Effectiveness of monovalent rotavirus vaccine against hospitalization with acute rotavirus gastroenteritis in Kenyan children

Sammy KhagayiKenya Medical Research Institute
Jane Juma Kenya Medical Research Institute, Jason Mwenda WHO Regional Office for Africa , Jackline Tate Centers for Disease Control and Prevention, Atlanta, Sammy Khagayi Kenya Medical Research Institute, Collins Tabu Ministry of Health, Nairobi, Kenya , Robert F. Breiman Emory Global Health Institute, Yaw Addo Emory Global Health Institute, Grieven Otieno Kenya Medical Research Institute, Betty Owor Kenya Medical Research Institute, James Nokes School of Life Sciences and Zeeman Institute for Systems Biology and Infectious Disease Epidemiology, Godfrey Bigogo Kenya Medical Research Institute, Evans Apondi Kenya Medical Research Institute, Mike Mwanga Kenya Medical Research Institute, John B. Ochieng Kenya Medical Research Institute, Umesh Parashar Centers for Disease Control and Prevention, Atlanta, Regina Njeru Kenya Medical Research Institute, Jennifer R. Verani Centers for Disease Control and Prevention-Kenya, Clayton Onyango Centers for Disease Control and Prevention-Kenya, Richard Omore Kenya Medical Research Institute, Anyangu Amwayi Ministry of Health, Nairobi, Kenya , Billy Ogwel Kenya Medical Research Institute, Mwanajuma Ngama Kenya Medical Research Institute

Background
Rotavirus remains a leading cause of diarrheal illness and death among children worldwide. Data on rotavirus vaccine effectiveness in sub-Saharan Africa are limited. Kenya introduced monovalent rotavirus vaccine (RV1) in July 2014. We assessed RV1 effectiveness against rotavirus-associated hospitalization in Kenyan children.

Methods
Between July-2014 and December-2017, we conducted surveillance for acute gastroenteritis (AGE) in three hospitals across Kenya. We analysed data from children age-eligible for ≥1 RV1 dose, with stool tested for rotavirus and confirmed vaccination history. We compared RV1 coverage among those who tested rotavirus-positive (cases) versus rotavirus-negative (controls) using multivariable logistic regression; effectiveness was 1-adjusted odds ratio for vaccination x100%.

Results
Among 677 eligible children, 110 (16%) were rotavirus-positive. Vaccination data were available for 91 (83%) cases; 51 (56%) had received 2 RV1 doses and 33 (36%) 0 doses. Among 567 controls, 418 (74%) had vaccination data; 308 (74%) had 2 doses and 69 (16%) 0 doses. Overall 2-dose effectiveness was 60% (95% confidence interval [CI]: 29-78%); for children aged <12 months 67% (95%CI: 31-84%) and children aged ≥12 months 72% (95%CI: 10-91%). Significant effectiveness was seen in children with normal weight-for-age (79% [95%CI: 53-90%]), length/height-for-age (73% [95%CI: 45-87%]) and weight-for-length/height (79% [95%CI: 44-90%]); however, no protection was found among underweight, stunted nor wasted children.

Conclusions
RV1 in the routine Kenyan immunization program provides significant protection against rotavirus AGE hospitalization. Protection was sustained beyond infancy. Malnutrition appears to diminish vaccine effectiveness. Efforts to improve rotavirus vaccine uptake and nutritional status are important to maximize vaccine benefit.