

The Paper Problem

Hi, I'm Yaw.

A few years ago, I did something kinda crazy. I paused my Ph.D. in computer science, put my stuff in storage, and moved to rural Rwanda to help re-invent how HIV/TB care was delivered to about 11 million people.

This is a pretty big task for a guy who is not from Rwanda and doesn't know anything about healthcare. Frankly, like most of my major life decisions, the whole move to Rwanda plan was not deeply considered.

I ended up contributing to a medical record system that has been adopted by the government and is being rolled out nationwide. So the Rwanda plan worked out great.

Anyway, as part of my experience in Rwanda, I spent a lot of time hanging out in hospital record rooms and that's when I discovered the paper problem.

The more data you have on paper, the more useless it is



This is the paper. And this is a hospital records room. This is the best case scenario. At least these patient records are in folders. And on a shelf.

All over the world, people collect data on paper. And there are good reasons for that, but at the end of the day, the more data you have on paper, the more useless that data is.

For example, you can't tell me how many of these patients have HIV without days of manual work. And the more patients you have, the more impossible the task becomes.

And as a computer scientist and programmer, the fact that the data is on paper deeply troubling. Ignore the life and death implications here. I mean, it's just so...inefficient.

Can't we just throw some computers at this paper problem?

No reliable infrastructure for computers



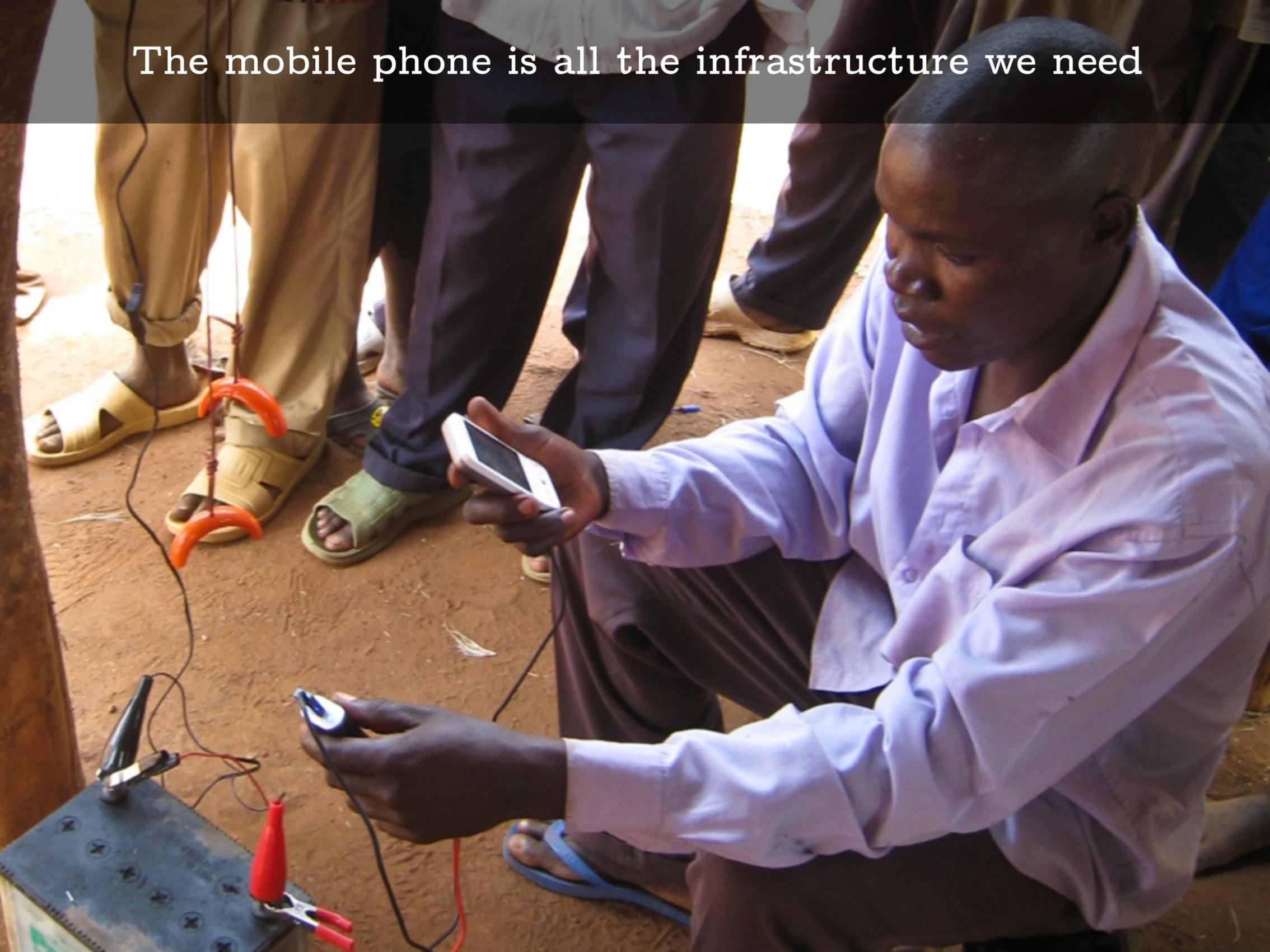
Well. No. This is a hard problem because these hospitals are in places like this. Places where there is no reliable infrastructure for computers.

Even if you have electricity, the power surges are so bad that your computer's power supply be shot in a few months.

And then good luck driving to town to find a replacement because when it rains, the roads turn into rivers of mud.

And yet...

The mobile phone is all the infrastructure we need



Even in places like this, it turns a fair number of people have cell phones. And they are not just dumb phones but smartphones that are easy to use and are basically mini computers.

And these phones work reasonably well in these environments. And because there is growing cellular availability so you can even connect to the Internet.

My experiences in Rwanda taught me that maybe the mobile phone was all the infrastructure we need to solve the paper problem. Not just in healthcare, but everywhere data was trapped on paper.

So that's how I became the guy obsessed with the paper problem. And that's what became my Ph.D. project when I returned from Rwanda.

And that's what drove the creation of Open Data Kit, the project I'm going to share with you today.

ODK replaces paper with phones. It's free. It's open source.

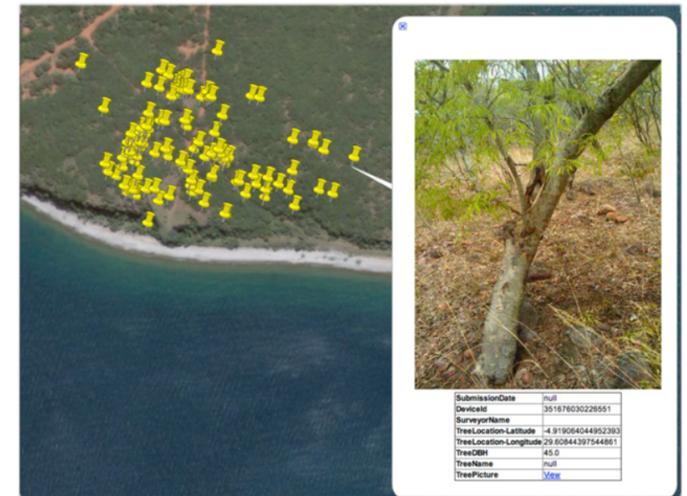
1. Build form

The screenshot shows the ODK Build Form interface. It features a menu bar with 'File', 'Edit', 'View', and 'Help'. The main area displays a form with four fields: 'First name' (text), 'Please record your location' (location), 'When is your birthday?' (date), and 'Please take a picture of yourself' (image). A right-hand sidebar shows the 'Properties' for the selected field, including 'Data Name', 'Caption Text', 'Hint', 'Read Only', 'Required', 'Kind', and 'Advanced' options. The bottom of the interface has a toolbar with 'Add new' and various field types like 'Text', 'Numeric', 'Date', 'Location', 'Media', 'Choose One', and 'Select Multiple'.

2. Collect data



3. Aggregate results



1371 → 1540 ↓

1541 → 1730 ↓

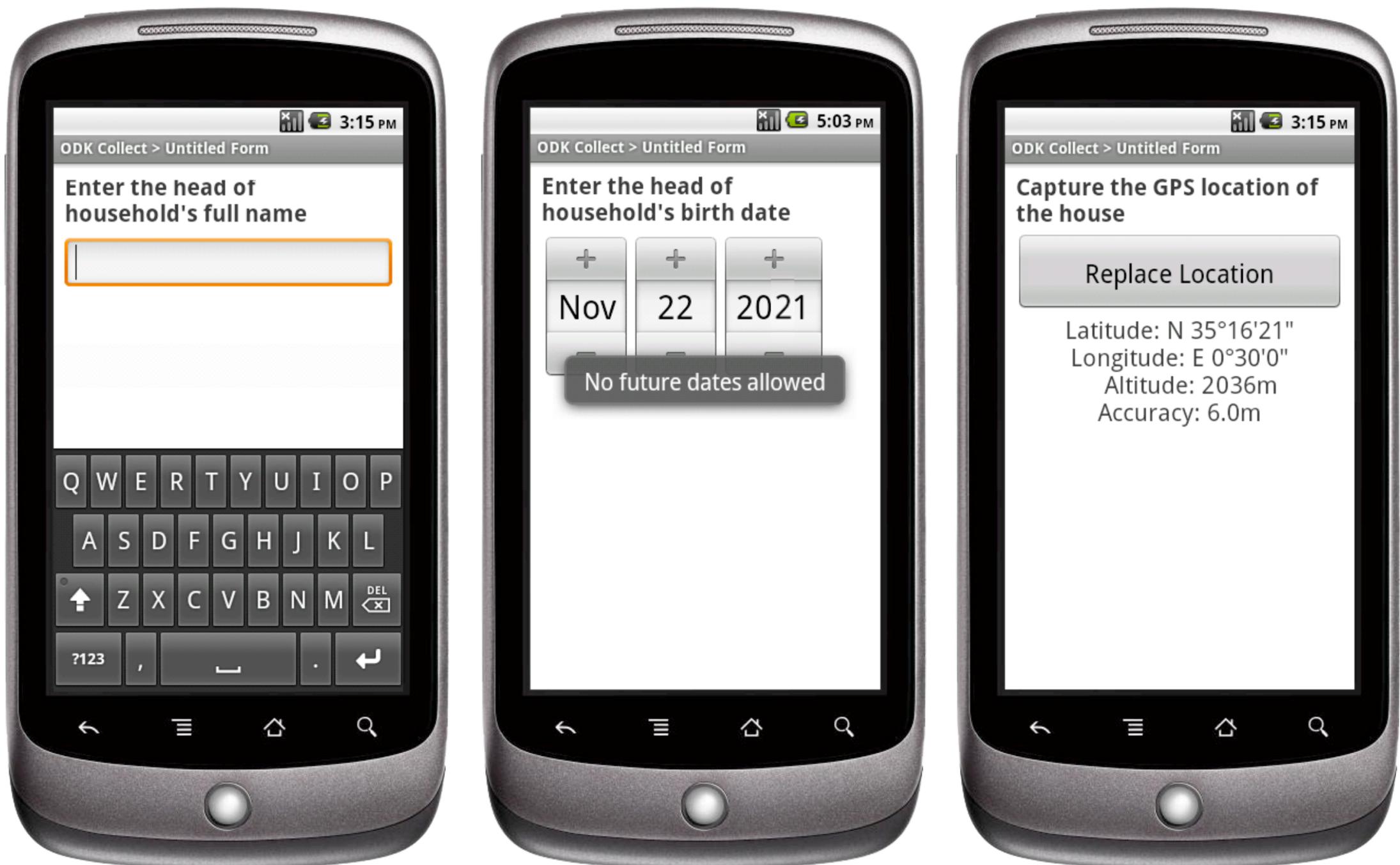
ODK replaces paper forms with smart forms on phones or tablets. It's great for mobile workers (e.g., rural nurses, building inspectors, census takers) who need to collect data.

ODK is totally free. And open source. And community-driven. And out of the box, it lets you:

1. Build an electronic form which replaces the paper form
2. Collect the form data on a mobile device
3. Aggregate the collected data on a server

It does much more than that, but that's the gist of it. And all of this is designed to work in the most challenging environments and at scale.

ODK enables faster and more accurate data collection



ODK enables faster and more accurate data collection through this super simple UI.

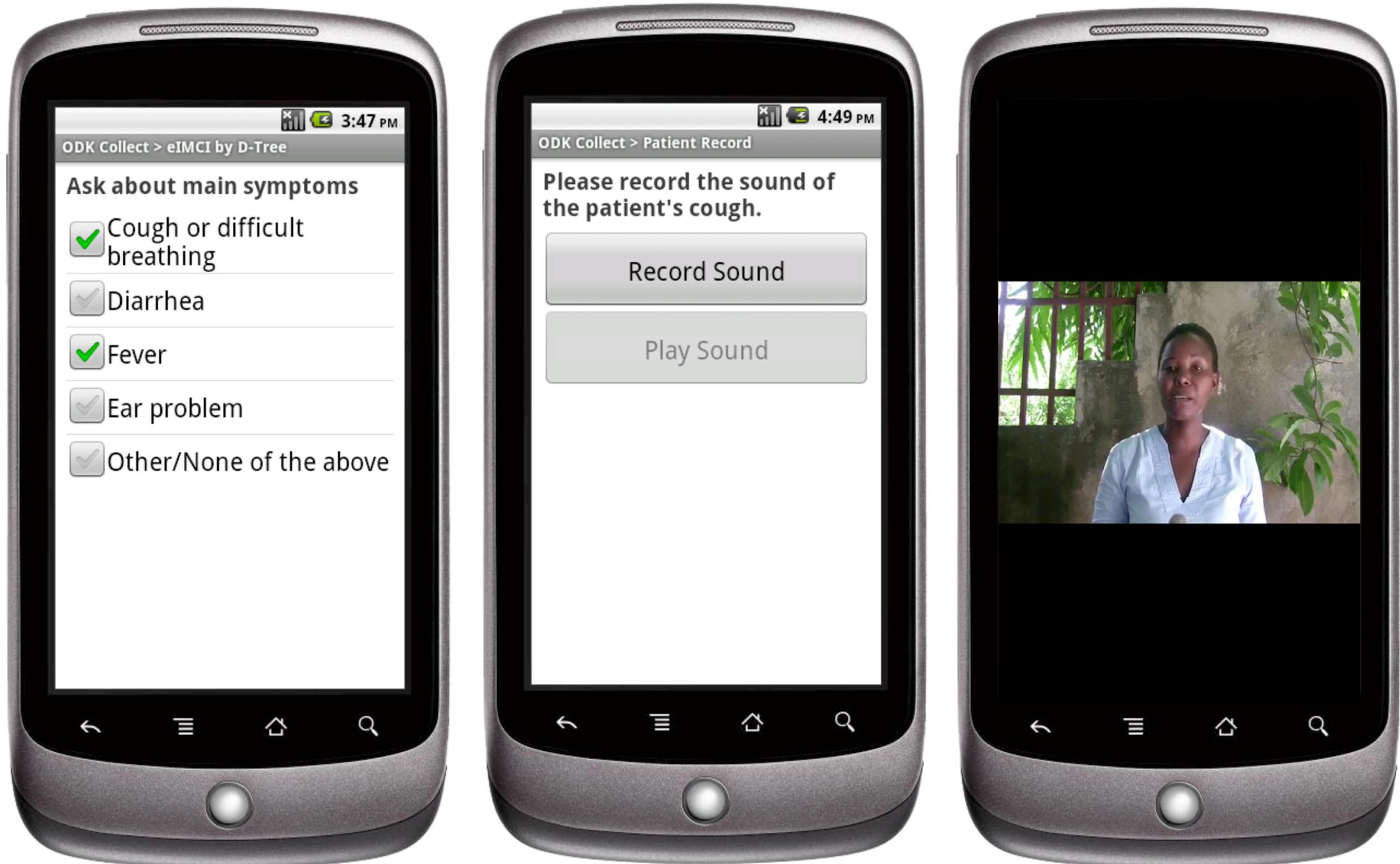
You can do things like collect text, numbers, and dates.

And you can put constraints on each entry so your data is more accurate.

And because we are on a phone, you can also capture GPS location using one click.

We even also use the camera on the phone to scan barcodes.

ODK can encode an entire workflow or process



ODK can encode an entire workflow or process into a form. So here is an example of IMCI in Swahili.

IMCI is the integrated management of childhood illnesses. It's basically a triage and diagnosis protocol for sick children under five.

My Swahili, like yours, is weak, so let's switch to English. With ODK you can do this on the fly.

And if I enter that the child is coughing and has a fever, in the next screen,

I can record the sound of the cough and add it to the form and then I can show the mother a video about how to treat fever.

So there is collection of data, but you really can put the entire workflow into the form.

Any data I gather can be stored offline and then be sent off to a server.

See your data and your impact in real time



DeviceId	351676030226627
SurveyorName	Shadrack
TreeLocation-Latitude	-4.9192410707473755
TreeLocation-Longitude	29.60762321949005
TreeDBH	57.0
TreeName	Myombo
TreePicture	View

On the server, ODK lets you see your data and your impact in real time.

There isn't one big server, you download an installer, and it configures one just for your organization. This way you control where your data lives.

Now that's nice and all, but when people find out ODK came out of a Ph.D. project, and that everything is free and open source, they start asking if the software actually works. Which is kind of funny, but also kind of offensive.

Well, yeah! ODK is used by tens of thousands of people who have collected millions of forms. I want to share some of the deployments that we know about in the sustainability space.

This map is from forestry workers with the Jane Goodall Institute in Tanzania. The process of them putting their form in ODK and starting this data collection campaign took them less than a day.

And in real-time supervisors can click on each yellow point in the map and get the data about chimp habitat.

Enables accurate, geo-tagged, multimedia rich data



And this is a really powerful tool because it enables data collection that is accurate, geo-tagged, and multimedia rich.

With ODK, the Surui tribe in the Amazon can do community-based forest monitoring, think REDD.

They can take pictures and GPS coordinates of trees, document the carbon that they have in their forests, and send that data off to a server, transform that data into carbon credits that bring income to their community.

And the end-to-end process is much easier and more verifiable than paper.

Enables collection of millions of data points in a few weeks



And you can do this at incredible scale, collecting of millions of data points in a few weeks

Carbon For Water wanted to distribute water treatment units to millions of people.

And as part of that distribution they want to scan the barcode of each unit, take some GPS coordinates, along with some socio-economic data.

The idea here is that if you can show that folks are not burning wood to purify water, that evidence can be turned into carbon credits that can monetized.

And it worked. They were able to deploy 4,000 phones with ODK to collect over a million forms in six weeks.

Only basic computer skills needed to use

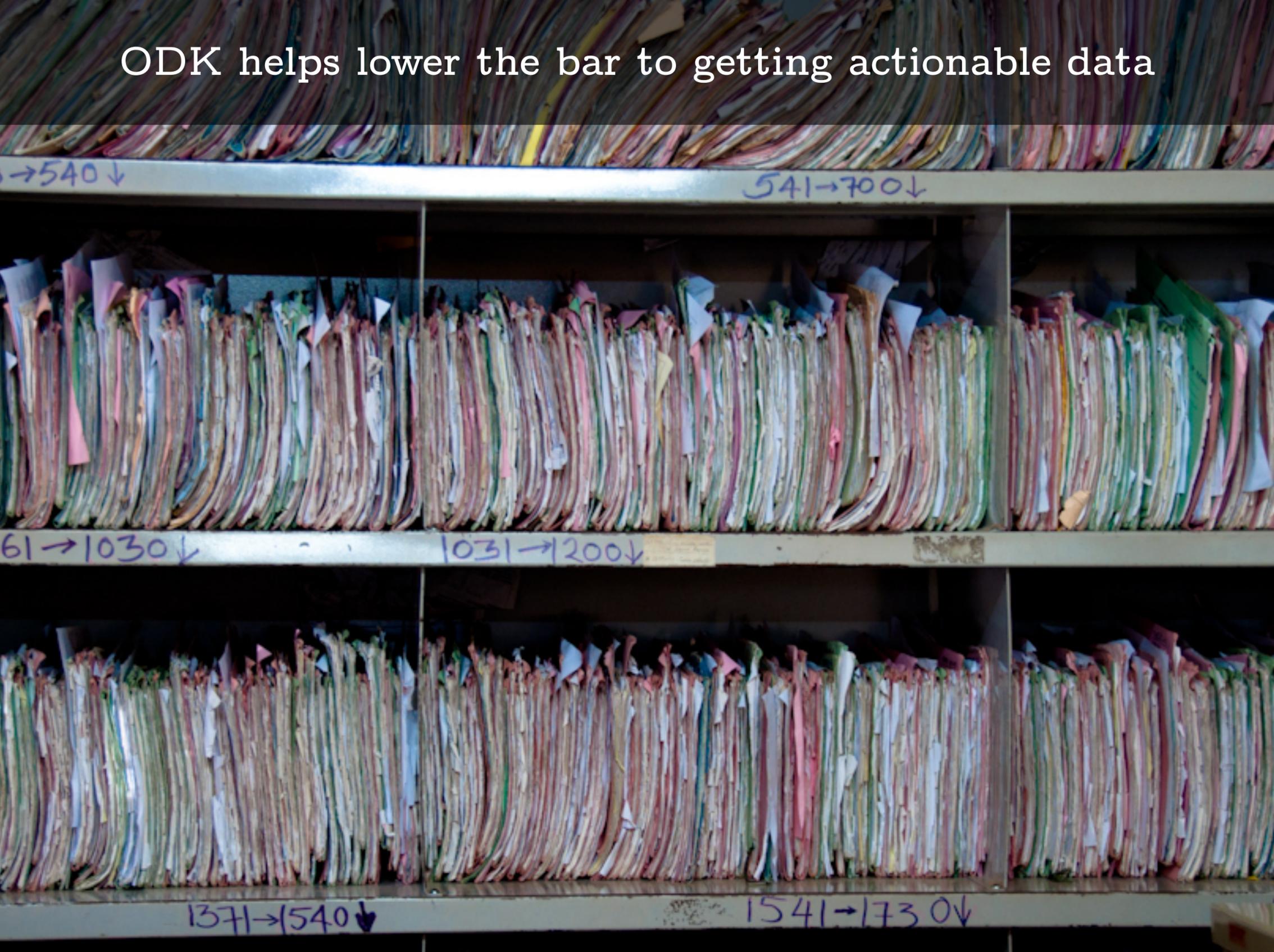


These tools only require basic computer skills to use and it works across sectors. Pretty much anywhere you need to replace a paper-based process, you can use ODK.

For example, the Carter Center uses ODK to monitor elections. They can now call a election fair or foul much faster. No need to wait for the paper reports to get entered into a computer.

They used it in Egypt, but we have users all over the world, even in places as remote as Tacoma. That's how you know it's really easy to use.

ODK helps lower the bar to getting actionable data



And at the end of the day, what really matters is that ODK lowers the bar to getting actionable data.

Remember these paper records I showed you earlier? This is from AMPATH, the largest HIV treatment program in Africa.

That hospital network serves 2 million people and they now use ODK.

At-risk patients get care in days, not months



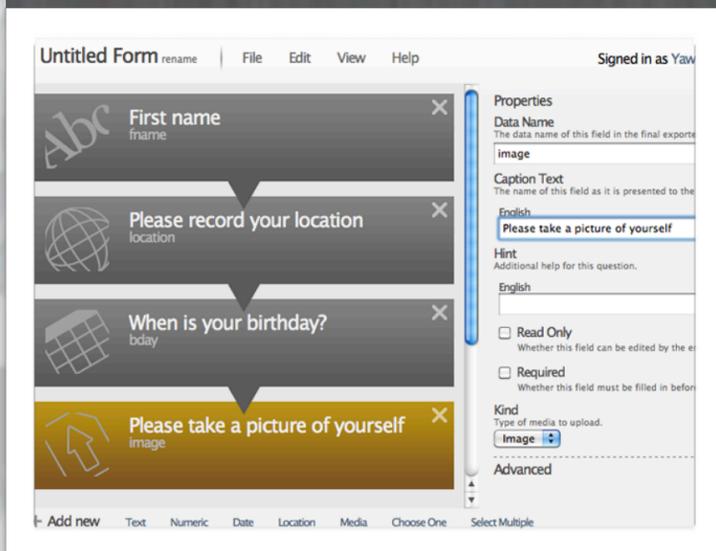
AMPATH's health workers have collected over 775k patient interactions with ODK. And it all goes into their electronic medical record system.

It now takes them days, not months, to identify at-risk patients who need to be on treatment. And the best part? It's cheaper than the paper system.

I'm almost out of time, so I want to end my story with this.

If you have a paper problem, try Open Data Kit

1. Build form

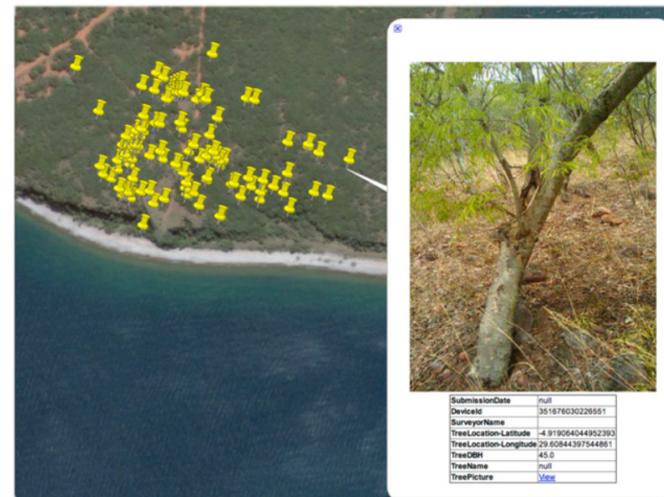


The screenshot shows the Open Data Kit form builder interface. On the left, there is a list of form fields being added to the form: 'First name' (text), 'Please record your location' (location), 'When is your birthday?' (date), and 'Please take a picture of yourself' (image). On the right, there is a 'Properties' panel for the selected 'Please take a picture of yourself' field, showing options for 'Caption Text', 'Hint', 'Read Only', 'Required', 'Kind' (set to 'Image'), and 'Advanced' settings. The top of the interface shows 'Untitled Form' and 'Signed in as Yaw'.

2. Collect data



3. Aggregate results



More about Open Data Kit at <http://opendatakit.org>

More about Nafundi at <http://nafundi.com>

If you are collecting your data on paper, you have a paper problem, and you might want to try something like Open Data Kit.

It'll give you the free tools you need to build a form, collect your data, and aggregate your results. You can find out more at opendatakit.org.

Nafundi, the company I run, builds stuff like ODK and if you want to find out more about what we do, go to nafundi.com.

And with that, are there any questions?