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Navigating the Path: Making Smart Choices… Advice to Physician Scientists on Choosing a Clinical Specialty

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This Review Article provides a compendium of advice for MD-PhD students to consider when deciding which, if any, clinical field they will select for residency training. It is grounded in published data and effectively considers factors including the potential for clinical disciplines to sustain research integration, provide mentorship, meet lifestyle expectations, and foster a long-term career as a research-focused physician-scientist.

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Abstract

Choosing a clinical specialty is a critical decision for physician-scientist trainees, influencing both clinical practice and research trajectory. This article provides a structured approach to specialty selection, emphasizing the importance of aligning clinical interests with long-term research goals, evaluating training pathways, and considering lifestyle implications. Physicianscientists, including MD-PhD and other dual-degree graduates, as well as MD graduates with research-intensive training, often pursue specialties with established research pathways. We outline key decision-making factors, including mentorship, clinical exposure, research commitment, and financial

sustainability. Additionally, we compare research track and categorical residency pathways, detailing differences in training structure, funding opportunities, and career outcomes. The article explores the evolving role of physician-scientists across career stages, from residency through senior faculty leadership, highlighting strategies to maintain research engagement while balancing clinical responsibilities. By critically evaluating these factors and leveraging mentorship and institutional support, physician-scientists can make informed decisions that align with their aspirations, ensuring a fulfilling and impactful career in both medicine and research.

Introduction

Choosing a clinical specialty is one of the most significant decisions in the career of a physicianscientist. This choice determines the nature of your clinical practice and profoundly influences your research trajectory and overall professional fulfillment. The journey to this decision is complex and multifaceted, requiring a deep understanding of your interests, skills, and longterm goals. As a physician-scientist, you are uniquely positioned at the intersection of clinical care and scientific discovery. This dual role offers the opportunity to make groundbreaking contributions to medicine, but it also demands a careful balance between clinical duties and research activities (Wyngaarden, 1979; Ley & Rosenberg, 2005).

Selecting a specialty is deeply personal and requires introspection and reflection. It involves considering your passions and interests, evaluating your strengths and skills, and understanding the lifestyle implications of different specialties. Additionally, seeking mentorship and gaining hands-on clinical exposure are crucial steps in making an informed decision. Your chosen specialty will shape your career path, influence your daily work, define your colleagues, and impact your ability to contribute to medical science (Zemlo et al., 2000; Hauser & McArthur, 2006).

In this article, we will explore key considerations and provide advice to help you navigate this important decision. Figure 1 provides a structured decision-making framework to help physicianscientists evaluate clinical specialty options in the context of research integration, mentorship, lifestyle considerations, and long-term career sustainability. We will discuss the importance of aligning your clinical interests with your research goals, evaluating your skills and strengths, and considering lifestyle factors. We will also highlight the value of mentorship and clinical exposure in understanding different specialties. Furthermore, we will delve into the unique challenges and opportunities of balancing clinical and research responsibilities as a physician-scientist. You cannot do everything, but you can do a lot if you are realistic and honest with yourself. By reflecting on these factors and seeking guidance from experienced mentors, you can make a choice that aligns with your aspirations and sets the stage for a fulfilling and impactful career (Bradford et al., 1996; Brass et al., 2010).

Trends in Physician-Scientist Training

Physician-scientist trainees often gravitate toward certain medical specialties that align well with research activities (Table 1). According to a 2008 study published in JAMA, the most popular specialties among MD-PhD graduates were Internal Medicine, Pediatrics, Surgery, Pathology, Neurology and Radiology (Andriole, 2008). A study in 2023 evaluated 11 selected specialties over an 11-year period (2009-2019) and showed that most US allopathic MD-PhD graduates entered internal medicine followed by pediatrics and pathology (Emala, 2023). When normalized to the relative size of total residency positions, the smaller residencies such as neurosurgery (7.2%), pathology (6.4%) and neurology (3.3%) had the highest percentage of entering residents that were MD-PhD graduates (Emala, 2023). More recent data suggest that some additional residency specialties are gaining popularity among MD-PhD graduates, including Dermatology, Anesthesiology, and Psychiatry. These fields typically offer structured opportunities for integrating research with clinical practice. Even nontraditional research specialties, such as Family Medicine,

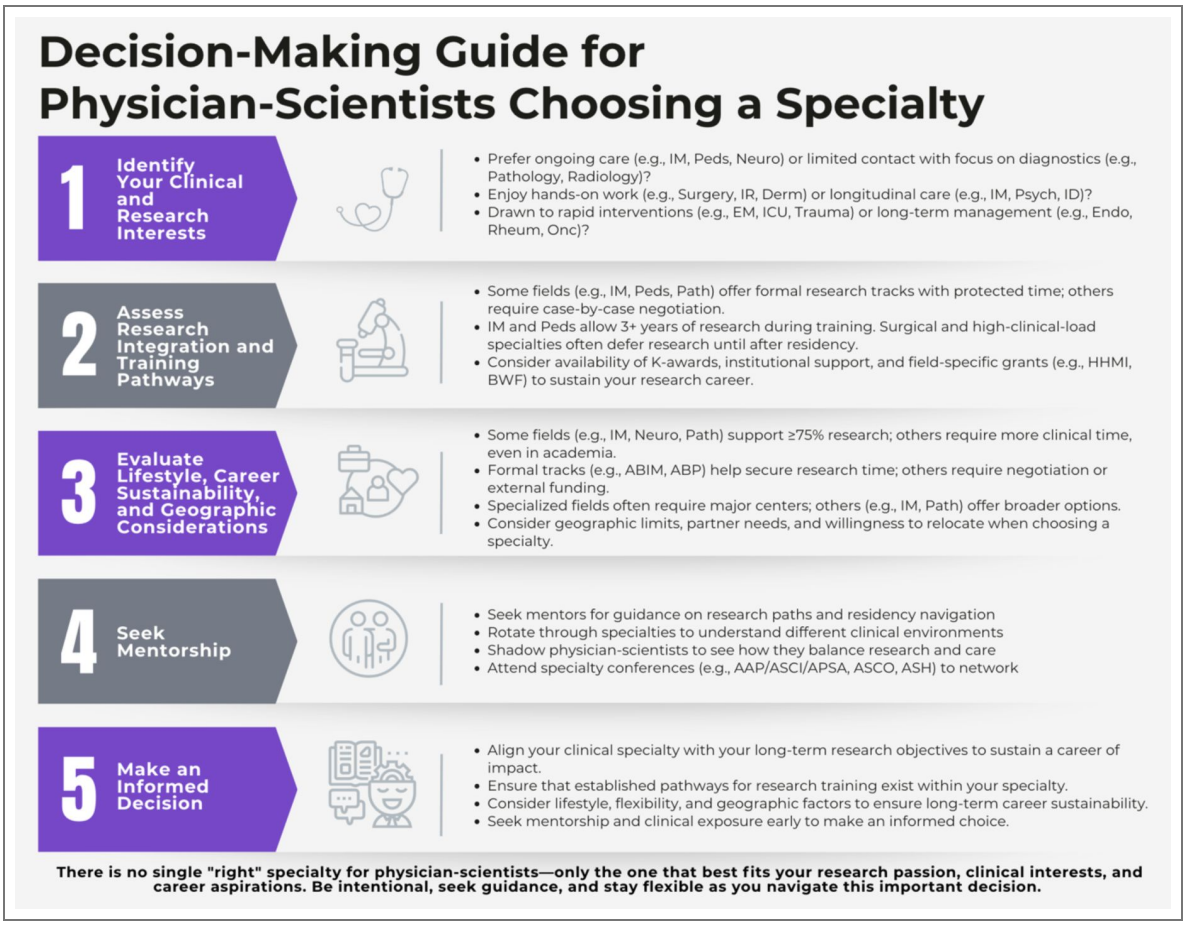

Figure 1. Decision-making framework for physician-scientists choosing a clinical specialty.

This figure presents a structured approach to specialty selection for physicianscientists, highlighting key considerations that inform an intentional and sustainable career choice. The framework emphasizes alignment of clinical and research interests, evaluation of research integration and training pathways, assessment of lifestyle and career sustainability factors, engagement with mentorship, and synthesis of these elements to support informed decision-making.

Emergency Medicine, Hospital Medicine, and Sports Medicine, are increasingly developing institutional pathways to support research careers, even though they are less well-traveled pathways for MD/PhD graduates.

(*https://www.aamc.org/media/9331/download*).

Table 1. Physician Scientist Specialty Choices, Research Integration, and Funding Opportunities Across Residency and Fellowship Training

Specialty	% of MD-PhD Grads (outcomes study)	Structured Research Program during residency/fellowship	Nature of Clinical Practice	Research potential post-training	Common Research Areas
Internal Medicine	27	ABIM Research Pathway (*https://wwwabim.org/certification/policies/research-pathway/policies-requirements/*)	Broad, inpatient/outpatient, chronic disease management	Strong NIH funding (K/R awards), academic research careers well-established, ABIM Physician-Scientist Pathway	Immunology, Infectious Diseases, Cardiovascular disease, Cancer biology, Respiratory diseases, GI pathophysiology
Pediatrics	13	ABP Integrated Research pathway (*https://www.abp.org/content/integrated-research-pathway-irp*)	Outpatient and inpatient, developmental and longitudinal focus	NIH-supported research pathways, subspecialty fellowships integrate research	Developmental biology, Cancer Biology, Infectious Disease, Immunology, Inborn errors of metabolism, genetics of inherited and rare diseases
Pathology	10	ABPath PhysicianScientist Research Pathway (*https://abpath.org/physician-scientist-researchpathway/*)	Laboratory-based, diagnostics, molecular testing, typically both anatomic Pathology (AP, tissue diagnosis) and clinical Pathology (CP, clinical laboratory testing) but sometimes just one or the other is completed. CP can be the shortest of all residencies (two-years)	Lab-based research seamlessly integrates into clinical work; NIH and industry funding prevalent.	Cancer Biology, Molecular Diagnostics, Immunopathology, broad pathophysiologic investigations
Neurology	9	Many institutions offer research tracks which provide a combined residency program in Neurology and Psychiatry, emphasizing research training	Inpatient and outpatient, complex chronic disease focus, Neuro-ICU and procedural tracks exist, clinic-based	NIH funding for neuroscience, translational and clinical research, researchheavy fellowships available	Neuroscience, Stroke, Neurodegeneration, Neuroimmunology Epilepsy, Movement Disorders
Radiology	5	ABR Holman Research Pathway (*https://www.theabr.org/diagnostic-radiology/initial-certification/alternate-pathways/holman-research-pathway*). Some programs offer dedicated research tracks, often supported by NIBIB T32s	Technology-driven, imaging-based diagnosis, procedural approaches (interventional radiology (IR)) and targeted therapy (IR and nuclear medicine)	Research in imaging, imaging technology, AI applications, application of imaging to translational research, NIH , foundation, and industry funding sources available.	Imaging and ImageGuide Therapy Methods, Biomedical Engineering, Applied Physics and Chemistry, Molecular Imaging and Therapy, Applications of imaging to specific disease biology
Psychiatry	5	Many institutions offer specialized training within general residency dedicated to nurturing future clinical and basic neuropsychiatric researchers.	Outpatient-focused, long-term patient care	NIH (NIMH) funding opportunities for neuropsychiatric research; research-focused career pathways.	Neuroscience, Neuropsychiatric Disorders, Addiction Research

Surgery (all)	12	Some programs offer dedicated research years or tracks, though not universally standardized.	Procedural, high-intensity, acute care	Limited protected research time; research opportunities available but require leadership negotiations for protected time and effort to integrate into career. For NIH K awards, surgeonscientists with active surgical duties can request a reduced effort of 50%.	Transplantation/Immu nology, Surgical Oncology, Regenerative Medicine, Trauma/Acute Care/Sepsis, Neurosurgery, Vascular Surgery, Burn/Wound Healing
Medical Genetics	1	ABMGG *https://wwwabmgg.org/initial-certification/certification-pathways/*	Consultation-based, highly specialized. Often combined with Medicine, Pediatrics, or Ob/Gyn, sometime Neurology and Pathology	Strong NIH and industry support; translational genomics and precision medicine research expanding rapidly.	Genomics, Rare Disease Research, Precision Medicine
Dermatology	3	Certain institutions offer research-focused fellowships or integrated research tracks during residency.	Outpatient with inpatient consult opportunities. Opportunity for small and large procedures. Average practice has a mix of cutaneous oncology, immunology, autoimmunity, and aesthetics.	NIH, foundation, and industry funding available, including CDAs; translational research opportunities exist.	Immunology, Microbiology, Skin Cancer, Neurobiology, Stem Cell & Stromal Cell Biology, AI, epidemiology, health disparities
Radiation Oncology	4	Many programs offer dedicated research time or tracks; specifics vary by institution.; *https://wwwacgme.org/specialties/the-holman-pathway*	Procedural, oncology-focused, technology-driven	NIH and private funding for cancer research; translational/clinical research integrated into practice.	Cancer Biology, Radiation Therapy Research
Family Medicine	<1	Limited Formal Research Tracks: Research opportunities may be available but are often less structured compared to other specialties.	Outpatient primary care, broad-spectrum medicine	Few research-intensive career pathways; NIH funding is uncommon.	Community Health, Health Disparities, Preventative Medicine
Obstetrics/G ynecology	<1	Some institutions offer research tracks or fellowships focusing on areas like maternal-fetal medicine.	Procedural and medical, maternal-fetal focus	Research exists in maternal-fetal medicine and gynecologic oncology, but protected research time is limited.	Reproductive Biology, Maternal-Fetal Medicine, Gynecologic Oncology
Ophthalmology	4	Some programs offer integrated research training during residency; availability varies by institution.	Procedural, vision-focused, outpatient	NEI (NIH) funding strong; vision science research well-supported.	Vision Science, Retinal Disease, Corneal Research

Reflect on Your Priorities, Interests, and Passions

The journey to selecting a clinical specialty begins with introspection. Because your clinical specialty should enhance your research program, you should first decide what type of research you want to pursue and how much of your time you want to devote to it. From that perspective, reflect on the clinical experiences that have most excited you and will best support your goal of developing and evolving a robust research program – this should be your primary consideration when choosing a specialty. Then, reflect on what you love most about clinical practice. Is it the pathophysiology of disease itself, the laboratory aspects of medicine, or the medical/surgical treatment of disease, or some combination? Do you enjoy medical procedures, which may align with surgery, anesthesiology or interventional subspecialties of internal medicine, pediatrics, or radiology? Are you most interested in inpatient, outpatient, critical care, or operating room settings? Consider the types of patients, diseases, treatments, clinical practice, and colleagues you find most engaging. This self-awareness is crucial because your specialty should resonate with your core interests. Critically, consider how your clinical interests align with your research

aspirations, at the same time you are considering the clinical practice that energizes you. A specialty that complements your research can provide a cohesive and fulfilling career path, allowing you to integrate your clinical practice with your scientific inquiries seamlessly (Glowinski et al., 1998; Kosik et al., 2014). For instance, if you are passionate about understanding the molecular mechanisms of cancer, a specialty in Oncology could provide a ready platform to translate your research into clinical applications. Similarly, if you are fascinated by the complexities of the human brain, Neurology, Neuropathology, Psychiatry, or Neurosurgery might be the ideal field to explore both clinically and scientifically. Studies have shown that MD-PhD graduates who select specialties aligned with their research are more likely to maintain a strong physician-scientist trajectory throughout their careers (Milewicz et al., 2015). Other less traditional research specialties, like Surgery, Anesthesiology, or Emergency Medicine, can also provide diverse and compelling clinical practice that facilitates a different type of alignment with focused research questions—even within a broad clinical practice. Many students get very excited when rotating with an upbeat clinical team during clerkships. It is more critical to reflect on your personal reactions while taking care of those patients that were seen during the clinical rotation. You can always build a terrific upbeat clinical team when you are a clinical attending physician, but those patients will stay with you if you choose that specialty.

Evaluate Your Skills and Strengths

Assessing your skills and strengths is another critical step. In various clinical settings, you may excel in certain areas, such as procedural skills, patient/family interactions, leading teams, or diagnostic challenges. Understanding your clinical strengths can guide you toward a specialty where you can thrive. For example, you might consider a surgical specialty if you enjoy performing intricate procedures. Those with high visual aptitude or who enjoy pattern recognition might gravitate towards Dermatology, Pathology, or Radiology. On the other hand, if you excel in patient relationships and long-term management, a specialty like Internal Medicine, Neurology, Psychiatry or Pediatrics might be more suitable (Patel et al., 2012). If understanding the pathophysiology of disease is your passion, Pathology might be a good choice. Similarly, consider how your research skills can be integrated into your clinical practice. Some specialties may offer more opportunities for translational research, where you can apply findings from basic science to clinical settings, and vice versa. For example, the frequency and ease of procedures yielding healthy or diseased clinical tissue specimens differ by specialty and subspecialty, e.g., adult skin biopsies will be easier to obtain than pediatric liver biopsies. The success of physician-scientists often hinges on their ability to integrate clinical expertise with research, as demonstrated by studies showing that early-career engagement in research-intensive specialties correlates with sustained NIH funding and academic careers (Marsh & Todd, 2015). Keep in mind that several sub-specialties within Internal Medicine, Pediatrics, Surgery, Anesthesiology, and Neurology might allow you to practice in a procedural or intensive care subspecialty, while it may also allow you to maintain an exclusively clinic-based practice.

Consider Lifestyle and Work-Life Balance

Different specialties come with varying demands on your time. Considering how the typical work hours and on-call responsibilities align with your personal life and well-being is essential. Be realistic. Remember that when you are responsible for clinical care, research responsibilities are deprioritized. For instance, some specialties, such as Surgery and surgical and procedural subspecialties, may require long clinical hours to maintain procedural proficiency with frequent on-call duties, and urgent procedures. Conversely, specialties like Dermatology, Pathology, Emergency Medicine, Anesthesiology or Radiology often offer more predictable schedules. Work-life balance, including caregiving and personal responsibilities, is influenced not only by clinical schedules and demands, but also by departmental culture and the degree of collegial and institutional support for flexibility and protected leave. These are factors to consider when

balancing clinical, research, and personal commitments (Culican et al., 2014). Depending on the character of your research, having time that cannot be interrupted by call responsibilities may be especially valuable.

Think about where you want to live and work. Some specialties may offer more flexibility in practice settings and locations, allowing you to balance your professional and personal life more effectively. For example, if you prefer to work in an urban academic center, specialties with strong academic and research components, such as Oncology or Cardiology, might be more appealing. On the other hand, if you envision practicing in a rural or community setting, general Internal Medicine, Pediatrics, or other primary care specialties might be a better fit; however, research opportunities may be very scarce, so this option should be approached with great care.

Length of Training

Certainly, the length of training is a critical factor to consider, especially for physician-scientist graduates who have already invested a significant amount of time in their education. The duration of residency and fellowship training varies widely across specialties, and this can have long-term implications for both career trajectory and personal well-being, especially for those who have already invested in combined MD/PhD training. Residency in fields such as Internal Medicine (as short as two years for those who “short track”), Pediatrics, or Pathology may provide a faster route to research independence compared to surgical or subspecialties (IM, pediatrics, etc.), but for many late-career physician scientists, the many benefits that alignment between their research program and their clinical specialty offer greatly overshadows the additional years of training.

For those eager to establish a research career early, choosing a specialty with a shorter training period and structured research pathways may allow for a more seamless transition to a faculty position and grant funding opportunities. Conversely, if a longer training period aligns with your passion and career goals, it may be worthwhile despite the extended commitment. Ultimately, understanding the balance between training length, clinical responsibilities, and research opportunities can help you make an informed decision that supports both professional fulfillment and personal sustainability. It is important to recognize that excellent clinical training is a foundation for a career as a physician-scientist. The commitment to research time during the early faculty years means that the continued growth in clinical judgement and experience of a physician-scientist will not be the same as a full-time clinician in the same specialty. Thus, it is critical to not short-change clinical training during residency which will be the foundation for excellence in patient care for one’s career. Keep in mind that the journey in medicine is as important as the destination, and rewarding experiences will inform your research and help you refine your thinking—even when those experiences are diverse and multidisciplinary.

Seek Mentorship and Advice

Mentorship is invaluable when choosing a specialty. Seek out physician-scientist mentors across fields who can offer practical insight and career guidance. Don’t be shy—many clinicians enjoy talking about their career paths and are often willing to host shadowing opportunities. Mentors can help you understand the realities of different fields and offer valuable advice. Networking is also crucial. Attend conferences, workshops, and specialty interest groups to connect with professionals in your areas of interest. These interactions can provide a deeper understanding of different specialties, the values of colleagues you will eventually join, and help you make a more informed decision (Brass et al., 2010). Additionally, mentors can introduce you to key figures in the field, provide opportunities for collaboration, and offer support as you navigate your career path (Schafer, 2009).

Gain Clinical Exposure

Hands-on experience is essential in making an informed decision about your specialty. Take full advantage of clinical rotations and electives to gain exposure to different specialties. This experience can help you understand the day-to-day activities and patient interactions in various

fields. For example, a rotation in Pediatrics can provide insight into the unique challenges and rewards of working with children. At the same time, an elective in Neurology can provide insights into the complexities of diagnosing and treating neurological disorders. An elective in Pathology would reveal that day-to-day practice differs significantly from your experience in the Pathology course, involving the diagnosis of numerous diseases and regular interaction with a diverse range of clinicians and researchers. Additionally, spend time working with physicianscientists in different specialties. Observing their work can provide valuable insights into the realities of each specialty and help you determine which one aligns best with your interests and goals. Shadowing can also help you understand the workflow, patient demographics, and common procedures for each specialty, providing a more comprehensive view of what to expect. Most of all, remember that being a specialist in a field is different from being a student on that clinical service—try to understand what mentors' practice looks like and how it interfaces with your scientific career.

Reflect on Long-Term Goals

Consider how your chosen specialty will sustain your interest and passion over the long term. Think about the potential for growth and advancement in the field. For example, some specialties are undergoing rapid evolution with the introduction of new treatments and technologies, offering opportunities for innovation and advancement. In other specialties, numerous opportunities exist for meaningful collaboration. Reflect on how you want to impact the field of medicine and research. Choose a specialty where you can make a meaningful contribution. This long-term perspective is crucial in ensuring your career remains fulfilling and aligned with your aspirations. Additionally, consider the potential for leadership roles, academic appointments, and opportunities to mentor the next generation of physician-scientists. These factors can contribute to a rewarding and dynamic career.

Residency and Fellowship Research Tracks: Structured and Institution-Specific Pathways

Physician-scientists pursuing research-intensive careers benefit from structured research tracks embedded within residency and fellowship programs (Table 2). While some specialties have well-established national programs (e.g., ABIM Research Pathway in Internal Medicine, ABP Accelerated or Integrated Research Pathway, ABPath Physician-Scientist Research Pathway in Pathology; the Holman Pathway in Radiology and Radiation Oncology), others rely on institution-specific tracks that are not always widely advertised, vary in research time and resources, and are structured heterogeneously, requiring individual investigations into programs of interest.

Table 2. Comparison of Research Track and Categorical Residency Pathways using Internal Medicine as an example

Key Features	Research Track	Categorical Track
Primary focus	Balances clinical training with early transition to protected research time	Primarily focused on clinical training
Structure	Integrates significant research time within fellowship; protected time for research built into the training plan. Includes built-in mentorship with clear expectations for faculty transition. Research-focused institutions often provide structured pathways leading to junior faculty positions.	Full-time clinical training with optional research electives
Duration	2 years of residency, 3+ years of fellowship (with embedded post-doctoral training)	3 years of residency, 3 years of fellowship
Eligibility	Requires strong research experience and a clear commitment to a physician-scientist career. Board eligibility for Internal Medicine in PGY-4 or PGY-5, Subspecialty Boards in PGY-6 or later.	Open to all applicants, requires completion of standard residency and fellowship clinical requirements before board certification.

Common specialties	Internal Medicine (ABIM Research Pathway), Pediatrics, Neurology, Pathology, Radiology	All medical specialties
Research Commitment	≥80% required research effort during later fellowship to early faculty years	Usual ~80% research effort for ~1 year
Funding support	≥80% research effort during later fellowship years; often includes NIH R38, R25, F32, or T32 support with expectation of application for mentor career award at the end of the training	Centers for Medicare and Medicaid Services-based funding; research funding may be available for those pursuing academic careers
Career outcomes	High proportion of graduates enter academic medicine (physician-scientist careers, faculty roles, NIH-funded research)	Majority enter clinical practice, though some continue in academic medicine
Application considerations	Requires strong research experience, commitment to physician-scientist training, and alignment with institution's research mission	Field-specific competitiveness features
Mentorship and support	Structured mentorship with dedicated physicianscientist training programs, institutional funding, and NIH support	Highly dependent on individual institution and faculty mentors
Effort and activities by PGY year (sample based on Internal Medicine timeline)		
PGY1	Intern year – 100% clinical responsibilities, inpatient-heavy	Intern year – 100% clinical responsibilities, inpatient-heavy
PGY2	Resident (first year) ~80-90% clinical, 10-20% research (depending on program structure); initial research planning Fellowship match	Resident (first year) ~80-90% clinical, 10-20% research (depending on program structure) with most having some scholarly requirement
PGY3	Fellowship Year 1 100% clinical subspecialty training Board-eligible for IM Boards	Resident (second year) ~80-90% clinical, 10-20% research (depending on program structure), most with scholarly requirement Fellowship match Board-eligible for IM Boards
PGY4	Fellowship Year 2 80% research <20% clinical	Fellowship Year 1 100% clinical subspecialty training
PGY5	Fellowship Year 3 80% research <20% clinical Board-eligible for subspecialty boards	Fellowship Year 2 80% research <20% clinical Board-eligible for subspecialty boards
PGY6	Fellowship Year 4 80% research <20% clinical	Fellowship Year 3 (80% research <20% clinical)
PGY7	First faculty or other position – Requires 80% research commitment for NIH career development awards (e.g., K08, K23, K99/R00)	First faculty or other position

Institution-Specific Research Pathways

Certain specialties—including Neurology, Psychiatry, Dermatology, Emergency Medicine, Surgery, and Anesthesiology—are evolving structured research tracks; however, there are institution-specific physician-scientist pathways that provide dedicated research time. These programs vary by institution but often include:

- Flexible training structures that integrate 12-24 months of protected research during or after clinical training.
- Specialized mentorship programs linking residents with established physician-scientists.
- Early access to K-award preparation and grant-writing support. (including institutional awards through local NIH-funded Clinical and Translational Science awards).
- Additional funding mechanisms from departmental T32 training grants, foundation fellowships, or institutional pilot grants.

Joining a Research Track After Starting Residency

Not all physician-scientists enter residency on a designated research track. Some programs allow residents to transition into research tracks after starting clinical training, especially in fields without a formalized national pathway. Strategies include:

- Choosing a residency with physician-scientist mentors
- Networking within your department early in residency to express interest in research opportunities.
- Seeking mentorship from physician-scientists who can advocate for your transition into a research-intensive pathway.
- Applying for internal institutional funding to support research during residency or fellowship.
- Utilizing NIH R25, R38, F32, K99/R00, or foundation fellowships to carve out research time during clinical training.

If you are applying to residency and considering research, inquire with programs about their flexibility in accommodating physician-scientists outside formal research pathways before ranking them. Some institutions strongly support research flexibility, while others require early commitment to a structured track.

Balancing Clinical and Research Responsibilities

As a physician-scientist, much of your career will be dedicated to research. This dual role requires a careful balance between clinical duties and research activities. Physician-scientists often struggle with balancing research and clinical obligations, and specialties with demanding clinical workloads can make it harder to sustain a research career. Specialties such as Internal Medicine, Neurology, Pediatrics, and Pathology historically provide more structured research pathways. Some specialties, such as anesthesiology and emergency medicine, have more clearly defined clinical schedules, which may facilitate balancing research commitments and personal responsibilities, compared with fields that require continuous longitudinal patient care and ongoing availability. In contrast, surgical fields often pose challenges in maintaining protected time for research in part due to the need to maintain a volume of clinical cases to maintain procedural skills and the need for urgent procedures with less predictable operating room schedules.

Emphasize Research Engagement

Understand that your primary role as a physician-scientist is to advance medical knowledge through research. This means that a substantial amount of your time will be spent designing studies, conducting experiments, analyzing data, publishing findings, grant-writing and rewriting, mentoring, teaching, and training. *You should strive for a clinical practice that informs and enhances your research, and vice versa*. The real-world challenges and patient interactions you encounter can inspire research questions and drive your scientific inquiries (Ley & Rosenberg, 2005). For example, observing a particular complication in patients with a specific disease might lead you to investigate its underlying mechanisms in the lab. This synergy between clinical practice and research can significantly advance both fields. It is important to recognize that achieving this balance may evolve over time, particularly during the mentored phase of a physician-scientist's career, when research independence, protected time, and clinical roles are still being established.

Choosing a Specialty that Complements Your Research

It is common to develop an interest in multiple clinical specialties. However, choosing one that aligns with and strengthens your research interests is crucial. For example, if your research focuses on Oncology, selecting a specialty like Hematology-Oncology can provide direct access to patient populations and clinical trials relevant to your work (Coller, 2012). Some specialties may have demanding clinical responsibilities or require significant time to maintain procedural competency, which may detract from your research time (Table 1). Consider specialties that offer a balance, allowing you to maintain a robust research agenda without overwhelming clinical duties (Table 2). Some specialties, such as Clinical Pathology, require little or no direct patient contact, with clinical duties often seamlessly interfacing with translational research. As a physician-scientist, you will have an opportunity to carve out a unique niche and become recognized as a leader in a particular field. Be mindful of the challenges of competing for limited research funds in fields dominated by basic scientists by recognizing the unique role that physician-scientists have to offer in facilitating translational research. If you gravitate to certain specialties because they are at the vanguard of technological innovation, for example artificial intelligence in Radiology, Dermatology, or Pathology, consider that by the time your postgraduate training is completed and you are ready to launch your independent career, the field may have moved on to the next great thing. For this reason, it is essential to select a specialty where patient populations and the frontiers of knowledge will continue to inspire and motivate you throughout your career, and where technologic innovations lead to new biologic and translational insights.

Protected Time

Protected time is critical for physician-scientists, enabling meaningful scientific investigation while maintaining clinical responsibilities. Some specialties, such as Internal Medicine, Neurology, and Pediatrics, have well-established pathways that integrate research into training, often through structured programs like the American Board of Internal Medicine (ABIM) Research Pathway or equivalent research tracks in other specialties. Additionally, these specialties tend to be well-supported by NIH funding mechanisms, such as K-awards and T32 training grants, which incentivize institutions to provide protected time to physician-scientists (Marsh & Todd, 2015). However, not all specialties provide the same level of institutional support for integrating research with clinical practice. While some training programs, particularly in fields like Surgery, have built-in research years and available T32-supported research positions, the level of support can vary significantly between institutions. It is important to recognize that the research orientation of a training program may not always align with the research orientation of the actual practice in that field. Therefore, when choosing a specialty, physician-scientist trainees should consider both the institution-specific training opportunities and their long-term career goals regarding clinical practice and research. Institutional support, NIH K-awards, and departmental policies can significantly ensure that physician-scientists maintain sufficient research engagement. Data suggest that early-career protected time correlates with long-term NIH funding success, underscoring the importance of evaluating a specialty culture and infrastructure regarding physician-scientist development (Hauser & McArthur, 2006). When choosing a specialty, physician-scientist graduates should consider how research time is structured during residency and fellowship and whether their chosen field has mechanisms to shield research commitments from clinical encroachment. Furthermore, different training programs within a field have varying research opportunities and support which should be taken into consideration in the residency and fellowship application process. Ask questions. The availability of protected time for research varies widely across specialties due to differences in clinical workload, funding structures, institutional priorities, and historical precedent. However, this is highly dependent on institutional culture. While some procedural and highly clinical fields, such as Surgery, Anesthesiology, and Emergency Medicine, might traditionally be perceived as having fewer built-in mechanisms for protected research time, many have developed strong pathways and a track record of success. In

fact, the structured nature of shift work in some of these specialties can be advantageous for those intending to balance clinical duties with research. When off-duty, physicians in these fields often have uninterrupted time that can be dedicated to research activities. Furthermore, revenue models that favor clinical procedures can disincentivize research (because clinically supported time generates much more revenue in these specialties than research grant funding). Conversely, specialties that incorporate generously reimbursed but short procedures can, in the right financial model, enable physician-scientists to subsidize research effort even with less clinical effort. Ultimately, the ability to integrate research with clinical practice in these specialties often hinges on the institution's specific culture and infrastructure (Garrison & Deschamps, 2014). As a result, physician-scientists in these fields often need to negotiate protected research time individually, secure external funding, or pursue alternative pathways such as research sabbaticals or postresidency research fellowships.

Moreover, the culture within a specialty influence how research is valued. Fields and departments with a strong tradition of clinician-investigators tend to embed research expectations into career development. In contrast, specialties that prioritize technical proficiency and procedural expertise may view research as secondary to clinical mastery. While some physician-scientists have successfully established research careers in traditionally nonresearch-intensive specialties, doing so often requires additional advocacy, mentorship, and institutional support (Culican et al., 2014). Physician-scientist graduates should carefully evaluate these dynamics and seek informed mentors when selecting a specialty, considering not only their research interests but also the structural support available for sustaining a dual career.

Financial Considerations

The financial realities of a physician-scientist career are important, but often undiscussed, factors to consider when selecting a specialty. While dual-degree training offers unique opportunities for impactful research and leadership, it comes with potential trade-offs in terms of earning potential and financial stability compared to full time clinical peers. Physician-scientists typically enter the workforce later than their MD-only counterparts due to extended training periods, often spanning 7-10 years beyond medical school. This delay impacts lifetime earning potential, as does the expectation of dedicating a significant portion of time to research rather than full-time clinical practice (Catenaccio et al., 2024). A recent analysis comparing MD-PhD and single degree MD academic physicians found that MD-PhD graduates earn a median of $363,655 less over their careers, representing a 7% less in lifetime earnings. This gap is even more pronounced in procedure-heavy specialties like Neurosurgery, where MD-PhD graduates earn over $1.8 million less over their lifetime than their MD counterparts. However, it is important to weigh this difference against the equally long-term difference in personal fulfillment and professional freedom associated with a career as a physician-scientist. MD-PhD physicians thus tend to select clinical specialties that allow for more research time, rather than maximum financial revenue. However, the greater, and generally unrecognized, challenge lies in the need to define one's financial goals over time. This is a complex decision that is often heavily shaped by one's immediate financial needs and sense of perpetually deferred compensation. While exceptions may occur for those with an entrepreneurial flair who successfully license a new technology or launch a startup and receive a windfall may recoup that financial investment, such as George Yancopoulos and Leonard Schleifer, who founded Regeneron Pharmaceuticals, developing a well-defined and informed set of financial expectations can: (i) serve as a powerful negotiating tool to help optimally align, rather than pit, one's scientific, clinical and financial interests against one another, and (ii) avoid more perilous comparative, limit-testing based approaches.

Notwithstanding the preceding considerations of financial needs and goals, it is equally important to recognize that, unlike clinicians in high-revenue specialties, physician-scientists often earn less than their full-time clinical peers due to the reduced revenue associated with reduced patient care responsibilities and dependence on external grant funding as their primary source of revenue (Catenaccio, et al 2024). External financial pressures—such as family obligations and the high cost of living in some communities—can thus influence career decisions (Jansen et al 2023). In

fact, studies suggest that financial concerns contribute to attrition from research careers, particularly for those facing funding instability post-training (Swartz et al 2024). In contrast, physician-scientists in high-paying fields are likely to dedicate less time to research than those in lower-paying fields, in which the salary disparity is less pronounced (Catenaccio et al., 2024).

Because research funding fluctuates but salaries do not, the choice of institution and level of institutional support for physician-scientists is a vital, but underrecognized, financial consideration. For physician-scientists, even grant-funded research time has costs that individual departments bear. Many academic centers offer startup packages or bridge funding to physician-scientists transitioning into faculty roles, but this support often continues even for those further along in their careers. These packages may include:

- Guaranteed protected research time (e.g., 75% research time for the first 3-5 years)
- Internal pilot grants to support preliminary data collection
- Salary guarantees to offset gaps in extramural funding
- Research Support, also known as Development Funds or "Start-up Package". The amount will vary, depending on many factors. It is critical to seek input from established investigators in your field when negotiating this component which may support research assistants, reagents, animals, core services, and related research needs.

When evaluating residency and fellowship programs, ask about long-term institutional support for physician-scientists—not just research time during training, but also faculty-level commitments to career development and grant stability. One metric that may be useful in assessing an institution's commitment to research is the amount of NIH funding garnered, both for research and training grants. The Blue Ridge Institute for Medical Research (*https://brimr.org/*) compiles institutional data on NIH funding by specialty, institution, and department. Training grant support can be discerned by searching for T32 grants on NIH Reporter (*https://reporternih.gov/*).

MD-PhD graduates generally have lower educational debt than MD graduates due to program funding (Andriole et al., 2008), but the variability in salary across specialties impacts long-term financial security. Loan repayment programs can help mitigate financial pressures:

- NIH Loan Repayment Program (LRP) offers up to $50,000 per year in debt repayment for physician-scientists conducting NIH-funded research.
- Institutional loan forgiveness programs—some academic centers provide loan repayment incentives to attract physician-scientists.
- Public Service Loan Forgiveness (PSLF) applies to academic medicine roles at qualifying institutions.

Understanding how funding stability, institutional support, and salary structure vary across specialties is essential for making informed career decisions. Financial sustainability should be weighed alongside research passion and clinical interests to ensure long-term career fulfillment. While physician-scientists face financial trade-offs, strategic planning—including selecting research-friendly specialties, negotiating startup support, and leveraging loan repayment programs—can help maintain financial stability throughout a successful career.

Alternative Research Careers: Expanding Beyond Academia

While many physician-scientist trainees envision an academic career, a growing number transition into industry, government, or other sectors where research plays a central role. The leadership skills acquired during physician-scientist training also serve one well in other careers. As a case in point, the perennially "most admired" chief executive officer (CEO) by Fortune 500 business leaders was physician-scientist Roy Vagelos, who served as department chair before leading pharmaceutical giant Merck for many years. These paths offer robust career options with different advantages:

- Pharmaceutical/Biotech Industry: Roles in drug development, translational medicine, and regulatory affairs. Higher salaries but likely requires transitioning away from independent

research.
- Government Research (NIH, etc.): Not reliant on extramural grants, policy-driven research, opportunities for high-impact work in public health.
- Medical Technology & AI: Growing opportunities in computational medicine, imaging informatics, and health-tech startups.
- Private Research Institutes & Foundations: Positions at non-profits focused on diseasespecific research (e.g., Broad Institute).
- Health Policy & Consulting: Combining research expertise with strategy and policy work in firms like McKinsey or academic health systems.

For those interested in non-traditional careers, considering research-oriented specialties with broad applicability—such as Internal Medicine, Pathology, or Radiology—may provide greater flexibility.

Long-Term Career Satisfaction

While it is possible to have affinity for multiple specialties, think about which one will sustain your passion and interest over the long term. A specialty that aligns with your research interests can provide a more cohesive and fulfilling career path. Reflect on the potential impact of your research within different specialties. Choose a field where you feel you can make significant contributions and drive advancements in both clinical practice and scientific knowledge. For example, if you are passionate about developing new treatments for neurological disorders, a specialty in Neurology can provide the platform to make significant contributions to the field. Additionally, consider the potential for career growth, leadership roles, and opportunities to mentor the next generation of physician-scientists (Hauser & McArthur, 2006).

At the same time, it is important to recognize that a specialty choice is not an irreversible decision. Many physician-scientists successfully transition into a different specialty during or even after residency when they find that another field better aligns with their research or career goals, or switch to an unexpected sub-specialty. Understanding that there is flexibility in career trajectories and research scope may help reduce the stress of making a “perfect” choice upfront.

An important point to consider is that PhD training primarily teaches you how to conduct research, rather than limiting you to the specific topic of your thesis project. The methodologies and problem-solving skills you acquire can be applied across a wide range of medical fields. For instance, learning how to dissect molecular pathways in cancer research could also equip you to study molecular pathways involved in immune activation or insulin sensitivity. This versatility is key, as the field and technology will likely evolve significantly by the time you transition back into research after your clinical training. New skills must always be acquired, rendering the specific details of your PhD project less critical. Thus, the fundamental research skills and scientific thinking you develop are the true assets applicable to various fields of clinical interest.

By focusing on a specialty that keeps you intellectually engaged and offers opportunities for meaningful research, you can build a rewarding career that combines clinical excellence with scientific discovery.

Career Evolution Over Time

It is important to recognize that how you spend your time will change over the course of your career. In the beginning stages, you may spend more time building a sustainable research program, establishing your lab, and securing funding. This period is crucial for laying the foundation for your future research endeavors. As your career progresses, you might take on more administrative roles, become involved in education, or increase your clinical care responsibilities. For example, you might take on leadership roles within your department, mentor junior faculty and trainees, or develop new educational programs. This evolution is natural and can provide a diverse and enriching career experience. Mentoring motivated individuals is not only personally rewarding and intellectually stimulating, but it can amplify the impact and breadth of your own research program. Planning for these changes, consulting with your mentors,

and being adaptable can help you maintain a fulfilling and balanced career. Embracing these new roles can also provide opportunities to influence the direction of your field and contribute to the broader medical community (Garrison & Deschamps, 2014).

Physician-scientists' career trajectories evolve significantly from early training through midcareer and senior roles. Understanding these phases can help guide specialty selection and long-term planning as described in Table 3. Physician-scientists must actively manage their career evolution, ensuring they maintain research engagement while adapting to changing professional responsibilities.

Table 3. Career Stages and Key Considerations for Physician-Scientists

Career Stage	Primary Focus	Key Challenges	Opportunities
Early Career (Residency, Fellowship, First Faculty Position)	Establishing clinical competence, securing protected research time, and developing independent research projects.	High clinical workload, obtaining first grants, managing dual training demands.	Research-track residencies/fellowships (ABIM Research Pathway, Integrated Research Pathways in Pediatrics, Neurology, Pathology, Homan Pathway), NIH-funded career development awards (F32, K-awards).
Mid-Career (First Independent Research Grant to Established Investigator)	Balancing clinical, research, and administrative responsibilities; mentoring junior researchers; securing sustained funding.	Time management, maintaining protected research time, transitioning to leadership roles.	NIH R01 funding, leadership positions in research divisions, and industry collaborations.
Late Career (Established Investigator to Senior Leadership and Mentorship)	Mentorship, institutional leadership, high-level advocacy for physician scientists.	Sustaining research momentum, shifting toward administrative responsibilities, and succession planning.	Directing training programs, serving on NIH study sections, and guiding institutional policy.

Conclusion

Remember that your extensive academic background embracing both clinical medicine and basic research truly sets you up to make important contributions at the bench, at the bedside, and in between. Physician-scientists bring a unique and invaluable perspective to medicine, bridging the gap between scientific discovery and clinical application. Your ability to think critically, approach problems from multiple angles, and integrate research into patient care is rare and has a profoundly positive impact. Choosing a clinical specialty is a deeply personal decision that requires careful consideration of your interests, skills, lifestyle preferences, and long-term goals. By reflecting on these factors, seeking guidance from mentors, and selecting a specialty that aligns with your research interests, you can create a fulfilling, synergistic career that maximizes your impact in both clinical and scientific domains. As you navigate this decision, remember that your training equips you with a special lens—one that allows you to push the boundaries of medicine, advance knowledge, and improve patient outcomes in ways that few others can.

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HHS | NIH | National Heart, Lung, and Blood Institute (NHLBI)	R38HL167237	Christopher Williams
HHS | NIH | National Cancer Institute (NCI)	P30CA016520	David Mankoff
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HHS | NIH | National Heart, Lung, and Blood Institute (NHLBI)	R38HL172261	Jaime Chu
HHS | NIH | National Institute of Allergy and Infectious Diseases (NIAID)	R38AI181012	Jaime Chu

Author notes

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Peer reviews

Reviewer #1 (Public review):

Summary:

This brief piece by Swartz and colleagues outlines the complexities surrounding the choice of clinical specialty for physician-scientists. It is, in general, clear and well-written, and it will be useful to research-oriented medical students choosing a path and to the mentors who are guiding them.

Strengths:

The writing is clear. The points made are not profound, but they are important and will be of use to the intended audience.

Weaknesses:

I have only minor suggestions for improvement. There are some areas of redundancy where the article could be tightened up by consolidating.

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Reviewer #2 (Public review):

Summary:

This article is a useful compendium of advice for MD/PhD students (and research-focused MD students) to consider when it is time to decide on a clinical field for residency training. The authors are a distinguished group of physician-scientists and program directors who are drawing on published data and their own experience as mentors to provide advice and resources to students about to make what can be a career-defining choice. It makes an effective argument for considering important differences between clinical fields in their

ability to sustain research integration, provide mentorship, meet lifestyle expectations, and foster a long-term career as a research-focused physician-scientist.

Strengths:

(1) A lot has been written about physician-scientists as an endangered species. Given the important role that physician-scientists can play if they engage in research that is informed by experience in patient care, not nearly enough has been written about the choices that students make during training that can keep them on track or throw them off.

(2) The article provides not only general advice, but specific information in the 2 tables that can help trainees to weigh their priorities and consider their options.

(3) Among the best advice is to weigh clinical demands, maintenance of procedural skills, recognition of the impact of research time on salary, and the impact of high salaries on the tension between research effort and clinical effort in clinical departments, which is where most physician-scientists in academia are employed.

Areas for potential improvement:

(1) Some of the most useful pieces of advice are scattered through the text when they might be more impactful if focused. For example, what are the 4 or 5 most essential factors that someone in an MD/PhD or an MD program should weigh when they are deciding between clinical disciplines? There are also published data on the experience of past graduates in achieving a research-focused career in each clinical discipline. How should that data be applied by trainees? What are the factors that should be weighed in deciding where to work as a research-focused physician once training has been completed?

(2) Some clinical fields at academic institutions have proved to be much more hospitable to careers as research-focused physicians than others. Published data highlight the challenges. I believe the authors have tried very hard to present a balanced perspective, but in the process, they have, I believe, missed an opportunity to guide trainees and make them aware of what they should look for to avoid making a decision that may prove incompatible with their long-term goals.

(3) An issue that hasn't been raised: Where will be the jobs for physician-scientists who have an MD {plus minus} PhD and want to do research and discovery? How many openings will there be for physician-scientists in academia 5-10 years from now? In industry? How are recent events in Washington affecting the continuation of those jobs? Unfortunately, I am not aware of labor statistics for physician-scientists, but perhaps the authors can find them.

(4) Additional questions that can be raised and addressed in the article: Should one of the "smart choices" in the article's title be where you do the residency, and not just which residency you do? How important is it to be at a successful, research-intensive medical center/university, both during and after residency and fellowship training? If being in an institution where there are numerous very successful physician-scientists and scientists improves the likelihood of being able to sustain a physician-scientist career, how should graduating students improve their chances of being at one of those institutions?

(5) In every clinical discipline, there are departments that value physician-scientists more than other departments and invest accordingly. What advice would the authors give to help graduating students identify those departments?

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Author response:

Thank you for the valuable feedback. We will be updating the manuscript to incorporate the reviewers' terrific suggestions. We specifically have:

- Reduced redundancy and streamlined overlapping sections (especially around research alignment, protected time, and clinical demands)
- Made the core decision-making framework more explicit and easier to extract (in a new Table 1, with clearer synthesis in the text)
- Strengthened the emphasis on institutional/program context as a key determinant of success—arguably as important as specialty choice
- Added more actionable guidance for trainees on how to evaluate departments (e.g., NIH Reporter, T32 presence, R01 density, K→R track record)
- Included a slightly more explicit statement acknowledging that while all specialties can support physician-scientist careers, the structural ease varies and may require different levels of negotiation/support

We did not address the broader workforce/job market question, since it feels outside the scope.

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