Global Health Mentoring Toolkits: A Scoping Review Relevant for Low- and Middle-Income Country Institutions

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Abstract. Capacity building in low- and middle-income country (LMIC) institutions hinges on the delivery of effective mentorship. This study presents an overview of mentorship toolkits applicable to LMIC institutions identified through a scoping review. A scoping review approach was used to 1) map the extent, range, and nature of mentorship resources and tools available and 2) identify knowledge gaps in the current literature. To identify toolkits, we collected and analyzed data provided online that met the following criteria: written in English and from organizations and individuals involved in global health mentoring. We searched electronic databases, including PubMed, Web of Science, and Google Scholar, and Google search engine. Once toolkits were identified, we extracted the available tools and mapped them to pre-identified global health competencies. Only three of the 18 identified toolkits were developed specifically for the LMIC context. Most toolkits focused on individual mentor–mentee relationships. Most focused on the domains of communication and professional development. Fewer toolkits focused on ethics, overcoming resource limitations, and fostering institutional change. No toolkits discussed strategies for group mentoring or how to adapt existing tools to a local context. There is a paucity of mentoring resources specifically designed for LMIC settings. We identified several toolkits that focus on aspects of individual mentor–mentee relationships that could be adapted to local contexts. Future work should focus on adaptation and the development of tools to support institutional change and capacity building for mentoring.

INTRODUCTION

Capacity building in global health is contingent on the delivery of advance mentoring in low- and middle-income country (LMIC) institutions. Mentorship here is defined as providing support and training for personal and professional development related to global health practice, education, and research. Mentorship not only has the ability to build institutional capacity, but also fosters long-lasting relationships for collaboration. Although many academics and institutions in LMIC settings receive formal or informal mentorship, the specific challenges for effective mentorship are less well addressed. Toolkits provide practical guidance and the structure to support effective mentor–mentee relationship.

Challenges to effective mentorship can be considered at the mentee, mentor, and institutional levels. At the mentee level, differences in cultural, social, and economic backgrounds between mentors and mentees may constrain the success of the mentoring relationship.1 For example, cultural etiquettes in social standing, gender norms, and respect may impact effective and transparent communication.2 Mentors may adopt a paternalistic view of the mentorship relationship, which may limit the mentees’ ability to achieve full independence.3 At the mentor level, investigators in LMIC settings have far fewer opportunities for mentor training compared with investigators in high-income countries (HICs). Hence, many relationships may veer away from mentorship toward taking advantage of mentees because of economic realities, institutional pressures, and social norms.

Mentoring relationships in LMIC institutions are further faced with several well-documented challenges related to equity compared with institutions in HICs. For example, LMIC institutions may be less likely to foster a culture of mentorship and collaboration building, and may have fewer opportunities for training, career advancement, and recognition.4 Institutional capacity to develop and support mentoring is also challenged by complexities of funding and support for research and innovation at the health systems level. For example, there is often a lack of grant funding, or higher education platforms and innovation hubs at the national level.5 Furthermore, because of “brain drain” and related effects, LMIC settings may have a limited number of experienced mentors who may be overwhelmed with mentees’ diverse needs.

The use of toolkits is a potential mechanism for providing support to mentees in a systematic way. Toolkits can help focus mentors and mentees activities together, and provide a framework to define goals and milestones. Toolkits are resources that may be written or online products that provide activities, checklists, and
suggestions. In the context of mentorship, they provide a sys-
tematic approach to guide the mentoring relationship and often
include milestones for evaluation and refocusing. We conducted a
scoping review to identify and examine the toolkits currently
available to support LMIC mentorship in global health.

METHODOLOGY

We chose a scoping review approach to 1) map the extent,
rage, and nature of mentorship resources and tools available and
2) to identify knowledge gaps in the current literature. We
used Arksey and O’Malley’s framework for conducting this
scoping review, which aims to summarize the current evi-
dence, best practice guidelines, and identify areas of limited
understanding.6 Unlike a formal systematic review, scoping
reviews do not use a priori inclusion criteria and do not assess
the quality of published articles included in the review.

To identify toolkits, we collected and analyzed data pro-
vided online that met the following criteria: written in English
and from organizations, and individuals involved in global
health mentoring. We searched electronic databases, in-
cluding PubMed, Web of Science, and Google Scholar, and
Google search engine. Search terms included “mentor” or
“mentoring,” “global,” or “international,” and “tool,” “guide,” or
“manual.” Search results were analyzed for content pertaining
to mentorship in global health and/or toolkits. In addition, we
reviewed the titles and tables of identified toolkits and included
those that provided guidance to mentors, mentees, or institu-
tions related to developing, fostering, and/or sustaining men-
torship relationships in a global health setting. We did not limit
findings to a specific time period. The online search was sup-
plemented by informal solicitation for additional resources, by
email, to the American Society of Tropical Medicine and
Hygiene (ASTMH) special issue authorship group.

Any resources that provided guidelines on supporting
mentoring relationships and building mentorship capacity
that could be applied to an LMIC setting (as decided on
by authors B. H., A. K., and A. W.) were included in this
review. The following information was extracted from each
identified resource: title, description, intended user, global
health competencies addressed, tool type (e.g., formative,
descriptive, evaluation), author(s), institution, and weblink.
We also identified whether the tool was “descriptive” and
described good/effective mentoring relationships, “formative”
and provided information on how to execute a good/effective
mentoring relationships, or “evaluative” and provided guid-
ance on how to evaluate the success of these mentoring
relationships and programs. Mentoring competencies have been
framed previously by Hamer et al. and Flemming et al., in
the following categories: Maintaining effective communication
(COM); aligning expectations (EXPs); assessing understanding
(UND); addressing diversity; promoting professional de-
velopment; fostering independence; professional integrity and
ethical conduct; overcoming resource limitations; fostering
institutional change (CHA).10–12 The Hamer et al. study further
delineated the skills required to attain these competencies.10

RESULTS

A total of 18 toolkits were judged relevant to this scoping
review (Table 1). We excluded several guides that focused
solely on mentoring junior faculty at U.S. institutions or staff at
the National Institutes of Health (NIH). Few toolkits were fo-
cused specifically on mentoring in LMIC setting (n = 3)11–13
with the majority published by North American organizations
(n = 15) (Table 1). Seven toolkits were created by universities,13–19
six by professional organizations,20–25 one by a funding agency,26
two by training consortia,21,26 and two by journals.8,27 Many
were focused on mentoring specifically in the health sci-
cences (n = 11). All were relevant for mentoring in global
health, but six specifically targeted mentoring in a global
health context. Several included checklists and predeparture
training guidelines that focus on the HIC mentee experience
in an LMIC setting, three of which were included in this scoping
review.19,22,23

Most toolkits were intended for mentors and provided
guidelines on how to effectively set expectations, communicate
with mentees, and build the mentoring relationship (n = 14). Ten
toolkits were focused on guiding the mentee, and provided
checklists or outlined important “to-do’s” to prepare for and
have a successful experience. Only three resources specifically
targeted the institution’s role in mentorship and provided rec-
ommendations for institutionalizing and supporting mentorship.
Tools were either descriptive (n = 5), formative (n = 5), or both
(n = 4). Only four tools provided guidance on how to evaluate
the success of mentoring relationships and programs.

Institution–mentor relationship. Three tools focused on
developing mentorship programs within institutions. They in-
cluded guidelines on setting up and managing programs and
one provided evaluation forms. The I-TECH clinical mentor-
ship toolkits provided specific guidance on how to build clinical
mentoring capacity at the institution.20 As such, these
toolkits provided resources to cultivate effective mentoring
relationships from the mentor prospective and provided
guidelines on how to train mentors. This toolkit is focused on
developing and managing mentorship programs using a case-
based approach. The Fogarty toolkit on “integration and
institutionalization of mentorship training” is a descriptive tool
that presents a stepwise approach to building institutional
mentorship capacity.12 The Association for Women in Sci-
ence’s guide also includes content for institutions, including
webinars on how to build a mentoring program.24

Mentor–mentee relationship. Many toolkits (n = 8) dis-
cussed the roles that different mentors can have on professional
development. A variety of tools were provided, including codes
of conduct/practice, mentorship agreements, letter templates,
and guides for individual development plans. These toolkits
provided resources for evaluation and monitoring of the
mentor–mentee relationship.13,17,18 The Malaria Capacity De-
velopment Consortium (MCDC) provided a strong example of
how mentoring could be conducted in a LMIC context.26 The
aim of the MCDC mentoring program is to help mentees with their
personal and professional development, so that they are able to
reach their full potential as self-reliant, self-confident, and in-
dependent scientific researchers. The MCDC also provided a
code of conduct, commandments for good mentoring, exam-
pies of agreements, and evaluation forms that allow the mentee
to document, manage, and record the mentoring meetings.

Competencies. Many of the toolkits addressed three
central competencies: COM (n = 13), EXPs (n = 11), and UND
(n = 9). These competencies were achieved by presenting
specific information on how to communicate with mentees,
provide feedback, and establish goals and expertise. Several
toolkits mentioned how a mentor can assist in nurturing
<table>
<thead>
<tr>
<th>Name of toolkit</th>
<th>Description</th>
<th>Intended user</th>
<th>Competencies</th>
<th>Format</th>
<th>Tools</th>
<th>Author, institution</th>
<th>Weblink</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentoring handbook</td>
<td>Guide for mentees and mentors on the benefits of mentoring and building a relationship. Distinguishes types of mentorship and discusses benefits of mentorship to both mentors and mentees</td>
<td>Mentors and mentees</td>
<td>COM, EXP, UND, and PRO</td>
<td>Descriptive</td>
<td>The Afya Bora Fellowship in Global Health Leadership</td>
<td><a href="http://www.afyaboraconsortium.org/materials/Mentoring%20Handbook.pdf">http://www.afyaboraconsortium.org/materials/Mentoring%20Handbook.pdf</a></td>
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<tr>
<td>Fogarty Fellows Toolkit for Mentoring</td>
<td>Short PowerPoint presentation that provides steps toward institutionalization of mentorship (including 1) Assess needs, 2) develop tools, 3) provide training, and 4) integrate across levels.</td>
<td>Institutions and mentors</td>
<td>DIV, PRO, RES, ETH, and CHA</td>
<td>Descriptive</td>
<td>Fogarty</td>
<td><a href="http://fogartyfellows.org/wp-content/uploads/2015/01/8D3Unt.pdf">http://fogartyfellows.org/wp-content/uploads/2015/01/8D3Unt.pdf</a></td>
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<tr>
<td>Morehouse SOM: Mentoring Academy</td>
<td>Includes mentoring tools we gathered from the Malaria Capacity Development Consortium for mentoring LMIC’s. Explores team mentoring and peer mentoring approaches.</td>
<td>Mentors and mentees</td>
<td>COM, EXP, UND, ETH, CHA, DIV, and PRO</td>
<td>Has both formative and evaluative tools</td>
<td>Morehouse School of Medicine</td>
<td><a href="http://www.msm.edu/Research/research_centers/RCMI/MentoringAcademy/about/main.htm">http://www.msm.edu/Research/research_centers/RCMI/MentoringAcademy/about/main.htm</a></td>
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<tr>
<td>Faculty Mentoring</td>
<td>Includes a list of 10 tips that may be covered in academic mentoring with a focus on obtaining promotions, managing time and work-life, differentiates between types of mentors—primary vs. thematic.</td>
<td>Mentees</td>
<td>COM</td>
<td>Descriptive</td>
<td>N/A</td>
<td>Stanford University</td>
<td><a href="https://med.stanford.edu/academicaffairs/professor/facultyresources/mentoring.html">https://med.stanford.edu/academicaffairs/professor/facultyresources/mentoring.html</a></td>
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<tr>
<td>Guidelines for mentor/mentee conversations</td>
<td>A document with guidelines on conversations between mentor/mentee on the tenure and clinician educator tracks.</td>
<td>Mentors</td>
<td>COM</td>
<td>Descriptive</td>
<td>Perman School of Medicine</td>
<td><a href="https://www.med.upenn.edu/lp/app/docrepo/guidelines-for-mentor-mentee-conversations.html">https://www.med.upenn.edu/lp/app/docrepo/guidelines-for-mentor-mentee-conversations.html</a></td>
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<tr>
<td>Mentoring Program Virtual Binder</td>
<td>Guides for faculty on how to establish mentoring relationships, post-doctoral fellows mentoring standards, sample individual development plans, mentor orientation and guidelines, reference letters</td>
<td>Mentors</td>
<td>COM, EXP, UND, PRO, and ETH</td>
<td>Includes all three mentoring standards; letters, templates, faculty guidelines; orientation and guidelines; links to external resources</td>
<td>CSF/UCSF</td>
<td>University of California</td>
<td><a href="http://csrc.ucsf.edu/mentoring/virtual-binder">http://csrc.ucsf.edu/mentoring/virtual-binder</a></td>
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<tr>
<td>University of Washington Mentoring resources</td>
<td>Specific tools that can be adapted such as sample mentoring agreements and evaluation forms.</td>
<td>Mentors</td>
<td>EXP and UND</td>
<td>Evaluative</td>
<td>University of Washington</td>
<td><a href="https://www.washington.edu/medicine/pediatrics/mentoring/mentoring-conferences.html">https://www.washington.edu/medicine/pediatrics/mentoring/mentoring-conferences.html</a></td>
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<tr>
<td>American Heart Association Mentoring Handbook</td>
<td>A lengthy guide that covers topics related to the forming, maintaining, and concluding mentoring relationships from the perspective of the mentor, mentee, and mentoring environment. Several chapters are focused on cardiovascular science, one chapter is focused on women, underrepresented minorities, and those who have been trained abroad, and another on foreign medical school graduates.</td>
<td>Mentors and mentees</td>
<td>COM, DIV, ETH, EXP, IND, RIS, and UND</td>
<td>Formative and descriptive</td>
<td>American Heart Association</td>
<td><a href="http://my.americanheart.org/idc/groups/aham-public/documents/downloadable/um_319794.pdf">http://my.americanheart.org/idc/groups/aham-public/documents/downloadable/um_319794.pdf</a></td>
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<tr>
<td>CGHHR—Mentoring Modules</td>
<td>6 downloadable modules for mentors and establishing a mentorship program. Modules provide tools for mentors to complete.</td>
<td>Mentors</td>
<td>IND and PRO</td>
<td>Formative</td>
<td>CGHHR</td>
<td><a href="http://www.cghhr.ca/resources/mentorship-and-leadership/mentoring-modules/">http://www.cghhr.ca/resources/mentorship-and-leadership/mentoring-modules/</a></td>
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<tr>
<td>CUGH Field Experience Checklist</td>
<td>Checklist for students preparing for an international health experience. Compilation of questions to ask oneself (scroll to bottom of webpage).</td>
<td>Mentee: HIC traveling to LMIC</td>
<td>EXP and UND</td>
<td>Formative</td>
<td>CUGH</td>
<td><a href="http://www.cugh.ca/content/annotated-list-online-global-health-resources">http://www.cugh.ca/content/annotated-list-online-global-health-resources</a></td>
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<tr>
<td>Faculty Preparation for Global Experiences Toolkit</td>
<td>Discusses considerations for international exchanges and collaborations. Provides an overview of the faculty role in preparing a student to travel, work overseas, this includes a section on &quot;debriefing.&quot;</td>
<td>Mentors preparing HIC students for students for international travel</td>
<td>EXP and COM</td>
<td>Formative</td>
<td>National League for Nursing</td>
<td><a href="http://www.nln.org/docs/default-source/default-document-library/toolkit_facpreplobal.pdf?sfvrsn=8a3825c783696709">http://www.nln.org/docs/default-source/default-document-library/toolkit_facpreplobal.pdf?sfvrsn=8a3825c783696709</a></td>
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<tr>
<td>Getting the Most out of Your Mentoring Relationship (available for members)</td>
<td>An online resource that provides links to webinars, workshops and articles related to developing and maintaining mentorship relationships and programs.</td>
<td>Institutions, Mentors and Mentees</td>
<td>COM, ETH, and PRO</td>
<td>Formative and Descriptive</td>
<td>Association for Women in Science</td>
<td><a href="https://awis.site-ym.com/Mentoring">https://awis.site-ym.com/Mentoring</a></td>
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</tbody>
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(continued)
independence (n = 4) and professional development (n = 8).
Only five mentioned ethics and professionalism, including helping the mentee learn about requirements for authorship and the importance of different authorship positions. Overcoming resource limitations was mentioned by two toolkits and CHA was also included in two toolkits.

**DISCUSSION**

Successful global health research and practice is dependent on strong mentorship, which requires training, guidelines, and standards for mentees, mentors, and mentoring institutions. We undertook this scoping review to identify and evaluate currently available mentoring toolkits. Most of the toolkits identified by the scoping review were developed by organizations in North America. Overall, there is a dearth of resources created by LMICs. In particular, few tools focused on how to support mentoring at the institutional level and few focused on additional competencies (e.g., ethics, resource limitations, CHA). Furthermore, none of the resources published from HIC authors and institutions included information on how they may be adapted to various settings, including LMIC settings.

Most toolkits focused on the individual mentor–mentee relationship. In particular, a number of toolkits provided standardized approaches to evaluate the training outcomes of mentees. Toolkits that focused on the mentee generally highlighted the importance of individualized development plan or similar documents developed together by the mentor and mentee. Many of the guidance documents recommend early engagement with the mentor to help establish rapport, define explicit short- and long-term goals, and clarify mutual expectations. In addition to established toolkits, it is also appreciated that mentors may use academic outputs to monitor trainee progress. For example, the Southern Africa Consortium for Research Excellence uses a logbook as a PhD mentoring tool.

We identified no toolkit that provided specific guidance on group mentorship activities. Group mentorship activities allow for peer mentoring and for mentees to discover a wide range of skillsets and training activities, while facilitating peer-to-peer mentoring. In the absence of formal guidelines for group mentorship activities, some research institutions may develop their own peer-training opportunities, such as “Work in Progress” meetings, where trainees and faculty meet to present and discuss current research of the trainees. This forum provides opportunities for scientific presentation, peer review, and troubleshooting of research challenges, drawing on the experiences of a collective group. Regular English language journal clubs may also be useful. Bringing together mentees at similar career stages for directed activities contributes greatly to achieving milestones. For example, a dedicated writing retreat with those actively working on a manuscript provides motivation for completion and an available audience for peer review of the work. In particular, in a research-constrained environment, where the number of mentors is few, group mentorship may provide a way to overcome limitations and build a supportive community for trainees to facilitate the exchange of ideas to overcome resource limitations and specific institutional challenges.

There are also fewer resources available for mentors to learn about the art and science of mentorship in LMIC settings. From the perspective of mentors, mentorship is positioned within a broader landscape of responsibilities. Competing agendas from teaching, clinical and research obligations...
sometimes interfere with training goals at the site. Mentoring foreign trainees can include overcoming time-consuming and often necessary bureaucratic hurdles such as regulatory approvals, resident permits, and ensuring safety. A successful intercountry mentor–mentee relationship often goes beyond a professional relationship and includes developing rapport with the family, providing personal support (e.g., advice about schools or childcare), and helping accompanying spouses.

Acknowledging the need for well-trained mentors in LMICs, The University of California Global Health Institute has worked in partnership with global health leaders to hold “Mentoring the Mentors” workshops adapted regionally in South America (2013), East Africa (2015), Southern Africa (2016), South Asia (2015), and most recently West and Central Africa (2018). The workshops strived to cover everything from goal setting to institutional self-study, the benefits gained by the institution by systematizing mentoring of mentees and showing better outcomes among those receiving effective mentoring and those who did not; and the need to train faculty and learners to imagine the mentor–mentee relationship not only as a capacity building and development initiative, but also a succession planning activity to ensure continued advancement of health for the country.

Limitations. This scoping review has several limitations. First, toolkits are only one way to strengthen global health mentorship in LMICs. These toolkits are not all-inclusive and have their own design flaws, omissions, and assumptions. We did not formally evaluate the quality of toolkits. Second, there was relatively less material created by LMIC mentors for LMIC mentees, potentially because of not being reached by our online search process. This likely represents the largest gap in use, distribution, and reproduction in any medium, provided the existing mentorship tools to diverse LMIC contexts.

CONCLUSION

Mentorship in global health research and practice is complex, but crucial to effective studies and programs. The toolkits provided in this scoping review provide practical advice for mentorship and can be used to spur change. Future endeavors in this field should seek to develop guidance around group mentoring activities and how to successfully adapt existing mentorship tools to diverse LMIC contexts.

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REFERENCES