

Teaching Immunization

for Medical Education (TIME)



Facilitator's Guide to the Multistation Clinical Teaching Scenarios (MCTS) Method and the TIME Project

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Introduction

Module Organization

Multistation clinical teaching scenarios (MCTS) were developed to encourage active learning in a small-group setting with a modest amount of faculty time. The MCTS materials include a Facilitator's Guide to the program and a Small Group Booklet and Facilitator's Answer Key for each module.

Facilitator's Guide to MCTS Method and the TIME Project

This manual includes information about the development and history of the modules and instructions for the facilitator.

Small-Group Booklet - Module Specific

Each small group of 2 to 5 students or residents should receive one *Small-Group Booklet*. PDF files are available from the Association for Prevention Teaching and Research's website: www.aptrweb.org. The booklet contains a list of the session's objectives, the module pages (each presenting a case scenario), related learning aids (e.g., graphs and abstracts), and questions to answer.

Facilitator Answer Key – Module Specific

This Key provides lists of suggested references on the particular module topic, module questions and suggested answers with teaching points, a sample test and answers to the sample test. PDF files are available from the Association for Prevention Teaching and Research's website: www.aptrweb.org.

The Teaching Immunization for Medical Education (TIME) Project

The Teaching Immunization for Medical Education (TIME) Project is a collaboration of the Association for Prevention Teaching and Research (APTR) and the Centers for Disease Control and Prevention (CDC).¹ The Advisory Committee of representatives from professional and educational organizations* provided guidance in all activities leading to the development of the original modules in the TIME series. A survey to assess the teaching of immunization in medical schools and residency programs was conducted prior to development of the original series.²⁻³ In response to deficiencies revealed by the survey, the Advisory Committee envisioned a resource to assist the educator and to provide information to practicing physicians. From a framework of core curriculum objectives, the TIME resources were created to offer a variety of educational modules for integration into existing curricula or for self-study by practicing physicians.⁴⁻⁷ Case-based materials were developed by a multidisciplinary team and widely field-tested:

Multistation Clinical Teaching Scenarios (MCTS) - encourages active, small-group learning, uses modest amounts of faculty and learner time, and is objective-driven. MCTS modules are available for hepatitis B, influenza, measles, pertussis, childhood vaccination, adult vaccination, and *Haemophilus influenzae* type b.⁸

*The organizations include the American Academy of Pediatrics, the American College of Obstetricians and Gynecologists, the American College of Physicians, the American College of Preventive Medicine, the American Medical Association, the American Osteopathic Association, the Association of American Medical Colleges, the Association for Prevention Teaching and Research, the Centers for Disease Control and Prevention (CDC), the Interamerican College of Physicians and Surgeons, the National Medical Association, the Society of General Internal Medicine, and the Society of Teachers of Family Medicine.

Information for Facilitators

Background on the Multistation Clinical Teaching Scenarios (MCTS) Method

The multistation clinical teaching scenarios were developed to encourage active small-group learning in a clinically relevant context with a modest amount of faculty time. The time commitment of both the facilitator and the student is typically 50 to 90 minutes, depending on the setting and goals. The MCTS teaching method may be readily used in medical pre-clinical and clinical years when students' or residents' time is limited. MCTS is well-suited to objective driven curricula. In the MCTS session, one facilitator can interact with groups ranging from 10 to 30 residents or students. The facilitator needs basic knowledge about the disease and immunization covered but does not need to be a content expert.

MCTS was developed at Harvard University to teach radiology.⁹ Viewboxes were displayed around a room and small groups of students rotated between viewboxes. At each viewbox, a clinical history was given along with questions (e.g., What is the differential diagnosis?).

W. Scott Schroth, MD, modified this approach to teach medical students during a primary care clerkship at George Washington University.¹⁰ Students rotated between stations that consisted of microscopes (e.g., Gram stain and urine specimens), X-rays, and brief histories. After all cases were completed, the facilitator led a discussion of the relevant teaching points. This approach was adapted by the authors for use with vaccine-preventable diseases.

Students and residents are assigned to small groups of 2 to 5 for an MCTS session. All of the small groups simultaneously address the first scenario. Each small group spends approximately 5 to 10 minutes attempting to solve the problem addressed in the scenario. The scenario is then discussed in a large group. The facilitator calls on one of the small groups to present their answers, then the facilitator and the large group

discuss each small group's response to the scenario and summarize the teaching points. The facilitator should correct wrong answers and discuss the teaching points. Generally, the large-group discussion should not last more than 7 minutes per scenario. After the first scenario is discussed, each small group works on the second scenario. A large-group discussion follows. The process is repeated until all scenarios are completed or the allotted time expires.

MCTS Module Development and Evaluation

A multidisciplinary team at the University of Pittsburgh, with expertise in preventive medicine, public health, family practice, pediatric infectious diseases, adult infectious diseases, and education evaluation, developed the MCTS materials in consultation with a general internist at George Washington University.

The curricular goals are to: (1) increase learner knowledge about vaccine-preventable diseases, vaccines, indications for vaccinations, and methods to increase vaccine coverage; (2) foster problem-solving abilities; (3) stimulate learning in a clinical context; and (4) help learners gain familiarity with key references such as the recommendations of the Advisory Committee on Immunization Practices (ACIP).

The first step in developing the modules was the creation of specific learning objectives that used the spectrum of Bloom's taxonomy, when possible.¹¹ After development and revision of the learning objectives, actual clinical cases were sought from hospital and medical office records and modified for teaching purposes. Additional scenarios were written to address objectives not covered by the clinical cases.

Following development, the scenarios were pilot-tested with students or residents from the University of Pittsburgh School of Medicine, George Washington University School of Medicine, and Saint Margaret Memorial Hospital Family Practice Residency (Pittsburgh, Pennsylvania). The materials were subsequently revised. Formative evaluation was used for modification, via pilot-testing, of the assessment tools.

Subsequently, summative evaluation was done by field-testing the materials at other medical schools and residencies for an independent evaluation.*

The purposes of the field test were to (1) examine the degree to which the students and residents met the learning objectives, (2) assess their perceptions of the teaching method, and (3) examine the feasibility and acceptability of the curriculum to the institution. Mastery levels were defined using the modified Nedelsky procedure.¹²⁻¹³

Three experts rated the likelihood that a minimally competent learner would know whether or not each alternative answer in a multiple choice question was correct. Then, the mastery level was calculated using the Nedelsky formulas and rounded, with the result that third-year medical students and second-year residents needed to achieve scores of 50% and 60%, respectively, in order to pass the posttest.

Results of the field test revealed that depending on the subject, 96% to 99% of MCTS learners achieved mastery on the posttest.¹⁴ Mean increases in scores from the 10-item pretest to the posttest were 3.2 items for measles; 3.8 items for influenza; and 1.8 items for hepatitis B, ($p < .01$ for each). Virtually all (99%) of the learners rated the MCTS sessions overall as very good or good. Furthermore, they found the sessions interesting (98%), agreed that the MCTS session made a valuable contribution to their learning (98%), rated the information learned in the session as applicable (100%), and liked MCTS as a learning method (94%).

The facilitators generally rated the materials highly. All (100%) felt that materials were clear and most (89%) rated the session overall as very good or good. Conference calls were conducted with participants at the field-test sites for further evaluation. Following field-testing, and review by CDC, the materials were revised.

Since initial publication, updates have been made periodically, as vaccination science and policy have changed.

*Field test sites included Albert Einstein College of Medicine of Yeshiva University, George Washington University School of Medicine, Hahnemann University, Mayo Medical School-Mayo Clinic and Foundation, Shadyside Hospital (Pittsburgh), West Virginia University School of Medicine, University of Louisville, University of Maryland School of Medicine, University of Puerto Rico School of Medicine.

Strategies for using the MCTS Modules

The content of the scenarios fits into the following categories: (1) description of a vaccine-preventable disease (usually the first scenario in a module), (2) missed opportunities to vaccinate, resulting in vaccine-preventable diseases, (3) outbreak investigation or control, (4) quality assessment and quality improvement of vaccination rates, and (5) vaccination decisions for a given clinical situation. The most pertinent scenarios can be selected or all can be used, at the discretion of the facilitator. If time is limited, the most important scenarios to cover are scenarios 1, 2, 3 or 5. We recommend that facilitators limit the small group time per scenario to approximately 8 minutes, depending on the complexity of the scenario and the education level of the learners.

Here are some possible settings for these materials:

- 1) Noon conference or the equivalent – three or four of the scenarios can be covered within 45 to 60 minutes. Residents have enjoyed the change from lecture or seminar to small-group learning experience.
- 2) Small-group breakout sessions to complement lectures in pre-clinical microbiology, immunology, and epidemiology courses.
- 3) Curriculum of a primary care clerkship – the materials have been used successfully as part of primary care clerkships, including clerkships in family practice, internal medicine, and pediatrics. Several scenarios can be selected to fit within the allotted period.
- 4) Workshops for residents, fellows, or providers – a longer block of time can be devoted to covering many in depth or all of the scenarios in one or two modules.

- 5) Grand Rounds – materials have been used in multidisciplinary Grand Rounds, resulting in intriguing discussions.

- 6) A "mix and match" option allows representative adult or childhood vaccinations to be covered in any of the above settings within one session. For instance, two of the hepatitis B scenarios and two of the influenza scenarios could be covered in the same session.

This material was developed from recommendations of the Advisory Committee on Immunization Practices (ACIP), published by the Centers for Disease Control and Prevention. The facilitator should use the most recent version available.

www.cdc.gov/vaccines/pubs/ACIP-list.htm

Preparation List for the Facilitator

- ___ Obtain a location and date to meet. A comfortable room with tables surrounded by movable chairs is ideal.

- ___ For each small group, obtain a copy of the Small-Group Booklet from APTR's website: www.aptrweb.org/resources/curriculum_time.html.

- ___ Have reference materials available: appropriate Pink Book chapters www.cdc.gov/vaccines/pubs/pinkbook/pink-chapters.htm and/or slide sets www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm from CDC's web site, internet access to CDC's website www.cdc.gov/vaccines and/or *SHOTS* software from www.immunizationed.org.

- ___ Choose the scenarios to be discussed. Typically, a group can cover three to four scenarios within one hour (students are often slower than residents).

- ___ Have basic familiarity with the vaccine, prevention strategies, and this MCTS module. Basic familiarity, rather than content expertise, is needed. See the section "Sources of Information" for suggested resources.

Suggested Schedule

1. Arrange chairs in groups of 3 to 5, and separate students or residents into small groups.
2. Distribute one copy of the *Small-Group Booklet* to each group along with a copy of the learning aids listed for the scenarios to be discussed. A major learning aid is needed: appropriate Pink Book chapters www.cdc.gov/vaccines/pubs/pinkbook/pink-chapters.htm and/or slide sets www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm from CDC's web site, *SHOTS* software from www.immunizationed.org, and/or internet access to CDC's website www.cdc.gov/vaccines. Review the objectives briefly, focusing on the primary objectives.
3. Instruct the students or residents to start the first scenario by having one member of each small group read the scenario aloud. Subsequently, each small group should work on answering the questions for that scenario. To answer the questions, the learners should use their previous knowledge and experience, the resource materials/internet, and the abstracts included in selected scenarios. Instruct them to divide the resource materials since each individual may not have time to read all of the materials.
4. Convene as a large group after 5 to 10 minutes, depending upon the complexity of the scenario. Select one group to present their answers to the questions. Critique their answers and discuss the teaching points for 5 to 7 minutes.
5. Repeat steps 4 and 5 for the remaining scenarios that have been selected.

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