

# SOUTH AFRICA

## Pulse Oximeter Project

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*Managed by: Drs. Rick and Anita Gutierrez, global servants to South Africa*

### **What the project will do:**

The Pulse Oximeter Project will provide pulse oximetry devices and instruction to hundreds of at-risk and afflicted South Africans suffering in the COVID pandemic in 2021.

1. Local leaders equipped to train people in home pulse oximetry monitoring.
2. Devices are distributed among members of Christian churches, Muslim and Hindu families and lay health builders.
3. Persons with symptoms suggestive of COVID-19 will be targeted for pulse oximetry home monitoring so that early access to health care will be facilitated.

### **What your support will accomplish long-term:**

This project has one simple goal: to detect clinical decline in the early course of COVID infection for people who are still at home, and direct them to medical care at the appropriate time. The simplest tool to do this with is called a “pulse oximeter device”. While these are readily available in the United States, they are less common in South Africa and knowledge on their proper use is low. However, they are available through vendors at a reasonable bulk price of around \$10 US per unit. The accuracy of these cheaper units has been found to be acceptable (in the ranges at which we are concerned) with our population of at-home COVID sufferers.

The South African per-capita Coronavirus death toll since May 2020 has been the world’s highest as estimated by the South African Medical Research Council if excess non-hospital deaths are included. On January 28, 2021 the Washington Post reported that Phumla Mnyanda, who runs a 260-bed hospital in Eastern Cape’s capital, Bhisho, said social media posts had spread misinformation on ways to avoid hospitals where people were dying, keeping an even greater number of people from coming in when they first felt symptoms. As patients neared death, families would rush them to the hospital only to find that little could be done to save their relatives. “They were coming too late, and by then, their oxygen levels are very low, and you saw it dropping and dropping, and there is nothing we could do,” she said in a telephone interview. “People are so scared because there are so many that have died.”

An additional reason people are going to the hospital in late stages of their illness is that with coronavirus lung infection, people tend not to feel as sick as they really are until they have advanced pneumonia. Our pulse oximetry intervention is designed to equip people with a valuable tool to detect this early decline in oxygen levels as well as provide information on when to seek medical care.

The South African healthcare system is 3 tiered, and we are targeting people who would be in the public health system. People in this group would have very limited access to pulse oximetry compared to private paying patients with the best private insurance.

The table below shows the current COVID statistics for the Republic of South Africa. Please note that our province Kwa Zulu Natal is at the top of the list with the worst numbers.

## COVID - 19 STATISTICS IN SOUTH AFRICA

04 February 2021

#	Province	Active Cases	No. of Cases		No. of Deaths		Recoveries		Current Hospital Numbers		
			Total	New	Total	New	Total	New	Admitted	ICU	Ventilated
1	KZN	42 016	318 797	+973	8 925	+56	267 856	+949	3 031(-179)	460(-18)	232(+12)
2	W. Cape	12 631	271 187	+495	10 488	+41	248 068	+1268	2 236(-47)	354(+17)	177(+1)
3	Free State	8 771	76 997	+170	2 786	+12	65 440	+271	499(-9)	61(-6)	58(-1)
4	Gauteng	8 101	391 798	+908	9 504	+107	374 193	+467	4 508(-228)	868(-36)	515(+6)
5	North West	7 735	57 911	+263	1 216	+10	48 960	0	615(-2)	73(+1)	47
6	N. Cape	3 542	32 302	+118	597	+2	28 163	+464	329(-1)	35(-1)	45(-2)
7	Limpopo	3 302	58 958	+385	1 645	+58	54 011	0	454(-20)	37(-1)	26(+3)
8	Mpumalanga	3 281	66 350	+302	1 523	+30	61 546	+87	490(-52)	104(-1)	51(+3)
9	E. Cape	2 647	192 467	+137	10 871	+44	178 949	0	731(-33)	106(+2)	51(-4)
	<b>TOTAL</b>	<b>92 026</b>	<b>1 466 767</b>	<b>3 751</b>	<b>47 555</b>	<b>360</b>	<b>1 327 186</b>	<b>3 506</b>	<b>12893(-571)</b>	<b>2 098(-43)</b>	<b>1 202(+18)</b>

New tests	Tests for the previous 7 days						
31 032	W: 39 596	Tu: 28 942	M: 21 549	Su:34 076	S: 41 540	F: 47 345	Th: 48 406

All information has been obtained from the NICD, Department of Health and Provincial Departments.

twitter: @sugan2503

facebook: SA Daily Covid-19 Updates

Two animated videos will be used in the training: Understanding COVID-19 and Understanding How to Use a Pulse Ox in COVID-19 in English and Zulu. These are made possible by funding by a current Palmer grant. Two additional chapters in our Health Builder Training Manual on COVID-19 and on how to use pulse oximeter will be written and distributed to all trainees.

Training on pulse oximetry, its use in coronavirus infection, and answering community questions about vaccination will be conducted at partner churches and in Hindu and Moslem homes. We will also distribute devices and conduct training through the large network of health builders and agricultural workers that we are engaged with in rural and urban areas. We will coordinate this outreach with a Muslim charity organization called the Phoenix Care Foundation. Other distribution partners include the iZulu Orphan Project in rural Zululand, Poverty Stoplight in Cape Town and our Baptist partners associated with Faye Yarbrough in King Williams Town, Eastern Cape. These sessions will be conducted during the months of February and March 2021.

Initial funds from other sources will be used to kickstart this project; we hope that a rapid promotion of the project will facilitate the purchase of further equipment and supplies as needed, and in relationship to the current dynamics and degree of coronavirus active infection in our province.

It is imperative in the current crisis to extend training to all sectors of society in which we work. In this case, we also must not neglect to care for people within our local churches, as they are also suffering. We anticipate a roughly equal distribution of supplies amongst our church network, and specifically reaching our local Muslim and Hindu communities as well as the outlying African communities who tend to have non-traditional or no churches. Along with distribution of pulse oximeters and training materials with clear instructions, brief printed devotional materials with well-loved passages of Scripture pertaining to healing, recovery, the love of Jesus, and the Gospel will be included. We have named these devotional materials in honor of a member of our partner Baptists, Brother Rufus Frank. He died of coronavirus just hours after reaching out to us. He may have benefited from earlier pulse oximetry which was not available to him.

After we thought of this idea, we did a medical literature search to guide our thinking. Of note we see in the British Medical Journal that the UK National Health Service have purchased 200,000 pulse oximeters to use in the same way as we have proposed. Larger medical insurers in South Africa are making pulse ox devices available to their COVID infected customers but this represents the more well-off population which isn't the target of our intervention. Our plan is to distribute between 600 and 1500 devices in our local province. The scope of this project is large, and we feel this is an appropriate scale for us considering the high degree of current infections. I have copied the relevant text below as follows:

#### **Covid-19: Patients to use pulse oximetry at home to spot deterioration**

*BMJ* 2020; 371 doi: <https://doi.org/10.1136/bmj.m4151> (Published 27 October 2020) Cite this as: *BMJ* 2020;371:m4151

Patients with covid-19 who don't need immediate hospital attention but are at high risk of developing serious symptoms are to be given pulse oximeters to use at home to reduce the risk of serious deterioration, *The BMJ* has learnt.

NHS England is believed to have purchased around 200000 pulse oximeters for the scheme, which clinical commissioning groups across England will be able to access.

The initiative is set to be rolled out across the country over the next six weeks and is being led by Matthew Inada-Kim, national clinical lead for deterioration at NHS England and a consultant in acute and general medicine at Hampshire Hospitals NHS Foundation Trust.

NHS England has advised since the start of the pandemic that medical intervention is necessary if oxygen saturation levels began to fall.<sup>1</sup> But during the first wave it became clear that some patients developed "silent hypoxia," where desaturation occurred but they exhibited no obvious symptoms, such as shortness of breath or feeling very unwell. These patients tended to require invasive respiratory support and had poor outcomes.

Nigel Watson, chief executive of Wessex Local Medical Committees, which is expected to be one of the first areas to implement the monitoring at home scheme, told *The BMJ* that the evidence was now fairly strong that if oxygen saturation fell to 94% or 93% the mortality risk increased to around 13%, and if it fell below that level the risk would increase to about 28%.

The idea is to create "virtual covid wards" of patients at risk, such as people aged over 65 years or those under 65 with a chronic condition, and to monitor oxygen saturation through patients taking readings and relating these to their health teams, Watson said.

“If it starts dropping and particularly goes to 94%, then you’ll potentially take some action, which may include [the patient] being admitted to hospital.”

Pilot areas have used various arrangements to monitor patients. In North Hampshire a group of general practices employed two nurse practitioners to run the service, while in Southampton the local GP federation led the service. On the Isle of Wight the service was run by the local hospital.

“You have different delivery models, but essentially the pathway is the same,” Watson said.

Rob Barnett, chair of Liverpool Local Medical Committee, confirmed that in his area health officials were working on how “virtual covid wards” could be implemented to ensure admission of patients to hospital “before their levels have dropped too much to make the recovery almost impossible.” But he pointed out that this would put more pressure on the hospital system.

“As we monitor more patients in the community, we will know what the tipping point is for them to get into hospital, which is likely to be earlier than we might do if we weren’t monitoring them at all,” he said. “So, the recovery will be better, but actually I think it inadvertently means we’re going to have even more patients in the hospital.”

By using pre-printed materials and eventually animations for training of Partners, along with simple ‘report back’ forms, we believe that sessions of between one to two hours per partner site will be adequate to kick off the intervention. If we gave 5 devices per trainee plus five reserve devices for the site coordinator, we would only require about 60 to 150 trainees to distribute 600 to 1500 devices. We estimate that with five to 10 participants at each site we would only need to conduct between 10 to 20 primary sessions to distribute our entire initial supplies. From that point based on continuous communication, feedback, and epidemiological monitoring of local infection dynamics we would proceed based on levels of funding available to further provision devices in the most expeditious and beneficial fashion.

With our current workload of other projects and animation work, we feel there is adequate time to do the entire distribution in the 60++ days of May and June 2021. We hope that as the Covax vaccination distribution system begins in South Africa and people start to have an uptake of vaccination, the infection rates will drop and the intervention will be shifted downwards. Pulse oximetry devices carry a five year estimated lifespan, so future waves of coronavirus infection or newly emergent variant spread and disease will be met with populations which already have training and pulse oximetry and devices available. This anticipation of future waves of coronavirus is appropriate for our public health stance as Bethel Health Builders. It is also anticipated that because of our involvement with non-Christian communities specifically, we will advance our ability to train members of other faiths and share the love of Jesus Christ with them in the process.

Regarding the pulse oximeter devices themselves, we anticipate the system functioning as a lending library. As each pulse oximeter device is used by a COVID sufferer, as they move out of the acute infection phase and either recover or are hospitalized - the device will be sanitized and placed in a clean zip lock bag along with laminated summary of instructions on the use of a pulse oximeter for distribution to the next user. In this way, we hope that devices may change hands as often as five times.

<b>GOALS</b>	<b>PROGRESS MEASURES</b>
<p>Train and equip partner Baptist Mission Churches Health Builders for the rapid deployment of pulse oximetry amongst their social networks current COVID sufferers.</p>	<p>Sessions to be scheduled and arranged, conducted with physical distancing at Baptist Mission participating churches. Session will cover pulse oximetry, it's utility in coronavirus infection, recommended protocol for integrating pulse oximetry with the health care system. Records will include persons trained, number of pulse oximetry devices distributed, and narrative and written feedback reports on the utility of pulse oximetry intervention.</p>
<p>Training and equip non-Christian religious community groups such as Muslims, Hindus and African animists for the rapid deployment of pulse oximetry amongst their social networks of current COVID sufferers.</p>	<p>Sessions to be scheduled and arranged, conducted with physical distancing at non-Christian homes. Session will cover pulse oximetry, it's utility in coronavirus infection, recommended protocol for integrating pulse oximetry with the health care system. Records will include persons trained, number of pulse oximetry devices distributed, and narrative and written feedback reports on the utility of pulse oximetry intervention. Records will include families visited and a narrative report of their openness to training as future health builders and level of spiritual curiosity and willingness to engage in Biblical studies with us.</p>
<p>Train and equip network of distributed rural health builders, fruit tree workers, and poultry farmers already involved with our mission for the rapid deployment of pulse oximetry amongst their social networks of current COVID symptom sufferers.</p>	<p>Sessions to be scheduled and arranged, conducted with physical distancing at network of distributed urban and rural health builders, fruit tree workers, and poultry farmers already involved with our mission. Session will cover pulse oximetry, it's utility in coronavirus infection, recommended protocol for integrating pulse oximetry with the health care system. Records will include persons trained, number of pulse oximetry devices distributed, and narrative and written feedback reports on the utility of pulse oximetry intervention.</p>

<b>PEOPLE AND PLACES SERVED</b>	<b>INDIRECT BENEFITS</b>
<p>750Men 750 Women SOUTH AFRICA</p>	<p>Consider the direct participants and then reflect on the multiple of people who will be influenced or affected by the project intervention and share the indirect benefits.</p>

<p>Kwa-Zulu Natal</p> <p>Regional, Durban, North Coast, Natal Midlands, Zululand, Inanda, Phoenix, Queensburgh, Zululand, Western Cape Province, Eastern Cape Province</p>	<p>Indirect Benefit- Public health education on utility of vaccination and pulse oximetry used for home COVID sufferers: 1500 Men, 1500 Women, 1,500 Youths and Children.</p> <p>Goodwill built between Christian and non-Christian communities as we are seen to be sharing with others during a time of crisis freely. It is hard to assign the upside benefit of such altruistic behavior in a time of crisis. It certainly is the mandate of our Biblical heritage to do so. Jesus tells us to share and love our neighbors</p>
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