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Guiding Cancer Control: A Path to Transformation

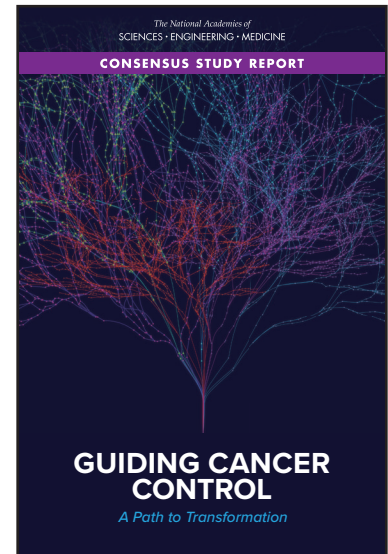
The challenge of cancer control starts with the complex nature of cancers themselves. Cancers can occur in many human tissues and organs, and there may be many different subtypes, yielding potentially hundreds of different types of cancers.

The burdens of cancers are also broad and diverse, from the physical, financial, and psychological tolls they impose on people to the costs they inflict on the nation's clinical care and public health systems.

Decades of concerted efforts to understand and eliminate cancers have produced significant advances in prevention, early detection, and treatment, but the burden of cancers remains substantial and continues to grow as the population ages. About 600,000 people in the United States died from cancer in 2018, and about 1.7 million people received a new diagnosis of cancer. Significant disparities in cancer incidence and outcome persist across different populations.

Cancer control efforts in the United States are particularly complex, involving more than a dozen federal agencies, 65 states and territories, and many private organizations, both nonprofit organizations and for-profit companies. Currently there is no uniform way of coordinating the efforts and priorities of these diverse stakeholders.

The National Academies of Sciences, Engineering, and Medicine, with support from the American Cancer Society, the Centers for Disease Control and Prevention, and the National Cancer Institute, convened a committee to develop a national strategy for cancer control. The resulting consensus report, *Guiding Cancer Control: A Path to Transformation*, presents the committee's strategic vision and its recommendations defining the key principles, attributes, methods, and tools needed to achieve the goal of implementing an effective national cancer control plan.



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ABOUT CANCER CONTROL

Addressing the complex causes and effects of cancer requires efforts across the continuum of cancer care, starting from basic risk awareness through cancer prevention, detection, diagnosis, and treatment, to palliative care, survivorship care, and hospice care, as well as all of the supporting services linked to these efforts.

Cancer control also is affected in various ways by the environment, technologies, economics, policies, and research. For example, factors such as education, food quality and availability, and policies related to housing and urban development can influence a person’s risk for developing cancer. There will be no single cancer control solution that can succeed across the expansive landscape of cancers and populations.

For the purposes of this report, “cancer control” refers to a variety of strategies and tactics aimed at helping people at risk for or diagnosed with cancers in various ways that can extend beyond the traditional notions of cancer prevention or treatment. Cancer control efforts in the United States traditionally have been hampered by poorly integrated resources, uncoordinated activities, and conflicting interests and incentives. The committee argues that the best chance for transforming U.S. cancer control is to apply a systems engineering approach.

A SYSTEMS APPROACH TO CANCER CONTROL

Cancer control should be seen as a system of systems, with a focus on the concept of a “complex adaptive system.” A complex adaptive system is a system consisting of individual entities that act and interact with one another to advance their own “interests,” modifying their behavior in response to what is happening in the rest of the system. Examples of complex adaptive systems include not only ecosystems and living organisms but also national economies, transportation systems, and population health.

Although new to cancer control, tools of complex systems analyses are routine in other industries, including banking, transportation, and manufacturing.

THE COMMITTEE’S RECOMMENDATIONS

Although significant advances have been made in recent years, it is crucial to overcome the current narrow and uncoordinated approaches significantly constraining progress and effectiveness across the segments of the cancer control continuum. A renewed vision to guide the development of new and more effective national approaches to cancer control is essential.

The committee recommends a strategy to ensure integration of resources and coordination of operations across the various components of a national cancer control system. A national plan should:

- Improve availability of preventive, screening, diagnostic, therapeutic, and palliative interventions, as well as survivorship care, hospice care and social services according to patient and family preferences and values;
- Leverage scientific advances to improve therapies and better understand their scientific, clinical, and economic impacts;
- Integrate a broad range of data sources by integrating the use of social, behavioral, and other information made possible by the convergence of communication, social media, cognitive, financial, and other technologies;
- Use and evaluate advanced technologies for continuous analytics, rapid reporting of trends and patterns, and improved forecasting and performance reviews;
- Apply the tools of complex systems analyses for assessing the “value” of cancer control interventions, guiding the development of products and services, developing new payment mechanisms, and helping patients make informed decisions;
- Minimize waste and harm stemming from disparate clinical practices, interventions lacking evidence of effectiveness, and conflicting clinical practice guidelines;
- Track and monitor financial links, incentives, and disincentives throughout the processes and systems of cancer control and rigorously require conflict-of-interest disclosures across cancer care, research, and patient advocacy activities;

“Use of the science and engineering of complex adaptive systems offers productive possibilities for new progress in guiding the cancer control system to reduce the burden of cancers for individuals, families, and society as whole.”

- Expand and support reproducibility strategies for developing reliable evidence from research;
- Discourage direct-to-consumer marketing of clinical products and services and tighten and enforce rules to curb promotion of non-evidence-based products and services;
- Launch and expand public engagement and outreach to broaden the understanding of cancer prevention as an integral component of a healthy life course.

The Department of Health and Human Services (HHS) should lead a national cancer control plan, in cooperation with a wide range of federal agencies, to reflect important non-health factors, such as the environment, education, workforce, housing and urban development. The specific agencies identified are the Office of Management and Budget, Department of Education, Environmental Protection Agency, Department of Defense, Department of Veterans Affairs, Department of Housing and Urban Development, Department of Agriculture, Social Security Administration, Department of Labor, Department of Commerce, Office of Personnel Management, Equal Employment Opportunity Commission, and the Department of Treasury.

HHS and the partner agencies should also fund and support an organization or consortium to prototype and develop a publicly available, interactive, and evolvable planning and monitoring tool. This comprehensive planning and monitoring tool should be centrally available and customizable across contexts and organizations.

The tool would help enable a functional understanding of the nation’s cancer control system and an ability to predict how it responds to various interests and pressures. Once such a comprehensive tool has been developed, policy makers could use it to guide the cancer control system in a desired direction.

To read the full text of the committee’s recommendations, visit nationalacademies.org/CancerControl.

CONCLUSION

The nation’s cancer control system will need to become much more effective, efficient, and accountable than it is today to successfully address the approaching wave of cancers in our aging society. Successful national cancer control efforts will require significant integration of resources and a major collaborative initiative among multiple participants to develop an effective national cancer control plan with joint accounting and accountability.

Use of the science and engineering of complex adaptive systems offers productive possibilities for new progress in guiding the cancer control system to reduce the burden of cancers for individuals, families, and society as whole.

To read the report, please visit [**nationalacademies.org/CancerControl**](http://nationalacademies.org/CancerControl).

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To read the full report, please visit
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