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We found ways to shorten the turnaround time for diagnosing babies with HIV

They say timing is everything. And in sub-Saharan Africa, where roughly a third of untreated HIV infected babies die before they reach the age of one, a timely diagnosis is everything.

By Jónas Oddur Jónasson 23 Jan 2018

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According to the latest UNAIDS data, 150,000 children are infected with HIV in sub-Saharan Africa, annua Due to the high number of children dying, diagnosing babies with HIV as early as possible is critical.

Public health officials have been grappling with this for many years. How can they reduce the time it takes get newborns' blood samples to the diagnostic lab and the test results back? This matters because it determines how soon babies can start medical treatment. The average turnaround time in sub-Saharan Africa often range from one to three months.

In general, shorter turnaround times can be achieved by improving the clinic-to-lab supply chain. This can happen through increasing the number of vehicles equipped to transport samples, hiring enough drivers, training enough medical personnel, buying the right type of diagnostic equipment, and improving communication systems.

African countries like Malawi and Nigeria have done this, with impressive results.

But as we show in our new study improving the day-to-day operations of clinic-to-lab supply chains is simp not enough. Sometimes the opportunities lie in the structure of the supply chain itself.

We came to this conclusion after evaluating the early infant diagnosis network in Mozambique. It's one of many sub-Saharan African nations struggling to improve its turnaround time for HIV testing.

We examined tens of thousands of cases in Mozambique right down to the original time stamps on sampl and the return dates of test results. Then we developed a tool to streamline this supply chain system. We found that some simple changes could improve the turnaround time and increase the number of infants

starting treatment.

An inefficient system

One of the biggest barriers to faster test turnaround times in Mozambique has to do with the network structure of laboratories and clinics. There are about 400 clinics in the country. These are assigned to laboratories based on governmental administrative districts. But these boundaries are drawn for political reasons instead of public health reasons.

As a result, one administrative district may be densely populated while another is sparsely populated. And this means that the workload at the various diagnostic laboratories differs according to the size of their surrounding populations.

If too many clinics send their samples to the same lab, they become congested and results are delayed. E if too few clinics send their samples to a given lab, the technicians have to wait longer to gather enough samples to justify conducting tests. This is because it costs just as much to test 100 samples as it does o sample – and the materials are expensive.

Changing the system

For our study we developed two models which captured the operational, medical, and behavioural factors affecting an early infant diagnosis network's effectiveness.

In the first model, we re-assigned clinics to labs to maximise the number of infants who start treatment, by minimising the turnaround time of results.

It showed us two important things. Firstly, a relatively minor modification reassigning some clinics to differe labs could decrease the average sample turnaround time by 11% compared with the current system.

Secondly, this increased the number of infected infants starting treatment by about 4%.

But we took our modelling one step further. In our second model, we wanted to determine if relocating the existing diagnostic machinery between labs could have an even larger public health impact.

What we found was that consolidating all diagnostic capacity in one centralised lab is optimal. Based on ou study we predict that consolidation could decrease the average turnaround times by an estimated 22% an increase the number of infected babies initiating treatment by 7%.

This result has implications, as consolidating diagnostic laboratories has been a much-debated issue in th field of public health in sub-Saharan Africa.

The bigger picture

Improving turnaround times between the diagnostic lab and the clinic and speeding up the initiation date fo HIV positive babies to start treatment boils down to using operations management to improve global healt

By shaving precious days, weeks and even months off diagnostic turnaround times, infants infected with H are able to get treatment quicker.

Whether it's reassigning clinics among the existing labs, or optimally reallocating the diagnostic capacity to centralised lab, improvements need to be made because timing truly is everything.

This article was originally published on The Conversation. Read the original article.

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