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FIRST-EVER TCL-AACI STUDY OF THE LEADERSHIP PIPELINE POINTS TO URGENT NEED FOR MORE DIVERSITY AT ELITE CANCER CENTERS

How diverse are the upper rungs of leadership at America's academic cancer centers?

→ PAGE 5

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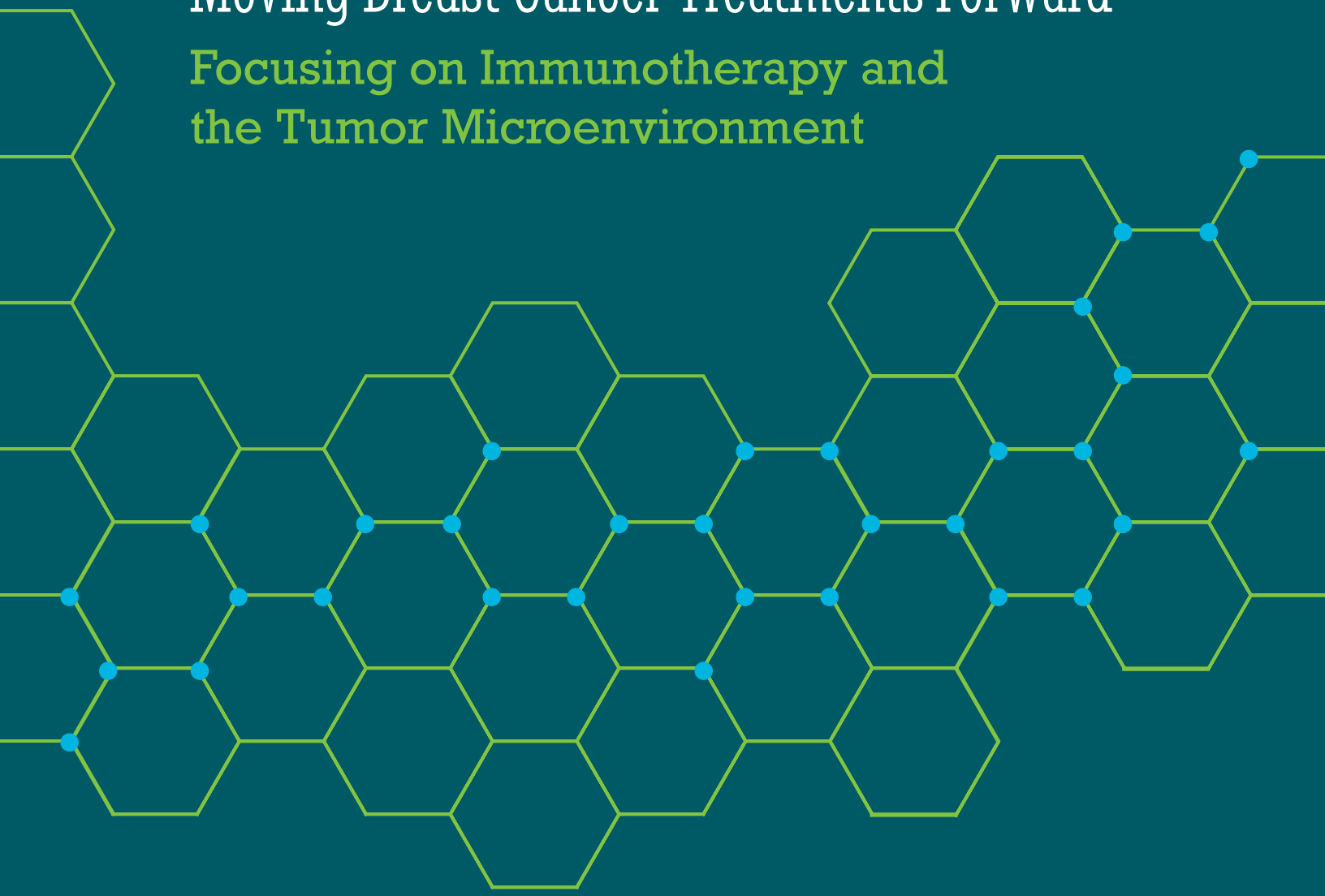

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THE CLINICAL CANCER LETTER

TRIALS & TRIBULATIONS

CLINICAL ROUNDUP

DRUGS & TARGETS

FIRST-EVER TCL-AACI STUDY OF THE LEADERSHIP PIPELINE POINTS TO URGENT NEED FOR MORE DIVERSITY AT ELITE CANCER CENTERS

By Matthew Bin Han Ong and Katie Goldberg

How diverse are the upper rungs of leadership at America's academic cancer centers?

Are these institutions promoting women and underrepresented minorities into top leadership positions? How prevalent are diversity recruitment programs? Do they work?

Data on cancer center directors is more or less available, but a tally of deputy and associate directors didn't exist. To examine the leadership pipeline, *The Cancer Letter*, in collaboration with the Association of American Cancer Institutes, conducted a survey focused on diversity and recruitment.

"To our knowledge, the AACI/*The Cancer Letter* survey is the first analysis of cancer center leadership diversity, and we hope it will provide a benchmark to compare progress toward goals for individual centers, and serve as the basis for meaningful dialogue," AACI President Roy Jensen and AACI Vice President and President-Elect Karen Knudsen write in an editorial in this issue of *The Cancer Letter*.

"As cancer center leaders, we have a responsibility to tackle these issues on behalf of our patients who are most affected by cancer health disparities," write Jensen and Knudsen, directors of, respectively, The University of Kansas Cancer Center and the Sidney Kimmel Cancer Center at Jefferson. "A core issue in confronting cancer disparities is our leadership pipeline and the need to attract and retain underrepresented minorities in oncology care and cancer research.

"Results from a leadership diversity survey, co-created by the AACI and conducted in partnership with *The Cancer Letter*, show that there's a long road ahead."

The editorial by Jensen and Knudsen appears on page 24.

Here are the highlights from the survey:

- In the sample, two in nine cancer center directors are non-white, and two in 13 cancer center directors are women.
- One in four deputy and associate directors are non-white, and two in five deputy and associate directors are women.
- Cancer centers led by women directors have the highest level of diversity in leadership, compared to other groups. Paradoxically, women directors are the most likely to report that their institutions' diversity recruitment programs are "ineffective."
- The leadership pipeline at centers led by white men is the least diverse. Nonetheless, white men directors are nearly as likely as non-white directors to assess their institutions' diversity recruitment efforts as "successful."
- NCORP Minority/Underserved Community Sites have the highest levels of diversity in leadership. One in five of all Black and three in 10 of all Hispanic/Latino deputy and associate directors work at these centers. Half of these centers are led by non-white directors.

The Cancer Letter curated a 20-question survey, with the goal of documenting representation of women as well as racial and ethnic minorities at the director, and deputy and associate director levels. The survey was then administered electronically by AACI.

Between June and August 2020, directors of 78 cancer centers responded to the survey, which asked them to:

- Provide information on their gender and racial or ethnic identities,
- Provide the same demographic data on their deputy and associate directors,
- Rate their institutions' diversity recruitment efforts, and
- Assess the state of diversity in the oncology workforce.

Directors of 61 NCI-designated cancer centers—out of 71—responded. The 78 cancer centers in this sample, including one Canadian institution, represent 606 deputy and associate directors.

The data obtained is largely representative of academic oncology in the United States. The results are blinded.

The survey data is benchmarked against population-level data (section J on page 21).

"If we're not diverse enough, we will lose the opportunity to learn something from the differences among us," Rohit Bhargava, director, Cancer Center at Illinois at the University of Illinois Urbana-Champaign, said to *The Cancer Letter*. "It may not come out from the commonalities among us, and those differences might hold the key to actually developing new approaches for everyone."

"Diversity, inclusion, and equity are essential in leadership and in the conduct of science. Our patients want 'people who look like me,'" Cheryl L. Willman, director and CEO of the University of New Mexico Comprehensive Cancer Center, said to *The Cancer Letter*. "The conduct of cancer science is full of often 'well-meaning,' but unconscious and conscious bias."

"It is now for the readers to decide what should be done with this information, and this will likely and appropriately include a call to increase female and minority leadership positions in cancer centers," David A. Tuveson, president-elect of the American Association for Cancer Research and director of Cold Spring Harbor Laboratory Cancer Center at Cold Spring Harbor Laboratory, said to *The Cancer Letter*.

Bhargava, Willman, and Tuveson are among nine cancer center directors who were asked to review the findings of the TCL-AACI survey. Their comments appear on page 27.

To enable further discussion, a slideshow presenting the data published in this issue is made available for download here.

The study was not designed to establish statistical significance, cause-and-effect relationships, and correlations. Averages were used to assess all quantitative responses.

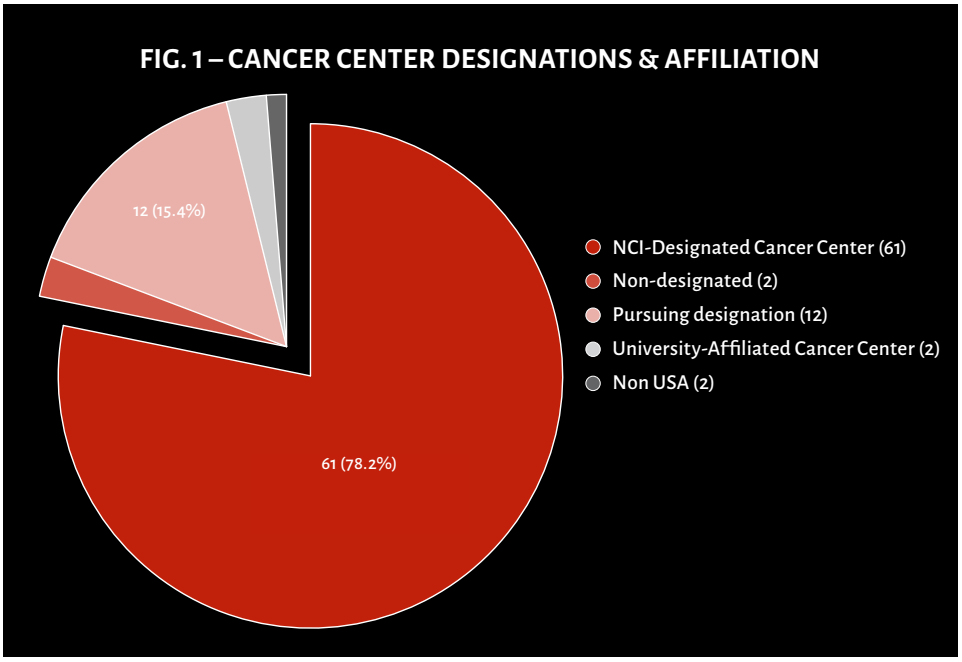
The following variables were not taken into consideration:

- Duration of directorship, and director's purview over recruitment,
- Diversity of the population each institution serves,
- Impact of location on diversity recruitment efforts,
- Status of—or funding for—diversity recruitment programs, and
- Job descriptions of deputy and associate directors.

The survey also does not accurately represent the percentage of women directors at NCI-designated cancer centers. All women directors are represented in the survey—the remaining 10 NCI-designated center directors who didn't respond to the survey are men. Overall, women make up 12.7% of the directorship at the 71 centers.

The results provide context for the findings *The Cancer Letter*'s earlier survey that focused on gender bias and sexual harassment in academic oncology. That survey found that women who have experienced inequities or harassment do not report such incidents, because they do not trust their institutions.

One of the respondents to the gender bias survey made this suggestion: "Give the male leadership, specifically those over 65, training in 'leaning out'—getting out of the way for the next generation of leaders."



"Each search committee should have a specific charge to increase diversity of applicants, and to more carefully consider gender and race in candidate selection," suggested another respondent.

That gender bias study, published in the Oct. 2 issue of *The Cancer Letter*, is available here.

The year 2020 has been, by any reckoning, traumatic for many racial and ethnic minorities in the United States.

SARS-CoV-2 decimated Black and brown households. The killing of George Floyd—and Breonna Taylor, and more—spurred one of the largest racial justice movements in U.S. history. In the midst of the COVID-19 pandemic, Asian Americans began taking defensive measures against widespread anti-Asian sentiment.

Throughout 2020, *The Cancer Letter*'s coverage focused on the interplay between the pandemic and systemic racism in American society (*The Cancer Letter*, Aug. 7, 2020).

Two reports, published by AACR in September, detail how science and health equity have always been inseparable: The first calls for legislative action to address the outsized toll that cancer exacts on racial and ethnic minorities and other underserved populations; the second describes the chilling impact of COVID-19 on cancer (*The Cancer Letter*, Sept. 25, Sept. 18, 2020).

The Cancer Letter's analysis of the leadership pipeline survey data follows:

A. Cancer center directors: Demographics, designation, education and specialty

- **Fig. 2a:** 2 in 9 cancer center directors are non-white.
- **Fig. 3a:** 2 in 13 cancer center directors are women.
- **Fig. 2b:**
  - The director cohort for NCI-designated cancer centers (n=61) is up to 15% less diverse, compared to cancer centers without NCI designation.
  - Cancer centers with NCORP Minority/Underserved Commu-

FIG. 2A – CANCER CENTER DIRECTORS BY RACE/ETHNICITY

N=78

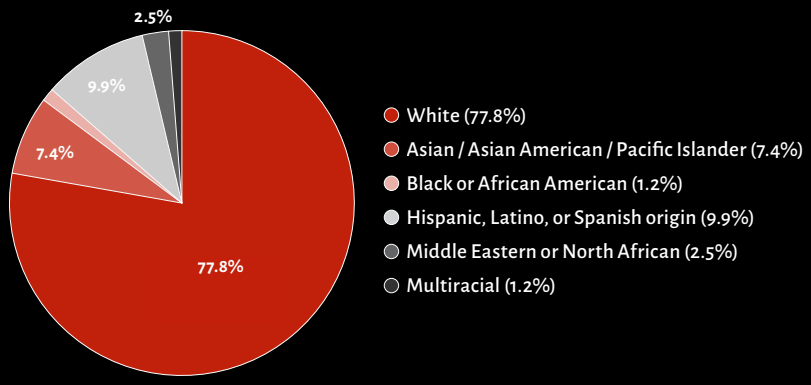


FIG. 3A – CANCER CENTER DIRECTORS BY GENDER

N=78

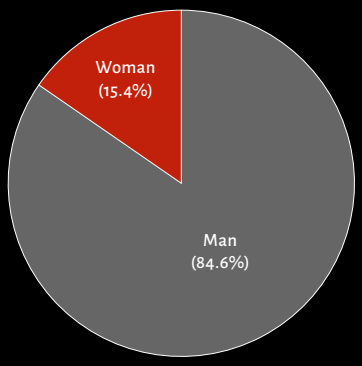


FIG. 2B – CANCER CENTER DIRECTORS RACE/ETHNICITY BY NCI DESIGNATION

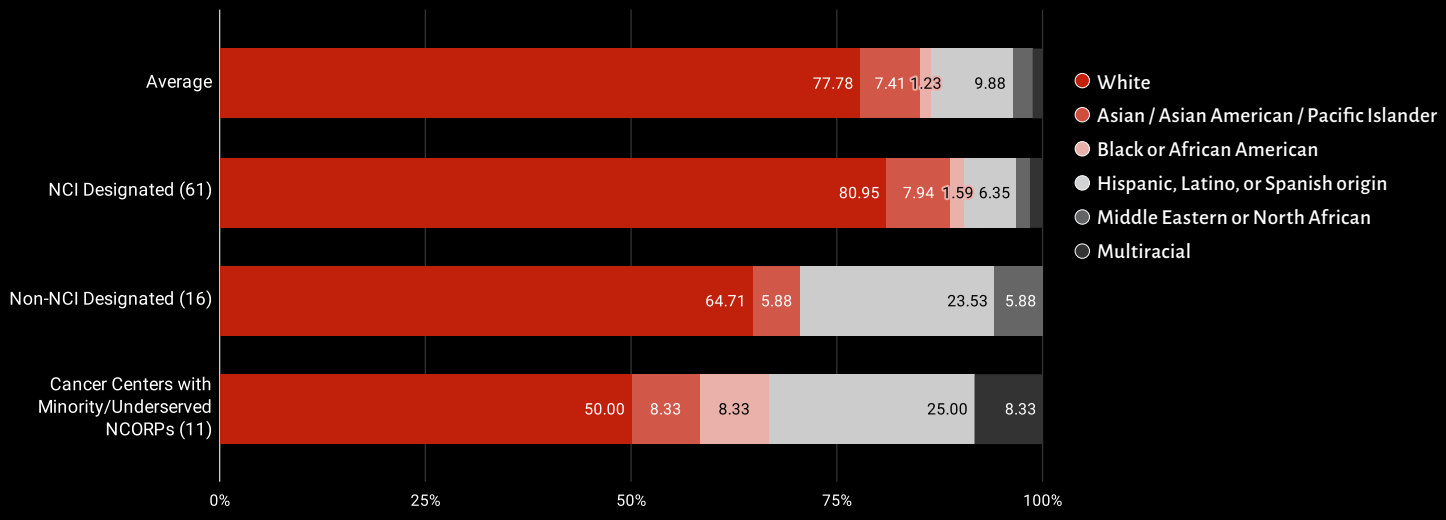


FIG. 3B – CANCER CENTER DIRECTORS GENDER BY NCI DESIGNATION

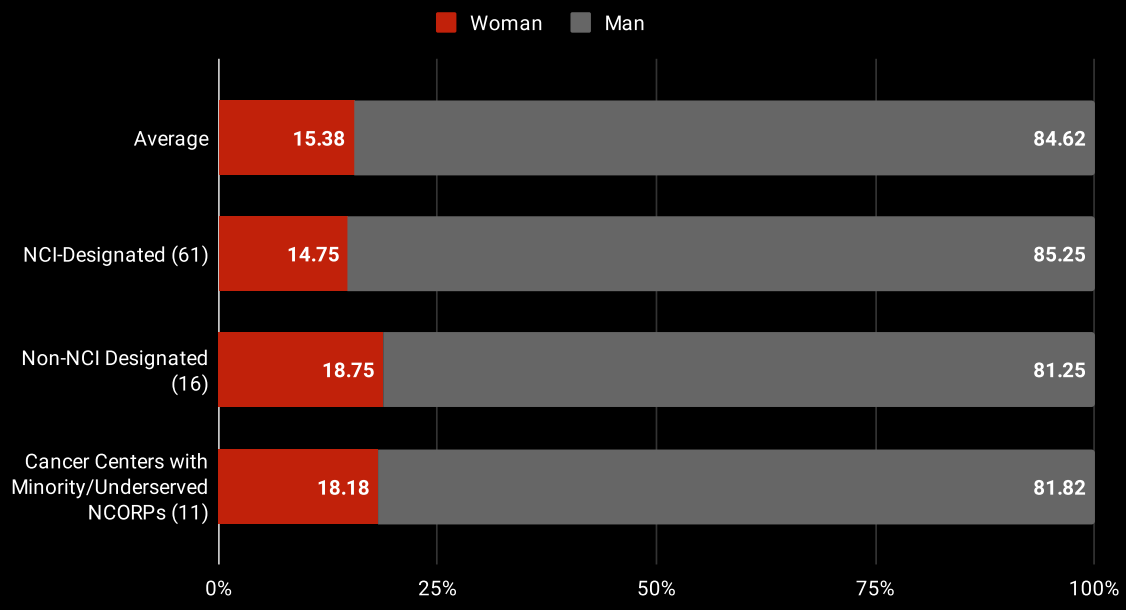


FIG. 4 – CANCER CENTER DIRECTORS BY PROFESSIONAL FOCUS

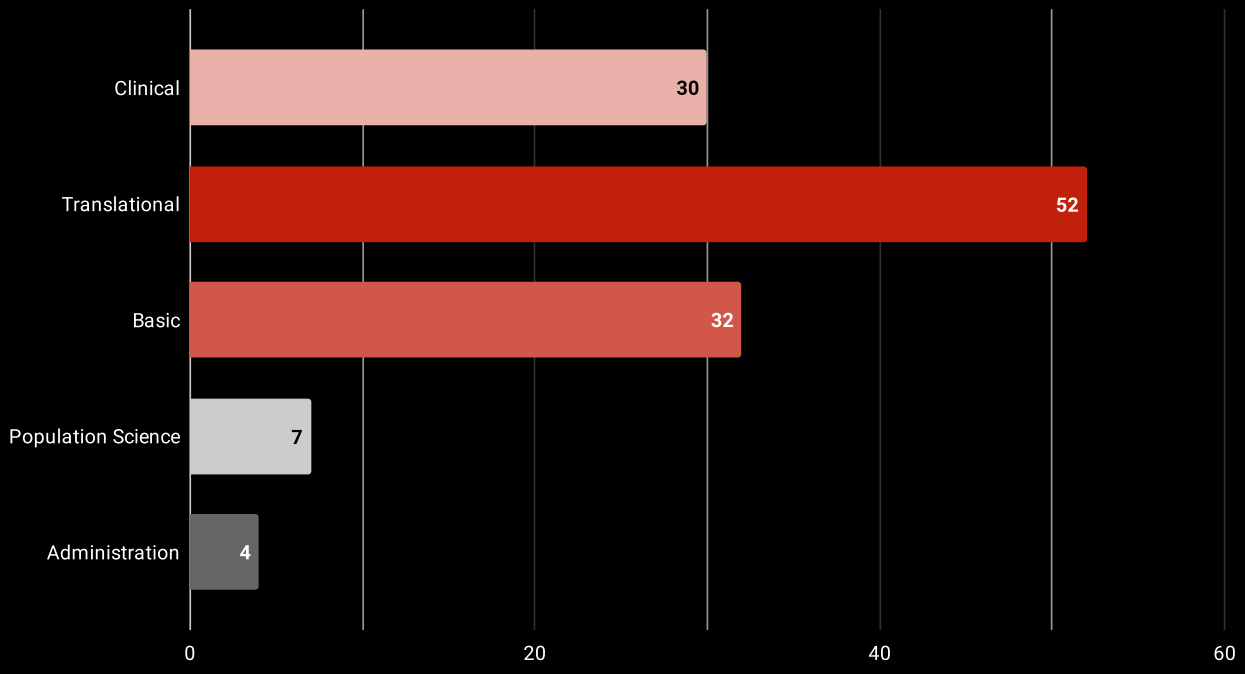


FIG. 5 – CANCER CENTER DIRECTORS BY SPECIALTY, DISEASE/RESEARCH AREA

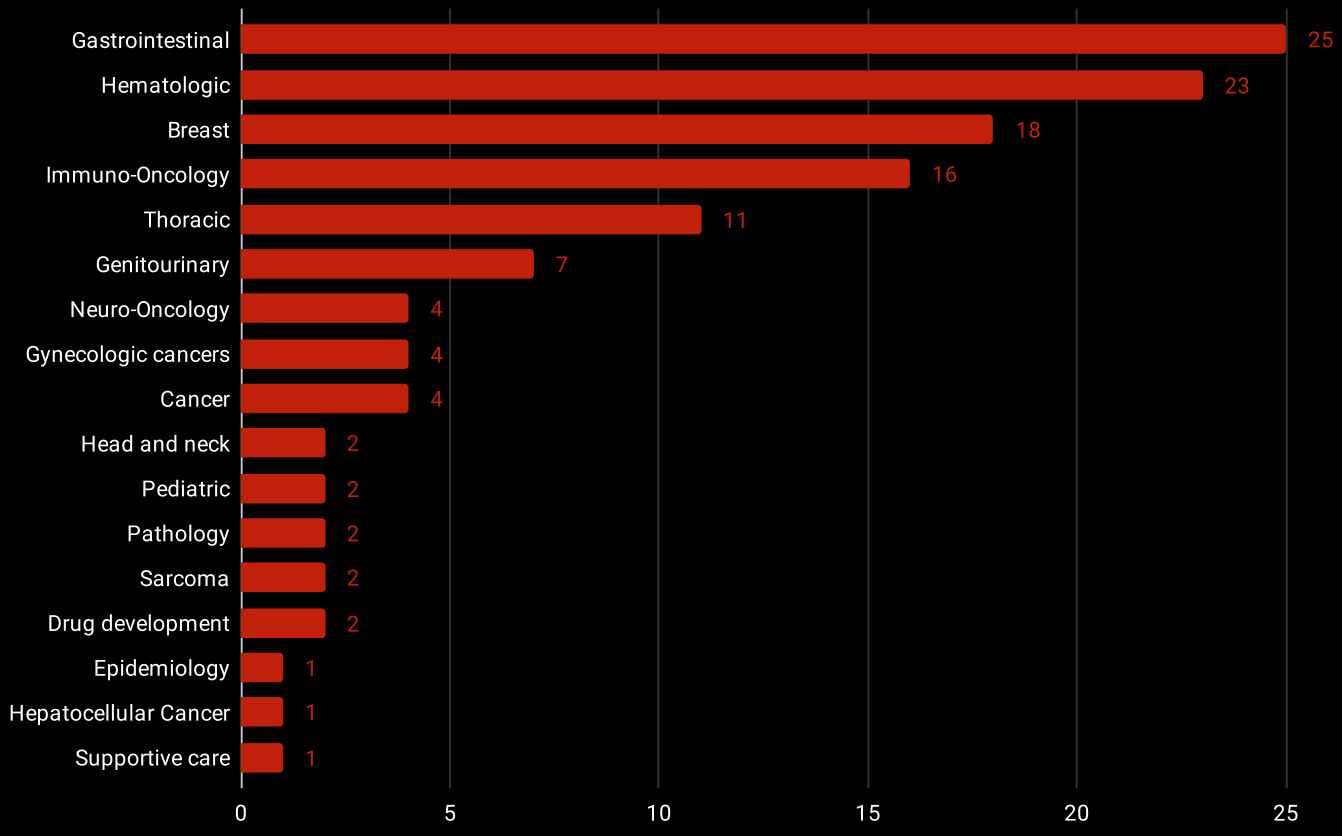


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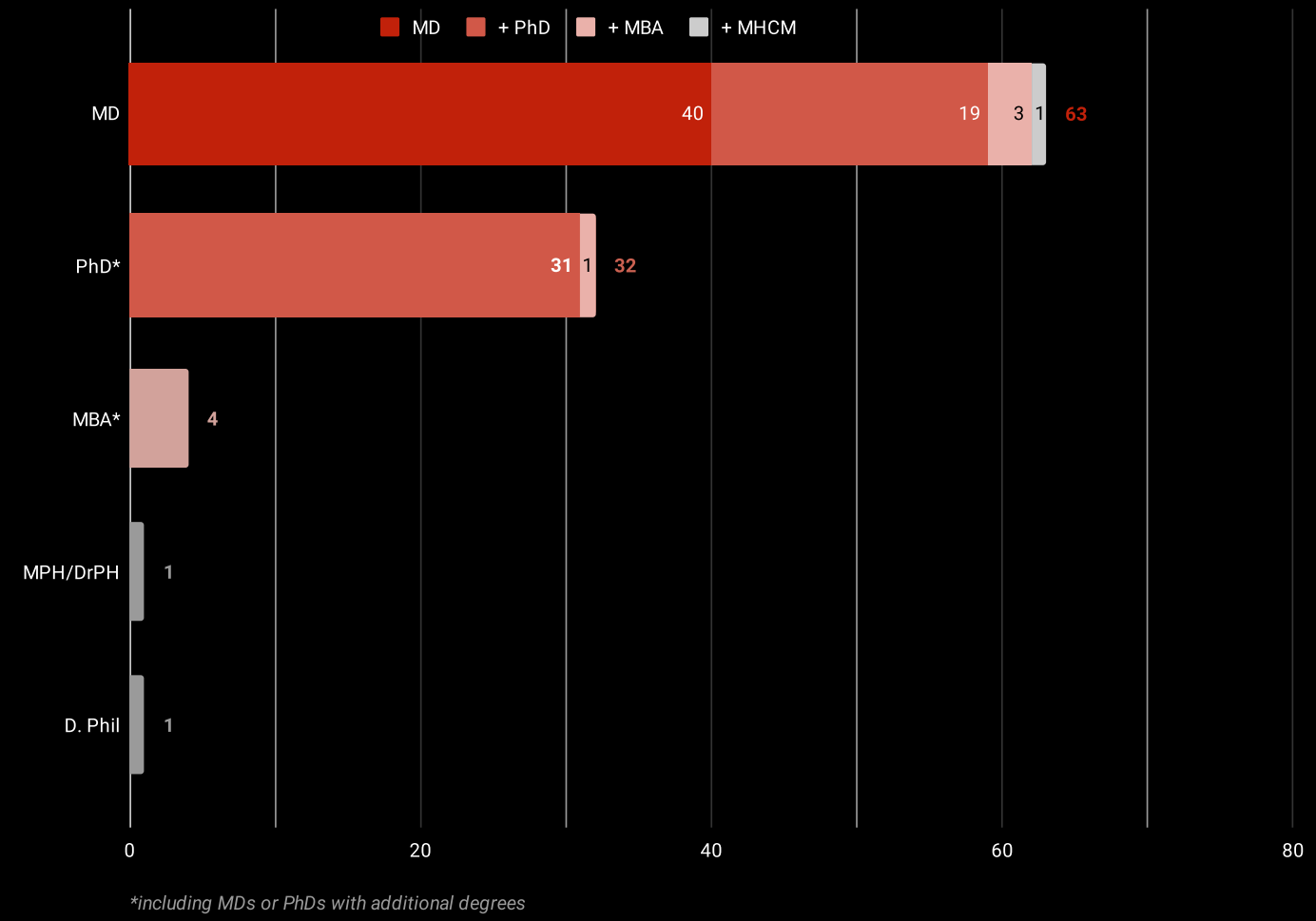
FIG. 6 – CANCER CENTER DIRECTORS BY ACADEMIC DEGREES



nity Sites (n=11), regardless of NCI designation, are the most diverse in top-tier leadership, with 50% non-white directors.

- **Fig. 3b:** All 9 women directors of NCI-designated cancer centers responded to this survey. The actual percentage of women directors of NCI-designated cancer centers is 12.7% (9 of 71). 10 out of the total of 71 NCI-designated centers did not respond to the survey.

B. Racial/ethnic diversity in the leadership pipeline and distribution of non-white deputy and associate directors across institutions

- **Fig. 7a:** 1 in 4 deputy and associate directors in the survey sample are non-white.
- **Fig. 7b:** 2 in 3 institutions (n=52) have 30% or fewer non-white deputy and associate directors. 2 in 5 (n=31) have 20% or fewer.

C. Gender parity in the leadership pipeline and distribution of women deputy and associate directors across institutions

- **Fig. 8a:** 2 in 5 deputy and associate directors in the survey sample are women.
- **Fig. 8b:** Half of institutions (n=38) have 40% or fewer women deputy and associate directors. There are no institutions with over 90%

FIG. 7A – DEPUTY/ASSOCIATE DIRECTORS BY RACE/ETHNICITY

N=606

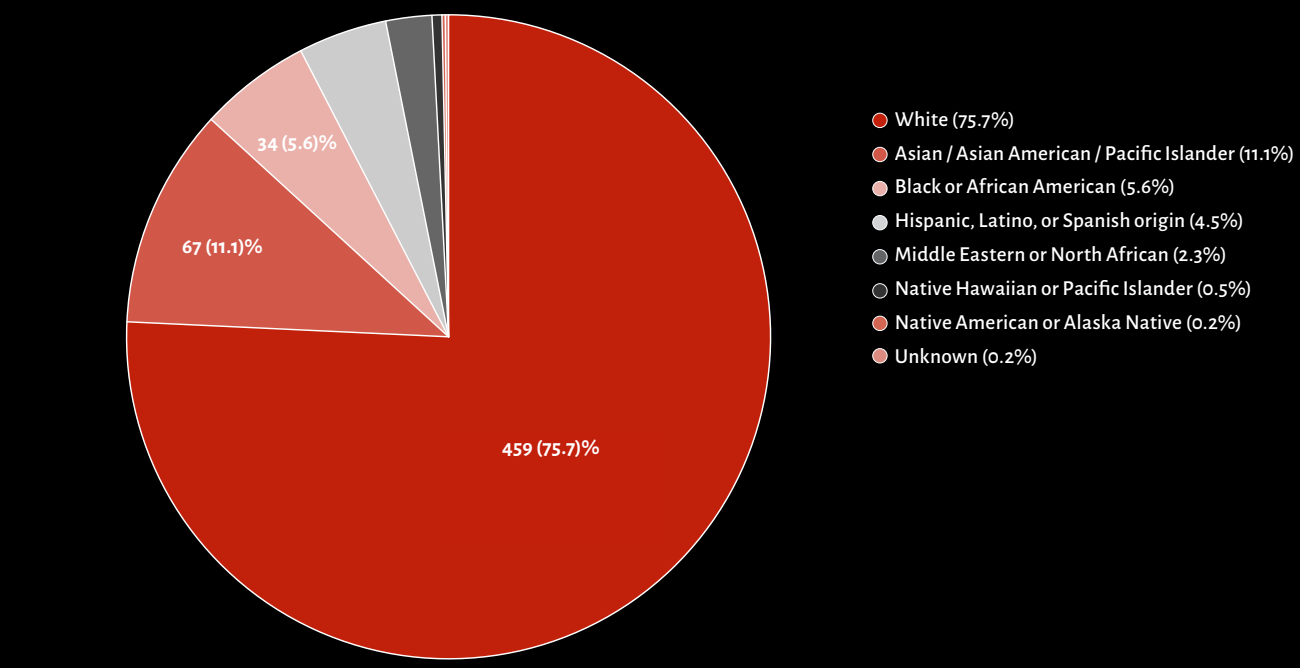


FIG. 7B – NUMBER OF INSTITUTIONS ACCORDING TO PERCENTAGE OF NON-WHITE DEPUTY/ASSOCIATE DIRECTORS

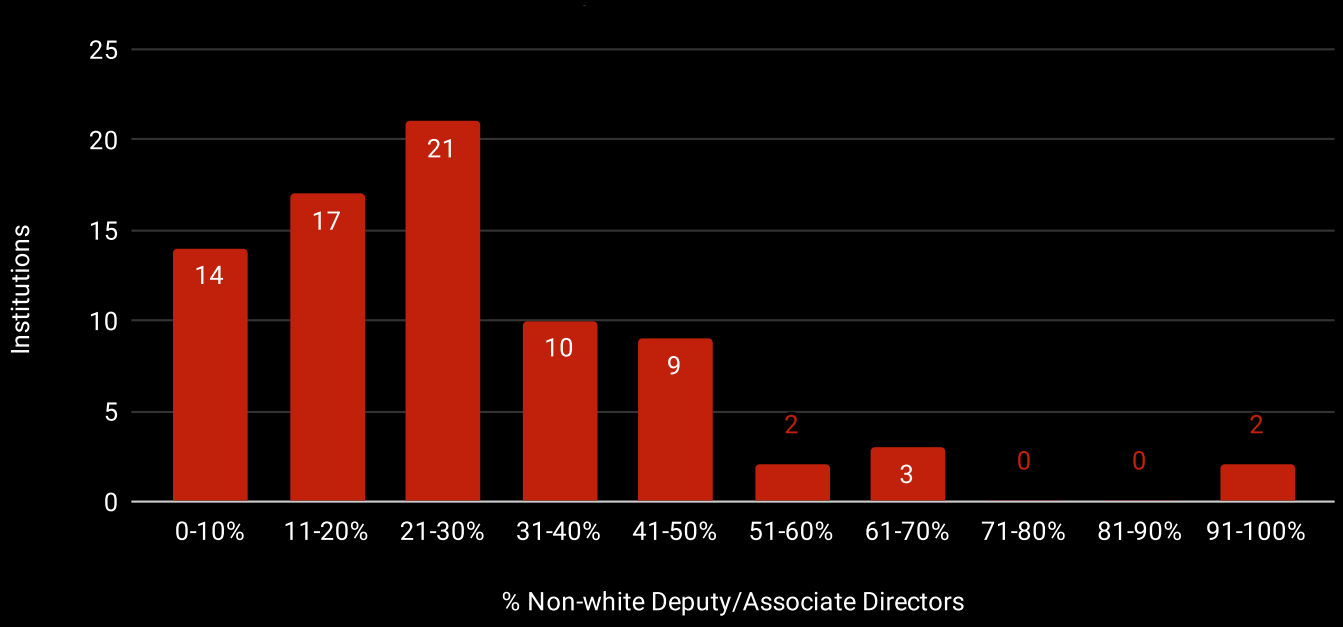


FIG. 8A – DEPUTY/ASSOCIATE DIRECTORS BY GENDER

N=606

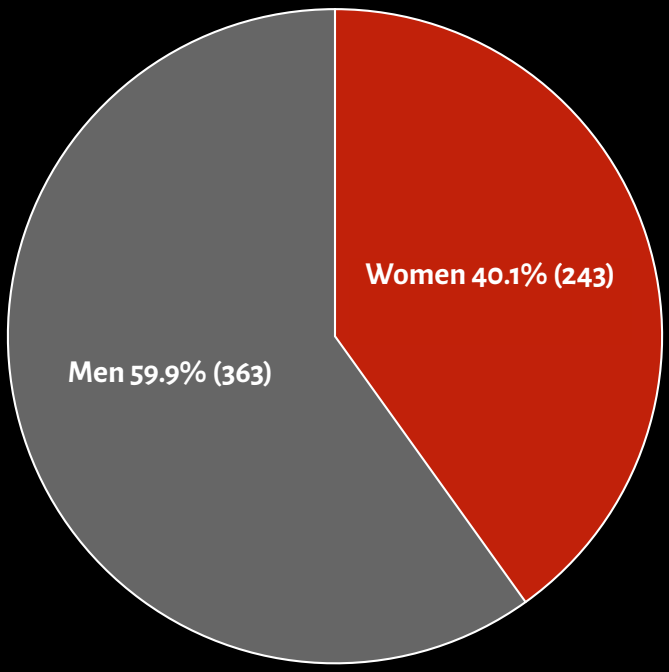
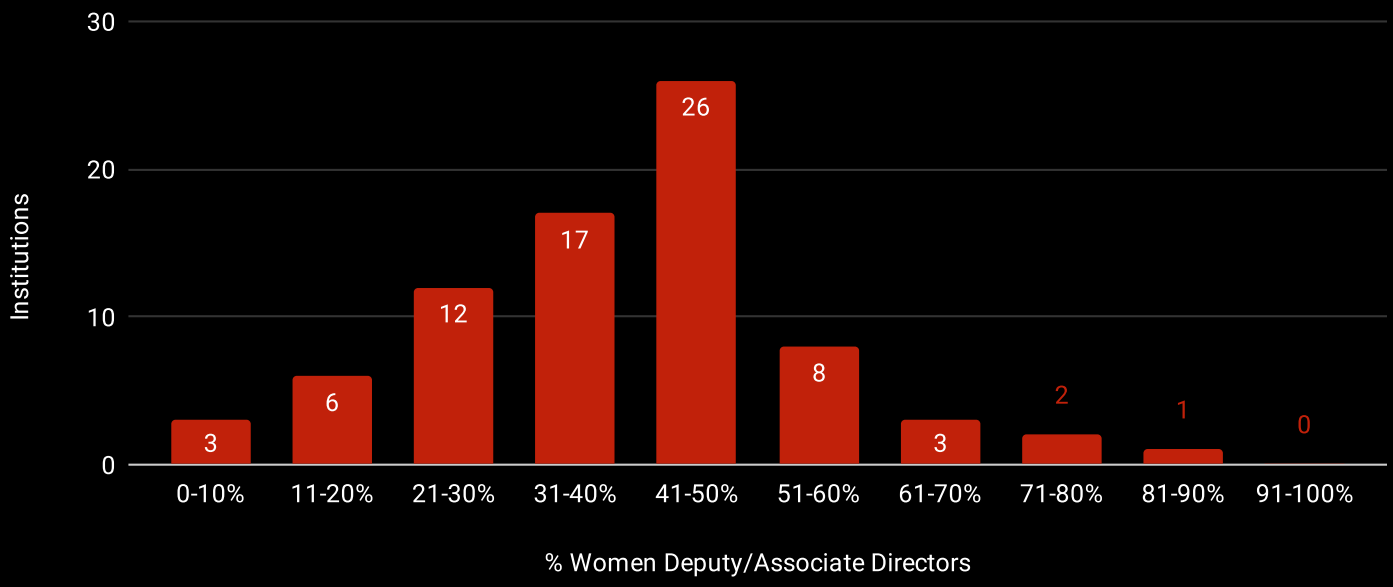
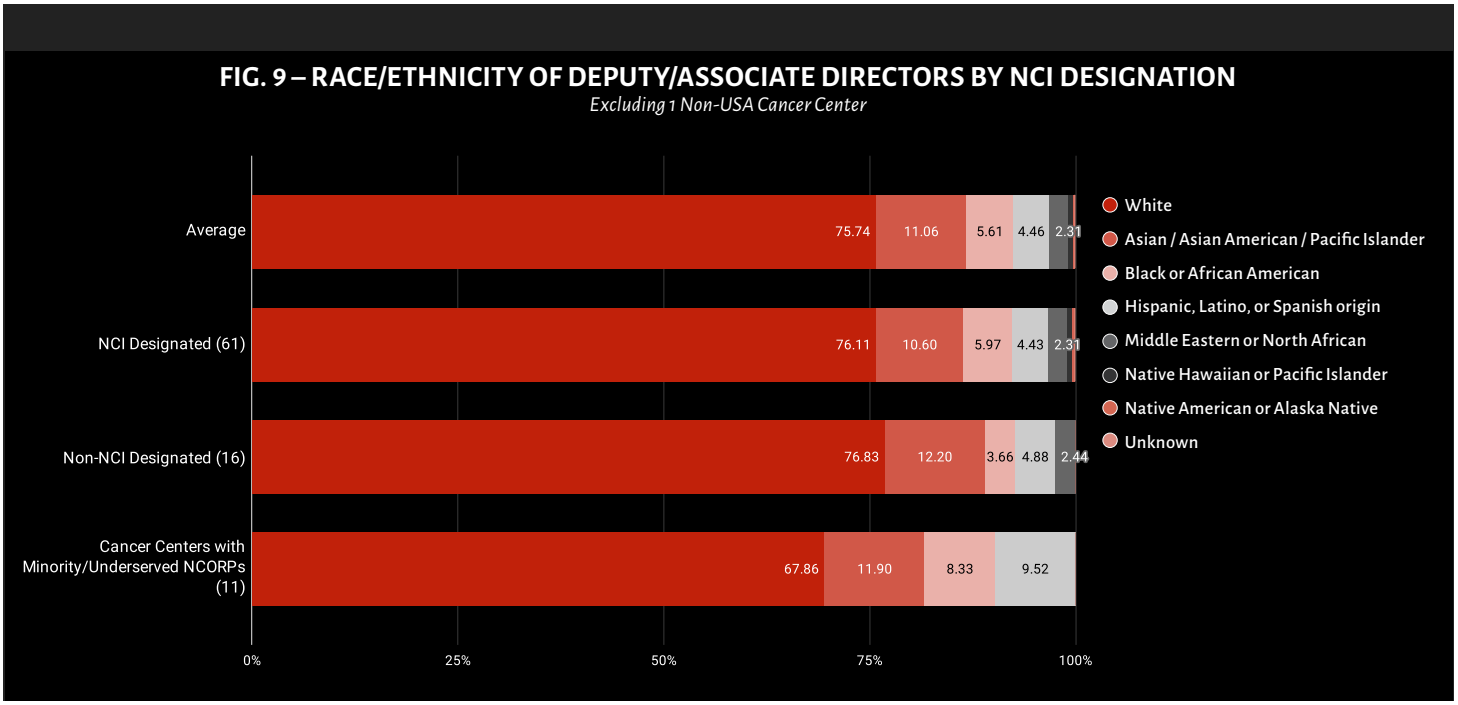


FIG. 8B – NUMBER OF INSTITUTIONS ACCORDING TO PERCENTAGE OF WOMEN DEPUTY/ASSOCIATE DIRECTORS





women deputy and associate directors. One-third of institutions (n=26) have 41-50% women deputy and associate directors.

D. Proportions of racial/ethnic minorities and gender relative to NCI designation

- **Fig. 9:** Cancer centers with NCORP Minority/Underserved Community Sites (n=11), regardless of NCI designation, have the most diverse cohort of deputy and associate directors (~32%, ~8% non-white vs. average), notably with greater representation of Blacks and Hispanics/Latinos.
- **Fig. 10:** As a group, cancer centers with NCORP Minority/Underserved Community Sites have about 10% fewer women deputy and associate directors.
- **Fig. 11:**
  - 14.1% of all cancer centers surveyed are also NCORP Minority/Underserved Community Sites. The proportion of Black and Hispanic/Latino deputy and associate directors are notably greater than 14.1% at these centers.
  - 1 in 5 of all Black and about 3 in 10 of all Hispanic/Latino deputy and associate directors work at cancer centers with NCORP Minority/Underserved Community Sites.

E. Proportions of racial/ethnic minorities and gender relative to directorship

Fig. 12:

- **Women directors** (n=12): Institutions led by women have greater proportions of Black (1.8% difference), Hispanic/Latino (4.5% difference), and Asian (3.9% difference) deputy and associate directors, compared to institutions led by directors who are men (n=66), regardless of race.
- **Non-white directors** (n=18): Institutions led by non-white directors have greater proportions of Hispanic/Latino (4.9% difference) and Asian (4.5% difference) deputy and associate directors, compared to institutions led by white directors (n=60), regardless of gender. However, institutions led by non-white directors have the lowest proportion of Black deputy and associate directors—by about half compared to other groups, and by more than half compared to institutions led by women.
- **White men directors** (n=50): As a group, institutions led by white men have the largest majority of white deputy and associate directors, at 79.9%. By comparison, institutions led by non-white or women directors are up to 10% more diverse—Hispanics/Latinos and Asians make up most of that difference, with no meaningful change in the proportion of Black deputy and associate directors

Fig. 13:

- **Women**: The proportion of women in deputy and associate director positions in the survey sample is consistent—at about 40%—re-

FIG. 10 – GENDER OF DEPUTY/ASSOCIATE DIRECTORS BY NCI DESIGNATION

Excluding 1 Non-USA Cancer Center

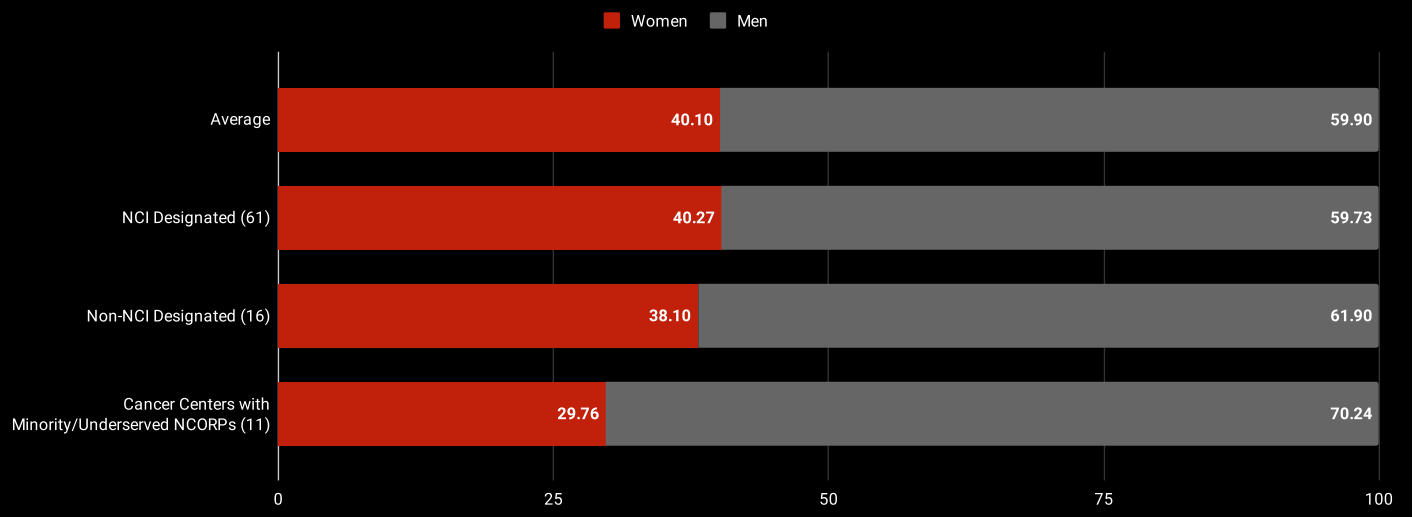
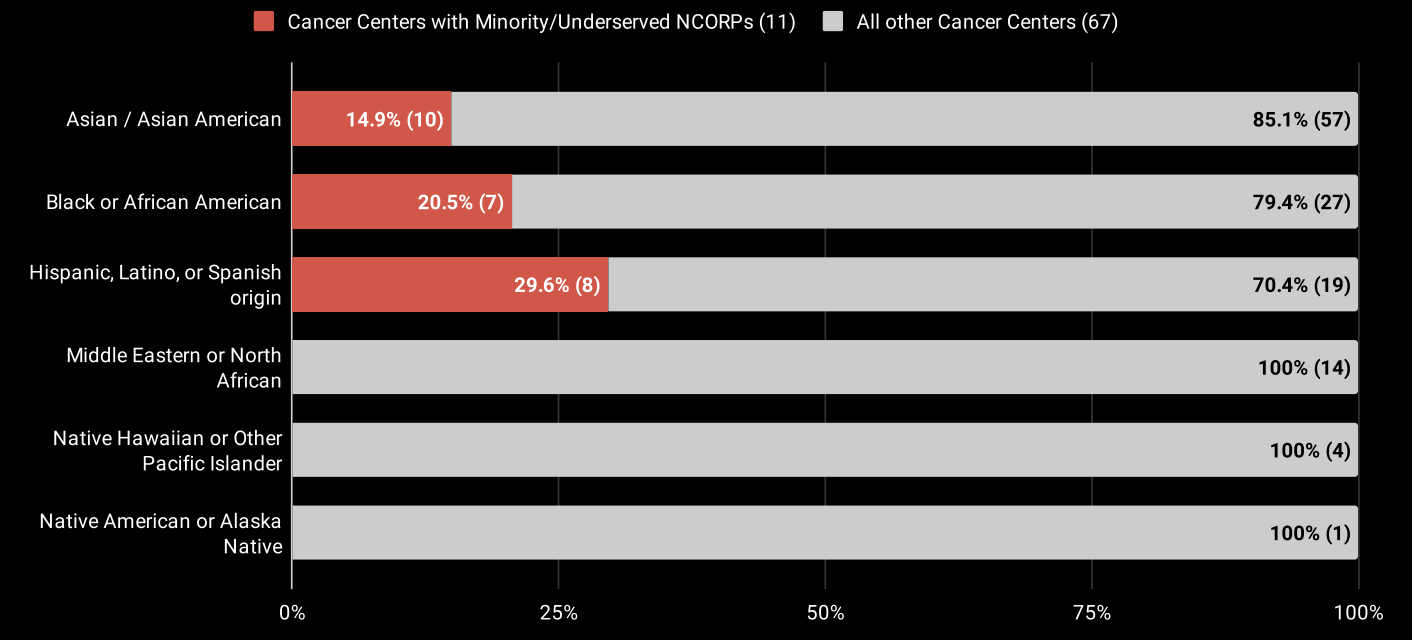


FIG. 11 – PROPORTION OF MINORITY DEPUTY/ASSOCIATE DIRECTORS AT CANCER CENTERS WITH MINORITY/UNDERSERVED NCORPs



14.1% of all cancer centers surveyed are also NCORP Minority/Underserved Community Sites.

FIG. 12 – RACE/ETHNICITY OF DEPUTY/ASSOCIATE DIRECTORS BY GENDER AND RACE OF DIRECTORS

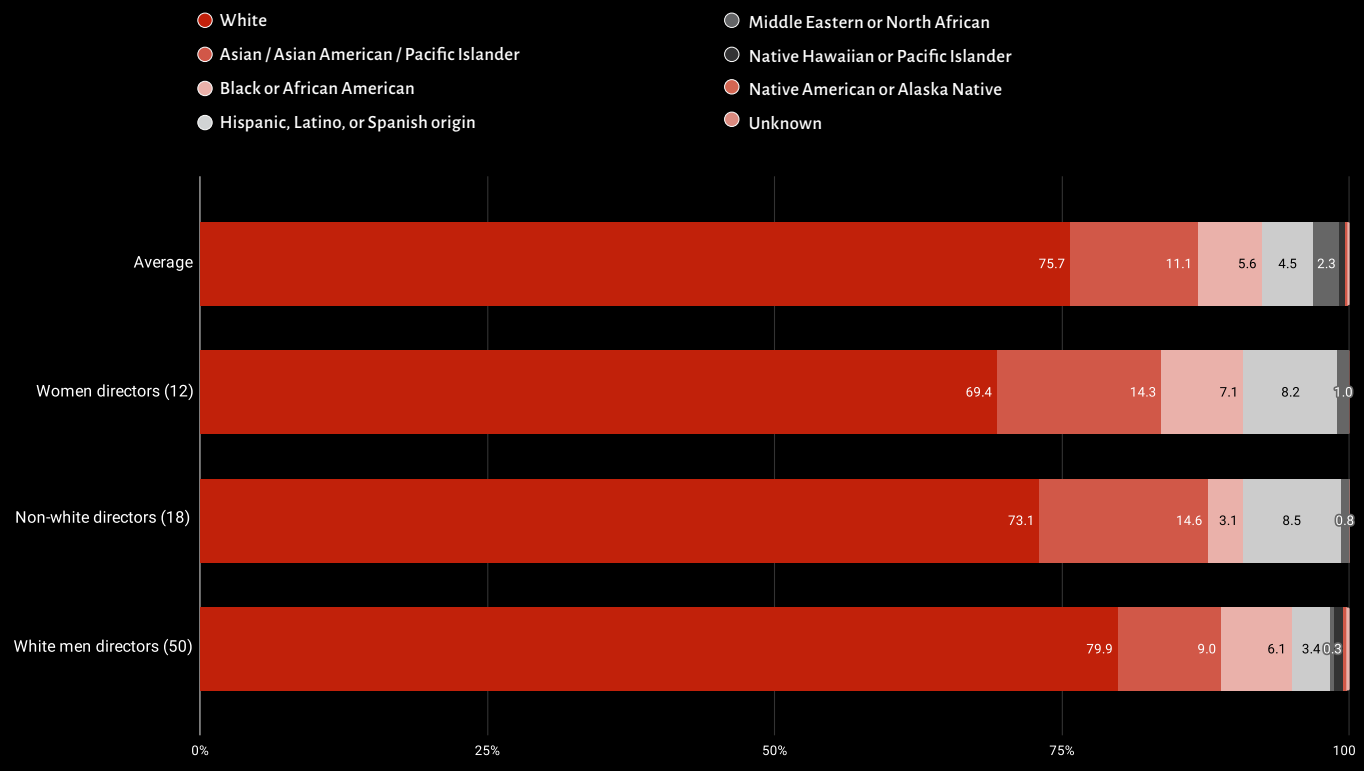


FIG. 13 – GENDER OF DEPUTY/ASSOCIATE DIRECTORS BY GENDER AND RACE OF DIRECTORS

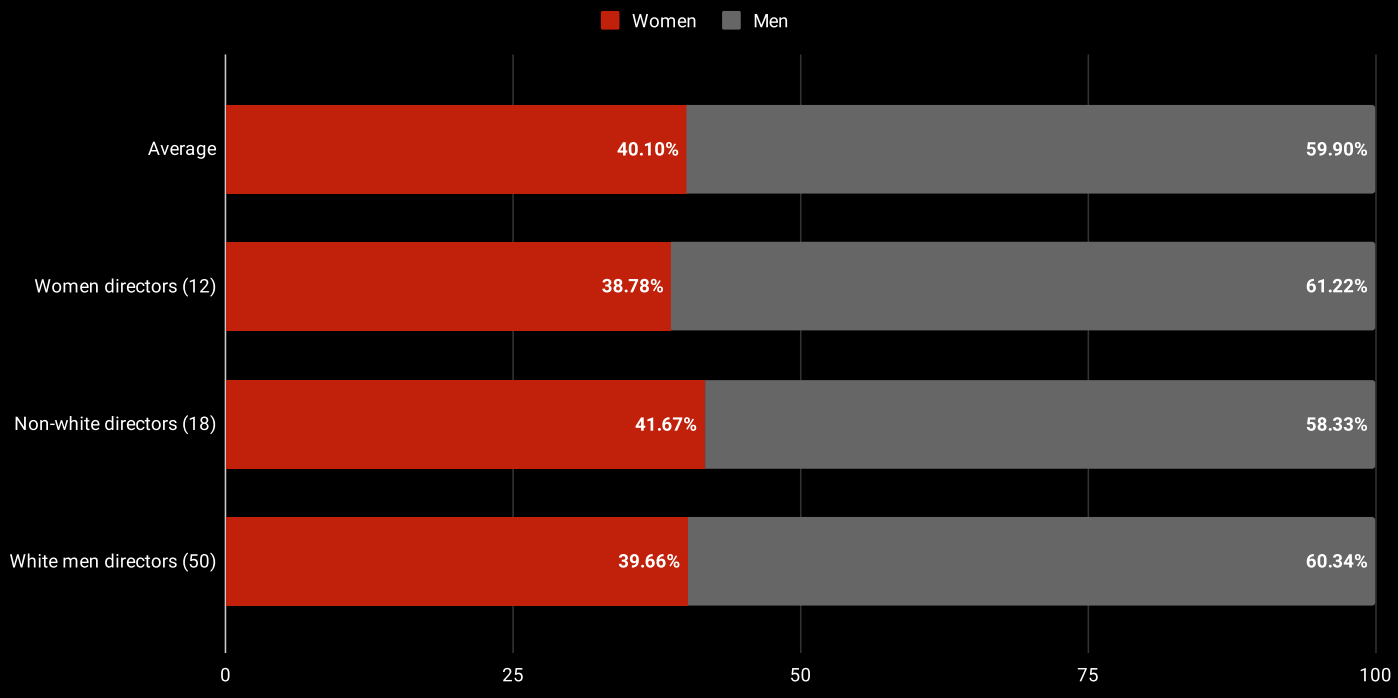


FIG. 14 – RACE/ETHNICITY OF DEPUTY/ASSOCIATE DIRECTORS BY REPORTED DIVERSITY OF RECRUITMENT SUCCESS

Directors responded to a multiple-choice question asking to rate their institutions' diversity recruitment efforts.

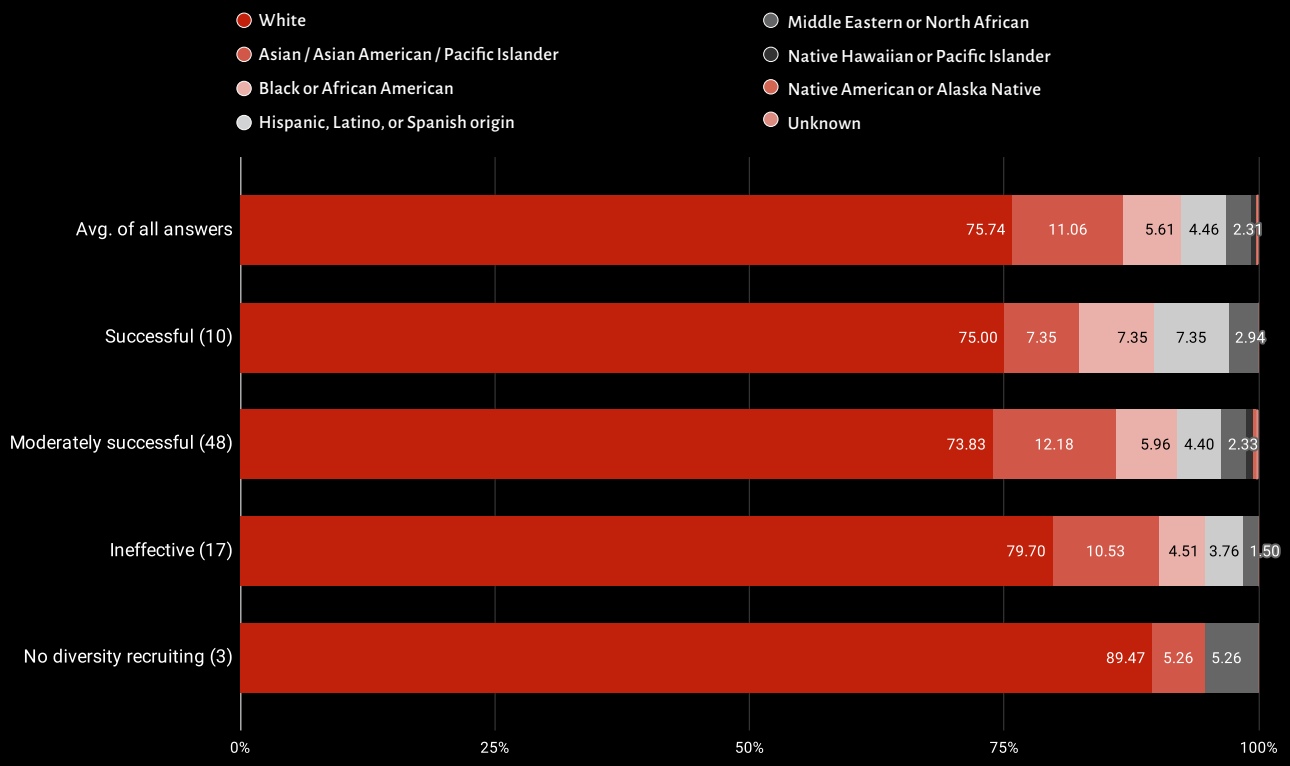


FIG. 15 – GENDER OF DEPUTY/ASSOCIATE DIRECTORS BY REPORTED DIVERSITY OF RECRUITMENT SUCCESS

Directors responded to a multiple-choice question asking to rate their institutions' diversity recruitment efforts.

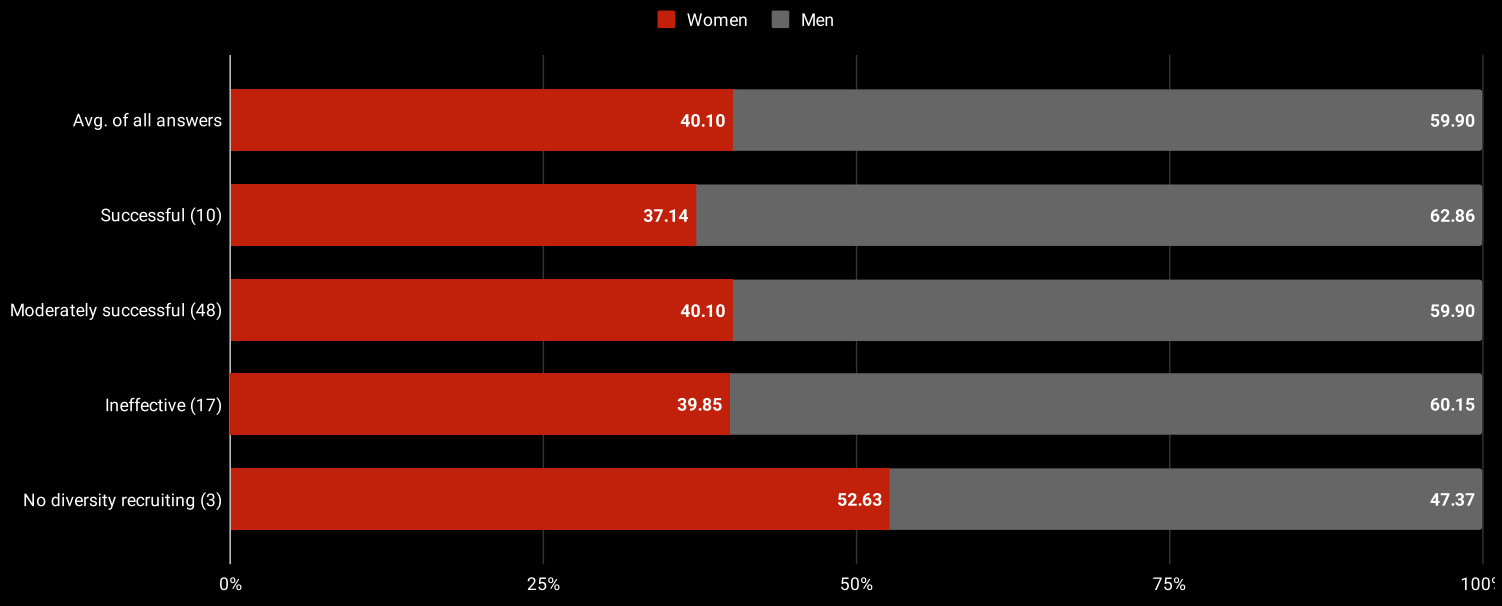
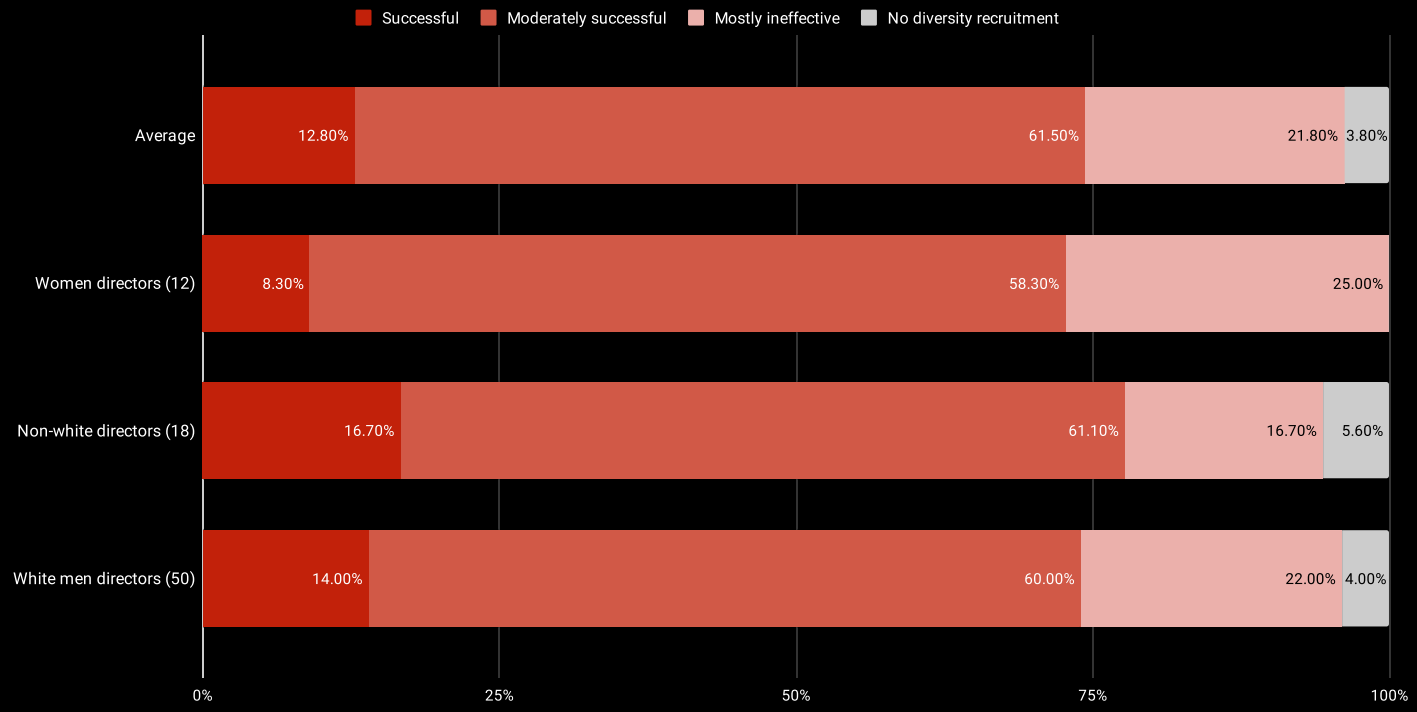


FIG. 16 – REPORTED RECRUITMENT SUCCESS BY GENDER AND RACE/ETHNICITY OF CANCER CENTER DIRECTORS

Directors responded to a multiple-choice question asking to rate their institutions' diversity recruitment efforts.



gardless of the gender or racial identity of the director. There is little variation to this proportion, regardless of the NCI designation of the center or of directors' reported success in diversity recruiting. In contrast, only 15.4% of directors in the sample are women.

F. Self-reported measures of success in diversity recruitment programs:

Fig. 14:

- **Successful** (n=10): Institutions with directors who reported that their diversity recruitment programs were successful do not have a much larger proportion of non-white deputy and associate directors (1.17% difference) compared to institutions directors who reported that their programs were moderately successful. Of note, however, is the fact that these institutions, as a group, have equal proportions of Asian, Black, and Hispanic/Latino deputy and associate directors (7.35%, respectively).
- **Moderately successful** (n=48): Institutions in this group have proportionally fewer Hispanic/Latino (2.95% difference) and Black (1.39% difference) deputy and associate directors compared to the Successful group, but a notably larger proportion of Asian (4.83% difference) deputy and associate directors.
- **Ineffective** (n=17): Institutions in this group have proportionally fewer Hispanic/Latino (up to 3.59% difference) and Black (up to 2.84% difference) deputy and associate directors compared to the Successful and Moderately Successful groups. The proportion of Asian/Asian Americans deputy and associate directors are comparable (1.65% difference) to the Moderately Successful group.
- **No diversity recruitment** (n=3): Although a minority, institutions without diversity recruitment programs have the least diversity in their leadership pipeline, with about 10% non-white deputy and associate directors (2 in 19). These institutions have no deputy and associate directors who identify as Hispanic/Latino or Black. Two of these institutions are 100% white at the deputy and associate director levels.

G. Self-reported success in recruitment by gender and race/ethnicity of directors, and by NCI designation

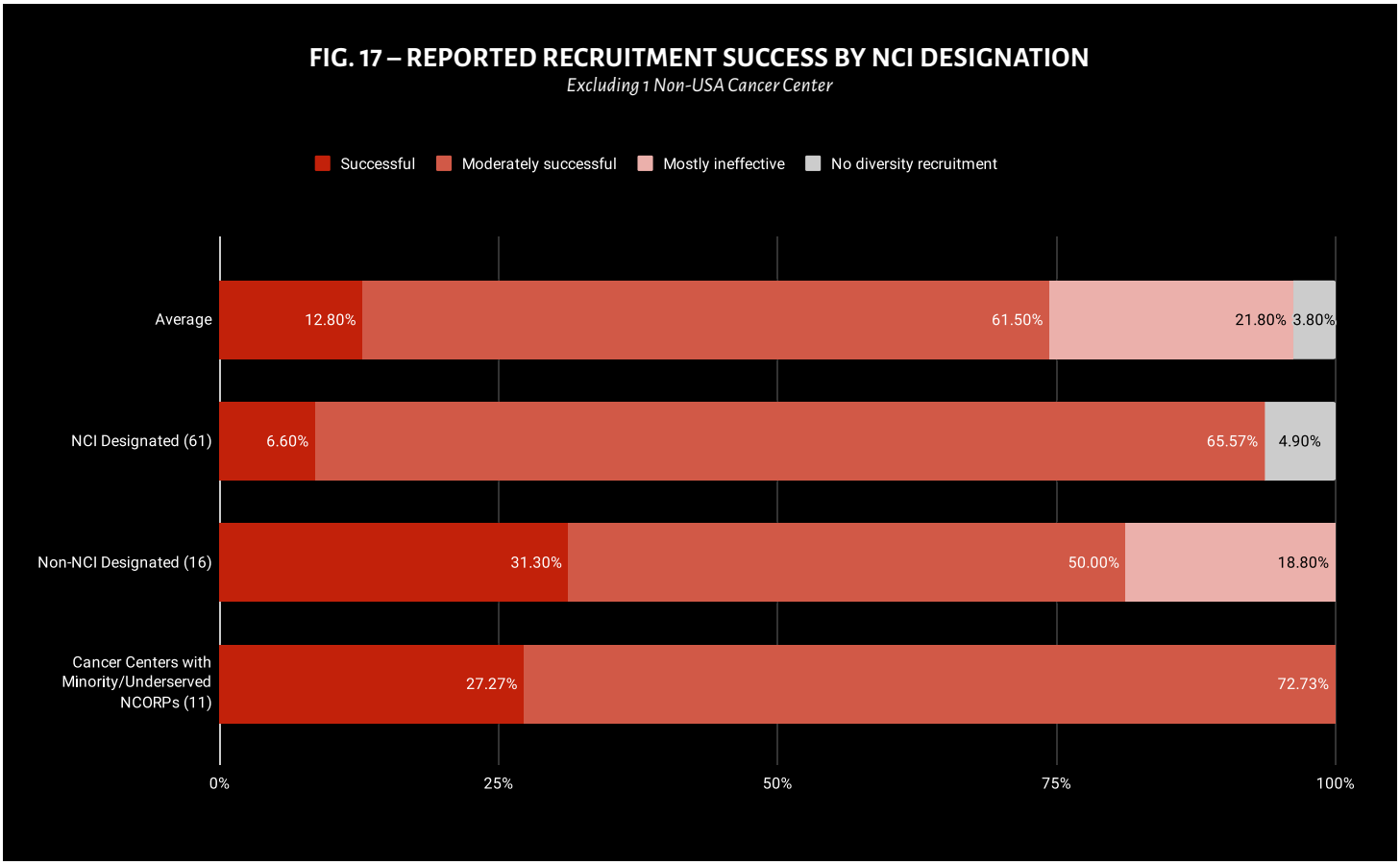


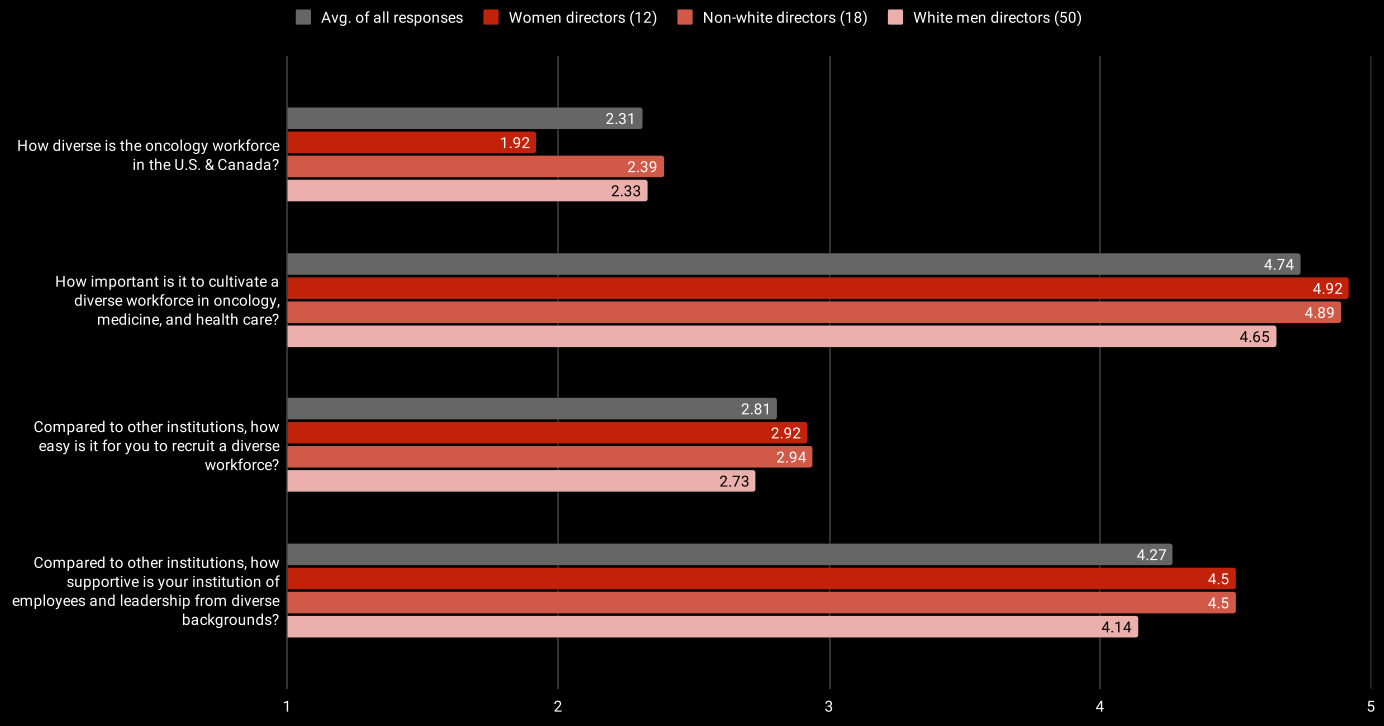
Fig. 16:

- **Women directors** (n=12): Women directors are the least likely of all groups to report that their institutions' diversity recruitment programs are effective (8.3%). A greater proportion of men directors (n=66), regardless of race or ethnicity, reported that their diversity recruitment programs are "successful" (13.6%). Institutions led by women directors all reportedly have diversity recruitment efforts.
- **Non-white directors** (n=18): A greater proportion of non-white directors reported that their recruitment programs are "successful" (16.7%), compared to other groups. An equal number of non-white directors rated their recruitment programs as "ineffective". In the cohort of white directors (n=60), 11.7% rated their recruitment programs as successful, 61.7% as moderately successful, and 23.3% as ineffective.
- **White men** (n=50): The proportion of white men directors who reported that their diversity recruitment programs are "successful" is comparable to the same for non-white directors (2.7% difference). As a group, white men directors are nearly twice as likely to report that their diversity recruitment programs are "successful" (14%), compared to women directors (8.3%).

Fig. 17:

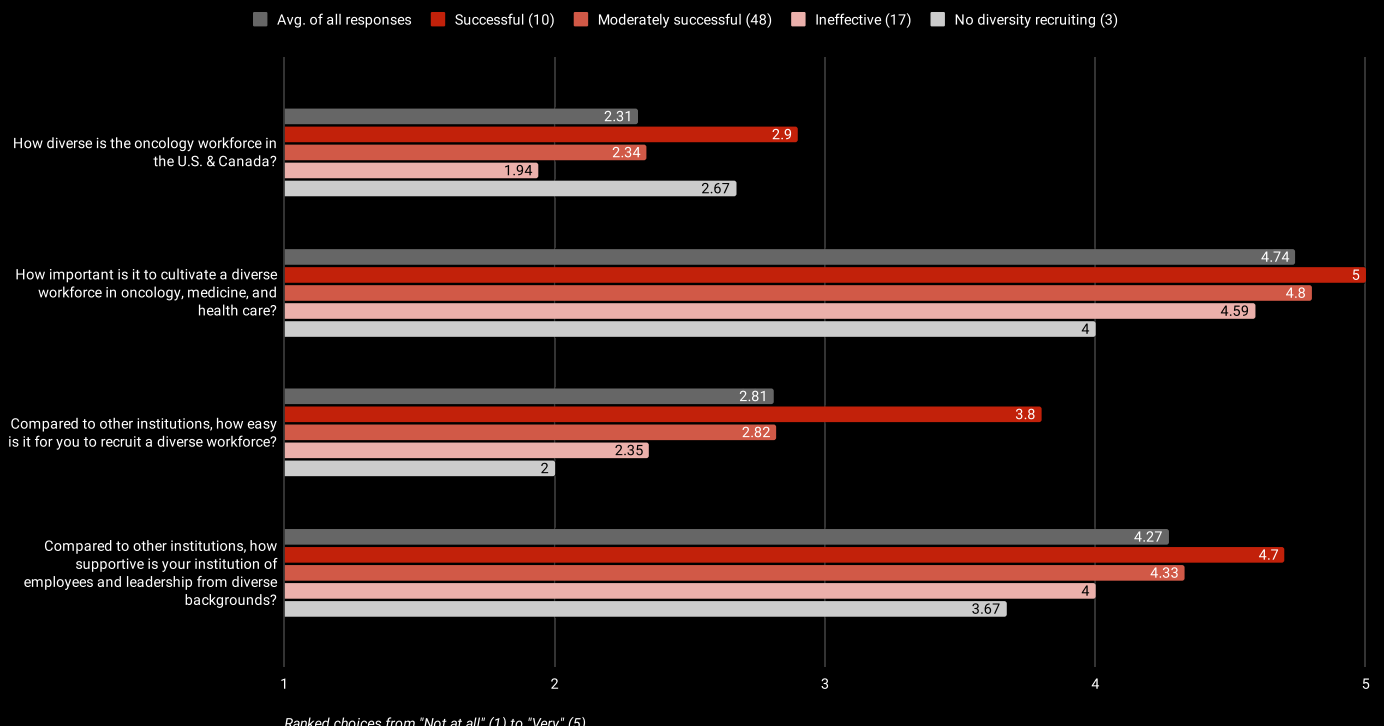
- As a group, NCI-designated cancer centers are the least likely to assess their diversity recruitment efforts to be "successful." Two in 3 of these centers report "moderate success." On the other hand, all cancer centers that acknowledged a lack of diversity recruitment efforts are also NCI-designated. No centers in this group rated their diversity recruitment efforts as "ineffective."
- As a group, cancer centers without an NCI designation are most likely to assess their diversity recruitment efforts as "successful" (1 in 3). Half of these centers report moderate success. On the other hand, all cancer centers that rated their diversity recruitment efforts as "ineffective" do not have NCI designation.
- Cancer centers with NCORP Minority/Underserved Community Sites, regardless of NCI designation, are the most likely to assess their diversity recruitment efforts to be "moderately successful" (3 in 4), with 1 in 4 rating their efforts as "successful."

FIG. 18 – CANCER CENTER DIRECTORS' ASSESSMENT OF DIVERSITY BY GENDER AND RACE/ETHNICITY



Ranked choices from "Not at all" (1) to "Very" (5)

FIG. 19 – CANCER CENTER DIRECTORS' ASSESSMENT OF DIVERSITY BY REPORTED RECRUITMENT SUCCESS



Ranked choices from "Not at all" (1) to "Very" (5)

H. Assessing diversity in the oncology workforce at North American cancer centers

Fig. 18:

- **Women directors** (n=12): Women directors in the survey sample rated the diversity of the oncology workforce lower than other groups.
- **Non-white directors** (n=18): Non-white directors rated the diversity of the oncology workforce highest out of all groups. On all other measures, their responses track closely to the averages for women directors.
- **White men directors** (n=50): As a group, white men directors rated the importance of diversity in the oncology workforce lower than other groups. These directors also report that it's harder for them to recruit a diverse workforce, and rated their institutions as less supportive, compared to institutions led by women and non-white directors.

Fig. 19:

- **Successful** (n=10): Directors who reported that their diversity recruitment programs were successful rated the diversity of the oncology workforce higher than other groups, and unequivocally say that it's important to cultivate a diverse workforce. Compared to other groups, these directors also report that it's easier to recruit a diverse workforce, and that their institutions are supportive.
- **Moderately successful** (n=48): As the largest cohort, the responses from directors in this cohort track closely to the average numbers.
- **Ineffective** (n=17): Directors who reported that their diversity recruitment programs were ineffective rated the diversity of the oncology workforce lower than other groups, and rank below average in their rating of the importance of cultivating a diverse workforce. These directors also report higher than average difficulty in recruiting a diverse workforce, and below-average support from their institutions.
- **No diversity recruitment** (n=3): Although a minority, directors at institutions without diversity recruitment programs rank above average in their rating of the diversity of the oncology workforce, falling only behind directors who report success. These directors rank lowest in their rating of the importance of cultivating a diverse workforce. They also report the most difficulty in recruiting a diverse workforce, and least support from their institutions.

I. Summary of observations:

1. For some groups, self-reported measures of success in recruiting diverse deputy and associate directors do not necessarily represent the actual diversity of physicians, administrators, or researchers in the leadership pipeline.

Although white men directors are nearly as likely as non-white directors to report that their diversity recruitment programs are "successful," institutions led by white men are the least diverse (deputy and associate directors) compared to institutions led by women directors and non-white directors.

Although women directors are most likely to report that their institutions' diversity recruitment programs are "ineffective" compared to other groups, their leadership pipelines (deputy and associate directors) are the most diverse.

2. Cancer centers with diversity recruitment efforts appear to have a more diverse leadership pipeline compared to institutions that don't have these efforts.

There is notably greater diversity among deputy and associate directors at cancer centers with directors who report that their institutions' diversity recruitment programs are "successful" or "moderately successful," compared to directors who report that their institutions' diversity recruitment programs are "ineffective" or non-existent (6% - 16% difference).

3. Cancer centers with NCORP Minority/Underserved Community Sites are the most diverse, regardless of NCI designation.

NCI-designated cancer centers are up to 15% less diverse in directorship, compared to centers without NCI designation. Centers with NCORP Minority/Underserved Community Sites, regardless of NCI designation, are the most diverse, with 50% non-white directors—and with about 32% (~ 8% above average) non-white deputy and associate directors.

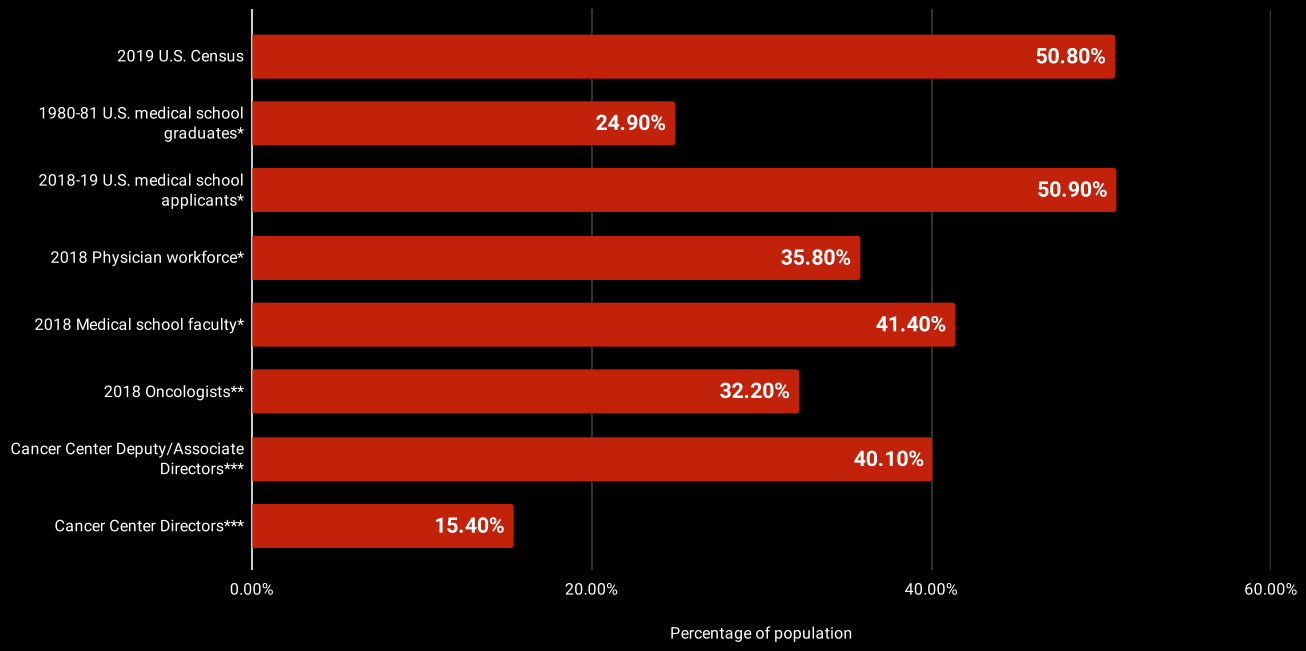
One in 5 of all Black and 3 in 10 of all Hispanic/Latino deputy and associate directors work at these centers with NCORP MU sites.

Alexandria Carolan contributed to this story.

J. Population Benchmarks

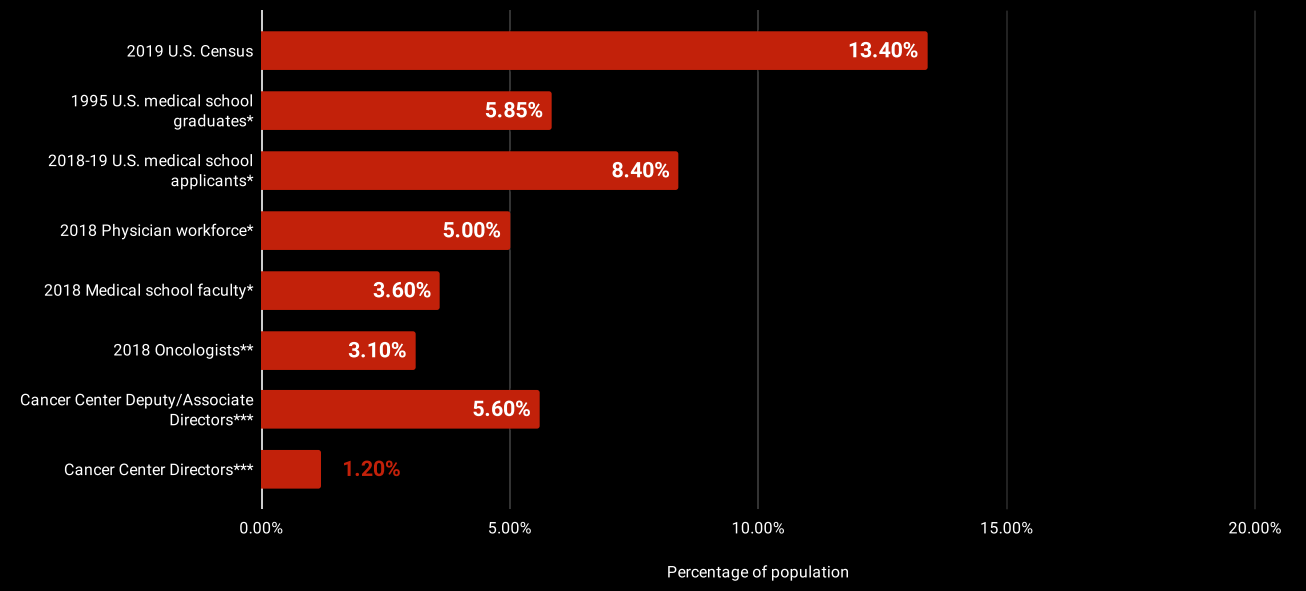
WOMEN

**AAMC data; **AMA data; ***The Cancer Letter-AACI survey*



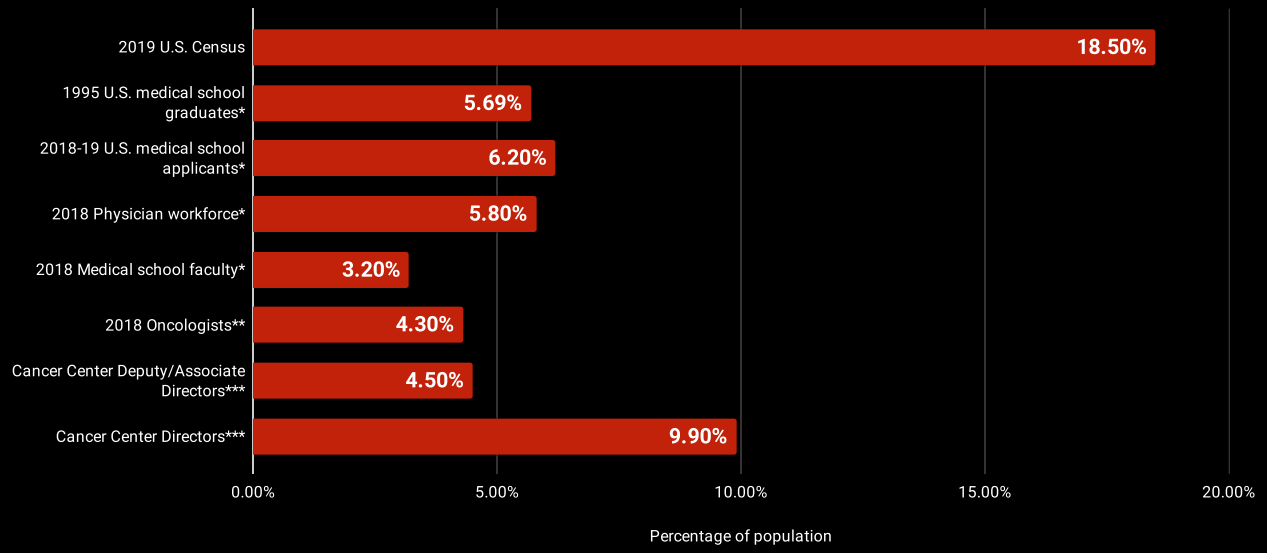
BLACK OR AFRICAN AMERICAN

**AAMC data; **AMA data; ***The Cancer Letter-AACI survey*



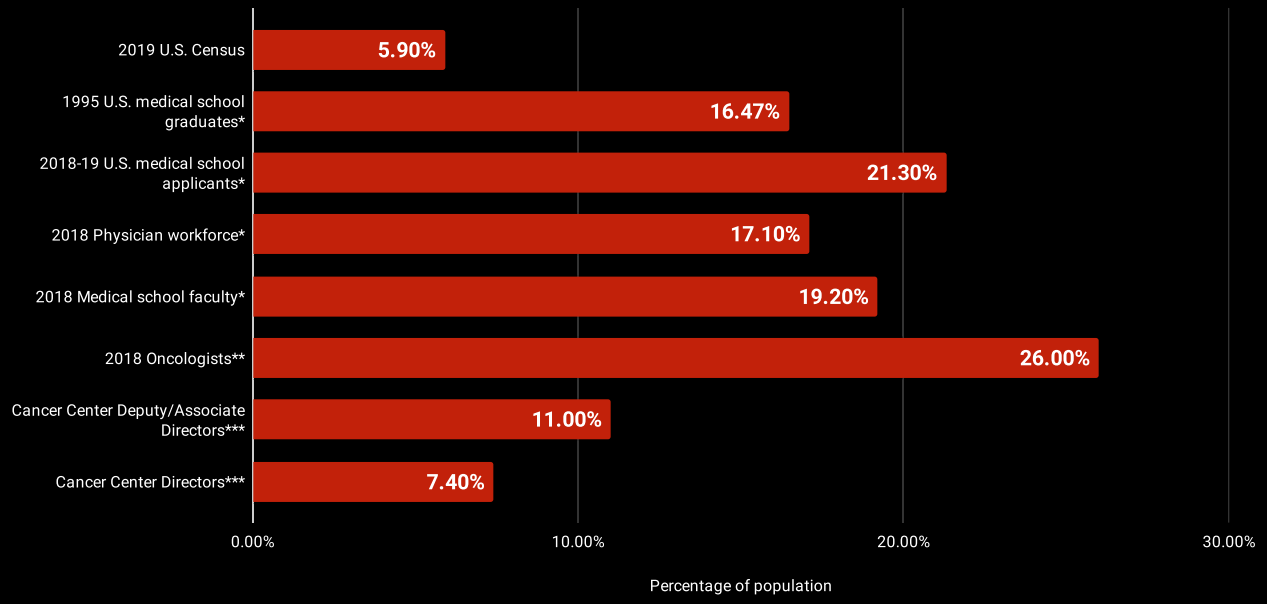
HISPANIC OR LATINO

**AAMC data; **AMA data; ***The Cancer Letter-AACI survey*



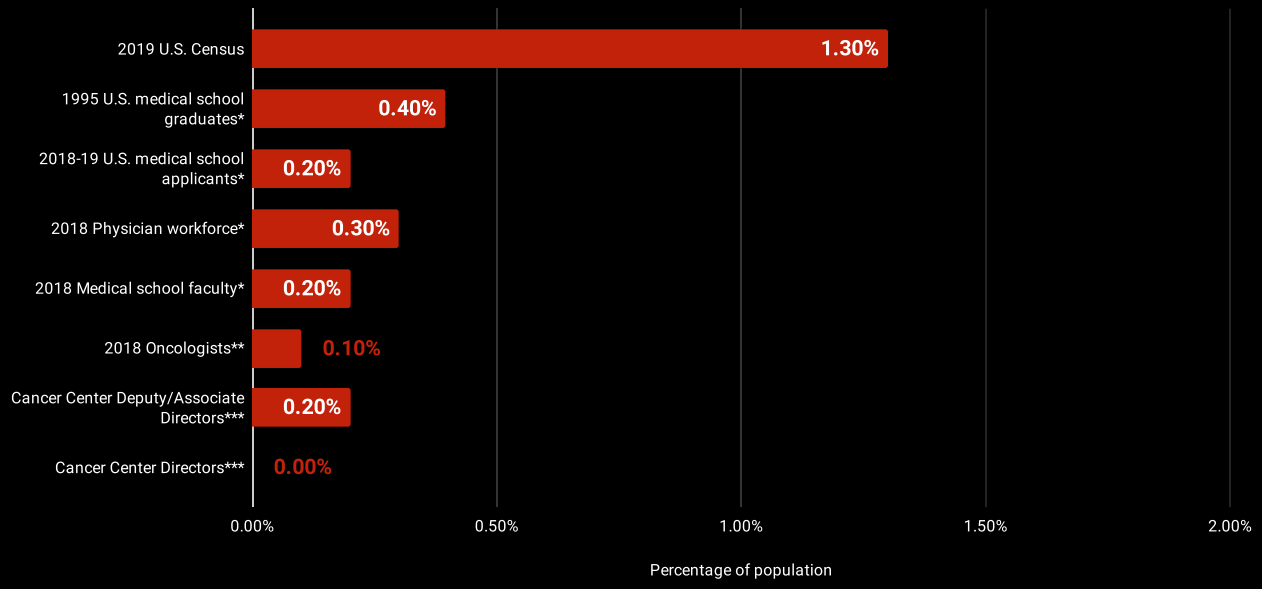
ASIAN OR ASIAN AMERICAN

**AAMC data; **AMA data; ***The Cancer Letter-AACI survey*



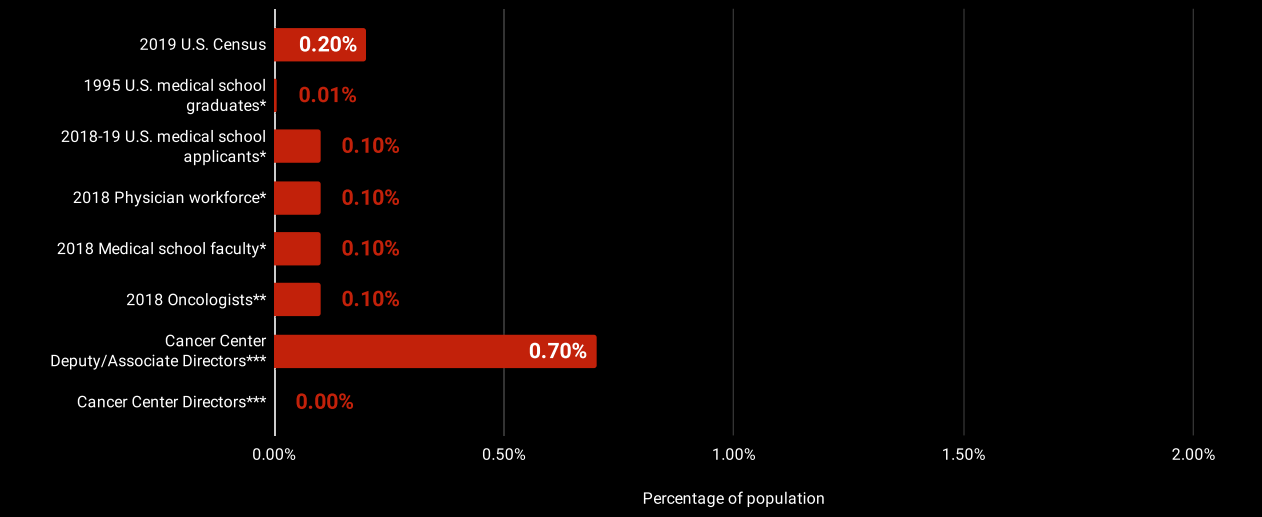
NATIVE AMERICAN OR ALASKA NATIVE

**AAMC data; **AMA data; ***The Cancer Letter-AACI survey*



NATIVE HAWAIIAN OR OTHER PACIFIC ISLANDER

**AAMC data; **AMA data; ***The Cancer Letter-AACI survey*



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GUEST EDITORIAL

A long road ahead but every reason to travel with purpose

Diversity, inclusion, and equity are important issues, not only to our nation's cancer centers, but to our nation as a whole. To embody these values, we must work to close gaps in cancer research and care.

Roy A. Jensen, MD
President, Association of American Cancer Institutes;
Director, The University of Kansas Cancer Center and Kansas Masonic Cancer Research Institute;
William R. Jewell Distinguished Kansas Masonic Professor;
Professor of pathology and laboratory medicine, anatomy and cell biology, cancer biology and molecular biosciences

Karen E. Knudsen, MBA, PhD
Vice president/president-elect, Association of American Cancer Institutes;
Executive vice president of oncology services, Jefferson Health;
Enterprise director, Sidney Kimmel Cancer Center;
Hillary Koprowski Professor and Chair,
Department of Cancer Biology, Thomas Jefferson University

As cancer center leaders, we have a responsibility to tackle these issues on behalf of our patients who are most affected by cancer health disparities: patients who experience higher rates of cancer cases and deaths, compared to the general population, lower screening rates, and complications specific to certain racial, ethnic, and other groups.

A core issue in confronting cancer disparities is our leadership pipeline and the need to attract and retain underrepresented minorities in oncology care and cancer research.

Results from a leadership diversity survey, co-created by the Association of American Cancer Institutes (AACI) and conducted in partnership with *The Cancer Letter*, show that there's a long road ahead.

Seventy-eight directors at AACI cancer centers responded, 61 of them from NCI-designated centers. One director identified as Black and 17 identified as either Hispanic, Latino, or Spanish; Middle Eastern or North African; Asian/Asian American; Pacific Islander; or multiracial.

Gender identity among directors also skews heavily toward men, with 66 respondents identifying as men and 12 directors identifying as women. These data alone underscore opportunities to expand diversity in cancer center director leadership at the highest level.

Below directors, at the deputy or associate director level, Black and/or African American representation increases slightly, from 1.2% to 5.6%. An improvement is also seen in Asian and/or Asian American representation, but there's a troubling decline in Hispanic and/or Latino representation. Notably, there's a significant improvement for women—who represent only 15.4% of directors but 40.1% of deputy and associate directors.

These data reveal interesting trends, which suggest that distinct challenges exist among underrepresented racial/ethnic and gender groups. These challenges are worth understanding as we explore how to meet goals for enhanced diversity and inclusion in cancer center leadership.

> “The key to moving the needle on diversity in cancer center leadership is to bring individuals from underrepresented groups into the field from the beginning.”

Awareness about diversity and inclusion strategies and effectiveness is emergent. When asked to evaluate our diversity programs and compare ourselves to other centers, cancer center leaders reported believing that we are diverse and that our diversity programs are somewhat effective, but the data show otherwise. For example, 70% of the directors who described their diversity recruitment programs as successful are white.

The key to moving the needle on diversity in cancer center leadership is to bring individuals from underrepresented groups into the field from the beginning.

This is especially true when it comes to Black and/or African American individuals entering and moving through the leadership pipeline. They are underrepresented at every step of the academic pipeline and the decline at the more senior levels of leadership is striking.

Workforce disparities are also seen among health researchers, few of whom identify as non-white, which can have a chilling effect on research into health equity, according to *Cancer Disparities and Health Equity: A Policy Statement From the American Society of Clinical Oncology*.

The lack of movement to the top rung of leadership is reflected in women's trajectory as well. We see women enter the oncology care and discovery workforce in numbers close to parity, but most do not seek—or are not selected for—leadership roles.

As the majority of leading cancer centers are taking aim at eliminating cancer disparities, we appreciate that addressing the cancer-related needs of the communities we serve is greatly enabled through diversification of the oncology workforce. It follows that assessing diversity in our own leadership teams should be part of the solution, and that tackling disparities begins with our own home institutions.

To our knowledge, the AACI/*The Cancer Letter* survey is the first analysis of cancer center leadership diversity, and we hope it will provide a benchmark to compare progress toward goals for individual centers, and serve as the basis for meaningful dialogue.

It is notable that enhancing diversity and inclusion is not only the right thing to do but has been shown to provide significant enhancement of business performance across a wide breadth of industries.

For example, in a recent report from McKinsey & Company, companies that scored in the top-quartile for gender diversity on executive teams proved to be 21% more likely to outperform using profitability as an endpoint, and 27% more likely to produce superior value creation.

Numbers are even more encouraging for ethnic and cultural diversity, with top quartile companies reporting 33% enhanced performance metrics. Conversely, companies in the bottom quartile for gender and ethnic/racial diversity were associated were 29% less likely to achieve greater than average performance metrics.

There is abundant data to suggest that increasing diversity in cancer center leadership has the capacity to enhance progress toward cancer, by positively impacting the patients we serve, generating scientific output, increasing engagement and retention of the oncology workforce, and indeed, the financial health of our own institutions.

As the leaders of the major 102 cancer centers in North America, we have an opportunity to lead in change. To be effective, cancer centers and their parent institutions need to make a commitment to durable, actionable change that can be measured with clear metrics. Mission statements are meaningless without concrete action.

AACI Presidential Initiative

Distinct from addressing challenges in the oncology biomedical workforce, the 2020-22 Presidential Initiative will leverage the expertise of North America's 102 leading cancer institutes to understand and mitigate cancer health disparities, using a number of vehicles.

In the first phase—increasing awareness and understanding—AACI plans to engage leadership across each center to:

1. Coalesce knowledge and understand priority disparities identified in each of the major cancers, and
2. Identify geographic areas not yet been studied.

A separate thread of the first phase will develop podcasts with cancer center leaders and key stakeholders, such as community representatives and elected officials, with the aim of uncovering currently implemented mitigation strategies, best practices, and opportunities for improvement.

It is our hope that the podcast will help cancer center thought leaders drill down on what they would like to achieve and understand how their peer institutions are addressing disparities. It also presents an opportunity for cancer centers to collaboratively develop best practices and advocate for changes in public policy to reflect them.

Phase two will convert what we learn into action. During a session at the 2021 AACI annual meeting, we hope to review the knowledge we've gained and initiate action plans for advocacy and accelerating progress to mitigate cancer disparities.

Reflecting on 50 years of progress—and planning for the next 50 years

Throughout 2021, NCI and cancer centers throughout the United States will be commemorating the 50th anniversary of the National Cancer Act, which established the NCI and the nation's standard-setting network of cancer centers.

Over the past 50 years, we have seen major developments in scientific discovery, cancer care, and quality of life for people with cancer. But until everyone has equal access to cancer treatment—and cures—there is still much work to do.

If not the 102 leading cancer centers, then who?

> To our knowledge, the AACI/*The Cancer Letter* survey is the first analysis of cancer center leadership diversity, and we hope it will provide a benchmark to compare progress toward goals for individual centers, and serve as the basis for meaningful dialogue.

AACI cancer centers are well-positioned to work together to play a major part in reducing cancer disparities across North America, and beyond.

"We can't let this issue slide into the background."

Directors of cancer centers reflect on the TCL-AACI data

Cheryl L. Willman
Director & CEO,
University of New Mexico
Comprehensive Cancer Center;
Distinguished Professor of Pathology
and Internal Medicine,
The Maurice and Marguerite
Liberman Distinguished Endowed
Chair in Cancer Research,
UNM School of Medicine

One of my concerns about the data is that it is a mix of NCI (61) and non-NCI centers (17). I am convinced from my own personal knowledge of the NCI centers, that if you looked solely at the NCI centers—this diversity data would be significantly worse. I think the survey data is skewed by the inclusion of non-NCI centers and if we looked solely at those, there would be far less diversity in race/ethnicity and sex among directors/associate directors.

For instance, this story reports that 15.4% of the center directors are "women"—but the percentage of women directors at NCI centers is significantly lower than that and is actually decreasing.

Over the past three years, several new NCI center directors have been appointed, and to my knowledge, only one was a woman (Lerman; Neili Ulrich took Mary Beckerle's place at Utah) and only a very few are minorities. This is a great disappointment to me.

Currently there are only nine women directors of the NCI Cancer Centers (Willman – UNM; Ulrich – Utah; Lerman – USC; LeBeau – U Chicago; Glimcher – Harvard; Johnson – RPCI; Knudsen – Sidney Kimmel/Jefferson; Sweasy – Arizona; Pietenpol – Vanderbilt).

Of these, one is retiring (LeBeau) and a new director is being recruited. That would bring us to only eight permanent women directors. This is a significant concern to me. I also believe that the proportion of associate directors who are racial/ethnic minorities at the NCI centers is far lower than reported here.

I think the NCORP data is really interesting. It obviously reflects a more diverse leadership profile. But

I also believe those cancer centers are located in regions of the United States with large minority and underserved populations, and I hope what it speaks to is the commitment of those institutions to hire diverse leaders to reflect the populations that they serve.

Diversity, inclusion, and equity are essential in leadership and in the conduct of science. Our patients want "people who look like me." The conduct of cancer science is full of often "well-meaning," but unconscious and conscious bias.

We set national rules and policies (for biospecimen collection, data sharing, and the development of data narratives) that too often do not respect the sovereignty of Tribal Nations and/or the cultures and beliefs of underserved, diverse, and minority populations making them feel unsafe or not respected or protected.

A majority of our human clinical and translational investigation and cancer clinical trials are predominantly conducted in non-Hispanic white individuals—fostering or leading to conclusions that are not generalizable to a more diverse population.

Current highly restrictive eligibility criteria for most cancer clinical trials restrict minority individuals from clinical trial enrollment, due to significantly higher co-morbidities. This is definitely on the NCI radar, but is a problem we have not solved.

At the University of New Mexico Cancer Center, currently 72% of our trainees are diverse scholars—race/ethnicity, gender, and sexual orientation. While we have not achieved these levels of inclusion in our faculty and leadership ranks at the cancer center and within our institution, we are committed to doing so. We now restrict the appointment of internal faculty to leadership roles, requiring national searches that meet diversity inclusion criteria.

We require all search committees to undergo implicit bias training and to develop pools of candidates that are diverse. We also believe it is absolutely essential to develop early-stage pipeline programs and have focused intently on engaging high school and undergraduate students in cancer science—the diversity of which exceeds 65%. In our region, many of our trainees are Hispanic, American Indian, or other minorities.

Rohit Bhargava, PhD

Director, Cancer Center at Illinois;
Founder Professor of Engineering,
Department of Bioengineering,
University of Illinois Urbana-Champaign

We are a new cancer center, and we are carefully considering some of these issues. So, this study is a good means to know the current landscape.

There are some natural challenges in society and in science that are also reflected in our cancer communities. Then, there are some unusual challenges, based on the type cancer center and its location. This data is a great start, but there are further underlying factors that I can think of. For example, geographic location might affect the composition of a cancer center leadership.

In some ways, this report is reassuring in that there's progress in the composition of the cancer centers' leadership across the country. There's more work, obviously, to be done, but the diverse composition of many institutions is heartening. The good composition of women and people of color in leadership by some institutions offers hope and models. It can be done in this community.

In particular, many of our members come from an engineering background. We are still addressing parity of representation of women in engineering, and there is much more work to be done in increasing participation of underrepresented minorities. Many of the minority representation trends serve to emphasize the a need to develop the entire pipeline.

An unexpected finding for me was the relative lack of representation of Asian Americans among the directors and other senior leaders of cancer centers. While there seem to be larger numbers of oncologists and medical experts from this group, senior leaders are fewer. The disparity in numbers between the NCI-designated and those that are not was also interesting, though smaller numbers may have disproportionate effects.

An interesting correlation to consider is the academic backgrounds of cancer center leaders. Biology has obviously made much more strides in including women and other groups, and that may be reflected in the compositions of more biological and medically-focused cancer centers. It does seem to me, at least in those fields, there's a more diverse representation. To me, it was heartening at some level. It is now more important than ever to think of diversity.

There is a transformative change happening right now in the world—with more information, better models of things, precise care, detection, and personalized approaches. That's the way the world is going and the field will go. If we're not diverse enough, we will lose the opportunity to learn something from the differences of backgrounds and experiences among us. Those differences might hold the key to actually developing new approaches for everyone. We also need to think of diversity of disciplines.

Perhaps an interesting future survey would be to understand how many with engineering, artificial intelligence and process management backgrounds are amongst us. Almost every industry has shown that these disciplines can bring about greater value and deliver a better experience for the customer. Maybe it is time to explicitly bring these disciplines into our community.

For our community in the cancer center world, it is very important to have the best minds, regardless of background, regardless of color, regardless of socioeconomic status. If we're not putting the best minds together—we will not be able to deliver better care at lower cost. The future of society depends on that paradigm being realized soon. And if we don't include the best talent, if somebody is left out because of the color of their skin, or because of their beliefs, or whatever, then that's not progressing against what society needs today. To me, that's a very critical element.

We take diversity very seriously in the Cancer Center at Illinois. I lead all our efforts to make sure we are considering diversity in all our efforts. We have appointed a chief diversity officer from amongst our staff. There's a person who focuses on all processes in the cancer center, being examined, to make sure that they're equitable and they include everyone.

For example, we are focusing on expanding the role of women in our CC leadership. We instituted a focused leadership program for early mid-career members of the cancer center. These are all very accomplished members, and we're going to put them through a year-long set of activities that expose them to the different facets of a cancer center operations and strategy. It puts them on the fast track to take on some leadership roles, scientifically—whether it's training grants or it's program projects. We feel that by homegrowing the talent, we will have a very solid foundation for many years into the future.

The biggest next step is that we don't let up. All the cancer center directors that I know and all the senior leaders in every cancer center that I know are incredibly wise and aware of the value of people. They are well aware of the benefits of maintaining a highly diverse cancer center and leadership, and so on.

However, we can't let this issue sort of slide into the background with the multitude of challenges that we're facing now. Not the least of which is the COVID pandemic, and certainly many other challenges that existed before COVID, and which just got exacerbated now with COVID-19.

As a community, I believe, we will maintain our focus on this issue and continue to move forward. As a community, we have to take a moment to celebrate that we have come far, and recognize that we need to go further. It is important to appreciate the progress that's been made, while at the same time having a clear-eyed-view of what it will take to continue to move us forward.

Those, to me, are the biggest takeaways in our community at this point—from the survey.

Finally, I want to congratulate *The Cancer Letter* for taking on this exercise. The data is very valuable, and helps us benchmark to make sure that we maintain excellence with diversity.

Robert A. Winn, MD
Director, Virginia Commonwealth University Massey Cancer Center

I'm really excited about the data presented. I think this is a very good first effort at trying to get our arms around something that's not always been easy to do. My enthusiasm is very high for this report.

I think, however, that the report still needs a little more granularity—while there is evidence of some diversity in our cancer centers, where is the diversity coming from? For example, is the diversity coming from the 71 NCI-designated cancer centers, or from the non-designated cancer centers?

It would also be good to know, in what positions does the diversity exist? Often, when we talk about diversity, for example, in most of our medical schools, the diversity is typically the dean of diversity, or chief diversity officer positions, as opposed to the dean of admissions, or the dean of a college.

What is the diversity we have amongst our associate directors? What positions do they hold? Are our underrepresented minority and women associate directors, associate directors of basic science, clinical research, population science, or community outreach and engagement/health disparity?

It would also be important to compare the number of diverse cancer center directors and the deputy directors in NCI-designated versus the non-designated cancer centers. That's an important thing to look at, because of the 71 cancer center directors, I am currently the only African American. I hope that changes soon. I think that this is an important step to get a better grip on the work we need to do to increase the diversity at our cancer centers. This current report is an important first step in addressing this issue.

It's important to point out that where there are NCORP sites, you tend to have more diversity, as shown in the report.

There are two interesting points that are alarming from the report. The negative trend in the number of African Americans in leadership positions is troubling. Moreover, and even more alarmingly are the incredibly low numbers of Native Americans who are active in our cancer centers.

The report also gives some validity to the importance of diversity among cancer center leaders. For example, it appears that women cancer center directors have a bit more insight into their pipelines than their male colleagues—in a sense, having the insight to recognize that, while they felt they were doing okay in developing diverse pipelines, there was still more to be done.

We know that diversity, inherently, is a good thing, and that the health field tends to lag behind the business world. The business world figured out decades ago that diversity in leadership matters and was simply just good business practice. We've had studies by Carnegie Mellon and others that have confirmed this finding. When you bring more diverse voices to the table, you actually strengthen the organization more than you weaken it.

I'm a firm believer that bringing diversity to the table is essential.

Since my start at the VCU Massey cancer center, I recognized that we did not have a chief diversity officer. I know that chief diversity officers are typically associated with medical departments, and colleges, but I think the time has come to expand this to all matrix as well as free standing cancer centers.

I think we could do a much better job in executing and implementing diversity programs by having a chief diversity officer in our cancer centers. As such, we've opened up a national search here at VCU Massey for a chief diversity officer.

I'm very excited about having a chief diversity officer to assist me in overseeing issues around fairness in our search processes, equity in our research and clinical trials etc.—the position will have both the resources and authority to make a real impact on our cancer center practices. I'm pretty excited about our future.

For there to be more diversity in oncology, we're going to have to do better in attracting folks into the field. The low number of African Americans, Latino/Latinx, Pacific Islanders, and Native Americans in our field is a call to action. The report clearly points out the lack of diversity among these groups. The report also points out the tremendous need to increase gender diversity as well in our cancer center leadership and rank and file members.

We'll never be able to attract diverse people into our field if those people feel excluded from the start. We have to better cultivate young people to want to take care of our cancer patients, and to advance the field of oncology through high impact research. We are at a crossroads right now, and getting it right, by which I mean, improving diversity in our cancer centers matters now more than ever.

Charles S. Fuchs, MD, MPH

Director, Yale Cancer Center; Physician-in-chief, Smilow Cancer Hospital

The data shared by *The Cancer Letter* highlighting the lack of diversity and gender inequality in oncology leadership positions is disappointing and underscores the importance of redoubling our efforts to recruit and mentor diverse faculty and staff at our leading cancer centers.

This is a priority for our cancer center and the focus of our Diversity, Equity and Inclusion Taskforce. We are committed to expanding diversity across all areas of our center, including our leadership team. Our scientific pursuits and academic missions will profoundly benefit from the increased diversity achieved at all levels of research, education, outreach, and patient care.

John Cleveland

Center director and executive vice president, Moffitt Cancer Center & Research Institute

Susan T. Vadaparampil

Associate center director, Community Outreach, Engagement & Equity, Moffitt Cancer Center & Research Institute

First, cancer centers that have diversity in the topmost position at a center have superior levels of leadership diversity in their organizations. This is especially true of centers led by women directors.

Second, there appears to be inclusion bias inherent in center directors who are white men, who perceive their leadership pipeline as diverse when in fact they are less diverse.

This underscores the need for inclusion bias training across the board.

Finally, initiatives to increase diversity via targeted recruitment, effective mentoring and retention, and successful promotion should be considered across all centers, along with a continuous review process that ensure such initiatives reach and sustain desired milestones.

Maximizing the impact of cancer research to all of the diverse populations in our local communities, in our states and across the nation goes hand-in-hand with enhancing the diversity of leadership. Including individuals from different backgrounds and life experiences facilitates informed and creative solutions to prevent, treat and cure cancer.

Moffitt's diversity efforts are designed to span all team members at our center. First, our Office of Institutional Diversity is focused on ensuring that cultural humility and inclusivity are infused into every component of our center, including our interactions with our patients. This is accomplished through purposeful recruitment, training and retention of minority team members, as well as through training in inclusion bias and racial equity and by providing language services.

Second, our Office of Community Outreach, Engagement, and Equity ensures that our scientific vision and direction are set in collaboration with our community through ongoing partnerships that were established well over a decade ago.

Finally, our Office of Research Education and Training ensures that diversity is considered from the very earliest part of the cancer training pipeline beginning with K-12 students, graduate trainees, post docs,

and extending to faculty across all levels. We emphasize both mentorship and sponsorship across all levels and support targeted initiatives to recruit and retain Black faculty trough the Faculty Diversity in Oncology Program.

While each group has had longstanding initiatives focused on diversity, this moment in time has emphasized the need for unity in our efforts. Thus, these teams now work more than ever in a coordinated fashion to ensure that every aspect of the institution includes a focus on diversity and inclusion. We have done a deep dive on our own efforts to recruit, retain, and support diverse faculty at the Center. Based on this assessment we are creating targeted goals in these areas.

We have also formalized an Office of Minority Accrual to Clinical Trials, to expand the reach of our research and trials into all of our community. Finally, our Community Outreach and Engagement facilitates ongoing involvement of our community to ensure that equity is foundational to setting the direction of our center.

As shown by your findings, while we have made progress, we have a long way to go.

First, at a foundational level we need to be much more self-aware, and do a deep dive on the diversity landscape of our centers, our patients, and the communities that we all serve. Figure out where the gaps and needs are and develop action plans that fully address them.

Second, establish metrics that ensure accountability in improving diversity in leadership. To move the needle on this critical issue, we need to be purposeful and deliberate in engaging appropriate leaders, and to establish clear benchmarks of success. And we need to provide the necessary resources to pull it off.

Finally, as center directors we need to lead by example and show that diversity and Inclusion matter deeply to each and every one of us. We need to make this very personal, and be deeply engaged in the outreach to the vulnerable populations in our communities, and to make this an expectation for all of our deputy and associate directors, program leaders, and eventually all faculty, such that diversity and inclusion become part of our DNA—no longer initiatives but the new normal.

Raphael E. Pollock, MD, PhD

Director, The Ohio State University Comprehensive Cancer Center, Kathleen Wellenreiter Klotz Chair in Cancer Research, Arthur G. James Cancer Hospital & Richard J. Solove Research Institute

Probably the most important takeaway from the data is that although we are making progress, we have a long way to go. This is particularly the case in the realm of underrepresented minority leadership. We are doing much better with breaking down the glass ceiling on behalf of our female oncology colleagues, but are still lacking regarding other groups. We need to be active and redouble our efforts, including expanding the training and faculty career trajectory pipelines to enable improved representation in this regard.

Diversity is critical, because no one group has a lock or monopoly on the badly needed new ideas. This is the life blood on scientific discovery, and we can choose to ignore this reality at the ultimate price of cancer disease control needed by all of our patients.

We have very active working relationships with high schools located in medically underserved neighborhoods in Columbus as well as strong connectivity with historically Black colleges and universities throughout the state of Ohio, our NCI-designated catchment area. Students are placed in OSUCCC member led research laboratories where cancer research projects are pursued. The students are tracked going forward, and are actively encouraged to apply to medical school or graduate school. A very high record of matriculation has resulted.

These efforts require modest outlays of resources, pay *bona fide* dividends, and the ROI can be observed downstream; the long term view will ultimately carry the day!

H. Shelton Earp, MD

Director, UNC Lineberger Comprehensive Cancer Center; Distinguished Professor, Lineberger Professor of Cancer Research; Director, UNC Cancer Care, University of North Carolina at Chapel Hill

We are all underperforming. With the exception of centers with associated NCORPs, I'm not sure that the data on the directors' race and gender, with respect to assembling a diverse staff, are what we would call "clinically significant." My guess is that within-group variation may be as large, or larger, than between-group differences. That's not an excuse for white male directors. It's just that we are all not doing enough.

Clearly, the lived experiences of different people can and should make a huge difference in the design and execution of population, public health, implementation, early detection, and clinical and translational research. We are missing key knowledge on 35% of our cancer patients. We are incorporating basic scientists more and more into collaborative efforts. The lived experience of minority basic scientists should contribute to the goals and objectives of team science. Their perspective also enriches training and adds new ideas to whatever we do.

Male-dominated societies have failed to take advantage of half of humanity for virtually all recorded history until the last 75 years. This is changing somewhat, as indicated by this year's data, with women playing an increasing, yet still not equivalent, role in cancer center leadership. (Although COVID 19 is presenting unequal challenges for all working women).

A greater level of inclusion could bring all of humanity, not just part of it, to bear on the world's problems.

Our center has a long history of discovery, analysis and definition of minority disparities in our state. We are proud of our findings in this area and our forays into intervention and implementation. With the enduring problems so starkly revealed by recent events, however, as well as the health and economic toll of COVID on minority populations, we clearly have only scratched the surface.

Our center has set up a high-level Equity Council which has begun to meet; its goal is not to "provide a "report", but to develop a path forward with metrics, a five-year plan, some specific targets for cancer center investment, and a mechanism for monitoring our responsiveness.

A cancer center can't solve all the problems of structural racism but it can concentrate on: improving timely clinical care of minority populations; increasing minority accrual to clinical trials; assuring staff equity and advancement; training a well-supported and well-mentored next generation of minority scientists; recruiting a larger cohort of minority and female faculty across population, clinical and basic sciences; and enhancing an atmosphere that feels and is inclusive.

All of us need to figure out how to sustain the passion of the moment.

David A. Tuveson MD, PhD

Director, Cold Spring Harbor Laboratory Cancer Center; Roy J. Zuckerberg Professor, Chief Scientist, The Lustgarten Foundation, Cold Spring Harbor Laboratory; President-elect, American Association for Cancer Research

There is a disproportionate over-representation of white males in cancer center leadership positions, relative to the numbers entering medical school today—this is likely multifactorial and implicit and explicit biases may factor into this trend.

However, since most leaders went to medical school in 1970-1985, you might include the metrics on what the representation of women and minorities were then, to give a more balanced view rather than the 2019 medical school applicants.

[See all benchmark data on page 21.]

Diversity encourages different fields of view and may support an overall stronger working environment for research by promoting inclusivity and equality.

We started an Education and Diversity program at our cancer center, to begin to address the diversity issue head on. The new deputy director leading this is African-Caribbean, and brings unique perspective to this topic.

Also, I have a fabulous Nigerian student in my lab who has just accepted a faculty position to start his own group at the Whitehead Institute. He has told me that he never envisioned himself in this position since very few people at our cancer center look like him.

I am trying to take his perspective to heart and make changes that encourage more diverse individuals to join our cancer center at all levels, since all I want is for cancer to be scared of us, rather than a potential cancer warrior to be concerned of a lack of people like themselves as the reason for not entering cancer science and cancer medicine. I have much to learn about this topic and hope to see my appreciation of this grow quickly.

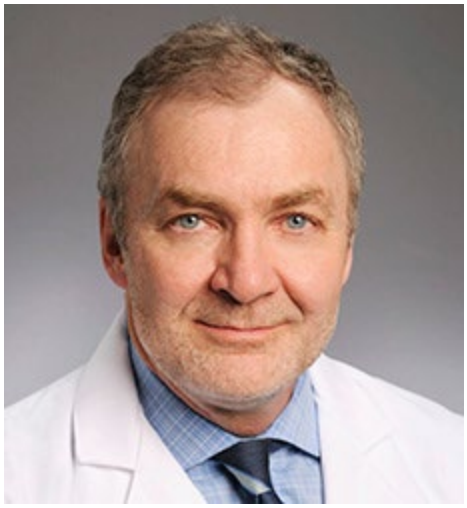
You have started by measuring the parameters about diversity and the workforce in cancer centers. It is now for the readers to decide what should be done with this information, and this will likely and appropriately include a call to increase female and minority leadership positions in cancer centers.

Diversity, Equality and Equity are now common concepts that many are espousing following the continuous violence against African Americans, and these issues may be related to health disparities amongst African Americans, Latino/Hispanics, and Native Americans.

I think the AACR report of a call to action on this topic also is a good start, and you might want to link it to your article. [*The Cancer Letter*, Sept. 25, Sept. 18, 2020]

Walter J. Curran, MD

Executive director,
Winship Cancer Institute
of Emory University;
Associate vice president, cancer,
Woodruff Health Sciences Center;
Lawrence W. Davis Chair of
Radiation Oncology,
Emory University School of Medicine



There is an opportunity at many cancer centers to better understand the value of a diverse leadership group. It's certainly important for us at Winship, as well as across Emory University.

This survey gives us a great body of data, and it will be interesting to see—with many diversity initiatives going on across cancer centers, universities, and other institutions—what such a survey will look like in five or 10 years. It was also interesting to see the distribution of the cancer center directors among physicians, physician scientists, and scientists and also among their cancer disease site of specialization.

What this tells me is that there's a rich diversity of leadership across our cancer centers. I do think there's an opportunity for us to be more intentional in terms of how we select associate directors, deputy directors, and other leadership roles. These leaders often become the directors of the future. We also must be clear on defining the roles for each of them, as well. It would be ideal if cancer centers reflect the demographics of their communities. Leadership should, at the very least, reflect the demographics of the scientific and medical communities that they lead.

If you have a given subset, a category of people, with lots of the mid-career physicians and scientists in that category, and they're also not represented in leadership—then that's an issue. Gender, race, and ethnicity are important, but also the leader's specialty or sub-specialty expertise. Cancer research inquiry is strengthened by a diverse leadership team.

I think, whether it's conscious or unconscious, for every one of us, our behaviors and our opinions reflect our background. So, I think our centers are better, the community of cancer research leadership is better, if as many possible backgrounds are reflected in leadership. My experiences as a white male have been different in my lifetime than the experiences of someone from a different group, and so having a diversity of experiences in a leadership group is important.

Emory University has made diversity a priority, and we reflect that principle in Winship. We have strong gender diversity among many Winship leadership teams,

but we have more opportunity. We in Atlanta reside in the cradle of the civil rights and we're in the large state with a large black community, and this provides us with both the opportunity and responsibility to have significant representation of underserved minorities among our physicians and leaders. And we've done some of that, but we have opportunities. We're not satisfied where we are.

We address the issues of diversity in two major ways. One is to ensure that we provide exceptional access to all members of our communities for cancer care, exceptional cancer care, and cancer research. And the other is to ensure that our providers and researchers reflect the demographics of the community.

I think most outstanding cancer centers do a better job with the former rather than the latter, and that is true here at Winship. We have enrollment in our trials that reflects the demographics of the community. We have extraordinary providers who reflect the demographics of our community, but we have opportunities in the leadership of our center to reflect our community better, and we are committed to this.

It is difficult to identify a challenge unless you can measure it, and I think your report helps us measure diversity in cancer leader leadership. I was surprised that the relatively low number of associate and deputy directors across cancer centers who are of Asian descent. At our institution, that's a fairly high number, but every center is different. I think we must seek out a diverse population of candidates for these positions. Sometimes that may mean looking beyond the usual places. Sometimes it means looking to other nations and institutions that don't involve simply naming the person we know down the hall.

We must also reach out to our communities. Winship investigators have several grants which support science opportunities to middle school girls, high school students, and college students at historically black colleges and universities. Winship also has a community advisory board that advises us on other initiatives.

As someone who was a middle school science teacher in a rural racially diverse public school myself prior to medical school, I'm certainly sensitive to the opportunities that our community provides us.

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GUEST EDITORIAL

ASCO survey demonstrates views on cancer care amid COVID-19 and racial reckoning

Lori Pierce, MD
President, American Society of Clinical Oncology;
Professor of radiation oncology, University of Michigan School of Medicine;
Vice provost for academic and faculty affairs, University of Michigan, Ann Arbor

Last week, a national public perception survey from the American Society of Clinical Oncology revealed a public grappling with cancer care amid the COVID-19 pandemic and the nation's reckoning with racial injustice.

This annual survey enables ASCO to understand the public's perception of critical issues in cancer care so we can inform our own education programs, communications initiatives, and work in public policy.

The results are a wake-up call and challenge for the oncology community, as they include evidence of delays in cancer screenings, significant differences along racial lines in perceptions of cancer care inequities, and widespread misunderstandings about cancer clinical trials.

Delays in cancer screenings amid the pandemic

Similar to other recent research, ASCO's survey found that many Americans have postponed critical cancer screening tests during the pandemic. Among Americans scheduled for a cancer screening test such as a mammogram, colonoscopy, skin check, or Pap/HPV test (37% of adults surveyed), nearly two-thirds (64%) reported that it was delayed or cancelled. Among people whose appointments were delayed or cancelled, 66% said it was their choice, and a similar percentage (63%) said that they were concerned about being behind on screenings.

Postponing cancer screenings for a few months is not necessarily dangerous, however, and avoiding medical settings may have protected many people from contracting COVID-19. But in the months and years ahead, we should be concerned if a significant number of Americans stop seeking preventive care as this is predicted to increase mortality. Now is the time for oncologists and

primary care physicians to follow up with patients to ensure they reschedule their evidence-based screening appointments.

Racial differences in perceptions of cancer care inequities

The survey revealed that while a majority of respondents (59%) say racism can affect the health care a person receives, there are significant differences in opinion along racial lines. Racial and ethnic minorities, including Blacks (76%), Hispanics (70%), and Asians (66%), are more likely to say that racism can impact the care a person receives than whites (53%).

Similarly, Blacks are significantly more likely than whites to believe there is unequal access to cancer care in America, with 71% of Black adults saying that Blacks are less likely to have access to the same quality of cancer care as whites, compared to 47% of white adults.

Like all healthcare in America, the oncology community remains far from the goal of ensuring equal access to timely, high-quality care. As the coronavirus pandemic has laid bare, systemic racism—the unequal treatment built into our health care system—undermines public health in measurable ways.

It also deeply affects patients with cancer specifically, as evidence shows Blacks have the highest death rate and shortest survival of any racial group for most cancers.

To do right by the patients we serve, we must confront the systemic issues that have created these disparities. To that end, this summer ASCO issued a set of recommendations to address equity in cancer care and research and is developing a concrete action plan for the coming years.

But this is just a start. We must also begin the difficult work of addressing our own biases to enact meaningful change for the benefit of patients.

Widespread misunderstandings about cancer clinical trials

Finally, but especially topical as the nation and world focus on clinical trials testing "coronavirus" (SARS-CoV-2) vaccines, were respondents' views on participation in research. The survey found that three in four Americans (75%) say they would be willing to participate in a clinical trial for a cancer treatment if they were diagnosed with cancer.

However, many have misunderstandings about the benefits of clinical trial participation. For example, nearly half of all respondents (48%) believe patients with cancer who participate in clinical trials are not receiving the best possible care. In addition, three-quarters of respondents (75%), including 87% of patients with cancer, believe that some people who participate in cancer clinical trials receive a placebo rather than proven effective treatments.

Oncology professionals know the reality that placebos are extremely rare in cancer clinical trials and are only used when there is no standard treatment available. The willingness to participate despite this untrue perception of risk is itself remarkable, but this is a misunderstanding that we can, and must, correct.

Improving participation in clinical trials (currently 3-5% for adults with solid tumors) depends in part on our ability to overcome persistent myths about them. These findings show we need to do a much better job of educating our patients and the public about the benefits of clinical trials for people with cancer, and their importance in driving progress against the disease for everyone.

“To do right by the patients we serve, we must confront the systemic issues that have created these disparities. To that end, this summer ASCO issued a set of recommendations to address equity in cancer care and research and is developing a concrete action plan for the coming years.”

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NCI awards 25 grants and contracts as part of SeroNet

By Alexandria Carolan

NCI has awarded 25 grants and contracts as part of the Serological Sciences Network initiative.

The network, called SeroNet, is designed to increase the nation's antibody testing capacity and engage the U.S. academic, government and private sector biomedical research institutions in efforts to understand the immune response to COVID-19.

"What seroprevalence levels are needed in a population for herd immunity—and the speculations go all over the map. But suffice it to say that we don't know," NCI Principal Deputy Director Douglas R. Lowy said at a press briefing Oct. 8. "Seroprevalence is actually what percentage in a population [has] antibodies. NCI is funding research to address these and related questions through SeroNet, as well as other research—and much of it is in collaboration with the National Institute of Allergy and Infectious diseases and the Centers for Disease Control [and Prevention]."

As part of the Paycheck Protection Program and Health Care Enhancement Act, Congress authorized $306 million for NCI to develop, validate, improve, and implement serological testing and associated technologies. SeroNet is the largest of NCI's serological science initiatives funded by the COVID-19 emergency appropriation, accounting for more than half of the allocation (*The Cancer Letter*, June 19, 2020).

Funds were distributed to eight Centers of Excellence, 13 research projects, and four capacity building centers. SeroNet also includes Frederick National Laboratory Serology Lab and one Network Coordinating Center.

"All of the SeroNet components will work closely together, sharing information and resources. Furthermore, all of the publications funded through Seronet will be published in an open access format, and the underlying data made immediately available," Dinah Singer, head of the Molecular Regulation Section and deputy director for Scientific Strategy and Development at NCI, said at the press briefing.

All the samples and data generated by SeroNet will be made publicly available, she said.

NCI has awarded Serological Centers of Excellence U54 grants to eight institutions, which will conduct research projects that will characterize the immune responses to coronavirus infection and determine what drives immune response, disease progression, and protection against future infection.

Award sizes for the Centers of Excellence range from $815,000 to $2 million each year for the five-year duration of the award.

The eight institutions that received the U54 grants as Centers of Excellence are:

- Ohio State University: Center for Serological Testing to Improve Outcomes from Pandemic COVID-19 (STOP-COVID),

Some SARS-CoV-2 serology questions

- **It is not currently known**:
  - whether being antibody-positive is associated with protection against reinfection
  - what antibody levels may be associated with protection
  - how long protection will last
  - What seroprevalence levels are needed in a population for herd immunity
- NCI is funding research, much of it with NIAID and CDC, to address these questions

- University of North Carolina Chapel Hill: North Carolina SeroNet Center for Excellence,
- Cedars-Sinai Medical Center: Diversity and Determinants of the Immune-Inflammatory Response to SARS-CoV-2,
- Johns Hopkins University: Johns Hopkins Excellence in Pathogenesis and Immunity Center for SARS-CoV-2 (JH-EPICS),
- Tulane University: Tulane University COVID Antibody and Immunity Network (TUCAIN),
- Stanford University: Mechanisms and Duration of Immunity to SARS-CoV-2,
- Emory University: Immune Regulation of COVID-19 Infection in Cancer and Autoimmunity, and
- Icahn School of Medicine at Mount Sinai: Vulnerability of SARS- CoV-2 Infection in Lung Cancer Based on Serological Antibody Analyses.

NCI also awarded U01 grants to researchers at 12 institutions to conduct research projects on basic and applied serological research.

"These research projects are smaller in scale and scope. Typically, they'll be carried out in a single lab," Singer said.

The award size ranges from $500,000 to $750,000 each year for five years, Singer said.

The 13 institutions that received U01 grants for research projects are:

- Wadsworth Center,
- Beth Israel Deaconess Medical Center,
- Case Western Reserve University for two separate projects,
- Kaiser Foundation Research Institute,
- Yale University,
- Michigan State University,
- University of Arkansas for Medical Sciences,
- La Jolla Institute for Immunology,
- University of Puerto Rico, Medical Sciences,
- University of Alabama at Birmingham,
- University of Massachusetts Medical School Worchester, and
- Harvard School of Public Health.

Also, four Capacity Building Centers were awarded subcontracts through the Frederick National Lab.

"These centers are charged with developing and expanding serological testing capacity and practice in the communi-

13 Research Projects (U01 grants)

University at Albany, Wadsworth Center High-Throughput Dried Blood Spot (HT-DBS) Technologies in SARS-CoV-2 Serology and Vaccinology	**University of Arkansas for Medical Sciences** DISCOVER: Disparities in Immune Response to SARS-CoV-2 in Arkansas
Beth Israel Deaconess Medical Center Immunologic Signatures of SARS-CoV-2 Vaccination and Disease	**La Jolla Institute for Immunology** SARS-CoV-2-reactive tissue-resident in memory T cells in health and cancer subjects
Harvard School of Public Health Leverage Serologic Data in Mathematical Models to Control COVID-19	**University of Puerto Rico, Medical Sciences** SARS-CoV-2 correlates of protection in a Latino-origin population
Kaiser Foundation Research Institute SARS-CoV-2 Serological Antibody Testing for Disease Surveillance and Clinical Use	**University of Alabama at Birmingham** Adaptive Immunity and Persistent SARS-CoV-2 Replication
Yale University Immuno-Serological Assays for Monitoring COVID19 in Patients with Hematologic Malignancies	**University of Massachusetts Medical School Worchester** Enhancing racial and ethnic diversity in COVID-19 research participation through storytelling (COVIDstory)
Case Western Reserve University Pre-exposure Immunologic Health and Linkages to SARS-CoV-2 Serologic Responses, Endothelial Cell Resilience, and Cardiovascular Complications: Defining the mechanistic basis of high-risk endotypes	**Michigan State University** Culturally-targeted communication to promote SARS-CoV-2 antibody testing in saliva: Enabling evaluation of inflammatory pathways in COVID-19 racial disparities
Case Western Reserve University Early Drivers of Humoral Immunity to SARS-CoV-2 Infections	

8

ty. They'll scale up screening capacity to reach at least 5,000 samples per week with assays that have been granted FDA Emergency Use Authorization," Singer said. "The centers will also perform long-term studies of the prevalence of COVID-19 across the country."

The four Capacity Building Centers are:

- Arizona State University,
- Feinstein Institute for Medical Research,
- University of Minnesota, and
- Icahn School of Medicine at Mount Sinai.

NCI serology efforts

NCI has developed three serology efforts related to the COVID-19 pandemic (*The Cancer Letter*, July 24, 2020). In April, the institute began to characterize the performance of many SARS-CoV-2 serology devices submitted to FDA.

In June, NCI started working on a serology dashboard to provide information on antibody testing in the U.S., and in September, the institute began work on a SARS-CoV-2 serum that would be available for use by vaccine manufacturers and by institutions producing convalescent plasma/serum for treating COVID-19 patients.

"This is a work in progress that we just began in September, and we hope sometime next month to be able to have that standard," Lowy said.

NCI measures specificity of serological devices, Lowy said.

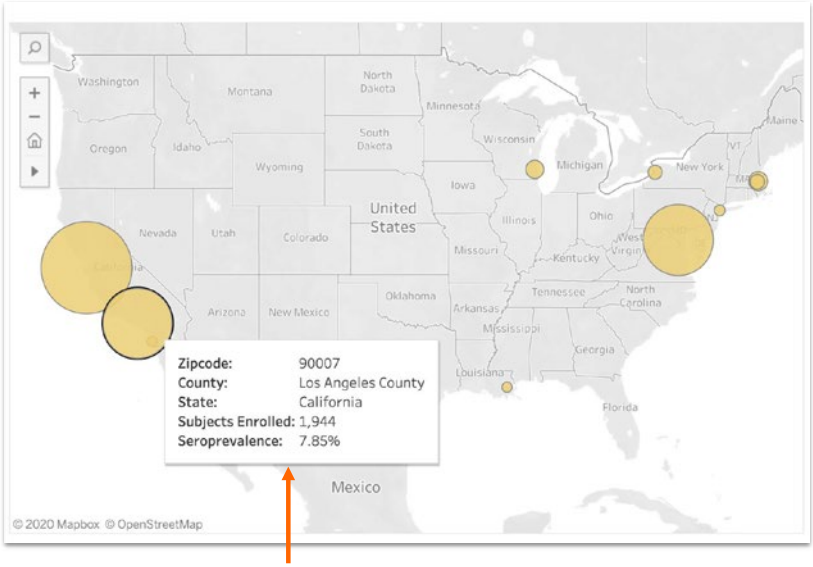
"There has been a remarkable variation, that in some devices that were submitted to FDA, they have been as low as 30%—but some have been as high as 100%. Specificity has varied from 87% to 100%. And specificity means that the device does not detect false positives."

NCI sends these results to FDA to help the agency determine whether a test is suitable for Emergency Use Authorization. Results are posted at the FDA website once the agency makes that determination.

Based on a summary of 102 commercial serology devices evaluated by FNLCR serology laboratory, if a test has 99% specificity and the seroprevalence rate is found to be 10%:

- Ten percent of the positives will be false-positives,
- (For 100 tests, nine will be actual positives and one will be false-positive).

Tracking dashboard in development: to visualize SARS-Cov-2 serology data



Dynamic popups showing any data elements deemed appropriate: State, county, ZIP code, time-trends

If a test has 95% specificity and the seroprevalence rate is found to be 10%:

- Fifty percent of the positives will be false-positives,
- (For 100 tests, five will be actual positives and five will be false-positive).

Antibody studies can be used to measure seroprevalence, and these tests should be able to identify "virtually everyone who has had symptomatic infection, and most of those who have had asymptomatic infection," Lowy said. "Antibody tests are not used for diagnosing herd SARS-CoV-2 infection. Diagnostic tests can instead identify parts of the actual virus, either viral RNA, which is most of what's used, or in some instances, measuring viral protein."

In June, HHS, CDC and NIAID asked NCI to develop the SARS-CoV-2 Serology Dashboard. The Frederick National Lab has the expertise developing dashboards through the clinical trials reporting system and other databases.

"The key features are to make this a publicly accessible data warehouse that would systematically document and track SARS-CoV-2 serology studies and associated test results, and then to have a tracking dashboard to visualize the serology data and to present the results overall and by key strata," Lowy said. "We hope it will go live with actual data sometime next month."

The dashboard will show appropriate data elements through dynamic popups on the dashboard, Lowy said. This could be broken down the level of state, county, or ZIP code.

"We have interacted with a group in Canada that is developing a serological dashboard that is analogous for the world—and our system is designed to be compatible and interoperable with theirs," Lowy said.

> "What seroprevalence levels are needed in a population for herd immunity—and the speculations go all over the map. But suffice it to say that we don't know."
>
> *– Douglas Lowy*

2020 NOBEL PRIZES

THE NOBEL PRIZE

Jennifer A. Doudna and Emmanuelle Charpentier receive 2020 Nobel Prize in Chemistry

Jennifer A. Doudna, of the University of California, Berkeley, and Emmanuelle Charpentier, of the Max Planck Unit for the Science of Pathogens in Germany, have won the 2020 Nobel Prize in Chemistry for the development of the CRISPR/Cas9 genome-editing system.

CRISPR/Cas9 stands for "clustered regularly interspaced short palindromic repeats/CRISPR associated protein 9."

"There is enormous power in this genetic tool, which affects us all. It has not only revolutionised basic science, but also resulted in innovative crops and will lead to ground-breaking new medical treatments," Claes Gustafsson, chair of the Nobel Committee for Chemistry, said in a statement.

The discovery was unexpected. During Emmanuelle Charpentier's studies of Streptococcus pyogenes, she discovered a previously unknown molecule, tracrRNA. Her work showed that tracrRNA is part of bacteria's ancient immune system, CRISPR/Cas, that disarms viruses by cleaving their DNA.

Charpentier published her discovery in 2011. The same year, she initiated a collaboration with Jennifer Doudna, an experienced biochemist with vast knowledge of RNA. Together, they succeeded in recreating the bacteria's genetic scissors in a test tube and simplifying the scissors' molecular components so they were easier to use.

In an epoch-making experiment, they then reprogrammed the genetic scissors. In their natural form, the scissors recognize DNA from viruses, but Charpentier and Doudna proved that they could be controlled so that they can cut any DNA molecule at a predetermined site. Where the DNA is cut, it is then easy to rewrite the code of life.

This tool has contributed to many important discoveries in basic research, and plant researchers have been able to develop crops that withstand mould, pests and drought. In medicine, clinical trials of new cancer therapies are underway.

Harvey J. Alter, Michael Houghton and Charles M. Rice receive the 2020 Nobel Prize in Physiology or Medicine for the discovery of hepatitis C virus

Harvey J. Alter, Michael Houghton, and Charles M. Rice received the Nobel Prize in Physiology or Medicine for the discovery of hepatitis C virus.

Alter is senior scholar at the NIH Clinical Center's Department of Transfusion Medicine, Houghton is director, Li Ka Shing Applied Virology Institute professor in the Department of Medical Microbiology & Immunology at University of Alberta in Canada, and Rice is the Maurice R. and Corinne P. Greenberg Professor in Virology at the Rockefeller University.

Prior to their work, the discovery of the hepatitis A and B viruses had been critical steps forward, but the majority of blood-borne hepatitis cases remained unexplained. The discovery of hepatitis C virus revealed the cause of the remaining cases of chronic hepatitis and made possible blood tests and new medicines that have saved millions of lives.

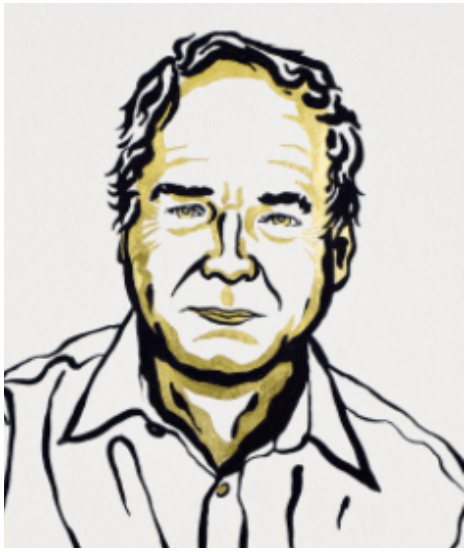
In the 1960's, Baruch Blumberg determined that one form of blood-borne hepatitis was caused by a virus that became known as Hepatitis B virus, and the discovery led to the development of diagnostic tests and an effective vaccine. Blumberg was awarded the Nobel Prize in Physiology or Medicine in 1976 for this discovery.

At that time, Harvey J. Alter, at NIH, was studying the occurrence of hepatitis in patients who had received blood transfusions. Although blood tests for the newly-discovered hepatitis B virus reduced the number of cases of transfusion-related hepatitis, Alter and colleagues demonstrated that a large number of cases remained. Tests for hepatitis A virus infection were also developed around this time, and it became clear that hepatitis A was not the cause of these unexplained cases.

A significant number of those receiving blood transfusions developed chronic hepatitis due to an unknown infectious agent. Alter and his colleagues showed that blood from these hepatitis patients could transmit the disease to chimpanzees, the only susceptible host besides humans. Subsequent studies also demonstrated that the unknown infectious agent had the characteristics of a virus.

Alter's methodical investigations had in this way defined a new, distinct form of chronic viral hepatitis. The mysterious illness became known as "non-A, non-B" hepatitis.

Identification of the novel virus was now a high priority. All the traditional techniques for virus hunting were put to use but, in spite of this, the virus eluded isolation for over a decade.



Michael Houghton, working for the pharmaceutical firm Chiron, undertook the arduous work needed to isolate the genetic sequence of the virus. Houghton and his co-workers created a collection of DNA fragments from nucleic acids found in the blood of an infected chimpanzee. The majority of these fragments came from the genome of the chimpanzee itself, but the researchers predicted that some would be derived from the unknown virus.

On the assumption that antibodies against the virus would be present in blood taken from hepatitis patients, the investigators used patient sera to identify cloned viral DNA fragments encoding viral proteins. Following a comprehensive search, one positive clone was found. Further work showed that this clone was derived from a novel RNA virus belonging to the Flavivirus family and it was named Hepatitis C virus. The presence of antibodies in chronic hepatitis patients strongly implicated this virus as the missing agent.

At this point, one essential piece of the puzzle was missing: could the virus alone cause hepatitis? To answer this question the scientists had to investigate if the cloned virus was able to replicate and cause disease.

Charles M. Rice, a researcher at Washington University in St. Louis, along with other groups working with RNA viruses, noted a previously uncharacterized region in the end of the hepatitis C virus genome that they suspected could be important for virus replication.

Rice also observed genetic variations in isolated virus samples and hypothesized that some of them might hinder virus replication. Through genetic engineering, Rice generated an RNA variant of hepatitis C virus that included the newly defined region of the viral genome and was devoid of the inactivating genetic variations.

When this RNA was injected into the liver of chimpanzees, virus was detected in the blood, and pathological changes resembling those seen in humans with the chronic disease were observed. This was the final proof that hepatitis C virus alone could cause the unexplained cases of transfusion-mediated hepatitis.

IN BRIEF

Kelvin Lee named director of IU Melvin and Bren Simon Comprehensive Cancer Center

Kelvin Lee was named director of the Indiana University Melvin and Bren Simon Comprehensive Cancer Center.

A $15 million fund established by the Walther Cancer Foundation will support him in this role.

Lee's position will begin in January 2021. He succeeds Patrick J. Loehrer, who served as cancer center director since 2009. Loehrer will continue to see patients with gastrointestinal and thymic malignancies and carry on his work focused on global oncology and health equities.

Lee was also named senior associate dean of cancer research at IU School of Medicine and the H.H. Gregg Professor of Oncology. He will also direct the cancer institute, an umbrella entity designed to facilitate collaboration among cancer disciplines at IU School of Medicine and Indiana University Health. He will have appointments with both the Department of Medicine and the Department of Microbiology and Immunology.

Since 2006, Lee was the Jacobs Family Chair of Immunology at the Roswell Park Comprehensive Cancer Center. The co-leader of the Cancer Center Tumor Immunology and Immunotherapy Program from 2006 to 2018, Lee led the group through three successful NCI cancer center support grant renewals before stepping down to take on the position of senior vice president for the Basic Sciences.

The IU Simon Comprehensive Cancer Center was designated a comprehensive cancer center by the NCI in 2019. The center's nearly 250 researchers conduct all phases of cancer research, from laboratory studies to clinical trials to population-based studies that address environmental and behavioral factors that contribute to cancer.

As cancer center director, Lee will also play a key role in setting the future course for two significant centers at IU School of Medicine—the Vera Bradley Foundation Center for Breast Cancer Research and the Brown Center for Immunotherapy.

"I am very excited to join IU School of Medicine to continue to build the world-class effort in cancer research, education and care for the people of Indiana, nationally and globally. The renewal of the IU Simon Comprehensive Cancer Center core grant and achievement of comprehensive designation speaks to the outstanding faculty and staff that are leading this charge," Lee said in a statement. "I have also been incredibly impressed by the deep commitment of IU School of Medicine and IU Health in these efforts, and this was a major reason in my decision to join IU.

As a physician-scientist, Lee's research interests are both laboratory and clinical based. In the lab, his research efforts are RO1-funded and primarily focus on multiple myeloma, as well as myeloid dendritic cell differentiation in cancer. Lee sees patients with multiple myeloma once a week in clinic and is the principal investigator on active clinical trials of immunotherapy in myeloma at Roswell Park.

Jan Kitajewski named director of the University of Illinois Cancer Center

Jan Kitajewski was named director of the University of Illinois Cancer Center, effective Oct. 16, 2020.

Kitajewski has been interim director of the UI Cancer Center since December 2019. During this time, he has established new pilot funding, managed an external advisory board visit, engaged community members, and worked recruited oncology physician scientists and other faculty.

Last year, his laboratory successfully secured an industry-sponsored research agreement to develop a novel cancer therapeutic antibody. Kitajewski was recruited in 2016 as head of the department of physiology and biophysics in the College of Medicine. As head, Kitajewski has spearheaded the recruitment of faculty members—expanding departmental focus in cardiovascular biology, obesity, cancer, and cell biology. He also oversaw the launch of a new master of science in medical physiology program and a new vascular biology, signaling, and therapeutics T32-funded training program.

Previously, Kitajewski was Charles and Marie Robertson Professor at Columbia University. He was co-director of the Cancer Signaling Networks Program at Herbert Irving Comprehensive Cancer Center, director of the Division of Reproductive Sciences in the Department of Obstetrics & Gynecology, and director of the Women's Cancer Program. Kitajewski was a program leader for 12 years and led three rounds of NCI review, receiving an exceptional score in 2014. He has also served on review panels for NIH and Department of Defense research grants, program projects and training grants, and NCI intramural program research evaluations.

After earning his PhD in molecular biology from Princeton University, Kitajewski completed a postdoctoral fellowship in molecular oncology working with Nobel Laureate Harold Varmus at the University of California, San Francisco. As a scientist, Kitajewski has received continuous funding from the NIH for 25 years and he has been the recipient of the Irma T. Hirschl-Monique Weill-Caulier Career Scientist Award, the DOD Breast Cancer Program Career Development Award, and American Cancer Society Junior Faculty Award.

His work has uncovered mechanisms of embryonic, ovarian, retinal and tumor angiogenesis and contributed to our understanding of fertility, preeclampsia, vascular malformations, retinopathies, tumor angiogenesis and metastasis. He also recently completed service as the President of the North American Vascular Biology Organization.

Ira Pastan receives Paul A. Volcker Career Achievement Medal

Ira Pastan, distinguished investigator at NCI, has received the Paul A. Volcker Career Achievement Medal from the Partnership for Public Service for his discovery of moxetumomab pasudotox-tdfk (Lumoxiti), which is indicated for the treatment of relapsed or refractory hairy cell leukemia.

Pastan's discovery led to the finding of a new class of drugs, recombinant Immunotoxins.

"Dr. Pastan is now building on the success of this new class of drugs he developed called recombinant immunotoxins that could also be effective against solid tumors such as pancreatic and lung cancer, and mesothelioma, in addition to leukemia," Thomas Misteli, director of cancer research at NIH, said in a statement.

In 2018, FDA approved Lumoxiti to treat relapsed or refractory hairy cell leukemia. Lumoxiti, is the result of decades of research by Pastan, whose discovery has led to a class of drugs that can kill cancer cells while leaving healthy cells intact and save patients' lives.

When Pastan first came up with his idea of using bacterial toxins for treating cancer, "it was not popular and most immunologists said it would never work, but he has taken this idea and this dream and turned it into reality," Michael Gottesman, deputy director for Intramural Research at NIH, said in a statement.

"Lumoxiti fills an unmet need for patients with hairy cell leukemia whose disease has progressed after trying other FDA-approved therapies," Richard Pazdur, director of the FDA's Oncology Center of Excellence and acting director of the Office of Oncologic Diseases in the FDA's Center for Drug Evaluation and Research, said in a statement at the time the drug was approved.

Reflecting on the FDA approval, Pastan, who continues to work at age 88, said, "I am very excited about that. It is how things usually begin. Once a drug is approved for one kind of cancer, you try to make it useful for treating other types of cancer."

Pastan's research focuses on bacterial protein toxins that are toxic to human and other animal cells.

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He worked to direct the biotoxin to target cancer cells. The agents are termed "recombinant immunotoxins," and they kill cells by interfering with the cell's ability to build proteins and grow, a mechanism not employed by other anti-cancer agents.

Once Pastan and his lab partners had a drug in hand, they started clinical trials and awaited the results. Pastan said he would always remember the moment he got word of the trial's effect on patients.

"I was on vacation, and I got a call from my clinical colleague. 'Ira! The leukemia counts have fallen by 50% and it's only day one.' The cancer went away entirely for many patients," Pastan said. "Eight or 10 years later, some of those patients have survived without any detectable cancer. So, the drug can cure many people."

Pastan is also known for mentoring other scientists, including Nobel Prize winners Harold Varmus and Robert Lefkowitz as well as Doug Lowy, deputy director of NCI.

Thomas J. Fuchs named dean of artificial intelligence and human health, co-director of Hasso Plattner Institute for Digital Health at Mount Sinai

Thomas J. Fuchs was named co-director of the Hasso Plattner Institute for Digital Health at Mount Sinai, dean of artificial intelligence and human health, and professor of computational pathology and computer science in the Department of Pathology at the Icahn School of Medicine at Mount Sinai.

Fuchs will build on AI initiatives at Mount Sinai Digital and Artificial Intelligence-Enabled Pathology Center of Excellence. In his research, Fuchs develops large-scale systems for mapping the pathology, origins, and progress of cancer, building a high-performance computer cluster to train deep data networks at petabyte scale.

Fuchs will co-lead the Hasso Plattner Institute for Digital Health at Mount Sinai, established in 2019 by the Mount Sinai Health System and the Hasso Plattner Institute.

Previously, Fuchs was director of the Warren Alpert Center for Digital and Computational Pathology at Memorial Sloan Kettering Cancer Center and associate professor at Weill Cornell Graduate School for Medical Sciences.

At MSK, he led a laboratory focused on computational pathology and medical machine learning. Fuchs co-founded Paige.AI in 2017, and led its initial growth as an AI company in pathology. He is a former research technologist at NASA's Jet Propulsion Laboratory and visiting scientist at the California Institute of Technology.

Kevin Kalinsky named director of Glenn Family Breast Center at Winship

Kevin Kalinsky was named director of the Glenn Family Breast Center at Winship Cancer Institute of Emory University. Kalinsky was also named associate professor in Emory University School of Medicine's Department of Hematology and Medical Oncology.

Kalinsky comes to Winship from New York-Presbyterian Hospital Columbia University Irving Medical Center. He was on the faculty there for 12 years as a breast cancer physician and investigator.

His research includes drug development in metastatic breast cancer.

David Gius named associate cancer center director for translational research at Mays Cancer Center

David Gius was named associate cancer center director for translational research at the Mays Cancer Center, home to UT Health San Antonio MD Anderson.

Gius was recruited to the Mays Cancer Center from the Robert H. Lurie Comprehensive Cancer Center at Northwestern University with a $6 million senior

investigator recruitment grant awarded in August by the Cancer Prevention and Research Institute of Texas.

Gius, professor of radiation oncology, studies the cellular processes that govern aging, cellular metabolism and cancer. He has developed several mouse models to study these health issues in breast cancer and other types of human malignancies.

He brought four researchers with him to the Mays Cancer Center and, in addition to the $6 million CPRIT grant, three NCI grants totaling about $4 million. He has developed eight genetically modified mouse models to study human breast, prostate and liver tumors.

"Our work addresses a fundamental issue in oncology, namely that age represents a strong cancer risk factor. I focus on the biology of the aging protein Sirtuin-3 (SIRT3) and two mitochondrial proteins that direct the mechanisms that affect the flow of energy in the development and growth of cancer and tumor cell resistance," he said in a statement. "Through our research, we hope to eventually be able to help medical practitioners identify patients who are more likely to respond to therapy, predict the duration of drug response and explain acquired drug resistance."

Sarasota Memorial Cancer receives $25 million from Brian and Sheila Jellison Family Foundation

Sarasota Memorial Healthcare Foundation has received $25 million from the Brian and Sheila Jellison Family Foundation.

The Jellisons' donation is the largest in the Sarasota Memorial Healthcare Foundation's history, pushing the healthcare foundation's cancer campaign closer to its $75 million goal.

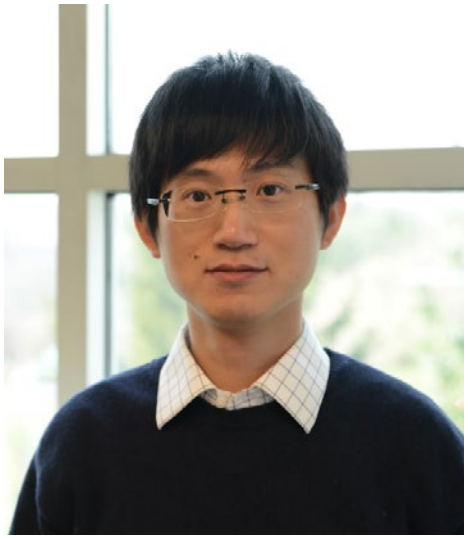
The cancer institute is expanding its team of oncology specialists and creating a centralized place for coordinated care and support for patients, families and caregivers.

The cancer Institute will now be known as the Brian D. Jellison Cancer Institute, which will include the eight-story oncology tower being built on the hospital's main campus. The building is expected to be open in fall 2021.

Yale's Sidi Chen receives $500,000 ACGT grant for pancreatic cancer research

Sidi Chen, assistant professor in the Department of Genetics and Systems Biology Institute at Yale School of Medicine and member of Yale Cancer Center, received a $500,000 grant from Alliance for Cancer Gene Therapy for pancreatic cancer research.

With the funding, Chen plans to advance a highly scalable strategy he's been developing—known as MAEGI, or Multiplexed Activation of Endogenous Genes as an Immunotherapy.



"The ACGT Scientific Advisory Council finds Dr. Chen's MAEGI technology to be unique and exciting because it simultaneously targets multiple differences and activates multiple immune system responses," Kevin Honeycutt, CEO and president of ACGT, said in a statement. "It has proven to be very effective in animal models. We believe our support will enable its advancement into the clinic where it would have major, life-saving impact on pancreatic and other difficult-to-treat cancers, such as melanoma, glioblastoma and triple negative breast cancer."

City of Hope forms AccessHope for employers to improve care, experience, outcomes and value

City of Hope has established AccessHope, a wholly owned subsidiary dedicated to serving employers and their health care partners by providing access to City of Hope's cancer expertise.

The institution has invested over $40 million into AccessHope, a company that partners with employers to provide their employees with cancer information and expert clinical decision support.

The company serves approximately 1.95 million members who receive cancer care through 34 employers, including 11 Fortune 500 companies, and collaborative relationships with Health Transformation Alliance and Quantum Health.

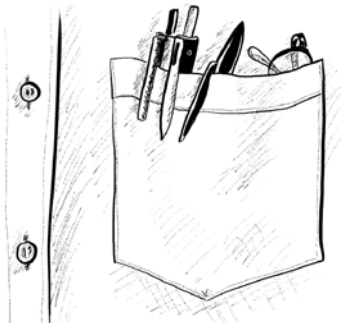
A pilot program with Blue Shield of California is also underway so community oncologists treating Blue Shield PPO members can consult directly with cancer specialists, and discuss the latest information on cancer treatments.

AccessHope has designed a suite of cancer support services including:

- Accountable Precision Oncology: Accountable Precision Oncology uses a proprietary algorithm of ICD10 and Rx condition triggers to target the top 20% of cancers that are most vulnerable to care mismatches in the treatment plan, are the most complicated/complex, and will be most positively impacted with respect to outcomes and cost savings by early and effective intervention.
- Expert Advisory Review: After a cancer diagnosis, patients can contact AccessHope to request a review of their medical record from an expert in their specific cancer type to evaluate the therapeutic approach. When needed, AccessHope's expert can work with an employee's local physician to provide input on a clinically appropriate treatment plan — with the goal of achieving optimal outcomes without the patient ever needing to travel for care.
- Cancer Support Team: Experienced oncology nurses are available to speak with patients and their families. Nurses can help patients understand their specific type of cancer, prepare for their first appointment with an oncologist, and provide emotional support and direction to trusted informational materials.
- Expert Evaluation: During an in-person evaluation at City of Hope, patients are paired with an oncologist or hematologist who specializes in their specific type of cancer and receive consultations with additional experts as needed (e.g., surgical oncologist, radiation oncologist, supportive care practitioner or other specialists). The service is inclusive of coordination with the patient's local doctor in continuing their ongoing care.

"We recognized several years ago the tremendous benefit to cancer patients of re-imagining how they can receive the most innovative care available as close to home as possible," Robert Stone, City of Hope's president and CEO, said in a statement. "The demand we have experienced from employers across the country led us to form AccessHope, which will accelerate and expand our ability to partner with like-minded employers, doctors and health care providers to transform the industry."

THE CLINICAL CANCER LETTER



TRIALS & TRIBULATIONS

Overcoming systemic barriers to improve cancer clinical trials

C.K. Wang, MD,
Chief medical officer, COTA

One of the more complex tasks that I performed in my medical oncology practice was enrolling patients on a clinical trial.

The process was often lengthy and many times unsuccessful, complicated by the extensive inclusion/exclusion criteria that a patient must meet, the demand for frequent office visits and, at times, the presence of a "standard-of-care" or "placebo" arm.

In recent months, this process has been further complicated by the ongoing COVID pandemic, which has resulted in care delays and restrictions on in-person visits. These factors have brought renewed attention to the systemic barriers that have always existed in the traditional clinical trial paradigm.

The existing clinical trial landscape

The clinical trial mechanism is complicated for a reason—each protocol must be meticulously designed and developed to meet the rigorous regulatory review process. As a result, the developmental cycle can take many years.

Unfortunately, in diseases where standards of care evolve quickly or the population has a high prevalence of exclusion criteria—whether it be age or multiple comorbid conditions—successful accrual to and completion of a clinical trial can be difficult for even the most promising therapies.

Historically, patients enrolled in clinical trials are generally younger, healthier, and less demographically diverse than

patients in the real world, which makes it challenging to extrapolate the results of a clinical trial to the broader patient population. Furthermore, only a small percentage of cancer patients ever participate in clinical trials.

To address these challenges, FDA in recent years has taken steps to address and encourage diversity in clinical trials. Additionally, sponsors have also started to explore alternate, more flexible trial designs such as decentralized or virtual trials.

More recently, COVID-19 and the ensuing widespread limitations on in-person contacts and patient visits have created new challenges to the clinical trial mechanism. We have witnessed the delay of new trial starts, the decline of enrollment to existing trials and last-minute protocol amendments to accommodate for social distancing.

In a time where more and more clinical trials are competing for the same patient population, it is imperative that the oncology community remove as many barriers to clinical trial enrollment as possible.

Minimize barriers to clinical trial participation

Most therapeutic trials require frequent in-person office encounters, laboratory visits, and imaging studies, which must be performed at the enrollment site. The extensive travel and visit requirements can be a barrier for many patients, whether they live in urban or rural areas.

While the decentralized or virtual trial design was developed to address this barrier, the medical community must be cognizant of the fact that the success of these trials may hinge on availability and access to technology.

The COVID-19 pandemic has recently brought this issue to the attention of the medical community. As in-person visits transitioned to virtual visits, patients who are technologically less savvy, lacking resources, or lacking access to telecommunication technology such as video conferencing have been less inclined to seek medical care or follow-up.

As the cancer population is typically older than the general population, technology access and literacy can be a real problem. It is important for the medical community to be mindful of this so that it does not become a barrier to the successful adoption of decentralized or virtual trials.

Remove standard-of-care or placebo groups where possible

Many patients seek out clinical trials to access new, and potentially more effective, treatments for their disease. For these reasons, the presence of a standard-of-care or placebo arm can be a deterrent to clinical trial participation.

An increasingly popular alternative is to incorporate a synthetic control arm into the clinical trial design, whereby historical clinical trials or real-world clinical data (RWD) are used to serve as the control arm. This design decreases the overall necessary patient enrollment volume and thus, can expedite clinical trial completion while decreasing overall cost.

Using real-world data to fill clinical trial gaps

Just as RWD can help accelerate clinical research by replacing control groups when appropriate, it can also provide invaluable insight into patient populations that are not eligible for or are under-represented in clinical trials or in situations where conducting formal clinical trials may not be feasible, e.g. rare cancers.

> “There is no simple solution to remove the existing barriers in the clinical trial mechanism, but it is a moral imperative that the medical community works tirelessly and expeditiously to minimize these barriers.”

RWD, in this scenario, enables researchers to evaluate therapies that are utilized in routine patient care and assess their efficacy and outcomes.

Forging ahead

Despite challenges and obstacles, clinical trials have and will continue to be the gold standard for regulatory therapeutic assessment. There is no simple solution to remove the existing barriers in the clinical trial mechanism, but it is a moral imperative that the medical community works tirelessly and expeditiously to minimize these barriers.

Judicious application of alternate sources of data and the mindful adoption of more flexible protocols are first steps in the right direction.

CLINICAL ROUNDUP

City of Hope leads novel clinical trial to treat cancer patients with COVID-19

In a new clinical trial, City of Hope is investigating a treatment for cancer patients with COVID-19 by repurposing leflunomide, an anti-inflammatory drug for rheumatoid arthritis, which is inexpensive and has few serious side effects.

Patients treated for cancer in the past two years may also be eligible.

FDA has recently approved the start of a phase I trial. At a later date, a phase II randomized clinical trial may take place if the first trial finds leflunomide to be safe and tolerable for these patients. City of Hope plans to work with other local medical centers who are treating cancer patients for SARS-CoV-2, the virus that causes COVID-19, to enroll them in the trial.

"There are currently few effective drugs against COVID-19, and our clinical trial targets a critical high-risk group — cancer patients whose immune systems are already weak," Steven T. Rosen, City of Hope provost and chief scientific officer, and the Irell & Manella Cancer Center Director's Distinguished Chair and Morgan & Helen Chu Director's Chair of the Beckman Research Institute, said in a statement. "Our hope is that leflunomide will eradicate COVID-19 in cancer patients, providing the medical community with an effective therapy against this devastating virus."

Sanjeet Dadwal, City of Hope chief of the Division of Infectious Diseases, is the principal investigator on the trial.

For the phase I trial, all patients will receive leflunomide and may also be able to simultaneously receive other standard of care treatments for COVID-19. They may receive remdesivir, an antiviral therapy. Patients with acute respiratory distress syndrome may receive the steroid, dexamethasone, and patients with complications of COVID-19 such as cytokine release syndrome, which can lead to multiple organ failure, can receive the antibody tocilizumab.

If the phase I trial is found to be a safe and tolerable treatment, then a phase II randomized, double-blind trial will open at a later date. About half the patients will receive leflunomide with standard of care therapies to treat COVID-19, and the other half will receive a placebo and standard of care drugs as well.

Leflunomide is an oral and generic anti-inflammatory drug approved by FDA to safely treat autoimmune diseases such as rheumatoid arthritis. The therapy has also been used in cancer patients with cytomegalovirus with tolerable side effects.

Laboratory experiments performed at City of Hope and Wuhan, China, indicate that leflunomide has high potential to shut down viral replication by preventing the synthesis of viral RNA, the genetic material. It also downregulates the expression of ACE 2, a receptor for COVID-19 cell entry. A small clinical trial using leflunomide in China also demonstrated the therapy has potential antiviral drug against COVID-19.

In a phase I clinical study, City of Hope treated patients with advanced multiple myeloma with leflunomide. The therapy stabilized their disease with tolerable side effects.

NCI has funded the trial with a P30 grant supplement for COVID-19 research projects. City of Hope is one of a few cancer centers that has received such funding during the pandemic.

City of Hope also received funding from private donors, including The Elias, Genevieve and Georgianna Atol Charitable Trust and The Norman and Sadie Lee Foundation.

Novel CAR T-cell lymphoma therapy developed at MCW advances to phase II study

A novel cancer therapy studied and developed at the Medical College of Wisconsin with promising clinical outcomes is leading to a larger phase II trial to improve on the current standard of care.

Results of phase I of the first-in-the-world double targeted CAR T-cell therapy clinical trial were published in *Nature Medicine*.

This is a novel, cell-based treatment against cancer targeting two proteins (antigens CD19 and CD20) on the surface of cancer cells. This CAR T-cell therapy trial began in October 2017 and resulted in safe and promising outcomes for patients with relapsed and refractory B cell non-Hodgkin lymphomas which are cancers of the immune system.

MCW researchers collected patient T cells and then used a specially engineered virus to augment their ability to identify and kill cancerous cells and effectively destroy the lymphoma. While phase I focused on safety and feasibility of the treatment, a multi-institutional phase II is being developed to determine the true efficacy and understand how the nuances of the treatment process can result in excellent outcomes for a larger subset of patients.

All patients in the clinical trial had failed prior treatments and their cancer had relapsed. Within 28 days of the CAR-T cell therapy, 82 percent responded positively. Six months later, more than half of the patients' cancer remained in remission. A higher dose of the treatment correlated with a prolonged remission, a trend the researchers plan to study further in the trial's second phase.

The new treatment genetically alters a person's own immune cells to target cancer cells in a unique and personalized fashion, a significant departure from more routine chemotherapy.

The cell product used for treatment was manufactured using the CliniMACS Prodigy device, which is part of an automated CAR T cell manufacturing platform developed by Miltenyi Biotec.

Housed at the Froedtert & MCW Clinical Cancer Center, the CliniMACS Prodigy device enabled the research team to conduct the CAR T-cell immunotherapy through a self-contained, desktop system, producing new cells ready to be infused back into a patient's bloodstream within 14 days. With the device, the entire process was performed locally at Froedtert Hospital.

This research was made possible through philanthropic dollars raised by the Children's Wisconsin Foundation and the MACC Fund and their support of the Cell Therapy Lab at MCW.

MD Anderson researchers identify characteristics of infused CAR T cells associated with efficacy and toxicity in large B-cell lymphoma

Researchers at MD Anderson Cancer Center have identified molecular and cellular characteristics of anti-CD19 CAR T cell infusion products associated with how patients with large B-cell lymphoma respond to treatment and develop side effects.

The research team also found that early changes in circulating tumor DNA one week after CAR T cell therapy may be predictive of treatment response in a particular patient. The paper was published online in *Nature Medicine*.

"CAR T cell therapy is highly effective against LBCL," corresponding author Michael Green, associate professor of lymphoma and myeloma, said in a statement. "However, we experience two main clinical challenges: achieving long-term remission and managing treatment-associated adverse events."

This study suggests that, within the first week of therapy, clinicians may be able to identify a subset of patients who may experience more poor outcomes or adverse treatment reactions, said Green. This would allow the care team to adjust therapy to improve efficacy or to act to mitigate toxicity.

For this study, researchers performed single-cell analysis on CAR T cells to study gene expression profiles in the infused cells. CAR T cells were collected from those remaining in infusion bags following treatment of 24 patients with LBCL. These genetic profiles were compared to treatment responses, determined at three months post-infusion by PET/CT scan.

"When we look at the characteristics of the infused CAR T cells, we found that samples from patients who were less responsive to treatment had exhausted T cells, whereas those who experienced complete responses had T cells expressing 'memory' signatures," co-corresponding author Sattva Neelapu, professor of lymphoma and myeloma, said in a statement. "Additionally, one cellular signature of T cell exhaustion was more commonly found in patients who exhibited a poor molecular response, and poor molecular response is generally associated with less-positive, long-term outcomes."

Further, the researchers analyzed early molecular responses in the patients by monitoring changes in circulating tumor DNA from treatment to one week post-infusion. The magnitude of change in tumor-associated DNA corresponded with response, suggesting that patients who displayed an early molecular response were more likely to experience a clinical response to treatment.

"When we examined the infusion product, we found that a cell population with characteristics similar to myeloid cells, with a monocyte-like transcriptional signature, was associated with development of high-grade neurotoxicity," Green said. "Detecting these cells may subsequently lead us to identify patients who would be at higher risk of developing neurotoxicity, allowing us to provide prophylactic treatment with agents that target the specific cellular features."

Further examination may lead to insights into the types and attributes of the cells present within the CAR T infusion product.

"This study also tells us that some rare and unexpected cells identified by single-cell analysis could be biologically

important," said co-corresponding author Linghua Wang, assistant professor of Genomic Medicine. "Going forward, we plan to functionally characterize these monocyte-like cells to better understand their specific biological mechanisms driving these clinical results."

These findings will help researchers develop clinical interventions that can block or target these cells. They also plan to validate the capacity of circulating tumor DNA to accurately predict patients' long-term outcomes.

This research was supported in part by the B-cell Lymphoma Moon Shot, part of MD Anderson's Moon Shots Program. With support from the Moon Shot and the Cancer Prevention & Research Institute of Texas, the research team plans to utilize PDX models of disease that relapsed following anti-CD19 CAR T cell therapy to preclinically test interventions that could lead to better treatment responses or to prevention of adverse side effects.

Other research support came from the Schweitzer Family Fund, NCI (P30 CA016672) and start-up research funds from MD Anderson. A full list of co-authors and their disclosures can be found here.

MD Anderson researchers: Cancer mutations accumulate in distinct regions based on structure of genome and mutational causes

A study from researchers at MD Anderson Cancer Center indicates that mutations found in cancers do not accumulate randomly, but are found in distinct patterns that vary based on the three-dimensional organization of the genome in the cell as well as the underlying factors causing the mutations.

Mutations caused by external factors, such as ultraviolet light or tobacco smoke, led to mutations in different regions than internal factors, such as defects in DNA damage repair or proofreading machinery. The findings, published in *Nature Genetics*, are important for understanding what factors may be driving mutations in a given cancer and may point to new therapeutic targets.

"DNA is not randomly organized within the nucleus, and we found that this structure is strongly correlated with how cancer cells accumulate mutations," lead author Kadir Akdemir, instructor of genomic medicine, said in a statement. "We know there are certain processes causing mutations in cancer cells, but we don't always understand the underlying causes. These findings should give us a clue as to how cancer accumulates mutations, and perhaps we can target and kill cancer cells by leveraging the mutations they accumulate."

Within the nucleus of the cell, DNA is packaged with proteins into chromatin, a highly organized and compacted structure that makes up our chromosomes. Within this structure, genes that are frequently used in the cells are organized together in "active domains," which are more readily accessible. Those genes used less often are similarly organized together in "inactive domains."

The researchers analyzed whether mutations are distributed more frequently in these active or inactive domains in cancer by studying publicly available whole-genome sequencing data of 3,000 paired samples of normal tissue and tumor tissue across 42 cancer types.

Across every cancer type studied, the inactive domains carried significantly more mutations than the active domains, suggesting that the accumulation of mutations is strongly correlated with the three-dimensional organization of the genome.

As a validation of these findings, the researchers looked specifically at the X chromosome in male and female patients. In females, one of their two X chromosomes is inactivated, so it is essentially itself an inactive domain. When comparing the X chromosome between sexes, females had more mutations than males with a marked distribution difference, largely driven by an abundance of mutations on the inactive chromosome.

Knowing that mutations can be caused by a variety of distinct processes, the researchers also investigated whether external environmental factors resulted in different mutation patterns compared to those caused by internal factors in the cell.

"Interestingly, we found that different causes of mutations resulted in distinct accumulation patterns within the cell," senior author Andy Futreal, chair of genomic medicine, said in a statement. "Extrinsic factors were associated with an enrichment of mutations in inactive domains, whereas intrinsic factors were correlated with enriched mutations in active domains. This provides us an important foundation going forward to understand the root of cancer mutations when we don't otherwise know the cause."

Knowing the causes and distributions of cancer-related mutations may open up potential therapeutic options, explained Akdemir, such as targeted therapies against a specific signaling pathway or combinations with immunotherapy.

For example, immunotherapy may be able to better recognize a cancer cell if more mutations are present. However, if mutations occur primarily in inactive domains, they would rarely be seen by the immune system. Therapeutic agents that restore activity to these domains,

used in combination with immune checkpoint inhibitors, could stimulate a stronger anti-tumor immune response.

This research was supported by the Cancer Prevention & Research Institute of Texas (R1205), The Robert A. Welch Distinguished University Chair in Chemistry, and NIH (P50CA127001, DP5OD023071, Z1AES103266). A full list of authors and their disclosures can be found with the full paper here.

UCSD study: Personalized cancer therapy improves outcomes in advanced disease

Researchers at the University of California San Diego School of Medicine found that patients receiving care for advanced cancer at Moores Cancer Center at UC San Diego Health were more likely to survive or experience a longer period without their disease progressing if they received personalized cancer therapy.

The study was published in *Nature Communications*.

Led by Razelle Kurzrock, director of the Center for Personalized Cancer Therapy at Moores Cancer Center and senior author of the study, a multidisciplinary molecular tumor board was established to advise treating physicians on course of care using an individual patient's molecular tumor makeup to design precision medicine strategies.

"Patients who underwent a molecular tumor board-recommended therapy were better matched to genomic alterations in their cancer and had improved outcomes," Kurzrock said in a statement. "The three-year survival for patients with the highest degree of matching and who received a personalized cancer therapy was approximately 55% compared to 25% in patients who received therapy that was unmatched or had low degrees of matching."

Of 429 patients evaluated by the molecular tumor board, 62% were matched to at least one drug. Twenty percent of patients matched to all recommended drugs, including combination therapies.

The tumor board acted in an advisory role and treating physicians chose not to use the board's recommended strategy in 38% of cases, opting instead for a standard therapy approach that might have been unmatched to the patient's genetic alterations or had a low degree of matching. These patients experienced a lower progression-free survival and overall survival rates.

The use of next-generation sequencing allows for the identification of novel potential targets for patients with cancer to improve outcomes, but there are challenges to using this approach widely, said Shumei Kato, associate professor of medicine at UC San Diego School of Medicine and first author.

"One of the hurdles is that every cancer patient appears to be carrying different molecular and genomic patterns despite having the same cancer type," Kato, a Moores Cancer Center medical oncologist specializing in rare and gastrointestinal cancers, said in a statement. "This can be challenging since we are customizing therapy based on the unique genomic pattern patients have, and thus it is difficult to predict the response. In addition, this approach requires multidisciplinary expertise as well as access to drugs or clinical trials not always available in smaller practices."

At Moores Cancer Center, the molecular tumor board is composed of experts in basic, transitional and clinical research as well as bioinformatics, genetics, radiology, pathology and physicians in multiple specialties such as medical, surgical and radiation oncology.

This research was funded, in part, by NIH (P30 CA023100) and the Joan and Irwin Jacobs Fund.

Phase III CheckMate-816 trial: Opdivo + chemotherapy demonstrates improvement in pathologic CR in resectable NSCLC

The phase III CheckMate-816 trial met a primary endpoint of pathologic complete response in resectable non-small cell lung cancer.

In the trial, significantly more patients treated with Opdivo (nivolumab) plus chemotherapy before surgery showed no evidence of cancer cells in their resected tissue compared to those treated with chemotherapy alone. CheckMate-816 is the first and only phase III trial to demonstrate a benefit with an immune checkpoint inhibitor in combination with chemotherapy as a neoadjuvant treatment in non-metastatic NSCLC.

Opdivo is sponsored by Bristol Myers Squibb.

Patients in the experimental arm of the trial received up to three doses of Opdivo plus chemotherapy prior to surgery, a standard number of cycles of therapy in the neoadjuvant setting. The safety profile of Opdivo plus chemotherapy was consistent with previously reported studies in NSCLC.

"Nivolumab has shown benefit as an adjuvant, or post-surgical, treatment option in other cancer types, and the positive results from CheckMate -816 speak to its

potential in the neoadjuvant setting of resectable non-small cell lung cancer," Mark Awad, clinical director of Lowe Center for Thoracic Oncology at Dana-Farber Cancer Institute, said in a statement.

The CheckMate-816 trial is ongoing to assess the other primary endpoint of event-free survival, to which the company remains blinded, as well as key secondary endpoints.

In non-metastatic NSCLC, Bristol Myers Squibb and collaborators are exploring the use of immunotherapy in the neoadjuvant, adjuvant and peri-operative settings, as well as in association with chemoradiation. To date, Opdivo has shown improved efficacy in the neoadjuvant or adjuvant treatment of four tumor types: lung cancer, bladder cancer, esophageal/gastroesophageal junction cancer and melanoma.

DRUGS & TARGETS

Opdivo + Yervoy receive FDA approval in mesothelioma indication

Opdivo (nivolumab) in combination with Yervoy (ipilimumab) received FDA approval for the first-line treatment of adults with malignant pleural mesothelioma that cannot be removed by surgery.

Opdivo and Yervoy are sponsored by Bristol-Myers Squibb.

This is the first drug regimen approved for mesothelioma in 16 years and the second FDA-approved systemic therapy for mesothelioma.

"Today's approval of nivolumab plus ipilimumab provides a new treatment that has demonstrated an improvement in overall survival for patients with malignant pleural mesothelioma," Richard Pazdur, director of the FDA's Oncology Center of Excellence and acting director of the Office of Oncologic Diseases in the FDA's Center for Drug Evaluation and Research, said in a statement. "In 2004, FDA approved pemetrexed in combination with cisplatin for this indication, and now patients now have an important, additional treatment option after more than a decade with only one FDA-approved drug regimen."

With currently available therapy, overall survival is generally poor for malignant pleural mesothelioma. Opdivo and Yervoy are both monoclonal antibodies that, when combined, decrease tumor growth by enhancing T-cell function.

This combination therapy was evaluated during a randomized, open-label trial in 605 patients with previously untreated unresectable MPM. Patients received intravenous infusions of Opdivo every two weeks with intravenous infusions of Yervoy every six weeks for up to two years, or platinum-doublet chemotherapy for up to six cycles.

Treatment continued until disease progression, unacceptable toxicity or completion of two years. The objective was to determine if Opdivo in combination with Yervoy improved overall survival compared to chemotherapy. At the time of the analysis, patients who received Opdivo in combination with Yervoy survived a median of 18.1 months while patients who underwent chemotherapy survived a median of 14.1 months.

The review was conducted under Project Orbis. FDA collaborated with the Australian Therapeutic Goods Administration, the Brazilian Health Regulatory Agency, Health Canada, and Switzerland's Swissmedic. The application reviews are ongoing at the other regulatory agencies. FDA approval occurred approximately five months ahead of the goal date.

Regeneron asks FDA for emergency clearance for COVID-19 therapy

Regeneron has submitted a request to FDA for Emergency Use Authorization approval for the REGN-COV2 investigational antibody combination for COVID-19.

REGN-COV2 is a combination of two monoclonal antibodies (REGN10933 and REGN10987) and was designed specifically to block infectivity of SARS-CoV-2. The agent was recently used to treat President Donald Trump.

If an EUA is granted, the government has committed to making these doses available at no cost, and would be responsible for their distribution.

At this time, there are doses available for approximately 50,000 patients. Regeneron said it expects to have doses available for 300,000 patients in total within the next few months.

FDA issues draft guidance that encourages inclusion of premenopausal women in breast cancer clinical trials

FDA has issued draft guidance encouraging the inclusion of premenopausal women in breast cancer clinical trials that investigate the efficacy of hormonal drug and biological products. When finalized, the guidance will provide recommendations for industry to generate additional data that will support the efficacy and safety of drugs and biologics for premenopausal women with breast cancer.

Historically, premenopausal women have been excluded from clinical trials that investigated the efficacy of hormonal drugs for the treatment of hormone positive breast cancer, largely due to concerns about potential differences in how these hormonal drug and biological products would behave in premenopausal versus postmenopausal women. This exclusion resulted in delays in availability of these therapies for premenopausal women.

"We believe that with sufficient estrogen suppression, hormonal drug and biological products are likely to have similar efficacy and safety in premenopausal women as in postmenopausal women. Therefore, premenopausal women should be included in these clinical trials," Richard Pazdur, director of the FDA's Oncology Center of Excellence and acting director of the Office of Oncologic Diseases in the FDA's Center for Drug Evaluation and Research, said in a statement.

"Once finalized, we hope that the recommendations in the draft guidance will encourage expanded drug development for the treatment of breast cancer in premenopausal women," he said.