

Review Article

A Report on the Keynote Address and Symposium on Research in Health Disparities in the USA

Samuel A. Kareff, MD, MPH¹, H. Nelson Aguila, DVM², Candace J. Chow, PhD³, Anna Marsden, MBA⁴, Reuben Ryan Cano, BS⁵, Ana María López, MD, MPH⁶

¹ University of Miami Sylvester Comprehensive Cancer Center/Jackson Memorial Hospital, Miami, FL, USA, ² National Cancer Institute, Bethesda, MD, USA, ³ University of Utah School of Medicine, Salt Lake City, UT, USA, ⁴ Huntsman Cancer Institute, University of Utah, Salt Lake City, UT, USA, ⁵ Duke University School of Medicine, Durham, NC, USA, ⁶ Sidney Kimmel Cancer Center, Thomas Jefferson University, Philadelphia, PA, USA

Keywords: health disparities, training, funding, cancer

<https://doi.org/10.53876/001c.91540>

International Journal of Cancer Care and Delivery

Vol. 4, Issue 1, 2024

Ensuring a diverse cancer research workforce remains challenging despite national recommendations and pathway programs dedicated to this mission. A panel composed of researchers, educators, and implementation scientists convened at the Binaytara Foundation's 2023 Summit on Cancer Health Disparities to discuss funded pathway opportunities, share case examples, and outline best practices to achieve a diverse workforce and support research in cancer health equity. The panelists highlighted existing pathway opportunities through the National Cancer Institute's Center to Reduce Health Disparities and illustrated specific funded examples, such as the University of Utah's Huntsman Cancer Institute's PathMaker program, the University of Utah's postbaccalaureate program, and NIH diversity supplement mechanisms. Programmatic examples were illustrated with success stories from the panel. The panelists concluded with the following insights for successful pathway implementation: 1) Since a diverse research workforce benefits society, investing in training and funding mechanisms is critical to promote individual and societal success in making progress towards cancer health equity; 2) A holistic, inclusive, and pathway-focused approach can successfully support, retain, and promote students, trainees, and faculty underrepresented in medicine and science; and 3) An inclusive workforce is best prepared to meet the needs of the diverse communities we serve.

Take-home messages

- A diverse research workforce benefits society. Therefore, investing in training and funding mechanisms is critical to promote individual and societal success in addressing cancer health disparities.
- A holistic and pathway-focused approach to training underrepresented students and trainees is essential to overcome barriers.
- An inclusive workforce retains future scientists and translates findings to diverse communities.

INTRODUCTION

Governmental¹ and non-governmental² entities explicitly define research to eradicate cancer health disparities as beneficial. This emphasis on populations beyond those of European ancestry is critical given that limitations in clin-

icopathologic and genetic data have directly contributed to cancer health disparities.³ Similarly, efforts to ensure a representative and inclusive workforce are touted as essential to achieve this goal. Still, workforce underrepresentation persists in both the clinical and investigational sciences, perhaps secondary due to downstream effects of structural racism such as race-based cultural exclusion, identity threat, racialized workplace emotional expression, and racialized task burdening.⁴ Even when successfully completing training, differences in NIH grant funding are noted between non-underrepresented cancer health researchers and their NIH-underrepresented counterparts.⁵ Additionally, authorship in prominent cancer journals has remained under-represented, and possibly stagnated, for female, Black, and Hispanic authors over the past two decades.⁶ The Black Lives Matter Movement⁷ and COVID-19 pandemic⁸ only magnified these and other disparities.

Various pathway programs have emerged to address the disparities that researchers who identify as racial or ethnic minorities, or women,⁹ experience in the field of cancer health disparity research. Some are more regionally focused. Others draw from a national sample. For example, the Asian American Network for Cancer Awareness, Research, and Training focuses on disparities in Asian-Amer-

ican communities in California and Hawaii,¹⁰ whereas the Éxito! Program empowers Latinx participants around the country.¹¹ Recognizing that disparities exist beyond race and ethnicity, initiatives to address inclusion in other underrepresented groups have been noted in the literature. A recent example focused on health equity for sexual and gender minority communities.¹²

The Binaytara Foundation's 2023 Summit on Cancer Health Disparities was held in Seattle, Washington, U.S.A. and convened a broad range of cancer health disparity researchers. Participants included the co-authors of this conference coverage piece. Herein, we recapitulate the session's keynote address and panel, as well as offer commentary related to existing pathway programs, their success stories, and guidance for their replication.

The authors intentionally chose to use the term "pathway" instead of "pipeline" to describe the educational programs as the former denotes flexibility in entry, exit, and re-entry; whereas the latter brings a more rigid image with clear, fixed entry and end points.

KEYNOTE ADDRESS: EXISTING PATHWAY PROGRAMS

HNA started the session with a keynote address contextualizing the landscape of the National Cancer Institute (NCI)-backed training and funding mechanisms in cancer health disparities research. As Deputy Director of the National Cancer Institute (NCI)'s Center to Reduce Cancer Health Disparities (CRCHD), he commented on the CRCHD's key missions: 1) diversity training, 2) workforce diversity, 3) partnerships and networks, and 4) a dedicated Disparities Research Program, all critical in the overall goal of CRCHD to reduce cancer health disparities. To combat significant challenges in training a diverse workforce, such as access to funding, a low pool of applicants, scarcity of role models, and inadequate preparation, the NCI has invested in the Continuing Umbrella of Research Experiences (CURE), providing several extramural funding opportunities starting at the middle-school level and continuing to the New Investigator/Early-Stage Investigator level. Since 2017, the CURE also offers training opportunities in the intramural laboratories of the NCI for post-bac/post-master, graduate students, and postdoctoral fellows. This program is the intramural CURE (iCURE). These initiatives provide ecosystems of support through which trainees in cancer health disparities receive appropriate mentored research experiences and participate in mentored mock reviews of grants, professional development workshops, and training navigation by NCI program directors.

HNA also highlighted allied initiatives such as the Early Investigator Advancement Program and the Cancer Moonshot Scholars Program. He concluded by sharing successful outcomes, such as publications, grants, and other achievements from trainees funded through the Diversity Supplement, F31 Diversity Fellowships, Career Development (K awards), and R21 grant portfolios. However, notable gaps remain in the programs. For example, the representation of awardees identifying as American Indian/Alaska Native

or Native Hawaiian/Pacific Islander remains low. The NCI continues to work with communities and institutions to broaden and encourage participation. For example, programs such as the Partnership to Advance Cancer Health Equity¹³ and the Youth Enjoy Science¹⁴ programs are important in increasing the number of trainees from these populations. Indeed, recent funding opportunities such as the Persistent Poverty Initiative may also bolster research capacity when examining specific disparities in cancer etiology.

PANEL PRESENTATIONS: ILLUSTRATING EXISTING PATHWAY PROGRAMS

After the keynote address outlined the NCI educational opportunities, the panel illustrated specific funded pathway programs. All programs discussed by the panel, as well as additional well-defined programs, are listed in [Table 1](#).

First, the PathMaker Program was highlighted.¹⁵ PathMaker is a STEM pathway program at the Huntsman Cancer Institute, University of Utah that aims to match high school and undergraduate students with mentored cancer research experiences. Initially funded with institutional support, the program achieved supplemental grant funding (P30 Supplement by AML) and is currently funded via the R25 mechanism. PathMaker provides research education, research experience, and skill development and wellness interventions.

The following program presented was PROMIS2U. Funded by a HRSA (Health Resources and Services Administration) grant to the University of Utah School of Medicine, the grant proposes to address the primary care physician shortage in tribal, rural, and medically underserved communities in Utah by strengthening the medical education pathway. PROMIS2U provides a conditional acceptance postbaccalaureate pathway that prepares trainees from rural, tribal, and medically underserved communities in Utah for admission to the University of Utah School of Medicine. Like PathMaker, PROMIS2U provides skill development and wellness interventions. This contextual support is intentional and is hypothesized to be essential for resilience, self-efficacy, and persistence towards the learner's goals.

Finally, additional mechanisms were addressed, such as the Geographical Management of Cancer Health Disparities (GMaP). The GMaP, funded by the NCI/CRCHD, is unique in scope as it provides pilot grant funding, travel support, mentor matching, virtual mock study sections, and expert grant reviews—all from a regional perspective.

SUCCESS STORIES: PERSONAL ENGAGEMENT IN PATHWAY PROGRAMS

The panelists also shared personal success stories about their engagement in workforce development pathway programs. RRC first discussed his experiences with the Huntsman Cancer Institute PathMaker Program. Coming from a marginalized Mexican community in a rural part of Utah,¹⁶ RRC attributes his success in matriculating at Duke Uni-

Table 1. List of Pathway Programs Discussed

Name of Pathway Program	Funder	Training Level(s)
Continuing Umbrella of Research Experiences	NCI	Middle school to Early-Stage Investigator/New Investigator
Intramural Continuing Umbrella of Research Experiences	NCI	Post-Bac/Post-Master – Graduate Students – Postdoctoral Fellows
Early Investigator Advancement Program	NCI	Early-Stage or New Investigator
Cancer Moonshot Scholars Program	NCI	Early-Stage Investigators
PathMaker Programs for Cancer Research	NCI R25 to the University of Utah Huntsman Cancer Institute	High school – Undergraduate students, Middle – High School science teachers
Summer Internship Program	Johns Hopkins University School of Medicine	Undergraduate students
Broad Summer Research Program	Broad Institute of M.I.T. and Harvard University	Undergraduate students
PROMIS2U (Pre-Matriculation Readiness for Ongoing Medical Student Success at the University of Utah)	HRSA (Health Resources and Services Administration) grant to the University of Utah	Pre-medical students
Geographical Management of Cancer Health Disparities	NCI	Undergraduate students – Early-Stage Investigator
Individual Predoctoral Fellowships to Promote Diversity in Health-Related Research (F31)	NCI	Pre-doctoral students
Maximizing Access to Research Careers (MARC)	NIGMS	Undergraduate students

This table lists by rows the pathway programs discussed. The names of each pathway program, and its corresponding funder and training level(s), are listed in rows.

versity's MD-PhD training program to first being connected with biomedical cancer researchers at Huntsman Cancer Institute, University of Utah. He comments that before this exposure to cancer biology research, he was interested in pursuing an MD to help eliminate the health disparities that affect Latinx and rural communities in the clinic. During this time during his research, he was exposed to mentors that were working on similar health disparities work through the lens of biomedical research. This prompted him to explore ways to integrate both research and clinical medicine as parts of his future career, and he was introduced to MD-PhD programs by his mentors in the PathMaker program. Moreover, the mentorship he received from the program allowed him to learn the culture, techniques, and skills necessary to pursue a career in medicine and basic science. These experiences allowed him to be recognized as the 2019 Most Outstanding Undergraduate Researcher Award from the University of Utah School of Medicine, and to participate in additional research opportunities through pathway programs at Johns Hopkins School of Medicine (Summer Internship Program), as well as the Broad Institute of M.I.T. and Harvard (Broad Summer Research Program). RRC is currently an MD/PhD student enrolled in Duke University School of Medicine's Medical Scientist Training Program. He plans to study cancer immunology during his doctorate training.

CJC next shared her experience as an awardee of an NIH (Clinical and Translational Science Award Program, CTSA) Diversity Supplement and the impact of the award as a post-doctoral fellow. After encountering repeated stereotypes while teaching high school, she pursued a PhD to examine how Asian American teachers think about social

identities (particularly racial and ethnic identity), and how identity informs pedagogical practice. After completing a PhD and moving to Utah, she successfully applied for a Diversity Supplement (co-mentor, AML) to examine how physicians think about social identities, and how these identities influenced their approaches to clinical care. Being awarded this supplement allowed her to transition into a career focusing on health professions and medical education research. CJC is currently an Assistant Professor in Internal Medicine, Director of Education Research, and Co-Director of PROMIS2U (a conditional acceptance postbaccalaureate program for premedical students) at the University of Utah School of Medicine. Her research continues to investigate how physicians and medical educators think about social identities within a context of privilege and oppression, and how these identities impact professional identity and practice.

Two of the panelists shared their experiences as directors of pathway programs. AM has served on multiple initiatives, including GMaP Region 6, PathMaker Programs for Cancer Research, and the Huntsman Cancer Institute's Plan to Enhance Diversity. In these roles, her primary focus has been to increase diversity within the biomedical cancer research workforce. AM commented that watching young trainees grow as individuals and identifying as a STEM professional is the most rewarding part of her job. To date, the PathMaker program has accepted 72 students, with all trainees having been accepted into college and many now pursuing professional training in PhD, PharmD, MD, and MD-PhD programs. AM also emphasized how awardees uniquely attribute their career success to these initiatives' keen focus on equity as many trainees have similar back-

ground experiences to RRC. Also, like RRC's experience most PathMaker participants go on to participate in future pathway programs that reinforce, guide, and shape their evolving research direction. CJC shared her experience as co-director of PROMIS2U. Students admitted to the program are generally Utah residents who are first-generation college students, who faced socioeconomic stressors growing up, who grew up in a rural, tribal, or medically underserved community and who are committed to practicing in a similar setting. The program is early in its experience and is demonstrating positive outcomes. Apart from observing academic growth in students, she has been invigorated by students' growth in confidence and sense of belonging in medicine.

CONCLUSION: LESSONS LEARNED TOWARDS TRANSFORMATIONAL CHANGE

To conclude the panel, the discussants shared their lessons learned. CJC acknowledged that finding a common purpose in advancing equity and eradicating disparities helps unite and bring focus to the educational initiatives of multiple stakeholders. Moreover, while preparing students from medically underserved backgrounds to pursue careers in medicine and research is important, it is also paramount to create cultures of inclusion and belonging in academic medical centers to retain such students once they become physicians and/or researchers. RRC remarked that organizational inclusion and support can change the tide in broadening participation in the biomedical workforce, and lead to more diversity of thoughts and ideas, thereby leading to increased scientific innovation. AM commented that a diverse and inclusive team is needed to connect with its participants in order to build trust. She added that finding quality mentors is key; persevering and building is essential to success; and remaining connected with participants by continuously providing current and former students with opportunities and resources aids in their success. Moreover, she highlighted the impact of these training mechanisms. She commented that teachers who have participated in the PathMaker Bridge program have later trained students to enter related fields and how, now shared, this experience can be replicated and have a multiplier effect. Finally, HNA remarked that implementing pathway programs, such as the CURE, is complex and requires consistency in available funding, or it may result in losing trainees. He also commented that providing physically and psychologically safe environments may help retain trainees.

The panel concluded by offering three key recommendations and insights. First, a diverse research workforce benefits society, fuels innovation, and promotes quality. Therefore, investing in training and funding mechanisms is critical to advance cancer health equity. As reflected by the panelists' own experiences, pathway interventions are not singular experiences. The field's efforts should then not be limited to an analysis of the benefit of a single intervention, rather, focused on implementing and analyzing interventions that are available at multiple points along the developmental pathway. Such touchpoints serve to reinforce, support, and provide the guidance necessary for success. There is no one-size-fits-all pathway. Second, a holistic, inclusive, and pathway-focused approach can successfully support, retain, and promote students, trainees, and faculty underrepresented in medicine and science. Finally, an inclusive workforce is best prepared to meet the needs of the diverse communities we serve. Without dedicated training, funding, and inclusion, disparities in cancer health will only be perpetuated.

CONFLICTS OF INTEREST

SAK reports having received funding from GMAp Region 2; no other authors reported conflicts of interest.

FUNDING INFORMATION

N/A

ETHICAL STATEMENT

N/A

ACKNOWLEDGMENTS

SAK received an honorarium from the Binaytara Foundation for preparing this manuscript.

AUTHOR CONTRIBUTION

Conception and design – AML; Data collection and assembly – HNA, CC, AM, RRC, AML; Data analysis, manuscript writing – SAK; Other contributions – HNA, CC, AM, RRC, and AML served as panelists

All authors have approved the manuscript.

Submitted: May 31, 2023 PDT, Accepted: August 31, 2023 PDT



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-SA-4.0). View this license's legal deed at <https://creativecommons.org/licenses/by-sa/4.0> and legal code at <https://creativecommons.org/licenses/by-sa/4.0/legalcode> for more information.

REFERENCES

1. NIH-National Cancer Institute. Cancer Disparities. Accessed May 23, 2023. <https://www.cancer.gov/about-cancer/understanding/disparities>
2. Patel MI, Lopez AM, Blackstock W, et al. Cancer Disparities and Health Equity: A Policy Statement from the American Society of Clinical Oncology. *J Clin Oncol*. 2020;38(29):3439-3448. doi:10.1200/jco.20.00642
3. Zavala VA, Bracci PM, Carethers JM, et al. Cancer health disparities in racial/ethnic minorities in the United States. *Br J Cancer*. 2021;124(2):315-332. doi:10.1038/s41416-020-01038-6
4. Kyere E, Fukui S. Structural racism, workplace diversity, and mental health disparities: a critical review. *J Racial Ethnic Health Disparities*. 2023;10(4):1985-1996. doi:10.1007/s40615-022-01380-w
5. Felder TM, Braun KL, Wigfall L, et al. Mentoring, Training, and Scholarly Productivity Experiences of Cancer-Related Health Disparities Research Trainees: Do Outcomes Differ for Underrepresented Scientists? *J Cancer Educ*. 2019;34(3):446-454. doi:10.1007/s13187-018-1322-z
6. Abdalla M, Abdalla M, Abdalla S, Saad M, Jones DS, Podolsky SH. The under-representation and stagnation of female, black, and Hispanic authorship in the Journal of the American Medical Association and New England Journal of Medicine. *J Racial Ethn Health Disparities*. 2023;10(2):920-929. doi:10.1007/s40615-022-01280-z
7. Ortega RP. Black scientists gather to form communities and boost diversity in science. *Nat Med*. 2021;27(5):756-758. doi:10.1038/s41591-021-01315-8
8. Banerjee R, Kareff SA, Leyfman Y, et al. Professional Challenges for United States Hematology/Oncology Trainees during COVID-19. *Cancer Invest*. 2023;41(6):539-547. doi:10.1080/07357907.2023.2199216
9. Rogova A, Martinez Leal I, Britton M, et al. Promoting Cancer Health Equity: A Qualitative Study of Mentee and Mentor Perspectives of a Training Program for Underrepresented Scholars in Cancer Health Disparities. *Int J Environ Res Public Health*. 2022;19(22):7512. doi:10.3390/ijerph19127512
10. Chen MS Jr, Chow EA, Nguyen TT. The Asian American Network for Cancer Awareness, Research, and Training (AANCART)'s contributions toward reducing Asian American cancer health disparities, 2000-2017. *Cancer*. 2018;124(Suppl 7):1527-1534. doi:10.1002/cncr.31103
11. Ramirez AG, Gallion KJ, Perez A, Adeigbe RT, Munoz E, Pasick RJ. Éxito!: Making an Impact in Training Latinos for Doctorates and Cancer Research. *J Cancer Educ*. 2019;34(5):928-937. doi:10.1007/s13187-018-1397-6
12. Kano M, Sanchez N, Tamí-Maury I, Solder B, Watt G, Chang S. Addressing Cancer Disparities in SGM Populations: Recommendations for a National Action Plan to Increase SGM Health Equity Through Researcher and Provider Training and Education. *J Cancer Educ*. 2020;35(1):44-53. doi:10.1007/s13187-018-1438-1
13. Aguila HN, Ogunbiyi PO, Springfield SS. The Minority Institution/Cancer Center Partnership Program: the NCI perspective. *J Health Care Poor Underserved*. 2010;21(1 Suppl):5-10. doi:10.1353/hpu.0.0267
14. Borengasser K, Rookwood CA, Solheim JC, et al. Collective Re-Storying of Mentee and Mentor Experiences in a Cancer Research Education Program for American Indian and Alaska Native Students. *J Stem Outreach*. 2022;5(2):1-14. doi:10.15695/item/v5i2.08
15. López AM, Rodríguez JE, Browning Hawes K, et al. Preparing historically underrepresented trainees for biomedical cancer research careers at Huntsman Cancer Institute/University of Utah Health. *Med Educ Online*. 2021;26(1):1929045. doi:10.1080/10872981.2021.1929045
16. Bliss C, Wood N, Martineau M, Hawes KB, López AM, Rodríguez JE. Exceeding expectations: Students Underrepresented in Medicine at University of Utah Health. *Fam Med*. 2020;52(8):570-575. doi:10.22454/fammed.2020.137698