

## A tribute to Robert Croyle, PhD, Director, Division of Cancer Control and Population Sciences

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Cite this as: *TBM* 2021;11:1967–1971  
doi: 10.1093/tbm/ibab024

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### Abstract

At the beginning of Dr. Robert Croyle's 18th and final year as director of the National Cancer Institute's (NCI) Division of Cancer Control and Population Sciences (DCCPS), before his retirement in December 2021, it is fitting to review some of his and the division's many accomplishments and pay tribute to him as one of the government's most effective leaders. The focus of this article is on Dr. Croyle's contributions in the behavioral and related domains and his and the division's impact on the landscape of cancer control and population sciences. Dr. Croyle joined DCCPS in 1998 as associate director for behavioral research. He became acting director of DCCPS in 2001 and then director in 2003. DCCPS is a formidable NCI division, with broad mandates and responsibilities and many partners from multiple sectors. The division conducts and supports an integrated program of the highest-quality genetic, epidemiological, behavioral, social, applied, survivorship, surveillance, and health care delivery cancer research. The division's notable successes in implementation science and the dissemination of evidence-based findings and products, use of cancer research consortia, and partnerships across National Institutes of Health and with external federal and nongovernmental organizations are among many that reflect Dr. Croyle's visionary leadership.

### Keywords

Cancer control, Behavioral research, Epidemiology, Surveillance, Health care delivery

### INTRODUCTION

Robert Croyle, PhD, has been a leader at the National Cancer Institute (NCI) since 1998, initially, as the first associate director for the Behavioral Research Program (BRP) in the Division of Cancer Control and Population Sciences (DCCPS), then as acting director, and, since 2003, as the director of DCCPS. From 2018 to 2020, Dr. Croyle also served as interim director of the NCI's Center for Global Health.

At the beginning of Dr. Croyle's final year as director, before his retirement in December 2021, it is fitting to review some of his and the division's many accomplishments and pay tribute to him as one of the government's most effective leaders. While I will focus especially on Dr. Croyle's contributions in the behavioral and related domains, his impact extends to the entire landscape of cancer control and population sciences. In choosing some areas to highlight, I am omitting many others equally important.

DCCPS is a formidable NCI division, with broad mandates and responsibilities and many partners from multiple sectors. The division conducts and supports an integrated program of the highest-quality genetic, epidemiological, behavioral, social, applied, survivorship, surveillance, and health care delivery cancer research [1]. Its FY21 operating budget is ~\$140M, and DCCPS is home to 750 grants and contracts valued at ~\$450M. DCCPS is a hybrid division; while it has a strong extramural presence, division professionals also are productive scholars who publish widely in top journals.

### A NEW NCI DIVISION WITH A MANDATE FOR BEHAVIORAL RESEARCH

In 1997, when Richard Klausner, MD, then director of the NCI, recruited me to lead the new DCCPS, we agreed on an organizational design that included programs for Epidemiology Research, which became Epidemiology and Genetics Research, Behavioral Research, Surveillance Research (which also included cancer statistics), and an Office of Cancer Survivorship [2] (for background on the history of cancer control at the NCI, see <https://cancercontrol.cancer.gov/about-dccps/about-cc/milestones-in-the-history-of-cancer>). [3] A comprehensive review of the history of cancer control and health care delivery research, since groundbreaking 1971 cancer legislation launched the War on Cancer, was authored by Kaluzny and O'Brien [4]). Structure and titles of the division's programs and organizational structure continue to evolve. A foundational report from the Cancer Control Program Review Group in 1997 provided the impetus for creation of the new division and a strong focus on behavioral research within it. The report stated: "Data show that lifestyle and environmental influences are responsible for a majority of the cancer burden. Thus, the Review Group recommends that NCI pursue a vigorous effort to exploit existing and emerging opportunities in behavioral prevention and cancer control" [5]. This was a landmark recommendation and recognition that behavioral research is central to the effective control of cancer.

In 1997, no National Institutes of Health (NIH) institute or center had a standalone behavioral research

program, and if we were going to create one, it had to be led by someone with impeccable scientific credentials, who also was a highly effective communicator and would attract the best and the brightest to the team. Bob Croyle was the right person to lead this challenge. Recruiting Dr. Croyle from the University of Utah as BRP associate director led to one of the strongest appointments Deputy Director Robert Hiatt, MD, PhD, and I made as DCCPS leaders and one that has had a long-term positive impact for the DCCPS.

While behavioral researchers had been funded previously to study topics such as smoking, cancer screening, and diet and cancer, before we created the BRP at NCI, the focus of research tended to be first on cancer screening, for example, and not necessarily on understanding behavior as the underlying phenomenon. Within the NCI, as in other institutes, there also had not been recognition of the need to include the basic science of health behavior as an important component of cancer prevention and control. Yet, it long has been recognized that behavioral factors, including tobacco use, diet and physical activity, alcohol use, and sun exposure, are among the major causes of cancer and that changing behaviors in those domains is critical to prevent cancers and find them when they are early, treatable, and, ideally, curable. More recently, human papillomavirus (HPV) vaccination was added to the cancer prevention arsenal. Similarly, regular cancer screening with effective tests is essential to reduce cancer mortality. Reducing cancer incidence and mortality requires attention to behavior, and funding the full range of behavioral research, as the Cancer Control Review Group had recommended [5]. As the social-ecological model shows, the focus of research is sometimes on the behavior of individuals and sometimes, instead, or also, on policy approaches to influence millions of people. For example, to reduce cigarette use and consumption of sugary beverages—two harmful behaviors—research demonstrates that policy approaches, such as taxation, may be most effective to change behaviors at the population level [2]. Often, multiple approaches are needed, such as interventions from physicians that might reach patients with messages about how tobacco use is affecting their health adversely, tailored messages to patients about how to stop tobacco use, and higher taxes on tobacco products. All these kinds of approaches have been used in research by DCCPS investigators.

#### A COMPREHENSIVE APPROACH TO BEHAVIORAL RESEARCH

Dr. Croyle created a comprehensive behavioral research program that included topical branches—for example, diet, smoking, cancer screening, and health communication—and a branch devoted to basic behavioral research. Health disparities is a

theme woven through all BRP branches and the rest of the division, and BRP leaders and staff reach across to other programs in the division and beyond in devising their plans and strategies.

Dr. Croyle recruited outstanding people from the extramural community and NIH to build a program that became one of the strongest at the NCI and a model for other institutes. Under Dr. Croyle's leadership, and continued by William Klein, PhD, current associate director, BRP, behavioral research at the NCI spans the cancer control continuum: from prevention through end-of-life, and from basic behavioral science to interventions to change behaviors, and to the scale-up of effective interventions, through principles of implementation science, so that they are widely used to improve the health of individuals and populations (as shown in Fig. 1). Of special note is BRP's leadership of the science to inform urgent tobacco control policy [6].

The NCI has made important investments in creating behavioral research infrastructure, for example, Transdisciplinary Tobacco Use Research Centers, which were launched in partnership with the National Institute on Drug Abuse and the Robert Wood Johnson Foundation (RWJF), and Centers of Excellence in Cancer Communication Research. Dr. Croyle and others in the BRP built a groundbreaking foundation of evaluation research to assess the impact of these initiatives and to study team science. *Strategies for Team Science Success: Handbook of Evidence-Based Principles for Cross-Disciplinary Science and Practical Lessons Learned from Health Researchers* has been downloaded 28,000 times since its publication in December 2019. The team science textbook was edited by Drs. Kara Hall, Amanda Vogel, and Robert Croyle and features innovative tools and resources for effective, cross-disciplinary team science that can be beneficial for researchers and practitioners [7].

BRP staff and others have developed many useful tools. HINTS—the Health Information National Trends Survey—began under Dr. Croyle's BRP leadership, thanks to Gary Kreps, PhD, and Brad Hesse, PhD, and regularly collects data from random samples of the public to assess adherence to recommended behaviors for the control of cancer. From the start, BRP staff were committed to make the data widely available. Hundreds of peer-reviewed journal articles have been published using HINTS data, and the number continues to grow. DCCPS staff have made publications, interventions and intervention guides, program materials, and more available through the DCCPS website.

#### IMPLEMENTATION SCIENCE

DCCPS leaders created the first NIH organization with an explicit focus on the dissemination of research findings. Initially led by Jon Kerner, PhD, the unit in the office of the division director was

## The span of behavioral research at the NCI

Understand the black box—basic science of behavioral research.

Develop and evaluate effective interventions to change behaviors such as tobacco use, diet and physical activity, sun exposure, use of HPV vaccination, and cancer screening.

Advance the science of health communications research.

Focus especially on issues related to health inequities.

Improve understanding about the health of cancer survivors and how to help them live the healthiest lives.

Use implementation science to facilitate adoption of evidence-based programs and policies to promote behavior change, through a variety of means, including partnerships with other organizations, such as the CDC and American Cancer Society, and to make proven interventions easily accessible.

Create tools and methods to control cancer, e.g., HINTS surveys, transdisciplinary research centers and training.

Partner with other parts of NCI and NIH to leverage funds to invest in behavioral research and cancer /cancer-related behaviors.

**Fig 1 |** The span of behavioral research at the National Cancer Institute.

developed to support research on what has come to be called implementation science and the dissemination of evidence-based findings and products. The recruitment and leadership of Russ Glasgow, PhD, and then David Chambers, PhD, as leaders in this area were essential to the expansion and success of implementation science. Dr. Croyle's visionary leadership of these efforts may be one of his most significant and lasting contributions to the control of cancer. When the focus on implementation science was launched, many were skeptical that such a unit was needed. Yet now, the area is accepted, not just as part of the NCI but as a critical part of most NIH institutes. A recent monograph is a testament to how much DCCPS has done to define, describe, support research in, and create tools for implementation science [7]. The tools developed by DCCPS have been important in advancing the control of cancer. For example, by providing access to evidence-based programs, the division has raised the standard of care in communities for cancer control. Evidence-based cancer control programs is a searchable database that connects program planners and practitioners to effective interventions, with the aim of encouraging them to use what is effective rather than creating one-off programs [8]. In the past, practitioners would have to contact individual researchers to gain access to intervention materials. The database makes that step unnecessary and,

thus, facilitates the use of programs shown to be effective. Many other tools and training programs also are available.

### HIGH-IMPACT INITIATIVES

Over the years since DCCPS began, division leaders created significant initiatives that changed how cancer control is studied and enabled more robust answers to important questions by creating research consortia among investigators. These consortia ensured the use of shared instruments, data sharing, and similar approaches. In each program area within DCCPS, investments were made to leverage resources and build collaborative networks, for example, the Cancer Cohort Consortium and the Cancer Intervention and Surveillance Modeling Network (CISNET) in the surveillance program. These networks facilitated sharing among researchers and reduced silos between them, increasing the nation's return on investment in cancer research.

Research on quality of cancer care has been a strong focus since the creation of the division, and Robert Hiatt, MD, PhD, former deputy director, was influential in launching the effort. Several large collaborative initiatives were developed, and work in this area has expanded greatly following the formation in 2015 of the Healthcare Delivery Research

Program. DCCPS also has encouraged research on the impact of the cost of care on patients' outcomes and has increased awareness that the cost of care influences outcomes. Specifically, researchers have shown that burden of cancer costs can have a deleterious impact on patients' outcomes.

The essential Surveillance, Epidemiology, and End Results Program Registries have been expanded, and new research settings added as part of a focus on health care delivery systems [9]. The Office of Cancer Survivorship has grown since the founding of DCCPS into a robust effort to understand the health of cancer survivors, threats to their health, and what interventions may improve health, survival, cure rates, and quality of life among cancer survivors.

Under Dr. Croyle's leadership, DCCPS was a strong participant and leader in the national Cancer Moonshot Initiative, which was launched by then Vice President Joe Biden. One of the focus areas for that effort, under a larger umbrella of implementation science, was realizing the potential of HPV vaccination to eliminate cervical cancer in the USA and around the world. Dr. Croyle also partnered with NCI's cancer centers program to issue supplements for research to increase the uptake of HPV vaccination and the implementation of smoking cessation programs for cancer patients.

Recently, there has been an expanded focus in DCCPS on rural health—particularly important in view of disproportionate mortality due to cancers whose outcomes could have been changed through prevention and early detection [10]. And, in the past year, DCCPS has provided support for research to assess the impact of COVID-19 on cancer patients and cancer-related behaviors, including cancer screening. A 2020 report projected a substantial increase in cancer cases and deaths as a result of the pandemic [11].

#### A LEADER WITH ORGANIZATIONAL INTELLIGENCE

Dr. Croyle excels in creating partnerships, and, as a result, DCCPS has leveraged its budget through partnerships across NIH, with the U.S. Food and Drug Administration (FDA), Centers for Disease Control and Prevention, American Cancer Society, RWJF, and many other organizations. Dr. Croyle led the initial development of the unique FDA–NIH partnership in regulatory science, now coordinated by the NIH Office of Disease Prevention, which has enabled a significant expansion of funding for behavioral science to inform FDA's regulation of tobacco products.

Dr. Croyle's partnerships with the Office of Behavioral and Social Sciences Research, National Institute on Minority Health and Health Disparities, National Institute on Aging, and other institutes have enabled NCI's investments to go further and have yielded answers to important questions, such

as the impact of interventions on underrepresented populations.

Within NCI and NIH, Dr. Croyle and DCCPS leaders have led in examining the division's culture and opportunities for underrepresented minorities in the wake of Black Lives Matter. While DCCPS previously had a strong focus on health disparities research, investments in grants in this area have grown consistently since 2015 and align with the division's role in confronting the challenges of structural racism.

Dr. Croyle is known as a warm, empathic leader who listens and encourages staff members to attend to their own wellness and to participate in collective, collegial events. He is known as a constructive listener who makes time for people and has created imaginative, uplifting ways for staff to feel valued, be involved, engaged, empowered, and build strong bonds with one another. His leadership has resulted in a division with high loyalty and job satisfaction and low turnover.

Dr. Croyle's effectiveness in working with six very different NCI directors and interim directors has been key to his success. He operates without a partisan perspective and has accomplished much, even as NCI leadership has changed with presidents and administrations. Few could have managed this as adroitly as Dr. Croyle has. His effectiveness as a leader of a large government organization is perhaps proof of the hypothesis that behavioral sciences training is a good foundation for leadership. Indeed, his solid grounding in the discipline may be one of the reasons Dr. Croyle has been such a highly effective leader. He will leave behind a powerful legacy of a highly respected division, an outstanding behavioral research program, and perhaps the strongest organization in the USA focused on implementation science.

In reviewing the history, challenges, and successes of behavioral research at the NIH, Czajkowski, Riley, Stoney, Klein, and Croyle wrote: "The Division has since evolved into a model for supporting research on cancer-related psychological and behavioral processes, health behaviors (including tobacco use), communication strategies, healthcare processes and outcomes of care, and translation of knowledge about cancer treatment and survivorship into practice and community settings" [12]. This successful evolution is due, in large part, to the visionary leadership of Dr. Croyle and the NCI's investment in cancer control and population sciences.

**Acknowledgment:** I am grateful to Stacey Vantor, MPA, Planning Officer, DCCPS, NCI, for her help in getting updated information about DCCPS and to Lisa Warren for editorial assistance.

**Funding:** None.

**Compliance with Ethical Standards**

**Conflicts of Interest:** The author has no conflicts of interest to report.

**Ethical Approval:** This is a commentary and does not involve human subjects.

**Informed Consent:** NA.

**Transparency Statement:** This is a commentary, not an article about research or study findings.

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