



Research Tracks During Psychiatry Residency Training

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Research is a systematic exploration for, and analysis of, new information for the purpose of better understanding a field of knowledge. The field of psychiatry is continually researching psychological, social, and molecular determinants of human behavior, linking neurobiological signals to clinical phenotypes, and designing more effective diagnostic tools and therapeutic interventions. These endeavors rely heavily on the participation of clinicians, as emphasized by the American Association of Directors of Psychiatric Residency Training (AADPRT) [1]. Clinicians play a huge role in connecting the psychiatric conditions they treat to basic scientific findings [2]. The Research Domain Criteria (RDoC) introduced by the National Institute of Mental Health (NIMH) is one recent example of this process. This empirically driven framework correlates mental health symptoms and behaviors with molecular, genetic, neurocircuit, and behavioral findings. It aims to provide a trans-diagnostic system connecting basic science signals with clinical symptoms [3]. Such a goal demands collaboration between the clinicians identifying psychological or behavioral constructs in mental disorders and the scientists investigating the physiological mechanisms by which these constructs function.

The roles of clinician and scientist need not be separated. Medical school education demands training in the basic sciences, and many clinicians further expand this training through advanced degrees or by undertaking research when working in their chosen speciality. However, psychiatry residency is long, with its own financial pressures and intellectual demands, and training programs need to encourage and assist psychiatry trainees who are interested in formal research. An engaging research curriculum not only helps inspire potential clinician-researchers, but, if correctly designed, helps them launch their careers, minimizing long-term losses to

employment alternatives with higher pay or the perception of a better lifestyle [2, 4].

The Importance of Engaging Trainees in Psychiatric Research

Psychiatric residency training in the USA typically consists of four postgraduate years (PGY1-4) of clinical training. Core training requirements are mandated by the Accreditation Council for Graduate Medical Education (ACGME), but residency programs retain significant autonomy in allocating time for additional training experiences and educational opportunities. Historically, psychiatry training programs have long acknowledged the importance of research as a component of a residency curriculum [5], and most psychiatry residencies offer practical research experience such as a small project which can be completed during an elective rotation. However, some programs offer formal and systematic training in research. This allows psychiatry residents to design and complete their own projects, often over several years, and usually in conjunction with specialist training in laboratory skills and/or clinical research assessments, data analysis, scientific writing, and grant applications. Such formal training is referred to in this article as a “research track.” Residents who complete a research track are frequently encouraged to pursue academic careers in psychiatry, which may include further training in a research fellowship, or pursuing an early career research grant such as a National Institutes of Health (NIH) Career Development Award (“K award”). Such competitive awards are highly desirable because they enable a clinician-scientist to continue research after residency by providing project funding and salary contributions, the latter of which releases clinicians from clinical duties linked to productivity reimbursement.

Why should a psychiatry residency program consider offering a research track? Although a formal research track may require many program resources, there are multiple educational benefits which program directors should consider. Research

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tracks not only prepare psychiatry trainees for careers as academic psychiatrists and clinical investigators; they also create clinical educators who can teach the next generation of residents about theoretical frameworks, scientific skepticism, and how to carefully design their own investigations. Through exposure to research training early in their careers, residents learn systematic ways of approaching clinical problems, including how to collect clinical data in a way that will be of maximum benefit to their laboratory, behavioral, statistical, and neuroimaging colleagues. Additionally, research track graduates can better mentor future research trainees, sharing the skills needed and processes involved, and their personal experience of how these can impact residency training. Thus, psychiatry trainees who complete a formal research track but do not proceed to a formal research career can still make significant clinical, educational, and scientific contributions to their field [1].

This paper is intended to assist program directors who are considering creating a research track, or assessing the design of a pre-existing track. First, we review research tracks currently available nationally. Then we discuss the challenges and benefits these tracks offer and resources they require (e.g., funding, equipment, space, and support staff). We aim to facilitate dialogue between program directors and faculty regarding their professional development as educators, researchers, and mentors, and assist them in designing a research track of maximum benefit to their trainees while furthering departmental research and teaching. This paper may also help residents and their mentors evaluate a research track and make an informed decision about whether it is appropriate for their psychiatric training and career development.

What Psychiatry Research Track Options Exist in 2017?

The websites of all 223 ACGME accredited psychiatric residency programs listed on June 1, 2017 were reviewed for publicly available information about their research curricula [6]. Seventy-three programs could not be accessed directly from the ACGME website (broken links, invalid addresses, etc.) and were searched for online via Google using the ACGME provided program name. Two programs could still not be evaluated: one website was available by login only; the other was a clinical facility advertising multiple residency specialties but not psychiatry. Ninety-six programs (43%) described informal research options (usually elective months). Fifty-eight programs (26%) explicitly described a formal research track on their website (Fig. 1a). The programs advertising formal research tracks gave widely varying amounts of information, from merely stating that a track was available to extensive descriptions of track resources and curricula.

Descriptions of research tracks varied, including title of the track, time available, educational requirements, and suggested research projects. Examples of titles included: *Research Track*, *Research Curriculum Track*, *Research Concentration Program*, *Psychiatry Resident Research Program*, *Resident Academic Track*, and *Career Investigator Track*. Time available for research varied widely in both longitudinal amount during residency and total amount each month. Longitudinally, most research tracks began in PGY1 or PGY2 (Fig. 1b). Organization of that time varied widely: some tracks offered one weekday for a year supplemented by research electives; others made increasing percentages of time available during the years of the research track. Twelve tracks devoted 80–100% of time to research by PGY4 year, requiring trainees to have met core ACGME graduation requirements by the end of PGY3. Four programs offered an extended residency of 5–7 years with one or more years of 100% research time. One program offered a combined PhD/residency track, and another offered a Master's degree in Human Investigations. Twenty-two research tracks stated that they had specific funding available for trainees: 9 from the National Institutes of Health (6 specifically from NIMH), 1 from the Veterans Administration, and the remaining 12 from a selection of institutions, departments, universities, or unspecified funds.

Educational requirements of research tracks varied. Several research tracks mandated grant-writing workshops, weekly or monthly research didactics, research clinics, and regular research discussion meetings. The type of research (laboratory basic science, animal studies, clinical research, neuroimaging, etc.) appeared driven by institutional availability, existing resources, and research foci of the primary investigators. Most residencies with a research track indicated on their websites which types of research they offered and gave examples of department research already being undertaken.

Motivation for and Pathways to a Research Career

Trainees are motivated to pursue research for varied reasons. For some, a personal interest comes from witnessing a loved one with psychiatric illness. Some trainees simply become curious about the mechanisms of psychiatric disease, while others wish to continue projects started earlier during academic training, such as from Master's or PhD programs. Some notice the paucity of effective diagnostic techniques and treatment options and want to remedy that. Others seek variety within their future clinical career or want to keep their options open while deciding between clinical and academic pathways. Finally, there can be a powerful influence from senior physicians and mentors who model academic pursuits.

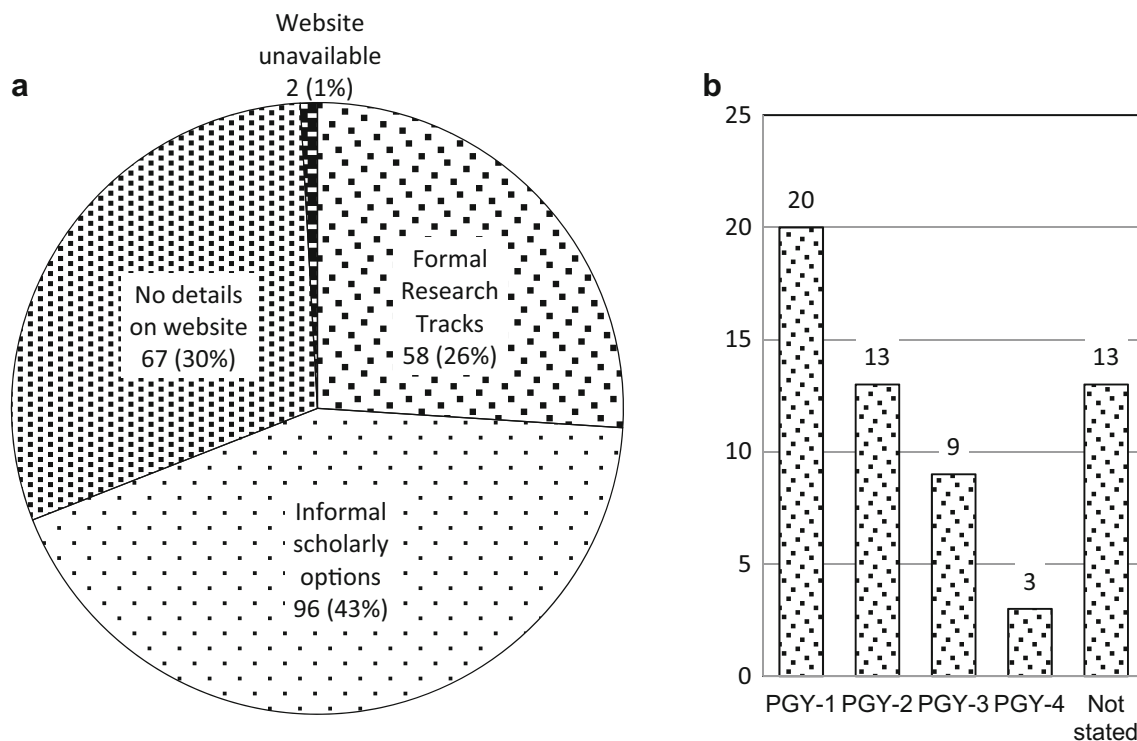


Fig. 1 Research opportunities at 223 U.S. psychiatry residency programs as described on their websites on June 1 2017, with **a** summary of website information about research available to trainees, and **b** postgraduate commencement year of the 58 formal research tracks

Psychiatric residents seeking research careers have other options besides research tracks. After residency, trainees could apply for research fellowships, either institutional or federal, and these typically give 1–3 years of dedicated research time. The advantages of research fellowships include the following: fellowships are funded and have successful track records; the fellow usually has no clinical responsibilities unrelated to the research project; the supervisors are experienced; and the fellow usually belongs to a team of researchers who can share ideas, work together, and co-author publications. However, research fellowships pay far less than full-time clinical positions, are competitive, and may be adversely affected by institutional or federal budget adjustments. A psychiatry resident could apply instead for a clinical position at an academic institution and try to “carve out” a research career by using their own time to write and apply for grants, subsequently using grant funding to exchange clinical time for research time. This process can take years and involves applying for multiple small grants, career development awards, and ultimately larger private and government grants. The advantages of this path include the following: academic institutions have IRBs readily available; a pool of patients is available for clinical research or samples; and the early career physician-scientist can continue expanding their clinical skills. This is an uncertain career path with no guarantee of successfully obtaining grants that demands a huge amount of time and effort on the part of the researcher to try to continue to meet clinical and financial targets for their institution. Given the

demands, this path may provide less time for the psychiatrist to spend with family or pursue other interests.

An alternative to these two traditional pathways is for the trainee to begin private clinical work after graduation, but hire an independent IRB to authorize the study of patients. This can be hard to successfully translate into a meaningful research career because these clinicians are frequently alone in their endeavors, without the institutional framework, administrative support, research teams, and mentorship needed for successful grant applications. They will usually be forced to use their own money and time and/or negotiate with their employer. Another bridge between the private and academic world includes the biotechnology or pharmaceutical industries, which routinely recruit physician-scientists, but they come with their own challenges, such as managing conflicts of interest. Finally, if a resident wishes to continue contributing to their field in an academic way, they can pursue a traditional clinical career but maintain “scholarly activity.” This can include reporting on interesting cases, commenting on developments in the field, teaching students, contributing literature reviews, or even helping to recruit patients for the studies of research colleagues. These activities are typically performed in addition to a psychiatrist’s clinical duties without dedicated research time.

Regardless of which career pathway an early-career psychiatrist chooses, a research track resident is better positioned for success in combining research and clinical pursuits. However, during the research track, trainees may not be able

to pursue other residency experiences, such as chief residency, integrated child and adolescent psychiatry (CAP) fellowships, and a breadth of elective experiences frequently available in the PGY-4 year.

Residents pursuing the integrated 5-year CAP fellowship may find it challenging to incorporate enough time for a research track because of the abbreviated nature of the program, but there are options. Residents can work closely with the fellowship director to utilize their CAP elective time for research. This would probably require a research project focused on a CAP topic. Residents strongly interested in CAP research careers would be most successful by meeting with both the research track and CAP directors early in residency training. Chief residency experiences vary by institution, but tend to be opportunities for residents to serve as leaders and policymakers, advocates and mentors for their resident colleagues, and liaisons between the faculty and residents. Chief residency requires a large time commitment, but sharing duties, opening specific chief roles to research track residents (e.g., a chief of research), or allowing research track residents to be interim chiefs in the event of a prolonged chief absence (e.g., maternity leave) can help research track residents become involved. In general, residents interested in pursuing education, leadership, and administrative roles may be more drawn to a chief resident path than a research track. PGY4 electives may need to be redirected towards research time, unless programs find a way to continue to offer these diverse training opportunities to research track residents.

What Are the Benefits and Challenges of Incorporating a Research Track into Psychiatry Residency?

Research tracks can benefit both trainees and their programs (Table 1). Psychiatric research is a specific form of training. Trainees learn to search the literature, teach themselves about their field of interest, design a study (whether clinical or basic science), and seek additional resources including grant funding, mentorship, and collegial collaboration. If a research track involves basic science, trainees may learn new laboratory skills, while residents involved in clinical research may develop new areas of expertise in performing clinical assessments. Residents involved in research also hone their statistical skills and their analytical critique of literature.

Meanwhile, residency programs benefit in multiple ways. Research done by trainees increases the number of projects undertaken by a department; raises the profile of departmental research (including internally among non-research track trainees); increases departmental publications, presentations,

Table 1 A selection of the benefits and challenges of formal research tracks for psychiatry trainees and for psychiatry departments and residency programs

	For trainees	For residencies/departments
Potential benefits	<ul style="list-style-type: none"> • Additional specialist training (lab skills, data analysis, clinical techniques) • Adjunct experiences and skills (committee memberships, participation in ethics boards) • Curriculum vitae enhancement (publications, presentations, committees, grants, skills) • Exploration and foundation of career in academia and research, networking, and collaboration • Preparation for teaching residents and directing research • Developing critical thinking 	<ul style="list-style-type: none"> • Enhance recruitment and retention of residents and faculty members with research interests • Support trainees in career evolution, skill building, developmental trajectory • Boost department research profile, publications, presentations, funding • Increase research literacy across entire residency • Enhance departmental networking with other members of a research specialty • Support faculty research and mentoring
Potential challenges	<ul style="list-style-type: none"> • Clinical demands competing with research requirements • Loss of other opportunities (chief resident, other tracks, elective rotations) • Dependency on mentors/funding • Isolation from residency colleagues • Possible extended length of training, with financial implications • Research track requirements (committees, meetings) not always educationally beneficial 	<ul style="list-style-type: none"> • Research demands competing with clinical duties and duty hours requirements • Loss of trainees to research track instead of specialty electives, other tracks, and chief resident positions • Providing adequate supervision time for research track program director and research mentors • Resident perception of preferential treatment of research track trainees, impact on morale • Laboratory and clinical resources and funding • Availability of mentors/supervisors

and funding; and encourages faculty who are interested in mentoring and teaching [5, 7]. Research track availability may also increase the size and competitiveness of the pool of residency applicants and increase the appeal of a program to medical school graduates who are interested in pursuing clinical investigations or academia [8].

Despite the benefits noted above, there are potential challenges associated with implementing a research track (Table 1). Research tracks may increase the personal demands of residency on trainees, especially if time is not carefully allocated or if clinical responsibilities are not clearly delineated. If residency training is prolonged by a research track, there may be associated financial burdens in delayed income expansion and ongoing student loan debt interest. Trainees may become socially isolated from their peers if they attend different research-oriented programming or if they are viewed as

being treated preferentially, especially if their clinical workload is reduced [9]. Research tracks may also limit other training experiences as described earlier.

Residency programs need to meet service requirements for safe patient care, and they may struggle to consistently give allocated time to research track trainees, especially if the number of residents in a class decreases. Programs may find it burdensome to financially support research trainees, whether through grants or private funding. Programs must be able to offer adequate facilities and experienced supervisors who can guide trainees successfully. These requirements may tax resources within a program.

What Should Program Directors Consider When Implementing a Research Track?

The research track program needs to incorporate effective research training with a successful research project without sacrificing ACGME graduation requirements or compromising clinical acumen and patient safety. We suggest that resources of a successful research track include adequate personnel, time, funding, and institutional facilities.

Personnel We consider a research track director essential for a successful research track. The purpose of this individual is to oversee the development of the track and review trainee progress [9]. The research track director monitors trainee-mentor relationships, morale, and research progress. The research track director can advocate for the trainee when necessary and prevent a trainee's clinical education from being compromised by participation in the research track or, vice versa and prevent a research project from being derailed by increased service requirements.

Meanwhile, the mentor/research supervisor should be familiar with the proposed research and understand the management of the study design and data collection. An experienced mentor can assist with project planning and anticipate obstacles, though senior researchers in a department are often less available if they travel and teach regularly. A mentor should have experience with psychiatric residents and understand their specific educational needs and clinical duties. There must be time for regular supervision, preferably weekly. Regular supervision is essential as it helps solve problems early, facilitates early data analysis, and enables manuscript and grant preparation. It is important for a trainee's career trajectory to have a successful project that results in publications, presentations, grants, and/or awards, and it is important developmentally that a research track experience provides meaningful educational progress. An experienced supervisor makes use of limited time and resources during residency in order to achieve these goals [2], ultimately making it more likely that the field of psychiatry retains a clinician-scientist [9]. Finally,

the program should consider contingency plans for a resident whose supervisor leaves the program, such as through retirement or transition to another institution, and should consider how the resident can salvage a research project if there is loss of a primary investigator and/or funding.

Time Adequate time is essential for a successful research project. This includes time for planning the project early in training, time for supervision with both the mentor and research program director to assess progress, and adequate time for data collection, analysis, and reporting. The specifics of a research project may dictate how time is organized. For example, a western blot experiment requires two *consecutive* days in the laboratory. An experienced mentor and/or research program director can advise a trainee of this and assess its impact on clinical duties and ACGME duty hour mandates. The residency program must establish whether the time and space the trainee needs are available in the appropriate laboratory or clinical settings. Simultaneously, the residency must determine whether they can spare the research track resident during their allocated research time and that contingency plans exist for resident absences, so that research track residents will not be diverted from research to clinical duties. If this is not possible, it must be made clear to trainees during the application process so they may plan their research accordingly.

Funding A number of funding questions arise in the immediate planning stages of a research project. The trainee and mentor should budget for their needs, which may include supplies, statistical or laboratory support, and even journal publication fees. Does the mentor already have adequate grant funding to finance the trainee's proposed project? If not, does the residency have a successful record of helping trainees obtain funding? As mentioned earlier, many residencies and/or their institutions are recipients of federal or private funding, but residency programs must decide whether they have the budget to adequately finance a research track.

Institutional Resources A successful research track has access to library resources, including literature and assistance with literature searches. This may affect funding if multiple interlibrary loans or specialist materials are required. Information technology resources may be a significant consideration, such as whether the institution has purchased the necessary citation management or statistical software. Laboratory time and space have been discussed above, but laboratory skills training may also be required. The program should assess whether they have the facilities and personnel for this.

In contrast to basic science researchers, trainees pursuing clinical research have different needs. They require access to a patient population and appropriate training in clinical assessment and therapeutic intervention. For any human research, an Institutional Review Board (IRB) is required. Most large

training hospitals have access to an IRB, but a smaller facility may choose to hire a private IRB to review a research proposal. Any proposed animal research demands specialist requirements including a federally mandated Institutional Animal Care and Use Committee (IACUC) and adequate facilities.

What Should Program Directors Consider When Advertising and Recruiting for a Research Track?

It is helpful for prospective residents (usually medical students) to have publicly accessible information regarding research opportunities. This should include details about protected research time and resources, funding availability and record of securing funding for residents, and examples of previous trainee projects, publications, and presentations. We noted that 30% of programs (Fig. 1a) supplied no clear information about any research options on their website even though it is an ACGME requirement to offer scholarly activity.

When advertising a research track, residencies need to consider how to recruit psychiatry residents who would benefit from and contribute to their research tracks. If a trainee has limited research experience, they are better suited to a research track that can train them, and programs can advertise this availability. By contrast, residency programs with demanding research tracks may seek trainees with significant previous research experience and may require applications to the research track during the application to the residency program, or possibly even a separate application through the National Resident Matching Program (NRMP). Regardless of trainee experience, it is appropriate to begin planning a project during the PGY1 year to ensure adequate time to find a mentor, gather resources, learn skills, and begin pilot studies or obtain IRB approval. Program directors and research track directors can collaborate with trainees in this process, potentially making it part of the application to the research track.

When assessing a candidate for a research track, residency program directors and research track directors need to consider candidate qualities in relation to the research track design. It is important that a resident be capable of meeting clinical ACGME requirements first before assessing whether they can also manage the additional responsibilities of the research track. Assessment measures can include ACGME milestones, supervisor feedback, and previous research supervisors' evaluations (where relevant). Where a resident has no or limited prior research experience, programs need to consider whether candidates have the aptitude to learn new research skills. It is outside the scope of this paper to consider how candidates could be assessed once accepted into a research track, but supervisors need to consider consistent ways to monitor resident progress within this specialized educational pathway.

It may be helpful for program directors to consider ways of addressing obstacles for trainees. As regards to student debt, wealthier institutions may be able to offer salary increases, especially for research track residents on extended programs which delay entry into a full clinical salary. It may also be possible to offer two versions of a research track, one that is fully encompassed within a typical 4-year training program and another that provides a subsequent postdoctoral-style training experience. If it is possible to participate in a research track without losing other opportunities (e.g., chief resident), this should be addressed on an individual basis as discussed above. Unnecessary activities can be pruned, such as obligations to sit on committees. The importance of keeping a trainee's morale up cannot be underestimated. The trainee must not feel isolated from resident colleagues, and we urge that the trainee be part of the regular psychiatric curriculum wherever possible without compromising research time.

Putting It All Together

A number of authors have looked at data from Canadian psychiatry training programs [10], but to our knowledge, this paper is the first compilation of information about research tracks offered by U.S. psychiatry residencies. One striking finding was the number of residency websites that made no mention of research. Programs using their public websites for the purposes of recruitment should consider including descriptions of research opportunities, institutional facilities available, and faculty interests, publications, and funding.

Organizing a research track may not be appropriate for all institutions. Some may not have adequate resources, financial or otherwise, to design a research training program that can ensure trainee success or equitable distribution of institutional assets. Other programs may not find it appropriate to address formal research, especially if their institutional culture has an alternative focus, such as caring for particular patient groups (rural, minority, military, inner-city, etc.) and providing trainees with specialist education in managing those patient populations. It is very reasonable for programs to self-assess their aptitudes and their goals to determine whether they will create a research track. The authors explicitly discourage programs from initiating a research track without first gauging resource availability and program design. Programs with established research tracks, and those without them, can assess their relative strengths and ascertain clinical-science foci in which they might be able to provide residents with this valuable and educational research experience.

All residency program directors are aware that participation in scholarly activity is a mandated part of ACGME psychiatry training requirements [11]. Meeting this mandate does not require a research track. However, formal research training provides benefits to trainees and their departments.

Research tracks require careful planning and thoughtful appraisal of resources, but up until now there has been minimal literature discussing the practical implementation of a research track. The authors hope that this paper will provide guidance to program directors and research track directors who are seeking to create or optimize a research track.

Compliance with Ethical Standards

Disclosures On behalf of both authors, the corresponding author states that there is no conflict of interest.

No human subjects were involved in this research.

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