Table S1. Exemplary quotes corresponding to key concerns, practical challenges, and ethical complexities.

Theme	Example Quotes
Privacy and Security Concerns	"…Some of [the people from the communities] saw it in the movies—on the movies like action movies like using for shooting or like you know bomb explosions, for spying. Some people asked questions like, if doing something else apart from the drone supporting specimens and the medical supplies. So, it was a bit tough to explain that to the community." Participant 05

"…People were more worried about issues like privacy, were wondering maybe were worried that maybe we would have cameras on drones and maybe they would be taking pictures and stuff like that." Participant 12

"Their concerns are like, if they did not know the project yet but before they see the drone flying, that may be a problem if they do not know the project. But if they are aware there is a project using the drone, there is no problem because they may think the drone is suspecting or spying their land or resources or shooting the people, their kids. They may shoot the drone, or they may throw the drones like if they are not aware of the existence of the project." Participant 05 |
| Safety Concerns | "The biggest concern of course worrying about safety; the drone crashing on people, on property." Participant 10

"I think we just wanted to make sure that the drones were as safe as possible. To make sure that nothing happens. Because in general our goal is to try and improve health service delivery and the health of people, so naturally, we don't want—in trying to do that or testing some technology to achieve that in the process, we are able to—I mean we end up you know injuring people or something like that. So, we just felt that it was necessary to take all precautions to make sure that was safe." Participant 12

"My negative worry about using drone in Madagascar is about what—spy or in some problem of war or some problem of biological war, that's my concern of using drones because that's bad; that's my main worry." Participant 06 |
| The importance of context | "...The only thing we got was to stay away from the refugee camp very close to where we were planning to fly. And we were told by everyone to stay away from there because these are people coming from you know war torn areas in Africa and they will panic if they see a drone fly over their heads so it's best to just avoid the area completely instead of causing panic there." Participant 10
"Mining is one of the concerns in here, because some—not much, but some people from other municipalities might think that drones could be used to transport- a means of transport of gold from one field of extraction to one location..." Participant 06

"…I think in the urban centers, the people were more worried about issues like privacy, were wondering maybe were worried that maybe we would have cameras on drones and maybe they would be taking pictures and stuff like that. So, we were focusing on that aspect because it was like a recurring theme in the urban setting, whereas in the in the rural setting that was not the issue at all. They were more worried about that some people may not fully understand how it works and they may associate it with maybe some magic or satanism or |

	things like that. Especially that we're also talking about the drones cutting images to blood. Blood is the effervescent product." Participant 12
Skepticism of Drone Technology	"…The first time it was very difficult for [district health officers] to understand because they had not seen any examples. So, when they draft the letter of support for first time, it was very generic. So, we try to talk to them to write some specific details, but they were quite hesitant because they have not seen how the technology actually work in the field. In the first time, it was quite difficult, but now in the second time, they have seen how the technology works and what the technology is. So now in the second time, the draft—the letter of support is drafted in a more like positive way and they have mentioned some good things about the impact the technology have created in the society." Participant 03

"Yeah I think some of the community members were skeptical. You know I think—although I'm going to be hesitant to comment here because it was a period of time that town of Caledon where there was a change that had taken place and their dispatch just stopped. So, once we— now the drone project, there was some that said "well look they're taking away our EMS response and they're giving us drone like we're sort of an experimental area." Participant 07 |
| Lack of Resources | "And then you have a limited amount of funding, limited amount of time to get your project down, so you're not going to spend like 6 months in a community making sure everybody is reached just to do 5 days of flights." Participant 10

"You know the normal reaction would be like 'okay, okay, okay, okay, hold your horses, you know, I'm busy. I have people here in the clinic.' They would not say they don't have time to deal with the drones, they would just push back a bit. They would say "we have a lot of stuff on our hands right now,' you know." Participant 04

"We have only shown the drone, but we haven't given the full information like what is drone, how can we collect the sample, suspected cases. how is patient, how can we collect the sample from that patient, after collecting sample how health workers enroll, how drone take it , after taking, how it is examined in our GeneXpert machine, what will be the result, that result is again transported by drone to the health facilities. After coming to health facilities how we inform to the patient, after informing, how we enroll and treatment after treatment how do we cure and complete them. If we would have been able to show them [stepwise what the drone does] then that would have been much better. As it was a short time period project, all making videos, giving orientations, program implementation, all thing we have to do, so it is little bit not sufficient." Participant 14

"It is important to give a training for the community health workers, because they are the community—I mean like community health workers in the village, if we fly the drone for example to the village, we don't like have as many technicians to go to the field, so at least we have the community health workers to receive the supplies or to send the specimens in the drone. So, it's important." Participant 05 |
| Technical Challenges | "…We did not succeed on the flight test of the drones. We always failed on the test—on the flight test, so we did not progress to the training of the community health workers because of that situation. But if the drone works well, so even |

	the members of the DrOTS team should have been trained from this." Participant 05
	"…This 15% loss was mainly due to weather issues. That is, as you know when the drone does not arrive. It doesn't meet the flight plan for different reasons, due to storm issues, weather issues, so the drone returns to its base." Participant 13
	"Occasionally, I worry about that. I worry about that because the flat and the topography in here made me worry because if the wind and the weather are not good at all, that might affect to the explosion were the loss of the drone and part of the distance and remoteness and that's the worry to get the loss of samples with this." Participant 06
Lack of Guidelines and Regulations	"But [existing guideline] is not applicable or suitable for our drone project because we have to carry sputum and medication, which weight more than 2 kg and have to travel more than 4 km. We have to give services to those who are far from the health service sites. 4 km wasn't sufficient. Therefore, we could not follow that guideline and we modify it and implemented it." Participant 14 "No, actually in the Ministry of Home Affairs, previously, before we started this drones in health, there were only very broad guidelines about use of drones, so it was not very specific on what type of drones we were able to fly or what frequency we were able to take. So, there were not guidelines." Participant 08 "But now, few months back they came with new regulations. And as per the new regulation, if it is small drone, they don't need to go to home ministry, they can get a letter of permission from the district office; that means from the local level. Now the home ministry, the now trust the local level and if it's a small drone or up to 2 kg then the local level themselves can issue the permission. But if it is a bigger drone like what we are using then only the home—central level ministry will be involved. So over time they are also learning and revising the terms and conditions." Participant 03
Inability to Access Appropriate Stakeholders	"Yes, we have selected the school level student because in every house there are some students so that if the student will understand about that importance then they will make understand to their families, their relatives so that it would be understand by all people, so we are focused only school level also. And in that orientation, we are giving orientation to teacher also so that if student not understand teacher will help them understand and if teacher doesn't understand then district level will help them." Participant 09 "So, if you invite everyone from the community, it's not possible because it's a huge number of people that you need to explain to. So, what we did was we invited the local leader of each community. So now in [COUNTRY], we have this smallest administrative unit, they are called wards. So we invited the ward chairperson and ward vice chairperson. And through these people we try to convey our information to the community." Participant 03
Complexities of Informed Consent	"For rural villages, we don't actually give it out to each community because when they give permission, it's a collective permission whereby the village head speaks for each of the households, which are present in the community unless somebody speaks out and says that it's a no…and if it was a urban setting, we have one consent form, which is for each household where it asks 'Is it okay if we do this, fly over your property? Are you comfortable with that?'" Participant 01

"We need to have an engagement of the authority, because you know in Africa—I'm not going to say everywhere, but the person trusts to the authority. When the authority agrees to something, there are more person[s] who will agree. That's why we think that to obtain an engagement of the allowance of the authority, it will be more helpful." Participant 15

"One thing is that maybe they couldn't say no to [the ward heads], so because of that also [community members] agreed." Participant 08

Perceived Individual's Limited Understanding of Drones for Health Project	"The difficulties about introducing the drones was some misconception about the drone's purpose, in regard of some rumour and somethings in the village such as gold mining. Gold mining was the one that caused many rumours in the village. People thought that we were there to drone for mapping of a mine and something underground and that was the main difficulties and challenge we met as. Because the region where we have been, there was some company from abroad to extract gold in there, and people get confused about who we are regarding to those company exploiting gold in some regions." Participant 06 "…I go and talk to all of these communities, the one thing that I feel is the people that we are talking to, they are so innocent…and almost 50% or even more people who participate in community engagement workshop, they are usually illiterate. So, these illiterate people like they are so innocent that they don't understand technology so they cannot think about anything negative or they cannot foresee privacy and this kind of things. So, they are very innocent and if you explain them something in a good way, then they easily trust on you." Participant 03 "There is room for doubts, there is room for concern, and there's just a normal lack of information right so all we do—the importance that we see is making sure that everyone who sees it, everyone who engages with it, everyone who knows about it has the right information about the mission of the drone, has the right information about the nature of the drone, has the right information about what the drone does, what it does not do, and so on and so forth. So that's in a way, creates awareness into what is the service on and what it is doing to kind of alleviate any potential misconception of this new technology that is being used, so that's why it's important" Participant 16 "Some were concerned about some people, you know, maybe thinking that there is some involvement of magic or Satanism or any supernatural powers in the operations of the drones." Participant 12 "Actually, it's so new to everyone even including us. That people haven't yet understood what all this spectrum of harms and benefits the drones might cause. Because of this thing also I think even the municipality people aren't still aware about what harms also it can cause. Because of this, I think they aren't raising many questions on drones because they don't even know what it can do and what it can't do. So at the moment when I was working on the project, I think everyone was very curious and excited, but now if you go back to those people now and ask them, I'm sure they still have many concerns now—few concerns about this project because they now understood a little bit how easy it is or how hard it is." Participant 08 "Then doing this community sensitization, that's a direct extension because the less familiar people are with drones, the more work you have to put in to

	making sure they know what they are getting themselves into when they say "yes I would like a drone show up in my community." Participant 10
Aligning with community priorities	"…Drone might not be responding directly or immediately to what they need. And with regards of the importance and emergency of human needs, like those people who are struggling or finding out what to eat everyday...their priority is to hunt food and to sustain their livelihood, rather than seeing a device flying on the sky, which doesn't bring food to them. And that's quite difficult for people." Participant 06
	"The project was only about tuberculosis, and some people thought that with another diseases when our medical team said "you only treat tuberculosis" because that is the only disease that we have authorization from the Ministry of Health, and some people were kind of panicked, because they cannot have the treatment for their diseases, so it was a very difficult to face that situation in the community." Participant 05
	"I think we have to remember that sometimes as researchers or even as medical people, we think we know best. But the community knows best, so involving them early is always—is always a good thing. So, I think that we have to learn some of that; learn how to do that better in our research. We're not very good at it." Participant 11
Transparency and honesty in project management	"And it was a bit difficult to have the information because the drone did not fly to them and during the sensitization they know that we are using drones to transport the things but until we conducted the perception study – when we did the study with them and they said like "we are excited to see the drones, and the drone is not coming yet", so we can see like from the perception that some people are upset and disappointed." (Participant 05)
	"…You go in front of [the communities] and then you start talking about hi-fi technology and they have very basic health problems…in their community. So, I find that very difficult time and again. So what I do to avoid that situation is I try to be very honest from my side when I deliver the details of the work that we are trying to do because in this project like we don't tell that—when we give the presentation, we don't tell that the drones is going to solve all the healthcare problems. What we just tell is like it's just another means of transport like jeep or a motorbike, because in the monsoon and when you have bad roads motorbike and jeeps they cannot travel, so if you send a drone, it becomes faster. So, rather than telling like it completely changes everything, you have to be very honest and when you become very honest and tell the details of your project, then you don't feel like cheating the community. So, yeah that's how we do it." Participant 03