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Kericho County Mitigates the Inadequacy of Reagents by Using Radiology to Test COVID-19 and Initiate Treatment on Time

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Authors (contacts and their institutions can be included as well)	Jane Kimbwarata, Senior Knowledge Management Consultant, COG Supported by: Peris Njibu, Health Officer, CoG Yvonne Ogwang, Communication Officer, COG Gerald Muka, Communication Officer, CoG		
Resource Persons (include their designations)	H.E. Prof. Paul Chepkwony, Governor Kericho County Dr. Shadrak Mutai, CECM Health Dr. Betty Langat, County Health Director Dr. George Muia, Medical Doctor, Kericho County Ms. Beatrice Koskei, Nursing Officer, Kericho County Mr. Peter Korir, Nursing Officer, Kericho County		

Introduction (Context and Challenge)

Soon after the Coronavirus hit Kenya in March 2020, the Government initiated mass COVID-19 testing but soon scaled down the testing citing reagents stock-out. The Health Cabinet Secretary confirmed the shortage in his August 10, 2020, daily COVID-19 update, saying that as it sought the help of embassies to secure reagents, the government had directed the Kenya Medical Research Institute to manufacture coronavirus testing reagents as a global shortage persists. The Ministry of Health, as a strategy, prioritised the testing of the elderly, those with underlying health conditions and patients presenting symptoms. The daily updates by the Ministry continue to give new infection numbers, pointing to the need to test as many people to curb the spread, especially asymptomatic patients who risk spreading it to unsuspecting citizens. The shortage has been causing delays in releasing results for samples picked from across the Counties, with some patients succumbing to the virus due to late treatment, especially if they had underlying conditions. The decline in testing also affects actual infection numbers since widespread testing can provide a better picture of the spread of COVID-19.



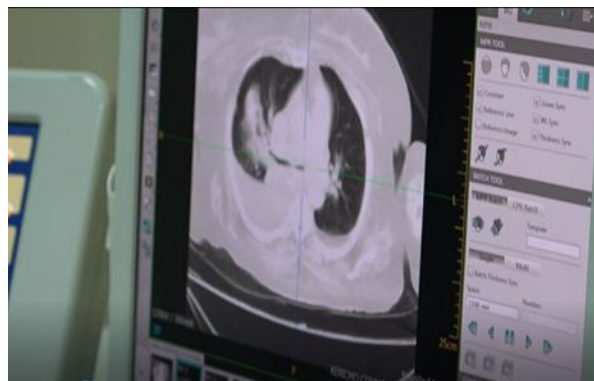
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Kericho County like all other Counties has been experiencing a shortage of reagents and causing a surge in the spread of the virus due to delayed testing, thus risking patients' lives, especially those with underlying conditions. Doctors at the Kericho County Referral Hospital came up with an ingenious solution to continue testing without using reagents. Doctors there are using CT scan to determine the status of suspected COVID-19 patients. So far, 99% of cases confirmed positive using CT scan have turned out positive using the reagents. COVID-19 positive patients show a unique pattern in the lungs that diverges from that of asthmatic patients or any other patient with a respiratory condition.



An abnormal CT scan image of a COVID-19 infected lung

Coronavirus continues to affect the citizenry in Kenya up to the grassroots level. Most economic activities have ground to a halt. Persons with underlying conditions are most affected while asymptomatic patients were as well affected.

Patients with suspected COVID-19 infection are at high risk of dying from it if they don't receive timely and quality medical care. Where there are no reagents, this is the likely scenario. Even when reagents are available, it may take 4 days for the results to be received, by which time the patients' condition may have worsened leading to deaths. Early recognition of the disease is essential for the management of these patients.

Implementation of the Practice (Solution Path)

Since CT scan is important in the diagnosis and treatment of lung diseases, including COVID-19, Kericho County Referral Hospital radiologists' review of follow-up chest CT scans for patients who had confirmed COVID-19 had revealed abnormal CT imaging features such as ground-glass opacity appearance with consolidation patterns in the lungs. And given the shortage of reagents, the radiologists decided to rely on CT imaging alone to identify the virus and begin treatment. This led to the successful treatment of the patients, saving many from succumbing to the virus.



Kericho Governor, Prof. Paul Chepkwony explaining the initiative of using CT scan to diagnose COVID-19



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Besides, serial CT scans are used to observe the different radiological patterns at different times throughout the disease course to determine the efficacy of the treatment.

Where doctors stayed away either because they were in the high-risk group or were stationed in other medical facilities, they were sent the CT scan images using telemedicine and were able to remotely diagnose COVID-19, thereby allowing for initiation of treatment.

The hospital did not incur extra expenses as the hospital already had the CT scanners. Further, the County Government uses its own doctors to do the testing. CT scan is a cheap but very effective first-line diagnostic tool for COVID-19. The patients pay a minimal fee of KES 200 which is used to sustain the service. The CT scanners are occasionally serviced by local engineers to ensure they are always in good working condition.

Results of the Practice (outputs and outcomes)

- Between November and December 2020 alone, over 50 patients had been diagnosed with COVID-19 using CT scan and successfully treated.
- Motivated by the successful treatment following CT scan diagnosis, doctors in Kericho continue to use the CT scan and DNA machines (for PCR testing) to save lives.
- Kericho County has also developed the capacity of private hospitals which have excellent facilities, to help in the fight of the virus.
- The surge in COVID-19 cases has been brought under control in Kericho.
- The County Government is supporting other Counties with their testing. Patients from other Counties are allowed to access services from the Kericho County Referral hospital.

This initiative yielded positive results because:

- Combining assessment of CT scan results with clinical and laboratory findings facilitated early diagnosis and successful treatment of COVID-19 in over 50 patients.
- Also, due to inadequate supplies of reagents, the radiologists relied on CT scan testing of the lungs to correctly diagnose COVID-19.
- The CT scan results are efficient and instant, as images are immediately available for review. In case reagents are not available to verify the results, patients that turn out positive using the CT scan are put under home-based care or referred for hospitalisation immediately.

Lessons Learnt

- COVID-19 manifests with chest CT imaging abnormalities, even in asymptomatic patients, with rapid evolution from focal unilateral to diffuse bilateral ground-glass opacities that progress to or co-exist with consolidations within 1–3 weeks. Combining assessment of imaging features with clinical and laboratory findings facilitated the early diagnosis of COVID-19 pneumonia.
- Since most COVID-19 patients have abnormalities on chest CT images at the initial presentation, imaging features combined with patients' exposure history and onset symptoms facilitated the identification of the suspected patients for further examinations, thereby saving on the use of the limited reagents.



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- Treatment of County health workers in a single facility and giving them specialized care. This ensured that they received good medical care and out of the 115 COVID-19 positive cases among health workers, none died because of the disease. Those admitted and treated were 18 and the rest (97) received home-based care.
- Availing quality PPEs to the health workers ensured minimal infections among them. Of the 115 positive cases among health workers, none contracted the disease in the work environment.
- The use of reagents worked well. However, the reagents are very expensive and the expense is transferred to the citizens.
- The use of CT scan is affordable and effective way to diagnose COVID-19, especially when faced with a shortage of reagents.
- COVID-19 is a vicious disease that requires mobilisation of collaborative action to fight it. Developing the capacity of private hospitals, which have excellent facilities to help fight the virus, is a crucial mechanism.

Recommendations (Conclusion)

- Combining imaging assessments with clinical and laboratory findings could help to identify COVID-19 infections early and initiate treatment.
- When faced with a shortage of reagents, CT scan results can still give enough evidence to suggest COVID-19 infection.
- While X-ray and CT scan can be used as diagnostic tools for COVID-19, the CT scan can diagnose the early stages of COVID-19, unlike the X-ray which diagnoses later stages. Both methods are instant, thus quicker than PCR testing.
- Work with what you have to save lives. You can either use clinical examination and patients' history or lab tests or CT scan or all three to diagnose COVID-19.
- Make use of telemedicine by collaborating with other medical facilities that have resources that you lack. Kericho uses a teleradiology platform where a doctor situated anywhere in the world can view images taken at hospitals in Kericho to diagnose the problem.
- Radiologists can use a CD to save the radiology images for doctors instead of a film, thus creating efficiency because the scan gets to the consultant doctor before the patients gets to the doctor. This way, the hospital uses fewer resources and saves money crucial to sustaining the service.
- Capacity-build your medical staff to be able to use available MES equipment donated by the National Government to save patients' lives. Kericho doctors are very well trained and are allowed to go for further training on request.
- Encourage behaviour change among patients by sensitising them to the Ministry of Health/WHO COVID-19 protocols. At Kericho, patients are required to wear face masks before being served. Continuous community sensitisation on the protocols is done. The County Government collaborates with the County Commissioner's office to arrest those who defy the measures in place.
- Do not sit back for lack of reagents. Use CT scan and save lives.



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Photo 1 and 2: Kericho County Radiology Unit