






Expanding Myeloma Training and Care in Western Kenya Through the ECHO Model: The Pilot Phase

Mercy Atieno Oduor, MPH, BSc¹ ; Teresa Cherop Lotodo, MD²; Tyler Severance, MD, MEd³ ; Beatrice Jepngetich Melly, MD⁴; Austin Omondi, BSc¹; Indagala Ndenga, Dip Nursing¹; Diana Flora Namaemba, BSc¹; Yvette Oyollo, BSc¹; Kelvin Mogesa Manyega, BPharm, MSc⁵ ; Jennifer Morgan, MD⁶ ; John Oguda, MPH, MBA⁷; Patrick Loehrer, MD⁶ ; and Terry Vik, MD⁶

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ABSTRACT

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PURPOSE Multiple myeloma (MM) in rural western Kenya is characterized by under and late diagnosis with poor long-term outcomes. Inadequate skilled rural health care teams are partly to blame. The Extension for Community Healthcare Outcomes (ECHO) model attempts to bridge this skills gap by linking rural primary/secondary health care teams (spokes) to myeloma experts in a tertiary care center (hub) in a longitudinal training program.

METHODS A hub team comprising myeloma experts and administrators from Moi Teaching and Referral Hospital/Academic Model Providing Access to Healthcare was assembled and spoke sites were recruited from rural health care facilities across western Kenya. A curriculum was developed by incorporating input from spokes on their perceived skills gaps in myeloma. Participants joined sessions remotely through virtual meeting technology. ECHO sessions consisted of a spoke-led case presentation with guided discussion followed by an expert-led lecture. An end-of-program survey was used to evaluate participant satisfaction, knowledge, and practice patterns.

RESULTS A total of eight sessions were conducted between April and November 2021 with a median of 40 attendees per session drawn from diverse health care disciplines. Twenty-four spoke sites were identified from 15 counties across western Kenya. The majority of attendees reported satisfaction with the ECHO program (25 of 29) and improvement in their myeloma knowledge (24 of 29). There were 74 new myeloma diagnoses made at the hub site in 2021, representing a 35% increase from the previous 3-year average despite the COVID-19 pandemic that suppressed health care access globally.

RECOMMENDATIONS The pilot ECHO model was successfully implemented in myeloma training for rural-based health care teams. Key attributes included collaborative curriculum development, interactive case-based bidirectional learning, and multidisciplinary engagement.

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INTRODUCTION

Multiple myeloma (MM) is a common adult hematological malignancy. Globally, 176,404 new cases were reported in 2020.¹ While MM predominantly affects persons of African descent, it remains underdiagnosed in Kenya. The Kenya age-standardized incidence rate of 2.8/100,000 in 2020 pales in comparison with Black American men at 16.8/100,000 or women at 12.8/100,000 or as compared with the national US average of 7.1/100,000 for both sexes in 2016–2020.²

Survival outcomes for MM in Kenya lag behind those in high-income countries. The US-based Connect MM Registry study which enrolled patients with newly diagnosed MM (ndMM) between 2009 and 2016 reported a median overall survival (OS) of 57.3 months among African American patients not undergoing stem cell transplant (SCT).⁵ Conversely, a modest OS of 29 months was recorded among patients with ndMM receiving treatment in a tertiary hospital in Kenya between 2009 and 2019 where SCT was not available.⁶ Late diagnosis which was hypothesized to be a major contributor to the dismal survival observed in Kenya

may be attributed, to a large extent, to inadequate skills among primary care teams in Kenya to identify potential patients with myeloma and refer them for specialized care.⁷ Innovations that bridge the skills gap between primary health care teams and experts at tertiary centers are therefore desperately needed.

The Extension for Community Healthcare Outcomes (ECHO) model is a telehealth education platform designed to improve health outcomes in medically underserved communities. It uses a hub and spokes design that links specialists to primary care providers to address the complex medical needs of rural communities through mentorship, support, continuous learning, and shared decision making (Fig 1). On initiation in 2001, project ECHO improved treatment outcomes among patients with hepatitis C virus in rural New Mexico.⁸ Our colleagues have reported increased recognition and early referral of pediatric cancer cases using ECHO in communities across rural western Kenya.⁹ This article aims to report an educational initiative

on MM for health care professionals in peripheral health facilities through the ECHO platform.

METHODS

At the onset of the program, a hub team was assembled comprising health care professionals involved in the management of MM primarily from Moi Teaching and Referral Hospital (MTRH) and Moi University. Fields represented hematology, hemepathology, social work, pharmacy, and nursing. Spoke facilities were identified from peripheral health facilities that refer patients with MM to MTRH for specialized care. The hub team underwent initial virtual immersion training, offered by ECHO India, covering planning for ECHO sessions, project ECHO navigation, and ECHO outcome.

Representatives from the hub visited potential spoke sites to obtain commitment from health facility management teams. The hub team shared the project ECHO model and its

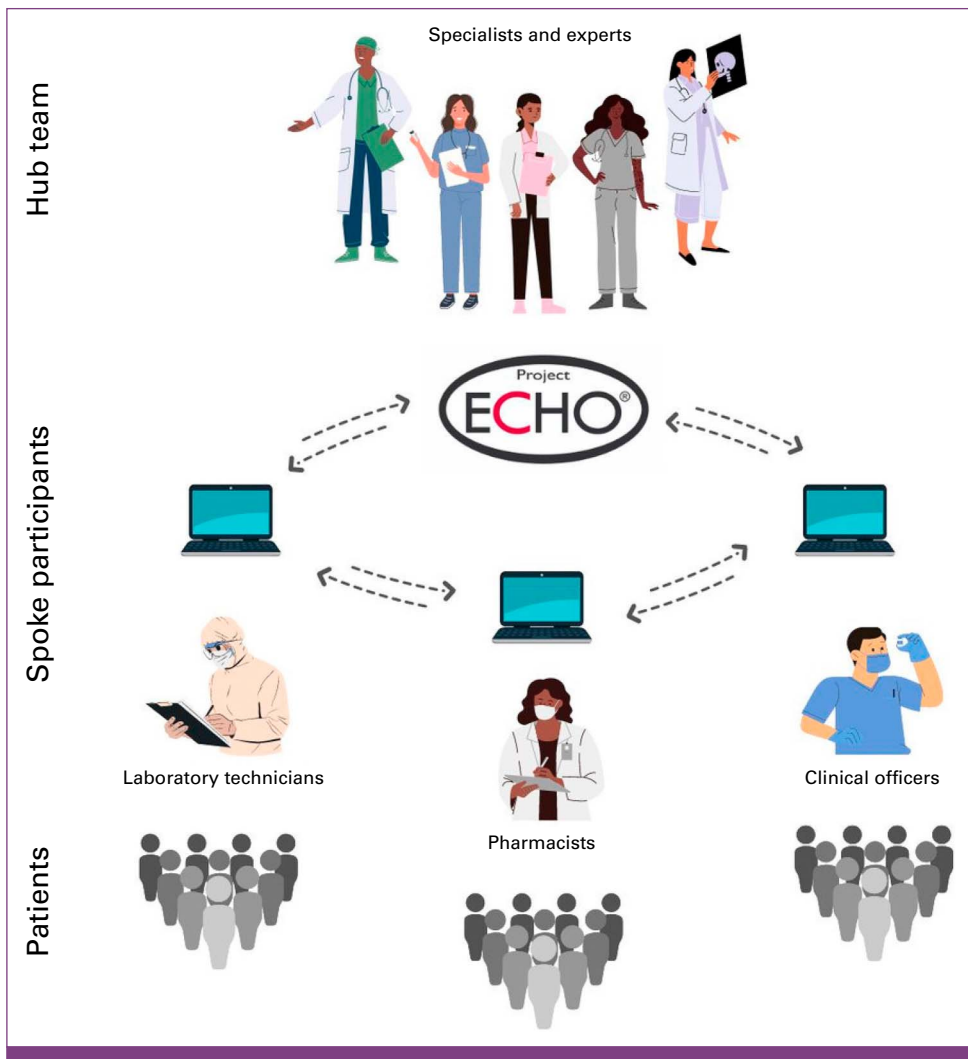


FIG 1. Project ECHO model by AMPATH MM Program. ECHO, Extension for Community Healthcare Outcomes; MM, multiple myeloma.

potential gains in building the health care professional capacity and expanding patient access to MM care. Discussions focused on diagnostic pathways for patients with suspected MM while at the peripheral health facilities and identifying possible reasons for delayed diagnosis. From these preliminary engagements, a low index of suspicion for myeloma among providers was identified as likely contributing to late diagnosis suggesting a need for continuous training and mentorship. Spoke sites identified participants to participate in the ECHO sessions which included health care professionals from accident and emergency, orthopedic, renal, neurology, medical, surgical, pharmacy, and laboratory units.

Content experts from the hub team and specialists from other myeloma centers finalized a curriculum after receiving input from spoke sites on topics of interest. For the pilot year, the following items were included in the curriculum: services offered by the AMPATH MM Program, clinical features, treatment, treatment-related adverse effects, surgical interventions, MM kidney disease, and palliative care for MM. A training calendar was also prepared. Before the MM ECHO launch, the spokes were instructed on how to prepare and share real anonymized patient cases and how to navigate through the ECHO sessions. The hub-based ECHO coordinator solicited cases to be discussed from spoke site participants a few days before each session. Cases were previewed by the hub team before each session.

ECHO sessions were 60 minutes in duration starting from 16:00–17:00 hours local time and occurred on the last Wednesday of each month. Each session would begin with a 40-minute case presentation and discussion. A spoke-based participant would make a complete case presentation and describe clinical challenges facing the spoke team. Hub-based specialists would then offer advice on how to

approach the problem on the basis of current evidence and clinical experience. Spoke participants from other sites would also share their experiences and ask questions on how to solve unique practice scenarios. The case discussion would be supplemented by a 20-minute lecture by a MM hub-based specialist on a related topic to enhance participants' knowledge and skills.

Routine reminders were sent to the spoke participants via the WhatsApp platform, email, and short message service texts before each session. All hub and spoke participants connected to the sessions remotely through a Zoom link using their personal computers, smartphones, or other devices. Attendees were tracked through the associated iECHO/SPARQ platform supported by ECHO India. Sessions were recorded for future reference by participants.

A survey was sent out at the end of the 8th session to evaluate participants' satisfaction, self-reported improvement in myeloma knowledge, and number of potential patients with myeloma referred for specialized evaluation to the hub team. Descriptive statistics was used to analyze surveys and compare the number of myeloma cases by year. Patient charts were reviewed for case numbers.

RESULTS

A total of eight ECHO sessions were held between April and November 2021. A cumulative 339 participants attended at least one session with a median of 40 participants per session, range 22–62. Of these, 245 unique participants attended at least one session of whom 136 (56%) identified as female. Forty-five attendees (18%) attended two or more sessions. Of the participants who submitted their data on professional roles, clinical providers (clinical officers, medical officers, registrars, and consultants) made up 64% (100 of 157), followed by nurses at 12% (Fig 2).

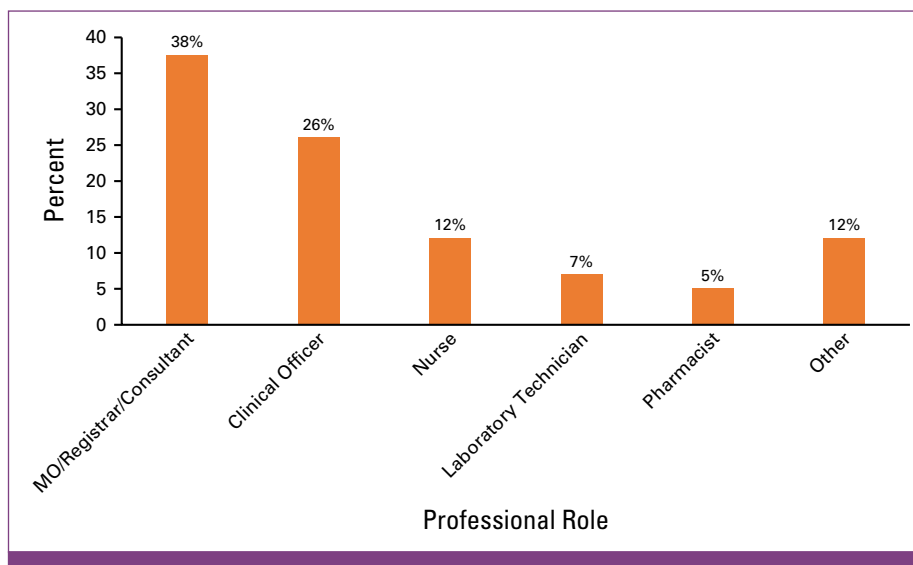


FIG 2. Distribution of participants by professional role. N = 157. MO, medical officer.

During the ECHO sessions, 87 participants provided data on their practice location from which 24 spoke sites were identified. [Figure 3](#) is a map of Kenya showing counties of origin for spoke facilities participating in project ECHO.

The end-of-year survey was filled by 12% of participants (n = 29). The majority of the respondents (25 of 29) were satisfied with their experience in the ECHO sessions. A high proportion (24 of 29) of attendees self-reported an improvement in their myeloma knowledge. Fourteen participants reported to have referred at least one patient with myeloma or suspected myeloma for specialized evaluation.

In 2021, a total of 101 patients with suspected myeloma were referred to MTRH from the peripheral health facilities for

further screening for MM. Of them, 73% (n = 74) were diagnosed with myeloma. This represents a 35% increase from the previous 3-year average at MTRH AMPATH and occurred of the COVID-19 pandemic when visits declined globally.

RECOMMENDATIONS

Enhanced health care professional proficiency and the resultant increased diagnosis rates for MM across western Kenya reported in this study represent an increase in access to MM care for rural, medically underserved communities, reflecting the primary aim of ECHO at its inception.⁸

Attributes that make the ECHO model an attractive approach for health care professional training are highlighted. First,

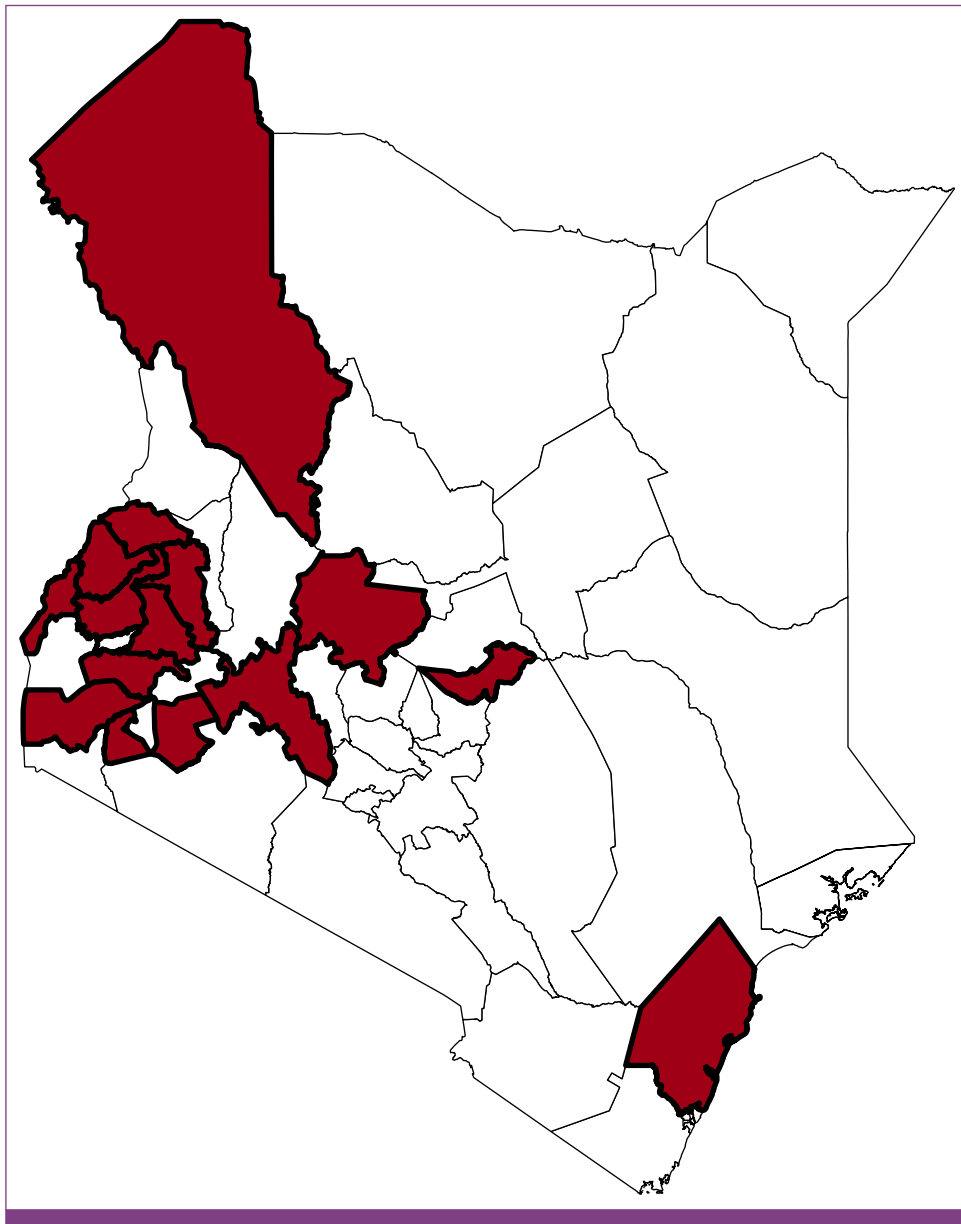


FIG 3. Map of Kenya showing the 15 counties of origin (burgundy) of spoke sites participating in multiple myeloma project ECHO in 2021. ECHO, Extension for Community Healthcare Outcomes.

the MM ECHO was responsive to the educational needs of its audience by using a consultative approach between subject matter experts and the audience for curriculum development. Additionally, the interactive format of ECHO sessions promoted the active engagement of all participants at each session. The case-based discussions encouraged learning objectives in the context of clinical care promoting internalization of concepts. Interactions with specialists enhanced primary health care teams' confidence to use evidence-based techniques in patient care.⁸ Moreover, bi-directional communication between the hub and spoke teams also engendered seamless referral processes.

Interdisciplinary involvement in both hub and spoke teams is another unique feature of MM ECHO. Through interdisciplinary education, MM ECHO promotes interdisciplinary teamwork and communication,¹⁰ leading to greater efficiency in care delivery and a reduction in care fragmentation.

Third, the MM ECHO successfully leveraged virtual meeting technology to reduce project and participant expenses. Costs were saved when participants joined ECHO sessions at the comfort of their homes or offices without having to travel or congregate physically. The AMPATH MM Program avoided costs for accommodation and conference facilities as was during training sessions in the pre-COVID-19 period. Virtual

meeting technology also made it possible to broaden the geographical reach.⁷

The pilot phase of the MM ECHO had limitations. There was a low response rate for the satisfaction survey which may undermine the conclusions from responses collected. Similar low response patterns have been observed in other ECHO initiatives.¹¹ Conducting mandatory surveys after each ECHO session could offer better response rates in the next phases of the MM ECHO. Survey completion could also be directly linked with continuing education credits to boost response rates. To further demonstrate its impact as a teaching platform, MM ECHO will need to employ more objective measures of educational gain imparted to participants preferably through Moore's framework.¹² Milgrom et al's¹³ evaluation of ECHO intervention in cancer prevention and survivorship care exemplifies this approach.

In conclusion, we demonstrated a virtual educational program on the basis of the ECHO model to scale the capacity of primary health care teams across western Kenya in offering specialized care for patients with MM. The program had a wide geographical reach, good attendance from diverse disciplines, high satisfaction, and affected positively on new diagnoses. MM ECHO was innovative because it promoted active participant engagement during curriculum development and delivery through case-based discussions.

AFFILIATIONS

¹AMPATH Oncology Institute, Eldoret, Kenya

²Moi University School of Medicine, Eldoret, Kenya

³University of Missouri, School of Medicine, Columbia, MO

⁴Moi Teaching and Referral Hospital, Eldoret, Kenya

⁵Kenya University Teaching, Referral and Research Hospital, Nairobi, Kenya

⁶Indiana University School of Medicine, Indianapolis, IN

⁷Indiana University Global Health, Indianapolis, IN

CORRESPONDING AUTHOR

Mercy Atieno Oduor, MPH, BSc; e-mail: odumercieh@gmail.com.

AUTHOR CONTRIBUTIONS

Conception and design: Mercy Atieno Oduor, Tyler Severance, Beatrice Jepngetich Melly, Diana Flora Namaemba, Kelvin Mogesa Manyega, John Oguda, Terry Vik

Financial support: Teresa Cherop Lotodo

Administrative support: Mercy Atieno Oduor, Teresa Cherop Lotodo, John Oguda, Patrick Loehrer

Provision of study materials or patients: Mercy Atieno Oduor, Beatrice Jepngetich Melly, Yvette Oyollo

Collection and assembly of data: Mercy Atieno Oduor, Austin Omondi, Indagala Ndenga, Diana Flora Namaemba, Yvette Oyollo, Terry Vik

Data analysis and interpretation: Mercy Atieno Oduor, Teresa Cherop Lotodo, Tyler Severance, Diana Flora Namaemba, Kelvin Mogesa Manyega, Jennifer Morgan, Patrick Loehrer, Terry Vik

Manuscript writing: All authors

Final approval of manuscript: All authors

Accountable for all aspects of the work: All authors

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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Terry Vik

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