

Strengthening immunisation services in East Africa through training

Lessons from the ECAVI Vaccinology Course for healthcare workers highlight the importance of continuous professional development

Vaccine-preventable diseases (VPDs) are a major contributor to morbidity and mortality in low-income countries (LICs).¹ Vaccination is an important child-survival strategy especially in high-burden LICs where more than 10 million children under 5 die annually.^{1,3} Immunisation, a major pillar for attaining Sustainable Development Goal (SDG) 3 (aiming to reduce the under-five year-old mortality rate [U5MR] to less than 25/1000 live births by 2030) can prevent almost three million deaths annually.^{4,5} Challenges facing immunisation coverage in LICs include language barriers, transport-related access problems, terrain-related accessibility barriers, low education and socio-economic status of caregivers, refugee status, cultural barriers, religious beliefs, young age of caregivers, population mobility, vaccine hesitancy and negative messaging.⁶⁻¹¹ Research in LICs has identified healthcare worker (HCW) training as a major intervention needed to increase vaccination coverage.^{1,2,6,9,11} The resurgence of VPDs which were earlier thought to be under control, such as measles, has heightened the need for innovative strategies to control this spread. In March 2019, 26 districts in Uganda were identified by the Ministry of Health (MoH) as experiencing recurrent measles outbreaks. This led to the MoH and Parliament initiating a measles action plan to combat the re-emergence of the disease in these districts, with enhanced HCW training and community/social mobilisation central to this plan.

Defining the problem

The launch of the SDGs in 2016 to replace the Millennium Development Goals (MDGs), came with the sad realisation that none of the countries in East Africa attained MDG 4 that aimed to reduce U5MR by two-thirds. According to the 2014 Kenya Demographic and Health Survey, infant mortality was 39/1000 live births with U5MR of 52/1000 live births, implying that at least one in every 19 children born in Kenya in 2014 died before reaching their fifth birthday.¹² The 2016 Uganda Demographic and Health Survey reported an U5MR of 90/1000 live births, and an infant mortality rate

of 43/1000 live births.¹¹ While these indicators have declined across East Africa, the improved child survival rates are attributed to increases in mosquito net use among children, and improvements in maternal health, including increases in the proportion of births delivered in health facilities assisted by skilled HCWs, and increases in postnatal care. However, the deaths from pneumonia, diarrhoea and other VPDs remain high, and are the actual drivers of child morbidity and mortality. Measles, a re-emerging VPD in East Africa, currently poses the biggest challenge to immunisation programmes around the world. The World Health Organization (WHO) African Regional Committee has adopted a regional measles elimination goal for 2020, urging all countries to achieve an incidence of confirmed measles of <1 case per million population and to attain the elimination of measles through achieving and sustaining measles vaccination coverage of $\geq 95\%$ at national and district levels, and supplementary immunisation activity (SIA) coverage of 95% in all districts.¹⁴

Evolution of the ECAVI Vaccinology Course

The East Africa Centre for Vaccines and Immunization (ECAVI) is an initiative of HCWs, working under the auspices of paediatric associations of participating countries, to promote advocacy, training, research and strengthening of immunisation programmes in East Africa. Founded in 2014 and registered as an international non-governmental organisation in both Kenya and Uganda, ECAVI promotes improved uptake and training on new and available vaccines, towards the prevention and control of morbidity and mortality associated with VPDs and cancers in East Africa. ECAVI plays a leading role in organising vaccinology symposia during annual scientific conferences for paediatric associations across East Africa, and closely partners with the WHO, UNICEF and MoHs in the region, to launch new vaccines and update vaccination schedules for recommended Expanded Programme on Immunisation (EPI) vaccines in the region.

Since 2016, ECAVI, working with partners and stakeholders, has trained over 500 HCWs through its annual vaccinology course held over five days. Of those trained, 49% are from Uganda, 29% from Kenya, 6% from Tanzania, 5% from South Sudan, 4% from Nigeria, 3% from Somalia/Somaliland, 2% from Rwanda, 1% from Ethiopia, and 0.5% each from Sudan and Afghanistan. ECAVI plans to hold its sixth vaccinology course from 22-26 June 2020, in Kampala Uganda. This course will focus on current and new developments in the use of vaccines in the East African region, targeting 100

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An ongoing session at the 5th vaccinology course.

HCWs from across East Africa, in line with ECAVI's aim of training 1000 HCWs over a period of 10 years. The course is designed for HCWs working in the field of vaccination administration and delivery [nurses, midwives, cold chain managers, EPI focal persons, medical doctors, masters students (MPH, MSc, and MMed), pharmacists, public health professionals, vaccine programme administrators] and HCWs who are interested in the clinical aspects of vaccines and immunisation.

Central to successful organisation of this course, has been the major role played by two key partners – the South African Vaccination and Immunisation Centre (SAVIC) at Sefako Makgatho Health Sciences University (SMU) in South Africa and the Network for Education and Support in Immunisation (NESI) at the University of Antwerp, Belgium. These two organisations have extensive experience and a great history for supporting advocacy, training and capacity-building towards improved immunisation systems in Africa. SAVIC and NESI have been central and pivotal to generation of course content, course administration, course delivery and the continuous evaluation and improvement of the course. The full list of organisations partnering with ECAVI in organising and running this course include the following:

- Makerere University (MU), Kampala, Uganda
- SAVIC at SMU, South Africa
- NESI at the University of Antwerp, Belgium
- Uganda National Academy of Sciences (UNAS)
- Kabarak University (KU), Nakuru Kenya
- Uganda Paediatric Association
- Kenya Paediatric Association
- Kenya, Tanzania and Uganda EPIs
- Paediatric Association of Tanzania
- University of Nairobi (UON), Kenya
- The Centre for Health Advancement, Research and Resource Mobilisation (CHARRM) based in Kampala, Uganda.

Justification for the course

Vaccination is a key strategy for prevention of communicable diseases, which contribute more than two-thirds of the U5MR in the East African region. The overwhelming response by HCWs to previous ECAVI vaccinology

course adverts, resulting in a growing waiting list of applicants, coupled with representation from beyond East Africa, shows that many HCWs are eager for training on current and new vaccines and how to improve their immunisation practices. Kenya and Uganda have recently experienced increased public resistance and negative sentiments against tetanus toxoid, measles-rubella, hepatitis B (HepB) and oral poliovirus (OPV) vaccines, which may contribute to declining uptake. Of Kenyan and Ugandan children aged 12-23 months, 68% and 52% respectively are fully vaccinated.¹²⁻¹³ In 2014 Uganda rolled out human papilloma virus (HPV) vaccination against cervical cancer; however, only 48% and 1% of the targeted girls respectively were reached for the first and second doses. The Uganda National EPI (UNEPI) attributes this low uptake of the HPV vaccine to inadequate community mobilisation and poor HCW knowledge on the vaccine roll-out strategy. However, vaccine hesitancy, vaccine refusal and rumours of adverse events following immunisation (AEFI) may have contributed as well. ECAVI aims at improving this situation, by contributing to immunisation programmes through strengthening systems and education of HCWs. There are group and plenary sessions with the participants interacting with over 20 facilitators to share views, research findings, experiences, successes, challenges, and formulate possible interventions for improving their own roles which are part of the larger national immunisation programmes. The course also promotes education and knowledge among vaccinators, empowering them to be vaccine advocates and immunisation champions. To ensure relevance and applicability, the expert facilitators are largely professors and senior lecturers from medical schools, MoHEPI officers, and stakeholders who participate in vaccination-related decision-making at the highest level in East Africa.

Content of the course

The course content includes:

- Introduction and history of vaccination in East Africa
- Basic immunology of vaccines (immune system, how vaccines work, current/new vaccines, and

- vaccines under development)
- Vaccine development and pharmacology (formulation/composition, indications and administration)
- Vaccine evaluation process: Preclinical, Phase I, Phase II and Phase III trials; and regulatory approval and registration
- Overview of VPDs
- Vaccine safety and AEFIs surveillance: Post-licensure and post-introduction monitoring of vaccine safety and effectiveness; identification, management and reporting of AEFI
- Vaccine registration and WHO prequalification; the process of introduction of a new vaccine into a national immunisation programme: important considerations; vaccination policy and immunisation schedules in Eastern Africa
- Current safety issues and controversies regarding immunisation (the media, language, terrain, beliefs, age, culture, communication on vaccines, vaccine hesitancy and negative messaging)
- Roles of Gavi, the WHO Global Vaccine Action Plan, EPI, National Immunisation Technical Advisory Groups, and national and subnational SIAs
- Vaccines for special groups and populations (pregnant women, adolescents, adults, and immunocompromised patients)
- Vaccine related logistics (integrating immunisation into health systems; cold chain management; communicable disease surveillance)
- Immunisation data management and record keeping: monitoring and evaluation, data capture, storage, analysis and sharing
- Practical skills training in immunisation, discussion, knowledge and experience sharing among participants

Participant selection

A maximum of 100 participants per course are targeted through adverts emailed to members of the various paediatric/medical associations, medical schools, selected hospitals and EPI officials, and also posted on the ECAVI website and Facebook page. Any interested HCWs must submit their CV with a formal application and motivation for attending, to the course administrator. A selection committee comprising of the course coordinators and course administrator vets the applications and selects 100 participants for the course.

Teaching methods

The mode of course delivery includes formal lectures; case studies and scenarios; videos; debate and discussions; practical demonstrations; site visits; participant presentations; assessments and evaluations. Participants answer a series of structured questions at the end of each day to reinforce key messages. They furthermore complete a daily course evaluation/feedback for future course improvement. Participants who attend more than 90% of sessions earn continuing professional development points and receive a certificate of attendance.

Conclusion and lessons learned

The WHO recently declared vaccine hesitancy, which results in sub-optimal vaccination coverage and outbreaks of VPDs, as a threat to global public health. Vaccination coverage and adherence to immunisation schedules can be improved through strengthening immunisation programmes and educating HCWs. ECAVI's vaccinology courses address these issues by training and empowering HCWs to become local vaccine advocates and experts throughout the East African region. Moving forward, engagements with participants from the various participating countries in the region identified the following ten focus areas urgently requiring attention to improve immunisation coverage in East Africa: vaccine hesitancy and negative messaging; identification, management and reporting of AEFIs; preventing re-emergence of measles and tetanus in older children; introducing Hep B birth dose and rubella vaccine into national EPIs; preventing polio eradication bottlenecks; improving influenza surveillance and vaccination coverage; strengthening cold chain systems and preventing vaccine stock-outs through strengthening transportation/delivery to rural and remote areas of East Africa; improved HCW training and supervision support; expanding HPV vaccine roll-out and coverage; and improving maternal vaccination coverage to prevent VPDs in early infancy.

References

1. Wolfson LJ, Gasse F, Lee-Martin S-P, Lydon P, Magan A, Tibouti A, et al. Estimating the costs of achieving the WHO-UNICEF Global Immunization Vision and Strategy, 2006-2015. *Bulletin of the World Health Organization*. 2008;86(1):27-39.
2. Maurice JM, Davey S. State of the World's Vaccines and Immunization: World Health Organization. 2009.
3. Rutherford ME, Dockerty JD, Jasseh M, Howie SR, Herbison P, Jeffries DJ, et al. Preventive measures in infancy to reduce under-five mortality: a case-control study in The Gambia. *Tropical Medicine & International Health*. 2009;14(2):149-55.
4. World Health Organization. WHO vaccine-preventable diseases: monitoring system: 2010 global summary. 2010.
5. World Health Organization. World health statistics 2010: World Health Organization. 2010.
6. Burton A, Monasch R, Lautenbach B, Gacic-Dobo M, Neill M, Karimov R, et al. WHO and UNICEF estimates of national infant immunization coverage: methods and processes. *Bulletin of the World Health Organization*. 2009;87(7):535-41.
7. Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS, Group BCSS. How many child deaths can we prevent this year? *The Lancet*. 2003;362(9377):65-71.
8. Schellenberg JA, Victora CG, Mushi A, de Savigny D, Schellenberg D, Mshinda H, et al. Inequities among the very poor: health care for children in rural southern Tanzania. *The Lancet*. 2003;361(9357):561-6.
9. Malande OO, Munube D, Afaayo RN, Annet K, Bodo B, Bakainaga A, et al. Barriers to effective uptake and provision of immunization in a rural district in Uganda. *PLoS ONE*. 2019;14(2): e0212270. <https://doi.org/10.1371/journal.pone.0212270>
10. Murray CJ, Laakso T, Shibuya K, Hill K, Lopez AD. Can we achieve Millennium Development Goal 4? New analysis of country trends and forecasts of under-5 mortality to 2015. *The Lancet*. 2007;370(9592):1040-54.
11. Uganda Demographic Health Survey, Uganda Bureau of Statistics, UDHS 2016.
12. Kenya Demographic Health Survey, Kenya Bureau of Statistics, KDHS, 2014.
13. MoH Uganda Health sector quality improvement framework and strategic plan 2015/16-2019/20.
14. World Health Organization. Regional Strategic Plan for Immunization 2014-2020, Regional Office for Africa AFRO Library Cataloguing-in-Publication Data, ISBN: 978 929 023 2780 (NLM Classification: WA 115).