KENYA MEDICAL RESEARCH INSTITUTE



EVIDENCE BRIEF

Emerging and Re-emerging infections; Surveillance, Diagnostics and Control

KEY MESSAGES

- The good surveillance system is useful, simple, flexible and representative.
- A one health surveillance system should be implemented to create awareness of known and unknown cases, emerging and re-emerging infections.
- Screening and diagnostic tools are readily available for early and effective detection of infections.
- Sustainable human and financial investments are key properties that can effectively integrate surveillance and diagnostic activities within the health system.

BACKGROUND

Public health surveillance is the systematic, continual collection, analysis, and interpretation of health data for the purpose of planning, making decisions, implementing, and evaluating public health activities ¹. For the quick identification and response to epidemics and outbreaks, effective public health monitoring systems are essential. The District Health Information System 1 and 2 (DHIS 1 and 2), a more resilient and integrated system, replaced Kenya's standalone web-based public health surveillance system in 2016².

In order to measure the illness burden in communities, identify outbreaks, and gauge the effectiveness of health interventions, the Centers for Disease Control (CDC), Kenya, supports the development and implementation of facility- and population-based disease surveillance systems³. A leader in cutting-edge and portable data gathering technologies is CDC Kenya. One of the most notable instances of the CDC's efforts to enhance health systems, develop sustainable public health infrastructure, and utilize data to influence policy is its assistance to the Government of Kenya in establishing national level monitoring ³.

To effectively combat disease at the population level, there must be a coordinated, all-encompassing understanding of and reaction to the disease. Countries rely on monitoring programs to develop this deeper insight. On the basis of the idea that the more a disease is understood, the more successfully it may be treated, surveillance programs are created to identify, confirm, report, and respond to new instances of illnesses of concern, emerging, and re-emerging infections ⁴. A potent tool in the battle to contain or eliminate illnesses like malaria that can be prevented by vaccination is surveillance. Following up with repeat vaccines and other interventions is made feasible by monitoring by locating pockets of vulnerable population that persist after an initial mass immunization program ⁵.

OBJECTIVE

Rapid evidence summary to highlight the surveillance and diagnostic control measures taken in studies conducted in various settings in Kenya and the larger East Africa presented during the KASH 12th, 2022, towards emerging and remerging infections.

SETTINGS

We looked at 8 studies from various parts of Kenya including Baringo, Kajiado, Kisumu, Nandi, Mombasa and Kwale counties. One study was conducted in selected health facilities within East African Countries such as Kenya, Tanzania and Uganda.

STUDY ABSTRACTS SELECTED FOR REFERENCE

Author	Title of presentation	Key Findings	Conclusions/Recommendations
Githinji G <i>et al</i> 2022	Capacity to conduct infectious disease surveillance: An investigation of suspected malaria outbreak in the epidemic prone Nandi County	Increase in cases in previously no malaria regions. Characterization of malaria cases and verification of the outbreaks. Assess malaria prevention and control in Nandi County	There is need for proper case detection, strengthened surveillance, data quality and management.
Joanne H <i>et al</i> 2022	Detection and investigation of vaccine-derived poliovirus circulation by environmental surveillance -A recent case study	The need for sustained surveillance efforts to detect any vaccine derived poliovirus. The presentation highlighted the misconceptions regarding the polio vaccines and that there was suboptimal community-based surveillance at 64% instead of 80%	There is need for strengthening the AFP surveillance at all levels of the sub-county. There is also need to strengthen routine immunization.
Esther N <i>et al</i> 2022	Gaps related to screening and diagnosis of tuberculosis in care cascading in selected health facilities in East Africa countries: A retrospective study;	High diagnosis of MTB that accounted for bacterial <i>Mycobacterium</i> <i>sp</i> , Uganda had separate cough centres compared to Kenya and Tanzania. Clinical diagnosis was highest in Tanzania, TB diagnosis was highest in HIV-positive patients.	Strengthen the integration of TB diagnosis and management around the health systems
Dorcas O <i>et al</i> 2022	One health surveillance: Evidence of known and new zoonotic arboviruses circulation in multiple hosts with potential impact to human;	A new mosquito borne <i>Orbivirus</i> previously not known in Kenya has been isolated from cattle for the first time in Kenya	Comprehensive surveillance of all documented arboviruses should be adopted in Kenya.

Clara M et <i>al</i>	HIV Infection During	We found the routine	Paired with knowledgeable
2022	Pregnancy at Kisumu	ANC system to be	and motivated staff. the system
	County Referral	useful (96.7%). The	can provide insights into the
	Hospital; A Surveillance	overall performance	HIV epidemic among pregnant
	Evaluation	was good (83.1%).	women.
		Representativeness	
		(91.7%) and simplicity	
		(95%) were excellent,	
		acceptability (86.7%)	
		was good; stability	
		(66.7%) and flexibility	
		(61.7%) were average,	
		while data quality was	
		poor (60%). the system	
		was meeting its objective	
		of providing HIV testing	
		trends, incidence, and	
		magnitude among	
		pregnant women. The	
		system can provide data	
		on HIV retesting, per the	
		guidelines	
Githinji G <i>et al</i>	Severe Malaria	Of the 98 (44.7%)	The surveillance system
2022	Surveillance System	referrals from peripheral	was useful, simple, and
	Evaluation in	facilities, 47 (48%)	representative. We recommended
	Msambweni Referral	received artesunate pre-	supportive supervision
	Hospital Kwale County,	referral treatment.	
	June 2021		
Ruth S et al.,	Evaluation Of Xpert Mtb/	According to this	There was increased detection
2022	Rif Assay In Detection	study, sensitivity and	of MTB in ratio 2:1 reagent
	Of Mycobacterium	Specificity of Ratio	to processed pellet in smear
	Tuberculosis From	2:1 SR was 72.1% and	negative samples and should be
	Sputum Pellets Using A	79.3% respectively	adapted in populations with high
	Reduced Sample Reagent	while the Negative and	smear negative TB rates.
	In Smear Negative	Positive Predictive Value	
	Samples In Kisumu	was 88.0% and 57.4%	
	County Western Kenya	respectively hence	
	(Kemri-Ughr)	agreeing with Cohen	
		kappa value of 0.476 at	
		p<0.001	

Albert O <i>et al.</i> ,	Drug resistant	A total of 12/394(3.0%)	For prompt and effective drug
2022	tuberculosis patterns	MDR cases were	resistant tuberculosis (DRTB)
	among presumptive	identified from	diagnosis in the country
	MDR patients from	5/47(10.6%) counties,	decentralizing tuberculosis
	Western Kenya, a MoH	comprising of	through genotypic and/or
	surveillance program	10/12(83.3%) males	phenotypic techniques is very
		of whom 4/10 (40%)	essential leading to prompt care
		were HIV infected as	and patient management
		well as the 2 females. A	
		total of 12/394 (3.0%),	
		9/12 (75%) males,	
		of whom 4/9(44.4%)	
		HIV infected, while	
		3/12 (25%) females	
		of whom 2/3(66.7%)	
		were HIV infected were	
		Mono RIF resistant and	
		35/394(8.8%), of whom	
		30/35(85.7%) males	
		with 14/30(46.6%)	
		HIV infected and	
		5/35(14.2%) females	
		of whom 3/5(60%) had	
		INH mono resistance	
		respectively.	

POPULATION TARGETS

The selected studies were conducted mostly in health facilities in various regions in Kenya. They focused on HIV-positive patients, TB-positive patients. Other studies focused on assessing the current malaria surveillance systems.

DISCUSSION

In reference to the eight (8) abstract studies presented during the KASH 12th, the need for strengthening existing public health surveillance systems was quite evident. An immediate need to employ better diagnostic techniques was also brought out. There is also need for proper case detection, data quality and management. The World Health Organization (WHO) advises that case management records⁶, sputum smear microscopy findings, information on HIV co-infection and antiretroviral treatment (ART) status be gathered for new tuberculosis cases and sent to the national TB program.

However, not every new case is reported; according to the WHO, even though six million cases were estimated to have been reported globally in 2012, three million additional cases are believed to have developed but were not reported as a result of poor diagnostics, limited access to primary care, and inconsistent legal requirements to do so ⁷.

Human Immuno-Deficiency Virus (HIV), Tuberculosis (TB), and other illnesses continue to be the top priorities for national public health programs. This is as a result of their significance to public health infrastructure due to lethal re-emerging infections that have taught the globe priceless lessons ⁸. The need for the public health infrastructure and capacities to detect early outbreak warning signs and deliver prompt action by National Governments in Countries especially Sub-Saharan Africa is paramount¹.

The difference between the number of cases reported to the Ministry of Health (MOH) and the actual number of new cases must be accurately estimated for a surveillance system to determine its case detection rate. The development and use of precise detection and diagnosis processes is a must for any surveillance system to be effective ⁹. An accurate diagnostic approach and a successful country reporting system are both indicated by a high case detection rate⁷.

The need to upgrade the surveillance infrastructure in these nations and switch from passive to active surveillance cannot be over emphasized. The challenges of adopting disease monitoring systems in countries with inadequate public health systems can be tackled and eventually overcome ¹⁰.

CONCLUSION

At all levels of the sub-County and County, proper case detection, increased surveillance, data quality evaluation, and administration are required. Kenyan government should embrace routine vaccination, TB diagnosis and management integration with the health systems, and documentation of arboviruses. Implementing routine monitoring with integrated data quality evaluation, training healthcare professionals in correct tool usage, and providing feedback to enhance data quality are all recommended. Key factors that offer insights into correct and reliable means of detecting emerging and re-emerging illnesses include having knowledgeable and motivated workers, having financial resources available, and using the right diagnostic tools to ease surveillance methods.

RECOMMENDATION

- Supportive supervision to increase detection of infectious diseases with promptness and effectiveness hence leading to proper care and patient management.
- Routine supervision with integrated data quality assessment, capacity building of healthcare workers on the proper use of tools, and feedback to improve data quality.
- Strengthening public health surveillance systems in sub–Saharan Africa is crucial in early detection of new cases as well as remerging cases.
- Sustainable and accurate diagnostic methods need to be adopted across human and animal health facilities for continues detection of emerging and remerging infections.

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