PAHO All in One Telehealth Package

Strengthening Public Health actions with integrated platforms, essential equipment and tools for effective digital care

Pan American Health Organization

World Health Organization
REGIONAL OFFICE FOR THE Americas

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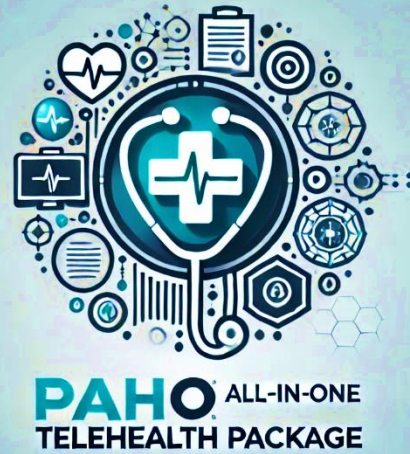
Version 1.0, August 2024

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Strengthening Public Health actions with integrated platforms, essential equipment and tools for effective digital care

Table of Content

PAHO All in One Telehealth Package – Structure

All in One Telehealth Platform	**Telehealth kit**
Virtual course for integration of telehealth in the primary health care	**Technical documents**

Section 1 – The platform

Section 1 - PAHO All in One Telehealth Platform

The **PAHO All in One Telehealth Platform** was developed based on international standards for interoperability. It is offered to countries as a digital public good developed with open-source technologies that can be adapted according to needs and models of care. It also has an architecture that allows incorporation and connection with pre-existing modules or those developed by third parties.
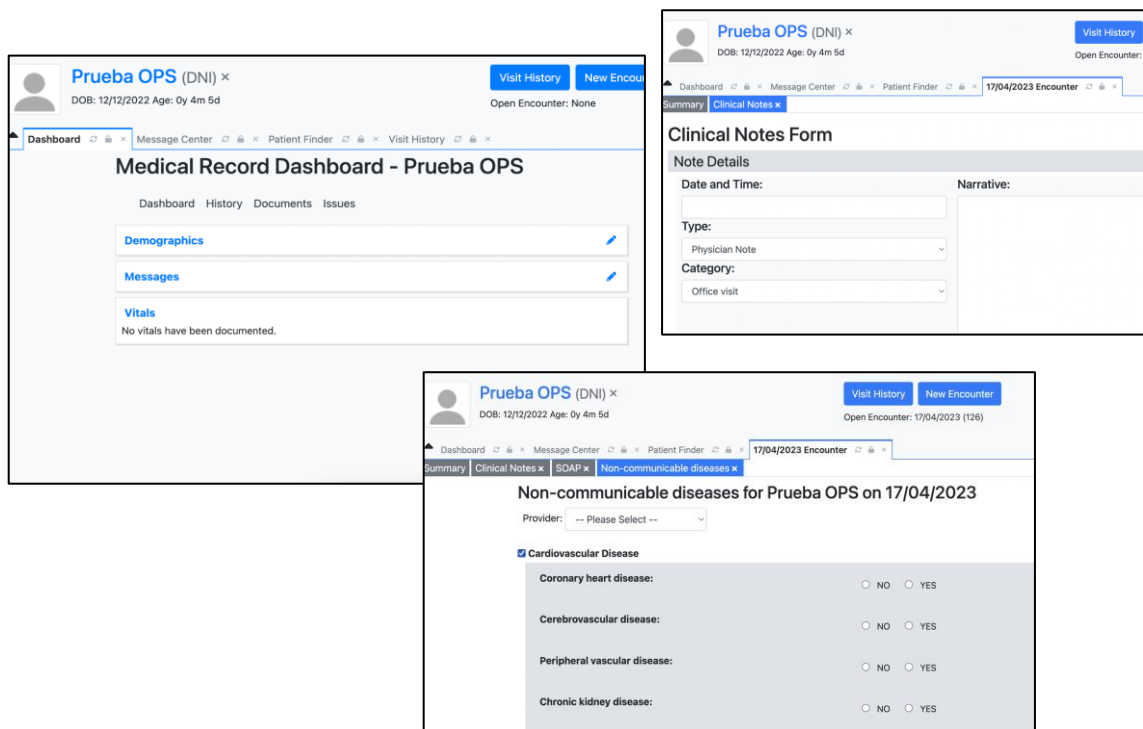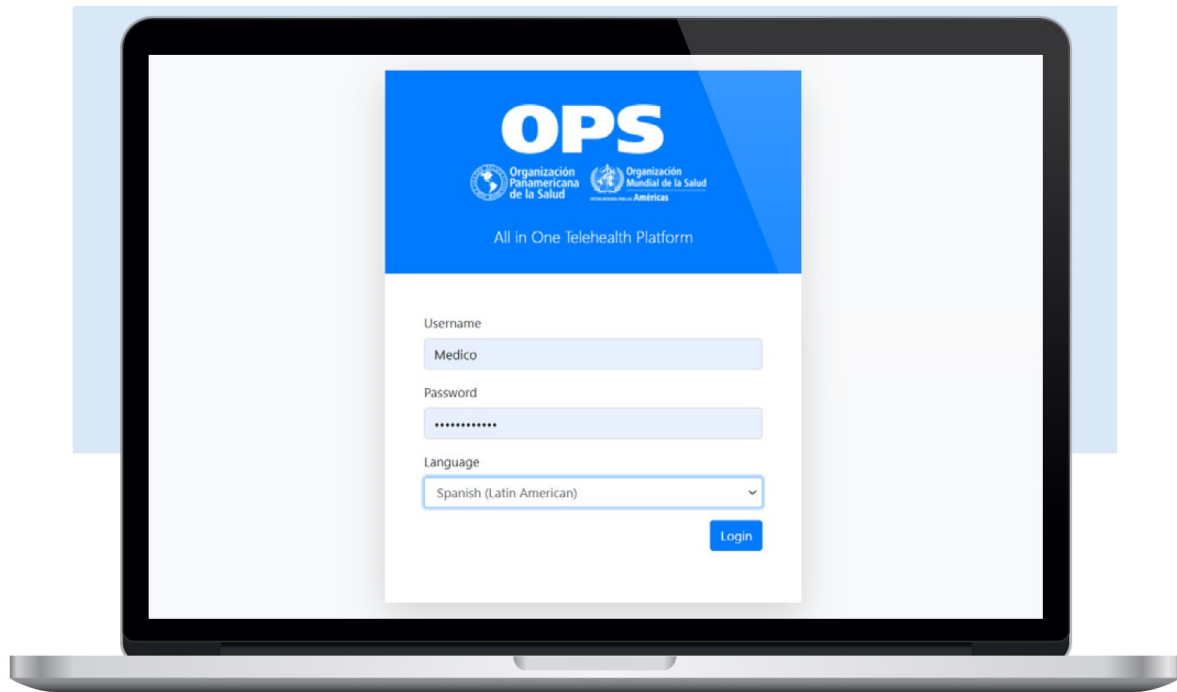
Section 2 – The kit

Telehealth kit

Section 2 - Telehealth kit

The Telehealth Kit is a comprehensive and versatile solution designed to enhance healthcare delivery in a variety of settings. This kit includes a selection of high-quality medical devices, tailored for both portable and ultra-portable applications, ensuring flexibility and adaptability to different environments.

Digital Stethoscope

ECG

Stadiometer

All-In-One Vitals Telehealth Monitor

Fetal Monitor

Ultrasound

Scale

Camera

Spirometer

TeleKIT | Basic
All-In-One Vitals Telehealth Monitor Electrocardiogram Digital Stethoscope Manual Digital Camera Ultrasound Stadiometer Scale (Medical grade) Spirometer
TeleKIT | Maternity module
Fetal monitor
TeleKIT | X Ray module
Portable X Ray Machine ● **Portable:** Recommended for permanently assigned care spaces with sufficient infrastructure (mainly electrical service) in hospital facilities or primary care centers. ● **Ultra portable:** Recommended for field health teams, hospital facilities or primary care centers without permanently assigned physical space. It is also recommended for those centers that, although they have assigned physical space, do not have the necessary infrastructure (especially electrical installation and security).

II-In-One Vitals Telehealth Monitor

Non Invasive Blood Pressure
Measuring method: Oscillometric Technique
Measuring range: 0mmHg~300mmHg
Maximal standard deviation: ≦ 8mmHg
Inflation time: <20s (typical adult cuff)
Overpressure protection limit: 300mmHg
Measuring range:
SYS: 30mmHg~270mmHg
DIA: 20mmHg~235mmHg
MAP: 10mmHg~220mmHg

Temperature
Measuring range: 32 °C ~43 °C
Measuring accuracy: ±0.2 °C
Response time: ≦ 5s
Probe: Infrared ear probe

SpO2
Technique: Dual-wavelength LED
SpO2 measuring range: 0%~100%
SpO2 measuring accuracy: ±3% (range from 70%~100%)
PR measuring range: 30bpm~250bpm
PR measuring accuracy ±2bpm
Sensor type: Adult, Pediatric

Blood Glucose
Measuring range: 20 - 600 mg/100ml (1.1-33.3mmol /L)
Measuring time: 6s
Sample volume: ≥ 0.7 microlitre
Measuring method: Electrochemical biosensor method

ECG
Measuring range: 30bpm~240bpm
Measuring accuracy: ±2bpm or ±2%
Display scale: 5.0mm/mV±10%
Common-model rejection ratio: ≥60dB
Option: ECG leadwire

SECURITY
- FDA-cleared and HIPAA-compliant

INTEGRATION / INTEROPERABILITY
- Patient identification through HL7 patient data query messages or ADT services. If not possible, it should ensure a secure method for patient record association
- Biosignal and vitals transfer using HL7 messages

EVALUATED AND APPROVED BY THE DEPARTMENT OF CONTROL AND ASSURANCE OF THE
OPS QUALITY (IMT/QR)
- YES
  MANUFACTURER: SHENZHEN CREATIVE INDUSTRY CO., LTD
  MODEL: PC-900 VITAL SIGNS MONITOR
  COUNTRY OF ORIGIN: CHINA

BOUGHT
- YES
  Creative Medical
  Spot-check Monitor PC-303

Electrocardiogram

Physical Specifications
Dimensions 420mm×330mm×120mm
Weight 5kg (Excluding recorder paper and battery)
Display 8 inch, 800×600 multicolor LCD screen (touch screen as optional)

Power Supply
Mains Supply:
Operating Voltage = 100V-240V
Operating Frequency = 50Hz/60Hz
Input Current = 0.9-0.4A

Internal Li-ion Battery Pack:
Rated voltage = 14.8V
Rated capacity = 2500/5000mAh
(1.5/2.5 hours continuous printing, 300/450 ECG reports)
Necessary Charge time: 3/6 hours

Recording
Recorder: Thermal dot-matrix recorder
Printing Density:
8 dots per mm / 200 dots per inch (amplitude axes)
40 dots per mm / 1000 dots per inch (time axes, @ 25 mm/s)
Recorder Paper:
Folded thermal paper: 210mm×295mm×100pages
Folded thermal paper: 215mm×280mm×100pages (Optional)
Rolled thermal paper: 210mm×30m (Optional)
Paper Speed: 5mm/s, 6.25mm/s, 10mm/s, 12.5mm/s, 25mm/s, 50mm/s
External Printer:
HP1010/1510, HP M401, HP 1020/1020PLUS/1106,
HP 2010/1050/2000, HP 2015/2035, HP 1525

HR Recognition
HR Range: 30 BPM ~300 BPM
Accuracy: ±1 BPM

ECG Unit
Leads: 12 standard leads
Acquisition Mode: simultaneously 12 leads
A/D Converter: 24 bits
Resolution: 2.52uV/LSB
Time Constant: ≥3.2s
Frequency Response: 0.01Hz ~ 300Hz (-3dB)
Gain: 1.25, 2.5, 5, 10, 20, 10/5 mm/mV, AGC

SECURITY
- FDA-cleared and HIPAA-compliant

INTEGRATION / INTEROPERABILITY
- Patient identification through HL7 patient data query messages or using the DICOM worklist to retrieve the list of patients with scheduled appointments.
- ECG report exportation to a file system using common file transfer protocols or to a PACS using DICOM storage modalities
- ECG data transfer using HL7 or other known standards.

EVALUATED AND APPROVED BY THE DEPARTMENT OF CONTROL AND ASSURANCE OF THE
OPS QUALITY (IMT/QR)
- YES
  MANUFACTURER: GUANGDONG BIOLIGHT MEDITECH CO., LTD.
  MODEL: E65 DIGITAL 12-CHANNEL ECG MACHINE
  COUNTRY OF ORIGIN: CHINA

BOUGHT
- YES
  Edan
  SE-1200 Express
  Electrocardiograph

Input Impedance: ≥100MΩ (10Hz)

Input Circuit Current: ≤0.01μA

Input Voltage Range: ≤±5 mVpp

Calibration Voltage: 1mV±2%

CMRR: ≥140dB (AC on)

≥123dB (AC off)

Sampling Frequency 16000 Hz

Pacemaker
Amplitude: ±750μV to ±700 mV
Width: 50μs to 2.0 ms

Filter
AC Filter: 50/60Hz
DFT Filter:
0.01Hz/0.05Hz/0.15Hz/0.25Hz/0.32Hz/0.5Hz/0.67Hz
EMG Filter: Off/25Hz/35Hz/45Hz
LOWPASS Filter:
300Hz/270Hz/150Hz/100Hz/75Hz

Data Transmission
Report Format: PDF, XML, DICOM, FDA-SCP
Data Transmission: Wi-Fi, Ethernet, RS232
Data Management System: SE-1515 Data Management System, bi-directional communication
HIS connection: DICOM Worklist/DICOM Storage/HL7/GDT

Wi-Fi
Transmitting Frequency: 2400-2497MHz
Frequency Band: 2400-2497MHz
Modulation Type: DSSS, CCK, OFDM
Transmitting Power: 6 - 17dBm
Effective Radiated Power: 6 - 17dBm

Safety
Specifications
Comply with:
IEC 60601-1:2005/A1:2012
EN 60601-1:2006/A1:2013
IEC 60601-1-2:2007
EN 60601-1-2:2007/AC:2010
IEC/EN 60601-2-25

Anti-electric-shock type: Class I with internal power supply
Anti-electric-shock degree: CF type with defibrillation-proof
Patient Leakage Current:
NC <10μA (AC) / <10μA (DC)
SFC <50μA (AC) / <50μA (DC)
Patient Auxiliary Current:
NC <10μA (AC) / <10μA (DC)
SFC <50μA (AC) / <50μA (DC)

Environment Specifications	
Temperature: Transport & Storage: -20oC (-4oF) ~ +55oC (+131oF) Working: +5oC (+41oF) ~ +40oC (+104oF) **Relative Humidity:** Transport & Storage: 25%~93% Non-Condensing Working: 25%~80% Non-Condensing **Atmospheric Pressure:** Transport & Storage: 70kPa ~106kPa Working: 86kPa ~106kPa	

Digital Stethoscope

Digital Stethoscope with removable earpiece, wireless charging pad, USB charging cable Wireless listening Bluetooth Compatible with IOS and Android products, .WAV and .PDF file formats Rechargeable lithium-ion battery with 10-hour life or higher If a subscription is required, it must be included. <u>Audio</u> 4 audio filters: diaphragm, bellmode, midrange and extended Ambient noise reduction with 60x audio amplification Super-bass driver delivers high-quality audio Compatible with high-quality traditional headphones	SECURITY ● FDA-cleared and HIPAA-compliant INTEGRATION / INTEROPERABILITY ● Patient identification through HL7 patient data query messages. If not possible, it should ensure a secure method for patient record association ● Media exportation using HL7 or other known standards. EVALUATED AND APPROVED BY THE DEPARTMENT OF CONTROL AND ASSURANCE OF THE OPS QUALITY (IMT/QR) ● NO BOUGHT ● NO

Manual Digital Camera

Scope: eye fundus, dermascope, otoscope and general exam. 40/25 Degree Field of View Macular Pigment Density (MPOD) 3D Map Lightweight, Handheld Quick Data Transfer. Must transfer the images to a laptop, PC, or mobile device. Wi-Fi and/or Bluetooth compatible. Micro SD card and AV output. 3.5" Full Color LCD or higher Photo and Video Capture	SECURITY ● FDA-cleared and HIPAA-compliant INTEGRATION / INTEROPERABILITY ● Patient identification through a known standard. If not possible, it should ensure a secure method for patient record association ● Image transfer using DICOM storage modalities or other common file transfer protocols EVALUATED AND APPROVED BY THE

Outstanding Illumination Dual Screen Mode 2M Pixels HD Resolution or higher, brightness and focus control	DEPARTMENT OF CONTROL AND ASSURANCE OF THE OPS QUALITY (IMT/QR) - NO BOUGHT - NO

Ultrasound

M6 Main Unit 15-inch LCD monitor B/M/Color/Color M/Power/Directional Power Doppler Flow Imaging Pulse Wave Doppler (includes High Pulse Repetition Frequency) PSHTM (Phase Shift Harmonic Imaging) iBeamTM (Spatial Compounding Imaging) iClearTM (Speckle Suppression Imaging) HR Flow iTouchTM (Auto Image Optimization) iZoomTM (Full Screen View) Abdomen/General Software Package iScanhelper 1TB Hard Disk & iStationTM Patient Information Management S-Video Output and USB 2.0 Ports AC Adapter and Lithium-ion Battery Pack Traveling Case Software 110-004393-00 Auto IMT Package (Automatic measurement for Intima-Media Thickness, Vascular Package should be configured at the same time) 110-004400-00 Free Xros MTM (Anatomical M-mode) 110-004401-00 Free Xros CMTM (Curved Anatomical M-Mode, TDI should be configured at the same time) 110-004402-00 TDI (Tissue Doppler Imaging, includes TVI, TEI, TVD and TVM) 110-004403-00 TDI Quantification Analysis Software (TDI should be configured at the same time) 110-004408-00 iNeedleTM (Needle Visualization Enhancement, available on L14-6Ns, L14-6s, 7L4s) DICOM Options 110-004379-00 DICOM Basic 110-004380-00 DICOM Worklist Application Shared Service Package (includes Abdomen/General, Obstetrics, Gynecology,	SECURITY - FDA-cleared and HIPAA-compliant INTEGRATION / INTEROPERABILITY - Patient identification through HL7 patient data query messages. If not possible, it should ensure a secure method for patient record association - Media exportation using HL7 or other known standards. - DICOM 3.0 - Importing the work list through the Worklist Information Model mode - Export of ultrasound images (US modality) and obstetrics-gynecology, echocardiography and vascular ultrasound reports through the Performed Procedure Step (MPPS) modality and Storage Commitment push model. - It also allows the export of results on DVD, CD and USB and the printing of images. - List of modalities - Verification AE (as SCU and SCP) - Storage AE (as SCU and SCP) - Storage Commitment AE （SCU） - Print AE (as SCU) - Worklist AE (as SCU) - MPPS AE (as SCU) - Query/Retrieve AE (as SCU) EVALUATED AND APPROVED BY THE DEPARTMENT OF CONTROL AND ASSURANCE OF THE OPS QUALITY (IMT/QR) - YES MANUFACTURER: EDAN MODEL: ACCLARIX AX3 COUNTRY OF ORIGIN: CHINA BOUGHT - YES Mindray

Cardiac, Small Parts, Urology, Vascular, Pediatrics, Emergency Medicine and Nerve packages)	M6
Transducers PR1E-30-90867 Convex array transducer, 3C5s PP3A-30-90859 Phased array transducer, 2P2s	

Stadiometer

| ADULT
Measuring range: 8 – 81" / 20 – 205 cm
• Graduation: 1/8" / 1 mm
• Dimensions, stadiometer (WxHxD):
13.3 x 83.9 x 23.2" /
337 x 2,130 x 590 mm
• Dimensions, for transport (WxHxD):
13.3 x 7 x 24.6" / 337 x 177 x 624 mm
• Device weight: 5.3 lbs / 2.4 kg
• Optional: carrying case seca 412
PEDIATRIC
Alcance de medición:
10–99 cm, 10–99 cm / 4–39"
• División: 5 mm, 5 mm / 1/4"
• Dimensiones (AxAxP):
1,250 x 140 x 300 mm /
49.2 x 5.5 x 11.8"
• Dimensiones, enrollada (AxAxP):
120 x 140 x 300 mm /
4.7 x 5.5 x 11.8"
• Peso: 575 g / 1.3 lbs
• Con elementos para guardarlo en la pared | SECURITY
● FDA-cleared and HIPAA-compliant

INTEGRATION / INTEROPERABILITY
● Patient identification through HL7 patient data query messages. If not possible, it should ensure a secure method for patient record association
● Data exportation using HL7 or other known standards.

EVALUATED AND APPROVED BY THE DEPARTMENT OF CONTROL AND ASSURANCE OF THE OPS QUALITY (IMT/QR)
● NO

BOUGHT
● NO |

Scale (Medical grade)

| Capacity
200 kg
Div (g):
100 g

Battery
Dimensions (AxAxP):
433 x 47 x 373 mm
Peso neto:
2,9 kg
Functions:
automatic disconnection, Tip on (automatic connection function by touch), switching kg/lbs/sts, Auto-HOLD | SECURITY
● FDA-cleared and HIPAA-compliant

INTEGRATION / INTEROPERABILITY
● Patient identification through HL7 patient data query messages. If not possible, it should ensure a secure method for patient record association
● Data exportation using HL7 or other known standards.

EVALUATED AND APPROVED BY THE DEPARTMENT OF CONTROL AND ASSURANCE OF THE OPS QUALITY (IMT/QR)
● NO |

	BOUGHT ● NO

Spirometer	
Measures: Peak Flow and FEV1 USB and/or Bluetooth connection FVC, VC&IVC, MVV, PRE and POST BD & Bronchial Challenge tests Real-time Flow/Volume loop and Volume/Time Curve with PRE/POST comparison Embedded temperature sensor for BTPS conversion Automatic Spirometry interpretation with alert messages Calibration free: uses a factory- calibrated disposable mouthpiece/turbine Cross contamination free: prevents exposure to patient inspired or expired air ATS compliant and supports NHANES III standard Multi-language interface Suitable for all ages	SECURITY ● FDA-cleared and HIPAA-compliant INTEGRATION / INTEROPERABILITY ● Patient identification through HL7 patient data query messages. If not possible, it should ensure a secure method for patient record association ● Spirometer report exportation to a file system using common file transfer protocols or to a PACS using DICOM storage modalities ● Spirometer data transfer using HL7 or other known standards. EVALUATED AND APPROVED BY THE DEPARTMENT OF CONTROL AND ASSURANCE OF THE OPS QUALITY (IMT/QR) ● NO BOUGHT ● NO

Fetal monitor	
Separate maternal pulse measurement Continuous monitoring during transport in healthcare facilities Integrated monitoring of maternal pulse rate and blood pressure (optional) External monitoring of multiple fetal heart rates, uterine activity, and fetal movement Extensive set of internal fetal parameters, such as direct fetal heart rate and intrauterine pressure	SECURITY ● FDA-cleared and HIPAA-compliant INTEGRATION / INTEROPERABILITY ● Patient identification through HL7 patient data query messages. If not possible, it should ensure a secure method for patient record association ● Report exportation to a file system using common file transfer protocols or to a PACS using DICOM storage modalities ● Data transfer using HL7 or other known standards. EVALUATED AND APPROVED BY THE DEPARTMENT OF CONTROL AND

	ASSURANCE OF THE OPS QUALITY (IMT/QR)
	- YES MANUFACTURER: EDAN INSTRUMENTS INC MODEL: F6 EXPRESS SUPPLIER: CHINA NATIONAL PHARMACEUTICAL FOREIGN TRADE CORPORATION COUNTRY OF ORIGIN: CHINA BOUGHT - NO

Portable X Ray Machine

- **Portable:** Recommended for permanently assigned care spaces with sufficient infrastructure (mainly electrical service) in hospital facilities or primary care centers.
- **Ultra portable:** Recommended for field health teams, hospital facilities or primary care centers without permanently assigned physical space. It is also recommended for those centers that, although they have assigned physical space, do not have the necessary infrastructure (especially electrical installation and security).

Output power   4 kW
X-ray tube (Focus)   0.6 / 1.6 mm
mAs (Adjustable)   1 to 190 mAs
Tube voltage (Adjustable)   40 to 110 kV
Nominal power 100 kV, 40 mA, 0.1 s, 4 kW
mA (Adjustable) 36 to 60 mA
Power supply   220 V ± 22V ; 50 to 60 Hz ± 1Hz
Anode heat capacity
(X-ray tube)   76 kHU
Machine frame size Highest : 1060 × 790 × 2210 mm
Lowest : 1060 × 790 × 1240 mm
Size   290 × 260 × 230 mm
Weight up to 20 kg
Flat panel digital detector (optional) of 17 × 17 inch
Simulation and digital double loop control
Preset anatomy memory choices
High quality X-ray (minimizes excess radiation)
Failure alert for self-protection
	SECURITY
	- FDA-cleared and HIPAA-compliant
	
	INTEGRATION / INTEROPERABILITY
	- Patient identification through HL7 patient data query messages. If not possible, it should ensure a secure method for patient record association
	- Media exportation using HL7 or other known standards.
	- DICOM 3.0
	- Importing the work list through the Worklist Information Model mode
	- Export of images (US modality) reports through the Performed Procedure Step (MPPS) modality and Storage Commitment push model.
	- Allows the export of results on DVD, CD and USB and the printing of images.
	- List of modalities
	  ○ Verification AE (as SCU and SCP)
	  ○ Storage AE (as SCU and SCP)
	  ○ Storage Commitment AE (SCU)
	  ○ Print AE (as SCU)
	  ○ Worklist AE (as SCU)
	  ○ MPPS AE (as SCU)
	  ○ Query/Retrieve AE (as SCU)

	EVALUATED AND APPROVED BY THE DEPARTMENT OF CONTROL AND ASSURANCE OF THE OPS QUALITY (IMT/QR)
	• YES
	  MANUFACTURER: SHENZHEN MINDRAY BIO-MEDICAL ELECTRONICS CO., LTD MODEL: MOBIEYE 700 COUNTRY OF ORIGIN: CHINA
	
	BOUGHT
	  NO

Section 3 – The training

Section 3 - Virtual courses and simulation platform

This document outlines four specialized online courses designed to support Health workers in enhancing their skills for the effective adoption of telehealth programs. These courses provide comprehensive training and guidance to ensure that health providers are equipped to improve health access and service delivery, enabling the successful implementation of telehealth solutions across various healthcare settings.

Virtual course for the integration of telehealth at the first level of care with the application of simulation models

https://campus.paho.org/en/course/integration-telehealth-PHC

Introduction to Interoperability and the FHIR Standard Course

https://campus.paho.org/es/curso/interoperabilidad-fhir

Gestión del cambio para servicios de telesalud

https://campus.paho.org/es/curso/gestion-cambio-telesalud

Introducción a los Sistemas de Información para la Salud

https://campus.paho.org/es/curso/sistemas-informacion-salud

Section 4 – The technical documents

Technical documents and references

Section 4 – Technical documents and references

COVID-19 AND TELEMEDICINE
Tool for assessing the maturity level of health
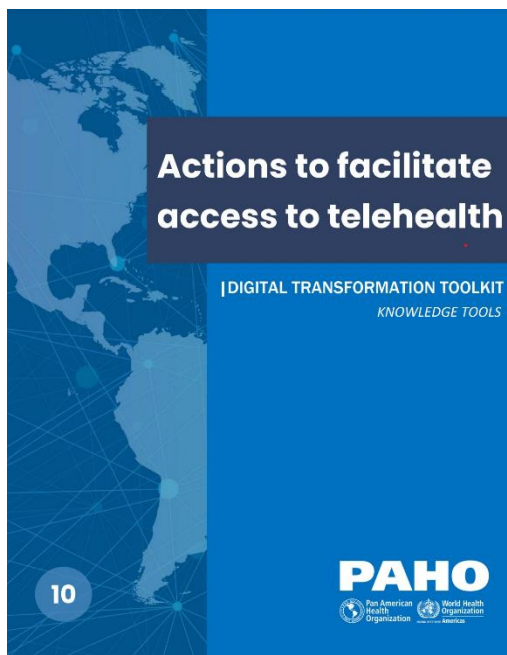institutions to implement telemedicine services

Version 3.0, July 2020
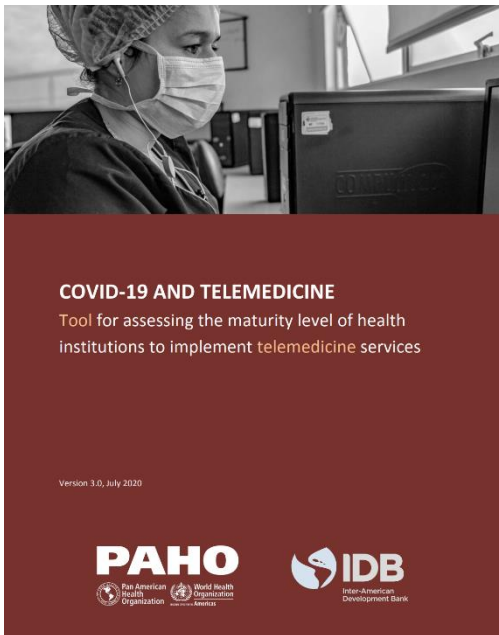
Telehealth readiness assessment tool

Tool for assessing the maturity level of health institutions to implement telemedicine services

This tool has been specifically designed to assist health institutions in evaluating their maturity level for offering telemedicine services. It not only helps institutions understand their current readiness but also aids in identifying potential gaps or areas requiring additional focus and expert technical support. Its design is grounded in models that have been successfully implemented by various health institutions with different levels of complexity across multiple countries. The development of this tool was a collaborative effort, involving institutions and experts specialized in telemedicine and the use of information technology (IT) in public health from the Region of the Americas. https://www3.paho.org/ish/index.php/en/telemedicine

Actions to facilitate access to telehealth

|DIGITAL TRANSFORMATION TOOLKIT
KNOWLEDGE TOOLS

10

Actions to facilitate access to telehealth

This knowledge capsule is based on the implementation of COVID-19 AND TELEMEDICINE: A tool for assessing the maturity level of health institutions to implement telemedicine services and has been developed to support that tool.

https://iris.paho.org/handle/10665.2/57019
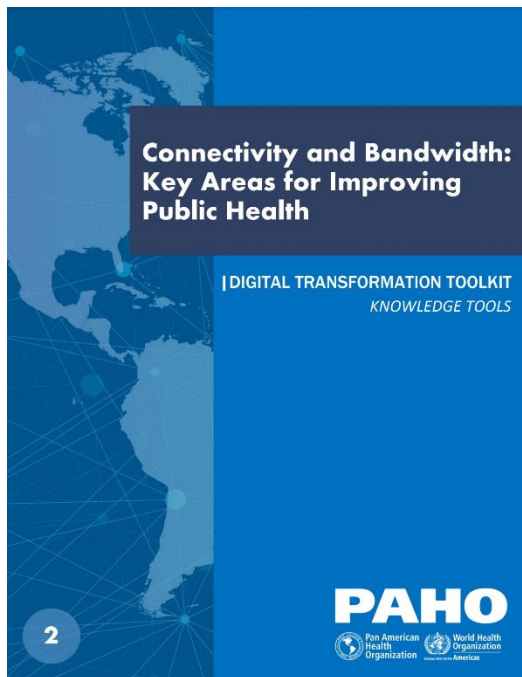
Connectivity and Bandwidth: Key Areas for Improving Public Health

For efficient and effective implementation of technology in the public health agenda, connectivity and bandwidth are critical for success both globally and in the Region of the Americas. Digital connectivity for all can enrich health service delivery, improve the quality of service and patient safety, and increase the efficiency and coordination of care. The publication discusses various questions, such as what digital connectivity means and whether the Region is ready for the age of digital interdependence. It also shows how the issues relate to the Information Systems for Health Initiative, and to the Eight Principles for Digital Transformation of Public Health launched by the Pan American Health Organization in February 2021. https://iris.paho.org/handle/10665.2/54578

Universal Connectivity. Policy overview

One of the eight guiding principles of the digital transformation of the health sector promoted by the Pan American Health Organization is connectivity. This policy overview presents key concepts, recommended lines of action and indicators for monitoring with the aim of advancing universal connectivity.
https://iris.paho.org/handle/10665.2/58404
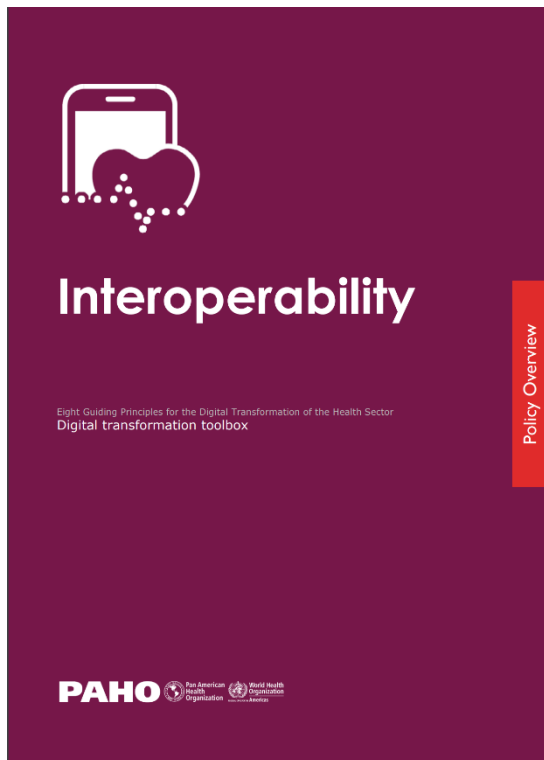
Interoperability

Interoperability enables Telehealth and other applications to access, exchange, integrate, and use data in a collaborative and coordinated manner through common interfaces and standards, inside or outside the same institutional, regional, national, and even transnational scope, to provide fast and seamless portability of information and optimize health outcomes. To achieve this, it is essential for governments to intervene by creating digital agendas that can generate a consensus on the strategy for building and scaling up health information systems, to facilitate establishing communication bridges across organizational, regional, and national borders.

https://iris.paho.org/handle/10665.2/58408
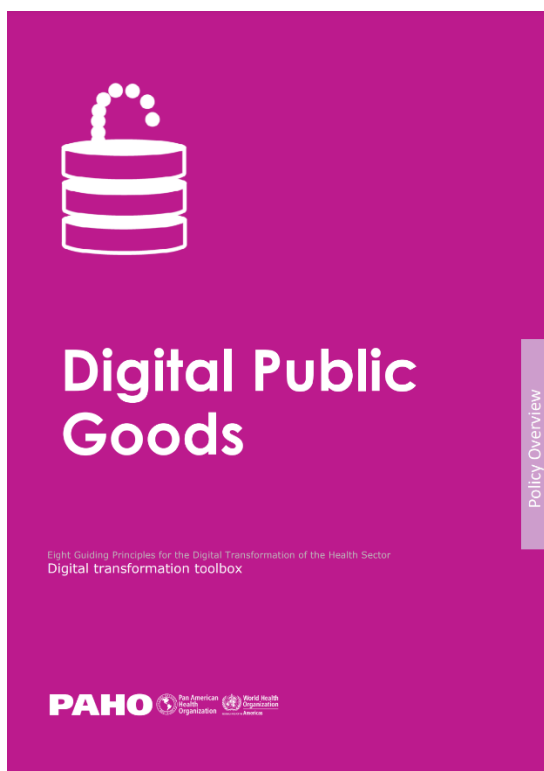
Digital Public Goods

Digital public goods (DPGs) constitute one of the eight guiding principles for the digital transformation of the health sector promoted by the Pan American Health Organization (PAHO). This policy brief presents key concepts, recommended lines of action, and monitoring indicators, with the objective of advancing DPGs. On the road to achieving universal access to health care, digital transformation plays a key role. DPGs, which include open software and applications, open interoperability standards, and open and shared high-quality data, represent an opportunity for low- and middle-income countries with fewer resources to access adaptive and innovative technologies.

https://iris.paho.org/handle/10665.2/58406