

## **RESEARCH FROM BENCH TO BEDSIDE TO COMMUNITY**

**OVERVIEW:** The Research from Bench to Bedside to Community version of the Research-Based PME event follows research as it goes from the laboratory to the patient and then on to the community. This program provides information about how medical research is conducted, funded, and managed along the way. Topics include basic, clinical, health services, community and population, and translational research, National Institutes of Health (NIH) funding, conflicts of interest, and the path to becoming a researcher.

### **OBJECTIVES:**

- Explain how medical research is conducted and funded.
- Discuss and introduce participants to the institutions and individuals involved in research and their roles.
- Describe the various funding sources of medical research.
- Discuss various career options for medical researchers and explain the training pipeline.
- Explain how research begins in a laboratory and outline the process that helps get those breakthroughs to patients or the community, or creates better care.
- Provide various examples of current vital medical research studies happening at your institution.

### **SUGGESTED PRESENTERS:**

- Medical researchers
- Hospital CEO or director of research
- Medical school dean
- Dean of research
- Medical students
- Residents
- Patients

**SUGGESTED TIME:** 1–1½ days

### **AGENDA:**

- Basic science research
- Clinical research
- Health services research
- Community and population research
- Translational research

## OVERARCHING KEY TOPICS:

- What are the different types of research? Explain them in reference to the parts of the day.
  - Basic science research, which provides the foundation of knowledge for the applied science that follows.
  - Clinical research, which determines the safety and effectiveness of medications, devices, diagnostic products, and treatment regimens.
  - Community and population research, which characterizes, explains, and influences the levels and distributions of health within and across populations.
  - Health services research, which studies access and consumption of health care services, focusing on utilization, costs, quality, delivery, organization, financing, and outcomes.
  - Translational research, which applies findings from each type of research described above and “translates” it to the next stage (for example, from basic to clinical, from clinical to community, and from community to basic research).
  
- Why is medical research important?
  - Medical research is the beginning of hope for millions of Americans suffering from debilitating diseases.
  - Medical researchers are working toward future cures and prevention methods and providing millions of Americans with a longer and higher-quality life.
  - Federally funded medical research accelerates local economies by spurring jobs and innovation.
  
- How is medical research funded?
  - Much of medical research is funded through the NIH, a federal agency within the Department of Health and Human Services.
    - Much of NIH-funded research does not occur at its Bethesda headquarters, but at research facilities across the country.
    - Half of all external research funded by the NIH is performed at medical schools and teaching hospitals nationwide. (Share examples of the research your institution conducts that is funded by NIH grants.)
  - Other research is funded by the Department of Veterans Affairs (VA) or other federal agencies. (Share examples of the research your institution conducts that is funded by VA or other federal agency grants.)
  - Research also can be funded by industry. (Discuss how your institution manages conflicts of interest, especially with regard to industry-funded research.)
  - Discuss how your institution covers costs that are not covered by the NIH, VA, other agencies, or industry, how much that is, and what types of costs those tend to be.
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- Discuss the timeline for going from bench to bedside to community and how and where government funding occurs.
- How does your institution work with potential beneficiaries of research to understand what outcomes matter to them?
  - Discuss how patient engagement is crucial to understanding the outcomes that matter most to individuals and their families, who are affected directly by new drugs and devices.
  - Explain how community engagement can identify research questions that matter to area residents, health and health care needs that can be addressed through science, and community assets that can assist with the development, implementation, and evaluation of clinical and community-based interventions.
  - Explain how all research—from basic to clinical to population—can be conducted through a lens of health equity. Such examination allows researchers and patients to describe avoidable and systematic group differences in health, understand why such gaps exist, and develop interventions that ensure that all Americans have the opportunity to attain their best possible health.

## RESOURCES:

[\*Medical Research\*](#) (webpage)

[\*Medical Research Funding and Regulation\*](#) (webpage)

[\*The Economic Impact of AAMC Medical Schools and Teaching Hospitals \(2018\) - Research\*](#) (website)

[\*Academic Medicine Investment in Medical Research\*](#) (PDF)

[\*Research Means Hope\*](#) (website)

[\*The Value of NIH-Funded Research at Medical Schools and Teaching Hospitals\*](#) (infographic)

[\*Basic Science\*](#) (website)

[\*Health Equity Research and Policy\*](#) (website)

[\*National Center for Advancing Translational Science's Research Spectrum\*](#) (graphic)

## ***BASIC SCIENCE RESEARCH***

**OVERVIEW:** The bench-to-bedside-to-community continuum begins in the laboratory, where participants discuss a research project with a medical researcher. This provides general knowledge of medical research and insights into how research labs are managed.

### **OBJECTIVES:**

- Discuss a single research program or project and relate it back to medical research, broadly.
- Explain how medical research is conducted.
- Discuss various career options for medical researchers and explain the training pipeline.
- Provide various examples of current vital medical research studies happening at your institution and discuss the sources of funding.

### **SUGGESTED PRESENTERS:**

- Medical researcher
- Hospital director of research
- Dean of research

**SUGGESTED TIME:** 1½ hours

### **KEY TOPICS:**

- What is basic science research?
  - Describe how it is conducted.
  - Discuss the benefits of basic science research.
  - Explain how basic science research provides the foundation of knowledge for the applied science that follows.
  - Explain the disciplines that basic science research encompasses.
  - Discuss how basic science research can affect, and be affected by, the other types of research.
- How is basic science research funded?
  - Explain the value of funding basic research in light of its longer lead time from outset to discovery and the need to investigate all avenues that could lead to tomorrow's treatments and cures.
  - Discuss where federal and private-sector funding come into play along the research timeline.

# PROJECT MEDICAL EDUCATION



- How do you become a researcher?
  - Discuss institutional and national efforts to support new and early-stage investigators.
  - Highlight efforts to increase the diversity of the medical research workforce.
  - Discuss the MD-PhD track curriculum.
  - Explain the National Institute of General Medical Sciences (NIGMS) Medical Scientist Training Program (MSTP).
  - Discuss the PhD track curriculum.
  - Discuss ways for an MD to become a researcher.
  - Talk about postdoctoral training.
  - Discuss the costs of an education in research.

## **ACTIVITIES:**

- Have medical researchers discuss projects in a laboratory setting. Encourage hands-on participation. For example, have participants look through microscopes, examine results, and conduct tests.
- Give an introductory presentation about the history of NIH-funded medical research and current funding issues. Place special emphasis how federal budget cuts have limited research opportunities at your institution.
- Explain the process of applying for an NIH grant and show how competition has increased with the decrease of federal funds. Give participants their “NIH Grant Award Letters.”
- Provide a tour of your institution’s laboratories.

## **RECOMMENDATIONS:**

- Encourage presenters to interact with participants. Make this a dynamic discussion, rather than a one-way flow of communication. Set this tone for the day early in the program by telling participants that you want the day to be a dialogue and inviting them to interrupt presenters to ask questions. Always attempt to make presentations more hands-on.
- When recruiting presenters, select those who have a history of effective communication with lay audiences. Most PME participants come from a background with little knowledge of medical science. Presenters should not assume that the audience has knowledge of basic medical concepts. Stay away from medical jargon. Coach presenters prior to the event and encourage them to be mindful of their audience when presenting.

# PROJECT MEDICAL EDUCATION



- If possible, avoid conducting labs or experiments involving animals. Medical schools and teaching hospitals closely adhere to high ethical standards when using animals in medical research; however, this is a controversial issue. If the program does expose participants to animal research, be sure to follow your institution's guidelines and prepare for questions.
- If possible, avoid conducting labs or experiments involving fetal tissue or human embryonic stem cells (as opposed to adult stem cells or induced pluripotent stem cells) as well. Although these types of research are important to human medicine and are strictly controlled for ethical standards, they nevertheless remain controversial with some sectors of the public. The importance of such research can be demonstrated in other, topical forums.
- Describe the challenges in securing funding for this complex process and the necessity of forming research partnerships with private-sector businesses, as well as conflict-of-interest policies.

## ***CLINICAL RESEARCH***

**OVERVIEW:** This portion of the event focuses on how research is used to determine the safety and effectiveness of medications, devices, diagnostic products, and treatment regimens. Participants engage with trial leaders and others who manage clinical trials to discuss how trials are run and their benefits.

### **OBJECTIVES:**

- Explain how clinical trials are conducted.
- Discuss clinical trials funding.
- Clarify the roles of researchers, physicians, and patients in clinical trials.
- Share the privacy concerns related to clinical trials and how your institution manages those concerns.
- Discuss some clinical trials that have been conducted at your institution.

### **SUGGESTED PRESENTERS:**

- Clinical trial leaders
- Physicians
- Residents
- Medical researchers
- Hospital director of research
- Dean of research

**SUGGESTED TIME:** 1½ hours

# PROJECT MEDICAL EDUCATION



## KEY TOPICS:

- What is clinical research?
  - Describe how clinical research is conducted.
  - Identify how participants enroll in clinical trials.
  
  - Discuss the benefits of clinical research.
  - Describe clinical trials currently being run at your institution.
  - Describe clinical trials that have been run at your institution and what the outcomes were.
- How is clinical research funded?
  - Discuss the federal agencies, predominantly the NIH, that fund clinical research
  - Describe how clinical research can be funded by industry or others.
    - Explain how you manage conflict of interest.
- How does clinical research intersect with patient care and education?
  - Describe how medical students and residents interact with clinical trials.
  - Describe how patient care is affected by clinical research.
    - Discuss the implications and effects of clinical trials on patients in the trials.
    - Explain how patient care is affected by the results of clinical trials.
- What are the privacy concerns related to clinical trials, and how does your institution address them?
- What are the diversity concerns associated with clinical trials, and how does your institution address them?

## ACTIVITIES:

- Have participants run a mock trial or attempt to gain consent for a trial from a standardized or mock patient.
- Have a roundtable discussion with patients who have benefited from clinical trials in the past.
- Discuss the benefits and history of clinical research.

## **RECOMMENDATIONS:**

- Encourage presenters to interact with participants. Make this a dynamic discussion, rather than a one-way flow of communication. Set this tone for the day early in the program by telling participants that you want the day to be a dialogue and inviting them to interrupt presenters to ask questions. Always attempt to make presentations more hands-on.
- When recruiting presenters, select those who have a history of effective communication with lay audiences. Most PME participants come from a background with little knowledge of medical science. Presenters should not assume that the audience has knowledge of basic medical concepts. Stay away from medical jargon. Coach presenters prior to the event and encourage them to be mindful of their audience when presenting.
- Prepare and distribute a list of clinical trials your institution is currently running.

## ***HEALTH SERVICES RESEARCH***

**OVERVIEW:** This section focuses on how research examines and affects the utilization of health care resources. Participants interact with researchers studying the health care delivery system and how costs, quality, and financing affect patient outcomes.

## **OBJECTIVES:**

- Explain health services research.
- Discuss how the results of health services research have affected care delivery, costs, and outcomes at your institution.

## **SUGGESTED PRESENTERS:**

- Health services researchers
- Physicians
- Residents
- Hospital director of research
- Dean of research

**SUGGESTED TIME:** 1½ hours

## **KEY TOPICS:**

- What is health services research?
  - Discuss current health services research going on at your institution.
  - Discuss how you have implemented findings of health services research conducted at your institution.

- How is health services research funded?
  - Discuss the creation of the Patient-Centered Outcomes Research Institute (PCORI) and the types of research it funds, specifically at your institution.
  - Discuss the Agency for Healthcare Research and Quality (AHRQ) and the types of research it funds.
  - Discuss other funding mechanisms for health services research.
- How does health services research intersect with patient care and education?
  - How do medical students and residents interact with health services research?
  - How is patient care affected by health services research?

## **ACTIVITIES:**

- Have participants run a mock clinical effectiveness assessment.
- Have a roundtable discussion with patients who have benefited from health services research or with hospital administrators who have implemented changes based on the results of health services research.
- Discuss the benefits and history of health services research.

## **RECOMMENDATIONS:**

- Encourage presenters to interact with participants. Make this a dynamic discussion, rather than a one-way flow of communication. Set this tone for the day early in the program by telling participants that you want the day to be a dialogue and inviting them to interrupt presenters to ask questions. Always attempt to make presentations more hands-on.
- When recruiting presenters, select those who have a history of effective communication with lay audiences. Most PME participants come from a background with little knowledge of medical science. Presenters should not assume that the audience has knowledge of basic medical concepts. Stay away from medical jargon. Coach presenters prior to the event and encourage them to be mindful of their audience when presenting.

## ***COMMUNITY AND POPULATION RESEARCH***

**OVERVIEW:** This portion of the event focuses on how researchers characterize, explain, and influence the levels and distributions of health within and across populations. Participants engage with researchers, physician researchers, and physicians who are working to address health outcomes, health determinants, and policies and interventions that link the two.

# PROJECT MEDICAL EDUCATION



## **OBJECTIVES:**

- Discuss how research can affect health outcomes and health determinants.
- Explain the interaction between research institutions and their communities.
- Provide examples of the community and population research occurring at your institution.

## **SUGGESTED PRESENTERS:**

- Physicians
- Residents
- Medical researchers
- Hospital director of research
- Dean of research

## **SUGGESTED TIME:** 1½ hours

## **KEY TOPICS:**

- What is community and population research?
  - Explain how research can address health outcomes and health determinants.
  - Explain how policies and interventions can link the two.
- How does your institution engage your community in research?
  - Describe how you determine what research will be important to your community.
  - Describe how you execute interventions within your community.
  - Discuss how you partner with other institutions or organizations to implement research efforts or interventions in your community.
- What are the unique aspects of funding for community and population research?

## **ACTIVITIES:**

- Have residents discuss how new research has influenced their training and the care they provide to patients. Consider having participants tour a hospital floor or conduct rounds showing patients they have treated with new techniques, devices, or medicines.
- Discuss the benefits and history of community and population research.

## **RECOMMENDATIONS:**

- Encourage presenters to interact with participants. Make this a dynamic discussion, rather than a one-way flow of communication. Set this tone for the day early in the program by telling participants that you want the day to be a dialogue and inviting them to interrupt presenters to ask questions. Always attempt to make presentations more hands-on.

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- When recruiting presenters, select those who have a history of effective communication with lay audiences. Most PME participants come from a background with little knowledge of medical science. Presenters should not assume that the audience has knowledge of basic medical concepts. Stay away from medical jargon. Coach presenters prior to the event and encourage them to be mindful of their audience when presenting.
- Prepare and distribute a list of significant discoveries or interventions that have arisen from research at your institution.

## ***TRANSLATIONAL RESEARCH***

**OVERVIEW:** This portion of the event focuses on how findings from each type of research are applied to medical practice and meaningful health outcomes. Participants engage with residents and physicians who are taking what has been learned through basic, clinical, or population research and applying it to the way they treat patients and the devices and medicines they prescribe.

### **OBJECTIVES:**

- Discuss how research has led to techniques, devices, and medicines in use today.
- Explain the difference between basic, clinical, and community and population research.
- Explain the interaction between research institutions, medical schools, teaching hospitals, and other institutions.

### **SUGGESTED PRESENTERS:**

- Physicians
- Residents
- Medical researchers
- Hospital director of research
- Dean of research

**SUGGESTED TIME:** 1½ hours

### **KEY TOPICS:**

- What is translational research?
  - Explain how research moves from one type to another and how it follows along the bench-to-bedside-to-community continuum. Include how research questions from the community can spark new basic research.
  - Describe the translational research continuum.

- How have you translated research from bench to bedside to community at your institution?
  - Describe advances in care that have come as a result of research.
  - Discuss what new techniques you are using.
  - Describe what new devices your institution has used with patients.
  - Describe what drugs or medicines you have prescribed.
  - Discuss community interventions you have implemented.
- What are the benefits of research for patient care and treatment?
- How does having a robust research enterprise enhance medical education?

## **ACTIVITIES:**

- Have residents discuss how new research has influenced their training and the care they provide to patients. Consider having participants tour a hospital floor or conduct rounds showing patients they have treated with new techniques, devices, or medicines.
- Discuss the benefits and history of translational research.

## **RECOMMENDATIONS:**

- Encourage presenters to interact with participants. Make this a dynamic discussion, rather than a one-way flow of communication. Set this tone for the day early in the program by telling participants that you want the day to be a dialogue and inviting them to interrupt presenters to ask questions. Always attempt to make presentations more hands-on.
- When recruiting presenters, select those who have a history of effective communication with lay audiences. Most PME participants come from a background with little knowledge of medical science. Presenters should not assume that the audience has knowledge of basic medical concepts. Stay away from medical jargon. Coach presenters prior to the event and encourage them to be mindful of their audience when presenting.
- Prepare and distribute a list of significant medical discoveries or innovations in patient care from your institution. Focus on discoveries that directly affect patients or are easily understandable.