Developing Virtual Care for Remote Communities in Sumbawa, Indonesia

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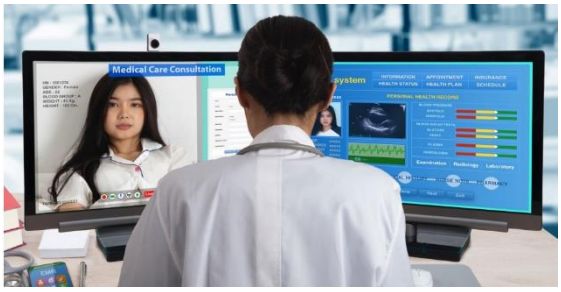
A virtual healthcare program (also called telemedicine or telehealth) designed specifically for rural, low-resourced areas of Indonesia can be developed and launched quickly and inexpensively. Health Access Sumbawa (HAS) proposes to organize a pilot "proof of concept" program on the island of Sumbawa, in West Nusa Tengara (NTB), an island of 1.6 million people, where HAS operates two remote primary care clinics staffed by nurses and midwives. HAS would do this by combining a suite of off-the-shelf technologies that are affordable, available now, and easy to use.

The Problem to be solved

The primary factors limiting patient access to doctors in rural Indonesia are the distance from home to the nearest hospital, the cost of that travel, and a shortage of qualified health practitioners.

A trip to a doctor from remote communities on Sumbawa typically involves many hours of travel over bad roads on a motor bike or bus, hours waiting to see a doctor, and at least one night stay in a hotel. The costs and risks of such travel often lead patients to stay home, use traditional medicine, and go to bed in the hope that they will recover without the help of a doctor or modern therapy.

The Opportunity



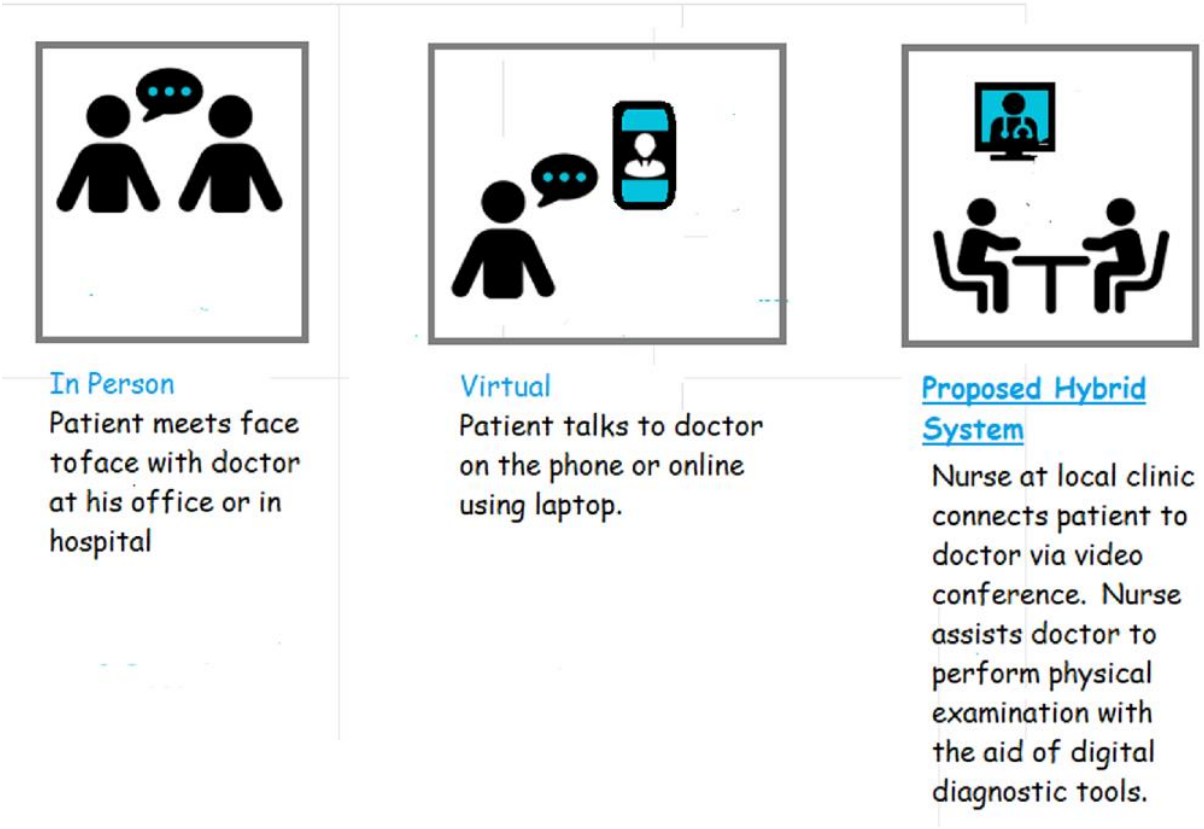
The global pandemic of 2020-2022 greatly accelerated the adoption of remote conferencing technology in the health care environment. Concurrently, new internet services such as Starlink are poised to connect remote villages everywhere to the world-wide web. These developments, combined with a

trend toward smart medical devices, suggests the time is ripe to introduce a virtual health service to improve access to care for under-resourced communities.

Our Concept is a Hybrid of Physical & Virtual

When we think of telemedicine we usually think of patients connecting directly with doctors by smart phone or laptop from home. This does not work very well in rural Sumbawa where most patients don't own a smart phone or laptop. Even if the patient does have a smart phone and internet connection, doctors are reluctant to diagnose many health problems based only on a phone or video call with the patient.

our hybrid concept is different. the patient physically goes to a nearby clinic where their primary care nurse sets up a virtual appointment with the doctor.



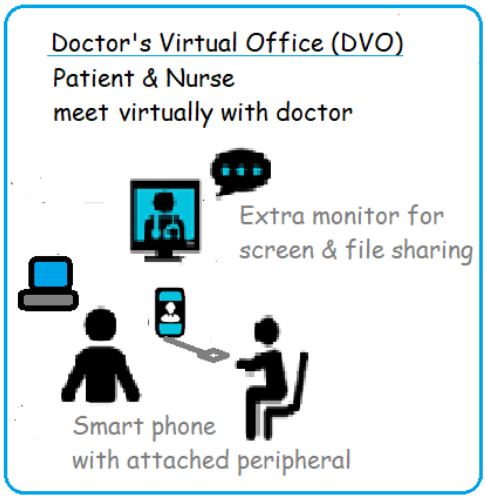
Doctors and/or nurses will triage patients and decide which patients need to travel to doctor's office or hospital, and which can be diagnosed virtually and treated locally. The local nurse will assist patient with doctor-proscribed therapies.

Overcoming broadband connectivity issues

Synchronous Telemedicine (communicating in real time) allows a consulting doctor to examine a patient from a remote location. A reliable broadband connection is a

prerequisite. Before now, this was unattainable in remote areas. Older telemedicine models (such as Doctors Without Borders) are mostly asynchronous (not real time communication). This involves creating a digital case file on the patient at the point of care and sharing it with a consulting specialist when a connection is available. Works best as a peer-to-peer consulting service for doctors.

Key Technologies Required or very useful on the patient-nurse side of the meeting.



1. Electricity
2. High speed broadband connection via satellite or from cell tower.
3. Smart phone & laptop suitable for video conferencing. Extra monitor.
4. Digital diagnostic devices such as otoscope & stethoscope connected to smartphone
5. Video conferencing application, such as Zoom Health, Doxy.me. or Microsoft Teams.
6. Secure cloud storage of electronic medical records
7. Contact Management software- Electronic medical Records (EMR) for patient charts, patient history, appointment scheduling, secure messaging, billing & payment, such as OpenEMR
8. Patient consent & disclosure forms. Virtual document signing application.

Challenges to Overcome

- Behavior change- Get partners comfortable using Telemedicine
- Low bandwidth/connectivity in remote areas
- Computer literacy
- Recruiting health partners to join the network
- Reimbursement-financial models
- Need robust, secure, scalable, shareable EHR (Electronic health Record)

In-Country rather than global networks most practical

In theory, telemedicine can bring together patients and providers from anywhere on earth. However, a range of barriers such as medical licensing, language, time zones, and reimbursement models may limit opportunities to network globally. However, in-

network practitioners can consult with global health specialists without violating licensing rules.

Proposed Pilot Program in Sumbawa, NTB

Build program in cooperation with district health departments.

- Secure funding
- Acquire the hardware / software.
- Recruit health partners for the program
- Set up physical facilities (in existing clinics) & virtual technology.
- Train HAS personnel and other healthcare participants.
- Market the service to patients / to community to be served.
- Field test: practice hybrid telemedicine in clinical settings over 2 to 3-year period. improve systems and proceedures on the go.
- Concurrently, Develop "Doctor's Virtual Office (DVO-Sumbawa.)"

Scale Up DVO

After successful proof of concept, and drawing on our lived experience, scale up Doctor's Virtual Office.

DVO will supply doctors and nurses with training videos, live webinars, checklists, etc. via its website, YouTube channel, and social media channels in Indonesian language. "At the elbow" personalized training will be available to doctors for a fee. An example of such a program is DTO of BC. (Doctors Technology Office of British Columbia, Canada)

Resources

- **People -** Partner with Sumbawa health departments & interested primary care doctors. Team will include HAS nurse & midwife, at least 2 cooperating primary care doctors, a digital technology consultant and a digital media specialist.
- **Funding Source-** Potential grantors include NGO's, provincial or national governments, HAS donor community, companies with major investments in Sumbawa (such as mining), telehealth hardware and software vendors, etc.

- **Budget $65,000 over 3 years.**

Additional Information

Current Situation with Telehealth in Indonesia

Indonesia's current state of virtual medicine reflects the long-standing challenge of Indonesia's digital development: unequal digital infrastructure that doesn't cover remote areas. Thus, if Indonesia is to harness telemedicine's full potential, it must be accompanied by a commitment to develop digital infrastructure so that access to online health services is not limited to Indonesia's urban areas.

Indonesian Start-up companies HaloDoc and Alodokter have already begun offering virtual medical consultations to patients in urban markets where most people have access to an internet connection. Indonesia's Ministry of Health has also put a toe in the Telemedicine waters with Telemin, conceived as Indonesia's national telemedicine platform, primarily a business-to-business service with features such as teleradiology, tele-EKG, and tele-USG. Several private Indonesian hospital chains also have their own telemedicine services.

BPJS Kesehatan—the national health insurance program— has a web-based portal used by government health centers to file their claims for financial reimbursement. There is talk that this system might be broadened to become a telemedicine site for the national health service.

However, despite the promising concept of Temenin, it is not nationwide, and not used by the general population, especially not outside metropolitan cities. As an illustration, in West Papua province where Temenin partnered with four hospitals, it was found that its utilization level is very low due to the problem of internet connectivity and lack of suitable features that match the local population's health needs.

Reference: Telemedicine in Indonesia: A Path towards Universalizing Healthcare?
https://cfds.fisipol.ugm.ac.id/2021/01/13/telemedicine-in-indonesia-a-path-towards-universalizing-healthcare/

Can Physical Diagnosis be done remotely?

A doctor uses his senses and medical instruments to diagnosis a patient's illness. The Senses Involved in physical diagnosis are primarily sight, hearing, and touch.

Physical diagnosis entails…

- Inquiry: Taking medical history. Listening to / Communicating with Patient. General Inspection, including biometrics such as height, weight, pulse, blood pressure, and temperature. Evaluation of pain.
- Visual observation of the Patient. Exterior of the body. Interior cavities such as ear, nose & throat (digital technology exists). Body movement, gait, posture, color, etc.
- Auscultation (listening to sounds within organs) of the Lungs, heart, bowel, etc. Such as listening to the rhythm of the heart (digital technology exists).
- Palpation (feeling with the hands to determine the size, shape firmness and location of an object on or in the body).
- Percussion (tapping on the surface of body parts to determine size, consistency, and borders of organs, presence or absence of fluids, sensations, reflexes, etc.).

Inquiry, visual examination and listening to the patient's bodily functions can be effective with web-based technology. The major limitation seems to be the lack of direct physical touch. New technology would be required to perform palpation and percussion diagnostic procedures remotely. Alternatively, make this part of the training of nurse/ health worker who is in the room with the patient, working under the direction of the doctor.

Criteria for Virtual Care "kits" (budget +/-$5,000)

Point-Of-Care Side:

Compact / Portable / Affordable / Cloud based / easy to use.

- Laptop/Tablet or smart phone plus peripheral diagnostic devices such as specialized cameras, microphones, lights, bio-metric measuring devices, scoping devices with built-in light and camera such as otoscope, stethoscope.
- Kit should fit into a backpack for transport on a motor bike.
- Kit must be affordable- Total cost under $5,000.
- Cloud -based hosting by a large data storge company, such as Amazon AWS.
- State-of-the-art digital security and data back-up safeguards.
- A private office / examining room.
- Trained virtual medicine assistant.

Consulting-Doctor side.

- Any Laptop, tablet, or smart phone with high-speed internet connection

- Software must be easy to use. Difficulty level- Zoom or equivalent
- Doctor must be in a private environment for patient confidentiality.

Key Technologies

1. Connectivity: Access to broadband Internet connection for remote areas include cellular and/or satellite services. Starlink will soon offer high speed connections via low earth orbit satellites. Costs are about $500 for the set-up and +/- $100/month for the service. A lower-cost solution for villages which have a weak cellular signal is booster technology. an outside antenna on a tower or roof is pointed in the direction of the nearest cell tower. This is connected by cable to a signal amplifier and antenna inside the building. Systems cost $300 to $600 to set up, plus monthly charges from the cellular provider, which run $10 to $100 per month in Indonesia, depending on data use.
2. Hardware. Digital medical devices are rapidly becoming available at affordable prices. Handheld devices such as digital stethoscopes and otoscopes are often powered by a smart phone. They create shareable digital files, including sound files, live video, photos, and graphs. Some come with artificial intelligence to assist the clinician with interpretation of the data. List of common hardware includes Smart phones, laptop computers, handheld diagnostic devices, monitor screens, microphones, cameras, lights, and biometric devices.
3. Software & Applications:
    a. Video conferencing applications (such as Zoom Health or Doxy.me) permit clinicians, patients, specialists, pathologists, etc. to meet online, share documents, audio, video, images, or Power Point decks in real time from any place on the globe that has an online connection. In addition to online doctor-patient visits, virtual meeting infrastructure can be used to manage a network of clinics, and for webinars/continuing education classes.
    b. Electronic Medical Records (EMR) facilitate secure recording, retaining & sharing patient's medical history and test results with the medical team and patients. High quality open-source software (such as OpenEMR) is available for free or low cost. EMR may also include patient billing and secure messaging.

Future digital innovations such as artificial intelligence have the potential to improve the quality of diagnosis and treatment decisions. However, AI which can broadly diagnose patients is a future hope, not a current day reality.

Challenges Working Across Borders

Case study 1. Doctors Without Borders

Their program connects PCP (Primary Care Physicians) with 490 Specialists from around the world. All volunteers. Many of the consults are asynchronous (Not dialoging at the same time. a file is sent to the specialists/specialist replies within 24 hours with an opinion). Volume is 200-250 cases a month. Most-used specialties: Radiology, Pediatrics, Internal Medicine, Infectious Diseases. Work in low-resource communities where regulation of healthcare is often weak. Because it is a peer-to-peer system, have few medical licensing issues despite working across national borders. All medical consultants go through a rigorous vetting process which takes 60 days or more.

According to Dr. Said Fliti, Clinical Operations lead for Telemedicine at Doctors Without Borders, the 4 **biggest challenges** they encounter are:

- Provider behavior change- Get partners used to utilizing Telemedicine
- Internet Connectivity issues in remote areas
- Computer literacy
- Volunteer pool of medical specialists

Case Study 2. Dr Tobi Maurer runs Tele-dermatology program for pacific islands including Palau & American Samoa. Funded by grants. Like Doctors Without Borders, asynchronous peer-to-peer program. Uses a special purpose platform for dermatology. High quality imaging is essential 3,000 x 4,000 pix size. High volume practice. Tens of thousands of cases per year.

Challenges

- Low bandwidth/connectivity
- Reimbursement-financial models
- Convincing administrators that their current EHR (Electronic health Record) cannot handle needs of asynchronous tele-dermatology.

Conclusions for DVO. Telemedicine across borders is suited to peer-to-peer asynchronous relationships. In-Country networks may be most practical for synchronous clinical situations. Will require good broadband connection.

END OF REPORT

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Health Access Sumbawa Inc. is a 501 (c) 3 not-for-profit charitable corporation registered in USA, Australia, and Indonesia.

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The Ask: $10,000/year x 3 years challenge grant to be matched dollar for dollar by other donors.

To help fund a $65,000 pilot program to develop telemedicine for remote, low resource communities in Indonesia that have no access to doctors.