



GCRF demonstrate impact in developing countries: round
2, phase 1

Project 73108

**“Innovative Access to Healthcare for Impact in Remote
Communities”**

**Community Remote Healthcare Background
and Priorities Report**

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Introduction

The purpose of this document is to outline the health needs and priorities of remote Maasai communities in Northern Tanzania, specifically in the Simanjiro region where our project partners, OMASI are based. OMASI's strength of relationship with, and influence in, the local communities, and their strong relationship with local medical practitioners, international medical NGOs, and district health officials, makes it an ideal location to test and implement a medical teleconsultation system here. However, the approach and learnings should also be transferable to other ODA countries.

The STI4D human centered design approach ensures that the users needs and preferences are assessed throughout the development process. By understanding the health needs of remote communities, the feasibility of a tailored teleconsultation system can be evaluated, and the specific benefits explored. This is important to ensure a system is not designed for which there is no obvious user benefit.

A full understanding of the current healthcare system is required to fully contextualise community priorities, and highlight and infer their unmet needs. For this reason, a number of community engagement tasks were planned to build a background picture of the community healthcare situation, and from these, draw out the key healthcare priorities. These include:

- Two interviews with a doctor in Terat, who works with rural communities
- An interview with a doctor from Arusha
- Interviews with District Health Officials in the Simanjiro region
- Focus groups with remote community members, separated into women, elders (male) and youth (male). These were conducted in Kiruru and Loswaki, and a separate survey was carried out for one respondent in Ormoti.
- Interviews with disabled/marginalised individuals in Kiruru and Ormoti.

This information is complemented with independent research and information gained through discussion with other international health NGOs that operate in the region.

Existing Health System

Health System Structure

The ministry of health, through the regional secretariat, supports and facilitates the implementation of health services at the council level. It works according to a pyramidal referral system operating upward from the lowest (village) level. Patients are referred up if a more thorough examination is needed [5]. The types of services provided at each level, arranged from the bottom upwards, are as follows:

- Village level: Community dispensary
- Ward level: Health Centre
- District level and higher: Hospitals and specialized hospitals [1]

The doctor we are working most closely with in Terat, is at a community dispensary, consisting of 1 doctor, 2 midwives, 1 lab technician, some other medical attendants and a diploma-level pharmacist [2]. Patients come from surrounding villages at a 30km radius for advice and treatment [8]. There is also one private dispensary in Terat [2]. For specialist advice, patients may travel up to 80km to larger hospitals in Arusha [8]. In the surrounding areas, other villages are serviced by other community dispensaries. The neighbouring dispensaries to Terat have only nurses, and no qualified doctors [11].

The current system is faced with challenges from insufficient doctors [1], and insufficient funds. The dispensary's medicine supplies often run out due to high demand [2][10], and the cost of fuel means that the Terat dispensary generator is only turned on to operate the laboratory machines when there are many patients in one day. This makes obtaining accurate diagnosis and prescriptions difficult [2]. Addressing these shortcomings are a high priority, both for the doctor who struggles to make accurate diagnosis without machinery, and for the patients who are unable to buy the medicine they require for treatment.

Rural Clinics

Mobile clinics make visits to rural areas once a month, for routine pregnancy and baby check-ups, and vaccinations [1][4]. Officially, they don't take any other medicines with them [1], but the local doctor explained that during community visits, they are inevitably presented with many other illnesses demanding treatment, either from mothers and children, or from severely ill patients that haven't made the journey to his dispensary. He usually brings some basic medication, such as paracetamol, oral hydration solutions, eye treatments and antibiotics, so as to be able to treat these patients. Unfortunately, it is never possible to bring enough medicine for all the patients, in which case he writes prescriptions for them to buy privately from a pharmacy. The health issues tend to be the same as those which he sees at the Terat dispensary [4]. The high demand for treatment during the rural clinics highlights the need for more frequent, remote access to a doctor in these communities.

Reaching the remote community takes 3-4 hours on a motorbike (requiring 4L of petrol, approximately 10,000TSH), from the Terat dispensary. The villagers know the doctors schedule, so turn up once a month to be seen. A local church building is used for the appointments [4]. As the mobile clinic only visits one community, most community members still need to travel to reach a clinic and there is high demand for this service [8].

Although a remote teleconsultation system will never be able to replace these in-person, monthly check-ups, which require a skilled operator to administer vaccinations and diagnose any pregnancy complications, it would be useful for diagnosing other illnesses before they become too severe. Some patients wait up to a month for the local doctor to visit them at the mobile clinic [2], and the strong tendency towards local medicine can result in patients putting ineffective herbs on wounds in the meantime, such that by the time he sees them, the wound has become septic and irreparable [5][6]. Women at Loswaki told us they sometimes fail to go to Terat for their pregnancy check-ups due to the cost of transport [10]. A telehealth system could be useful to encourage patients to seek medical advice at an earlier stage of their illness, preventing illnesses reaching severe levels before being treated.

Outreach/Workshops

The current health system faces challenges due to a lack of acceptance of modern medicine [1], though this is improving as community members' education levels increase [5]. Outreach and education is done somewhat sporadically, sometimes during village meetings [1]. Both the doctor we spoke to from Arusha, and the district medical officer, agreed that more health education sessions would be a good idea, and video links may be able to assist with this [3][1].

Focus group respondents had mixed experiences on health workshops with one group claiming no health education was ever done, whilst others said they'd had both government workshops in the Terrat dispensary, and other private seminars on HIV/AIDS, coronavirus, diarrhoea and malaria. The malaria workshop on malaria treatment cost money, but the attendant felt it had been a useful experience [8]. Increased outreach/workshops do not appear to be a priority to community members.

Community General Needs and Priorities

From focus groups conducted in Oloswaki and Kiruru, and the single survey conducted in Ormoti, community members raised demands for the following health services to be available more locally. The time and cost required to reach health services at present, sometimes as far as 80km to Arusha for specialist treatment, results in many people turning to traditional medicines instead [8].

Top priority:

- Pharmacy
- Dispensary & Doctors
- Diagnostic Lab & Clinic for Mother and Child Services

Medium priority

- Ambulance
- First Aid
- Traditional medicines [8][9]

As can be seen, access to medicines and doctors are of the highest priority. Due to government regulations, the purchase of medicines is only meant to happen following a consultation, once a prescription has been obtained. Even if this is not enforced outside of the main cities, the guidance does mean that pharmacies are generally only set-up near facilities with doctors. Remote villages like Loswaki and Kiruru have no local access and must still journey into the nearest village with a dispensary/health centre in order to reach a pharmacy to purchase medicines [9]. Access to the pharmacy is difficult especially in the rainy season when the roads become flooded. The cost of transport is high for community members, and they fear wild animals if travelling at night [10]. The transport is particularly challenging in emergencies, both due to costs and availability of vehicles, and illustrates the need for a dedicated ambulance [9][10].

Our telehealth system could help address the need for doctors, but without additional infrastructure and supply chains, meeting the demands for medicines (pharmacies) and diagnostics will be more challenging, but not impossible. We would be unable to help with emergencies and ambulances.

Community Understanding of Health

Focus groups in Kiruru demonstrated that despite the claimed lack of health education, community members had a good understanding of how to keep healthy. They believed the following were important to maintain good health:

- Eating a varied and balanced diet including plenty of vegetables, fruit, meat and milk etc.
- Drinking plenty of clean and safe water
- Proper shelter to get sufficient sleep
- Having good clothing to avoid colds
- Peace and harmony with family and community
- Availability of health services (hospital, dispensary and pharmacy) and ease of accessibility to doctors and consultants.
- Good infrastructure like roads and electrification

The community members at Loswaki said they got most of their health education from programmes on the radio [9].

Disability Provision

There is no special provision in the health system for disabled people. They must pay the same consultation and treatment fees as other patients, and rely on the support of their friends and

family for their livelihoods. Due to the nature of physical disabilities, transport to see a doctor is even more challenging, and they need significant support. Medical insurance would benefit these patients who have to visit the doctor regularly, but due to either lack of information or lack of the initial upfront funds, most of them do not have it. Insurance would also still not cover the high transport fees [8]. For those with reduced mobility, a telehealth system could bring benefits, helping them to have remote check-ups without the need for long distance transport.

Main Diseases and Causes of Death

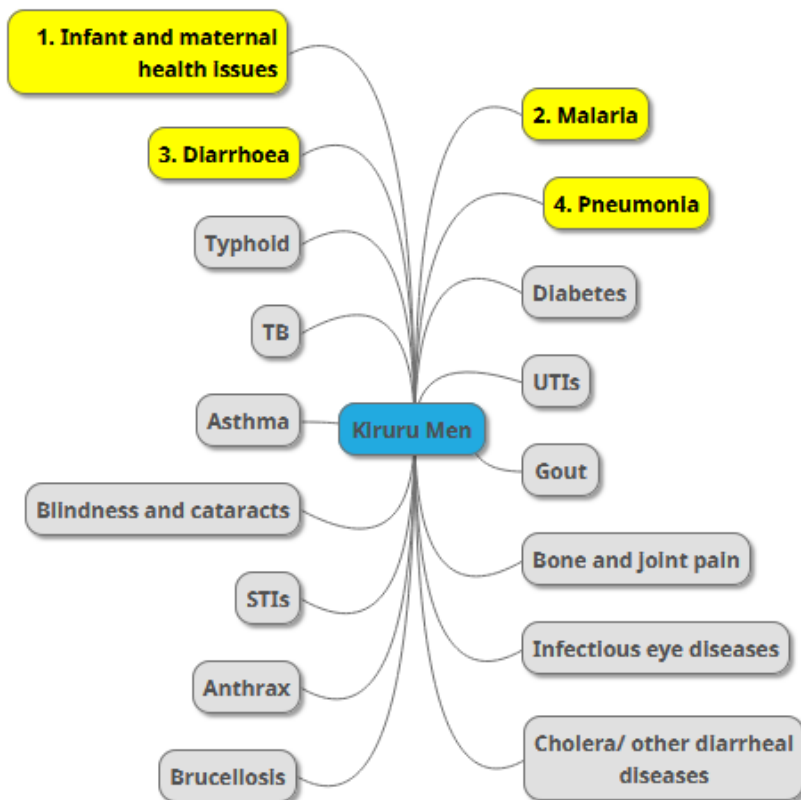
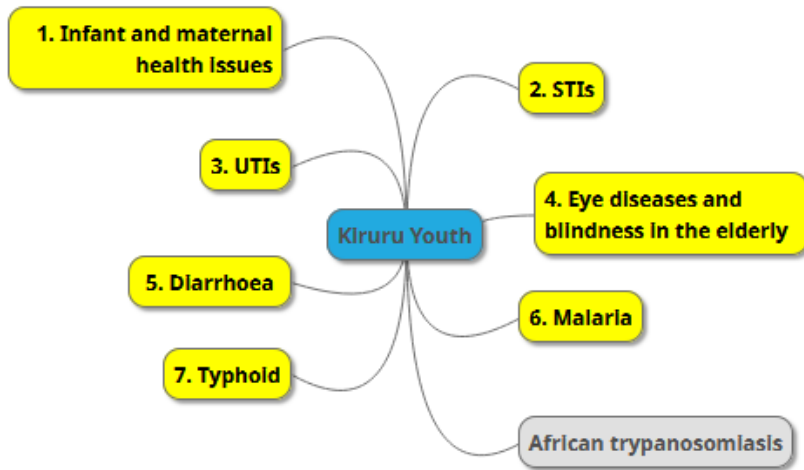
The WHO states that HIV/AIDS continues to be the leading cause of death for adults in Tanzania. Child mortality is usually from preventable diseases, including malaria, pneumonia, diarrhea, malnutrition, complications arising from low birth weight, and HIV/AIDS [5].

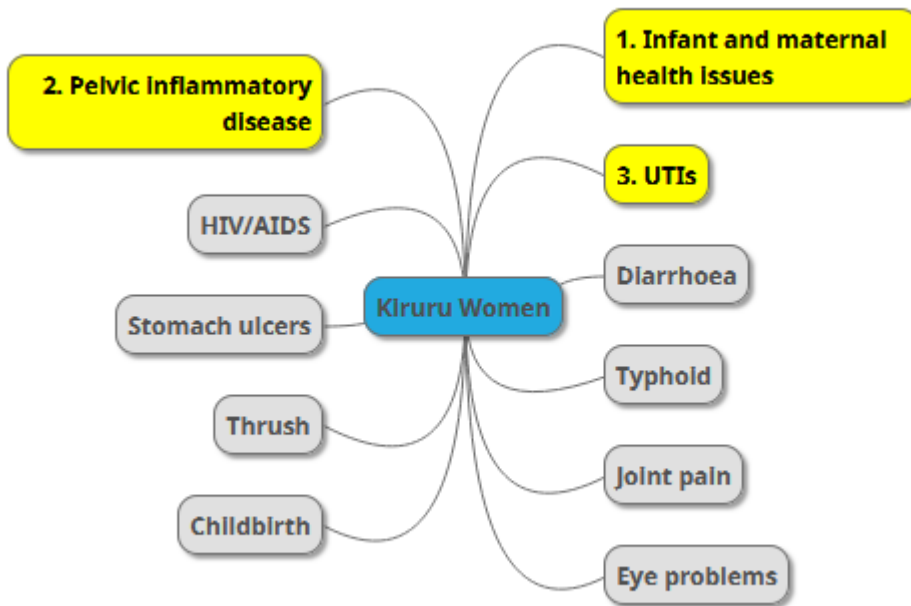
For the rural communities surrounding Terat, the doctor confirmed the prevalence of diarrhoea, pneumonia, and malaria, adding skin diseases along with eye and ear diseases in children as very common. The majority of these ailments could be diagnosed clinically through a remote video call, allowing the patient to buy the correct medication without making the journey into Terat. However, for some illnesses, such as malaria, laboratory blood tests are required, in which case the journey into the dispensary would still be necessary. Other tests, such as urine and blood sugar, could be done by a trained operator with the right equipment. For an accurate diagnosis, some skill may be required by the operator, e.g. listening to a patient's chest with a stethoscope if they have a cough [4]. Investigations into the use of digital stethoscopes to relay this audio to the doctor could be a potential solution, and the teleconsultation system would help patients confirm the long journey to the dispensary was really necessary before making the trek.

Other common diseases as stated on a "Top 10 Diseases" poster at Terat Dispensary during a visit in October 2020, included all of the aforementioned, plus STDs, Diabetes, Hypertension and UTIs. This was further backed by an interview with the Simanjiro District Medical Officer who stated that malaria, diarrhoea, anaemia, UTIs and infections of the respiratory tract were the most common [1].

Maternal mortality remains a problem, with approximately 44% of women coming into a facility to give birth, whilst local communities encourage traditional birth attendants [1]. This is something a remote health system is unlikely to be able to assist with, as childbirth complications would require an expert present, and video advice is unlikely to be sufficient.

Focus groups in Kiruru identified the following problems as the biggest health issues faced by community members. Diseases in yellow bubbles were further prioritised by the community members in the numbered order shown. The figures show that Infant and maternal health issues are the biggest challenge, followed by UTIs, diarrhoea and malaria [8].





Illnesses not only impact community members by preventing them from doing their daily tasks due to personal illness or needing to care for a family member, but seeking medical help can also take an entire day due to the distance they must travel [8].

Attitudes towards Mental health

Unlike in Britain, mental health in Tanzania is still a taboo subject, with most problems being ignored and hidden. Some people still believe mental health is linked to family curses and witchcraft [7], which means appropriate care is not given. Others believe it is caused by stress, family conflicts, poverty, and untreatable diseases [8]. Mental health is not a priority for the current healthcare system, as there are still so many deaths from more preventable physical (non-mental) diseases [1].

Appointments

Timings

As many remote communities have poor signal, or community members may not own a phone, bookings are not common for doctor appointments at the Terat dispensary. Patients know the doctor's schedule, so turn up to wait at an appropriate time. The same occurs during the remote mobile clinic visits [4][1]. Trying to impose a booking system would not work effectively for a teleconsultation system as patients are not used to turning up at a pre-specified time, and the doctor could be called away for emergencies, thus missing the appointment time. A high degree of flexibility will be required [3]. A schedule could be set up such that different specialisms are attended to during specific hours each day, and patients can call in at any time during the allocated consultation period. The local doctor estimated calls occurring over 1 or 2 hours, 3 days a week, with calls going through to the dispensary and then being forwarded onto a doctor or nurse when they are available [2]. The emergency use-case would also need to be considered, if the doctor is willing to take calls during evenings and weekends for extreme cases.

Emergencies

At present, patients travel to the doctor in an emergency. It is very rare for a doctor to leave the clinic [2][8]. Examples of emergencies include cuts with lots of bleeding and labour whilst

non-emergencies include conditions such as diarrhea and headaches [2]. There are stories of women going into labour at night and being unable to travel to the dispensary due to lack of money or lack of availability of transport. Those who do manage to find the funds can find themselves giving birth on the side of the road if they do not reach the doctor on time, and risk being attacked by wild animals [10]. Assistance in emergencies is therefore a high priority for community members.

A teleconsultation system would probably be unable to assist in an emergency, except perhaps to contact the doctor and enable them to prepare for the patient's arrival, if outside working hours.

Community members have some basic understanding of first aid for emergencies, cleaning wounds and bandaging them to slow bleeding, but hospital treatment is still necessary [8].

Gender

In the Maasai culture, women are not given much power to speak. If a woman is sick, then she will usually tell her husband who will talk to the doctor on her behalf. People tend to trust males more, so having only a male doctor on a teleconsultation call should not be a problem [4].

Community focus groups in Kiruru also demonstrated that people would be happy to get advice from a professional of any gender to get proper treatment, or to have another person translating in the same room. The women also said they'd be happy to express themselves to a different gender doctor, especially if a relative or husband was present [9]. This holds promise for community members accepting the presence of a trained operator in a teleconsultation room.

Costs & Payment

Patient Costs

The Tanzanian health system is subsidised and community health insurance is an option [3]. For children under 5 years, pregnant women, and elders over 60, healthcare is free, as are family planning services. [1]. The social welfare department also gives grants which are cheaper if a doctor refers you [3].

The local doctor told us that government insurance costs up to 6 people 30,000TSH per year (approximately £10). If the number of people in a family exceeds this, they would need to pay another 30,000TSH [2]. Theoretically, insurance covers all doctor's appointments, laboratory services and medications, but often government medicine supplies run out due to high demand. When this happens, the doctor writes a prescription for the patient to go and buy the medication from a private pharmacy. If this happens during a remote clinic, the patient will have to pay for transport to a pharmacy, as well as the higher cost of private medicine [4]. For this reason, the cost benefits of reduced transport needed to see a doctor via a teleconsultation system, may be outweighed by the costs of transport to a pharmacy and the cost of privately buying medicine. Unless medicine can be obtained at the same low prices as when received directly from the doctor, this may make the system less appealing to community members. Working out a way to deliver medicines cheaply must be looked into during the design of the system.

According to the local doctor, patients that have no insurance and do not qualify for free healthcare (as above), must pay 2000TSH to see the doctor, with an additional 2000TSH per lab test required, and 200TSH for an exercise book for the doctor to record their medical history (a one-time payment). Medicine and treatment are additional costs dependent on the illness. For example, in the case of a broken bone, 100000TSH must be paid at Terat to immobilise a fracture, and then additional payments are made when referred to Arusha for the main procedure [2]. The cost of

medicine from the doctor is likely still less than that from a private pharmacy [4], and there is no consistency between pharmacies on the prices they may choose to charge [8]. A private consultation with a doctor costs 10,000TSH [10].

The local doctor said that often people without insurance are unaware of its existence [2]. This aligned with the results of focus groups in Kiruru and Ormoti, where health insurance was never mentioned and its existence was not known [8]. Less than a quarter of residents at Loswaki village have insurance, and these are mainly families of people working for the government, who are more aware of the government insurance options available [10]. Focus groups in Kiruru claimed the consultation fee at Terat was 8000TSH to 12000TSH [8] (This was possibly talking of private doctors, or including the price of medicines). They must also travel 7-15km to reach the local dispensaries, costing an additional 12,000-20,000TSH in motorbike fees [8]. If they are forced to travel further afield to specialist hospitals in Arusha (up to 80km away), transport costs can be as high as 300,000TSH [8][10]. As transport costs are often equal to or double the cost of seeing the doctor, a tele-health system could result in significant savings.

The table below shows information on patients seen by the local doctor at the dispensary in Terat on a typical day (08/01/2021). The key statistics are:

- Distance travelled to reach Terat:
 - 19km average
 - 7km to 44km range
- Transport:
 - 100% stated motorbike as their means of transport
 - 21% also gave the option of a bus
 - 7% occasionally used a lorry (available on market day only)
 - 7% sometimes made the journey by foot.
- Time taken:
 - 66 minutes on average
 - Range from 30 to 190 minutes
- Transport cost:
 - 9,800TSH average
 - Range from 2,000TSH to 20,000TSH
- 57% of patients could have been treated remotely if the consultation had been done via video call.

Distance to Terat (km)	Time taken (mins)	Means of Transport	Cost of Transport (TSH)	Diagnosis	Would remote treatment have been possible?
7	30	Motorbike	7000	UTI	no
7	30	Motorbike or Foot	5000	Burn wounds	yes
10	45	Motorbike	10000	pneumonia	yes
10	60	Motorbike	10000	Diarrhoea	yes
15	90	Motorbike		Pneumonia	yes
15	30	Motorbike or Bus	7000 or 3000	diarrhoea	yes
15	45	Motorbike	7000		no
18	45	Motorbike	10000	Cut wound	no

20	30	Motorbike or Bus	5000 or 10000	Anaemia/ pediculosis	no
22	90	Lorry on market day or Motorbike	3000 or 20000	Pneumonia & skin infection	yes
25	60	Motorbike	10000	Scabies	yes
25	60	Motorbike or Bus	5000 or 15000	Skin rash	yes
30	120	Motorbike	20000	Cut wound	no
44	190	Motorbike	20000	Malaria	no

Patients pay in cash for medication and insurance, and their paper receipt helps the doctor identify who qualifies for insured healthcare when a patient is ill [4]. If payments are taken at a teleconsultation unit, there may be concerns over security due to the accumulation of cash. A compromise would be needed between how regularly the cash deposits are banked (requiring costly transport into the larger villages), or whether the cash simply accumulates until the doctor's mobile clinic visit.

Doctor payments

The government pays the doctor an allowance for the community visits, and covers the cost of transport [4]. The teleconsultation system is unlikely to be able to reduce these transport costs as the clinics still need a professional to administer vaccines and conduct the maternal check-ups. The economic and health benefits from early treatment of illnesses following remote diagnosis will be harder to prove, but has potential when presenting a case to the government for their support.

Prescriptions

The local doctor believes he could diagnose and prescribe medicines from a video consultation, however prescriptions for legal purposes should be stamped by a doctor [2]. This would not be possible remotely by conventional means, but there is potential that the operator could do so on the doctor's behalf, or a digital prescription could be emailed and printed at the operator station. Finding a way around the current government rules like this would require significant government buy-in.

Despite this, we have anecdotal evidence from patients that pharmacies will often sell drugs illegally without a prescription to make money. Patients are unwilling to make the full journey into the dispensary and so will visit a more local pharmacy to buy medicine directly [2][10]. They may also want to avoid the hospital consultation fees [8]. One patient claimed that pharmacies sometimes knowingly sell unnecessary drugs to patients to make money [6]. Even if prescriptions cannot be given via remote consultation, the patient can be advised by the doctor, and will not be fooled into buying unnecessary medication from local pharmacies, thus saving them money. Having easier access to a consultation to ensure they are buying the correct medication is a high priority for community members.

For many communities, the distance required to reach a pharmacy for medicine is equal to the distance to reach a doctor [8], so if medicine is required, the travel costs will be unavoidable, unless the tele-health centre can also sell medication. A remote diagnosis would however ensure that the travel costs are justified and the correct medication is sought.

Paperwork

Medical records from mobile clinics and dispensary appointments are all kept in paper form in the local dispensary. Every 5 years these are sent to the district hospital [4]. At the hospital level they are digitised [3], reported on and discussed by a committee. These records help inform future outreach activities [1].

Integration of Tele-Health System

General feedback from doctors so far has been positive [2][3] with the belief that it could complement the existing health system, and may be able to fit within the standard working hours of doctors, if approved by the government [4].

Government policy means there may be some security concerns regarding remote consultations, so ensuring secure platforms are chosen is essential [4].

Summary

The community needs and priorities research and report has highlighted that there is a market and commercial opportunity for a tele-health consultation system. Even if the doctor cannot treat the patient remotely, gaining an early diagnosis for illnesses could be invaluable for cases where patients are unwilling to travel and pay money to reach a doctor when they are unsure of the severity of their illness. More research is required into how it could fit into the existing healthcare infrastructure, and appropriate pricing for such a system.

One of the largest challenges that should be explored for maximum impact of the system, is how a remote diagnosis can enable patients to receive medication at a fair price. At the hospital/health centre/dispensary, patients can receive medication at a subsidised price following a prescription, subject to availability. If they do not visit the health centre, they may buy medicine from a private pharmacy, where prices are often higher. There may also be restrictions to the medication they can buy without an officially stamped prescription from the doctor's surgery. Telehealth trials have shown that medicine delivery from the subsidised dispensary and from pharmacies to the telehealth consultation point, following a consultation, is possible. Putting in place the infrastructure for a longer term, larger scale trial may be more complex, but early trial results are extremely promising and show that the community needs for medicine and healthcare can be met.

Appendix 1: Community Health Needs/Preferences from Oloswaki

The following figure shows the relative popularity of all services suggested across the health-focused SVTs in Loswaki. The diameter of the bubbles is proportional to the popularity of that service, represented by the number of counters assigned across all participants. The colour code demonstrates how many of the groups mentioned that service. The results show that the most popular health services required are **a pharmacy, ambulance, laboratory, women's doctor, x-ray service and lighting for medical purposes.**



References

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- [3] Interview with city doctor, Arusha, 21-09-2020
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