

Health Information Systems Approach to Managing Task Interdependence in Cancer Care Teams

Veronica Chollette, Derrick D. Beasley, Ekland Abdiwahab, and Stephen Taplin

National Cancer Institute, Bethesda, MD; Emory University, Atlanta, GA; and University of California San Francisco, San Francisco, CA

The National Academy of Medicine (NAM) identified the need to improve care coordination more than a decade ago. Care coordination is the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care.¹ When care is not well coordinated, errors, omissions, and harms occur.² In their 2001 report, *Crossing the Quality Chasm*,³ the NAM emphasized that to achieve expected care quality, attention to care process and coordination was needed.⁴ There were also high expectations that Health IT would contribute to better coordinated care, and there has been a huge investment in information technology.³ Despite these investments and hopes, when the NAM looked specifically at cancer care 12 years later in 2013, they characterized it as a system in crisis because coordination was largely the exception rather than the rule.⁵ The slow progress in care coordination inspires a rethinking of how Health IT can be designed to help patient care teams better manage challenges related to coordination of care among and across the multiple teams of clinicians, practices, and health systems involved in cancer care.

It is not surprising that care coordination is a challenge in cancer care because it often requires the cooperation of two or more people to complete a task; diagnosing a cancer, taking care of comorbid disease, safely infusing

chemotherapy, and recognizing the long-term consequences of therapy all require the interaction of physicians, nurses, clerks, and technical staff. In fact, there are few tasks in cancer care that do not require some degree of reliance on two or more people, and that challenge was recognized in many of the articles in the recent Special Series in *Journal of Oncology Practice* on teams in cancer care.⁶ Team researchers call this work interdependent and recognize that there is some variation in the degree to which the interaction and coordination of team members is required to complete the task.⁷ We suggest that consideration of how Health IT can assist in the management of interdependent tasks may be a path toward achieving coordinated care. Our suggestion is that thinking about task coordination as the management of interdependent work may clarify what we need from information technology.

An article by Trosman et al⁶ in the recent series on teams in cancer care highlights the challenge of managing this interdependent work. We suggest that rising to this challenge is exactly what information technology must do to contribute to improving care.^{6,8,9,10-12} Trosman et al suggest that people in health care do not always recognize and manage the interdependent tasks of medical care and therefore may not be operating as an effective team.



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The question then becomes, how can Health IT help them do that and therefore support both teamwork and coordination of care? To answer that question, we reviewed the literature in PubMed, Scopus, and Embase to see if there was any evidence that Health IT facilitated teamwork and/or coordination. Searching these databases for cancer care publications using the terms health information technology, coordination of care, teamwork, cancer, and task interdependence revealed 1,157 articles for years 2011 to 2015. Only one article demonstrated a relationship among an electronic health record, improvement of teamwork, and improved clinical outcomes; the outcome, however, was not related to cancer care. No evidence could be found of Health IT aligning team processes or improving team effectiveness in cancer care. That does not mean that there is no relationship; it simply was not studied.

We therefore think that understanding task interdependence and its role in coordination of care in the context of Health IT is an opportunity worth exploring. A Health IT system could maximize a team's ability to achieve better-coordinated care if it stimulated engagement and collaboration of care teams through notification of team members of tasks that involved interdependent teamwork, identified their role in the task as well as the team member responsible for task completion, and showed progression and completion of tasks.

When considering how Health IT would help, it would be important to differentiate among the four types of interdependent tasks (pooled, sequential, reciprocal, and team) and to consider what functionality needs to be different for each.¹³⁻¹⁵ Below, we define and summarize examples of the four types of interdependent work of cancer patient care teams and propose differences in Health IT systems functionality that each might require.

- Pooled interdependence characterizes tasks in which each group member shares the same role. Each individual performs all steps required to complete a given task on his or her own. Health IT can support cancer care teams to engage in a variety of interdependent work. For example, Health IT allows medical assistants at an oncology practice to complete the task of identifying a patient's name, age, and insurer to request approval for a treatment regimen. Managing this interdependence simply means that the Health IT system will issue an alert, identify a time limit, and allow any medical assistant on the team to fill in the data and document completion of the task.

- Sequential interdependence requires one team member to act or to complete his or her share of a task before another member can complete the next step. For example, Health IT captures documentation of a primary care physician's examination, laboratory tests, and x-rays before the patient is referred to a specialist, who in turn also reviews the results of laboratory tests or x-rays and considers further testing before making a subsequent referral as needed. It is possible to think of this as a sequence of informative documented events across and between practices and health systems.
- Reciprocal interdependence is characterized by a two-way workflow, and this is a more common reality in medical care. The output from team member A (or team A) becomes the input to team member B's (or team B's) work, but team member B's output also feeds back as inputs for team member A's work in a feed-back loop. In cancer care, the oncologist may rely on the primary care physician to assess a patient's symptoms and/or refer them appropriately. The primary care physician relies on the oncologist to do a more detailed assessment. The patient relies on both of them to maintain their health. Managing this interdependence with Health IT means that all tasks and their status must be documented. It needs to be made clear who is responsible for each step; each team member involved needs to complete their part; and all team members need to know that the steps were completed, what the results of the evaluations were, and whether the patient has cancer. Here, Health IT must clearly show the progression of each care task, and anyone on the team should be able to view it.
- Team (complex) interdependence requires members to mutually interact and collectively manage the flow of inputs and outputs between members. This often requires all team members to interact in a dynamic way, with significant effort invested in coordination and communication to effectively complete the global task. For example, the task of creating a survivor care plan or managing a patient with multiple chronic conditions involves the collective input and coordination via Health IT of many caregiver types within and across care teams, practices, and systems.¹⁶ Here, Health IT must make the status of each care task clear, anyone should be able to document it, and the system should be able to solicit opinions and comments as well as document decisions.

DISCUSSION

Thinking about various kinds of task interdependence across the cancer care continuum begins to clarify that teams interact in multiple ways. Suggesting how Health IT might support cancer care is responsive to the NAM's call for better-coordinated care. What is less clear is whether Health IT supports cancer care teams to deliberately organize multiple tasks of care, which are often interdependent. We suggest that building Health IT systems that recognize different types of task interdependence across the care continuum calls for new functionality and may help to optimize the health care team to coordinate better patient care within and across practices and health systems.

Future research should attempt to understand if Health IT can successfully help cancer care teams manage interdependent tasks of care coordination across the continuum of care. Mixed-method approaches to explore the design, taxonomy of care coordination, health system and behavioral barriers, and facilitators may offer insight into how Health IT can support effective shared responsibility for better care coordination and patient outcomes.¹⁷⁻¹⁹ Additionally, as cancer care increasingly takes place in the community and outside of a hospital system, coordination and managing interdependent tasks becomes even more challenging as it crosses different information systems and/or clinicians who lack access to a Health IT system. Fragmentation of care remains if these team members are excluded from documenting their tasks in a Health IT system shared by all patient care team members.

As legislation calls for improvement in health information systems to facilitate coordination of care, input from health care providers, team researchers, and patients that considers how care teams manage task interdependence may help build a tool that can be responsive to the NAM's call for high-quality coordinated care delivery. Input from these stakeholders in the design of Health IT that identifies and helps manage the interdependence of medical care has the potential to positively transform care coordination and to maximize effective patient outcomes. Whether it does is a testable hypothesis. **JOP**

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Author Contributions

Conception and design: All authors

Collection and assembly of data: Veronica Chollette, Derrick Beasley, Eklund Abdiwahab

Data analysis and interpretation: All authors

Manuscript writing: All authors

Final approval of manuscript: All authors

Accountable for all aspects of the work: All authors

Corresponding author: Veronica Chollette, National Institutes of Health, 9609 Medical Center Dr, Rockville, MD 20850; e-mail: cholletv@mail.nih.gov.

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

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Veronica Chollette

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