

The Role of Philanthropy in Nurturing the Next Generation of Diverse Physician Scientists

Louis J. Muglia, MD PhD

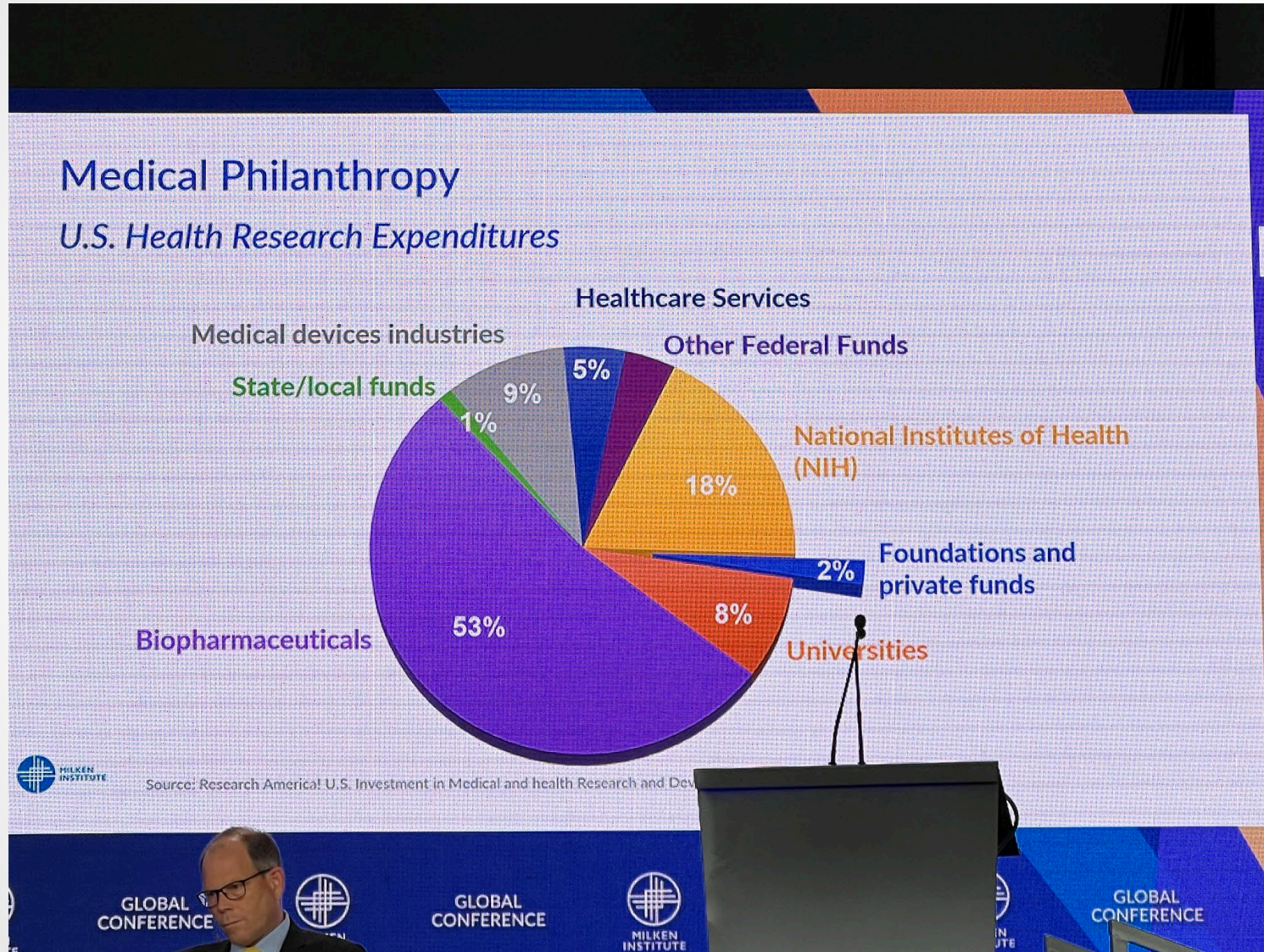
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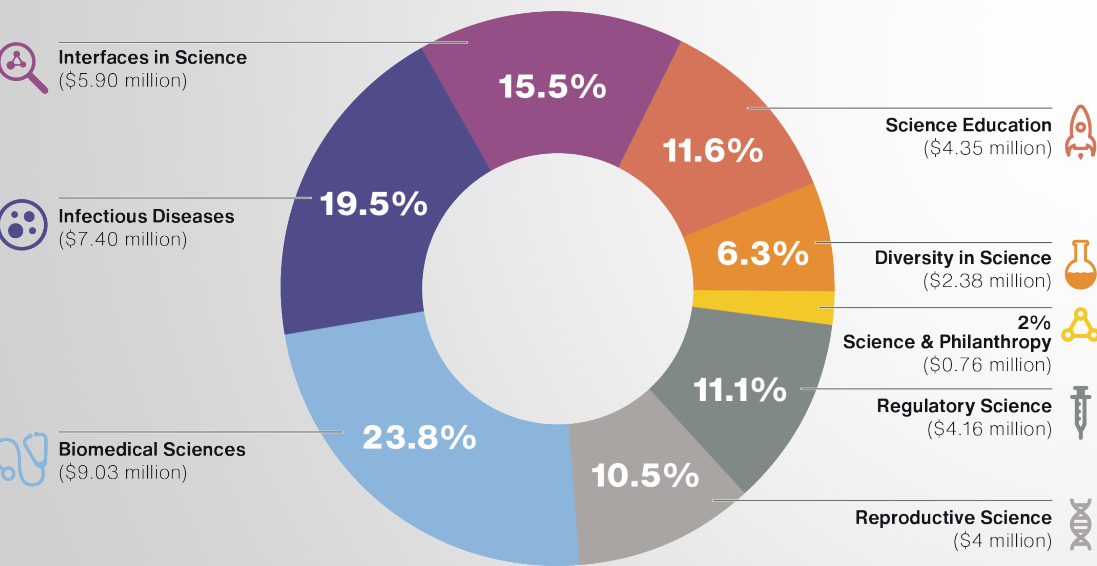
Dollars in Medical Philanthropy (Milken Institute)



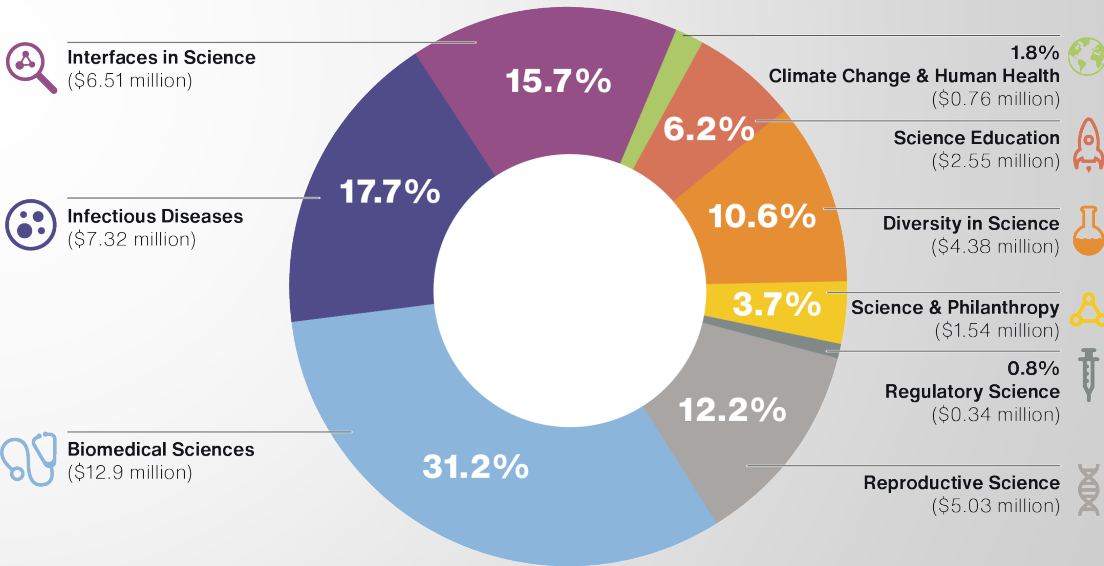
The BWF Mission Statement

The Burroughs Wellcome Fund serves and strengthens society by nurturing a diverse group of leaders in biomedical sciences to improve human health through education and powering discovery in frontiers of greatest need.

BWF awarded more than \$36 million in grants during fiscal year 2021



BWF awarded more than \$41 million in grants during fiscal year 2022



Our Commitment to Diversity

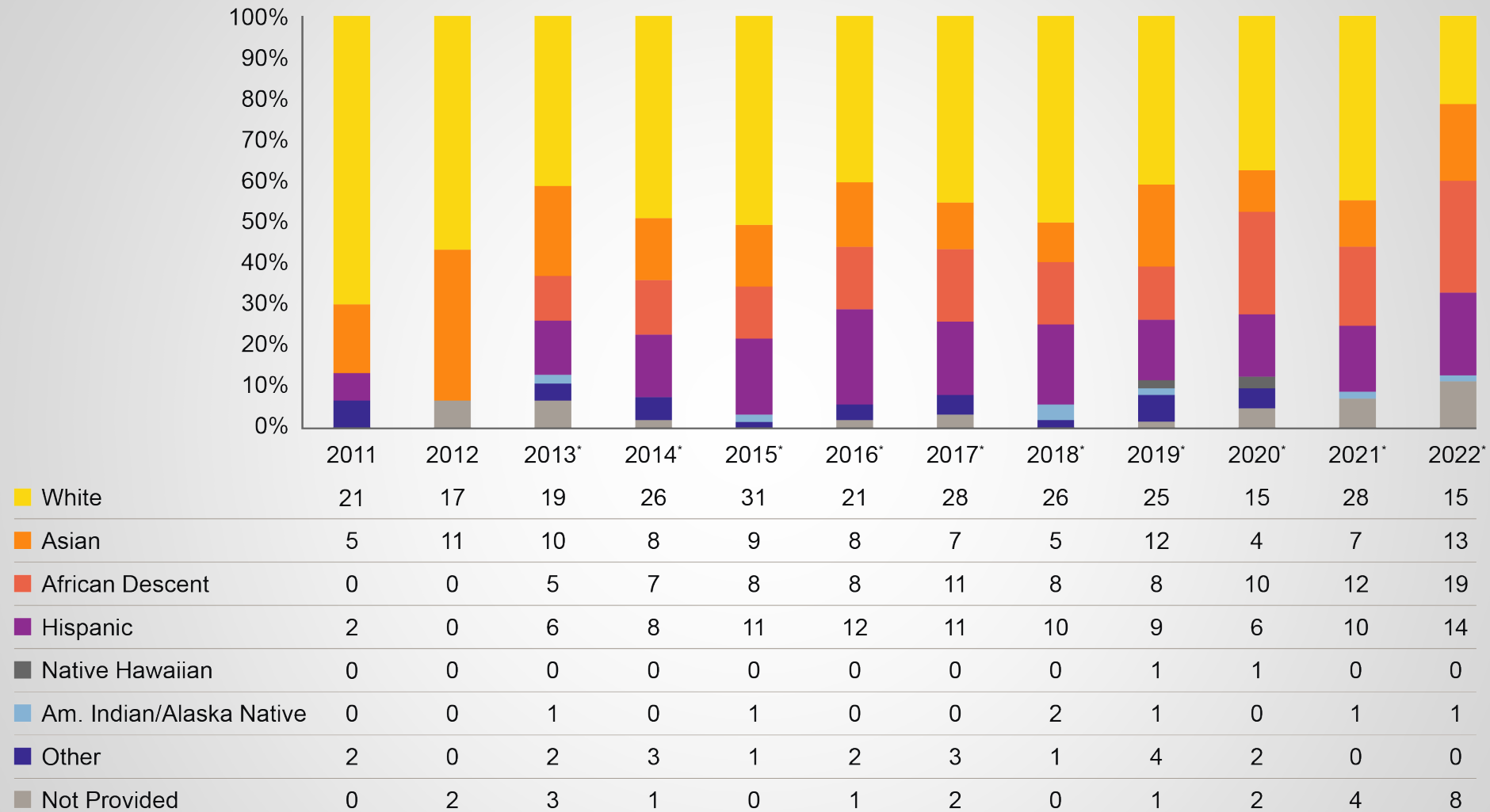
- Individual demographics
 - Race/ethnicity
 - Age
 - Gender
 - Sexual orientation
 - Socioeconomic status
 - Geographic location
- Voice for Social Justice
- \$8M invested in PDEP, GDEP
- \$18.5M to URM PIs over last 5 years



Diversity in Science Programming

- **Postdoctoral Diversity Enrichment Program (PDEP)**
- **Graduate Diversity Enrichment Program (GDEP)**
- **Diversity Enrichment Network (DEN)**
 - Convenings and networking
 - Event and activity sponsorships
 - Strategic ad hoc awards/grants
 - Leveraging assets across awards
 - Consistent and continuous amplification

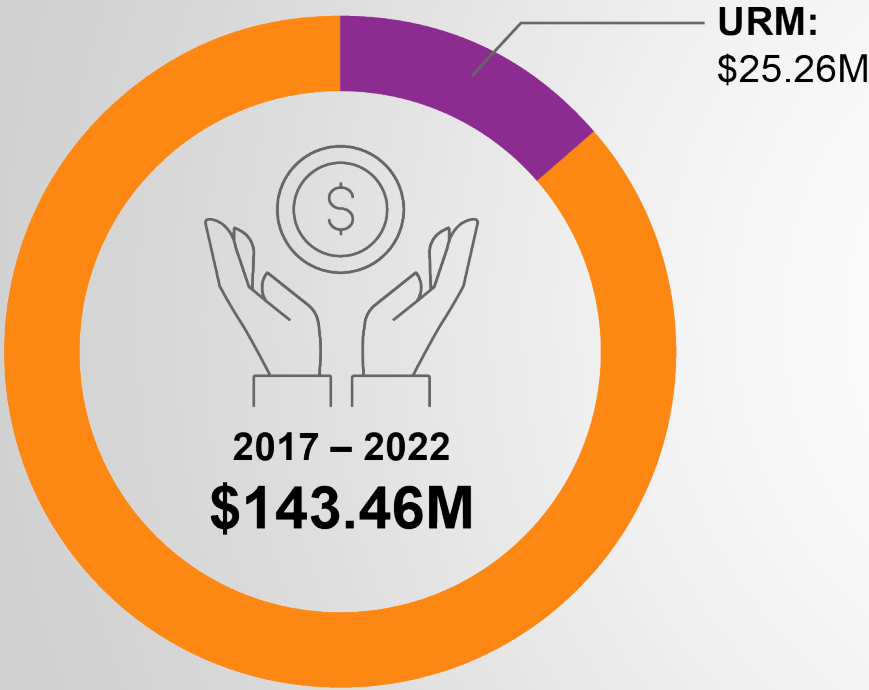
Ethnicity of Individual BWF Awardees with PDEP Awardees (2011-2022)



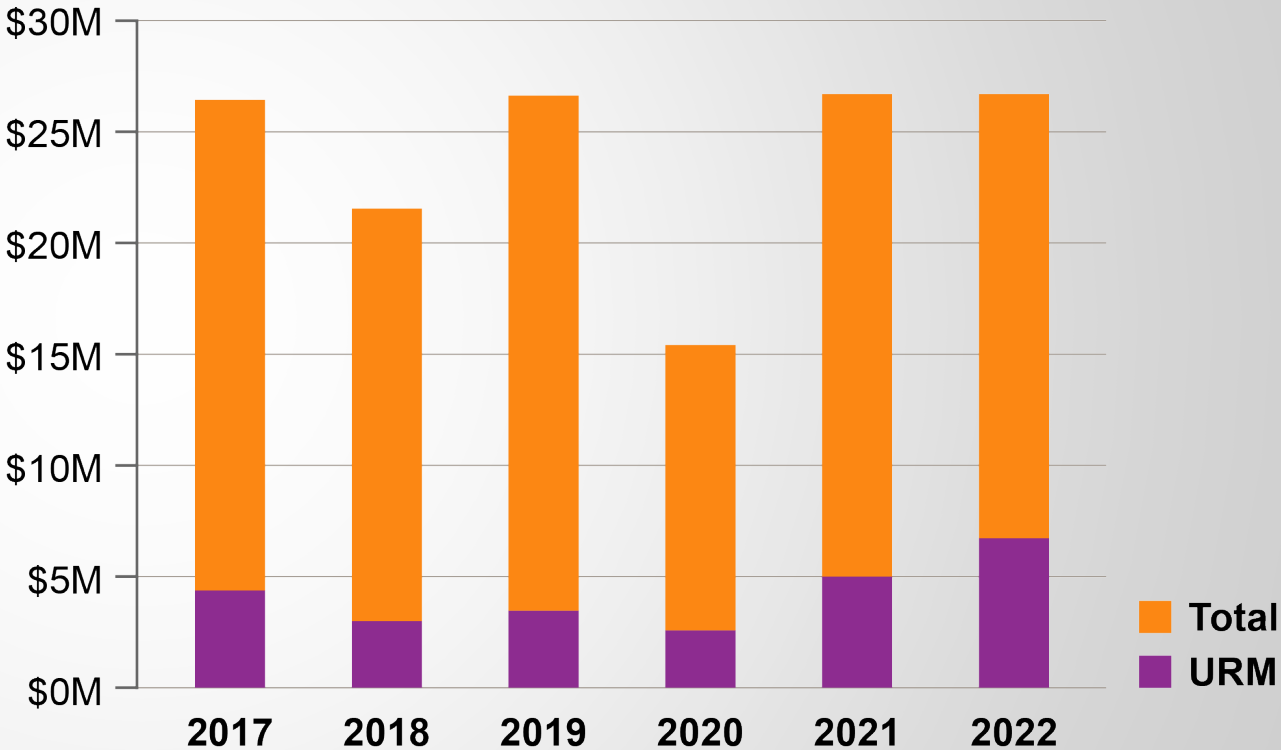
49% URM

URM (Underrepresented Minorities) Funding

6 Year Total



URM vs. Total Dollar Amount



The Problem

- The decline in numbers of physician-scientists, particularly pediatric physician-scientists, has received long-standing recognition and little evidence of significant resurgence despite various expert conferences and intervention strategies.
- The most common current pathways center on integration of a research experience during medical school as part of an MD-PhD program or “Year Out” program. These strategies, while providing useful experience, retain significant limitations:
 - lengthening the duration of training
 - not aligning with the clinical experience that sparks scientific interest.

The Inspiration of Marilyn Gaston, MD

Marilyn Hughes Gaston, M.D., faced poverty and prejudice as a young student, but was determined to become a physician. She dedicated her career to medical care for poor and minority families, and campaigns for health care equality for all Americans.

Dr. Gaston first became interested in the problems of children with sickle cell disease (SCD) while doing her internship at Philadelphia General Hospital in 1964.

Her 1986 study of sickle-cell disease led to a nationwide screening program to test newborns for immediate treatment, and she was the first African American woman to direct a public health service bureau (the Bureau of Primary Health Care in the United States Department of Health and Human Services).



Huda Y. Zoghbi, MD – A leader in neuroscience

- Huda Y. Zoghbi was born and raised in Beirut, Lebanon. She wanted to study Shakespeare and other English literature in college, but her mother insisted that she study science so she could go into medicine. Zoghbi ultimately found herself welcomed at Meharry Medical College in Nashville, Tennessee, where she completed her medical training in 1979. Zoghbi intended to be a clinical pediatric neurologist, but soon turned to research.
- “I was encountering a lot of patients who had devastating neurological problems, and many of them were genetic,” she recalls. “All we could do was make a diagnosis, but we didn’t know the cause. I found that really quite devastating, particularly after I got pregnant with my first child, While still a resident at Baylor, Zoghbi met a five-year-old girl named Ashley with the neurodevelopmental brain disorder known as Rett syndrome. “She made a very big impression on me,” says Zoghbi. With much persistence, in 1999, she and her collaborators announced that they had identified MECP2 as the gene responsible for Rett syndrome.



BWF's Entry into the Physician Scientist Arena as an Independent Foundation

The initial and current major funding mechanism is the Career Development Award. This type of award which combined postdoctoral funding with faculty support was pioneered by the Lucille P. Markey Charitable Trust Programs in Biomedical Sciences (a limited term charity) and adopted by BWF as the Career Awards in Biomedical Sciences (CABS) in 1993 with initial awards made in 1995 to both PhDs and physician scientists. Since 1995 BWF has supported 4 physician scientist competitive programs with an investment of more than \$250,000,000.

BWF Physician Scientist Programs

1. Career Awards for Biomedical Sciences (1995-2006) was open to both PhDs and physician scientists. Over the 12-year period of the award 2,202 proposals were received with 591 being from physician scientists. 242 of the physician scientist proposals were from the MD (only). 89 of the physician scientists received awards and 21 (23%) were MD (only).
2. Clinical Scientist Awards in Translational Research (1997-2006) was aimed at the mid-career physician scientist who did translational research 104 \$750,000 awards were made.
3. Career Awards for Medical Scientists (2007-date) is a bridging award for the physician scientist. About 16% of the total awards have gone to the MD (only).
4. The Physician Scientist Institutional Award was created in 2017 to address the increasingly small number of physicians entering the workforce as physician scientists. To capitalize on an underutilized source of physician scientists, proposals were limited to the training of the MD (only).

Current Ad Hoc Physician Scientist Annual Support

1. Pediatric Scientist Development Program (\$62,500/yr)
2. Developing the Next Generation of Pediatric Researchers: A Convening by the Burroughs Wellcome Fund and the Coalition for Pediatric Medical Research (\$60,000)
3. Physician Scientist Support Foundation (\$75,000/yr)
4. Vanderbilt-Meharry Medical School James Carter Scholars Program (\$82,051/yr)
5. Indiana University Medical Physician Engineers, Scientists and Clinicians Preparatory Program for High School and College Students (\$55,500/yr)
6. CITAC/CSIC Canada (\$15,000/yr)
7. Association of Clinical Translational Science (\$10,000/yr)
8. Alliance for Academic Internal Medicine (\$5,000/yr)
9. American Physician Scientist Association (\$75,000/yr)
10. Reproductive Scientist Development Program (Ob/Gyn) (\$100,000/yr)

Significant Barriers Identified by the BWF PSIA Initiative and the Physician Scientist Support Foundation

The PSIA generated 136 proposals from 83 medical schools. The most common barrier was the absence of both mentors and role models. The importance of this barrier was illustrated very succinctly from one proposal which opined:

“Mentoring is the single most effective intervention”

Other Notable Barriers From the PSIA Submissions:

- **Finances and funding** – 50% of students convey that the ability of paying loans back was deciding factor in decision to pursue career as a physician-scientist
- Lack of research experience
- Institutional barriers
- Pressures of the clinic and medical school
- Cultures
- Career and work life balance

Innovations in MD-only physician-scientist training: experiences from the Burroughs Wellcome Fund physician-scientist institutional award initiative

Allison T. McElvaine,¹ Jacqueline A. Hawkins-Salsbury,² Vineet M. Arora,³ Mark T. Gladwin,⁴ James R. Goldenring,⁵ David P. Huston,⁶ Deborah Krakow,⁷ Kyu Rhee,⁸ Julian Solway,^{3,9} Richard A. Steinman,⁴ Dwight A. Towler,¹⁰ Paul J. Utz,¹¹ Wayne M. Yokoyama,^{2,12} Rolly L. Simpson,¹³ Louis J. Muglia,¹³ Sallie R. Permar,¹⁴ and Rasheed A. Gbadegesin^{1,15}

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Current Investments

K-12	Undergraduate	MD or MD/PhD Training	Residency	Fellowship	Assistant Professor	Associate Professor	Senior Faculty
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Beckman Foundation

Cystic Fibrosis
Foundation (pilot)

————— Burroughs Wellcome Fund —————

Cystic Fibrosis
Foundation (pilot)

Transition Award:
Burroughs Wellcome
Fund
Cystic Fibrosis
Foundation
Doris Duke Foundation
Simons Foundation

Lasker Foundation
Beckman Foundation
Doris Duke Foundation

First BWF Physician Scientist Convening

- January 13th, 2022 3:30-5pm ET
- Organizations Represented (8):
 - Lasker Foundation – Claire Pomeroy
 - Doris Duke Foundation – Sam Gill & Sindy Escobar-Alvarez
 - Health Research Alliance – Maryrose Franko
 - F prime (Venture Capital) -- Stacie Weninger
 - Simons Foundation – Kelsey Martin & Alice Lou Clayton
 - Cystic Fibrosis Foundation – JP Clancy & Elizabeth Yu
 - Beckman Foundation – Anne Hultgren
 - BWF – Lou Muglia, Rolly Simpson and Paige Cooper
 - Dr. Joseph Hill from UT Southwestern

*Invited but unable to attend: Rita Allen Foundation

Ideas Incubating from Convening

Single or Dual Stage Investment Ideas

- Collaboration award for basic scientist & clinician to work on addressing a biomedical research question/project that would be enhanced with both clinical and research expertise
- Institutional Post-bac program for aspiring Physician Scientists (combine research and clinical shadowing) Priority to be paired with new physician scientist faculty and option to include funding for senior faculty mentor to lead the program
- Institutional awards for research track MD students, residents or additional fellow slots (or some combination) option to include funding for senior faculty mentor to lead the program

Multi-Stage Investment Idea

- Institutional awards to foster & facilitate collaboration between basic scientists and clinicians on campus funds to enhance basic science & clinical curriculum (add electives and/or add to core courses), Loan Repayment Component for clinicians, and infrastructure (offices, programs, etc) to connect the two worlds **tiered funding categories based on institutions current NIH funding dollars

Larger Collaboration Idea

- Institutional continuum award to create a multi-level program supporting postbac (research + clinical shadowing), year out MD students, research track resident or fellow slots that are supported by senior faculty mentors

Areas of Discussion During First Convening

- Current Organizational Priorities
- Pain Points
 - Individual trainees
 - Departments/Institutions
 - Funders
- Suggested Approaches to Collaboration
 - Career lifespan approach, with opportunities along continuum
 - Modest and large collaborative RFPs with both institutional and individual opportunities
 - Backing into RFP(s) after crystalizing the distinct assets MD only & MD/PhDs bring to research and shaping opportunities that align with one or both
- Specific Collaboration Ideas
- Models of Past & Current National Programs & Initiatives
- Relevant Organizations to Include or Engage

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