

Breaking down barriers: Decoding archetypes in hospital medicine research

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INTRODUCTION

The field of hospital medicine has made progress in growing its research productivity as the clinical practice of hospital medicine has matured. Hospital medicine researchers come from a range of backgrounds, including clinicians and nonclinicians with diverse research expertise in health outcomes, health services research, methodology, data science, informatics, and social science disciplines.¹ The growth of hospital medicine research has been supported by an increase in (a) hospital medicine or general medicine research fellowships,² (b) hospitalist engagement with institutional research enterprises, and (c) the need for quality improvement and/or educational research that aligns with hospital medicine clinical roles and institutional priorities. However, despite the growth of research in hospital medicine, there remains a shortage of hospital medicine researchers³⁻⁵ and the field has not yet reached the level of research output seen in other subspecialties.¹ Moreover, while hospitalists' daily work often serves clinical, leadership, and educational missions within institutions, the opportunity to progress this work into impactful research and be recognized for it can be lost if the pathways for professional and research-specific skill development that lead to success and ultimately promotion are unclear and/or unrecognized.⁴ To highlight the diversity of research pathways and the opportunities available for hospitalists to conduct impactful research, we aimed to identify archetypes and associated pathways for hospital medicine researchers.

The goals of clarifying distinct pathways of hospital medicine research are to: (a) attract trainees interested in hospital medicine research, (b) demonstrate to current hospitalists that there are both traditional and nontraditional ways to engage in research, (c) highlight the availability and importance of nontraditional research pathways in the field of hospital medicine, and (d) underscore the scientific contributions of hospital medicine research across both traditional and nontraditional pathways to the delivery of high-quality inpatient care. As a newer specialty, hospital leadership may be less aware of and undervalue the scientific expertise and impact hospital medicine researchers make across institutional domains (e.g., clinical, quality, education, and operations).⁶ Highlighting the diverse career pathways that hospital medicine researchers have available can underscore the depth of scientific expertise in hospital medicine and demonstrate the importance of providing time and financial support to those interested in hospital medicine research.

HOSPITAL MEDICINE RESEARCH ARCHETYPES

We describe the following four "hospital medicine researcher archetypes": (1) traditional researchers (i.e., clinician and nonclinician scientists), (2) embedded researchers (i.e., researchers who support [and are paid by] their institutional missions),^{7,8} (3) research contributors (i.e., methods and/

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or operations experts that facilitate multiple projects), and (4) exploratory researchers (i.e., clinicians who conduct single, usually unfunded, small projects). Each archetype, with its respective training, skills, funding, return on investment opportunities, and growth potential, is described in Table 1. While features of each archetype may not be unique to hospital medicine, hospital medicine as a collaborative interdisciplinary field is well suited to support integrated team science across this spectrum, to allow for fluidity between the archetypes over an individual's career, and for individuals to develop expertise across a wide range of disciplines including quality improvement, dissemination and implementation science, medical education, health system operations, and bioethics.⁹

TEAM SCIENCE—A KEY FEATURE OF HOSPITAL MEDICINE RESEARCH ACROSS ARCHETYPES

Hospital medicine is clinically broad and collaborative, and by extension, a hallmark and strength of hospital medicine research is collaborative interdisciplinary team science. Hospital medicine clinicians lead the delivery of coordinated multispecialty care from within the center of our complex healthcare system, and consequently, hospital medicine researchers have diverse clinical and methodological expertise, and are experienced in engaging subspecialty content experts as part of research teams. As a result, hospital medicine research programs that include researchers from multiple disciplines are well-positioned to develop and support research productivity overall and for individuals within each research archetype. As an example of a team-based approach, a research group may include a traditional researcher who has governmental funding to study care transitions working with an embedded researcher (e.g., an acute care unit lead) who is seeking to reduce hospital readmissions. Together, they may engage two research contributors: a qualitative methodologist to study implementation and a data scientist to build an electronic health record best-practice advisory. Finally, the traditional or embedded researcher may mentor an exploratory researcher who serves as a project champion to engage hospital medicine clinicians in the institution. Although this example includes a traditional researcher, it is not a requirement; team science in hospital medicine can occur by utilizing the skills and experiences of the other research archetypes to produce significant work that addresses important scientific/clinical questions and is scholarly. The team approach diffuses responsibilities, leverages the diverse strengths of individual team members, promotes mentorship and engagement of junior researchers, and allows for individuals to develop and grow as researchers throughout their careers while making important scientific contributions locally and even nationally.

FLEXIBILITY ACROSS ARCHETYPES

It is also important that although the research archetypes are delineated as separate entities, hospital medicine allows fluidity between archetypes and the ability to pursue a hybrid of archetypes

as a career. Flexibility is particularly important for junior hospitalists interested in research but unsure of the optimal balance between research, clinical time, and other professional activities. Many hospitalists (without prior research training) begin as exploratory researchers, requiring mentorship to complete a project, and work on projects that fit within institutional priorities. With proactive "menteeship,"¹⁰ exploratory researchers can acquire the necessary experiences and research skills to progress to higher levels of research activity while exploring and learning what level and amount of research one wants in their career. At higher levels of research activity, hospitalists can build on their skills and research involvement by pursuing necessary additional formal training and expertise or identify opportunities as an embedded researcher or research contributor and continue to utilize their research skills in focused ways without pursuing a full career as a traditional researcher. Last, researchers can concurrently pursue roles in different projects across archetypes. For example, an exploratory researcher working under and mentored by a traditional researcher may develop the skills necessary to lead a smaller research project as the PI. In such instances, the archetypes are less a career "identity" and more a role defined by the research project.

DEVELOPING EXPERTISE

For those interested in pursuing research beyond the "exploratory stage," developing expertise is crucial. Expertise allows hospital medicine researchers to demonstrate value and obtain protected time or resources for work. The diversity of expertise and skills of hospital medicine researchers is broad and wide, but developing a focused expertise is important for all hospital medicine researchers across archetypes. As inpatient clinicians, hospitalists have broad clinical and operational expertise in caring for complex patients. Hospitalists are therefore often valued and sought after to join multidisciplinary scientific teams addressing the clinical and scientific complexities of delivering high-value coordinated healthcare. However, sometimes disease-state-specific research in hospitalized patients can appear "owned" by subspecialists, with funding and recognition of scholarly work more likely attributed to the subspecialty (and subspecialist) rather than to hospital medicine (and the hospitalist). To mitigate this, hospital medicine researchers need to highlight their expertise locally and/or nationally and ensure their role on the research team is broadly recognized.

Although traditional researchers—and sometimes embedded researchers and research contributors—often develop research expertise through formal degree-granting training (e.g., hospital medicine fellowship, masters in science or public health, or even doctoral degrees), this is not required for all hospital medicine researchers. While expertise in a specific research method (e.g., quantitative methods) is best gained through formal training programs, expertise in hospital medicine research can be clinical (e.g., perioperative and communication), operational (e.g., quality improvement and unit lead), or project-specific (e.g., education, informatics, and data science). To develop expertise, a budding researcher should: (a) identify an investigative area (s) of interest, including potential mentors and collaborators; (b) identify

TABLE 1 Hospital medicine archetypes.

Archetype	Training and education	Research activity	Time spent on research	Funding	Contribution to hospital medicine or ROI	Potential job growth
Traditional big "R" Researcher (classic clinician and nonclinician scientist)	<ul style="list-style-type: none"> MD/DO and/or PhD. If MD/DO, usually master's degree (MPH, MSc, etc.). Often completed hospital medicine (or other research) fellowship with training in health outcomes/services research. The first large grant is often a career development award to obtain additional training and cover 75% of the salary. 	<ul style="list-style-type: none"> Multiyear, independently built research program(s) as principal investigator. Research program(s) may span disease states and content areas and are not necessarily strictly within the field of hospital medicine. 	<ul style="list-style-type: none"> Traditionally 75%–80%; almost always >50% MD/DO: 75%–80% PhD: 100% 	<ul style="list-style-type: none"> Primarily extramural funding (NIH, AHRQ, CDC, VA, etc.)* through grants which are expected to cover the majority of salary. May also have extramural funding from foundations or industry. May have some institutional support based on experience and expertise and/or overlap between research and hospital operational priorities. 	<ul style="list-style-type: none"> Generates unique scientific knowledge to be disseminated nationally/internationally. Builds national reputation of Hospital Medicine. Indirect funds from external grants support institutional work. Serves on national scientific committees outside of hospital medicine and provides perspective of hospitalists. Presents work nationally through oral presentations. Publishes work as manuscripts. 	<ul style="list-style-type: none"> Academic Hospital Medicine Division Chief or other Academic Leadership Positions (e.g., Chair of Medicine). Institutional Research Leaders (e.g., Vice Chair, Dean). Industry or government/public policy agencies. Leader of research lab, center, or institute.
Embedded Researcher	<ul style="list-style-type: none"> MD/DO and/or PhD. If MD/DO, usually master's degree (MPH, MSc, etc.). May have completed hospital medicine fellowship with training in health outcomes/services research. 	<ul style="list-style-type: none"> Supports institutional initiatives in quality improvement, operations, and/or education. Works within and helps lead the learning healthcare system. Work may be contained within the field of hospital medicine. 	<ul style="list-style-type: none"> MD/DO: 25%–50% PhD: 100% 	<ul style="list-style-type: none"> Institutional support for operational need. May be included on externally funded grants as coinvestigators in specific roles aligning with institutional work. No expectation of salary recovery. 	<ul style="list-style-type: none"> Works on questions of institutional priority (improvements in care, hospital operations, education), which may be tied to financial incentives/penalties. Work contributes to improved healthcare delivery which can generate cost-savings. Can be used as example of institutional investment in quality and patient safety for public relations or other external uses (e.g., donors and recruitment). Supports traditional researcher in obtaining external funding and indirect funds. 	<ul style="list-style-type: none"> Chief Quality Officer or other roles (e.g., Chief Medical Informatics Officer) depending on skillset. Hospital Medicine Division Chief Leader. May transition into traditional researcher role or obtain research/clinical/operational leadership role, depending on skillset/interest. Internally funded center director. Industry or government/public policy agencies.

(Continued)

TABLE 1 (Continued)

Archetype	Training and education	Research activity	Time spent on research	Funding	Contribution to hospital medicine or ROI	Potential job growth
Research Contributor	<ul style="list-style-type: none"> MD/DO and/or PhD. Training in a specific methodologic domain, or Clinical/operational/other expertise with no additional research training. 	<ul style="list-style-type: none"> Supports a traditional researcher or research team. Works frequently with embedded researcher on local projects. May be part of a research lab or center. 	<ul style="list-style-type: none"> 0%-25% 	<ul style="list-style-type: none"> Coinvestigator or site-lead on externally funded grants. Principal investigator of small local grants. May have operational role that supports research time. No expectation of salary recovery. 	<ul style="list-style-type: none"> Serves on local committees as hospital medicine or content expert. Presents work locally and nationally as abstracts. Frequently or occasionally publishes work as a manuscript. Sharing of skills and support of research productivity helps develop a pipeline of researchers across archetypes. 	<ul style="list-style-type: none"> May transition into traditional researcher role or obtain research/clinical/operational leadership role, depending on skillset/interest. May focus on advancing in other areas such as education, clinical operations, or leadership relevant to their skillset (e.g., data science).
				<ul style="list-style-type: none"> Work contributes to improved healthcare delivery which can generate cost-savings. Supports traditional/embedded researcher in obtaining external funding and indirect funds. May help with recruiting others interested in collaborating with contributors. Sharing of skills and support of research productivity helps develop a pipeline of researchers across archetypes. 	<ul style="list-style-type: none"> Helps “do the work” and/or brings certain expertise to a larger research team. Coauthor on published abstracts and manuscripts from collaborative projects. Primary author (first or senior) if PI on local grant. May advance the field within their methodologic area (e.g., novel methods and data science). Work contributes to improved healthcare delivery which can generate cost-savings. Supports traditional/embedded researcher in obtaining external funding and indirect funds. May help with recruiting others interested in collaborating with contributors. Sharing of skills and support of research productivity helps develop a pipeline of researchers across archetypes. 	

(Continued)

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Archetype	Training and education	Research activity	Time spent on research	Funding	Contribution to hospital medicine or ROI	Potential job growth
Exploratory Researcher	<ul style="list-style-type: none"> • MD/DO, advanced practice provider. • Typically no research training. • Usually, a mentee with project-specific mentorship. 	<ul style="list-style-type: none"> • Small local projects of interest to mentor or institution. • Usually, one project at a time. 	<ul style="list-style-type: none"> • <5% 	<ul style="list-style-type: none"> • Unfunded one-off projects determined by mentors' interests and/or institutional opportunities. • Principal investigator of small local grants, typically under a mentor. • Work done on "own time." 	<ul style="list-style-type: none"> • No requirement for disseminating work. • Poster presentations at national, local, or regional conferences. • Talks at local research meetings. • Work may be unpublished, or if published may be attributed to the division. • Provides opportunities for younger or clinically oriented hospitalists to explore research interests and develop research experience. • Work contributes to improved healthcare delivery which can generate cost-savings. • Contribution to research productivity helps create an environment that attracts and supports a pipeline of researchers across archetypes. • Investment in exploratory researchers may reduce costs of burnout, improve satisfaction, and help retention/recruitment. 	<ul style="list-style-type: none"> • Research supports clinical work and expertise as a clinician. • Research activities are helpful for promotion (academic) or small leadership roles (nonacademic). • May decide to pursue one of the other archetypes.

Abbreviations: AHRQ, Agency of Healthcare Research and Quality; CDC, Center for Disease Control and Prevention; NIH, National Institutes of Health; PI, Principal Investigator; VA, Veterans Affairs.

how that interest serves the local environment (e.g., institutional priorities or needs of the research community); (c) pursue institutional involvement in related projects and other informal training (e.g., single local quality improvement courses); and (d) leverage the alignment and experience to gain resources (e.g., protected time and seed funding). Over time this process can help a hospital medicine researcher develop a reputation for expertise, allowing the researcher to become the “go-to” person for a particular topic or content area. While working to develop expertise, hospital medicine researchers must be purposeful about identifying boundaries of responsibility, clarifying the amount of work expected, advocating and/or renegotiating for support (e.g., effort/financial, team, and administrative) as workload or deliverables increase, and clarifying recognition (e.g., authorship) for the product that is produced. This intentional forethought allows researchers to identify “win-win”¹¹ projects where their expertise and involvement align with the resources available and advance them toward their desired research pathway. Upfront conversations also mitigate being un- or under-recognized as valued contributors to interdisciplinary research teams.

CONCLUSION

Hospital medicine includes researchers with a diverse range of expertise and skills, but as a young field, the pathways for those interested in conducting hospital medicine research may be less defined with fewer role models of successful senior research colleagues. Describing the types of hospital medicine researchers and pathways for professional development can help attract trainees into hospital medicine research careers and support junior hospitalists interested in incorporating research into their careers. As a broad clinical specialty, hospital medicine researchers are sought after for their contribution to team science. Furthermore, hospital medicine researchers can be flexible in how they participate in research at different stages of their careers and develop expertise that is recognized locally and nationally. By continuing to support hospitalists interested in research at different levels and career stages, the strong and vibrant research community in hospital medicine will continue to grow and mature.

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