

**APPLICATION FOR ADMISSION TO
PSYCHIATRIC EPIDEMIOLOGY TRAINING PROGRAM**

1. NAME _____

2. MAILING ADDRESS _____

3. TELEPHONE NUMBER(S) _____

4. EMAIL ADDRESS _____

5. WHAT IS YOUR DATE AND STATE (OR COUNTRY IF FOREIGN BORN) OF BIRTH?

DATE _____ STATE/COUNTRY _____

6. CITIZENSHIP STATUS:

THE NIMH STIPULATES THAT ONLY "US CITIZENS OR INDIVIDUALS LAWFULLY ADMITTED FOR PERMANENT RESIDENCE MAY APPLY." PERMANENT RESIDENTS MUST SUBMIT A NOTARIZED STATEMENT INDICATING POSSESSION OF THE ALIEN REGISTRATION RECEIPT CARD—1-151 OR 1-551. INDIVIDUALS WITH TEMPORARY OR STUDENT VISAS ARE NOT ELIGIBLE FOR SUPPORT.

ARE YOU A US CITIZEN? ____ YES ____ NO IF "NO" PLEASE ANSWER BELOW

OF WHAT COUNTRY ARE YOU A CITIZEN? _____
DO YOU HAVE A VALID US "GREEN CARD" _____

(IF INFORMATION REQUESTED BELOW IS LISTED ON ENCLOSED CV, PLEASE INDICATE)

7. EDUCATION:

PLEASE PROVIDE INFORMATION REGARDING ALL SCHOOLS ATTENDED AND DEGREES RECEIVED SINCE HIGH SCHOOL.

SCHOOL	DATES ATTENDED	DEGREE	MAJOR
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

8. EMPLOYMENT:

PLEASE LIST ALL EMPLOYMENT (LAST 5 YEARS) RELEVANT TO YOUR APPLICATION TO THIS PROGRAM.

EMPLOYER	POSITION	DATES OF EMPLOYMENT
_____	_____	_____
_____	_____	_____
_____	_____	_____

9. OTHER EXPERIENCE:

PLEASE DESCRIBE OTHER ACTIVITIES OR EXPERIENCE RELEVANT TO YOUR APPLICATION TO THIS PROGRAM.

10. AWARDS:

PLEASE LIST ANY AWARDS, HONORS, FELLOWSHIPS, OR GRANTS RECEIVED.

11. OTHER FUNDING:

DO YOU PRESENTLY HAVE OR HAVE YOU BEEN NOTIFIED THAT YOU WILL RECEIVE ANY FELLOWSHIPS OR GRANTS THAT WILL OVERLAP WITH THE P.E.T. FELLOWSHIP?
____ YES ____ NO IF "YES", FROM WHAT SOURCE?

12. PUBLICATIONS (AUTHORS, TITLE, JOURNAL/BOOK, DATE):

13. ACADEMIC/CAREER GOALS:

STATE IN ONE OR TWO PAGES YOUR ACADEMIC AND CAREER GOALS. PLEASE BE AS SPECIFIC AS POSSIBLE. STATE WHAT TRAINING YOU WISH TO RECEIVE IN THIS PROGRAM THAT WILL FURTHER THOSE GOALS. WHY ARE YOU INTERESTED IN STUDYING PSYCHIATRIC EPIDEMIOLOGY?

14 TRANSCRIPTS:

PLEASE SUBMIT TRANSCRIPTS OF YOUR UNDERGRADUATE AND GRADUATE ACADEMIC RECORDS,

15 LETTERS OF RECOMMENDATION:

PLEASE ARRANGE TO HAVE THREE (3) LETTERS OF RECOMMENDATION SENT TO US BY INDIVIDUALS WHO ARE FAMILIAR WITH YOUR WORK. (PLEASE ASK THEM TO WRITE TO US. WE WILL NOT CONTACT THEM.)

16. OPTIONAL:

YOU MAY SUBMIT REPRINTS OF YOUR PUBLICATIONS, UNPUBLISHED PAPERS FOR COURSES, OR COPIES OF MASTER’S THESES OR DOCTORAL DISSERTATIONS, OR ANY OTHER OF YOUR WRITINGS THAT MAY BE HELPFUL IN EVALUATING YOUR CAPABILITIES AND INTEREST.

DEADLINE FOR APPLICATIONS: December 15TH

We are accepting POSTDOCTORAL FELLOWSHIP applications with a start date of SEPTEMBER 1, 2024

We are accepting PREDOCTORAL FELLOWSHIP OPENINGS for the academic year 2024-2025.

	NIH Stipends (current)	Department Supplement	Total
Predoc Stipend	27,144	19,536	46,680
<i>Postdoc Stipends- levels are dependent on experience</i>			
0	56,484	3,516	60,000
1	56,880	3,120	60,000
2	57,300	2,700	60,000
3	59,592	408	60,000
4	61,572	-	61,572
5	63,852	-	63,852
6	66,228	-	66,228
7	68,604	-	68,604

TO FAMILIARIZE YOU WITH OUR TRAINING PROGRAM, WE HAVE ATTACHED A DESCRIPTION EXTRACTED FROM A GRANT APPLICATION THAT WE WROTE SEEKING FUNDING FOR THE PROGRAM. IT BEGINS WITH A SECTION ABOUT THE RATIONALE FOR A TRAINING PROGRAM IN PSYCHIATRIC EPIDEMIOLOGY AND IS FOLLOWED BY A DESCRIPTION OF THE PROGRAM’S STRUCTURE AND FUNCTIONING. IN ADDITION TO THIS MATERIAL, THERE ARE SEVERAL FACTS YOU SHOULD KNOW ABOUT APPLYING TO THE PROGRAM.

COLUMBIA UNIVERSITY
PSYCHIATRIC EPIDEMIOLOGY TRAINING PROGRAM

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EMAIL: PET@COLUMBIA.EDU

Co-SPONSORED BY: DEPARTMENT OF EPIDEMIOLOGY SCHOOL OF PUBLIC HEALTH
DEPARTMENT OF PSYCHIATRY COLLEGE OF PHYSICIANS AND SURGEONS

PROGRAM DIRECTOR: KATHERINE M. KEYES, Ph.D.
Co-DIRECTORS: MARK OLFSO, M.D.
SHARON SCHWARTZ, Ph.D.
EZRA SUSSER, M.D., DrPh.

TRAINING Co-ORDINATOR: SHARON SCHWARTZ, Ph.D.

STEERING COMMITTEE & FACULTY

ALAN BROWN, M.D. DEBORAH HASIN, Ph.D.
ROBERTO LEWIS-FERNANDEZ, M.D. WILLIAM FIFER, Ph.D.
KATHERINE M. KEYES, Ph.D. MARK OLFSO, M.D.
SHARON SCHWARTZ, Ph.D. EZRA SUSSER, M.D., DrPh.
ARDESHEER TALATI, PH.D. MYRNA WEISSMAN, Ph.D.

FACULTY:

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LISA BATES, Sc.D. DANIEL W. BELSKY, Ph.D.
WILLIAM P FIFER, Ph.D. MADELYN S. GOULD, Ph.D.
SIDNEY H. HANKERSON, Ph.D. MADY HORNIG, M.A., M.D.
CHRISTINA HOVEN, Ph.D. JEREMY C KANE, Ph.D.
JENNIFER MANLY, Ph.D. PIA MAURO, Ph.D.
CATHERINE E. MONK, Ph.D. KIMBERLY NOBLE, M.D.
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SETH PRINS, Ph.D. CHRISTIANE REITZ, M.D., Ph.D.
KARA RUDOLPH, Ph.D. ARDESHEER TALATI, PH.D.
NIM TOTTENHAM, Ph.D. BLAKE TURNER, Ph.D.
MELANIE M. WALL, Ph.D.

[Abbreviations used: Columbia University (**CU**); Imprints Center for Genetic and Environmental Lifecourse Studies www.cumc.columbia.edu/dept/imprints/ (**Imprints Center**); Mailman School of Public Health (**MSPH**); New York State Psychiatric Institute (**NYSPI**); the Columbia University Psychiatric Epidemiology Training Program (**PET**)]

2. 2. PROGRAM PLAN

A. Background

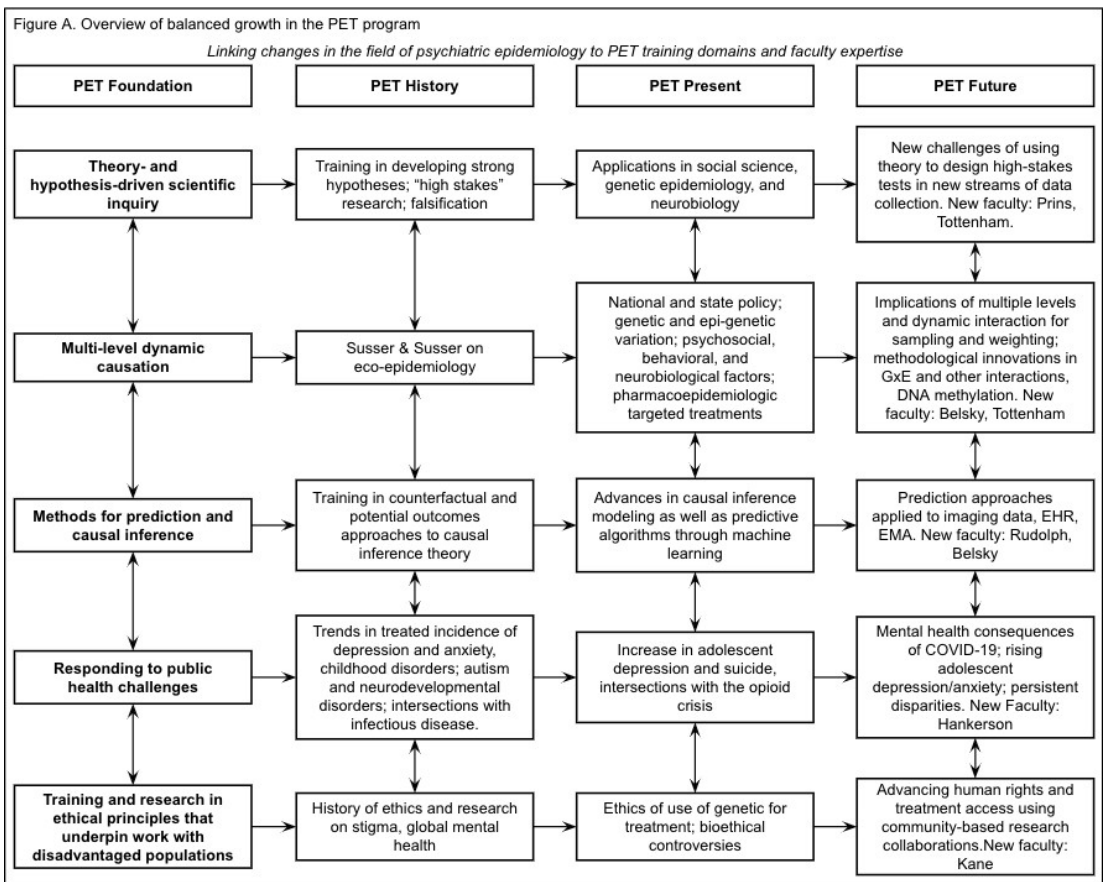
In the United States, common psychiatric disorders such as depression and anxiety, as well as sequelae including suicide,^{1,2} have increased at an unprecedented rate in the past decade, particularly among young people.³⁻⁷ Disorders of childhood continue to exert profound impact on families throughout the lifecourse.⁸⁻¹⁰ The landscape of psychiatric disorders in the US coincides with a rapidly changing social environment, including new and emerging risk factors such as social media,^{11,12} a global pandemic,¹³⁻¹⁵ climate crises, and a rapidly changing policy environment. All of these new, emerging, and resurging risk factors are propelling through communities at a time when healthcare policies around mental health continue to shift,¹⁶ including policies around cannabis use, opioid prescriptions, and behavioral healthcare financing that have country-wide implications for mental health and substance use disorders.^{17,18} Each of these environmental shifts interacts with and/or is mediated through variation in genetic, epigenetic, molecular, and neurological underpinnings of psychiatric disorders, for which new streams of data and new methods for analysis are expanding. Thus, the rationale for training the next generation of psychiatric epidemiologists is compelling. Psychiatric epidemiology is a core science of public mental health and is capable of advancing our understanding of multi-level risk factors to reduce the incidence and burden and ameliorate the course of psychiatric disorders in the population. Well-trained methodologists who can ask informative questions of existing data, deeply understand psychiatric phenomenology, design and collect urgently needed new data, innovate and apply methodological advances, and translate results to practitioners and policymakers will be critical to reducing growing mental health problems in the US and their inequitable distribution.¹⁹ Psychiatric epidemiology training provides a foundation to discover the underlying causes and how they affect psychiatric disorders, as well as understanding the disorders' secular trends, disparities, and the development and testing of interventions. Given the important role of epidemiology in understanding mental health etiology and care, it remains critical to train scientists in epidemiological methods and techniques.

During its 50-year history of continuous funding, the Columbia University Psychiatric Epidemiology Training Program (PET) has trained generations of highly productive psychiatric epidemiologists to prepare them for current challenges (see Section B: Program Plan, and Section 6: Progress Report). While every training program has specialized elements, the PET program is unique in combining five foundations (Figure A) of training, expertise, history, and approach to research that has led to specific contributions of our scholars. In this application, we explicate recent transitions in PET leadership and faculty and how they continue the balanced growth we have achieved over five decades of training in each foundation. We describe each of the five foundations, including their history within our program, current progress in implementing the goals of the last grant period, and our plans for the next five years to continue building upon these foundations with additional faculty, training, and expertise. These foundations are interrelated and cross-cutting across subfields within psychiatric epidemiology and across faculty who study social and environmental influences on mental health, from those who study genetics, biological processes and neuroscience to those who focus on assessing interventions to reduce mental health sequelae, improve mental health service delivery, and lower barriers to accessing care. These foundations also are essential for epidemiologists to participate in rebuilding the public mental health infrastructure to prepare for future global crises, including pandemics.

A.a. Overview: Positioning PET for success.

A.a.1. Transitions in PET leadership and faculty. Smooth transitions in PET leadership have made it easier to sustain continuity and growth across our five foundations. The program was initially led by Dr. Bruce Dohrenwend (who officially retired this year after 50 years on PET faculty);

then by Dr. Bruce Link (previously Co-Director); and then Dr. Ezra Susser (previously Co-Director). Dr. Katherine Keyes will now lead the program, to bring the next generation into leadership through her outstanding achievements in the field, methodological rigor, broad areas of expertise, and successful history of mentoring students and building careers. Dr. Keyes has been a Co-Director of the program since 2018 and transitioned to Director in 2020. She has been central in developing our conceptual framework and is well-suited to integrate its components across the five foundations. As described in Section B.a.1, she has an extensive record of NIH funding, including three current NIH R01 grants that can support trainees, as well as extensive experience mentoring students and postdoctoral researchers. She was joined by Co-Director Dr. Mark Olfson in 2019, a distinguished professor of psychiatry and epidemiology whose work has been central to understanding the epidemiology of services for mental health, electronic health record data on suicide and overdose epidemiology and prevention, and the impacts of mental health and substance use policy on the country's ability to provide treatment and other services to those in need. Dr. Olfson also has an extensive track record of NIH funding and mentoring.



We see these smooth transitions in Leadership as hallmarks of what has made PET successful. As a former PET trainee and long-time faculty member, Dr. Keyes represents continuity with the past and deepening of the central components of our five foundations

Dr. Olfson represents our approach to balanced growth, broadening our areas of strength in joining together clinical service delivery, pharmacoepidemiology, and medicine with population health questions about mental health risk groups and access to care. Together with established Co-Directors Drs. Susser And Schwartz, the PET leadership team has worked together and integrates diverse disciplinary transitions to provide illuminating discussion and diversity of training opportunities for our scholars. We detail the program structure in Section B: Program Plan to elucidate how roles will be differentiated and tasks shared among the core directors of the program. Importantly, all current and proposed leadership are highly involved in the program currently—they attend weekly seminars together, actively mentor the fellows together, and meet monthly to discuss how to make our program operate more effectively for our students. Transitions in leadership have been strengthened by balanced growth in our faculty, Steering Committee, and External Advisory Board. Our training program comprises 31 faculty members, including six new faculty members since our last renewal who were invited to develop and enhance our five foundations. Table 2 lists faculty members and their areas of expertise. Transitions in our External Advisory Board are described in Section B.a.5; we have expanded the board with an array of senior scholars presenting integral disciplines including neuroscience, biostatistics, and psychology. Jointly, the PET leadership, faculty, Steering Committee, and External Advisory Board support our training in

research in the five foundations, as detailed below.

A.a.2. Unique strengths of PET within the Departments of Epidemiology and Psychiatry at Columbia. To further indicate both the uniqueness of the training program as well as the full array of opportunities for fellows outside of the program, and in response to comments in the previous review cycle of the PET program, we discuss the relationship between PET and other T32 programs at Columbia University. Several PET faculty also are faculty on other T32 training programs, especially those in the Departments of Psychiatry and Epidemiology (Table 3). Generally, training programs in the Department of Psychiatry focus more on basic science and clinical research and do not offer training in psychiatric epidemiology; hence there is no overlap with PET. Nonetheless, these programs are useful to PET as a further source of expertise in neuroscience; similarly, PET is useful to those programs when their trainees wish to venture into population health studies (e.g., Ezra Susser co-mentors postdoctoral trainee Rene Hen in Psychiatry on neuroscience of schizophrenia).

There are, however, three T32 programs (two in Public Health, one in Psychiatry) that are especially complementary, though not duplicative, of PET. Compared with PET, these are all relatively new programs. The long-standing history of PET benefits these programs in many ways, including through sharing of resources, such as courses in ethics of research and grant writing.

The NIMH T32 on Implementation Science in Global Mental Health, situated in Psychiatry, is a small postdoctoral training program and does not focus on psychiatric epidemiology (see attached letter). Global psychiatric epidemiology is, however, a component of implementation science, and we offer expertise in that area. Drs. Ezra Susser, Kathleen Pike, and Jeremy Kane are faculty members of that training program; faculty and trainees from each program are invited to give seminars in the other. The NIEHS T32 on Environmental Lifecourse Epidemiology is a newly funded program that emerged from the strength of lifecourse studies in both Epidemiology and Environmental Health Sciences at Mailman School of Public Health (MSPH) (see attached letter). The program focuses on how to examine the influence of environmental exposures (especially toxins) on a wide range of conditions over the lifecourse (not primarily psychiatric disorders). The PET program offers expertise when psychiatric disorders are relevant to their outcomes; the Environmental Lifecourse Epidemiology program offers additional expertise for our training in lifecourse studies; and we jointly sponsor Imprints Center seminars relevant to both T32s. The NIDA Substance Abuse Epidemiology Training Program offers training in substance use, a topic that is not within the scope of NIMH except in terms of its relevance to psychiatric disorders (see attached letter). Thus, there is little overlap but, especially in light of the comorbidities between psychiatric and substance use disorders, much room for mutually beneficial exchange. The program is led by long-term PET faculty Deborah Hasin, who regularly gives seminars in PET to familiarize trainees with substance use epidemiology. PET Director Katherine Keyes is trained in both areas and is on their faculty, creating additional opportunities for synergy.

A.b. Foundation 1: Training in theory- and hypothesis-driven scientific inquiry.

A.b.1. PET history and faculty expertise. Our 50-year history has been centrally focused on a foundation of identifying and developing theory-driven questions and hypothesis tests to address complex problems and bringing forth methodological rigor using appropriate study designs to test theories. “Theory” is a broadly encompassing term that refers to ideas or principles that organize our thinking and our science to explain phenomena. We invoke theory to make predictions and construct hypotheses about what we should observe under various conditions, exposures, and stimuli. It structures our ideas, the type of data that we collect, the variables that inform our models, and our interpretation of data. A theory about the organization of social and biological processes thus provides a framework to identify and define research problems, develop and evaluate study designs that provide insight to these problems, and interpret relevant data. Importantly, strong theories lead to predictions and hypotheses that are falsifiable and inform subsequent refinement of hypotheses about how psychiatric disorders are produced. Theory is used and is critical to both social and biological sciences, although it can be used in myriad different ways. In social sciences, it is common to organize studies around specific, named theories; in biological sciences, it is common to structure studies around general theories of biological organization and how that impacts individual differences. Yet, in both social and biological sciences, theories are used to ask how and why patterns of organization and processes occur, the mechanisms through which exposures influence outcomes,

and the macro- and micro-processes that result in the observed data. Theory-informed research is not simply using a conceptual model to organize variables; theory-informed research with clear, falsifiable hypotheses that have stakes for mental health determine the structure of the very questions that we ask, the way that we answer them, and how they inform public health.

This approach to training is not merely an academic exercise; it is critical to engaging in research that has the potential to impact public health, intervention, and mental health service delivery. Indeed, by interrogating why we ask the questions that we ask and what theories inform our thinking about scientific questions, we structure our program to train scholars how to think critically in terms that are likely to impact the field and public health. A particularly apt example is the processes of scientific discovery in genetic psychiatry. The observation that psychiatric disorders tend to cluster within families has been made for centuries;²⁰ theories of genetic transmission have developed and shifted over the course of decades that fundamentally rest on predictions and observations about cell division, replication, and a mechanistic understanding of biological systems. As new data have been collected and observations made, theories of how and why genetic and epigenetic factors influence psychiatric disorders have grown and been challenged, redeveloped, and refined. This process has been amplified in recent decades with intensification of technological innovation and sample sizes to sequence and study the genome. Even descriptive studies of genome-wide associations are based on theories and empirical observations regarding the nature of polygenic causation and interaction, probability theory, interpretation of null hypothesis testing, and case-control study design theory;²¹ results from these descriptive studies are then pursued and probed for mechanistic understanding and causal inference. They are increasingly complex and involve multiple levels of organization to provide mechanistic theories of causation that can be tested. The field of psychiatric genetics has made exceptional strides in both theory development and testing,^{22,23} moving from hypothesis-driven candidate gene approaches,^{24–26} to high-power descriptive “discovery” approaches,^{27–29} to mechanistic models that incorporate a range of biological processes.^{30–32} At each stage, there have been remarkable developments in theories of genetic understanding that are guided by falsification of hypotheses and new knowledge. Importantly, only with a strong biological and social theory grounding can we design studies that provide informative study designs and hypothesis tests that allow us to make sense of what we observe in the world. Theoretical framing and causal inference approaches, consideration of selection and representation within samples, and careful attention to bias and confounding in data analysis remain the critical components that theoretically-driven epidemiology brings to psychiatric genetics and the field more broadly.³³ Our PET faculty have been centrally involved in psychiatric genetic efforts, including Dr. Christiane Reitz, who uses whole exome and genome sequencing as well as large-scale targeted re-sequencing and RNA sequencing to identify genetic determinants of neurodegenerative disorders;^{34–36} Dr. Ezra Susser, who leverages both genomic and epigenetic data across the world to inform mechanistic understanding of schizophrenia and autism;^{37–39} and Dr. Dan Belsky, who has been a leader in development and application of poly-genetic risk scores to structure new scientific understanding of genetic transmission.^{40–43}

We train ourselves and our students to engage in this theory-informed research in what Dr. Bruce Link (PET Director, 1996–2015) termed “high-stakes” ways. This involves training students to test hypotheses for which the outcome has strong implications for our understanding of theory and practice, both for social and biological science. This foundation underlies seminal research that has emerged from PET leadership, such as Dr. Bruce Dohrenwend’s classic paper in *Science*⁴⁴ that began with a theory about how social class influences psychiatric disorders and, using that theory, constructed a study design that generated various hypotheses about social class. It also is exemplified in Dr. Link’s articulation of the fundamental cause theory of social inequalities and health^{45–48} that is a core theoretical framework whose utility continues to expand, for example during COVID- 19⁴⁹ among other contemporary health issues.^{50,51} Throughout our long history, and despite changes in research areas of emphasis and methodological foci, our approach to theory-informed research has been about understanding theories of organization that both implicitly and explicitly guide our selection of research questions as well as building study designs that strongly test resulting hypotheses, across both social and biological processes and their intersections.

A.b.2. Progress since the last renewal. Commitment to theory-informed design can be seen throughout the work of our faculty and our scholars, from the way that we design our classes, to whom we invite for Faculty– Fellow seminars, to the feedback we provide our scholars. Thus, here we

highlight several notable examples from our faculty and scholars as recent examples of the type of work that we support. For example, Dr. Seth Prins (who was a PET fellow and joined PET as a faculty member in 2018) examines how conceptualizations of social class and the criminal justice system interact to produce mental illness as well as its socioeconomic patterning,^{52–55} with significant policy implications as modifiable interventions. Recruitment of Dr. Jerzy Eisenberg-Guyot as a postdoctoral fellow in the PET program in the Fall of 2020 has substantially advanced this research agenda, given his extensive work on the role of labor unions and worker protections as determinants of social disparities, health, and mental health.^{56–58} As debates over social safety nets and union protections renew in the US, these research programs remain critical inroads to understanding their mental health effects.

Another example of our work in this area since the last renewal is development of Dr. John Pamplin's ongoing research program. During his training as a PET fellow, Dr. Pamplin began engaging with the literature around the environmental affordances model.^{59–61} The environmental affordances model hypothesizes that racial disparities in mental and physical health arise due to differential coping mechanisms that are salubrious at mitigating depression in the face of stressful life events and increase risk for chronic health outcomes. Working with Drs. Bates, Keyes, Susser, and others, Dr. Pamplin explicitly engaged with the environmental affordances model to test the plausibility of and alternatives to the model^{62,63} and used epidemiological principles to outline inconsistent methodological descriptions. He found that existing theories about why racial differences in mood disorders emerge can be falsified; the data are not consistent with the environmental affordances theory that differences arise due to differential coping mechanisms between Black and White individuals. This process of falsification is scientific progress in action; it makes space for new theories to emerge about racial differences for which new study designs, variables, and conceptual frameworks can be developed.

A.b.3. Looking forward. Data collection is expanding, and science is increasingly relying on data collected at high volume, rapidly, and with millions of potential variables. These methods of data collection provide new opportunities to engage in active instruction in how to use theory to ask questions that can be interrogated through data and to inform how we answer these questions. It makes our foundation even more urgent to pursue—big data have little value if the right questions are not asked, with high stakes, falsifiable hypotheses, and competing theories. We have invited several new faculty members to the program to advance our work in this area. In particular, psychiatric epidemiology is informed by rich sociological theory and collaboration, with many of our junior and senior faculty having strong training in the social sciences and sociology that scaffolds our instruction. Further, we have expanded our interdisciplinary collaborations with new faculty, such as Dr. Nim Tottenham. Based in the Department of Psychology, Dr. Tottenham focuses on framing and testing hypotheses regarding development of neural circuits that underlie affective behaviors across childhood and adolescence,^{64–66} with particular emphasis on limbic–cortical connections via the amygdala–medial prefrontal cortex.^{67,68} Theory informs this work at all levels, including understanding how the brain is organized, testing hypotheses that derive from theories in animal and human models, informing what variables are confounders versus mediators of particular mechanistic hypotheses, and how observed data translate to potential interventions. Dr. Tottenham's work, mentorship of fellows, and contributions to our seminars will bring new theoretical perspectives to our collective contributions.

A.c. Foundation 2: Interrogating multiple levels of causation incorporating synergy and mechanisms.

A.c.1. PET history and faculty expertise. Scholars of psychiatric epidemiology have long grappled with the fact that psychiatric disorders are complex constellations of symptoms, with causes unfolding at multiple levels of organization from cells to society, and across the lifecourse including multi-generationally and from conception (or pre-conception) to death.^{69,70} Our training approach to conceptualizing and providing the analytical frameworks for investigations that incorporate multiple levels of causation are perhaps best represented by Dr. Susser's work on eco-epidemiology.^{71–74} Drawing on decades of scholarship in epidemiology including from Mervyn Susser and others,^{75–77} eco-epidemiological frameworks explicitly locate "risk factors" within the social and political contexts from which they arise, biological factors through which they are embedded and embodied, and pathways through which their effects can interact across the lifecourse and across generations. This

approach has formed a foundation of many PET scholars' work, from faculty to students, and examines synergy and mechanisms^{78,79} across genomics and circuits, physiology and behavior, and molecules and cells, as well as how those synergies then cause symptoms of disorders that impair people's lives.

A.c.2. Progress since the last renewal. Our approach to studying multiple levels of causation and dynamic interactions is demonstrated by both looking across our faculty as a whole as well as within individual faculty research programs. Considering cross-national and cross-state variation in exposures, including to policies, political and social environments, and social norms, is perhaps among the most macro of the multiple levels of causation. Drs. Deborah Hasin, Melanie Wall, and Katherine Keyes have used various data sources both within the US and cross-nationally to document downstream consequences of changing mental health, social, and substance use policies on psychiatric disorders,^{17,80,81} including how policies interact with other levels of organization. Drs. Mark Olfson⁸²⁻⁸⁴ and Melanie Wall have similarly used epidemiological data to examine the effects of changes in healthcare policy on insurance coverage and treatment of mental health and substance use disorders.^{85,86} Dr. Susser's work on genetic epidemiology of schizophrenia in Xhosa populations is illuminating how diverse samples are critical to advances in genomics.³⁹

Rapid advances in technology and science in neurodevelopment and psychiatry, as well as genetic and epigenetic variation, are important components of our eco-epidemiological approach, represented throughout our faculty and training. Our faculty engage in critical research interrogating neurobiological mechanisms, cellular disruptions, and genetic variation that leads to psychiatric disorders, and they have mentored PET fellows with great success. For example, Dr. Catherine Monk has an extensive research and mentoring portfolio examining the neurobiological and molecular underpinnings of how stress experiences become biologically embedded in poor mental health across the lifecourse,⁸⁷⁻⁹¹ carrying on a PET tradition of questioning and researching mechanisms underlying stress exposures. Her mentoring of predoctoral and postdoctoral fellows in these endeavors has led to extensive collaborations within and across faculty and fellows throughout Columbia.^{87,92} Faculty including Drs. Kim Nobel, Christine Reitz, and Ardesheer Talati also have considerable research and funding portfolios in the neurobiological mechanisms underlying psychiatric risk and have provided excellent mentoring to PET students. This is exemplified in the progress of our scholars, for example Dr. Emily Merz who is mentored by PET Faculty Dr. Kim Noble in using large-scale community-based neuroimaging data to investigate the neuroanatomical underpinnings of depression/anxiety disorders.^{65,93,102,103,94-101}

Countries with linked population-wide health registries, such as Denmark and Sweden, have long been the focus of psychiatric epidemiology, and such data sources are rapidly expanding in other countries, including the US. Since the last renewal, PET faculty have been integrally involved in these efforts^{104,105} as well as consortium projects and collections of worldwide psychiatric data, including for schizophrenia genetics,^{39,106} pharmacoepidemiology and pharmacogenetics of psychiatric disorders,^{107,108} and neurodevelopment and neurobiology of psychiatric risk across the lifecourse.¹⁰⁹⁻¹¹² Columbia researchers also have leveraged these data to advance science on etiology and delivery of care, demonstrating multigenerational consequences of parental depression on offspring brain development,¹⁰⁴ as well as pharmacoepidemiology of schizophrenia and other disorder treatments. Dr. Olfson has been particularly innovative in leveraging large and complex administrative data sources.¹¹³⁻¹¹⁵

We also have faculty that span investigations across the lifecourse, interrogating interactions from conception through old age. Drs. William Fifer (Steering Committee member) and Kim Noble examine prenatal and early childhood environmental effects on infant cognition,^{116,117} Drs. Madelyn Gould, Katherine Keyes, and Christina Hoven have extensive experience documenting child and adolescent psychiatric disorder incidence and unique risk factors across time and place;¹¹⁸⁻¹²¹ and Drs. Jennifer Manly and Katherine Keyes have investigated how cognitive changes across aging can interact with and portend other psychiatric challenges.¹²²⁻¹²⁵ PET faculty research expertise also cuts across lifecourse development, with an extensive history and current research program among our faculty in examining how early conception influences development of psychiatric disorders later in life. Drs. Ezra Susser, Alan Brown, and others in our program were among the foundational leaders in this field, beginning with long-term neurodevelopmental consequences of in utero famine exposure.¹²⁶⁻

¹²⁹ This work continues today studying neurodevelopmental consequences of nutritional deficits

across the globe,^{130–132} including innovative research on telomere length across life and influences on psychiatric disorders.^{130,131,133–136} Drs. Ardesheer Talati and Myrna Weissman are among the foremost experts on the effects of psychotropic medications and other pharmaco-epidemiological fetal exposures on long-term offspring outcomes,¹³⁷ conducting cutting-edge assessments of neurobiologic underpinnings of depression, anxiety, autism spectrum disorders, and attention-deficient hyperactivity disorder.^{110,138,139}

A.c.3. Looking forward. Electronic health record, digital health, environmental, and administrative data that can span tens of millions of patients present new opportunities and challenges for improving population mental health.^{140–144} Further, epidemiology has become centrally involved in population neuroscience, as imaging datasets continue to expand in size and scope.^{145,146} Yet the core of the science remains grounded in our foundation of asking theory-informed questions and designing studies that answer questions of public health significance. In the next five years, we will expand our collaborations and efforts across new and emerging data sources. These investigations will be supported by our extensive faculty-funded projects in neuroimaging, genetics, mathematical modeling, and social epidemiology.

One current thread in cross-disciplinary epidemiological efforts is the trade-off between deep phenotyping and big data.¹⁴⁷ Our program's legacy is one of defining and measuring clinical phenomenology; we played key roles in development of the Diagnostic and Statistical Manual of Mental Disorders (DSM)^{148–150} and of numerous instruments to measure psychiatric disorders.^{151,152} This programmatic focus on understanding and accurately measuring clinical phenomenology is evident in our ongoing cohort studies, such as the three-generations study led by Dr. Myrna Weissman^{153,154} and the Children in the Community study led by the late Dr. Pat Cohen.^{155–157} Because of the intensity of data collection, these studies have relatively small samples (by today's standards) yet are highly informative about clinical phenomena. At the same time, our faculty and students are leading efforts to build technology and innovation to rapidly expand large datasets, often with administrative records of psychiatric diagnoses or heterogeneous measurements harmonized in consortia cohorts. While these sources are able to test previously untestable hypotheses, lack of detail on social factors and clinical phenomenology as well as other limitations create inferential ambiguity. The future of the field will include triangulation of findings across data sources with different underlying strengths and weaknesses—ignoring one in favor of the other will limit the progress of science. A good example of this framing in our program is van Dijk et al. (2021),¹⁵⁸ led by a postdoctoral fellow and mentee of Dr. Weissman, in which the multi-generational and cross-generational contribution of parental and grandparental psychopathology to offspring depression was assessed with the ABCD cohort data, which is large but with limited measures of family history, and replicated in Weissman's three-generations cohort, which is smaller but with extensive and direct measures of family history. Such approaches validate the reciprocal and complementary nature of big data and family studies in psychiatric epidemiology and provide a framework to consider how eco-epidemiology and rich measurement can be leveraged moving forward.

Another contribution of psychiatric epidemiology over the next five years will undoubtedly be in promoting rigor and strength in data collection and inference in psychiatric neuroscience. Historically, imaging studies were small and samples were highly selected¹⁵⁹ due to the expense of data collection. Yet large, community-based samples are increasingly the standard, with major contributions from PET faculty. The study of “representative brains”¹⁶⁰ to limit bias for neurobiology of psychiatric disorders is gaining traction.¹⁶¹ Dr. Katherine Keyes has conducted numerous simulation and empirical studies with trainees^{162,163} to demonstrate that trajectories of brain development documented in “community samples” (i.e., volunteers) may not generalize to desired target populations. This link between epidemiological principles embedded into large administrative, clinical, and general population sampling schemes will be an important foundation of our work and our training at Columbia. In addition to methodological development in incorporating multi-level causation, interaction, and mechanisms into sampling designs, our faculty are incorporating novel areas of growth into this foundation of our program. For example, a dearth of well-replicated gene–environment interactions in psychiatric epidemiology has plagued the field for decades. Despite tremendous investment into early candidate genes that seemed to interact with stress, it is now clear that the potentiation of genes given varied social environments is complex and will require more comprehensive studies. Dr. Daniel Belsky has been added to our faculty in this

renewal to address the new challenges of multi-level and dynamic research. Dr. Belsky's decade of work on the Dunedin and other cohort studies has extensively developed polygenic risk scores for various psychiatric disorders and related morbidities^{41,164–166} and applied these methodologies to quantify processes of human biological aging and how such unfolding potentiates risk for disorders across the lifecourse.^{167–170} He has extensive work examining how the social environment, from neighborhood income to familial risk, interacts with genetic vulnerability dynamically across the lifecourse.^{42,171} He currently has two R01s to examine how DNA methylation underlies expression of genetic vulnerability across the lifecourse to influence human health and is currently mentoring one of our predoctoral PET students, Christopher Crowe, on measurement and biology underlying expression of loneliness in older adults.

A.d. Foundation 3: Methods for prediction and causal inference.

A.d.1. PET history and faculty expertise. A foundational history of the PET program and training has been application of causal inference principles and methods to elucidate causes of psychiatric disorders. This foundation is evident in many scientific discoveries from faculty and fellows in our program, as well as the methodological work that has supported these discoveries for decades. Susser and Schwartz co-authored the textbook *Psychiatric Epidemiology* (published by Oxford University Press in 2006),¹⁷² which is emblematic of how causal inference permeates each area of our epidemiological training. The authors provide a conceptual context to investigate causes of psychiatric disorders through the counterfactual framework, which is increasingly gaining traction in psychiatry.^{173,174} Within PET, we ground training and discussion of causation in that framework, including perspectives that challenge traditional approaches, drawing on key methodologists in epidemiology (e.g., Robins, Vanderweele, Hernan)^{175,176} and aligned disciplines (e.g., Pearl, Rubin, Shadish, Cook, Campbell)^{177–179} so that each research question is interrogated through the lens of causal inference principles.

We also focus training to ensure that faculty and fellows properly differentiate important concepts of *prediction* from concepts of *causation*. Differentiating between prediction and causation, including which framework is right for a given question, continues to be a major focus of methodological work in epidemiology,^{180–182} including psychiatric epidemiological research.^{173,183} For example, we might be interested in whether a specific set of genetic variants are *causes* of bipolar disorder, or we might be interested in *predicting* who is likely to get bipolar disorder based on a set of genetic variants, without presuming whether the genetic variants are causes. The former is a causal question, while the latter is a prediction question. Yet in practice, research sometimes conflates these two modes, using prediction tools for causal inference questions and vice versa. Tools including study design and analysis to answer causal questions are often different from those to answer prediction questions, so training emerging scientists to understand the difference between the two is critical to designing studies and answering the right questions.

A.d.2. Progress since the last renewal. Both prediction and causal identification have clear and compelling roles in psychiatric epidemiology, but they are used for different questions, with different methodologies, and for different goals. By understanding these differences, we provide trainees with the tools for understanding both prediction and causal inference as well as using them appropriately for a specific question. This grounded instruction in the use of predictive and causal inference methods has infused our program throughout our history. Dr. Sharon Schwartz (Co-Director of PET) has written extensively on how to select the right tools for the question at hand and instructs our advanced graduate courses in concepts of causal

inference. New streams of data and analytic technology for both prediction and causation are rapidly becoming available to provide intensive and detailed data with which to understand the distribution, causes, and interventions to reduce rapidly dynamic psychiatric disorder incidence and prevalence. Both within the US and internationally, investment in high-quality epidemiological cohort studies as well as extensive medical record linkage and collection provides a critical foundation for what will undoubtedly be the catalyst of scientific discovery for psychiatric disorders in the next decade.

A.d.3. Looking forward. There are numerous advances in rapid and large data collection that hold promise for progress in causation and prediction over the next decade. Wearable technologies with the ability to capture minute-by-minute and day-to-day behavioral and physiological variation as well as changes in mood, substance use, and other psychiatric symptoms are rapidly accelerating. PET predoctoral trainee Debbie Huang,¹⁸⁴ under the mentorship of Dr. Katherine Keyes, is using one such rich data source of daily ecological momentary assessment data to examine how networks of depressive symptoms unfurl over the course of months. These technologies are providing critical information into the role of sleep, motor activity, cardiovascular activity, and other daily fluctuations in the onset and persistence of psychiatric disorders such as bipolar disorder.^{185,186} Other faculty also are using these and other massive data repositories for a wide range of projects documenting neurobiology of prenatal exposures, genetic discovery across disorders, and cross-disorder comorbidity and consequences of psychiatric disorder symptoms.

Faculty engaging in these efforts have a strong role in the PET program, mentoring students and providing opportunities for career development. For example, Dr. Greta Bushnell, trained in pharmacoepidemiology, was mentored by Dr. Mark Olfson in documenting increased risk of pediatric fracture following benzodiazepine use, comorbidity between anxiety disorder and substance use disorder diagnoses, and time trends in antipsychotic and anxiety medication use in youth.^{187–190} She is now an Assistant Professor of Epidemiology at Rutgers University funded by a K01 grant mentored by Drs. Olfson and Keyes as well as her colleagues at Rutgers.

In addition to expanding data sources, statistical and predictive methods to analyze these data sources are rapidly accelerating. PET faculty members are playing leading roles in the development of these methods and their application. The past decade wrought a rapid increase in machine learning and predictive modeling methods to capitalize on these data streams. PET faculty Dr. Melanie Wall, for example, directs the Mental Health Data Science Department in Psychiatry at Columbia and extensively contributes to development and application of predictive modeling and trained algorithms to uncover new risk factors, interactions, and patterns underlying major psychiatric disorders across many domains including suicidal behavior.^{191–195} She has a notable track record of training junior scientists to expand these efforts. Some have argued that in psychiatry there have been relatively few practical advances achieved using these new techniques^{27,196}—for example, suicide remains frustratingly unpredictable.¹⁹⁷ Machine learning algorithms for clinical prediction yielded several promising findings in suicide prevention studies, yet utility remains low.^{198–201} Thus, substantial work remains to be done in developing and validating these approaches for clinical intervention and evaluation of population utility. Further innovations in technology-aided suicide prevention, including techniques such as speech analysis or cell phone geolocation, and sophisticated analyses of electronic health record data are under development²⁰² and may assist in that effort. As the field progresses, PET faculty and our trainees will continue be at the forefront of methods development and application.

Our efforts to advance instruction, training, and expertise in causal inference are aided by recruitment of new faculty at the forefront of such methodological development. Dr. Kara Rudolph, Assistant Professor of Epidemiology, is currently funded on an R00 from NIMH. Dr. Rudolph specializes in development of causal inference methods for application to new data sources. She has developed novel algorithms for causal inference through machine learning, including targeted maximum likelihood estimation techniques and stochastic simulations to estimate mediation estimates.^{203–206} PET trainees such as Dr. Jonathan Platt have applied these methods in influential publications documenting the role of childhood adversity in cognitive ability and psychiatric disorders,^{207,208} as well as mediation effects of time trends in depression incidence across the 20th century.²⁰⁹ His emerging research shows when and how gender differences in depression are changing across historical time,²¹⁰ differentially by cohort, providing data that allow theory refinement

and new hypotheses about social causes of depression incidence. Alongside Dr. Rudolph, we have added new faculty to include others who are developing novel prediction and inference algorithms, including Dr. Dan Belsky who has developed prediction methods and applications within psychiatric genetics to identify how polygenetic approaches to characterize vulnerabilities can lead to better predictions for allocation of treatment and identification of cases.

A.e. Foundation 4: Responding to changes in public health and mental health.

A.e.1. PET history and faculty expertise. A hallmark of the field of psychiatric epidemiology is documenting whether and how patterns of psychiatric disorder incidence and prevalence are evolving in the community.²¹¹ The PET program at Columbia has historically been at the forefront of developing research programs that provide critical surveillance of incidence and prevalence—from Dr. Mark Olfson’s studies of time trends in treatment utilization patterns for childhood disorders such as depression, bipolar disorder, and ADHD,^{212–215} to Dr. Ezra Susser’s extensive history of scholarship on trends in autism and other neurodevelopmental disorders,^{216,217} to our numerous faculty and scholar engagement with the intersection of mental health and other global crises such as terrorism and infectious disease.^{218–222}

All of these investigations are embedded in our foundational focus on social factors that serve as risk factors, as well as causes of underlying trends in disorders, and relevant context to treating mental illnesses. While the COVID-19 pandemic has laid bare existing inequalities in the US that socially pattern risk for infection, conditions that exacerbate infection effects, and unequally distributed treatment and care, such patterns are not new. Our faculty have been studying other illnesses and social conditions that have captured the attention of the world throughout the last 50 years, providing the expertise, evidence base, and training to ensure that generations of scholars have the tools, intellectual discipline, and commitment to confront important questions of public health. Examples include our extensive history of studying HIV/AIDS and the way in which infections are socially patterned and have implications for psychiatric disorders, as well social conditions that have been at the forefront of public inquiry in past decades, from crises of homelessness, terrorism, and economic instability.

A.e.2. Progress since the last renewal. Evidence developed by our faculty and scholars has established troubling dynamics that portray a stark portrait of the need for additional mental health surveillance, research systems, and a stronger psychiatric epidemiological workforce. Drs. Keyes and Olfson documented that adolescent mental health in the US has demonstrated unprecedented changes over the past decade, with consistent evidence of increasing depressive symptoms.^{1–8} Declines in adolescent mental health beginning in approximately 2010 are observed across multiple large-scale studies using several measures of psychiatric wellbeing,^{1–3,5} major depressive episodes^{2,3}, suicidal ideation and behavior⁵, and hospitalization for mental health such as suicide-related hospitalizations and deaths.^{4,6–8}

Columbia PET faculty are among the foremost experts on suicide prevention in the country, making us well-poised to train leaders who can reverse these trends. Dr. Madelyn Gould, for example, has been a leader in suicide prevention for decades, with classical papers on suicide clusters and suicide contagion,^{223–225} she currently leads efforts to evaluate public health measures to prevent suicide.^{226–228} Dr. Gould partnered with Drs. Keyes and Olfson for an ongoing project to assess temporal and spatial variation in suicide and implications for suicide contagion, where together they are training doctoral student Gonzalo Martinez-Ales.^{229–231} Their work will be fortified by the research program that Dr. Olfson has led for decades on suicide risk,^{2,115,214,232–234} assessing clinical levers that can be used to better identify, assess, track, and treat patients at high risk for suicide.

Further, recent trends in incidence and prevalence of mood disorders and suicide intersect with the drug overdose crisis in the US, which continues to have major implications for population health and psychiatric disorder care. More than 750,000 people in the US died from an overdose in 1999–2018,²³⁵ with two-thirds involving an opioid.²³⁶ Overdose deaths involving stimulants such as cocaine and methamphetamine are now rapidly increasing, due in large part to adulteration of those substances with synthetic opioids.^{237,238} Substance use disorder is among the strongest risk factors for death by overdose, and mitigating the crisis of overdose deaths critically involves identification and rapid scale-up of available treatments for psychiatric disorders including substance use disorders.²³⁹ These disorders are highly comorbid with other psychiatric disorders, and the co-occurrence has roots

across the lifecourse with causal links early in life throughout adulthood.^{9,240}

The changes in psychiatric disorder incidence cannot be understood without considering the way in which racial and ethnic health disparities intersect with disorder incidence and treatment. Our progress in developing scholars who critically examine the role of social inequalities has produced critical scholarship showing that racial disparities in psychiatric disorders are increasing, and the role of race and racism in the health and wellbeing of Black, Latinx, and other racial/ethnic groups has come to the forefront of national discourse. Notable examples of our scholar's work in this area over the last five years includes that of Melissa Dupont-Reyes and John Pamplin, both PET predoctoral fellows, as well as PET postdoctoral fellow Dr. Alice Villatoro. Drs. Dupont-Reyes and Villatoro, who met and began collaborating as PET fellows, have established an extensive research program identifying significant points of intervention to improve help-seeking behaviors among underserved populations and reduce disparities in mental health and substance abuse treatment,²⁴¹⁻²⁴⁴ including interventions to reduce stigma of mental health disorders in adolescents and novel approaches to expand mental health care access among immigrant Latinx populations.²⁴⁵⁻²⁴⁷ Dr. Dupont-Reyes was recently awarded a highly selective Robert Wood Johnson Foundation "Pioneering Ideas" grant for this work, with Dr. Villatoro as a Co-Investigator.

A.e.3. Looking forward. A mental health crisis is building among adolescents in the US, intersecting with unprecedented increases in suicide across all ages and a continuously evolving overdose epidemic reflecting unmet needs of individuals with substance use disorders—all against the background of a global pandemic. Further, these are simply examples of the dynamics across other psychiatric disorders and their sequelae. All of these trends prompt vexing "why" questions that require new data to formulate the answers. Understanding the factors that cause changes over time in the prevalence and incidence of disorders and death may be distinct from factors that cause cases within a particular point in time. This concept of "causes of incidence" versus "causes of cases"²⁴⁸ has been foundational in community health and epidemiology for decades, one that we cover extensively in our training at PET.

The need for expansion of this effort is particularly salient in the present moment. The events of 2020 fundamentally shifted human interactions across the globe and will continue to fundamentally shift psychiatric disorder incidence, prevalence, and care in the US and worldwide for decades. Indeed, emerging evidence suggests that depression, anxiety, and post-traumatic stress disorder (PTSD) have increased in the US population since the beginning of the COVID-19 pandemic,²⁴⁹⁻²⁵³ due to stress and isolation, chronic illness from COVID-19, financial adversity, and grief. Careful surveillance and monitoring as the years progress will be critical, especially in low-resource settings worldwide that occupy the vast majority of the burden of untreated psychiatric disorders as well as COVID-19. Even when the pandemic subsides, the psychiatric burden caused by the events surrounding the pandemic as well as residual effects of COVID-19 illness itself are likely to persist. Mental health care during the pandemic, rapidly shifting to tele-psychiatry, text- and app-based therapy, and remote medication management, accelerated a long-term change that was predicted for delivering care,^{254,255} with limited information yet on the effectiveness of these tools and modes of delivering care. Global leaders in psychiatric epidemiology are calling on the research and intervention communities to reconsider the allocation of resources and mental health infrastructure in the wake of COVID-19 in the decades to come, given the exacerbation of inequalities in care and the exposure of vulnerable populations to infection and increased risk factors for psychiatric disorders.²⁵⁶ Dr. Susser makes integral contributions to these efforts, including mentoring trainees and scholars across the world to engage in critical research efforts to develop infrastructure and expand access to mental health treatment in resource-poor settings.

Finally, shifts in psychiatric disorder incidence and prevalence in the US and worldwide need to be integrated with the other basic components of our training program. Indeed, these shifts are occurring during a time of remarkable and rapid development in computing and analytic resources, methods development, and rapid data collection. Cohorts of more than a million individuals are now becoming routinely collected, with extensive biological and environmental data. Yet these cohorts remain challenging to study, given that there are often substantial missing data, measurement error, and often scant information on the social and cultural underpinnings of individuals, which we know from decades of psychiatric research are critical in forming a full sense of patient wellness. Moreover, data on millions of variables and individuals are uninformative if the right questions are not asked,

analyzed with methods that are particularly attuned to issues of bias, account for confounding for causal inference, and appropriate to the data.

A.f. Foundation 5: Training and research in ethical principles that underpin work with disadvantaged populations, such as those with mental illnesses.

A.f.1. PET history and faculty expertise. Training and research on ethics and equity in mental health is not a check box or one-off for our program—it is central to our mission and a thriving research area for our faculty and students. Indeed, the Columbia PET program is perhaps best known, among other areas, for our focus on bioethics and human rights considerations of people with mental illnesses, including understanding the stigma of psychiatric disorders and how this stigma leads to reduced access to care as well as marginalization from society. As part of understanding the insidious and often unseen ways in which stigma can infiltrate every part of interactions between people with mental illnesses and the societies they inhabit, we focus on the ethical commitment on the part of scientists to improve the lives of people with mental illnesses as a human rights issue. Unfortunately, the field of psychiatry and psychiatric epidemiology has a checkered past when it comes to ethical treatment of people with mental illnesses. As a discipline, psychiatry and other mental health disciplines are tasked with labeling and medicalizing thoughts and behaviors, and such a duty involves our ethics and values as much as our science. Debates within the field as well as across many scientific fields in the ethical lines between advocating for autonomy and freedom for people with mental illnesses versus prompting treatment

engagement, sometimes through coercion, is a difficult but critical conversation that the field reckons with often. The PET program and our faculty have a long history of deep involvement with these debates, including Dr. Ezra Susser's commitment to excavating historical legacies of psychiatric epidemiology focusing on both the progress and ethical tragedies of our discipline,^{69,257} Dr. Bruce Link's work on modified labeling theory and stigma,^{258–261} and the legacy of scholars such as Dr. Larry Yang in designing and conducting research on mental illness stigma.^{262,263} We actively work with trainees developing research and scholarship around psychiatric disorder patient advocacy across the world.

A.f.2. Progress since the last renewal. Our faculty and students have made substantial contributions to the critical and often fraught issues of ethics in psychiatry and mental health. Dr. Paul Appelbaum leads a considerable portion of this research program as Director of the Division of Law, Ethics, and Psychiatry at Columbia. Through this Division, Dr. Appelbaum leads research and has published hundreds of articles on informed consent, decisional capacity, mandatory treatment advance directive, and confidentiality.^{264–266} He gives seminars to PET fellows on current topics and controversies in the ethics of psychiatric treatment, including a scheduled upcoming talk on diagnoses of excited delirium in the context of police-involved deaths. Dr. Ruth Ottman, PET faculty since 1981, established a national research program on the ethics of genetic testing for neuropsychiatric disorders. Her research program uncovers the psychosocial impact of genetic testing, especially focused on racial and ethnic minority populations, and considers the ethical principles that should guide integration of genetic knowledge to treatment in ways that respect individual autonomy and adheres to ethical principles to provide patients with accurate scientific knowledge as well as support and follow-up.^{267–270} Dr. Ottman's program of research sits alongside a range of faculty who conduct research and interventions across the world in an effort to expand and promote treatment and human rights for those with mental illness. Dr. Kathleen Pike, PET faculty and Director of the Global Mental Health program in collaboration with the World Health Organization, has provided an extensive infrastructure for training and research on global initiatives focused on mental health, education, and women's health that attend to human rights and ethics.^{271,272}

A.f.3. Looking forward. We are committed as a program and as an institution to continuing to elevate ethics and human rights, given that the conditions and suffering of individuals with mental illnesses both in the US and throughout the world will continue to be critical for public health in the years to come. Like many inequalities, the COVID-19 pandemic also disproportionately impacts not only people with mental illnesses but also their treatment and care.²⁵⁶ Continuing to advocate and develop equitable intervention dissemination strategies in low-resource settings, both within the US and worldwide, is never more critical as psychiatric disorders and symptoms accumulate. Post-acute

COVID-19 syndrome (often termed “long COVID”) includes psychiatric and neurological symptoms that may be reinforcing over time and will require substantial investment across the world in developing an infrastructure for ethical treatment and care. These emerging issues are situated within communities in which mental illnesses remain highly stigmatized, in which individuals with disorders do not receive adequate care and are often marginalized. Dr. Jeremy Kane, new faculty in PET in the current grant period, conducts critical work in low-resource settings including refugee and conflict areas, to develop, implement, and evaluate interventions to address PTSD and other mental health challenges as well as develop measures and conduct surveillance.^{273–276} He is already taking an important role in the mentorship of our students—for example, he is co-mentoring first-year doctoral student Navdep Kaur with Dr. Keyes in analyzing the largest psychiatric epidemiological survey of the Afghanistan general population conducted to date. Focusing on the US, Dr. Sidney Hankerson also has been recruited as new faculty in PET given his commitment to reducing stigma and expanding access to mental health treatment within Black communities and other communities of color in the US. He is currently conducting a randomized controlled trial to identify and treat individuals with depression through churches that predominately serve Black communities in New York, conducting critical community-based research that collaborates and integrates community perspectives and needs. These research programs exemplify the commitment we make in the PET program to address stigma and reduce barriers to care for individuals with mental illness through scholarship and participation in ethical principles that address human rights and dignity both in the US and throughout the world. This commitment includes understanding the lived experience and perspectives of people living with mental illness, and based on this, developing and testing ways to engage and encourage people living with mental illness in shaping their own care and the programs designed to serve them.