The American Thoracic Society Guideline Methodology Training Program

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ABSTRACT

A new era in guideline creation began in 2011 with publication of the Institute of Medicine (now the National Academy of Medicine) Standards for Developing Trustworthy Clinical Practice Guidelines. The American Thoracic Society (ATS) was committed to developing guidelines in accordance with the new standards and decided that an experienced guideline methodologist would be required on ATS guideline projects to ensure correct implementation of the standards. The ATS Guideline Methodology Training Program was launched to increase the pool of trained methodologists. Each year, accepted trainees (methodology scholars) attend a workshop that introduces them to the terminology and process of guideline development and are given the option of participating in a guideline project. Scholars work with the mentorship of a lead methodologist to conduct and then present a systematic review to

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the guideline committee, discuss the evidence, and participate in the development of evidence-based graded recommendations. Scholars have participated in 22 ATS guidelines over the past 9 years, and most remain engaged in guideline development. For the past 2 years, the methodological aspects of all ATS guideline projects were led by graduates of the training program, and several scholars have accepted positions to lead guidelines for other professional societies. Guideline methodology is particularly suitable for clinician educators because the work is clinically oriented, and guidelines confer high academic capital. Those who elect not to continue in guideline development still acquire the skills to perform and publish systematic reviews, as well as to educate trainees in reading and reviewing literature.

**Keywords:**
clinical practice guidelines; professional education; methodology; systematic reviews; evidence synthesis

The Institute of Medicine (now the National Academy of Medicine) published “Standards for Developing Trustworthy Clinical Practice Guidelines” in 2011, heralding a new era in guideline creation. The goals of the standards were to reduce bias and maximize transparency by increasing the methodological rigor of clinical practice guidelines (CPGs) (1). The standards require strict conflict-of-interest management, composition of a committee with a broad spectrum of perspectives, use of systematic reviews to inform recommendations, standardized articulation of recommendations, and ratings of both the quality of evidence and the strength of each recommendation.

The American Thoracic Society (ATS) has a long, proud history of developing CPGs and thus was determined to develop its guidelines in accordance with the new standards. The ATS Documents Development and Implementation Committee (DDIC) decided that an experienced guideline methodologist would be required on all ATS guideline projects to ensure correct implementation of the standards. However, too few methodologists were available to fulfill the demand.

The DDIC sought guideline methodology training programs from which to recruit graduates but was unable to identify any such programs. At that time, most methodologists were being trained by the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) working group based at McMaster University in Ontario, Canada, or by graduates of that program. The DDIC therefore hypothesized that creation of an ATS Guideline Methodology Training Program to teach individuals how to develop CPGs that adhere to the Institute of Medicine (now the National Academy of Medicine) standards would significantly increase the pool of qualified methodologists and standardize the methodological approach to support ATS’s CPG projects. Furthermore, a training program would help fulfill three of four stated missions of the ATS: 1) to advance professional development by training the next generation of guideline methodologists, 2) to transform patient care by increasing the number of high-quality CPGs, and 3) to impact global health by including methodologists from around the world.
The ATS Guideline Methodology Training Program has now existed for 9 years. It has proved to be a particularly good opportunity for clinician educators because the work is clinically oriented, guidelines confer high academic capital, and those who elect not to continue in guideline development still acquire the skills to perform systematic reviews and educate trainees in reading and reviewing literature. Herein, we describe the program and report the outcomes after nearly one decade of training.

HOW THE TRAINING PROGRAM WORKS

Applications to the training program are accepted throughout the year and are available from www.thoracic.org/statements/document-development/.

Each fall, the DDIC collectively reviews and evaluates the applications on the basis of a number of criteria, including previous experience with systematic reviews, communication and conflict resolution skills, availability to commit to a 2-year guideline, and potential to eventually go on to be a lead methodologist on a future guideline. The annual number of trainees (methodology scholars) varies, depending on need and funding, but is typically about five scholars. Accepted scholars attend a workshop in early December that introduces them to the terminology and process of guideline development and then are given the option of participating on the methodology team of a new guideline project beginning in January or deferring to another year if there is not a guideline of interest to them or their personal circumstances do not permit participation in a guideline at that time.

The selection of scholars is carefully timed to coincide with the selection of ATS CPG projects. Each year, proposals for CPGs are reviewed by the assembly planning committees and DDIC during the summer, ranked by the Program Review Committee (formerly the Program Review Subcommittee) during the fall, approved by the Board of Directors in December, and initiated in January. Selection of the scholars during the fall prepares them to join new guideline methodology teams that are assembled in January.

Methodology teams consist of an experienced lead methodologist and several scholars, typically one scholar per one or two clinical questions. Each team is joined by additional stakeholders, from experts in the field to patient representatives, to form a guideline committee. After committee composition, a guideline begins with the formulation of important clinical questions as determined by the panel of experts on the CPG project. The scholars assist the lead methodologist in working with committee members to frame those questions using the PICO (population, intervention, comparator, and outcome) framework and to prioritize outcomes for each question. Once the questions and outcomes are finalized, the scholars work with the mentorship of the lead methodologist to conduct a systematic review for each question. This includes collaborating with a medical librarian to design a search strategy and conduct searches in multiple databases, establishing study selection criteria, screening the titles and abstracts of the search results, reviewing the full texts of articles, extracting data, and aggregating data statistically. A key component of the training is learning to appraise the quality of evidence using the GRADE approach. The scholars present their systematic reviews to the committee, discuss the evidence base, and, alongside the lead methodologist, help the
expert panel contextualize the evidence using GRADE’s Evidence to Decision framework (5) to derive evidence-based, consensus-driven graded recommendations. This work may take up to 2 years to complete, with the scholars typically dedicating 3-5 hours per week to the task (Figure 1).

For their effort, the scholars are typically middle authors on the guideline because the CPG co-chairs are generally granted first and senior authorship. However, if the systematic reviews yield a publishable unit, the scholars and lead methodologist may independently publish those systematic reviews with the scholars as first authors and the lead methodologist as senior author.

In the past, a single scholar was assigned to an entire guideline, but the workload proved too high. Thus, assigning several scholars to a guideline resulted in greater scholar satisfaction and helped complete the CPGs within the 2-year goal. When only one scholar was assigned to a guideline, most scholars felt ready to lead a guideline after participation in only one guideline project, reflecting the wide variety of study designs encountered across multiple guideline questions and, therefore, the broad experience of appraising evidence. Since moving to a strategy of assigning multiple scholars to one guideline project, however, most scholars do not feel ready to lead a guideline methodologically after participation in one
guideline project, because they receive less exposure to a variety of study designs. Typically, scholars return to work on a second or third guideline before feeling confident to assume the lead role.

**TRAINING PROGRAM OUTCOMES**

The ATS Guideline Methodology Training Program is in its ninth year and has enrolled 48 participants. Thirty-four scholars remain in guideline methodology, and 14 scholars have transitioned to careers that focus primarily on research, clinical care, administrative duties, and/or quality assurance. Among the 34 scholars who remain engaged in guideline development, 8 scholars (24%) are now lead methodologists, 8 scholars (24%) will likely be qualified as lead methodologists upon completion of their current guideline assignment, and 18 scholars (53%) are in the early stages of their training and still working toward independence (Figure 2).

Among the lead methodologists, one now leads the American College of Chest Physicians’ guideline program, and numerous others have accepted positions or have been contracted to lead guidelines for other professional societies. For the past 2 years, the methodological aspects of all ATS guideline projects were led by graduates of the training program.

Scholars have had a substantial impact on the CPGs produced by ATS, having spearheaded the methodology of 22 ATS guidelines. Past and present methodology scholars were surveyed with 33 (69%) of 48 responding (Table 1). Fifty-seven percent estimated that they worked on one or two questions for their guideline, and 73% considered the time commitment “just right,” with 60% estimating that they spent 3–5 hours per week on guideline-related tasks, followed by 20% estimating that they spent 6–8 hours per week on such tasks.

Although 36% reported receiving authorship on the guideline alone, 50% reported receiving authorship on the guideline plus three or four systematic reviews. Ninety-three percent indicated that their knowledge of guideline methodology was “very useful” or “essential,” 83% reported feeling “definitely supported” by ATS during guideline development, and 97% said that

**Figure 2. American Thoracic Society guideline methodology training program outcomes.**
Table 1. Results of a survey of American Thoracic Society Guideline Methodology Training Program scholars

| Category                                                                 | Number of Scholars | Percentage of Scholars |
|--------------------------------------------------------------------------|--------------------|------------------------|
| How many guidelines have you participated in?                            |                    |                        |
| 0, beginning first guideline soon                                        | 3                  | 9                      |
| 1                                                                        | 14                 | 42                     |
| 2                                                                        | 10                 | 30                     |
| 3                                                                        | 3                  | 9                      |
| 4                                                                        | 3                  | 9                      |
| On average, how many questions or recommendations did you work on?       |                    |                        |
| 1                                                                        | 8                  | 27                     |
| 2                                                                        | 9                  | 30                     |
| 3                                                                        | 4                  | 13                     |
| 4                                                                        | 2                  | 7                      |
| 5                                                                        | 1                  | 3                      |
| 6 or more                                                                | 6                  | 20                     |
| Not applicable                                                           | 3                  | 3                      |
| On average, how many hours per week were spent working on the guideline? |                    |                        |
| 0–2                                                                      | 3                  | 10                     |
| 3–5                                                                      | 18                 | 60                     |
| 6–8                                                                      | 6                  | 20                     |
| 9–11                                                                     | 2                  | 7                      |
| 12–14                                                                    | 0                  | 0                      |
| 15 or more                                                               | 1                  | 3                      |
| Not applicable                                                           | 3                  | 3                      |
| How would you rate the time commitment required for your guideline?      |                    |                        |
| Extremely easy                                                           | 0                  | 0                      |
| Somewhat easy                                                            | 3                  | 10                     |
| Just right                                                               | 22                 | 73                     |
| Somewhat overwhelming                                                    | 5                  | 17                     |
| Completely overwhelming                                                  | 0                  | 0                      |
| Not applicable                                                           | 3                  | 3                      |
| Category                                      | Number of Scholars | Percentage of Scholars |
|----------------------------------------------|--------------------|------------------------|
| How many peer-reviewed publications did you author related to your guideline? |                    |                        |
| Guideline only                               | 11                 | 36                     |
| Guideline plus one systematic review         | 5                  | 17                     |
| Guideline plus two systematic reviews        | 2                  | 7                      |
| Guideline plus three systematic reviews      | 7                  | 23                     |
| Guideline plus four or more systematic reviews | 5               | 17                     |
| Not applicable                               | 3                  |                        |
| Does your current career involve guideline methodology? |                  |                        |
| Yes                                          | 27                 | 84                     |
| No                                           | 5                  | 16                     |
| Did not respond                              | 1                  |                        |
| Does your current career involve evidence synthesis? |                |                        |
| Yes                                          | 30                 | 91                     |
| No                                           | 3                  | 9                      |
| How useful has your knowledge of guideline methodology been to your career? |          |                        |
| Not useful                                   | 0                  | 0                      |
| A little useful                              | 2                  | 6                      |
| Very useful                                  | 19                 | 59                     |
| Essential                                    | 11                 | 34                     |
| Did not respond                              | 1                  |                        |
| How useful has your knowledge of evidence synthesis been to your career? |          |                        |
| Not useful                                   | 0                  | 0                      |
| A little useful                              | 2                  | 6                      |
| Very useful                                  | 15                 | 47                     |
| Essential                                    | 15                 | 47                     |
| Did not respond                              | 1                  |                        |

Table 1. Continued.
they would participate in the training program again if they could go back in time. Notably, the survey was likely enriched with those enthusiastic about guideline development because 71% of those accepted to the training program remain in guideline methodology, but 84% of the survey respondents indicated that they are still active in guideline methodology. Scholars benefit from networking and mentorship opportunities provided by working with a panel of experts. The skills developed during their methodology training also provide opportunities for scholars beyond those available just within ATS. There are many potential options for scholars, including contributing to guidelines developed by other academic societies, developing institutional guidelines, creating educational modules on GRADE methodology and evidence-based medicine, and providing content expertise related to systematic reviews and meta-analyses performed at their own institutions.

**FUTURE OF THE TRAINING PROGRAM**

The DDIC wants to build on the successes of the ATS Guideline Methodology Training Program. This year, the committee plans to derive a list of core competencies that scholars must master to graduate from the training program and to develop an assessment strategy. Once metrics are established, the DDIC plans to collaborate with ATS’s leadership to investigate the creation of an ATS certification for guideline methodology. If this vision becomes a reality, the ATS would become only the second organization to offer certification in guideline methodology. The recently established INGUIDE...
(International Guideline Development Credentialing and Certification) program, a collaboration between the Guideline International Network and McMaster University’s Department of Health Research Methods, Evidence, and Impact, also offers certification for guideline participants, chairs, and methodologists (6). However, the INGUIDE program differs substantially from the ATS guideline methodology program, given that the former is primarily didactic and the latter is best considered a hands-on apprenticeship.

**WHAT TYPE OF INDIVIDUAL THRIVES IN THE PROGRAM?**

The guideline methodology training program has attracted a wide variety of scholars (Table 2). Twenty (42%) were women. Forty (83%) entered as instructors, assistant professors, or associate professors; five (10%) as fellows; two (4%) as full professors; and one (2%) as a medical student. Thirty-nine (81%) had an M.D. degree, four (8%) had a Ph.D. degree, two (4%) had a combined M.D./Ph.D. degree, two (4%) had a Pharm.D. degree, and one (2%) was a

| Table 2. Characteristics of American Thoracic Society Guideline Methodology Training Program scholars |
|--------------------------------------------------|-----------------|-----------------|
| **Category** | **Number of Scholars** | **Percentage of Scholars** |
| Sex | | |
| Female | 20 | 42 |
| Male | 28 | 58 |
| Seniority | | |
| Medical student | 1 | 2 |
| Fellow | 5 | 10 |
| Junior faculty* | 40 | 83 |
| Senior faculty† | 2 | 4 |
| Degree | | |
| M.D. | 39 | 81 |
| Ph.D. | 4 | 8 |
| M.D./Ph.D. | 2 | 4 |
| Pharm.D. | 2 | 4 |
| No doctoral degree | 1 | 2 |
| Geographic location | | |
| United States | 43 | 90 |
| Australia | 3 | 6 |
| Europe | 1 | 2 |
| Middle East | 1 | 2 |

*Junior faculty defined as instructor, assistant professor, or associate professor.
†Senior faculty defined as full professor.
medical student who had not yet earned her doctoral degree. Finally, 43 (90%) were based in the United States, 3 (6%) in Australia, 1 in the United Kingdom (2%), and 1 in the Middle East (2%). Data on race, ethnicity, and practice setting are not available.

Scholars who perform the best and gain the most from the program are those who have dedicated time in their weekly schedule to focus on the work without being distracted by other commitments and who have prior experience with evidence synthesis, particularly systematic reviews. Evidence synthesis tends to be task oriented; therefore, organized and efficient workers tend to excel. Degree and discipline (e.g., M.D., Ph.D., Pharm.D.), specialty (e.g., pulmonary, critical care, sleep), and seniority (i.e., fellow, junior faculty, midcareer faculty) do not appear to influence performance (as indicated by mentor evaluations), except to the extent that available time is affected.

It is noteworthy that guideline methodology may be particularly suitable for clinician educators. Clinician educator positions are largely paid by clinical work, but academic products are expected as a condition of practicing in an academic medical center. Guideline methodology is a good fit for such positions because the work is clinically oriented, it can be easily set aside temporarily when one goes on clinical service, and it can be done remotely from any location with internet access. Furthermore, guidelines confer high academic capital with publications in high-impact journals with frequent secondary citations. Those who elect not to continue in guideline development still acquire the skills to perform and publish systematic reviews, as well as to educate trainees in reading and reviewing literature. This is not meant to imply that pure clinicians and researchers cannot excel in guideline methodology, only that they have to balance more demands to do so.

CONCLUSIONS

Nearly a decade ago, the DDIC hypothesized that creation of an apprenticeship to formally teach how to develop CPGs in accordance with modern era standards would build the supply of methodologists available to support ATS’s CPG projects. The vision gave rise to the ATS Guideline Methodology Training Program, which has evolved to meet the needs of participants, the ATS, and the larger guideline community. The training program fulfilled its mission because all ATS guidelines initiated during the past 2 years have been led methodologically by program graduates. An unexpected but desirable consequence, however, is that the training program has launched a new career pathway, with graduates leading or working for other professional societies to develop CPGs. For more information about the program, contact Kevin C. Wilson, M.D. (kwilson@thoracic.org).

Author disclosures are available with the text of this article at www.atsjournals.org.

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