

BRIEFING PAPER

June 2017

Transforming Africa's capacity to detect, prevent and control disease



Africa needs better capacity for detecting, identifying and controlling disease. This is the best defence regionally and globally against diseases. This doesn't have to be expensive: there are cheap technologies available now that can transform Africa's capacity for controlling disease. Invest now and save lives, livelihoods and ecosystems.



Introduction: a continent poorly equipped to detect and prevent disease

Diseases in Africa cause death and devastation to lives and livelihoods on a massive scale. In 2015, an estimated 400,000 people died of malaria on the continent¹; in the same year, 800,000 people died of AIDS-related causes²; 25,000 people die from rabies each year³. Livestock diseases like Rift Valley Fever and Malignant Catarrhal Fever often devastate herds and livelihoods.

Studies show that 72 per cent of the disease burden in Africa is attributable to poverty and interactions between socio-economic opportunities and the health of animals, people and ecosystems, compared to 27 per cent in the rest of the world.⁴ Malnutrition, poverty, and the unequal spread of wealth make people far more vulnerable to disease.

Climate change, population growth, urban development and globalisation are creating conditions where diseases can spread even more easily.

Many African countries are poorly equipped to detect, prevent and control disease – let alone eradicate the sort of diseases stamped

out in industrialised countries many years ago.

There are many reasons for this:

- **Countries lack clinical equipment and laboratories.** Where these do exist, they are usually in cities far from the rural source of many endemic diseases.
- **Rural communities lack access to health systems and knowledge** to help them detect, diagnose and treat disease. This means they can easily misdiagnose and mistreat outbreaks, and so end up helping the disease spread rather than controlling it. This can also lead to antibiotic resistance.
- **Health systems for humans are poorly funded and badly monitored.** Many people are unable to afford to buy drugs. Many others buy medicines from unofficial chemists rather than government health services, leading to misdiagnosis, mistreatment and the further spread of disease.
- **People often lack trust in government health services,** after years of underfunding and poor quality. Instead they often fall back on their own knowledge and medical systems.
- **Certain cultural practices** can help spread disease – drinking unpasteurised milk and eating semi-cooked meat, for example.

¹ [World Malaria Report 2016](#) (World Health Organization 2016)

² [UNAIDS Factsheet 2016](#) (UNAIDS, November 2016)

³ Betty Dodet and others [Human rabies deaths in Africa: breaking the cycle of indifference](#) (Royal Society of Tropical Medicine and Hygiene, 2015)

⁴ Mark Rweyemamu et al [The changing landscape for health research in Africa: The focus of the Southern African Centre for Infectious Diseases and Surveillance](#) (*Journal of Veterinary Research*, 2014)



The impact of poor capacity and knowledge

Unless countries and communities can detect disease efficiently and quickly, the devastation can be immense:

- Diseases will cause more damage to lives and livelihoods, and could spread much further.
- Misdiagnosis and mistreatment can help diseases spread and lead to antibiotic resistance.
- A disease outbreak can decimate livelihoods, on a continent where most farmers and herders are uninsured.

The links between animal, human and environmental health are acutely affected by these threats.

Malignant Catarrhal Fever (MCF) is one example of a disease that devastates livelihoods in Sub-Saharan Africa, and is becoming more prevalent because of changing climate, development and living conditions. The disease used to be rare in Tanzania and be more prevalent in Kenya. Today, changes to the delicate balance between environment, wildlife, livestock and people are creating new outbreaks.

MCF moves between wildebeest and cattle and spreads when animals are young. The wildebeest migrate from the savannah northward into Kenya: there used to be so much open space that wildebeest and cattle would remain separate. Due to urban expansion, cattle are unable to move away from the wildebeest: the animals are brought closer together, and MCF spreads fast.

Similarly, cattle are now being kept in large numbers in the Luangwa valley in Zambia, bringing them into closer contact with wildlife, including wildebeest.

The disease is fatal for cattle. And for the Maasai who are dependent on livestock for food and livelihoods, it is devastating.

**“The disease becomes a hindrance to the Maasai’s access to markets, whether local or international. The poor get more entrapped into poverty because of disease of livestock.
It is a vicious cycle.”**

**– Professor Mark Rweyemamu,
Director, Southern African Centre
for Infectious Disease Surveillance
(SACIDS)**

Cattle are also affected by different non-fatal diseases, which can damage livelihoods: if cattle are infected, the Maasai won’t be able to sell their meat at market. Such diseases are also a threat to all those in the region who sell meat into international markets. An outbreak can ruin livelihoods.

As well as damaging livelihoods, this can also increase the numbers of animals has the effect of increasing the number of animals – because fewer are killed for sale – and this can upset the balance between wildlife, livestock and environment, potentially leading to further disease outbreaks.



Building up tech and capacity to detect disease

Africa needs better capacity for detecting, identifying and controlling disease generally and at source.

Many diseases originate in rural Africa – HIV and Ebola, for example. It can take time for these diseases to spread from rural to urban settings, but when they do, the devastation is immense.

One problem here is that the services needed to do this are often a long way from the source, presenting challenges for research and treatment.

SACIDS has been researching and devising systems for disease detection and control at a fraction of the cost of conventional laboratories. These include mobile phone-based systems for detecting, diagnosing disease and treating disease. This research will help Africa fix its health systems and build up resilience.

“Over and above looking at vaccines, we need to strengthen health systems. If we don’t, [treatment and prevention] are likely to be much more expensive.”

**– Professor Mark Rweyemamu,
Director, SACIDS**

A cross-sector response

Systems for identifying, detecting, treating and monitoring diseases are vital.

These need to operate across sectors. With Malignant Catarrhal Fever, for example, there is no point only focusing on wildebeest, or only focusing on cattle. Research and health systems need to span both, and to take into account how humans interact with the animals and their environment:

- How adept are they are detecting and identifying disease?
- What kind of treatments do they use and have access to?
- What role do cultural practices play in shaping attitudes to livestock disease?
- How effective are local and national systems for identifying and treating disease?

An African idea, African-led: Ensuring first-rate education and research for disease control

For far too long, frontline, high quality epidemiology and health research in Africa has been dominated by Western academics. SACIDS has been working to ensure African researchers lead their own studies and shape knowledge and understanding of diseases and public health on the continent.

“SACIDS is an African idea, African-led.”

**– Professor Mark Rweyemamu,
Director, SACIDS**

Since 2008, SACIDS has been building up



Africa's capacity to map, monitor and treat disease.

It has done so through increasing resources and knowledge in molecular biology, epidemiology and risk modelling.

Robust systems and knowledge of molecular biology are vital. Researchers and health services need to know what type and strain of disease they are dealing with, in order to decide what treatments to use.

“Molecular biology will remain central and important [to] building up capacity and a better understanding of the tolerances, disease ecologies and opportunities for health management appropriate for Africa.”

– Richard Kock, Professor of Wildlife Health and Emerging Diseases, Royal Veterinary College, UK

A new generation of academics

SACIDS supports Master's, PhDs and postdocs centred around core themes. It develops and delivers internationally competitive courses, and offers research development apprenticeships. SACIDS now has postdoctoral students working in positions of leadership in institutions across the continent, as well as “more and more young scientists confident to work in global setting”, says Rweyemamu.

SACIDS has established two One Health-based MSc programmes in molecular biology and analytical epidemiology – the first of their kind in Africa. The organisation has also helped Eduardo Mondlane University in Mozambique to develop an MSc in molecular biology and biotechnology.

This kind of science should no longer be treated as a luxury, with international researchers leading studies. African countries must be able to detect, prevent and treat diseases themselves, without relying heavily on foreign involvement. This also ensures that research is shaped by African priorities, not dictated by external influences and factors.

“Progress driven by SACIDS in improving opportunities for tertiary education [...] bodes well for Africans taking control of their own science [...] and making it more appropriate to their social, cultural and environmental context.”

– Richard Kock, Professor of Wildlife Health and Emerging Diseases, Royal Veterinary College, UK

“High quality science has



traditionally been treated as a luxury. The challenge now is to show it's a necessity.”

**– Professor Mark Rweyemamu,
Director, SACIDS**

Engaging with data

SACIDS also ensures data is stored and shared in a clear and accessible way.

African countries also need to overhaul how data is collected and stored. For example,

SACIDS teams have been using [Afyadata Manager](#), a tool that analyses field data and then sends feedback to the data collector, where it is analysed immediately. The system is intelligent enough to detect any abnormal pattern: if such a pattern is discovered, an alert is then sent to higher authorities. This is an open source tool: others can download, adapt and use it easily and for free.

Governments and institutes should also invest in systems for sharing data: openness and accessibility are vital to improving Africa's capacity for understanding, controlling and preventing disease outbreaks.

A brighter future

The SACIDS network has made important, exciting headway in developing the capacity of countries in East and Southern Africa to prevent disease and build resilience.

Now far more needs to be done by governments to build up the capacity of local people, researchers and government services to detect, control and prevent diseases.

If African governments are bold and imaginative enough to invest in education and research, they will transform their countries' capacity for preventing and controlling disease.

They will also lead the way in One Health, promoting research and solutions that build on a definitely African model of sustainable living and wellbeing.

At a time when the world faces unprecedented threats from man made climate change and population growth, Africa can and should show the rest of the world the way forward in living sustainably and protecting lives, livelihoods and the planet.



7 ways African governments can transform local capacity for disease prevention:

- **Invest in disease prevention**, rather than short-term fixes *after* crises break out
- **Support and create platforms** for researchers to pool resources and share ideas
- **Develop systems** for creating policy across sectors, taking into account different challenges and needs, and across borders
- **Invest in technologies** to make this happen: there's still a myth that technology is expensive. This is no longer the case. Invest a little now, save millions in the future
- **Invest in communications infrastructure** to improve collaboration and speed up disease diagnosis
- **Support local people** and their access to smart phones, simple tech and government services
- **Be bold!** One Health makes social and economic sense. Show others the way forward

“I hope that as Africa develops on its own terms, it will [...] promote a very different and more sustainable vision for the future of humanity and the environment.”

– Richard Kock, Professor of Wildlife Health and Emerging Diseases, Royal Veterinary College, UK

Notes to editors:

- [SACIDS](#) (the Southern African Centre for Infectious Disease Surveillance) is a virtual centre with a physical base at the Sokoine University of Agriculture in Tanzania. It was established in 2008.
- Funders: Wellcome Trust Grant WT-087546/Z/08/D and IDRC Grant 107030-001
- All photographs © Ivan Gonzalez
- Written by Imogen Mathers from imogenmathers.com
- For more information, please contact Yunus Karsan on yunus.karsan@sacids.org