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Health Informatics Training Program in Low and Middle Income Countries

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> **Abstract.** We developed the first health informatics training program in Armenia and in the Caucasus region. The training program consists of four educational pillars, including a bootcamp, an individualized training program, a capstone, and a scholarly project. We conducted surveys and qualitative interviews to evaluate the training program. With trending positive results we acknowledge that it is important to understand the landscape of health informatics and conduct needs assessment prior to establishing such a training program in an LMIC.

Keywords. LMICs, clinical informatics, training, Armenia

1. Introduction

Health information technologies including Electronic Health Records and telehealth are being widely implemented in Low- and Middle-Income Countries (LMIC), especially since the COVID-19 pandemic [1,2]. Many LMICs, including the Republic of Armenia, are in urgent need for training of health informaticians to support best practices and innovation in the domains of clinical care, public health policy, translational research and public health informatics [3]. Armenia possesses the building blocks for a national electronic health record system that can leapfrog the systems in the US and Europe if there is a workforce to build the necessary infrastructure.

2. Methods

Our inaugural training program included four fellows: two physicians and two computer engineers. Over three months, fellows participated in a twenty module bootcamp modeled after AMIA's 10x10 modules, which introduced the field of clinical informatics [4]. Our fellows were placed in the Ministry of Health of the Republic of Armenia, ARMED (Armenia's national EHR vendor), National Institute of Health of the Republic of Armenia, and the National Pulmonary Center. Each fellow will then complete two projects over the next twelve months that are relevant to their current roles and advance

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health informatics in Armenia. Each project has two components, (1) a practical implementation, and (2) a scholarly evaluation or research project. To enable each fellow to complete their projects, we are providing supplementary coursework and mentors with relevant expertise.

We conducted four semi-structured qualitative interviews to explore bootcamp participants' experiences and needs related to the bootcamp program. Specifically, our interview protocol included open-ended questions related to the bootcamp content, structure, teaching methods, and participants' interaction with their peers and the workshop facilitators. To analyze the qualitative data, we applied two cycles of coding. In Cycle 1, we applied a combination of open coding, in-vivo, and process coding methods [5,6]. The emerging codes from Cycle 1 helped us to create the initial codebook. In Cycle 2, we applied pattern coding to identify patterns both within and across participants' responses and organize them into larger themes and sub-themes [5,6]. The broader themes included reasons for enrolling into the program, program activities, interactions and collaborations, most enjoyable parts of the program, suggestions for improving the program, impact on future career decisions, and challenges.

3. Results and Conclusions

Overall, we found that the participants found the program beneficial and helpful for their careers. For example, some of the sub themes related to the most enjoyable parts of the program included relevant and up-to-date lecture topics, approachable lecturers, convenient timeline for busy professionals, making connections with instructors and peers, having a chance to make a difference for the country, among others. The participants found the program impactful in terms of their future career decisions. For instance, participants mentioned that they are planning to "design and deliver lectures on the topics covered at the bootcamp" and "apply the skills gained in clinical practice". Our goal has been to train the leaders in a nascent field in an LMIC and our results indicate positive outcomes. More importantly, the training program has received tremendous support in the country, and we have successfully identified champions for the program.

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