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The need for laboratories to have qualified leaders and managers is widely recognized. However, laboratories do not always have the resources to support leadership and management development. To address this need, a group of laboratories from the United Arab Emirates formed a programme to develop leadership and management skills. In 2014, the programme was implemented in 11 middle-East and North Africa countries, including Egypt, Jordan, Lebanon, Libya, Qatar, Oman, and the United Arab Emirates. (See page 10 for further details.)
ABSTRACT Laboratories need leaders who can effectively utilize the laboratories’ resources, maximize the laboratories’ capacity to detect disease, and advocate for laboratories in a fluctuating health care environment. To address this need, the University of Washington, USA, created the Certificate Program in Laboratory Leadership and Management in partnership with WHO Regional Office for the Eastern Mediterranean, and implemented it with 17 participants and 11 mentors from clinical and public health laboratories in 10 countries (Egypt, Iraq, Jordan, Lebanon, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, and Yemen) in 2014. Designed to teach leadership and management skills to laboratory supervisors, the programme enabled participants to improve laboratory testing quality and operations. The programme was successful overall, with 80% of participants completing it and making impactful changes in their laboratories. This success is encouraging and could serve as a model to further strengthen laboratory capacity in the Region.

Mise en œuvre d’un programme de mentorat en développement professionnel pour les directeurs et les cadres de laboratoire au Moyen-Orient et en Afrique du Nord

RÉSUMÉ Les laboratoires ont besoin de directeurs à même d’utiliser les ressources internes de façon efficace, de maximiser leurs capacités à dépister les maladies, et d’œuvrer pour le bien de ces établissements dans un environnement de soins de santé en perpétuel changement. Pour répondre à ces besoins, l’Université de Washington (États-Unis), en partenariat avec le Bureau régional de l’OMS pour la Méditerranée orientale, a mis au point le Programme de certification en direction et gestion de laboratoire qui a été suivi par 17 participants et 11 mentors issus de laboratoires de santé clinique et publique dans 10 pays (Arabie saoudite, Égypte, Iraq, Jordanie, Liban, Maroc, Oman, Pakistan, Qatar et Yémen) au cours de l’année 2014. Conçu pour former les responsables de laboratoire aux compétences de direction et de gestion, le programme a permis aux participants de renforcer la qualité du dépistage et des opérations de leurs laboratoires. Le programme a été une réussite dans l’ensemble puisqu’il a été suivi jusqu’à son terme par 80 % des participants et que ceux-ci ont ensuite pu mettre en place des changements réels dans leurs laboratoires. Ce succès est encourageant et pourrait servir de modèle afin de renforcer davantage encore les capacités des laboratoires dans la Région.

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Introduction

Countries around the world have been implementing the International Health Regulations (IHR) since 2007, requiring all countries to detect, assess, notify, and respond to public health threats (1–3). Health laboratories are a key component of this response and quality practice is essential, unfortunately, many countries are falling behind in these capabilities (3–5). Laboratories are complex, people-driven systems that require strong leadership and effective management to deliver accurate, timely and reliable test results (6,7). Unfortunately, many laboratory leaders have not had formal management training or experience leading organizations (8–10). While some training programmes exist, most have been designed for audiences in the United States of America, are proprietary or fee-based, lack formal mentorship, are offered exclusively online without opportunity to meet faculty or fellow participants, and have lacked a curriculum that addresses core competencies (8,10–18). While field epidemiology training programmes have been envisioned as a mechanism to deliver laboratory management training, they have historically focused on the laboratory’s role in outbreak response and have lacked a structured curriculum in laboratory management and leadership. Additionally, some donors have funded trainings through disease-specific programmes. There remains a global need to strengthen laboratory capacity and quality from a systems approach (19).

Because of these gaps, we developed a competency-based, blended-learning, mentored professional development programme in health laboratory leadership and management which can be tailored to local environments and implemented globally. The Certificate Programme in Laboratory Leadership and Management (CPLLM) was designed to strengthen the leadership and management skills of laboratory supervisors with the goal of improving their laboratories’ operations (8,10) and advancing national and regional progress in disease detection and response, laboratory quality and biosafety and biosecurity.

Methods

Programme design
The CPLLM was structured into an in-person programme orientation and course on laboratory systems, 4 online courses, and the applied Capstone Project (Figure 1). Learning objectives were aligned with key laboratory leadership competencies (8,10). Adult learning programmes that include components of work-based training significantly impact attainment of competencies and behaviour change (20–24). Accordingly, the CPLLM’s Capstone Project component was an individualized opportunity for participants to address areas in their laboratories’ operations that needed improvement; expand and apply leadership, management, analytical, and communication skills; and implement principles of continuous quality improvement. Capstone Project assignments reinforced these concepts and were due during breaks in coursework.

**Curriculum development**

The curriculum for the CPLLM (Figure 1) was developed using adult learning methodologies, and included 1 course delivered in person, 4 online courses [including > 85 recorded lectures and videos, interactive assignments, readings, quizzes, and surveys, all accessible through a learning management system (LMS, Canvas™)] (20–23,25). Each online course lasted 4 weeks (except for Laboratory Leadership and Management, which was 8 weeks) and required 20–25 hours of work. Participants spent 5–6 hours per week on coursework and Capstone Project work.

The Canvas™ learning management system is an internet-based application used for the delivery, administration, monitoring and evaluation of the CPLLM; a University of Washington survey indicated that 79% of users prefer this interface to other learning management systems (26,27). Canvas™ was customized for the CPLLM, and was a central gateway where participants and mentors could access all programme content, including reading materials, videos, lectures and links to resources—all organized into modules for easy navigation. Participants could also download all materials for offline viewing. Canvas™ contained robust capabilities for communication and collaboration, including discussion boards, messaging, email, schedule notifications and announcements, and allowed posting of multiple file types, including voice and video. Each online course was led by an instructor and teaching assistant, who monitored participants’ assignments, guided online discussions and provided support as needed.

**Participant recruitment and selection**

To facilitate appropriate candidate recruitment within multiple ministries of health, a detailed profile was developed which described the required experience of participants. The ideal participant would be a director or manager in a public clinical or public health laboratory (mid-career); hold a Bachelor’s degree (or equivalent) with > 5 years experience in laboratory medicine, > 1 year in a supervisory role, regarded as an emerging leader with strong motivation for laboratory improvement and self-improvement. Recruitment began in September 2013; 3 candidates from the public sectors in Egypt, 2 each from Iraq, Jordan, Oman, Pakistan, Qatar,
Saudi Arabia and Yemen, and 1 each from Lebanon and Morocco were accepted. Selected participants had no previous training in leadership or management.

**Mentor recruitment and participation**

Mentorship in the laboratory can improve worker performance (28–30) and mentors played an important role in the CPLLM. A detailed profile was developed and used to recruit qualified mentors and 11 were selected for their reputations as leaders in health laboratory practice, their experience in laboratory management, their reputations as results-driven and skilled problem solvers, and as communicative and encouraging teachers. Mentors were coached on mentoring skills at the programme kickoff meeting and throughout implementation. Each mentor supported 1–2 participants, both remotely (Canvas™, Skype™ or telephone) and in-person. Average time commitment to each participant was approximately 1–2 hours per week throughout the 9-month programme, and mentors helped participants address barriers to Capstone Project implementation and evaluated their leadership and management skills. Mentors also contributed to the online discussions where appropriate.

**Programme implementation**

The CPLLM began in Casablanca, Morocco in January 2014. At the orientation session, participants gave presentations about their laboratories and conveyed their goals for the programme. Orientation included an introduction to the purpose, goals and expectations of the programme, an overview of the online curriculum, Canvas™ and the Capstone Project assignments. The Laboratory Systems course followed, covering the roles and requirements of laboratories in a health system, elements of a functioning laboratory system and laboratory quality management (31). Participants then returned to their laboratories to conduct a laboratory self-assessment (32) and began the online portion of the CPLLM. Capstone Project work began in February with a comprehensive laboratory assessment; participants used the results to develop the goals and work plans for their Capstone Project. The Capstone Project had to have a direct, practical value within the laboratory, involve the laboratory staff and demonstrate leadership and management skills. Participants completed 7 Capstone Project assignments during the CPLLM and summarized their findings at the programme finale in September 2014.

**Programme evaluation**

Programme success and curriculum quality were based on a number of indicators (33), including programme completion rate, Capstone Project quality, discussion quality and participant and mentor feedback, and was evaluated by both quantitative and qualitative methods (24,33,34). Surveys assessed learner satisfaction with content, and pre/post-course tests, and in-course quizzes and assignments measured participants’ comprehension; Capstone Project assignments demonstrated the application of course theory. Participant and mentor input on discussion boards was also evaluated. Course evaluations collected quantitative and qualitative data about each course. Programme evaluations were also requested from mentors.
Participant progress has also been monitored since completion of the CPLLM, measured by informal survey.

**Results**

The CPLLM was highly successful with 14 (80%) of the participants completing the programme and making substantial improvements in their laboratories, particularly in the areas of quality management and biosafety and biorisk management (Figure 2). All participants improved their leadership and management skills and their laboratories’ performance during the programme. They also stated that course content was useful to their jobs, and said they would recommend the CPLLM to their peers. Participants indicated that mentors communicated frequently, that the frequency and duration of communications with their mentors were adequate and that their mentors were helpful, providing advice and feedback during the programme. Participant and mentor feedback sessions were also conducted at the finale meeting to get qualitative input on the programme (Table 1). This feedback was overwhelmingly positive, with the majority of responses indicating satisfaction with the programme.

**Discussion**

We developed the CPLLM to address the global need for improved laboratory management and leadership. It was designed for a global audience and fostered networking and collaboration, strengthening laboratory systems at the national and regional levels. The CPLLM achieved a high graduation rate due to a number of critical factors (33). First, appropriate participants were recruited and we ensured they had the support of their organizations and recognition by their supervisors. Strong mentorship and collective problem-solving helped ensure retention of participants in the online environment. Feedback received from this cohort was used to further refine the curriculum and optimize participant satisfaction for CPLLM implementation in other countries (the CPLLM is being implemented in Zambia in 2016).

Importantly, the CPLLM was highly regarded by participants because it delivered both theoretical and practical applications of effective laboratory leadership and management. The Capstone Project was a unique component of the CPLLM because it exemplified leadership and management theory, and resulted in measureable improvements within a short period of time, unifying the entire laboratory around a common goal. By developing strategic thinking skills, embracing process improvement and learning how to lead change, laboratory managers improved laboratory performance. Since programme completion in September 2014, many participants have communicated that they have started preparing for ISO 15189 accreditation using the new WHO Laboratory Quality Stepwise Implementation (LQSI) tool (35). While financial support for this cohort did not support long-term impact evaluations, these would be ideal to incorporate in future years.
The CPLLM affirms the impact of formal leadership and management training on laboratory capacity, and can build on previous investments for improved laboratory system operability and preparedness (36,37); the modular online curriculum allows the CPLLM to be customized with location-specific case studies for any country. The CPLLM was provided at no cost to participants thanks to generous United States of America government grants. However, for sustainability of the programme, user-fees and twinning partnerships with local universities may be pursued for future implementation. Additionally, continuing professional development credits could be pursued with national health professions associations, and may improve workforce retention (38–40).

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References


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