mandated to share its summary clinical records with the National Registry of Electronic Medical Histories (*Registro Nacional de Historias Clínicas Electrónicas* - RENHICE) system once it is functional. As part of the Project activities, MINSA is planning to develop a new management and governance model for the RIS that would include a proposal for reorganizing financing arrangements for first-level care within the public sector.

C. Higher Level Objectives to which the Project Contributes

30. **The Project will contribute to the higher-level objective of decreasing the burden of disease for the Peruvian population that does not have access to health services through social security or private health insurance,** both in terms of healthy years of life lost and in terms of opportunity costs and monetary costs. Improving the resolutive capacity and quality of health services at the first level of care should decrease the needs of this population to pay out-of-pocket for health services from private providers.

31. **Also, the Project will contribute to improving the efficiency of the health sector: (i) By providing the tools to enable better control of health services and spending, the Project will contribute to the financial sustainability of the health sector in Peru.** (ii) The Project investments are expected to reduce the saturation of second and third level health facilities, allowing them to focus on higher-complexity services.

32. **The Project is aligned to the World Bank Group's Country Partnership Framework (CPF) (FY17-21) (Report No. 112299-PE), discussed by the Executive Directors on May 2, 2017.** The CPF prioritized Bank support improving health service delivery for the poor, and in particular the design of a new service delivery model for health care, including adapting services to the new epidemiological challenges, encompassing shifts in infrastructure, technology, and the referral system. The Project also contributes to the World Bank Group's twin goals of ending extreme poverty by 2030 and promoting shared prosperity by improving the living standards of the bottom 40 percent of the population in every country.

2 PROJECT DEVELOPMENT OBJECTIVES (PDO)

A. PDO

33. **The objectives of the Project are** to: (i) improve the resolutive capacity and quality of public First-Level Health Services in Lima Metropolitan Area and Prioritized Regions and (ii) increase the capacity of the Single Health Information System and the public sector's pharmaceutical products and medical supplies provision system.

B. Project Beneficiaries

34. **Project beneficiaries include 20.3 million Peru residents who do not have social security or private health insurance.**[32] Residents who do not have social security or private health insurance typically use public

[32] WB staff estimation based on the 2017 census.

health sector services or pay out-of-pocket for private providers. Those residents tend to have less economic buying power than those with access to social security or privately insured health services. In 2017, 82 percent of the moderate poor and 84 percent of the extreme poor in Peru were covered by health insurance (with 18 percent of the total poor not yet covered). Among the moderately and extreme poor that were covered by insurance, SIS was the insurance providers in 90 percent and almost 100 percent of the cases, respectively.

35. **The Project directly addresses two main complaints among public facility users: poor availability of medicines and time wasted due to inefficient appointment systems and long wait lines.** Component 1 would benefit a subset of the overall Project beneficiaries, namely 2.7 million people who reside in the Lima Metropolitan Area and approximately 128,000 residents of the other selected geographical areas that do not have social security or private health insurance. Improving the resolutive capacity and quality of public first-level health services would improve the relevance and quality of services provided to these residents, and reduce their need to pay out-of-pocket for private care. The positive impact on poverty reduction could be expected through two channels: (i) Higher ability of beneficiary individuals – among which the poor are overrepresented - to build their human capital, thus addressing an important non-monetary dimension of poverty; (ii) A reduction in out-of-pocket expenditures (total health expenditures are estimated at around 8 percent of households' budget in Peru) increasing the budget space for other expenditures and reducing health-related income shocks that affect, in particular, the poor and vulnerable groups.

36. **The Project will also have additional direct and indirect beneficiaries.** Other direct Project beneficiaries will be health personnel who will have access to improved infrastructure, equipment, and new professional tools. The social security systems (EsSalud, FFAA, and FFPP) and their members will benefit indirectly if improved procurement mechanisms for pharmaceutical products and medical supplies result in lower prices and more reliable supply. The social security systems will also benefit indirectly from improved health data standards, from the services provided by the health information system, and from the new service delivery model.

C. PDO-Level Results Indicators

PDO 1: Percentage of RIS that offer an expanded range of health services in Lima Metropolitan Area and prioritized regions
PDO 2: Control of hypertension in adults (age 35 and above) in the Lima Metropolitan Area (Percentage)
PDO 3: Percentage of the targeted population with a health issue that seeks care in the first level of care
PDO 4: Percentage of RIS in Lima Metropolitan Area and prioritized regions that reach optimal implementation of the five essential SUIS modules
PDO 5: MINSA is able to trace pharmaceutical products in real time throughout the reception, storage, and distribution processes in Lima Metropolitan Area and prioritized regions.

3 PROJECT DESCRIPTION

A. Project Components

The Project has four components:

37. **Component 1: Improving the Organization and Supply of Health Services Using an Integrated Health Networks Model in Lima Metropolitan Area and Prioritized Regions (US$45,718,898: US$38,744,828 IBRD and US$6,974,069 GoP).** This component will introduce a new model of service delivery based on the concept of Integrated Health Networks (RIS) in select geographical areas. The component aims to improve the quality, efficiency, appropriateness, and timeliness of the public health system's response to the new health needs of the population and reduce the current inequities in access and quality of care. The expected benefits of this component are an improvement in the resolutive capacity, quality, and coordination of care and a reduction in waiting times.

38. **The Project will support the organization of RIS and upgrading of first-level facilities in Lima Metropolitan Area and prioritized regions**. In the first year of Project implementation, MINSA will carry out a complete assessment of the selected geographical areas' situation and identify the optimal locations and levels of infrastructure investment (such as rehabilitation, expansion, tear-down/reconstruction or new construction) as well as equipment.[33] The Project will intervene in prioritized facilities that will be converted in Up-to-12 Hours IPRESS and 24-Hour IPRESS. In some geographical areas, the existing stock of facilities may be located too far away from new population centers, and entirely new up-to-12 Hour and 24-Hour IPRESS may be needed.

39. **To ensure the success of the new model of care, MINSA needs to ensure the buy-in from various stakeholders**, including patients, health personnel, administrative personnel and managers who are used to the current model. MINSA will require strategies to communicate changes in responsibilities for services between IPRESS. MINSA will also need communication and inclusion strategies to switch from a "physical waiting lines" to an efficient appointment system in the first level of care. While MINSA might use technology to facilitate the appointment process as well as the navigation of patients through the system, there would need to be user-friendly alternatives for patients who do not have access to such technology. Patients and health personnel should be able to give feedback as to the effectiveness of the new processes, and this should be used to tweak the model.

40. This component will finance technical assistance, training, goods, and services for the:

a) Design, implementation tools, dissemination, training, and monitoring of the Integrated Health Networks model to respond to the new patterns of the burden of disease, including clinical practice guidelines, patient care pathways, determination of infrastructure, equipment, personnel and service standards, organizational, management, and financing arrangements;
b) Mapping of health facilities;
c) Formulation of strategic plans in terms of health service needs, health service provision, health infrastructure, medical and non-medical equipment, connectivity and personnel;
d) Determination of the requirements for connectivity, IT infrastructure and equipment under the RIS approach;
e) Identification of optimal locations for the rehabilitation, expansion, reconstruction or construction of first-level health facilities;
f) Design and implementation of a plan to strengthening the health service human resources capacity;
g) Design and implementation of change management and communication plans;

[33] MINSA has compiled a preliminary list of first level facilities where the project would intervene. However, they are subject to confirmation depending on the parameters of the new networks.

h) Monitoring and evaluation of the Integrated Health Networks model;
i) Other activities required for the design, implementation, and monitoring of the RIS model.

41. The component will also finance:

j) Civil works for construction, refurbishment, renovation, expansion, relocation and tear-down/reconstruction of new or existing IPRESS to serve as Up-to-12-Hour and 24-Hour IPRESS;
k) Medical Equipment including biomedical equipment, clinical furniture, medical instruments, and complementary equipment for the "Up-to-12 Hour IPRESS" and "24 Hour IPRESS";
l) Non medical equipment including information technology equipment, electromechanical equipment and others for the "Up-to-12 Hour IPRESS" and "24 Hour IPRESS";
m) Supervision services for works and equipment under this Component.

42. **The choice of locations for the implementation of this component was driven by strategic considerations.** The implementation would be geared toward urban and peri-urban settings. The Lima Metropolitan Area was chosen as it represents a large share of the population (31.7 percent in 2015[34]) and because it is under the direct control of MINSA, which should facilitate the implementation of the new model. While Lima and some of the chosen locations are not among the poorest regions of Peru, the Project will have a focus on the poor because it will benefit the poorest groups within those geographical areas.

43. **Component 2: Improving the Capacity of the Single Health Information System at the National Level (US$71,664,338: US$60,732,490 IBRD and US$10,931,848 GoP).** This component's main objective is to generate adequate access to, and management of information for the clinical and administrative decision-making process in the health system. Adequate access encompasses the notions of quantity, quality, and timeliness of information. To achieve this objective, the component will focus on: (i) Strengthening of governance and standardization of data and ICT processes; (ii) Providing a technological and network infrastructure suitable to support the roll-out of the SUIS; (iii) Strengthening human competencies for the registration, management and use of information in the SUIS; and (iv) Integrating user engagement as a fundamental axis in the development and implementation of the SUIS. Activities to be carried out in each of these areas are detailed as follows:

44. **Governance and standards for data and ICT processes:**

a) The adoption of international models and standards of data governance and ICT processes;
b) The development of applications for clinical, administrative and support/oversight management, and their integration to the SUIS;
c) The development of mechanisms and platforms for interoperability of information including RENHICE and the Health Sector Interoperability Platform (*Plataforma de Interoperabilidad del Sector Salud* – PIDESalud);
d) The development and implementation of an information security management model;
e) The development of normative and budgetary instruments aimed at ICT sustainability;
f) The identification and implementation of innovative data management and exploitation technologies;
g) Design of the digital health innovation strategy.

45. **Technological and network infrastructure suitable to support the roll-out of the SUIS:**

[34] Instituto Nacional de Estadística e Informática, "Estimaciones y Proyecciones de Población Total de Las Principales Ciudades" (Lima, Peru, nd).

h) Construction and equipment of physical infrastructure with sufficient capacity to ensure storage, processing, security and data availability. Plans include a distributed data center located in distinct locations. The identified locations include buildable lots in Lima, Trujillo, and Huancavelica that fulfill technical considerations of the Ministry of Transport and Communications regarding connectivity, as well as requirements of distribution of physical hazards, availability of buildable land and access to services. The Lima location of the data center will be installed in a new building that will be financed by the Project and will include the necessary office space for the daily work of the staff of the General Office for Information Technology (*Oficina General de Tecnología de la Información* - OGTI).

i) Equipment and works to provide internal and external connectivity to IPRESS. This is to allow first-level facilities in the geographical areas selected for component 1, to implement the information systems specific to this level of care.

46. **Strengthening of human competencies for the registration, management and use of information in the SUIS**:

j) Training of human resources in the implementation, management, and operation of the SUIS;
k) Development of management tools for strategic, tactical and operational decision-makers;
l) Development of manuals and actions for change management.

47. **User engagement:**

m) Development of instruments, communication strategies, and events to promote the population's capacity to use the new SUIS capabilities;
n) Improvement of instruments to identify user needs;
o) Promotion of open data.

48. **Component 3. Improving the Management of Pharmaceutical Products and Medical Supplies**[35] **in Lima Metropolitan Area and Prioritized Regions (US$30,116,764: US$25,522,682 IBRD and US$4,594,082 GoP).** This component seeks to improve access in terms of quantity, quality, timeliness, and affordability to pharmaceutical products, medical devices and medical supplies in facilities belonging to MINSA and the Regional Governments. The component will support improvements to the: (i) management model; (ii) financing model; (iii) listing and planning processes (timely definition of items needed and quantities); (iv) procurement processes; (v) storage and distribution processes; and (vi) practices in the use of pharmaceuticals and medical supplies.

49. **This component will also finance the construction and equipment of a new central warehouse in Lima and the rehabilitation of several warehouses in prioritized regions**. The new warehouse in Lima will be located in an adjacent lot to the one that will be used to build the Data Center building, within the perimeter of the Sergio Bernales hospital site (Comas district). The warehouses will be built and equipped in line with the BPA guidelines, as well as with current seismic resistance, fire protection and security requirements.

50. **The component will also support the implementation of a traceability and stock management system for pharmaceutical products and medical supplies** that will be running on the platform that will be developed under component 2. This system will be interoperable with the prescription system also to be implemented under component 2. Traceability of pharmaceutical products and medical supplies will be gradually expanded to include MINSA/GORE warehouses, health networks, second and third-level IPRESS, pharmacies of first-level IPRESS, and patients.

[35] Includes medical devices

51. **This component will finance**:

a) Technical assistance, training, goods, and services needed to improve the management and financing models for pharmaceutical products and medical supplies
b) Technical assistance, training, goods, and services needed to improve the design, implementation and monitoring of the listing, planning, procurement, storage, distribution and usage processes for pharmaceutical products and medical supplies, and the traceability system;
c) Civil works for the construction of a new specialized central warehouse in Lima and the rehabilitation and/or construction of regional warehouses;
d) Equipment for specialized warehouses, including racks, refrigeration units, loading/unloading equipment, signage, ICT equipment, furniture, etc.;
e) Vehicles for the transportation of medicines and medical supplies;
f) Supervision services for works and equipment implemented under this Component.

52. **Component 4: Project management (US$10,325,000: US$0 IBRD and US$10,325,000 million GoP).** The Government's Program (including the WB and IADB projects) will be implemented by the National Health Investment Program (*Programa Nacional de Inversiones en Salud* – PRONIS), a unit within MINSA. As the Project Implementation Unit (PIU), PRONIS will include project specific staff (some for the WB Project and some for the IADB project) as well as staff that will support the entire Government Program. This component will finance the related operating expenses, equipment, furniture, vehicles and personnel necessary for the execution of the WB Project in the areas of contract management, procurement, financial management, technical and monitoring and evaluation, including Project financial audits. This component will also finance technical assistance needed to complete the formulation of the Government Program in invierte.pe. This component will also finance selected operational expenses and staff to implement common activities under the Government's program.

B. Project Cost and Financing

Project Components	Project cost US$	IBRD Financing US$	Counterpart Funding US$
Component 1: Improving the Organization and Supply of Health Services Using an Integrated Health Networks Model in Lima Metropolitan Area and Prioritized Regions	45,718,898	38,744,828	6,974,069
Component 2: Improving the Capacity of the Single Health Information System at the National Level	71,664,338	60,732,490	10,931,848
Component 3. Improving the Management of Pharmaceutical Products and Medical Supplies[36] in Lima Metropolitan Area and Prioritized Regions	30,116,764	25,522,682	4,594,082
Component 4: Project Management	10,325,000	-	10,325,000
Total Project Costs	157,825,000	125,000,000	32,824,999

[36] Includes medical devices.

C. Lessons Learned and Reflected in the Project Design

53. **Synergies with other WB sector interventions**. The Project builds on previous work done under three rounds of technical assistance (P147195, P151238, P161496) and ongoing dialogue with the Social Protection Commission. It also builds on diagnostic work carried out in the context of the 2017 Public Expenditure Review (PER). The Project is consistent with the World Bank Group's Systematic Country Diagnostic for Peru (Report No: 112693-PE, April 2017).

54. **Disaster and climate risk.** Peru is highly vulnerable to a range of geophysical hazards including earthquakes, tsunamis, and landslides. The earthquake risk is due to the country's location at the nexus of the Nazca oceanic and South American crustal plates. This exposes health facilities not only to earthquake risks but also to risk of landslides as earthquakes have been linked to landslides.[37] Also, Peru is vulnerable to extreme precipitation, flooding, and drought linked to the recurrent "El Niño" and "El Niño Costero" phenomena. The latest *Niño Costero* that started in December 2016 made evident that much of the first-level health infrastructure was not designed taking into consideration climate risks such as excessive rainfall or floods. While the reconstruction of the facilities affected by the "*Niño Costero*" will not be financed through this Project, *this Project will support* (i) the mapping of health infrastructure against currently identified geophysical, climate and environmental risks; (ii) the proactive development of new, safer minimum standards; and (iii) the upgrading of infrastructure using better standards of physical location and construction. Under Component 2, the Project will finance a new data center with distributed locations (in 3 distinct regions) to replace the current data center which is in a building that has been structurally damaged by earthquakes. The distributed locations of the data center will help ensure the resilience of the health information system in the face of physical threats such as earthquakes and climatic phenomena. Under Component 3, the Project will finance the construction of a state-of-the-art warehouse for pharmaceutical products and medical supplies, to replace existing unsafe and vulnerable warehouses. The vulnerability of the current infrastructure was made all the clearer following a devastating fire in MINSA's largest warehouse in Lima in 2016. The new infrastructure will be constructed to comply with current seismic resistance and fire resistance norms.

55. **Climate Co-Benefits.** The Project has the potential to generate significant climate co-benefits largely related to the incorporation of climate change resiliency measures and climate-smart actions. Health infrastructure investments supported by the Project will take into account the following climate-smart actions when applicable and to the extent possible: (i) assess potential for floods in supported areas and use permeable paving materials and other design elements to reduce stormwater runoff during heavy rains; and (ii) support creation of green spaces to reduce urban heat island effects; (iii) the rehabilitation and reconstruction of select facilities will benefit, when possible, from energy-efficient heating, ventilation and air conditioning (HVAC) systems which reduce HVAC-related costs and enhance infection control, as well as other energy and cost-saving investments such as insulated glass windows, light-emitting diode (LED) lights, lighting control measures (e.g., dimming, occupancy sensors, daylighting), and water-saving features. Additionally, improved construction standards will include standards for the management of healthcare waste.

[37] Devin McPhillips, Paul R. Bierman, and Dylan H. Rood, "Millennial-Scale Record of Landslides in the Andes Consistent with Earthquake Trigger," *Nature Geoscience* 7, no. 12 (December 2014): 925, https://doi.org/10.1038/ngeo2278.

56. **Citizen-oriented design.** The three main components of the Project were designed to help address the main complaints that have been raised by citizens regarding the public health system: they include the lack of services for noncommunicable and chronic conditions at the primary care level, the lack of continuity and coordination of care (both addressed through Component 1), the lack of an efficient appointment management system (addressed through Component 2), and the lack of essential medicines in primary care facilities (addressed through Component 3). Going beyond an appointment system, the SUIS will create new channels of communication between citizens and health care providers. A new citizen portal will enable users to receive information on their care, obtain test results, schedule appointments, communicate with their doctors/providers, and provide feedback on the service they have received.

4 IMPLEMENTATION

A. Institutional and Implementation Arrangements

57. **MINSA will be in charge of the implementation and oversight of the World Bank Project.** Within MINSA, the PIU will be PRONIS. The PIU will be responsible for Project management under the direct supervision of the Vice Minister for Health Services and Health Insurance. PRONIS is the unit currently in charge of the implementation of most investment projects of MINSA. It has the required experience and technical capacity to formulate, evaluate and execute investments within the framework of *Invierte.pe*.[38] PRONIS includes units specialized in each of the stages of investment projects as shown in **Figure 7**, including a pre-investment unit (*Pre-inversión*), a technical specifications unit (*Estudios Definitivos*), and a civil works unit (*Obras*). Those units will manage the applicable stages of execution of the WB- and IADB-financed investments. Also, a dedicated management team will be created to coordinate and manage the WB- and IADB-financed projects. The structure of the dedicated unit as shown in **Figure 8** will include specialists in procurement and financial management for each of the two Banks. The Operational Manual will outline the specific technical and operational roles of the main PIU members.

[38] Invierte.pe is the National System of Multiannual Programming and Investment Management. This system aims to guide the use of public resources destined to investment for the effective provision of services, as well as the provision of development infrastructure. Investment programs must be approved in Invierte.pe before they can be financed by the World Bank.

Figure 7: Organigram of PRONIS after creation of new RIS Program management team

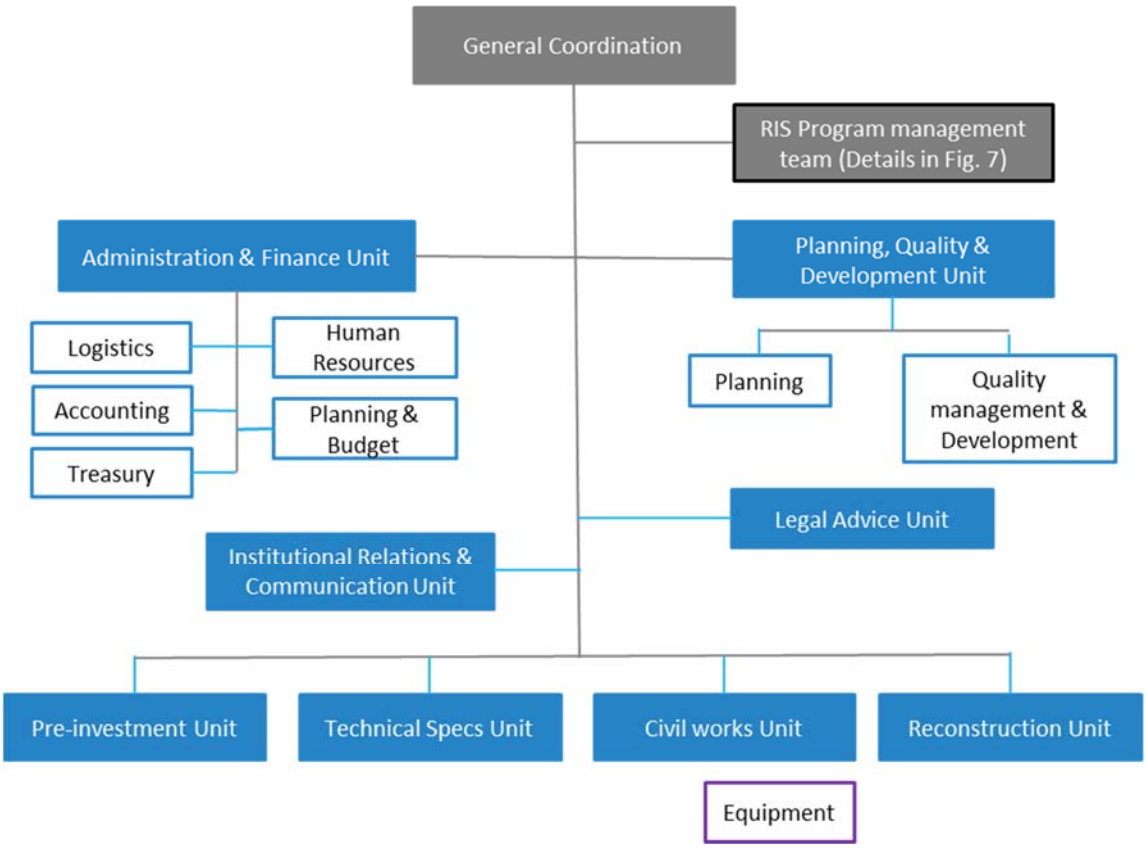
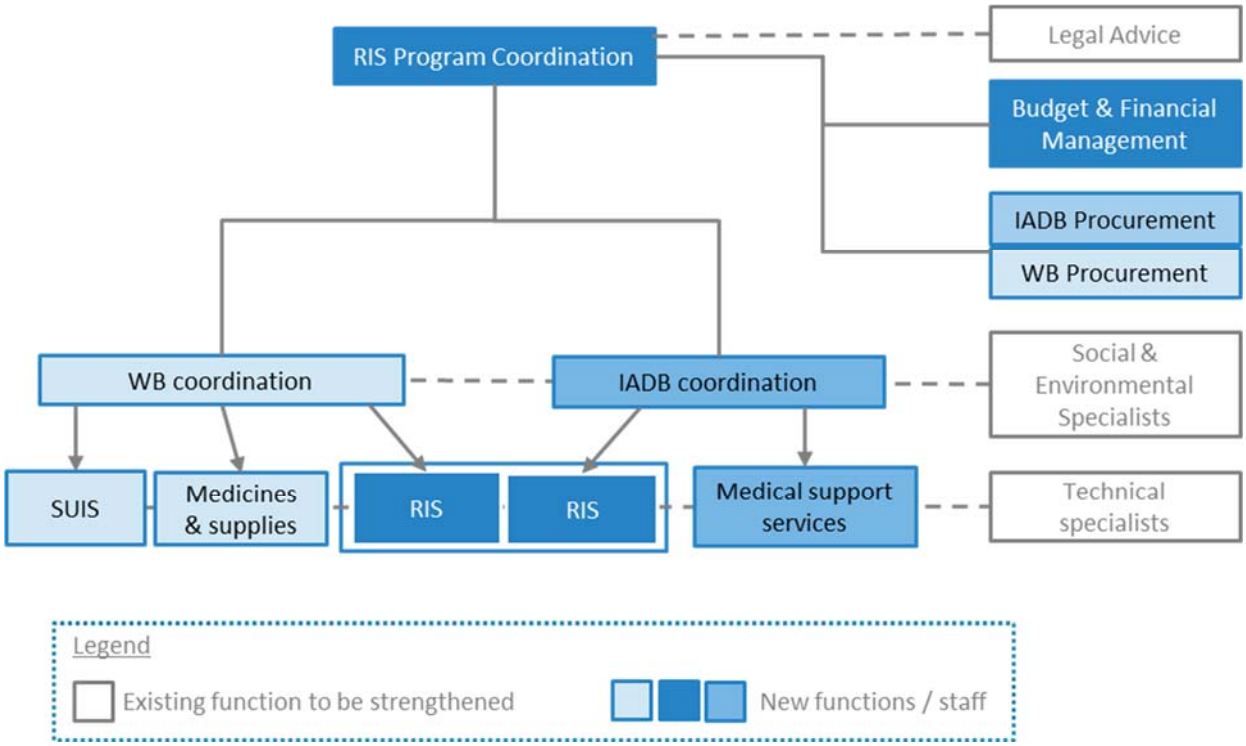


Figure 8: Proposed structure of the RIS Program management team



58. RIS investments in Regions outside of the Lima Metropolitan Area will be coordinated with Regional Governments through institutional cooperation agreements. Some activities under WB Project component 3, including improvement of the procurement process, will be coordinated with the relevant public institutions whose objective is to optimize public procurement at the national level.[39]

B. Results Monitoring and Evaluation

59. **Project results will be monitored and evaluated using a combination of survey and administrative records.** Peru has a strong history of yearly (permanent) household and demographic and health surveys that recently started incorporating blood pressure measurements as well as other indicators related to chronic and noncommunicable diseases. Those surveys are representative at the regional level for key indicators. The National Institute of Statistics and Informatics (*Instituto Nacional de Estadística e Informática* - INEI*)* is responsible for collecting the data and normally publishes both the results and the data within five months after completion of data collection. INEI also carried out a population census in 2017, whose results are available. Starting in 2017, the HIS administrative system collects reliable service delivery data for the public sector in the Lima Metropolitan Area. This can be used to monitor service delivery in the first level of care. Also, the SUIS will be used to monitor some Project implementation indicators including usage of the health information system itself. MINSA will be responsible for processing data from the SUIS. The Vice Ministry of Health Services and Health Insurance (*Vice Ministerio de Prestaciones y Aseguramiento en Salud*) will be

[39] http://www.perucompras.gob.pe/institucion/central-compras-publicas.php

responsible for compiling service delivery indicators. The different line units at MINSA will be responsible for producing indicators related to the progress in their respective investments.

60. **The impact of the Project on service delivery will be monitored using trend analysis.** Given that the entire Lima Metropolitan Area will be reconfigured under the RIS model, it is not possible to identify "control" areas to carry out a randomized controlled evaluation. The proposed evaluations include:

a) A pre and post evaluation of health care utilization patterns;
b) Surveys of health personnel (professional and auxiliary) to assess the understanding and implementation of RIS, in the context of health personnel training;
c) Incorporation of standardized (simulated) patients or other research method as a tool for measuring the quality of care and clinical practice in the first level, in the context of the implementation of the RIS program;
d) Carrying out patient satisfaction surveys through a functionality integrated into the SUIS (beneficiary feedback). This survey will use the information available from the patient appointment module in the SUIS. The results of the patient satisfaction surveys will be disaggregated between men and women and will be made publicly available. MINSA will use the results of the patient satisfaction surveys to identify adjustments to be made to the RIS model.

C. Sustainability

61. **This investment should result in more sustainable, cost-efficient health infrastructure at the first level of care.** Many of the existing first-level IPRESS have grown in a disorganized manner, and current designs do not consider optimization of patient flows, security of care, security and resilience of infrastructure. The investments in infrastructure and equipment will comply with MINSA standards that will allow more efficient flows of patients and adaptation to future needs in each health center. These buildings will be safer and less costly to maintain than the existing facilities.

62. **Upon completion of the Project, MINSA will need to ensure availability of sufficient budget for the annual maintenance and operation of the health information system as well as the gradual upgrading of its components**. The investment in information systems (including the data center) will require periodic upgrading as servers and other IT equipment investment achieve end-of-life. However, it is expected that the benefits of the investment in terms of efficiency gains to the health system will outstrip both the initial investment and the annual maintenance and upgrading costs. The costs of the absence of a solid information system are mostly invisible: lack of information results in duplication of health staff effort, compromises to patient safety, lapses in quality assurance, diversion of resources and many other opportunity costs which cannot easily be quantified.

D. Role of Partners

63. **Synergies with other donor interventions in the sector.** The Government of Peru intends to use resources from the IADB to finance the modernization of the health services network in additional locations. MINSA will coordinate the interventions of the World Bank and IADB-financed projects. Both projects will use the same model, with adjustments to the needs of the interventions areas. The interventions under Component 2 will be nationwide and will not be co-financed by other donors. On the other hand, IADB will finance some nationwide interventions that are not included in the WB Project design, such as blood banks, medical emergency transportation services, and laboratory networks. Supervision of the Project will include a joint

WB-IADB technical review of procurement plans to ensure economies of scale. This revision between the WB and IADB technical team and the PIU would define those purchases that could be joint between the two projects to ensure economies of scale, and where the purchase would be completed with either one or the other Project, without co-financing.

5 KEY RISKS

A. Overall Risk Rating and Explanation of Key Risks

64. **The overall risk rating for the proposed Project is assessed as Substantial.** Key risks include: (i) frequent changes in political authorities, including at MINSA, which has created volatility in technical staffing as well as in policy focus; (ii) MINSA's limited capacity to formulate and execute policy, which is further exacerbated by the decentralization of many functions to the regional level; (iii) an ambitious technical design that includes in-house production of software for the Single Health Information System, and the design of a new model of care; and (iv) limited implementation capacity, including fiduciary capacity, given the size and geographical spread of the proposed investments. To mitigate risks related to political changes, the proposed Project has been anchored in the Government Program, which has been declared viable and budgeted, creating a medium-term plan and strong Government commitment to the Program. To mitigate the risk related to the ambitious technical design, the proposed Project includes sufficient funding to secure the required expertise and human resources to complete the proposed activities. In addition, the strategy to develop software in-house will increase MINSA ownership of the systems as well as their medium and long-term sustainability. To mitigate the risk related to limited implementation capacity, the legal agreement of the proposed Project includes a dated covenant to guarantee the hiring of additional fiduciary staff.

6 APPRAISAL SUMMARY

A. Economic and Financial Analysis

65. **Costs and benefits considered in the analysis**. This analysis estimates the benefits generated from selected and tractable direct and indirect impacts of the Project. Component 1 will generate indirect benefits in selected geographical areas, including: (i) a reduction in the burden of noncommunicable diseases (NCD) following the expansion of the resolutive capacity of first-level health services to include cardiovascular diseases and diabetes; (ii) cost savings for MINSA through the control of hypertension. Component 2 will generate a reduction in waiting times at first-level health facilities. Component 3 will generate direct monetary benefits in the form of savings from the framework/centralized procurement of pharmaceutical products and equipment (intermediate indicator) throughout the health system.

66. **There are several other sources of benefits that are not immediately quantifiable.** Since the Project will lead to a systematic improvement in the quality of care, its benefits will extend beyond control of noncommunicable diseases. For example, the use of clinical guidelines and the establishment of a referral and counter-referral system is expected to improve the quality of care and increase efficiency at all levels of care. The costs of the current absence of a robust information system are mostly invisible: lack of information results in duplication of health staff effort, compromises to patient safety, lapses in quality assurance,

diversion of resources and many other opportunity costs which cannot easily be quantified. Thus, the estimated economic benefits in this analysis likely represent the lower bound on the overall benefits.

67. **The benefits of the Project interventions are calculated under the assumption that the targets for the included PDO and intermediate indicators will be achieved because of the Project.** The four indicators that are considered in this socio-economic evaluation are: (i) Percentage of RIS that offer an expanded range of services in the areas selected for component 1; (ii) Control of hypertension in adults over 35 years of age in Lima Metropolitan Area; (iii) Non-centralized public spending on pharmaceutical products and medical supplies procured through framework contracts / electronic catalog; (iv) Reduction in wait time for patients in first-level facilities. The control of hypertension in practice generates direct monetary benefits in the form of reduced expenditure for MINSA and indirect benefits of reduced expenditure and opportunity cost for the patient. For this analysis, we use only the direct benefits from reduced expenditure for MINSA. Finally, the Project envisages a reduction in waiting times at first-level IPRESS due to the introduction of a new appointment system, as well as an improved referral system. The analysis includes the benefits to the patients from these improvements in service.

68. **Status quo assumptions.** The analysis assumes that, in the absence of the Project, the included indicators would remain at their current level during 2019-2028. On the other hand, the analysis assumes that overall expenditure on pharmaceutical products and medical devices for hospital services would remain constant over the years in the absence of the Project. However, in practice, such demand is likely to increase, and thus the actual benefits generated by the Project could be even larger. On net, it is difficult to predict the impact of the Project in a precise way.

69. **Parameters.** The benefits of the Project are calculated for three effectiveness scenarios, whose parameters are presented in Table 2. In the high-effectiveness scenario, all PDO end targets are fully met. In the medium- and low-effectiveness scenarios, the PDO end targets are only partially met. The parameters are as follows:

a) The burden of disease assumptions are as follows: under the low, medium and high-effectiveness scenario, the expansion of NCD services will reduce the burden of disease by 2,500, 3,000 and 5,000 disability-adjusted life-years (DALY) respectively. These numbers correspond to 2.1 percent, 2.5 percent and 3.0 percent reductions in the burden of disease due to cardiovascular diseases and diabetes in the intervention areas, respectively. Note that the burden of disease due to NCDs has been increasing secularly while the burden of disease due to communicable diseases has been declining in Peru. Therefore, the Project investments are expected to contribute to a slow down in the burden of disease due to NCDs, and not to an absolute reduction.
b) Component 1 of the Project will be implemented in the Lima Metropolitan Area, and prioritized regions. The analysis takes into account only the estimated target population residing in the intervention areas in Lima. The projected beneficiaries in Lima account for 2.7 million out of the estimated 2.8 million beneficiaries of component 1.
c) DALYs are valued at the GDP per capita in Peru in 2016 which is US$6,571.[40]
d) Estimates for the NCD-related disease burden for 2016 were obtained from the Institute for Health Metrics and Evaluation.[41] Nationally, cardiovascular diseases contributed 386,158 DALYs (5.9 percent

[40] World Bank, "World Development Indicators | DataBank."
[41] Institute for Health Metrics and Evaluation, "GBD Compare."

of total) to the burden of disease, while diabetes contributed 162,588 DALYs (2.48 percent of total). Thus, the total number of DALYs lost due to these two illnesses was 548,746. After accounting for the proportion of the population living in the Project intervention areas, these two conditions accounted for a burden of 118,365 DALYs.

e) For hypertension, per the data from the 2017 ENDES,[42] 33.2 percent of adults over 35 years in the target population (those uninsured and those with SIS) of the intervention areas in the Lima Metropolitan Area had hypertension. Of these, only 19.5 percent had controlled hypertension. Under the high effectiveness scenario, the control rate will increase to 30 percent. Under the low- and medium- effectiveness scenarios, the control rate will increase to 25 percent and 27.5 percent respectively.

f) The cost savings from each case of control of hypertension are assumed to be US$7.87.[43]

g) Savings from centralized/framework procurement of pharmaceutical products and medical supplies under the low, medium and high effectiveness scenario, will reduce expenditure by US$6 million, US$8 million, US$10 million respectively.

Table 2: Economic and Financial Analysis parameters under different effectiveness scenarios

Impact indicators	Economic and Financial Analysis parameters					Type of benefit
	Metric	**Baseline**	**Change from baseline by scenario**			
			Low effectiveness	**Medium effectiveness**	**High effectiveness**	
Percentage of RIS that offer an expanded range of services in the areas selected for component 1	Reduction in the burden of disease (measured in DALYs) due to cardiovascular diseases and diabetes	118,365	2,500	3,000	3,500	Value of DALYs saved
Control of hypertension in adults (age 35 and above) in the Lima Metropolitan Area	Number of patients with controlled hypertension	103,428	29,171	42,431	55,691	Cost savings to MINSA
Non-centralized public spending on pharmaceutical products and medical supplies procured through framework contracts/ electronic catalog *(not a Project indicator)*	Savings from centralized procurement through framework contracts/electronic catalog	US$0	US$5 million	US$7.5 million	US$10 million	Cost savings to MINSA
Reduction in wait time for patients in first-level facilities *(not a Project indicator)*	Average waiting time in minutes	135	30	45	60	Value of time saved by patients

70. **Accrual of benefits.** The Project will invest funds over the next five years (January 2019-January 2024. There are two issues to consider in computing the economic/monetary value of the benefits. First, benefits may not start accruing immediately, as there may be a lag between program implementation and its results.

[42] Instituto Nacional de Estadística e Informática, "Perú: Encuesta Demográfica y de Salud Familiar 2016: Nacional y Regional" (Lima, Peru, 2017).

[43] B. Stevens et al., "The Economic Burden of Hypertension in Latin America," *Health Economics and Social Policy, Deloitte Access Economics*, 2016.

Second, benefits are likely to accrue for several years after Project completion. For this analysis, we consider the benefits over a 10-year period, so from 2019-2028. Benefits beyond this period are excluded because of the increasing uncertainty about the counterfactual scenario. It is possible that the Government may implement other projects or take other actions to reach the same outcomes in the absence of this Project. It is assumed that benefits will start flowing at the end of the first year of the Project (2019) and will linearly increase until full implementation of the Project (2024). For the burden of disease, it is assumed that benefits will start flowing in the second year of the Project (2020) and will linearly increase until full implementation of the Project (2024).

71. **Discount rate.** For the discount factor, the analysis considers the time-value of money (TVM), which captures the idea that if it were not for this Project, the funds could be invested elsewhere to generate positive returns. The analysis also considers inflation in the economy, assumed to be a stable 3 percent. The analysis includes calculations for two values of TVM – 5 percent and 9 percent. Adding the TVM rates to the inflation rate yields net discount rates of 8 percent and 12 percent respectively.

72. **Current Economic Value.** Table 3 shows the current economic value of the Project under the medium-effectiveness scenario. The principal source of *savings* is the reduction in the expenditure on pharmaceutical products and medical supplies.

Table 3: Flow of benefits from the Project under the medium-effectiveness scenario, current US$ million

Benefits	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	Total
DALYs saved due to control of NCDs	0.00	3.94	7.89	11.83	15.77	19.71	19.71	19.71	19.71	19.71	137.99
Savings due to control of hypertension	0.07	0.13	0.20	0.27	0.33	0.33	0.33	0.33	0.33	0.33	2.67
Cost savings through framework contracts/electronic catalog procurement of pharmaceutical products and medical supplies	1.50	3.00	4.50	6.00	7.50	7.50	7.50	7.50	7.50	7.50	60.00
Savings through reduction in waiting times	0.43	0.85	1.28	1.70	2.13	2.13	2.13	2.13	2.13	2.13	17.01
Total Monetary value	1.99	7.93	13.86	19.80	25.73	29.67	29.67	29.67	29.67	29.67	217.68

73. **Net Present Value (NPV).** The NPV of the Project depends on the discount rate used and the effectiveness level of the Project. Table 4 below summarizes the present value of benefits, the present value of costs, as well as the NPV under the considered scenarios. In the medium-effectiveness and low-TVM case, the NPV is US$38.6 million. The NPV under the high TVM scenario is US$23.8 million. These correspond to an Internal Rate of Return (IRR) of 25.9 percent. Under the low- and high-effectiveness scenario, the IRR is 11.7 percent and 42.5 percent respectively.

Table 4: Net Present Value and Internal Rate of Return, 2018 US$ million

	Low effectiveness		Medium effectiveness		High effectiveness	
	High TVM	Low TVM	High TVM	Low TVM	High TVM	Low TVM
Present value of economic benefits	81.5	102.0	105.8	132.3	130.2	162.6
Present value of economic costs	82.0	93.7	82.0	93.7	82.0	93.7
Net present value	-0.5	8.3	23.8	38.6	48.1	68.9
Internal rate of return	11.7%		25.9%		42.5%	

74. **Returns to investment.** Overall, the economic analysis of the Project shows that there are high returns to the investments. Even under conservative assumptions and not accounting for all economic benefits of the Project, the IRR is 11.7 percent.

B. Technical

75. **The rationale for strengthening the public health system in Peru is valid as the public sector provides more than 50 percent of health services in the country and is the main provider among the poor population.** Formally employed persons participate in a contributory social security health system (mainly EsSalud). Formal service exchange agreements exist between MINSA and EsSalud to provide EsSalud services to SIS members, and MINSA/GORE services to EsSalud members. In practice these agreements have not contributed to any significant expansion of services for the poor as EsSalud has limited service delivery infrastructure at the first level of care and its hospitals are saturated with demands from its member population. The GoP is not currently considering outsourcing of first-level services for the poor to EsSalud a viable strategy for improving services for the poor. Regarding potential outsourcing to the private sector, Peru has limited experience with outsourcing public hospital construction and operation to the private sector through Public-Private partnerships, although medical services are not included in the agreements. However, there is no institutional framework to improve first-level health services through such partnerships.

C. Financial Management

76. **General:** Financial management (FM) for this Project will be carried out in accordance with OP/BP 10.00 and Financial Management Manual for World Bank Investment Project Financing Operations (February 10, 2017). A Financial Management Assessment (FMA) was carried out to evaluate the adequacy of financial management arrangements for the implementation of the Project. Within the PIU (PRONIS), a Project implementation team will be created that will report to PRONIS' General Coordinator. The expenditures to be financed under the four components of the Project will include: civil works, consultancies, training, goods and services as well as select operational and staff costs to implement activities under the GoP's program.

77. **PRONIS has budgetary, administrative and financial autonomy.** In accordance with the proposed institutional arrangements,[44] PRONIS will be in charge of the FM aspects of the Project which include: planning, budgeting, accounting, internal controls, funds flow, financial reporting, and auditing. The Project will be implemented under the frameworks established by Peru's laws governing public budget and financial

[44] This FMA reflects implementation arrangements discussed with PRONIS.

management, including the use of the SIAF system and its General Chart of Accounts. The General Comptroller's Office (*Contraloría General de la República*) will carry over the selection process of the audit firm that will audit the Project. The WB funds will be disbursed to a Designated Account that will be opened at the *Banco de la Nación*.

78. **The relevant challenges that will be faced by the Project will include**: building the PIU staff's experience in implementing WB-financed projects; recruiting key fiduciary staff with the capacity to rapidly get acquainted with WB financial management guidelines; and submitting the financial reports to the WB in due time. Also, the PIU will need to interact with subnational governments to implement some of the components which could delay Project implementation. Considering the above-listed risks and challenges, the fiduciary risk is rated ***Substantial***.

79. **To manage fiduciary risk, the PIU has submitted the:** (i) draft version of the inter-institutional agreements with sub-national governments; (ii) definition of the format for the financial reports for the Project; and (iii) draft version of the financial management chapter of the Operational Manual, including the terms of reference of the fiduciary staff. The adoption of the Operational Manual by PRONIS in a manner acceptable to the WB is a condition of effectiveness of the loan. The hiring of a procurement and a financial management specialist to work full time within PRONIS, within 90 days after effectiveness of the loan, under terms of reference acceptable to the Bank is a dated covenant in the loan agreement.

Financial Management Arrangements

80. **Organization and Staffing**: PRONIS has administrative and budget autonomy and will be responsible for the fiduciary aspects of the Project through its administrative and finance unit; however, to cope with additional technical and fiduciary responsibilities of the Project, PRONIS will hire additional fiduciary staff (part of the Project management team) to support the administrative and finance unit and the budget, planning and modernization unit. No later than 90 days after effectiveness, PRONIS will hire a financial management specialist under terms of reference acceptable to the WB. The selection of these staff will require the WB's no-objection. If needed, the PIU will recruit an accounting and treasury specialist. The specific roles and responsibilities of PRONIS units and the Project fiduciary specialist are reflected in the draft Operational Manual. A draft version of the staff terms of reference was deemed satisfactory to the Bank at appraisal.

81. **Planning and Budgeting**: The preparation of annual work program and budget will be in accordance to the procedures established by MEF through its General Public-Sector Budget Office (*Dirección General de Presupuesto Público*). Those procedures will be complemented by specific processes and procedures established in the Operational Manual. To ensure an adequate budget control, PRONIS will be responsible for: (i) budget formulation and timely request of resources for each year according to the annual operating plan; (ii) proper recording of the approved budget in the respective information systems using a classification by Project component and sub-component; and (iii) timely recording of commitments, accruals, and payments, to allow adequate monitoring of the budget and produce accurate information on Project commitments for programming purposes.

82. **Accounting and Financial Information System:** PRONIS must comply with Peru's laws governing budget and financial management, including the use of SIAF and its General Chart of Accounts. This system allows to keep records of all accounting and payment transactions of the Project. Considering the nature of Project activities and information needs for monitoring purposes, the PIU will also use the Project Execution Module

(*Módulo de Ejecución de Proyecto* - MEP) in SIAF, which will help in issuing the financial reports and the preparation of statements of expenditures according to the Project components in US Dollars to submit them to the WB.

83. **Financial Reporting:** The PIU will prepare the Interim Financial Reports (IFR) using the MEP module of SIAF. The IFRs will include: (i) a statement of sources and uses of funds, including reconciliation figures (as needed) and cash balances, with expenditures classified by Project component/subcomponent/categories; (ii) a statement of accumulative investments, reporting the current semester and the accumulated operations, and footnotes explaining the important variances of actual versus planned amounts. The reports should include loan proceeds and local counterpart funds. The IFRs would be prepared in local currency and in US Dollars and submitted to the WB on a semi-annual basis no later than 45 days after the end of each calendar semester. The format and required content of the IFRs was satisfactorily submitted to the WB before appraisal for inclusion in the Operational Manual.

84. On an annual basis, the PIU will prepare Project financial statements including cumulative figures, for the beginning of the year and as of the end of the year, and explanatory notes in accordance with International Public Sector Accounting Standards. Those financial statements, duly audited in accordance with the WB's requirements will be submitted to the WB within six months after the end of the Government's fiscal year (December 31). Working papers for the preparation of the semester and annual financial statements will be maintained by the PIU and made easily accessible to WB supervision visits and external auditors.

85. **Internal Controls:** In general, PRONIS must comply with local requirements related to financial management, including internal controls and internal procedures. In addition, the WB and the PIU will agree on specific processes and procedures for Project implementation. Those processes and procedures will be reflected in the Operational Manual and will ensure clear separation of responsibilities among the staff of the Project team and the Administrative and Finance Unit of PRONIS: authorization for disbursements/approval of physical progress for Project activity implementation. The draft version of the Operational Manual was submitted to the WB at appraisal and reflects adequate internal control processes and procedures to implement the Project.

86. **Internal Audit**: MINSA's organizational structure includes an Internal Control Office (*Oficina de Control Interno*) that oversees the PIU adscripted to MINSA. The Internal Control Office may play a role in ex-post internal control of Project transactions.

87. **External Audit:** Annual audit reports on Project financial statements, including management letters should be submitted to the WB, within six months of the end of the Borrower's fiscal year (December 31). The audit should be conducted by an independent audit firm acceptable to the WB and under terms of reference approved by the WB. The selection of the audit firm should be performed through the General Comptroller's Office. The cost of the audit can be financed out of loan proceeds. The scope of the audit will be defined by the PIU in agreement with the WB based on Project-specific requirements and so as to respond, as appropriate, to identified risks. The audit report should include a management letter and review of compliance with agreed processes and procedures. Audit requirements include those outlined in **Table 5**.

Table 5: Audit requirements

Audit type	Due date
Project financial statements	June 30
Special Opinion: Statement of Expenditures	June 30

Flow of Funds and Disbursement Arrangements

88. **According to the institutional arrangements of the Project, Project funds will be managed exclusively by PRONIS as the PIU.** Disbursement of WB loan proceeds will follow the WB's disbursement policies and procedures as described in the Disbursement and Financial Letter. The Bank will disburse loan proceeds using Advance, Reimbursement, and Direct Payment methods.

89. **Designated Account**: A Designated Account in US dollars will be opened and maintained in the *Banco de la Nación* by the PIU. The PIU will have direct access to funds advanced by the Bank to the respective designated account. Funds deposited into the designated account as advances will follow Bank's disbursement policies and procedures, to be described in the legal agreement and Disbursement and Financial Information Letter. To process payments, the PIU will be able to withdraw the required amount from the designated account to a local currency bank account from where payments will be made to consultants and suppliers. The payment process and procedures will be established in the Operational Manual.

90. **Counterpart funds**: PRONIS will manage the counterpart funds for the Project using the Single Treasury Account (*Cuenta Única del Tesoro Público*) established by the GoP. Funds for the Project will be identified with a specific Project code and account in SIAF to process payments.

91. **Retroactive Financing:** The Project does not consider retroactive financing.

92. **Methods of Disbursement:** The following disbursement methods may be used to withdraw funds from the loan: (i) **Advance method**: the Designated Account will have a flexible ceiling based on a quarterly forecast; (ii) **Direct payment**: The minimum application size for direct payment requests will be US$1 million; and (iii) **Reimbursement method**: The minimum application size for the reimbursement method will be US$1 million.

93. **Documentation requirements: Statement of Expenditures.** Supporting documentation for documenting Project expenditures under the disbursement methods authorized for the Project shall be in accordance with the provisions established under the Disbursement and Financial Information Letter.

94. **Disbursement deadline date:** The Disbursement Deadline Date is four (4) months after the Closing Date specified in the Loan Agreement. Any changes to the Disbursement Deadline Date will be notified by the WB.

95. **Supervision Plan**: The WB financial management team plans to perform at least two supervision missions per year, while also reviewing the annual audit reports and the semester's IFR.

D. Procurement

96. **General:** Procurement for the Project will be carried out in accordance with the "World Bank Procurement Regulations for Borrowers under Investment Project Financing" dated July 1, 2016, and revised November 2017. As per the requirements of these regulations, the PIU completed a comprehensive Project Procurement Strategy for Development (PPSD) that identifies the appropriate selection methods, market approach, and type of review by the World Bank. The objective of this exercise is to improve procurement efficiency.

97. **The PPSD establishes the best procurement arrangements to ensure the value-for-money while efficiently achieving the agreed PDOs.** The PPSD is focused on the high-value contracts financed under Components 1, 2 and 3, namely the principal consultancy services, works, goods and services needed for MINSA to design and implement the Integrated Health Networks model in Lima Metropolitan Area and prioritized regions, strengthen the Single Health Information System, and improve management of pharmaceutical products and medical supplies. The definition of the best procurement arrangements for each case is based on a market analysis, the timing of the designs and studies, geographic distribution, local capacities, and lessons learned from similar experiences.

98. **Procurement capacity of the implementing agency:** PRONIS will oversee the procurement aspects of the Project. Based on a WB assessment (November 2018), the entity's capacity to implement procurement activities for the Project is adequate, and the risk is Substantial. The main findings of this capacity assessment are: (i) the qualifications and experience of the staff that will work in procurement is limited to local law and procedures; (ii) the record-keeping and filing systems, procurement planning systems, and monitoring and control systems used by PRONIS aim to satisfy local law requirements; and (iii) PRONIS has low capacity to meet the WB's procurement requirements.

99. **Procurement institutional Arrangements:** The PRONIS team will be strengthened to ensure the capacity required to manage the procurement process under the WB requirements, as follows: (i) as mentioned in Paragraph 79, the hiring of a procurement specialist to work full time within PRONIS, within 90 days after effectiveness of the loan, under terms of reference acceptable to the Bank is a dated covenant in the loan agreement; (ii) the WB will provide additional training for all PRONIS staff; and (iii) PRONIS will hire a contract manager to manage the civil works contracts using the WB's standard form of contract**.**

100. **The corrective mitigation measures** proposed are listed in Table 6.

Table 6: Procurement mitigation measures

Mitigation Measures	Stage
Hiring of one skilled procurement staff	90 days (maximum) after effectiveness
The Procurement Plan must be included in and managed through the Systematic Tracking of Exchanges in Procurement (STEP) system	During implementation

101. **Frequency of procurement supervision:** The WB will carry out prior review of select procurement processes, as well as annual supervision visits that will include site visits and a post-review of a sample (approximately 20 percent) of procurement actions.

102. **The Project will finance works, goods, consulting services, non-consulting services, training, and operating costs.** The Project will finance technical assistance, training, goods, and services needed for the

design of the RIS model, including the design of the service delivery, management, financing and governance aspects of the RIS. The Project will support the conformation of RIS and upgrading of first-level IPRESS in several geographical areas including Lima Metropolitan Area and prioritized regions; it will finance infrastructure investment (rehabilitation, expansion, tear-down/reconstruction or new construction), construction supervision, and ICT equipment. Table 7 presents a summary of the procurement approach options. A detailed list is included in the PPSD Document.

Table 7: PPSD, Procurement Approach Options, and Recommendation

ATTRIBUTE	SELECTED PROVISION	SUMMARY OF JUSTIFICATION/LOGIC
MARKET ACCESS	National International	There is local capacity among contractors to execute the type of civil works to be financed; there is also interest on the part of international contractor firms and consultants to work in Peru. No restrictions will be included for participation in any process. The works will be grouped by lots to promote the participation of large and small contractors.
SELECTION METHODS	Works/goods/services • Request for Bids (RFB) • Request for Quotations (RFQ) • Direct Selection Consulting Firms • Quality and Cost Based Selection (QCBS) • Consultant Qualification Selection (CQS) • Direct Selection (DS) • Individual Consultants • Competitive • Direct Selection (DS)	Due to the low level of technical complexity of the consultancies, works, and services to be acquired, the use of more complex methods of selection is not foreseen. If PRONIS procedures are used for the selection of human resources to support the operation, they must be validated by the WB.
SUPERVISION	Prior Post	Both schemes will be used, according to the risk and complexity of the procurement processes.
STANDARD PROCUREMENT DOCUMENT	Standard Procurement Document • Request for Bids (RFB) • Request for Proposals (RFP)	Both documents will be used according to the needs of each selection process.
SPECIAL CONTRACT CONDITIONS	None	
CONTRACT PRICE/COSTING METHOD	Works/goods and services • Global sum, fixed price • Unit prices • Consulting • Global sum • Time worked	

ATTRIBUTE	SELECTED PROVISION	SUMMARY OF JUSTIFICATION/LOGIC
ADJUSTMENT/PRICE REVIEW	None	There are no construction periods longer than one year. Consulting contracts will be selected following Social Behavior Change Communication (SBCC) methods.
NEGOTIATION	Technical in the case of consultancies	
BEST AND FINAL OFFER (BAFO)	None	
VALUE ENGINEERING	None	
PROPOSAL EVALUATION METHOD/OFFERS	Highest combined score Lowest evaluated cost	
CONTRACT MANAGEMENT APPROACH	Standard Form: The contract format provided in the WB documents will be used; due to the type and complexity of the works, no major difficulties are foreseen in the contractual stage.	

103. **Procurement Plan.** The Procurement Plan for the first 18 months of the Project was prepared by the Borrower based on the PPSD and agreed with the World Bank. In accordance with paragraph 5.9 of the 'World Bank Procurement Regulations for IPF Borrowers' (July 2016, revised November 2017), the PIU will use the WB's STEP system to upload and update the Procurement Plan.

E. Social (including Safeguards)

104. This Project triggers both the Indigenous Peoples (OP/BP 4.10) and the Involuntary Resettlement (OP/BP 4.12) safeguards policies. The Social Risk Rating (SRR) is deemed to be Moderate. It is expected that the Project will contribute to high positive social impacts in the beneficiary communities.

105. **The Project includes investments with known locations and other locations not yet defined. The investments whose location is known at the time of Project appraisal are**: (i) a data center and warehouse in Lima to be constructed within the compound of the Sergio Bernales hospital, district of Comas (Components 2 and 3); (ii) a data center in La Libertad region, to be located in the city of Trujillo on a vacant lot belonging to the Regional Government (Component 3); and (iii) a data center in Huancavelica region, to be located in the city of Huancavelica within the compound of the regional hospital of Huancavelica (Component 3). The investments whose location is not yet defined are: (i) civil works for the construction, refurbishment, renovation, expansion, relocation and tear-down/reconstruction of new or existing health facilities to serve as Up-to-12-Hour and 24-Hour IPRESS (Component 1) and (ii) civil works for the construction and rehabilitation of warehouses in prioritized regions (Component 3).

106. **For investments whose location is not yet fully defined** [RIS investments (Component 1) and warehouses in regions (Component 3)], MINSA has prepared in accordance with World Bank policies an Environmental and Social Management Framework (ESMF), an Indigenous Peoples Policy Framework (IPPF), and a Resettlement Policy Framework (RPF). The ESMF includes a review of applicable national policies and regulations as well as WB Safeguard Policies and their requirements for the Project; feedback from stakeholders, including but not limited to affected communities, user groups and beneficiaries, and

government and officials at municipal level; and an assessment of institutional capabilities and implementation arrangements for the Project. The IPPF provides a framework to apply the Indigenous Peoples Policy, which applies due to the possible area of influence of Component 1. Some of the Regions to be prioritized for the RIS (Component 1) may include indigenous populations. If indigenous people are identified in the locations that are yet to be defined, the principles reflected in the IPPF will guide the preparation of Indigenous Peoples Plans (IPP) to mitigate any potential risks. The RPF provides a framework for the preparation of site-specific Resettlement Action Plans (RAPs) in the eventuality that physical resettlement and/or economic displacement is necessary in the investment locations that are yet to be determined. These three frameworks were published on the MINSA/PRONIS website[45] on November 28, 2018 and on the World Bank website[46] on November 30, 2018. Given that these civil works are of limited scale and complexity, it is expected that labor will be sourced locally. Therefore, there would be neither a significant influx of workers nor a need to set up residential camps for workers.

107. **For the three known Project locations, MINSA developed site specific Environmental and Social Assessments (ESA) with their respective Environmental and Social Management Plan (ESMP) in accordance with WB and national policies and standards.** The proposed locations for the data centers and Lima warehouse are urban in nature. None of these facilities would provide direct on-site services to the public. Consultations were carried out for the Lima location on October 26, 2018 and for the Trujillo location on November 18, 2018. For the Huancavelica location, a virtual consultation was carried out throughout the month of November 2018. This modality was deemed more appropriate given that MINSA had recently held a face-to-face consultation on the planned GoP-financed construction of a hospital in the same compound. One salient finding of the Lima consultation is that consultation participants supported the rehabilitation and construction of a new hospital (which is part of a separate GoP financed investment project), however the construction of the data center and warehouse are not understood as a priority but as a secondary issue. For these three locations, it is known that no indigenous peoples are present at this time and IPPs are not necessary. Finally, MINSA does not anticipate any adverse impacts with respect to resettlement for these three locations. The Lima ESMP was published on the MINSA/PRONIS website[47] on December 13, 2018 while the Trujillo and Huancavelica ESMPs were published on the same website on December 19, 2018. The three ESMPs were published on the World Bank website[48] on December 19, 2018. Given that these civil works will be carried out in urbanized areas, it is anticipated that the needed labor will be sourced locally without requiring an influx of outside workers.

108. **Land.** In the case of the Lima location for the data center and warehouse, the land belongs to MINSA. In the cases of Trujillo and Huancavelica, the land required for the Project is currently owned by the Regional Governments which have agreed to transfer the land to MINSA. Since the land is already owned by the Peruvian State, voluntary land donation (VLD) will not be needed; the transfer of land title or an intra-government arrangement on the use of the land will be done in accordance with Peruvian national laws. Land acquisition is the responsibility of the GoP and will not be financed by the Project. A Grievance Redress Mechanism will be established before Project effectiveness, which is reflected in the ESMF and will be further detailed in the ESA and ESMPs.

[45] https://www.pronis.gob.pe/tipo/impacto-ambiental/
[46] https://isearch.worldbank.org/search?weightFile=weights&q=p163255&s=relevancy&currentTab=All
[47] https://www.pronis.gob.pe/tipo/impacto-ambiental/
[48] https://isearch.worldbank.org/search?weightFile=weights&q=p163255&s=relevancy&currentTab=All

F. Environment (including Safeguards)

109. **The Project triggers OP/BP 4.01 Environmental Assessment because it will finance civil works and because health facilities manage medical waste.** The project is classified as "B" based upon the temporary and non-significant nature of most of its anticipated adverse impacts. The Project also triggers the Physical Cultural Resources (OP/BP 4.11) policy due to the possible presence of archeological artefacts in areas selected for civil works.

110. **The Project will finance investments in three defined locations** (see section E). In Lima, Trujillo, and Huancavelica, the Project will finance the construction of data centers with sufficient capacity to ensure storage, processing, security, and data availability, in three already identified locations that include buildable lots and comply with technical considerations regarding connectivity, distribution of physical hazards and access to services. The Project will also finance the construction of a warehouse on the same plot as the data center in Lima. MINSA has prepared ESAs with their respective ESMPs for the three known Project locations. The ESMPs will also include chance find procedures to comply with Physical Cultural Resources OP/BP 4.11.

111. **For those investments whose location have not yet been defined** (see section E), the ESMF includes: (i) An environmental screening checklist of the existing conditions and an initial assessment of standard potential environmental impacts and required mitigation measures to be used once the investments are defined in order to rule out any significant environmental and social impacts; (ii) the types of site-specific Environmental Assessments including Environmental Management Plans, to be carried out for the subprojects once the scope of work is fully defined; (iii) the processes, responsibilities, institutional arrangements, and budget needed to comply with applicable national legislation (including legislation pertaining to medical waste management) and WB safeguards policies. The preparation of these instruments will follow the General World Bank Group Environmental, Health, and Safety Guidelines and the specific industry WB Group Environmental, Health and Safety Guidelines for Health Care Facilities. As noted under section E, the ESMF was published on the MINSA/PRONIS website[49] on November 28, 2018 and on the World Bank website[50] on November 30, 2018.

G. Other Safeguard Policies (if applicable)

N/A

H. World Bank Grievance Redress

Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit

[49] tps://www.pronis.gob.pe/tipo/impacto-ambiental/
[50] https://isearch.worldbank.org/search?weightFile=weights&q=p163255&s=relevancy&currentTab=All

complaints to the GRS, please visit *http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service*. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

7 RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY: Peru
Peru Integrated Health Networks

Project Development Objective(s)

The objectives of this Project are to (i) improve the resolutive capacity and quality of public First-Level Health Services in Lima Metropolitan Area and Prioritized Regions; and (ii) increase the capacity of the Single Health Information System and the public sector's pharmaceutical products and medical supplies provision system.

Project Development Objective Indicators

Indicator Name	DLI	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Improve resolutive capacity & quality of public 1st level health services in Lima M.A. & pr. regions							
Percentage of RIS that offer an expanded range of health services in Lima Metropolitan Area and prioritized regions (Percentage)		0.00	10.00	20.00	70.00	80.00	100.00
Control of hypertension in adults (age 35 and above) in the Lima Metropolitan Area (Percentage)		19.50	20.00	21.00	23.00	25.00	26.00
Percentage of the targeted population with a health issue that seeks care in the first level of care (Percentage)		55.00	55.00	57.00	60.00	62.00	65.00

Indicator Name	DLI	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Improve the capacity of the Single Health Information System							
Percentage of RIS in Lima Metropolitan Area and prioritized regions that reach optimal implementation of the five essential SUIS modules (Percentage)		0.00	5.00	20.00	40.00	50.00	60.00
Improve the capacity of public sector's pharmaceutical products & medical supplies provision system							
MINSA is able to trace pharmaceutical products in real time throughout the reception, storage and distribution processes in Lima Metropolitan Area and prioritized regions. (Text)		No traceability	No traceability	Traceability up to MINSA and regional warehouses in Lima Metropolitan Area and prioritized regions	Traceability up to hospitals and executive units in Lima Metropolitan Area and prioritized regions	Traceability up to hospitals and RIS, in Lima Metropolitan Area and prioritized regions.	Traceability up to IPRESS pharmacies and patients, in Metropolitan Lima and prioritized regions

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Improving organization & supply of health services using a RIS model in Lima M.A. & prior. regions							
Number of works and equipment of first-level IPRESS concluded in accordance with current infrastructure and equipment regulation (Number)		0.00	0.00	0.00	2.00	4.00	6.00

Indicator Name	DLI	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Number of clinical practice guidelines for the most relevant chronic and non-communicable diseases approved and published through an online or mobile application (Number)		0.00	2.00	4.00	6.00	8.00	8.00
MINSA has a system for measuring user satisfaction, disaggregated by women and men (WB corporate citizen engagement/ beneficiary feedback indicator) (Text)		No automated administrative system or protocol for measuring satisfaction	Patient feedback protocol and system developed as part of the unique patient portal	Patient feedback system piloted in select health facilities	Patient feedback system rolled out in geographical areas selected for GoP program	User satisfaction results published, disaggregated by men and women	User satisfaction results published, disaggregated by men and women
Control of hypertension in adult (age 35 and above) women in the Lima Metropolitan Area (Percentage)		30.60	31.20	32.20	34.20	36.20	37.20
Control of hypertension in adult (age 35 and above) men in the Lima Metropolitan Area (Percentage)		8.40	9.00	10.00	12.00	14.00	15.00
Improving the Capacity of the Single Health Information System at national level							
Number of modules and components of the Single Health Information System that are developed, integrated and operational (Number)		4.00	8.00	20.00	30.00	40.00	51.00
Number of MINSA data center locations that are operational (Number)		0.00	0.00	0.00	1.00	2.00	3.00
Improving management of pharmaceutical products and medical supplies in Lima M.A.& prior. regions							

Indicator Name	DLI	Baseline	Intermediate Targets				End Target
			1	2	3	4	
MINSA plans purchases of pharmaceutical products and medical supplies using registered demand data and monitors data in real time in Lima Metropolitan Area and prioritized regions (Yes/No)		No					Yes
Number of state-owned pharmaceutical products and medical supply warehouses that conform with BPA guidelines (Number)		0.00	0.00	0.00	2.00	3.00	5.00
Percentage of IPRESS in Lima Metropolitan Area that evidence optimal availability of essential medicines (Percentage)		5.00	5.00	5.00	20.00	30.00	60.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Percentage of RIS that offer an expanded range of health services in Lima Metropolitan Area and prioritized regions	Denominator: The number of planned RIS in Lima Metropolitan Area and prioritized regions. Numerator: Among the RIS in the denominator, those that offer services for common chronic and non-	Yearly	RIS: MINSA HF database and PRONIS records; Service: SUIS (HIS-MINSA)	Processing of administrative data.	MINSA

	communicable diseases.				
Control of hypertension in adults (age 35 and above) in the Lima Metropolitan Area	Denominator: Incidence of hypertension is calculated as the percentage of population in the Lima Metropolitan Area for whom blood pressure measurement detected high blood pressure, or that reported having been diagnosed with hypertension. Numerator: Control of hypertension is a measurement of blood pressure within normal range, conditional on having hypertension (either measured or self-reported). Only include those persons that report not having EsSalud, other social security or private insurance.	Yearly. The indicator with be disaggregated by men and women. Gender-disaggregated indicators are included as intermediate indicators.	Insurance status, blood pressure measurement and self-reports: ENDES household survey.	The ENDES survey is not representative in regional areas selected for component 1. It is representative in the Lima M.A. Explicit assumptions: (i) The BID financed project would intervene in the Lima M.A. areas not intervened by the WB financed Pproject, and (ii) Both projects will have a similar impact.	INEI (data collection), MINSA (calculations)
Percentage of the targeted population with a health issue that seeks care in the first level of care	Denominator: the population that reported being ill or injured in the last 30 days, excluding those who reported it was not serious enough to seek care. Exclude the population that had social	Yearly	Household survey: ENAHO	Household survey	INEI (data collection); MINSA (calculation of indicator)

	security or private insurance. Include all age ranges and compute the indicator at the national level. Numerator: among the population in the denominator, those who saught care from a public first level IPRESS.				
Percentage of RIS in Lima Metropolitan Area and prioritized regions that reach optimal implementation of the five essential SUIS modules	Denominator: The number of RIS in Lima Metropolitan Area and prioritized regions. Numerator: among the RIS in the denominator: those RIS that implement the 5 essential modules of the SUIS, being: the medical programming module, the unique patient portal, the referral/counter-referral module, one consultation module (one among the prenatal care ("wawared") module, the growth monitoring ("CRED") module, the vaccination module) and the pharmacy module.	Yearly	SUIS	IPRESS' use of the SUIS modules will be verified at the central level based on documented activity. The calculation method for the "optimal implementation" indicator will be included in the operational manual.	MINSA - OGTI
MINSA is able to trace pharmaceutical products in real time throughout the reception, storage and distribution	MINSA should have a system that allows it to track inventories over time	Measure yearly starting in	SUIS	SUIS with validation from traceability audit	MINSA - OGTI (SUIS) and PRONIS (audit)

processes in Lima Metropolitan Area and prioritized regions.	in all warehouses and IPRESS. The system should include dashboards for over- and undersupply as well flags for products that are at risk of expiring.	Jan 2021.			

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Number of works and equipment of first-level IPRESS concluded in accordance with current infrastructure and equipment regulation	Includes first level IPRESS whose infrastructure is upgraded through refurbishing, rebuilding or new building, and whose equipment is upgraded as to function as a up-to-12-hour or 24-hour IPRESS. Regulations are the applicable regulations for up-to-12-hour or 24-hour IPRESS, depending on the designation of the IPRESS.	Yearly. Data collection should be ongoing during the process of IPRESS upgrading.	Administrative records and field visits	The IPRESS should be inspected at completion of the construction and equipment phase, and evaluated against the current regulations.	PRONIS
Number of clinical practice guidelines for the most relevant chronic and non-communicable diseases approved and published through an online or mobile application	The CPGs should conform to the AGREE II standard and be made available in a user friendly online or mobile format to health care providers.	Yearly	CPGs adopted by Ministerial Resolution: el Peruano. Application: MINSA or other website	Records and website review.	MINSA

			for download.		
MINSA has a system for measuring user satisfaction, disaggregated by women and men (WB corporate citizen engagement/ beneficiary feedback indicator)		Annual	SUIS	Automated survey sent after a visit through the unique patient portal and/or through an alternative protocol established by MINSA.	MINSA
Control of hypertension in adult (age 35 and above) women in the Lima Metropolitan Area	Denominator: Incidence of hypertension is calculated as the percentage of women age 35+ in the Lima Metropolitan Area for whom blood pressure measurement detected high blood pressure, or that reported having been diagnosed with hypertension. Numerator: Control of hypertension is a measurement of blood pressure within normal range, conditional on having hypertension (either measured or self-reported). Only include those persons that report not having EsSalud, other social security or private insurance.	Yearly. This is a gender-disaggregated version of PDO indicator 2.	Gender, insurance status, blood pressure measurement and self-reports: ENDES household survey.	The ENDES survey is not representative in regional areas selected for component 1. It is representative in the Lima M.A. Explicit assumptions: (i) The BID financed project would intervene in the Lima M.A. areas not intervened by the WB financed Project, and (ii) Both projects will have a similar impact.	INEI (data collection), MINSA (calculations)

Control of hypertension in adult (age 35 and above) men in the Lima Metropolitan Area	Denominator: Incidence of hypertension is calculated as the percentage of men age 35+ in the Lima Metropolitan Area for whom blood pressure measurement detected high blood pressure, or that reported having been diagnosed with hypertension. Numerator: Control of hypertension is a measurement of blood pressure within normal range, conditional on having hypertension (either measured or self-reported). Only include those persons that report not having EsSalud, other social security or private insurance.	Yearly. This is a gender-disaggregated version of PDO indicator 2.	Gender, insurance status, blood pressure measurement and self-reports: ENDES household survey.	The ENDES survey is not representative in regional areas selected for component 1. It is representative in the Lima M.A. Explicit assumptions: (i) The BID financed project would intervene in the Lima M.A. areas not intervened by the WB financed Project, and (ii) Both projects will have a similar impact.	INEI (data collection), MINSA (calculations)
Number of modules and components of the Single Health Information System that are developed, integrated and operational	SUIS plan includes the development and integration of 23 service delivery modules,10 administrative and legacy modules, and 5 health sector management modules. It also contemplates the integration of 13 additional	Yearly	SUIS	OGTI report and extract of SUIS records	MINSA - OGTI

	components.				
Number of MINSA data center locations that are operational	Locations must conform to Tier 3 or above of the Uptime Institute's categorization. The current MINSA data center does not qualify.	Yearly	Administrative records and field visits	Direct observation + external technical audit	MINSA
MINSA plans purchases of pharmaceutical products and medical supplies using registered demand data and monitors data in real time in Lima Metropolitan Area and prioritized regions		Anual	Administrative records, SUIS	Review of administrative records + field visits	MINSA
Number of state-owned pharmaceutical products and medical supply warehouses that conform with BPA guidelines	Warehouses are to include MINSA's Lima Central warehouse as well as 6 regional warehouses belonging to MINSA or GOREs.	Yearly	Administrative records + field visits	Review of administrative records + field visits	MINSA + auditor
Percentage of IPRESS in Lima Metropolitan Area that evidence optimal availability of essential medicines	The definition of the optimal availability indicator for RIS and the list of essential medicines will be included in the operational manual.	Yearly	Medicine and medical supplies tracin g system	Data extract from the medicine and medical supplies tracing system	MINSA - DIGEMID

ANNEX 1. SECTOR AND PROJECT DESIGN ANALYSIS

Burden of disease

Figure A1- 1: Main causes of burden of disease (disability-adjusted life years), Peru, 1990 vs. 2015

Source: Institute for Health Metrics and Evaluation[51]

Demand for delivery service in Lima Region (including Lima Metropolitan Area)

1. MINSA statistics show that demand for delivery services in first-level facilities in Lima is low: Between 2003 and 2016, the number of births in Lima decreased by approximately 13 percent. Given that insurance registration in social security has increased in the same period, the decrease in the number of births in public facilities is most likely even larger than this. Of the approximately 160,000 births occurring annually in Lima,

[51] Institute for Health Metrics and Evaluation, "GBD Compare."

only about 2,000 occur in health centers. (see Table A1- 1) Yet MINSA owns an estimated 35 health centers that attend deliveries in Lima, averaging less than 60 births per year per center.

Table A1- 1: Number of births, by location, Lima region, 2014

Location	Number of births	percent of total
Hospital or clinic	153,806	97.8%
Health center	**1,998**	**1.3%**
Health post	**45**	**0.03%**
Medical office	500	0.3%
Home	326	0.2%
Total	157,179	100%

Source: MINSA : http://www.minsa.gob.pe/estadisticas/estadisticas/nacimientos/NACMacros.asp?00

Clinical Practice Guidelines

2. **The incompleteness of CPGs and inexistence of standardized patient care pathways limits the options for improving and measuring the quality of care.** Well defined evidence-based clinical practice guidelines for the most prevalent diseases and health conditions create a compilation of justified health services that should be the basis for the continuous adjustments of the basic package of services. On the other hand, patient care pathways improve continuity of care, help to coordinate health networks, facilitate training of human resources, and reduce inequities. Peru has an established legal framework as well as technical guidelines for the development and use of clinical practice guidelines.[52] The framework stipulates that MINSA is in charge of developing and approving CPGs and that CPGs must conform to the Appraisal of Guidelines Research and Evaluation, Release II (AGREE II) standard. However, since this legislation was put in place in 2015, no new CPGs have been approved, and therefore all 30 currently applicable CPGs predate the legislation. These CPGs cover childhood common conditions (such as diarrhea, acute respiratory infections, and anemia), obstetrical complications, newborn care, common vector-borne diseases (dengue, chikungunya, avian flu), as well as hypertension and dental care. However, they do not cover other common noncommunicable diseases such as diabetes, congestive heart failure, or cancer prevention and treatment. Also, only two of the CPGs conform to the AGREE II standard, and none of the CPGs have been made available to health practitioners in a user-friendly format. Apart from the CPGs produced and approved by MINSA, many general and specialized hospitals produce their own CPGs. A 2017 MINSA survey of hospitals revealed the existence of over 6,000 CPGs that were developed in such a context. Of those, MINSA estimated that less than 1 percent were evidence-based. Finally, Peru has not developed any standardized patient care pathways.

Health Information System: current situation and needs

3. **For a health system to function effectively and efficiently, it must be able to rely on an information system (or systems) that provide(s) both health care providers and local, regional and national health system administrators with the information they need to make timely and appropriate clinical, administrative and organizational decisions.** Ideally, an integrated health information system should allow the integration of various sources of health information into an integrated or interconnected data warehouse that allows all administrators to access and analyze data and understand both the current situation and trends, thereby helping them identify the appropriate intervention strategy. Equally important is the health information system's role in facilitating and orienting both the health care provider and the patient during the

[52] Ministerial Resolutions Nº 302-2015/MINSA and Nº 414-2015/MINSA.

care process. Health information systems that are focused on reporting information up the administrative hierarchy tend to generate large administrative burdens and resistance from healthcare providers because they do not add value to the care process or local management. In contrast, health information systems that focus on facilitating the care process and produce service production and administrative information as a byproduct, can reduce administrative burdens and improve patient care.

4. **Notwithstanding the efforts made, Peru's fragmented health information systems are neither able to support effective local management of health care processes nor produce complete information on the pillars of the health system.** Peru has made notable achievements in information management in some areas, such as vital statistics, the National Registry of Universal Health Insurance Beneficiaries[53] and the continuous and reliable collection of household surveys. However, most of the health information systems that are currently in use are focused on reporting information to higher administrative levels and do not manage to support efficient management of health services. Also, the systems often have duplicated data entry points and produce fragmented non-comparable information. In first level IPRESS, the patient medical information is not recorded in a digital information system. On the other hand, the statistical information about IPRESS is recoded in digital information systems with a view to generate public health indicators as opposed to supporting clinical management decisions. As far as health care is concerned, the current systems do not allow health providers to exchange the information needed to ensure continuity of care (e.g. referrals and counter-referrals, prescriptions, lab results, medical imaging results) or efficient management of facilities, staff and inputs (e.g. pharmacy management, appointments, shift management, billing). As far as financing is concerned, the systems do not support the purchasing function of the SIS (linking beneficiaries with services and payments), or accurate accounting of spending on different levels of care (hospitals vs. first level of care) or inputs (personnel, pharmaceuticals, etc.).

5. **The main investments required to upgrade Peru's health information system fall in four categories**: (i) Adoption of standards for healthcare processes and data; (ii) Adopting a more integrated, robust, secure and modern software platform based on standards; (iii) Migrating to a data center as the basis for private cloud storage and computing; (iv) Building a secure and reliable network that connects all facilities with data processing and storage centers.

6. **To orderly and systematically register the data that form the core of the health information system, the use of standards is essential.** Health information systems collect and process large amounts of data that need to be consolidated into functional, interoperable databases. For this to be possible, the processes that generate the data need to be standardized.[54] The data that are registered in each process also need to be registered in an orderly and systematic way using data standards.[55] Finally, applications need to use the common standards and be interoperable either by design or through retrofitting.

7. **In Peru, health processes are not standardized or articulated, and current health information applications tend to computerize the existing reality.** As a result, health systems remain fragmented,

[53] http://portal.susalud.gob.pe/blog/registro-de-afiliados-nacionales-2018/
[54] For example, patient registration and dispensing of medicines should have standard steps and documentation requirements that are common to all health facilities.
[55] For example, diagnosis need to be registered using a common standard such as International Classification of Disease, 10th revision (ICD-10).

incomplete, repetitive, in mutual competition between them, mostly semi-manual, unstandardized and therefore unreliable.[56]

8. **Regarding data standardization, new legislation introduced positive changes, although their implementation is incomplete to date.** In 2006, MINSA adopted several standards for health data identifiers (*Identificadores Estándares de Datos en Salud* - IEDS), including standards for medical procedures, pharmaceuticals, health service users, health facilities and medical support services, service production units in health facilities, care episodes, health personnel, and health financiers.[57] In 2011 MINSA also adopted the Health Level Seven (HL7) Interoperability Standard for clinical data[58] and the Digital Imaging and Communications in Medicine (DICOM) standard for medical imaging,[59] and it established the legally required minimum data to be included in Electronic Medical Histories. However, no specific entity was given the mandate, financial and technical resources to ensure the implementation, maintenance, and control of their use. As can be seen in Table A1- 2, the implementation of the 2006 standard health data identifiers has been piecemeal.

Table A1- 2: Implementation status of the Health Data Identifier Standards (IEDS)

IEDS	SCOPE	IMPLEMENTATION STATUS
IEDS N^{O} 001	Medical procedures	4 percent of public facilities apply the standard. 78 percent use an unapproved classification. 18 percent use an obsolete classification.
IEDS N^{O} 002	Pharmaceutical products	Not implemented.
IEDS N^{O} 003	Health Service Users	Unknown
IEDS N^{O} 004	Health Facilities and Medical Support Services	Limited implementation through SUSALUD, requires updating.
IEDS N^{O} 005	Service production units in health facilities	Partial implementation in hospitals. No implementation in the first level of care.
IEDS N^{O} 006	Care episodes	Applied in the ambulatory consultation setting in 30.7 percent of health facilities and in 28.5 percent of hospitalizations.
IEDS N^{O} 007	Health personnel	Implemented in the INFORHUS application.[60] Requires modification.
IEDS N^{O} 008	Health financiers	Partial implementation. Requires revision to enable nation-wide implementation.

Source: WB elaboration using MINSA[61]

9. **The scarce use of standards has impeded the integration and interoperability of the various applications currently in use in the health system**, such as the HIS (registration of ambulatory care), SIS (for insurance claims), SISMED (distribution of medicines), SIGA (logistics management), SIAF (financial management), etc.

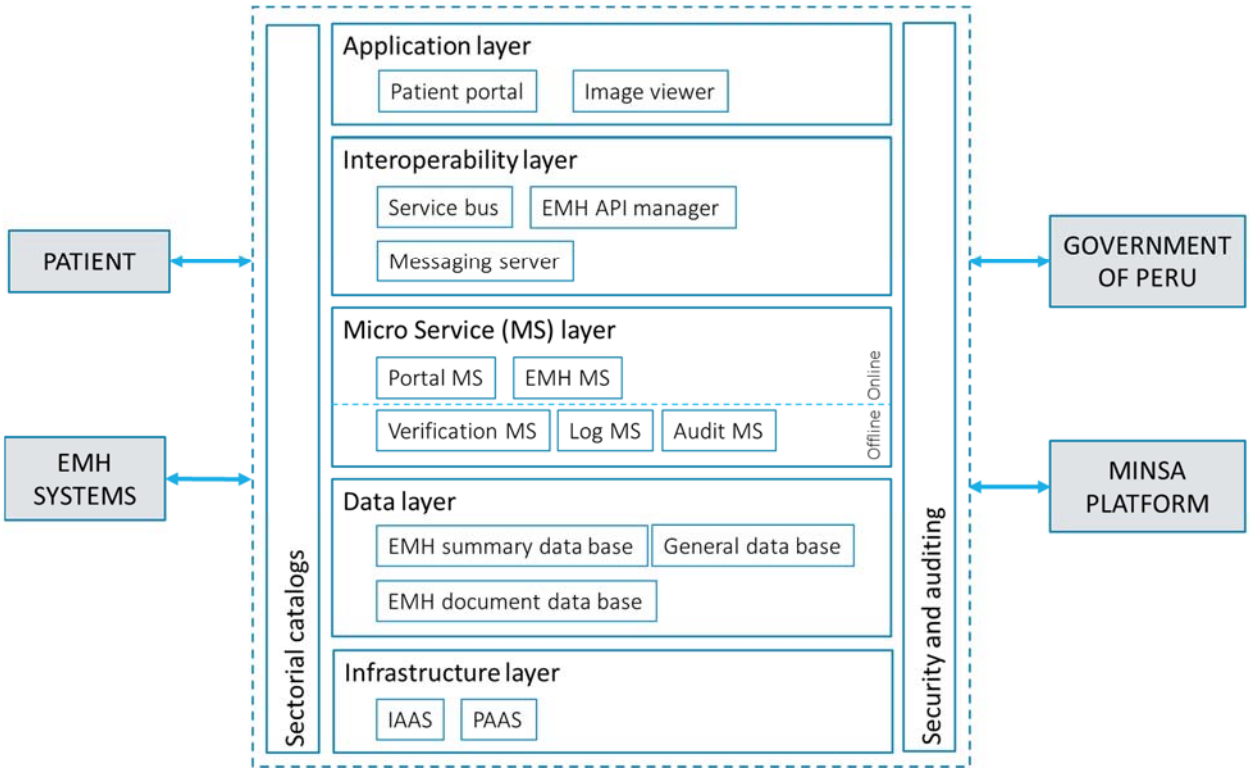
[56] Banco Mundial, *Financiamiento de la salud en el Perú: Análisis de la situación actual y desafíos de política al 2021*; Hernán Garrido-Lecca, "Informe Técnico de la Comisión Multisectorial Encargada de Proponer los Mecanismos que Permitan Consolidar un Sistema Nacional de Salud, Comisión Multisectorial establecida por RS 002-2008-SA." (Lima, Peru, 2015), ftp://ftp2.minsa.gob.pe/descargas/Profesionales/sns/Archivos/ITCM_InformeFinal01-13.pdf; MINSA, "Determinantes de los Sistemas de Información en Salud. El caso de tres sistemas de información de VIH/SIDA, hepatitis B y sífilis en contextos de atención apoblación indígena en la Amazonía." (Lima, Peru: Dirección General de Epidemiología, 2015).
[57] Supreme Decree N° 024-2006-SA.
[58] HL7 refers to a set of international standards for transfer of clinical and administrative data between software applications used by various healthcare providers.
[59] Ministerial Resolution N° 576-2011.
[60] National Register of Health Personnel (*Registro Nacional del Personal de la Salud*).
[61] "Proyecto de Inversión Pública: Mejoramiento y Ampliación Del Sistema Único de Información En Salud a Nivel Nacional."

The HIS is the only one in public health with a wide national deployment. However, historically the system has had a limited scope, poor reliability,[62] and slow feedback to users and therefore it has been of limited use for managing health services at the local level. HIS does not incorporate functions such as epidemiological surveillance, public health insurance, supply management or drug distribution. As a result, various entities inside and outside of MINSA as well as hospitals and even first-level IPRESS sought to fulfill their need for statistical and non-statistical data by developing or acquiring ad-hoc computer applications for their own purposes. Neither the processes for collecting the data nor the produced databases were articulated with the existing applications. Also, private software vendors were not required to comply with data standards or interoperability requirements. While currently in-use software includes a combination of single-user DOS-based[63] applications, Windows and Linux based desktop applications, outdated "xBase"-type applications as well as more robust database systems, a few applications (such as birth registration) have been successfully migrated to web-based platforms.

10. **Since 2016, MINSA has made significant progress towards adopting a more integrated, robust and modern software platform that is based on standards.** MINSA was able to leapfrog into developing a new health information system platform and modules using open-source code, international standards for data, and the HL7 interoperability standard. The architecture of the SUIS consists of five layers (**Figure A1- 2**): (i) The application layer will contain applications for users, such as a citizen portal and outpatient care modules; (ii) The interoperability layer will implement the Health Sector Interoperability Platform - PIDESalud, which will allow the interoperability of the systems used by the entities in the GoP that are involved in the health sector, as well as private or public providers that use their own systems; [64] (iii) The service layer consists of services and microservices (MS) that process user requests such as electronic recording of medical data, searching for a patient on the basis of his/her identification document, searching for medical test results, etc.; (iv) The data layer is responsible for storing the information from the Electronic Medical Histories,[65] as well as the RENHICE. The RENHICE is meant to contain a summary of health services obtained by each person whether through public, EsSalud, private or other providers; (v) The infrastructure layer supports the SUIS.

[62] Vargas et al. "Evaluación del Sistema de Información Rutinaria de la Dirección de Salud V Lima Ciudad," *Revista Peruana de Epidemiología* 14, no. 1 (2010): 58–64. found errors in diagnostic coding (14.3 percent), inconsistency with the clinical history as a source document of data (20 percent), and deficient recordkeeping for the growth monitoring consultations, family planning and prenatal care (77.7 percent).
[63] Disc Operating System.
[64] The information system would make software available under a Software-as-a-Service (SAAS) modality.
[65] The data infrastructure would be made available to health service providers under Infrastructure-as-a-Service (IAAS) and Platform-as-a-Service (PAAS) modalities.

Figure A1- 2: Architecture of the Single Health Information System



Source: MINSA.[66] API=Application Program Interface; EMH=Electronic Medical History

11. **The development of the service layer registers significant advance.** Some of the application modules are already fully developed and tested including:
    a) Admission and management of appointments (one-stop shop, programming, references and counter-references, social service, online appointments)
    b) Pediatric services: Growth and development monitoring services and immunizations
    c) HIV screening and care
    d) Human resources management
    e) Production of health services and billing
12. **Other modular applications currently under development include**:
    f) Outpatient services (Outpatient services by age groups, ophthalmology, telemedicine, emergency care)
    g) Maternal health and family planning
    h) Auxiliary tests (medical imaging, pathology and clinical laboratory)
    i) Mental health
    j) Tuberculosis
    k) Oral health
    l) Pharmaceutical products and medical supplies management

[66] MINSA, "Proyecto de Inversión Pública: Mejoramiento y Ampliación Del Sistema Único de Información En Salud a Nivel Nacional."

13. **The interoperability layer will implement the Health Sector Interoperability Platform – PIDESalud**, which will contain various services that will allow the interoperability of the systems used by the entities in the Peruvian State that are involved in the health sector.

14. **In the data layer, MINSA has advanced in the development of the National Registry of Electronic Medical Histories** - RENHICE, as required by Peruvian Law (2011). RENHICE is meant to contain a summary of health services obtained by each person whether through public, EsSalud, private or other providers. (see **Box A1- 1**)

Box A1- 1: Objectives of the National Registry of Electronic Medical Histories (RENHICE)

The National Registry of Electronic Medical Histories has the following objectives:

a) Organize and maintain the electronic medical records registry.
b) Standardize data and clinical information from electronic medical records, as well as the characteristics and functionalities of information systems of electronic medical records, to achieve interoperability in the health sector.
c) Ensure the availability of clinical information contained in the electronic medical records for the patient or his legal representative and authorized health professionals in the context of healthcare to the patient.
d) Ensure the continuity of the patient's health care in health establishments and medical support services, through the exchange of clinical information that he or his legal representative requests, shares or authorizes.
e) Provide information to the National Health System for the design and application of public policies that allow the effective exercise of people's right to health.
f) And others that will be established in its Regulations.

Source: Government of Peru[67]

15. **Modern health information systems do not store health information in health facilities but rather use a data center as the basis for private cloud storage and computing.** The data center is the physical location of the main servers and communication equipment including the core switch. The data centers must comply with good practices and implementation standards for data centers. Data centers must be distributed between distinct but interconnected locations, so as to generate a private cloud. The Uptime Institute standards specify four levels of certification for the data center Infrastructure.[68] To date, no public institution in Peru has managed to operate a basic data center whose infrastructure could qualify as TIER 1, the basic level of certification.

16. **MINSA currently has only one data center that does not comply with minimum requirements regarding earthquake resistance, access conditions, cooling or electrical safety.** The current stock of 198 servers is largely outdated, have low storage capacity and low speed. The estimated storage gap is 4.551 terabytes, while the bandwidth gap is 294.900 MB. The data center is located on the second floor of MINSA's main building in Lima. The latest 2018 structural evaluation of the building recommended the evacuation of the building due to the probability of a partial or total collapse in case of a medium severity earthquake.[69] Other

[67] "Ley No 30024: Ley Que Crea El Registro Nacional de Historias Clínicas Electrónicas," El Peruano: Normas Legales (Lima, Peru, May 22, 2013), ftp://ftp2.minsa.gob.pe/normaslegales/2013/Ley30024.pdf.
[68] Uptime Institute, LLC., "Data Center Site Infrastructure Tier Standard: Topology," 2018, https://uptimeinstitute.com/uptime_assets/889d381be3ad2900e838d497ba1ed0a2dbda4bbd31454b2d475eb986f2af3a55-00001E.pdf.
[69] MINSA, "Proyecto de Inversión Pública: Mejoramiento y Ampliación Del Sistema Único de Información En Salud a Nivel Nacional."

deficiencies include the lack of controlled access to the data center, the inadequate amount of available space that has resulted in unsafe conditions, and deficient electrical and cooling infrastructure.[70]

17. **Regarding perimetric information security, MINSA has acquired basic security tools including firewall, Ironport®, web filter, and antivirus.** However, a 2017 Ethical Hacking review recommended the implementation of a complete perimetric information security system to include the prevention and detection of hacking, a web application firewall, and the development of information security protocols. The current situation makes the health information system vulnerable to information loss and cyber-attacks.

18. **Finally, Peru's modern health information system will require a secure and reliable network that connects all health facilities with data processing and storage centers.** MINSA estimates that 46 percent of health facilities in rural areas already have internet access. Restrictions on access are concentrated in the Amazonian geographical area, although the access levels observed on the Coast and the Mountain geographical areas also need to be improved. To overcome this limitation, the Telecommunications Investment Fund (*Fondo de Inversión en Telecomunicaciones*) is expected to provide broadband internet and intranet access as well as computer equipment to health facilities in 24 prioritized regions.[71] Once this investment is made, the remaining challenge would be to close the gap of trained human resources to provide the technical support needed to ensure the continuing connectivity in these facilities.

19. **The unit in charge of strategic planning and management of the health information system is OGTI.** However, its activities have been hampered by high turnover of political and technical authorities[72], as well as the lack of financial resources. These circumstances has led to a low availability of specialized technical personnel, hindering the development process of a robust health information system. The budget of the OGTI has not had substantial increments – in absolute terms – in recent years, on the contrary, the participation of the OGTI budget in relation to the management costs of MINSA has decreased from 10.9 percent in the 2008 to 2.9 percent in 2017.[73]

Provision of pharmaceutical products and medical supplies: current situation

Table A1- 3: Availability of medicines in first-level IPRESS, by Executive Unit, November 2017

Ranking	Executive Unit (DIRIS/DIRESA/GERESA)	Percentage of Health Facilities		
		Optimal availability (>90% of the PNUME)	Regular availability (70%<x<90% of the PNUME)	Low availability (<70% of the PNUME)
1	Amazonas	38.6%	33.7%	27.7%
2	Ancash	34.9%	39.5%	25.7%
3	Apurímac I – Abancay	20.7%	37.4%	41.9%
4	Arequipa	7.2%	36.7%	56.2%
5	Ayacucho	51.3%	48.2%	0.5%
7	Cajamarca I	11.9%	29.8%	58.3%
8	Callao	59.6%	19.1%	21.3%
9	Apurímac II - Andahuaylas	24.3%	52.4%	23.3%
10	Cajamarca II – Chota	14.0%	40.7%	45.3%

[70] For example, the backup generators are located on the access ramp to the underground parking garage, for lack of other available space. Due to lack of space inside the data center, server racks were placed in locations where they obstruct cooling system vents.
[71] MINSA, "Proyecto de Inversión Pública: Mejoramiento y Ampliación Del Sistema Único de Información En Salud a Nivel Nacional."
[72] Since the HCE Law was passed in 2011, there have been seven Ministers of Health and eight Directors at OGTI.
[73] MINSA, "Proyecto de Inversión Pública: Mejoramiento y Ampliación Del Sistema Único de Información En Salud a Nivel Nacional."

Ranking	Executive Unit (DIRIS/DIRESA/GERESA)	Percentage of Health Facilities		
		Optimal availability (>90% of the PNUME)	Regular availability (70%<x<90% of the PNUME)	Low availability (<70% of the PNUME)
11	Cusco	42.5%	46.2%	11.3%
12	Cajamarca III – Cutervo	56.0%	38.6%	5.4%
13	Huancavelica	51.9%	37.5%	10.6%
14	Huánuco	43.0%	42.7%	14.2%
15	Ica	45.3%	45.3%	9.5%
16	Cajamarca IV – Jaén	57.1%	36.8%	6.1%
17	Junín	30.9%	42.7%	26.4%
18	La Libertad	43.6%	35.2%	21.2%
19	Lambayeque	9.5%	44.1%	46.4%
22	Lima region	9.3%	46.4%	44.3%
24	Loreto	6.6%	27.4%	66.0%
25	Madre de Dios	18.3%	26.9%	54.8%
26	Moquegua	30.6%	50.0%	19.4%
27	Pasco	53.0%	39.9%	7.1%
28	Piura I	13.2%	30.3%	56.5%
29	Puno	37.8%	41.7%	20.4%
30	San Martín	21.9%	37.4%	40.7%
31	Piura II – Sullana	10.2%	20.5%	69.3%
32	Tacna	28.2%	71.8%	0.0%
33	Tumbes	2.5%	32.5%	65.0%
34	Ucayali	28.9%	38.3%	32.8%
35	Apurímac III - Chincheros	40.0%	26.7%	33.3%
36	Lima Metropolitan Area	0.3%	3.6%	96.1%
	Total general	29.5%	37.5%	33.0%

Source: MINSA "Proyecto de Inversión Pública: Mejoramiento de La Gestión de Productos Farmacéuticos y Dispositivos Médicos a Nivel Lima Metropolitana" (Lima, Peru, 2018).

20. **The entire supply chain (i.e. the processes of selection, planning, procurement, storage, distribution and use of pharmaceutical products and medical supplies) (Figure 4) is affected by problems in its information systems.** The Integrated Medicine and Medical Input Supply System (*Sistema Integrado de Suministro de Medicamentos e Insumos Médicos-Quirúrgicos* – SISMED) that is managed by DIGEMID uses a client-server software application to administers the information regarding the distribution of medications to storage facilities and health facilities. Health facilities use the SISMED application to digitalize a monthly consolidation of their usage information as well as summary information regarding their revolving fund. However, there are several weaknesses in the system. First, the IT system is fragile and severely outdated, being programmed in Visual Fox Pro, a programming language that was discontinued in 2006.[74] Second, even in its design, the system does not allow to trace the use of medicines to IPRESS pharmacies or patients. Finally, the implementation of the SISMED has been only piecemeal. Even the logistics offices of the central warehouse lack an installation of the SISMED application, which prevents them from tracking stocks in the specialized warehouses. On the other hand, the other functional units involved in the supply chain use parallel systems

[74] The management of information, responsibilities, deadlines for communication at the national level, as well as formats and tools are governed by the provisions of paragraph 7.9 of the SISMED directive, adopted initially by Ministerial Resolution No. 1753-2002-MINSA-SA/DM and reformed by article 4 of Ministerial Resolution No. 367-2005/MINSA. These provisions have not been updated since 2005.

including SIAF,[75] SIGA,[76] ARFSIS,[77] SIASIS,[78] and HIS[79] that also handle various types of data on the flow, consumption, and financing of pharmaceutical products and medical supplies. Since there are no interfaces that articulate the various systems, the supply chain cannot be managed in real time and in an articulated form between the different entities of Government.

Table A1- 4: Situation of public pharmaceutical and medical supply warehouses of the DIRIS in the Lima Metropolitan Area

Indicator	Quantity	Location detail
Number of warehouses	8	Lima Center: 1 Lima North: 2 Lima South: 4 Lima East: 1
Number of unsafe, improvised warehouses	5 out of 8	Located in community feeding centers (2), health center auditorium (3)
Number of warehouses with refrigeration (e.g., for vaccines)	1 out of 8	
Number of warehouses that fulfill Good Storage Practices	0 out of 8	

Source: WB elaboration based on MINSA.[80]

Government Program

Table A1- 5: Results chain of the GoP program

Activities
• Develop a new model of organization care based on the network concept, including standardized clinical practice guidelines and patient care pathways • Strengthen selected RIS: Build/expand/rehabilitate and equip first level IPRESS in selected RIS • Strengthen the Single Health Information System • Strengthen and streamline Medical Support Services • Improve management of pharmaceutical products and medical supplies
Outputs
• IPRESS rehabilitated/updated/rebuilt to higher quality standards • Increased number of clinical practice guidelines and pathways for prevalent health problems updated, disseminated and in use • The data center and platform for the Single Health Information System is fully operational • The new Center for Medical Support Services is fully operational • The new National Warehouse for pharmaceutical products and medical supplies is fully operational
Expected outcomes
• Updated first level IPRESS use clinical practice guidelines, patient pathways, medical support services, ICT tools, and improved logistics systems to provide integrated care to patients, including care for prevalent non-communicable diseases

[75] Integrated Financial Management System (*Sistema Integrado de Administración Financiera*)
[76] Integrated Administrative Management System (*Sistema Integrado de Gestión Administrativa*)
[77] Registration Application of the Comprehensive Health Insurance System (Aplicativo de Registro del Seguro Integral de Salud)
[78] Integrated Insurance System of the Comprehensive Health Insurance System (*Sistema Integrado de Aseguramiento del Seguro Integral de Salud*)
[79] Health Information System
[80] MINSA, "Proyecto de Inversión Pública: Mejoramiento de La Gestión de Productos Farmacéuticos y Dispositivos Médicos a Nivel Lima Metropolitana."

- **Improve the resolutive capacity and quality of public first level IPRESS in prioritized areas**
- Population increasingly uses first level IPRESS to receive services for prevalent non-communicable diseases
- **Improve the capacity of the Single Health Information System and of the public sector's pharmaceutical products and medical supplies provision system**
- First-level IPRESS use Single Health Information System modules to manage appointments, admissions and patient records in the intervention networks.
- MINSA plan purchases of pharmaceutical products and medical supplies using registered usage data and tracks the usage data in real time
- Pharmaceutical products and medical supplies are bought efficiently (at lower prices), are available where needed - reducing waste and diversion of pharmaceutical products and medical supplies

Expected higher level impact

- Improved health system performance
- Reduced burden of diseases from non-communicable diseases in the intervention areas
- Contained cost for pharmaceutical products and medical supplies allow to expand the basic package of services
- Second and third-level IPRESSs face reduced congestion from patient with low-complexity health needs as they receive care in first-level IPRESS
- Patients with noncommunicable conditions access adequate services in first-level IPRESS, which reduces their need to pay out of pocket for services in the private sector
- Increased equity in access and quality of care