Multilevel Interventions Across the Cancer Care Continuum
Background Perspectives & Description of 2011 Conference and Journal Supplement
May 2010

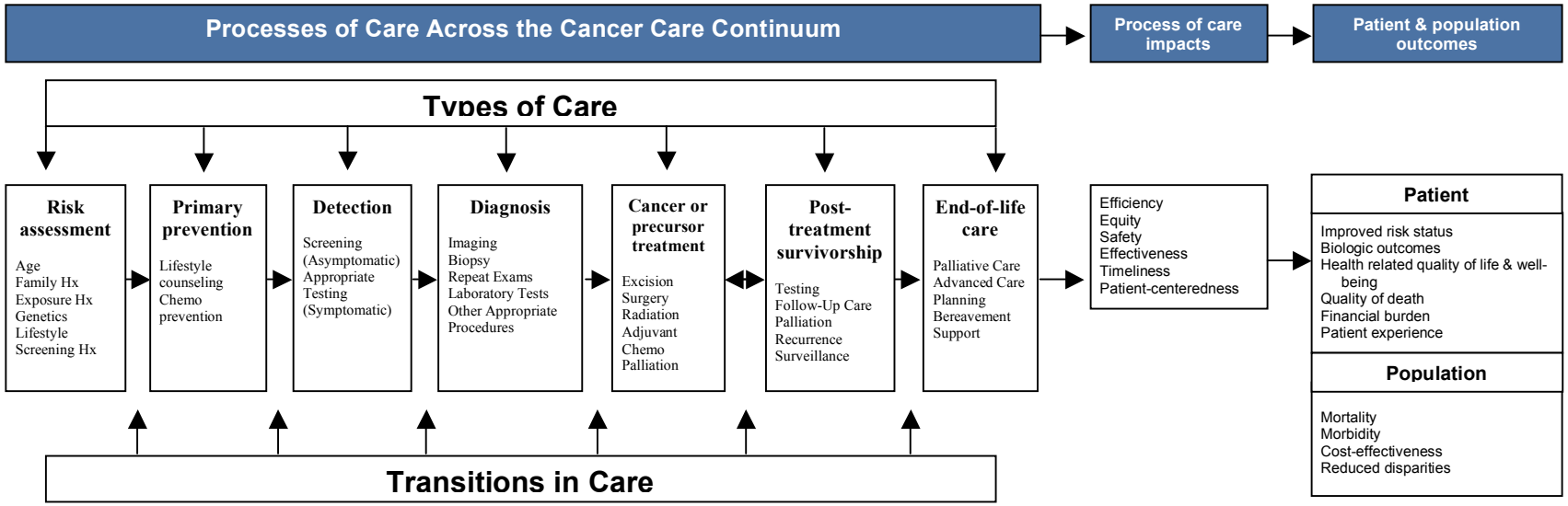
Brief Problem Statement

Cancer care, including prevention counseling; screening and follow up; treatment; surveillance; and end-of-life care, often takes place within health care organizations or intersects in some way with them. Organizational and policy research have traditionally examined the ways in which health care organizations respond to environmental influences, such as national and state health policies and programs, advocacy groups, community demographics, and health care markets. Health services research related to cancer has traditionally examined the role of individual patient characteristics; family and social supports; provider and provider team characteristics; and organizational structures and processes on patients' receipt of, or participation in, health services; however, the complex ways in which environmental influences and organizational structures and processes *interact* to influence patient care and outcomes remain largely unexamined. Even less studied are methods of intervening to affect these contextual influences in measurable ways that improve the structures and processes of care and outcomes for individuals needing cancer care. The role of national and state health policy in patient care is growing and changing as a result of recently passed health care reform legislation; legislative changes both underscore the influence of policy levels on health care organizations, providers and patients, and provide opportunities for multilevel intervention research.

The Cancer Care Continuum

The continuum of cancer care includes risk assessment, primary prevention, screening, detection, diagnosis, treatment, survivorship, and end-of-life care (Figure 1). Movement across the span of the cancer care continuum involves several *types* of needed care, as well as *transitions* between the types of care. *Type* refers to the care delivered to accomplish a specific goal, such as detection, diagnosis, or treatment. *Transition* refers to the set of interactions necessary to go from one type of care to another, such as from detection to diagnosis. Each type and transition in care is subject to influences at multiple levels that can facilitate or impede successful achievement.

Figure 1. Opportunities to Optimize Cancer Care

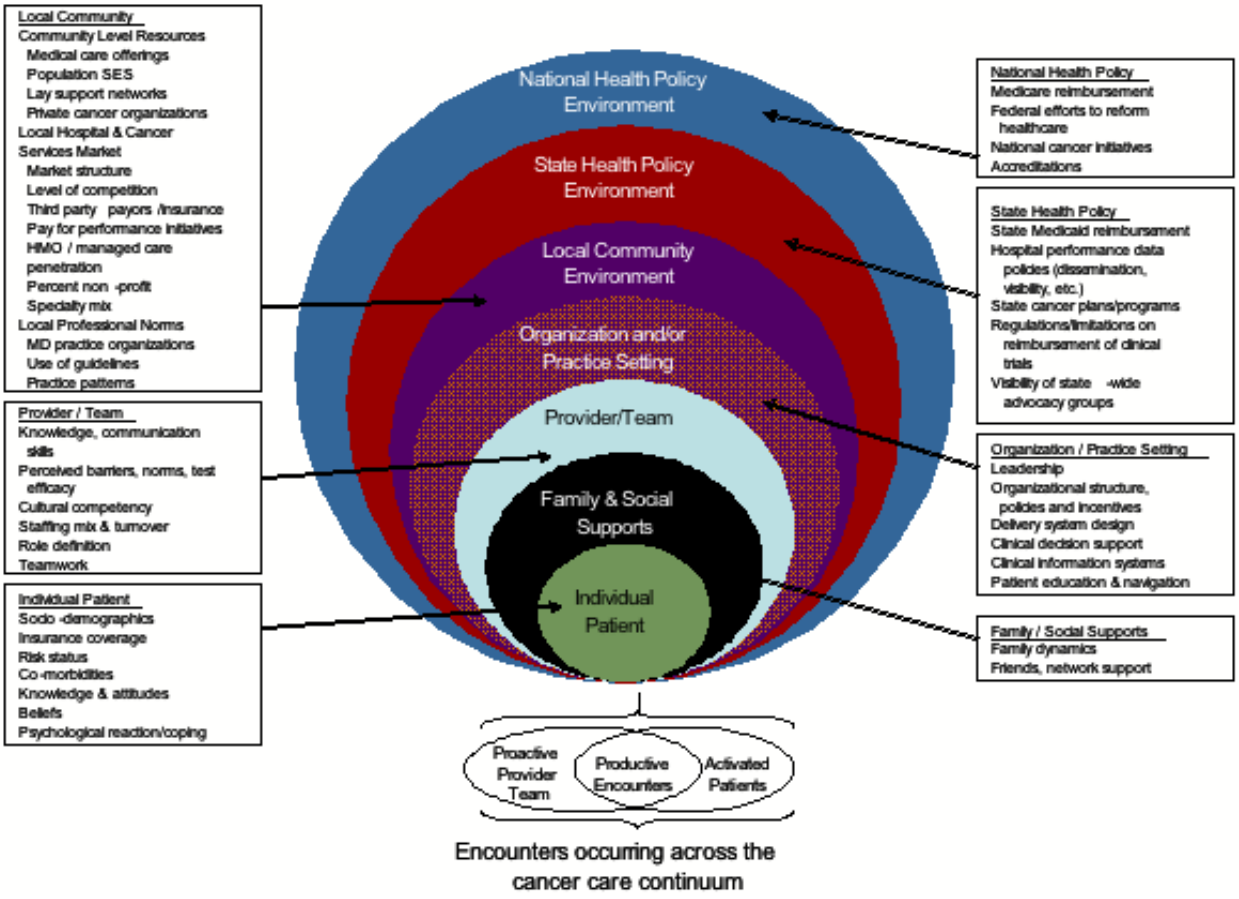


An Ecological Perspective

An ecological perspective acknowledges that many levels of context directly and indirectly affect patients' health behaviors. We define *level* to mean a conceptual construct that organizes and distinguishes different orders of hierarchically linked factors that influence the outcome of interest. For the purpose of our meeting, *levels* are the various contextual layers, such as the environment, organization, health care provider, family, and individual patient characteristics, which directly or indirectly influence a range of patient care outcomes.

Existing models consider three levels (the medical care system, the medical care organization, and the individual patient) or four levels (the system or environment in which medical care organizations are situated; the medical care organization; the provider group/team; and the individual provider). Our approach expands upon these models to encompass additional relevant levels to the cancer care continuum: the *national health policy environment*, including such factors as national health reform, reimbursement policies or cancer programs; the *state health policy environment*, including state reimbursement policies or cancer programs; the *local community environment*, including local health care markets and professional norms; the *organization or practice setting*, including human and capital resources and processes designed to improve care; the *provider and provider team*, including skills and attitudes; *family and social supports*, including social networks; and the *individual patient*, including socio-demographic characteristics, risk factors and beliefs and attitudes (Figure 2). The bottom panel of Figure 2 summarizes the ultimate effects of system/policy-level interventions: Proactive Provider Teams, Productive Encounters, and Activated Patients.

Figure 2. Multilevel Influences on the Cancer Care Continuum.



Most simply, each successive level in Figure 2 may influence the adjacent or nonadjacent levels within it. For example, institutional theory describes how organizations are constrained by the technical (market, resource, technological) and institutional (social, political, legal) features of the community, state and national contexts in which they operate.

The relationships between levels may be more complex, however. Actors may interact with one another *within* and *between* each contextual level. Network theory describes webs of linkages between organizations, with linkages across organizations of similar forms (such as hospitals linked to other hospitals), or linkages between organizations at different levels of the environment. In the context of cancer care, for example, we can envision an oncology practice embedded within a hospital, and linked to community-based or state level cancer programs. Similarly, physicians who operate both within cancer programs and community hospitals,

spanning the boundaries of multiple provider organizations, connect directly to patients as well as to multiple layers of the health care organization's environment.

The influences also may act in multiple directions. For example, while provider teams must live within the policies and regulations of their organizations on a daily basis, over time, providers and provider teams may interact with their organizations to influence policy changes. Furthermore, the influences of one contextual level may not be completely sequential (i.e., a change in one level having an impact on the adjacent level below it). Intervening levels may be skipped. For example, a change in national policy may directly influence the structures/process of healthcare organizations, without being "filtered" by intermediate levels of state health policies, or local community environments. Similarly, a change in healthcare organizational structure may directly influence patient levels outcomes, without intermediate effects on family or other social support systems.

Because of the complex influences of contextual factors on patient care outcomes, it is important to ask whether addressing several levels simultaneously is necessary to achieve significant improvements to types and transitions of care, and therefore individual progression across the cancer continuum to optimal care outcomes.

Multilevel Intervention Strategies

An *intervention* is a set of specified strategies designed to change the knowledge, perceptions, skills, and/or behavior of individuals or organizations with the goal of improving patients' outcomes. A *multilevel* intervention addresses at least two levels of contextual influence, thereby targeting the individual patients whose behavior is intended to be changed and also some of the national, state, community, organizational, provider, and social/familial contexts in which those individuals exist and participate in health care.

For example, a multilevel intervention aimed at improving follow-up of abnormal screening tests within a health center with multiple practices could include components at three levels:

(1) An organizational level that addresses the medical and administrative leadership of an organization. The purpose of the intervention at this level would be to insure that leadership understands the screening deficits at their facility, are supportive of changes in their institutions practices to address it, and supportive of implementing a tracking system to identify the status of individuals with abnormal screening tests (e.g., patients referred, patients evaluated, and patients in need of further evaluation or treatment).

(2) A provider team level engaging members of the health care team in adopting skills in patient-centered communication, and the appropriate use of the tracking system.

(3) A patient level that includes culturally appropriate materials and instructions regarding the meaning of the test results and how abnormal screening tests are evaluated.

This example of a multilevel intervention has a number of process measures of interest, including organizational leadership, knowledge, perceptions and support, and team knowledge, perception, cohesiveness and function; however, the ultimate outcome measures for multilevel interventions must be at the level of patient care. In the case of our example, the patient outcome of interest could be receipt of the screening test or the completion of follow-up evaluation of an abnormal screening test. The latter would radically change the potential sample size at the individual level since only about 10% of screening tests are abnormal. Considering appropriate endpoints and measures will be part of the discussion during our meeting, but in this example, the key point is that the ultimate endpoint is a patient behavior.

It is, however, also possible to influence patient care outcomes with a focus on organizational measures of care quality (i.e., focusing on how changes in levels of context can be designed to improve care outcomes at the level of the provider office, or the cancer care program, or the hospital level). Our interests may lie in developing interventions that improve patient care outcomes in the aggregate (i.e., rates of 5-year survival, nonrecurrence, or functional status post treatment, for the patients treated within particular types of healthcare settings).

2011 Conference

In March 2011, there will be a conference organized around 11 foundational papers that grew out of a discussion of these issues at a small group multidisciplinary meeting in June 2009. The purpose of the 2011 conference is to advance multilevel research in health care, with a focus on cancer. Following the conference, the 11 papers will be published as a journal supplement in the *Journal of the National Cancer Institute*.

Journal Supplement

Objectives

The supplement will:

a) Distill lessons learned from other multilevel research in other therapeutic areas
b) Expand the conceptual basis for multilevel interventions
c) Explore research designs, methods, and measurement techniques that meet the challenges presented by multilevel influences and interventions
d) Examine factors contributing to implementation and sustainability of multilevel interventions

e) Propose applications of multilevel approaches within the changing health care environment

Content

The supplement draws on the interdisciplinary expertise of behavioral scientists, economists, epidemiologists, health services researchers, physicians, and sociologists to examine what is known about multilevel effects and interventions, explore conceptual and research design issues, and discuss practical applications of multilevel approaches in the context of new developments in health care.

Questions to be addressed in this supplement include:

- How can knowledge about multilevel effects from other disease areas, such as heart disease and diabetes, be applied to cancer?
- How can multilevel interventions be made operational and meaningful?
- How can definitions of context from across disciplines be brought to bear on the multilevel framework?
- How can the concept of time be considered so as to identify barriers and facilitators of health care and health outcomes longitudinally?
- What are the mechanisms by which interactions across levels occur, and how can these interactions be measured?
- What is the potential for systems or simulation modeling to examine the effects of combinations of factors across levels?
- How can partnerships be developed to examine multilevel interventions from a larger platform?

Organization

The supplement will be organized into three sections to address these questions:

Section I will describe multilevel influences and interventions across the cancer care continuum, and highlight examples from the literature on chronic disease care and prevention.

Section II will address challenging conceptual issues and opportunities for research on multilevel interventions. The importance of context and time will be explored and innovative study designs and measurement techniques will be discussed. Application of systems modeling approaches to address the complexity of the problem will be discussed, as well as the need for rich research partnerships across multiple disciplines.

Section III will outline future directions for multilevel interventions and research, with special emphasis on implementation, sustainability, and application of multilevel frameworks to current issues in health care, including personalized medicine and health care reform.

Drs. Stephen Taplin, Steven Clauser and other NCI team members will interact with the authors to develop and complete the articles.

Outline

I. Overview of Multilevel Interventions across the Cancer Care Continuum

Paper 1: Introduction
Authors: ***Stephen Taplin****, Rebecca Anhang Price, Jane Zapka, Mary Fennell, Erica Breslau, Heather Edwards, Veronica Chollette, Steve Clauser*

Paper 2: State-of-the-art in multilevel interventions across organ systems and the cancer care continuum
Authors: ***Kurt Stange****, Allen Dietrich, Russell Glasgow, Erica Breslau*

Paper 3: Multilevel issues across the cancer care continuum
Authors: ***Jane Zapka****, Patricia Ganz, Eva Grunfeld, Katie Sterba, Stephen Taplin*

II. Challenges and Opportunities for Research on Multilevel Interventions

Paper 4. In search of contextual synergy: strategies for combining interventions at multiple levels

Authors: ***Bryan Weiner****, Megan Lewis, Karyn Stitzenberg, Steve Clauser*

Paper 5. Time and timing: Concepts for consideration in multi-level interventions
Authors: ***Jeffrey Alexander****, Irene Prabhu Das, Timothy Johnson*

Paper 6. Overview of analysis and study design issues
Authors: ***Paul Cleary****, Cary Gross, Alan Zaslavsky, Stephen Taplin*

Paper 7: Role of systems modeling in understanding multilevel effects:
Authors: ***Joe Morrissey****, Kristen Hassmiller-Lich, Rebecca Anhang Price, Jeanne Mandelblatt*

III. Applications and Future Directions in Multilevel Interventions and Research

Paper 8: Models of scientific infrastructure for conducting multilevel research: Is big science the answer?
Authors: ***Ann Barry Flood****, Kelly Devers, Mary Fennell*

Paper 9. Applications of multilevel interventions in clinical settings related to cancer
Authors: ***Elizabeth Yano****, Lisa Rubenstein, Karen Glanz, Larry Green, John Ayanian, Brian Mittman, Veronica Chollette*

Paper 10. Linking multilevel approaches to current issues in health policy
Authors: ***Richard Warnecke****, Sarah Gehlert, Richard Barrett, Carol Ferrans, Garth Rauscher, Young Cho, Julie Darnell, Blasé Polite, Stephen Taplin*

Paper 11: Multilevel approaches and the challenges of delivering genomic and personalized medicine
Authors: ***Muin Khoury****, Russell Glasgow, Maren Scheuner, Marc Williams, Mary Fennell, Steve Clauser*

Paper 12: Conclusion

Timeline
We received an outline of the papers in mid-March 2010 and the first drafts by June 1, 2010. With the help of the Consulting Committee, the editorial board provided comments to authors by August 1, 2010. A second draft was due by September 15, 2010. The outline and drafts will be the foundation for the associated conference that will occur in 2011.

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