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Report to the White House Office of  
Science and Technology Policy

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# The Cancer Moonshot, Public Policy, and Medically Underserved Cancer Care Communities

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Their voices awakened in the insurers, innovative companies, organized medicine, and policymakers at the listening session an understanding that the Cancer Moonshot can succeed only if every American community benefits from its promise. Among the attendees there was the clear realization that the Moonshot must reach long-neglected neighborhoods — not just with words and promises, but also with transformative actions if we are to write the last chapter of the war on cancer. The Biden administration’s willingness to let the voices of the neglected help adapt the Moonshot to meet the particular needs of their communities is the secret sauce that is making the Cancer Moonshot an American success story.

With so many voices committed to a common enterprise, I can list only several who had an immediate hand in writing this report. The first name that must be mentioned is Arthur Woodson, an activist based in Flint, Michigan. His impassioned and tireless advocacy for the city of Flint reached all the way to the White House, which in turn led NMQF to visit Flint. Adjoa Kyerematen and Kristen Hobbs, two NMQF staffers, did the first thing that community change agents must do: They traveled around the country to underserved communities and listened intently to residents as they expressed their needs and concerns related to cancer. These listening sessions, coupled with health fairs and one-on-one interviews, informed, and in some instances reaffirmed, NMQF’s understanding of what characterizes medically underserved cancer care communities. They are creatures of public policies, and if the goals of the Moonshot are to be attainable in those communities, then public policy will need to change.

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Dr. Gary A. Puckrein

President and CEO

National Minority Quality Forum



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# Preface

Arthur Woodson is a resident of Flint, Michigan. He has dedicated the past 10 years of his life to drawing attention to the excessive burden of cancer that exists in his hometown. Over the years, he has witnessed the suffering of friends, neighbors, and family from rare and aggressive forms of cancer. Through his own investigations, Woodson found that, within a one-block radius, eight people were diagnosed with multiple myeloma. For a cancer in which 4 in 100,000 people are diagnosed in a lifetime, to find eight cases of multiple myeloma in one block appeared to be more than a coincidence.<sup>1</sup> More broadly, he noticed more and more young and middle-aged people around that area “catching strange cancers” and then dying far too soon. The reason for the higher frequency of these cancers in Flint has not been well studied.

Woodson and his neighbors point to public policies that brought water contaminated with carcinogens to their medically underserved community. Their charges have not triggered an investigation by either elected officials or the medical establishment to discern if indeed environmental policies and/or unregulated behavior by private industry elevated their cancer risk. Meanwhile, inadequate healthcare has shortened the lives of these cancer victims.

Former Michigan Governor Rick Snyder impaneled a bipartisan task force in 2015 to investigate the water crisis and its aftermath. The task force concluded that Flint residents, who are majority Black and among the most impoverished of any metropolitan area in the United States, did not enjoy the same degree of protection from environmental and health hazards as provided to other communities, ...[leading] to the inescapable conclusion that this is a case of environmental injustice.<sup>2</sup> It is also a case of medical injustice.

There are many Flint-like communities around the country that have their own Arthur Woodson advocates. These are medically underserved cancer care communities whose work and living spaces are contaminated by carcinogens. Inequities in cancer care, along with the carcinogens, combine to form a toxic brew that produces elevated cancer risk and premature deaths. These communities come in all shapes and sizes: urban, rural, majority/minority, predominantly White, English-speaking, Spanish-speaking, industrial, and farming.

This report introduces a public/private partnership, with the hope of igniting many more, to reimagine cancer detection and care in communities in which we, the public, have permitted an excessive burden of cancer to destroy lives and bring misery to surviving loved ones. By our social contract, the terms of which are the preservation of life, liberty, and the pursuit of happiness, we, who are at once the governors and the governed, have an obligation to one another. We are invoking those terms to bring a nation together to aid long-neglected communities.

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# Executive Summary





The Cancer Moonshot, an initiative launched by U.S. Vice President Joe Biden in 2016, was inspired by the spirit of the "moonshot," which refers to President John F. Kennedy's ambitious goal of landing a man on the moon in the 1960s. In January 2016, during his final State of the Union address, President Barack Obama announced the creation of the Cancer Moonshot Task Force, with Joe Biden as its leader. Following his election as President of the United States in 2020, Biden revived the Cancer Moonshot as part of his broader healthcare agenda.

His renewed commitment presents a unique opportunity to address the persistent disparities in cancer care that have disproportionately affected historically underserved and marginalized populations, especially those facing economic challenges.

After decades of collaborative effort and relentless pursuit of innovation, the United States is at a pivotal juncture in the fight against cancer, poised to leverage remarkable scientific advancement and cutting-edge technologies, including Artificial Intelligence (AI) and Machine Learning (ML), to transform cancer care. The integration of AI/ML can enhance early detection, streamline clinical trials, and facilitate personalized treatment plans, enabling a more proactive and informed approach to cancer care.

The conclusion of this journey, however, will remain elusive until the country makes a steadfast commitment to ensure that these breakthroughs benefit every corner of America. This endeavor demands a critical reevaluation of economic theories that have perpetuated a tiered healthcare system, allowing medically underserved cancer care communities (MUCCCs) to develop (see page 14 for a definition of MUCCCs). The emergence of MUCCCs is rooted in the idea of an imbalance between an overwhelming demand for healthcare and a limited supply to meet that demand. In the legacy healthcare system, policymakers resolve this supposed imbalance by rationing care. MUCCCs are distinguished by the combination of medical rationing and the exposure to environmental toxicants that cause an elevation in cancer risk in these neighborhoods. The resulting disproportionate burden on MUCCCs raises pressing public policy concerns that require urgent and sustained action.

Over the years substantial investments aimed at eliminating cancer inequities have been made. However, these efforts have been fragmented and isolated, failing to address the underlying rationing occurring in our tiered health system, and so they have had limited ability to transform cancer care in MUCCCs.

Challenging the idea that America cannot afford to pay for equitable, high-quality cancer care, and building on the Cancer Moonshot call for the establishment of public/private collaboration, the National Minority Quality Forum and the CEO Roundtable on Cancer are launching a Cancer Stage Shifting Initiative (CSSI). This public/private collaboration is designed to move cancer care in MUCCCs from late-stage to early-stage diagnosis and treatment. It aims to reduce cancer incidence, enable early cancer detection, provide frontline medicine to underserved communities, and align financial models with care protocols that do not depend on disparities to achieve financial benchmarks.

CSSI will meet the following objectives:

- Publish peer-reviewed articles that document the existence of MUCCCs.
- Publish an AI-generated Cancer Index (a geographical information system) that maps MUCCCs, the annual incidence and prevalence of cancer types, the rates of healthcare utilization, and the cost of care by geographies (ZIP codes, counties, states, congressional and state legislative districts, and metropolitan statistical areas) and by demographic cohorts (age, gender, race, and ethnicity).
- Conduct a pilot study whose overall purpose is to produce synchronized and scalable cancer care protocols and payment models that render cancer disparities practically insignificant. The study challenges the notion that society cannot afford optimal cancer care for all of its members, and in doing so provides critical intelligence that is needed to take the Cancer Moonshot to every corner of America.

CSSI is not merely a scientific endeavor; it is also a strategic blueprint, illuminating pathways to a sustainable and equitable cancer care framework. It seeks to unravel the complex interplay between socioeconomic factors, accessibility, and health outcomes, providing invaluable insights that can shape future policies, interventions, and healthcare models to ensure that every individual, regardless of background or circumstance, has access to the highest standard of cancer care in a sustainable way.

## SECTION 1








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# The Cancer Moonshot and the Legacy Healthcare System

# Public Policy and the Cancer Moonshot

The Cancer Moonshot, an initiative launched by former U.S. Vice President Joe Biden in 2016, was inspired by the spirit of the "moonshot" concept, which refers to President John F. Kennedy's ambitious goal of landing a man on the moon in the 1960s. In January 2016, during his final State of the Union address, President Barack Obama announced the creation of the Cancer Moonshot Task Force, with Biden as its leader. Following his election as President of the United States in 2020, Biden has continued the Cancer Moonshot as part of his broader healthcare agenda.

The main goal of the Cancer Moonshot is to make significant advancements in cancer research and treatment in order to ultimately find a cure for cancer. The initiative aims to bring together researchers, clinicians, patients, advocates, and other stakeholders to collaborate and share information in order to accelerate progress in understanding and combating cancer. The Cancer Moonshot focuses on several key areas, including:

- |   |  |   |  |
|---|--|---|--|
|    | Reducing deaths from cancer by 50% over the next 25 years.                             |    | Improving patient access to cancer treatments and care.                          |
|   | Enhancing cancer prevention and early detection methods.                               |   | Enhancing the development and use of immunotherapies and combination therapies.  |
|  | Expanding the understanding of cancer through improved data sharing and collaboration. |  | Supporting the development of precision medicine approaches to cancer treatment. |
|  | Accelerating the development and approval of new cancer therapies.                     |   |  |

Biden's renewed commitment to the Cancer Moonshot presents a unique opportunity to address the persistent disparities in cancer care that have disproportionately affected historically underserved and marginalized populations, especially those facing economic challenges.

We are at a real crossroads regarding the provisioning of cancer care in America. After decades of work and collaboration, there has been substantial progress in cancer treatment, screening, diagnosis, and prevention, with scientific advances beginning to deliver the tools that will enable us to begin to write the last chapter of on the war on cancer. The writing, however, will not be completed until we learn how to take those discoveries to every American neighborhood. The learning will inevitably require us to reconsider public policies that rest upon economic theories that have propagated a tiered healthcare system, which has in turn permitted medically underserved cancer care communities (MUCCCs) to develop (see page 14 for a definition of MUCCCs).



Advocating for equitable policies is essential in dismantling systemic barriers and facilitating access to quality cancer care. By implementing reforms that prioritize the needs of marginalized communities, we can ensure that every individual, irrespective of their socioeconomic background, has the opportunity to benefit from the Moonshot.

It is therefore with a deep sense of urgency that the National Minority Quality Forum (NMQF) and the CEO Roundtable on Cancer (CEORT) present this comprehensive report, “The Cancer Moonshot, Public Policy, and Medically Underserved Cancer Care Communities,” to the White House Office of Science and Technology Policy, outlining recommendations and actions to take cutting-edge cancer treatments to MUCCCs in response to Biden’s renewed call for a Cancer Moonshot.

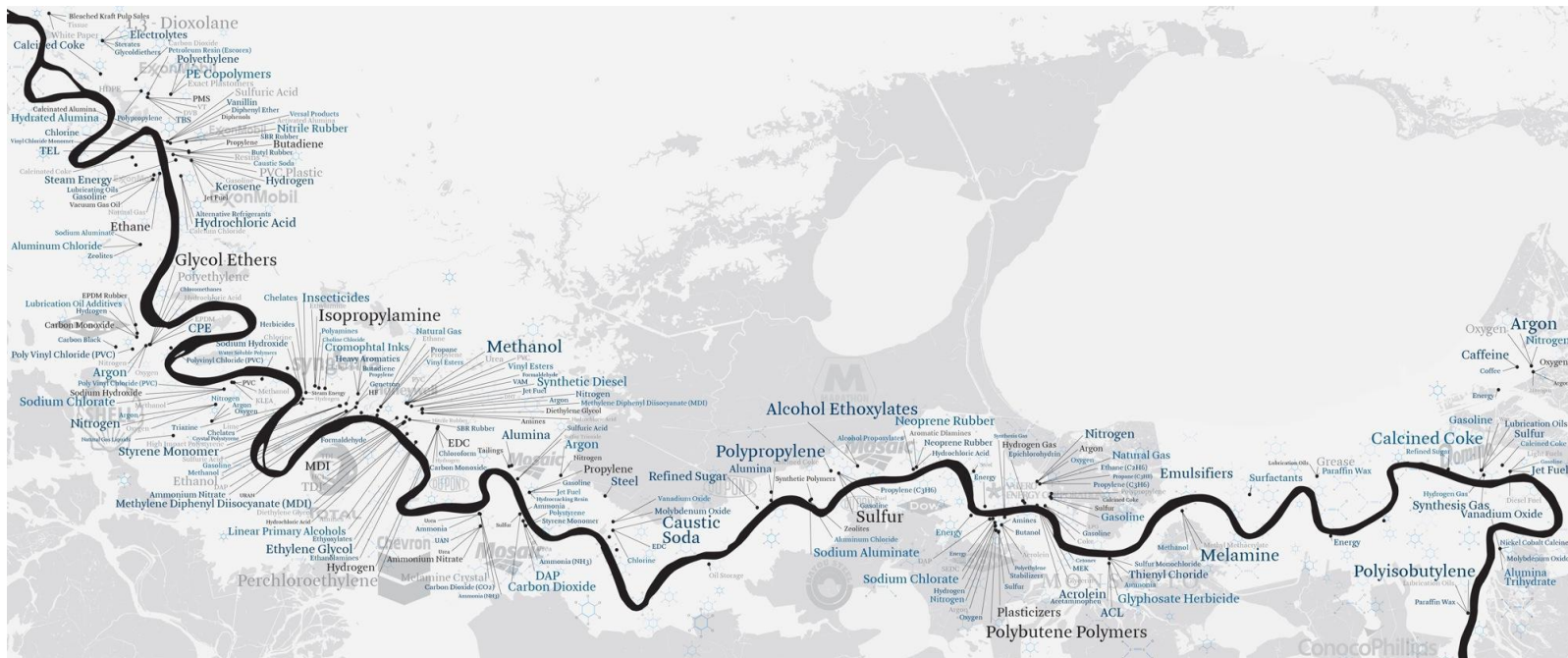
The Cancer Moonshot inspires, but it needs us all to act if its goals and objectives are to be realized in neighborhoods across the country. NMQF and CEORT are stepping up, not only to be moonshot messengers, but also to lead a strategic effort that calls on a broad community of actors to join us on a journey to the center of the American dream, where e pluribus unum lives. The Cancer Moonshot carries us there, where we will learn together that the delivery of cancer care is inscribed in our social contract, that healthcare policy should not violate that contract by separating us into winners and losers, and that ending cancer inequities is very much at the core of the American dream.



# Medically Underserved Cancer Care Communities

There is a body of evidence that suggests that there are marginalized Americans who live and work in carcinogenic environments where the risk for cancer is higher when compared to national averages (see Appendix A for a discussion of public policy and environmental cancer risks). These Americans grapple with a multitude of challenges that extend beyond limited access to healthcare.

The profound lack of awareness about cancer prevention and early detection and intervention, coupled with a scarcity of robust healthcare infrastructure, magnifies the existing disparities in these communities. Public policy, even by negligence, permitted the formation of these carcinogenic environments, and in these very same communities, public policy has also turned them into medically underserved areas.



Mississippi River Chemical Corridor

Source: Kate Orff, Petrochemical America; New York: Aperture, 2012, p 128-129.

Typically, medically underserved areas are defined as areas or populations having too few primary care providers, high infant mortality, high poverty, or a high elderly population.<sup>3</sup> In addition to these criteria, there are signals in the medical literature that some marginalized populations also reside in what we describe as MUCCCs. The characteristics of MUCCCs are as follows:

- The residents are either people of color or rural White communities, both of whom have been affected by persistent poverty and historic inequities.
- Public policies have caused the population to be exposed to carcinogens.
- Cancer screening rates are disproportionately lower when compared to more affluent communities.
- The incidence of cancers surpasses national averages.
- The residents are more frequently diagnosed with late-stage, metastatic cancers.
- The cancer survival rates fall well below national averages.
- Public policy disrupts or lowers access to the best modern therapies.
- Clinical trials are not considered as a treatment option due to inadequate infrastructure.
- Community trust in the medical establishment is low.
- There are no strategic plans to reduce the incidence of cancer or promote early-stage diagnosis of cancer.

The public policies that created MUCCCs are grounded in the belief that there is an unlimited demand for medical care and a limited supply to meet that demand, so healthcare must be rationed (see Appendix B for a discussion of public policy and medically underserved communities). Even though this consensus has not been rigorously tested, it has acquired enough currency to drive healthcare policy, with the effect of causing the formation of MUCCCs in the very locations where carcinogens are elevating cancer risk.

The policies that created MUCCCs must be rewritten so they align with the emerging science; otherwise, the benefits of the Cancer Moonshot will not reach the marginalized, and cancer inequities will persist. Through the Environmental Protection Agency's Environmental Justice Program, the Biden-Harris administration is continuing to take steps to clean up carcinogens, but to date, there has been no large-scale pilot study to offer evidence-based solutions to address the inadequacy of cancer care in these communities.



# Innovations in Cancer Screenings

According to the American Cancer Society, early cancer detection improves cancer survival rates.<sup>4</sup> However, currently there are screening tests for only five cancer types (breast, colorectal, cervical, lung, and prostate), and these tests are for just over 50% of the 1.9 million new cancer diagnoses in the United States every year. The existing tests, while valuable, leave most cancers — which account for nearly 3 of every 4 cancer deaths in the United States each year — without available screening tests.<sup>5</sup> The absence of a valid test for most cancers and the fact that approved tests are underutilized in MUCCCs and other marginalized communities means cancers are most often discovered when the patient is symptomatic, at a late stage, when the cancer is growing aggressively or has metastasized, and life-saving therapies have not yet been discovered.

Certainly, efforts to improve cancer screening rates in underserved communities will help meet the Cancer Moonshot goal of reducing cancer mortalities by 50% over the next 25 years, but the advance in cancer screenings technology can make an even more substantial contribution to the Moonshot goal.





Our knowledge of how cancer develops, along with our ability to analyze blood for genetic and genomic signals and other biomarkers coming from cancer cells, is enabling a new generation of screening tests, called multi-cancer early detection (MCED) assays. These tests will complement existing screening methods and have the capacity to diagnose many more types of cancer, often detecting cancer at its earliest stages, even before symptoms manifest. They have the potential to be meaningfully deployed into communities that are traditionally underserved or that have been exposed to carcinogens. MCEDs simultaneously detect and localize multiple cancers with a single blood draw, including those lacking recommended screening programs.<sup>6</sup> As they enter routine use, MCEDs portend an overall stage shift in cancer care — from late to early stage — with the potential for earlier interventions, less-intensive treatments, and better patient outcomes.

MCEDs have the clear potential to serve as an ideal test to surveil populations that live in impacted, carcinogenic environments. As community surveillance tools, MCEDs could be more cost-efficient than the five approved screening methods, which only test for one cancer at a time and in some instances require specialized diagnostic machines. These machines need to be transported into MUCCCs in large motor vehicles, which incurs additional cost, or the patient needs to travel to a facility for the test. In some instances, MCEDs can also detect early-stage cancers where Food and Drug Administration (FDA) approved screenings have lower levels of accuracy.

While MCEDs are breakthrough science, they are not yet broadly covered by insurance. Today, patients seeking MCED tests can access them via clinical research programs. They are available commercially to individuals who are willing to pay out of pocket for a test, but at a cost that makes the promise of MCEDs inaccessible to those living in MUCCCs. The Nancy Gardner Sewell Medicare Multi-Cancer Early Detection Screening Coverage Act (H.R.2407/S.20), a bill awaiting a vote in Congress, would establish a new pathway for Medicare coverage of MCED tests, following their approval by the FDA for widespread clinical use. This bill's passage would not only encourage more extensive MCED research, but it would also help to address longstanding cancer inequities. Unfortunately, congressional action lacks the urgency that would be in keeping with the character of the Cancer Moonshot and of significant benefit to MUCCCs.

## SECTION 2

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# Cancer Stage Shifting Initiative

# Recommendations and Actions

Strategically, the quality of cancer care in underserved communities has not been subjected to a comprehensive review. Basic investigations, such as asking the residents of MUCCCs their perception of needs and goals, have not been undertaken across the country and shared with those trying to make a difference. Data collection and availability is inadequate. With notable exceptions, widespread neglect in research facilities in MUCCCs is evident. Mitigation of environmental risk has not been synced with medical intervention to reduce the incidence of cancer. Translational science and payment models have not been aligned to ensure equitable care; nor have they been designed to increase the speed by which discoveries get to bedside. Public policies have not required needs assessments to determine what upgrades to local cancer care networks are necessary. Community engagement can best be described as haphazard. Public policies have not established national and community level benchmarks so that improvements can be measured. There have been informal conversations about financing, but no serious effort is underway. The United States has invested well over \$100 billion on the Cancer Moonshot, but only a trickle has researched the underserved.

NMQF and CEORT are launching a Cancer Stage Shifting Initiative (CSSI). This public/private collaboration is conceived as a tool to move cancer care in MUCCCs from late-stage to early-stage diagnosis and treatment. It aims to reduce cancer incidence, enable early cancer detection, provide frontline medicine to underserved communities, and align financial models with care protocols that do not depend on disparities to achieve financial benchmarks.

CSSI will meet these objectives by operating as a fully integrated set of interventions that are powered, measured, and coordinated to end cancer inequities by lowering the incidence of cancer, detecting cancers at the earliest possible stage, and delivering state-of-the-art care to those diagnosed in long-neglected communities.

These interventions include:

- The publication of a body of peer-reviewed articles that document both the existence of MUCCCs and their specific challenges, as well as instances where public policies can make qualitative and quantitative improvements.
- The publication of an Artificial Intelligence (AI)-generated Cancer Index (a geographical information system) that maps MUCCCs, the annual incidence and prevalence of cancer types, the rates of healthcare utilization, and the cost of care by geographies (ZIP codes, counties, states, congressional and state legislative districts, and metropolitan statistical areas) and by demographic cohorts (age, gender, race, and ethnicity). The maps of MUCCCs will recommend where immediate improvements in the quality of cancer care are required.

- A pilot study conducted in selected sites around the country. Its overall purpose is to produce synchronized and scalable cancer care protocols and payment models that render cancer disparities practically insignificant. The study challenges the notion that society cannot afford optimal cancer care for all of its members, and in doing so provides critical intelligence that is needed to take the Cancer Moonshot to every corner of America. CSSI is not merely a scientific endeavor; it is also a strategic blueprint, illuminating pathways to a sustainable and equitable cancer care framework. It seeks to unravel the complex interplay between socioeconomic factors, accessibility, and health outcomes, providing invaluable insights that can shape future policies, interventions, and healthcare models to ensure that every individual, regardless of background or circumstance, has access to the highest standard of cancer care in a sustainable way.

Demonstrating that MUCCCs can be eradicated will provide a benefit to all Americans. By going to places where the struggle will be most difficult, we will build into our various agencies the ability to wrestle control of cancer outcomes. The commitment is to end the threats to life, and with the war won, we will see a reduction in the financial investments that our education has demanded.



# The Pilot Study

CSSI's pilot study will have three arms.

The MCED arm seeks to be a groundbreaking endeavor that deploys MCEDs as mass surveillance tools within MUCCCs. This arm is envisioned as a non-interventional exploration, fortified by a public/private partnership, aimed at scrutinizing four pivotal clinical endpoints:



Can MCEDs be used as a rapid cost-effective tool to identify cancer clusters by cancer types within a defined geographical area?



Can MCEDs be used to characterize the distribution of stages of cancer types in a population?



Are MCEDs efficient in detecting earlier-stage cancers in large-scale populations?



Can MCED surveillance be used to increase the enrollment of clinical trial participants drawn from the medically underserved?

While the pilot study is initiated with MCED surveillance, it will be followed by two integral ancillary arms designed to:

1. Navigate individuals who receive a positive signal from the surveillance into cutting-edge treatments typically inaccessible to residents of medically underserved communities, therefore fostering a realm of equitable advanced healthcare solutions.
2. Aggregate the cost metrics of the surveillance and cutting-edge treatments as data streams, enabling the training of sophisticated AI/ML algorithms. This fusion of data and AI technology aims to synergize essential care with fiscal prudence, obviating the need for rationing in cancer care and rendering inequities in cancer care as scientifically negligible endpoints within the innovative models.

Participants in the study will have consented to contributing genomic and serology samples and will have granted access to their comprehensive electronic health records, bolstering the fortification of a national registry and driving the evolution of personalized and equitable cancer care.



The integration of AI is a cornerstone of CSSI, serving as a catalyst to unlock new dimensions in cancer care. AI/ML's unparalleled analytical capabilities can decipher patterns and correlations within the amassed data, enhancing the precision and accuracy of early cancer detection through MCED surveillance. Furthermore, AI stands as a beacon in clinical trials, optimizing participants' selection, personalizing clinical trial protocols, and ensuring the inclusion of diverse and underserved populations. The predictive prowess of AI, which transcends the conventional boundaries, has the potential to offer prognostic insights into cancer progression and outcomes, thus enabling proactive and individualized intervention strategies that are paramount in mitigating disparities and fostering equity in cancer care.



# The Cancer Index

Before the pilot can be launched, NMQF and CEORT must use the best science to identify MUCCCs. This identification will be invaluable to follow-on initiatives that seek to deploy state-of-the-art cancer care to the underserved. To localize MUCCCs, NMQF and CEORT are partnering to upgrade the capabilities of NMQF's Cancer Index (CI), which was first published in support of the 2016 launch of the Cancer Moonshot. In that first iteration, CI operated as a community data lake and geographical information system (GIS) that mapped five cancers (prostate, colorectal, breast, lung, and cervical) by various geographies, race, and ethnicity.

The upgrade will begin with the move of CI to NMQF's private cloud, where the cancer data holdings of the community data lake will be expanded, and the map function of the GIS will be greatly enhanced. CI will then offer maps, tables, and spreadsheets for more than 1,000 different cancer types, with their physical locations searchable by International Classification of Diseases 10 codes. The data in CI will be curated and aggregated by geography (states, ZIP codes, metropolitan statistical areas, congressional and state legislative districts); by demographic cohorts (age, gender, race, and ethnicity); and by care centers (inpatient, outpatient, physician practice, emergency room, and clinic). The GIS will also identify MUCCCs where environmental toxins have combined with inadequacies in cancer care to shorten life expectancies. CI will offer maps of these localities by cancer types and toxins as places where immediate improvements in the quality of cancer care are required.

This work dovetails with CEORT's Access, Choice, and Education (ACE) Cohort, which aims to improve the health of those disproportionately affected by cancer by increasing access, choice, and education to clinical trials (see Appendix C).<sup>7</sup>

In addition to housing CI, the private cloud will also host a Cancer Virtual Research Center to study cancer care in MUCCCs, with computing resources (such as virtual machines, storage, and analytical software, including ML applications) all contained within a controlled and secure infrastructure. Authorized researchers will be able to access the 5 billion records that are available in NMQF's community data lake. The private cloud will have enhanced security and privacy to protect sensitive data. NMQF will be able to customize the environment to meet specific requirements and preferences of users. The virtual research center is scalable, and resources can be adjusted based on demand, allowing NMQF to optimize resource utilization and cost efficiency. AI algorithms, trained on NMQF's vast community data lake, will offer opportunities to cocreate clinical/economic models in which inequities are insignificant endpoints.

The private cloud will also house a media center (websites, podcasts, videos, etc.) designed to reach both mass and targeted audiences. Powered by patient-level records drawn from the community data lake and curated data from CI, these microsites will be optimized to ensure that the information reaches the right audience, with actionable information delivered in a wide variety of accessible formats, such as audio and video files, disease-specific maps, detailed statistical reports, chart books, infographics, cartoons, blogs, etc.

The media center's architecture will allow developers to acquire and share audience information from these public sites. This shared information will translate into analytics that allow developers to identify lookalike audience clusters by geography or demographic cohorts. Clustered identification permits developers to edit their microsites for optimized responses to search queries and to identify behavioral trends that predict moments when cluster members will be more receptive to receiving specific cancer information. Through publicly available links and sign-ups for additional information, the media center will offer audiences the option to participate in a nondirective cancer educational moment where additional information and resources are made available.

The private cloud can be appropriately viewed as a continuous learning community where bi-direction interactions among researchers, patient advocates, innovative companies, organized medicine, policymakers, and medical economists are transforming cancer care in MUCCCs.





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# Conclusion

Longstanding public policies created MUCCCs, and the reimagining of cancer care will require flexibility and action by public/private partnerships to strengthen local care networks. In a sense, CSSI is atoning for past public policies that have left too many Americans living and working in carcinogenic environments without appropriate beneficial care. We the public have significantly lowered the quality of life and the lifespan of MUCCCs residents by not urgently delivering the best modern therapies to their aid. The intent of CSSI is to evoke a common purpose to bring payers, innovative companies, patient advocates, policymakers, healthcare providers, and the general public into an initiative where American know-how and spirit are the driving forces.

The cancer care networks in MUCCCs include clinicians, public health agencies, pioneering companies, patient advocates, government agencies, insurers, employers, schools, faith communities, community-based organizations, media, policymakers, voters, and individual patients. Every node in the network needs to be touched by the Cancer Moonshot message and brought to understand that the local network has the power, and will receive the tools, to improve cancer care in its community.

When President John F. Kennedy announced his commitment to sending Americans to the moon, he was once asked why he wanted to undertake such an initiative. His answer was succinct: “an unwillingness to postpone.” We launch the pilot in that same spirit and believe we owe that same level of commitment to long-suffering communities. Our government was organized to conserve life and to treat each life as equal, inherent, and inalienable. By coming together, we take the next step in the journey to perfect the American dream. Learning how to provide beneficial care to all is not a moral obligation; it is contract, a promise we made to one another. And so, we begin writing the last chapter of the bipartisan, intergenerational battle against cancer.

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# Appendices

# Appendix A

## The Environmental Risk for Cancer

The relationships between cancer, environment, and social status are well documented.<sup>8,9,10,11</sup> Historically marginalized populations often live and work in environments where toxicants in the air, water, and soil elevate their risk for cancer.<sup>12,13,14,15</sup> Since the National Housing Act of 1934 institutionalized racialized housing discrimination, a practice commonly known as redlining, the federal government has played an integral role in keeping communities of color in substandard living conditions.<sup>16</sup> Though the practice of redlining was legally abolished with the Fair Housing Act of 1968, the impacts of redlining are visible to this day.<sup>17</sup> Historically redlined neighborhoods receive less public and private investment, resulting in high poverty rates and deteriorating public facilities.<sup>18</sup> These conditions, coupled with poor urban planning, create a perfect storm, raising the risk for cancer and other medical challenges. Higher rates of carcinogenic vehicular emissions pollute the air of historically redlined communities. Their residents live with industrial pollutants in the air and soil, along with greater amounts of asbestos and other toxins. Beyond this, racial and ethnic minorities make up 56% of the people living within 3 kilometers of a carcinogenic waste-producing site, while a majority of communities of color are at high risk for lead exposure through their water.<sup>15,19</sup> For instance, the latest National Air Toxics Assessment (NATA) report conducted by the Environmental Protection Agency (EPA) found 12 hazardous air toxics that raised the risk for cancer by an estimated 98.3%.<sup>20</sup> Further analysis highlights disparities in the distribution and impact of these air toxics, based on factors such as race, ethnicity, and segregation.<sup>21</sup>

People of color often live in impoverished and polluted neighborhoods, many of which have dense industrial facilities, resulting in heightened exposure to harmful air toxics.<sup>22,23</sup> Specifically, the risk of cancer due to air toxics exposure is influenced by the level of segregation within a community. One study examining St. Louis, Missouri, found low-income residents live disproportionately closer to industrial pollution sources.<sup>24</sup> In order to assess lifetime cancer risk disparities, studies have examined air toxicity coupled with racial and income segregation patterns. The researchers found residents of these communities had an elevated cancer risk associated with air toxics at the census tract level.<sup>25</sup> Recent advances in current air emissions inventories and ambient air exposure modeling data have correlated the distribution of air toxicant exposures and cancer risks among diverse communities. Studies in South Carolina and California have found burden disparities in the distribution of such facilities and cancer risk at the census block and tract level by race/ethnicity and socioeconomic status.<sup>25,23</sup>

Exposure to polyfluoroalkyl and perfluoroalkyl substances (PFAS) can increase the risk for cancer, as PFAS persist in the environment and body's endocrine system. They pose a systemic and generational risk to human health, especially to those living in communities utilizing water systems near industrial facilities, military fire training areas, airports, and waste facilities.<sup>26</sup> Observations of 7,873 community water systems from 2016 through 2022 and across 18 states, it was found that drinking water from watersheds near these polluting sites was associated with a 10% to 80% increase in PFAS. These polluted watersheds disproportionately serve Hispanic and Black communities. Specifically, Blacks have a 6% to 9% higher risk of sharing their watershed with an industrial facility, military fire training area, and airport; and they have a 7% to 13% higher risk for their community water systems to be in proximity to a wastewater treatment plant.

Similarly, Appalachian communities such as East Liverpool, Ohio, are exposed to an elevated risk for cancer caused by soil contaminated by hazardous waste incinerators.<sup>27</sup> Moreover, socially disadvantaged communities often encounter PFAS in food packaging, cookware, fabrics, and personal care products.<sup>28</sup> Due to historical social and financial impacts of systemic racism, home and personal care products with carcinogens, such as PFAS and parabens that are endocrine-disrupting chemicals, are marketed and made readily accessible in low-income communities of color. Women of color are at most risk to be exposed to personal care products that elevate the risk for breast cancer. African American women have been found to use personal care products containing endocrine disrupting and carcinogenic chemicals (hair relaxers/straighteners) more often and earlier in life (as early as 4 years old) and at a higher rate and duration compared to White and Hispanic women.<sup>29</sup>

Several case studies have illustrated the intersection of environmental justice and carcinogens. One study identified Native American communities that are disproportionately exposed to uranium mining and other environmental hazards that have been linked to an increased risk of cancer, kidney disease, and other adverse health outcomes.

Another study concluded that petrochemical companies intentionally place their facilities in towns with established poor communities of color, meaning that “toxicity follows poor, segregated communities, not the other way around.”<sup>30</sup> These companies choose to build in communities of color, as residents are often in need of jobs and are politically vulnerable, due to a lack of support from local government or access to resources.<sup>31</sup> As wealthy and White communities have increased their opposition to having these facilities in their neighborhoods, the industry has changed its tactics on the “spatial distribution of environmental hazards.”<sup>31</sup> And although people of color have mobilized to fight for the health of their communities since the 1990s, their success has been limited.<sup>32</sup>

Cancer Alley, an area of Louisiana located along the lower Mississippi River, exists because of Jim Crow and zoning laws and the EPA's history of unequal enforcement of federal environmental laws based on the race of the population impacted.<sup>31,33</sup> Cancer Alley currently hosts nearly 150 oil refineries, plastic processing plants, and chemical facilities and accounts for 25% of the petrochemical production in the United States. Its ever-widening corridor of petrochemical plants has subjected the mostly African American residents in St. James Parish to cancer, respiratory diseases, and other health problems. According to a combination of data from the EPA's NATA map and Environmental Justice Screening Tool, the cancer risks in this predominantly Black residential area could be at 104 and 105 cases per million, while those threats in predominantly White districts range from 60 to 75 per million. In parts of Cancer Alley, ProPublica estimated lifetime cancer risk is up to 47 times what the EPA deems acceptable. Environmental advocates and scholars consider the region a "sacrifice zone," where state-level environmental protection mandates are met, but certain regions suffer the brunt of hotspots.<sup>34</sup> Others have referred to the same region as "Death Alley," due to the disproportionate number of deaths.<sup>35</sup>

Sections of the Greater Houston area make up the third largest hotspot of cancer-causing air in the country, behind Louisiana's Cancer Alley and an area around Port Arthur, Texas, which is on the Louisiana border.<sup>36</sup> Twenty-one industrial and toxic waste facilities are located within three miles of the Harrisburg/Manchester neighborhood of Houston, whose Hispanic residents comprise 90% of the population and Black residents make up 8%.<sup>37</sup> Many plants and refineries are located along the Houston Ship Channel, which is bordered by neighborhoods such as Harrisburg/Manchester and Galena Park, which is 80% Hispanic.<sup>38</sup> Almost 40% of Galena Park residents and 90% of Harrisburg/Manchester residents live within one mile of an industrial facility.<sup>39</sup> These communities are disproportionately exposed to toxic substances and emissions, compared to predominantly White communities. Industrial facilities in Houston emitted an additional 23 million pounds of pollutants over what they were allowed in 2019 alone.<sup>40</sup>

The Houston Landing, a local news site, reported that in October 2023, 19-year-old Amy Rivas rented a one-bedroom apartment in Houston's Greater Fifth Ward. No one told her that she had moved into a state-designated cancer cluster, where an unusually high number of residents had been diagnosed with the disease, or that the EPA was testing the soil in her neighborhood for contamination. No one told her that the city had just offered to relocate residents from the area to safer locations in Houston. In Texas, real estate agents and city officials say lax regulations govern what sellers and landlords must disclose to clients and renters. Texas does not require environmental assessments for residential properties, and there is no disclosure required if the land was previously used for industrial purposes — making any disclosure for homes near industry even more difficult to include. As a result, sellers and real estate agents are left to make an ethical decision on what to tell new buyers, measuring their moral compass against their potential commission.

City officials say there is little they can do to prevent new construction in cancer clusters or stop residents from moving into them. Between 2018 and 2023, Houston’s permitting department approved 1,501 single-family homes, duplexes, and apartment complexes in the cancer cluster’s 77020 and 77026 ZIP code areas, according to city permitting data — despite the state’s own determination that the area had higher-than-normal rates of cancer. Rivas had no clue about any of this. Now, she knows she should not touch the soil or breathe near it. If she decides to garden — which she said she would not — she needs to clean her shoes before she reenters her home.<sup>41</sup>

In 2021, ProPublica published the most detailed map of cancer-causing industrial air pollution, using data from an EPA model called Risk-Screening Environmental Indicators.<sup>42</sup> This model estimates excess cancer risk around petrochemical facilities in Greater Houston is higher than 1 case of cancer in 100 people over the course of a lifetime.

To measure the health impact of carcinogenic environments, researchers recommend using “attributable risk” (meaning, the incidence rate of adverse health events caused by pollution) because exposure alone is not a reliable proxy for harm. Attributable risk is determined by the interaction of pollution exposure with other social factors, such as nutrition, stress, and access to healthcare.<sup>43</sup> A long history of public policy working against marginalized communities gives them a higher attributable risk for cancer.

Several 1980s studies calling out the excessive health burden associated with living near waste caused President Bill Clinton to issue an executive order in 1994 calling for “environmental justice” — the principle that the adverse effects of pollution should not be borne disproportionately by minority or low-income populations.<sup>44</sup> Through the EPA, the federal government is working to address that disproportion in communities of color, but there is still much work to be done.

Flint, Michigan, is another case in point. It is where public policy clearly elevated the risk for cancer, creating an excessive burden in an already medically underserved community. Entrenched poverty, toxicants in the soil and air, and lack of access to quality preventive cancer care all lead to persistently high rates of cancer in Flint. In 2016, state officials administering Flint’s water system rocked the public consciousness with news that toxic levels of lead, among other carcinogens, persisted within Flint’s water supply. In 2020, the Michigan Department of Health and Human Services confirmed that Flint’s increasingly higher poverty rates and population decline coincided with considerably higher cancer rates within certain areas of the city.<sup>45</sup>

# Appendix B

## Medically Underserved Communities

America has a tiered healthcare system in which people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty are having their lives adversely affected by inadequate care that result in higher rates of hospitalizations, emergency room visits, disabilities, and mortality. They also experience a poor quality of life when contrasted with those who receive preferential care.<sup>46</sup> These inequities are rooted in healthcare laws, policies, and regulations that operate from the principle that there is an unlimited demand for medical care and a limited capacity to service that care; consequently, healthcare must be rationed.<sup>47</sup> This principle necessarily picks winners and losers, with the burden falling on the marginalized living in medically underserved communities.

Perhaps the most thoughtful recent discussion of access to healthcare by a federal body is to be found in The 1983 President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Securing Access to Health Care: A Report on the Ethical Implications of Differences in the Availability of Health Services* (the 1983 Commission).<sup>48</sup> What is important about the commission's report is that it was written by key opinion leaders convened by Congress and President Jimmy Carter to wrestle with the knotty question of how to provision healthcare to the American people. The conclusions they reached align with the dominant school of thought that has been informing healthcare apportionment in the country to the present day.

While the 1952 President's Commission on the Health Needs of the Nation concluded that "access to the means for the attainment and preservation of health is a basic human right," the 1983 Commission rejected the idea.<sup>49,50</sup> It concluded that society had "ethical obligations" to provide equitable access to healthcare, but that healthcare was not a human right.<sup>51</sup> The 1983 Commission reasoned that discussions of a right to healthcare have frequently been premised on offering patients access to all beneficial care, to all care that others are receiving, or to all that they need — or want. By creating impossible demands on society's resources for healthcare, such formulations have risked negating the entire notion of a moral obligation to secure care for those who lack it. In their place, the 1983 Commission proposed a standard of "an adequate level of care, which should be thought of as a floor below which no one ought to fall, not a ceiling above which no one may rise."<sup>52</sup>

The 1983 Commission also distinguished between equitable and equal access to healthcare. As long as significant inequalities in income and wealth persist, it concluded that "inequalities in the use of health care can be expected beyond those created by differences in need."<sup>53</sup> Given people with the same pattern of preferences and equal healthcare needs, the 1983 Commission went on: "Those with greater financial resources will purchase more health care."<sup>54</sup>



Conversely, given equal financial resources, the different patterns of healthcare preferences that typically exist in any population will result in a different use of health services by people with equal healthcare needs. The 1983 Commission contended that trying to prevent such inequalities “would require interfering with people’s liberty to use their income to purchase an important good like health care while leaving them free to use it for frivolous or inessential ends.”<sup>55</sup> The 1983 Commission assessed that prohibiting “people with higher incomes or stronger preferences for health care from purchasing more care than everyone else gets would not be feasible, and would probably result in a black market for health care.”<sup>56</sup> In addition, since providing an adequate level of care is a limited moral requirement, this definition also avoids the unacceptable restriction on individual liberty entailed by the view that equity requires equality. Provided that an adequate level is available to all, those who prefer to use their resources to obtain care that exceeds that level do not offend any ethical principle in doing so.

The 1983 Commission set out the argument for a tiered healthcare system and in the process ignored the reality that its definition of “adequate level of care” would necessarily lead to an elevation of patient risk, poor quality of life, and shortened life expectancy in communities marginalized by poverty and racial and ethnic discrimination.

The commissioners subscribed to an economic theory that evolved into a face validity consensus that there exists an unlimited demand for healthcare and a limited capacity to meet that demand. Their reasoning is in sync with the prevailing opinion that has been informing American healthcare policy since the last quarter of the 20th century. Those policies have produced our tiered healthcare system, in which healthcare must be rationed.

What was outside the 1983 Commission’s purview was what “adequate care” would mean for millions of Americans already burdened by living in carcinogenic environments where there was an elevated risk for cancer. It was in these communities that the “attributable risk” of the environmental justice movement and the excessive burden the 1983 Commission described would be manifested in cancer clusters and poor survival rates. Compounding the problem for the residents of these communities, the “societal obligation,” or federal intervention that the commission envisioned, did not materialize. In the absence of comprehensive public/private interventions or federal policies, cancer care in these at-risk communities was allowed to fall below the level of adequate care. Their residents have less access to guideline-directed healthcare, newer diagnostic screenings, state-of-the-art biometric devices, modern therapies, subspecialty care, and participation in clinical research.

There has been substantial progress in cancer treatment, screening, diagnosis, and prevention over the past several decades, but communities marginalized by lower socioeconomic status, living and working in carcinogenic environments, geographically isolated, or belonging to a racial or ethnic minority are slow to see the benefits. Rural communities tend to exhibit higher cancer death rates, less-frequent use of proven screening tests, and higher rates of advanced cancer diagnoses. For marginalized urban communities, public policies in housing have fostered low screening rates for cancer. Moazzam et al., for example, found cancer screenings were poorest in areas where redlining existed.<sup>57</sup> Studies have shown that people of color and women on Medicaid are less likely to be tested for lung cancer.<sup>58</sup>

African Americans, the majority of whom live together in easily identifiable geographies that are burdened by carcinogens, are much more likely to develop some cancers (e.g., lung and colorectal) and have higher death rates.<sup>59,60</sup> White people living in the Appalachian of regions Kentucky, West Virginia, and Ohio have much higher rates of lung, colorectal, and cervical cancers.<sup>61,62</sup> These disparities are not irregular occurrences, but rather are stable patterns that characterize the operations of local care networks.<sup>63,64</sup> Colorectal cancer has also disproportionately affected those with a lower socioeconomic status. It is one of the leading causes of mortality in the United States, with African Americans having the highest incidence and mortality rates. In recent years, the mortality rates for colorectal cancer have decreased, but the same disparities have been maintained for African American and other non-White populations. Early screening is essential for colorectal cancer treatment, but low-income people are less likely to access cancer screenings.<sup>65</sup>

Speaking generally, cancer care can pose an excessive financial burden. Recent research has started to refer to the burden as “financial toxicity” as a means to emphasize it as a significant side effect of cancer treatment. While financial toxicity is relevant across most groups in the U.S., people of color and other marginalized communities are particularly vulnerable to the costs of cancer care. These groups are more likely to struggle financially, which is another factor that maintains health disparities.<sup>66</sup> The cost of cancer care is constantly increasing, with drugs and diagnostic imaging leading the cost increases. Patients and physicians make decisions based on the costs of procedures, rather than on beneficial care. Novel therapies come with big costs. For those who are already struggling financially, this will influence their decision-making greatly.<sup>67</sup>

While the 1983 Commission spoke of “adequate care for all,” our tiered healthcare system has left many uninsured. People of color and ethnic minorities make up a good portion of those without insurance.<sup>68</sup> The absence of insurance informs the failure to detect cancer early through guideline-directed screenings and limits the course of treatment that is available to a patient. Affording minimal adequate care is not just a problem for the uninsured. A good portion of the people who are diagnosed with cancer are of laboring age. A cancer diagnosis can disrupt their ability to earn an adequate wage, or it could cost a person their job. This risk, coupled with the fact that cancer care is tremendously expensive, legitimizes the fear that many marginalized groups have toward medical intervention when it comes to cancer.

Advances in cancer therapeutics have revolutionized survival outcomes in patients with cancer. Cancer immunotherapies, for example, have emerged as a significant advancement in cancer treatment, offering several benefits in comparison to traditional treatment modalities. Unlike traditional treatments, like chemotherapy and radiation, which directly target cancer cells, immunotherapies focus on harnessing and enhancing the body's immune system to recognize and destroy cancer cells. Immunotherapies can stimulate the immune system to generate a long-lasting memory response. This means that even after the initial treatment, the immune system may continue to recognize and attack cancer cells, offering potential long-term protection against cancer recurrence.

One study found White and Black patients residing in areas of lower educational and economic wealth were less likely to receive immunotherapy.<sup>69</sup> Carrol et al. reported that in the Medicare program, practice characteristics and rural location were associated with adoption of immunotherapy, suggesting that there were geographic disparities in access to important innovations for treating patients with cancer.<sup>70</sup> Chimeric antigen receptor (CAR) T-cell therapy is a form of immunotherapy changing the paradigm in hematologic malignancies, but disparities in access exist in the real-world setting. Ahmed et al. found that African Americans were less likely than other racial/ethnic groups to receive CAR T-cell therapy. They found that socioeconomic stratum and insurance coverage were important underlying causes of the disparities.<sup>71</sup> Another study found that women and Black Medicare beneficiaries suffering from a metastatic renal cell carcinoma were less likely to be treated with immunotherapies when compared to White male beneficiaries.<sup>72</sup> Yet there is evidence, even when less novel therapies are made available in a timely way, reductions in cancer disparities can be achieved.<sup>73</sup> Fane, L. S., et al found Asian Americans and Pacific Islanders (AAPI) being treated for stage I, II, III, and IV melanoma had higher mortality rates than non-Hispanic Whites. A contributing factor they found was a delay in time to treatment among uninsured AAPI patients.<sup>74</sup>

Unrepresentative cancer clinical trials is another influential factor informing inequities in cancer care. Even though people of color have higher rates of incidence and mortality for many types of cancer, most studies are made up of at least 80% non-Hispanic Whites. It is also important to note that women (particularly women of color) and elderly people are often excluded from clinical trials. White men are always the majority, even when their population is less at-risk.<sup>75</sup>

Hispanics and African Americans were underrepresented in myeloma clinical trials in which all of the participants received CAR T-cell therapy. In these studies only 7.3% of CAR T-cell therapy-related admissions were of patients from neighborhoods with a mean income less than \$40,000. Almost one-third of the CAR T-cell recipients lived more than two hours from the center in which they were treated; the majority of patients were from the higher socioeconomic stratum. There were fewer patients with Medicare and fewer uninsured patients in the CAR T-cell group. While analyzing drugs approved by the FDA for thoracic malignancies from 2006 to 2020, Chiang et al found significant underrepresentation of non-White participants in FDA drug registration clinical trials, even though there was an excessive disease burden of lung cancer among non-Whites.<sup>76</sup> Low clinical trial enrollment of minorities also feeds the inequity.<sup>76</sup>

# Appendix C

## CEO Cancer Gold Standard™ and Going for Gold Partnership

In 2000 President George H. W. Bush asked Robert A. Ingram, then the CEO of GlaxoWellcome, to convene and chair an organization composed of action-oriented chief executives as part of the output from the National Dialogue on Cancer. The organization was named the CEO Roundtable on Cancer (CEORT). Bush challenged them to “do something more about cancer prevention, diagnosis, and treatment within your own family as well as within your corporate family.”

The Bush family had experienced a very personal and powerful relationship with cancer ever since the tragic death of their 3-year-old daughter, Robin, from cancer. Robin's passing instilled a lifetime commitment to do whatever they could to bring an end to cancer. Evolving from the National Dialogue on Cancer, to C-Change, to what is now known as CEORT, the organization brings public, private, and nonprofit leaders, cancer survivors and advocacy groups, elected officials, and academic experts together to identify both barriers and opportunities and to work collaboratively on identifying national priorities for achieving the eradication of cancer.

CEORT's mission is to develop and implement initiatives that reduce the risk of cancer, enable early diagnosis, facilitate access to the best available treatments, and hasten the discovery of novel and more effective anti-cancer therapies to help eliminate cancer as a personal disease and public health problem.

As its first major initiative, CEORT created the CEO Cancer Gold Standard™ (Gold Standard) to encourage organizations to evaluate and evolve their health benefits and corporate and enterprise culture and to take extensive, concrete actions in five key areas of health and wellness to fight cancer in the workplace. The Health and Well-Being Council, one of CEORT's leadership groups, is responsible for expanding the reach and impact of the Gold Standard and for reviewing the program annually to ensure it is based on the latest scientific evidence supporting patient health. The Gold Standard is embraced by more than 200 enterprises and benefits more than 7 million employees and their family members around the globe. It is a no-cost health and wellness designation that provides an evidence-based framework for enterprises of all sizes (inclusive of governments and municipalities) and from diverse industries around the globe to have a healthier workforce by focusing on cancer risk reduction, early detection, and high-quality care.

In 2008, President Bush noted the program's progress, stating:

"The CEO Cancer Gold Standard is a powerful program that advances the elimination of cancer as a public health threat. But on a more personal level, it also is a boon to employees and their families. As such, I take great pride in the CEO Roundtable on Cancer that developed the Gold Standard, and I urge businesses large and small, for-profit and not-for-profit, to embrace it. This is a marvelous example of America's corporate leadership at its golden best."

In the fall of 2021, CEORT launched Going for Gold (G4G) as a new partnership opportunity and an extension of the Gold Standard. G4G is a multi-year strategic partnership between corporations, Historically Black Colleges and Universities (HBCUs), Hispanic-Serving Institutions (HSIs), and other Minority-Serving Institutions to elevate the health of those disproportionately affected by cancer in their communities. The program seeks to engage students, families, school alumni, and communities through this grassroots mobilization of outreach around cancer prevention, early detection, and access to advanced treatments and clinical trials.

Employers who achieve Gold Standard accreditation are partnered with G4G HBCUs and HSIs to address cancer disparities in medically underserved communities. Expanding these relationships in support of the Cancer Stage Shifting Initiative, CEORT and the National Minority Quality Forum (NMQF) will encourage other employers (public and private) to seek Gold Standard accreditation. The idea is to transform workspaces in medically underserved communities into centers of cancer awareness, prevention, early detection, and improved access to advanced therapies.

As part of CEORT and NMQF's combined forces approach to the Cancer Moonshot, we will focus on leveraging G4G as a basis for community engagement in collaboration with local government agencies to reach marginalized populations, as well as the broader public. Through social media and in-person events, CEORT and NMQF will broadcast the trusted voices of HBCUs and HSIs, strengthened by their partnership with Gold Standard-accredited employers, to educate the residents of medically underserved communities about cancer prevention, early detection, and clinical trial participation.

The Cancer Index will operate as a virtual media center supporting these activities. Powered by information drawn from the cancer data warehouse or NMQF's broader community data lake, microsites will be optimized to ensure that the trusted voices of HBCUs and HSIs reach the right audiences with actionable cancer information delivered in a wide variety of accessible formats (such as audio and video files, disease-specific maps, detailed statistical reports, chart books, infographics, cartoons, blogs, etc.).

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