Interhospital Transfer Center Model: Components, Themes, and Design Elements

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Abstract

Objective: Timely access to advanced and specialist treatment often requires rapid interhospital transfer of patients from community hospitals to tertiary care centers. Transfer systems are variable in structure and process and are described in the literature as being fragmented, complex, and difficult to navigate.

Methods: Nonparticipant observation at 10 tertiary care transfer systems.

Results: Identified core components (ie, primary transfer system answering point, bed management coordination, and transport team dispatch) are essential elements of an interhospital tertiary care transfer center.

Conclusion: The Interhospital Transfer Center Model provides a useful framework to guide the design, implementation, and evaluation of interhospital transfer systems.

Introduction

Increasingly patients require time-critical interventions not available at community hospitals.[1] More than 500,000 critical care transfers occur in the United States annually.[2] Approximately 5% of all patients admitted to intensive care units and nearly 50% of ST elevation myocardial infarction patients require transfer from community hospitals to tertiary care centers.[3,4] Interhospital transfer systems are fragmented, ad hoc, and complex to navigate.[5] Barriers contribute to increased patient morbidity and mortality, increased care costs, and reduced efficiency of care systems.[6-8] Available evidence identifies the need for specific infrastructure, standardized processes, and automated communications to design clinically focused, high-quality, and operationally effective transfer systems.[9] Verifying the validity of these recommendations and deriving consensus are critical to improving efficient and effective interhospital transfers.

The purpose of this article was to report on a series of site visits to 10 tertiary care transfer systems conducted from July 2012 to July 2013 to derive best practice recommendations on clinical, financial, and operational outcomes of the existing transfer system. Observations were synthesized with existing literature to enable the generation of a model for safe, reliable, and effective patient transfers.

Methods

A convenience sample of 10 academic tertiary care transfer systems was selected for nonparticipant observation (Table 1). Selection considerations included geographic location, presence of a competitive environment, innovative or unique system design, and existing collegial relationships. Each potential site was contacted by e-mail requesting an opportunity to visit, and all sites contacted agreed to participate. Up to 4 leaders from an existing academic medical center interhospital transfer program visited each site and engaged in semistructured discussions and observations with host organization colleagues. Discussions were semistructured around predetermined themes (health system overview, transfer system structure, technology, process, staffing, challenges, and outcomes) using general open-ended questions. Host organization participants included a variety of personnel (including program directors, managers, physicians, registered nurses, paramedics, and clerical staff).

Nonparticipant observation is a method in which an investigator studies the experiences and processes through observing practice and interactions and then clarifies observations and processes through discussion.[10] Because this project focused on service-specific factors, it was determined that no specific ethical approval was required. Patient identifier data were not accessed, shared, or recorded. Guided access and escorted facility tours were provided by authorized personnel from each host organization. The research team maintained interorganizational confidentiality, and specific proprietary knowledge was not shared among the sites visited. A dialogue inclusive or lessons learned, concept sharing, and support for

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Table 1. Site Visit Institutional Summary (American Hospital Directory, www.ahd.com)

Site	Type	Teaching FTEs	Total Beds	Annual Patient Days
1	Voluntary nonprofit	53	671	203,823
2	Voluntary nonprofit	634	945	248,658
3	Voluntary nonprofit	593	688	222,856
4	Voluntary nonprofit	289	552	146,991
5	Governmental, county	313	413	135,581
6	Voluntary nonprofit	331	1024	359,128
7	Voluntary nonprofit	372	886	214,182
8	Voluntary nonprofit	898	931	290,438
9	Voluntary nonprofit	137	2350	648,324
10	Voluntary nonprofit	594	999	306,118

FTE = full-time equivalent.

the project existed during each visit. Site visit notes were recorded in written format, content analysis undertaken by the research team, and core components identified. After this process, a conceptual model was developed—the Interhospital Transfer Center Model. Validation of the model elements was obtained through member checking and consultation with experienced (greater than 10 years) multidisciplinary leadership in the areas of transfer system administration, operations, and clinical care.

Results

Core elements are described and summarized in the Interhospital Transfer Center Model as shown in Figure 1.

Core Components

Transfer center systems are built on 3 core components. Core components include (1) primary transfer system answering point (TSAP), (2) bed management coordination (BMC), and (3) transport team dispatch (TTD). These 3 core components were observed at all 10 of the sites visited and are considered to be fundamental to the foundation of a sustainable transfer system.

TSAP

TSAP is the initial, single point of access for a community hospital to contact a tertiary care center. TSAP provides several critical functions to the transfer system including a collection of initial patient identifiers, teleconferencing community physicians with tertiary care providers, and initial activation of the transfer process. Information from the community hospital guides decisions when gaining access to the tertiary care center. Initial data points collected includes the community hospital name and location, referring physician, patient demographic details, and suspected clinical condition requiring tertiary care. TSAP provides a critical function by teleconferencing the community hospital physician with a tertiary care provider for case presentation and consideration for transfer acceptance. TSAP staff monitors discussions in anticipation of the next steps of the transfer process, including expedited assignment of resources for time-critical conditions. An example of TSAP function is represented in Table 2.

BMC

BMC is a function within a hospital to assign beds based on specialty clinical service and patient needs. BMC is similar to an air traffic control center where multiple streams of movements are coordinated and resources assigned. Bed availability at tertiary care centers is often limited. Highly sought after resources include cardiac monitoring beds and specialty critical care beds. Multiple streams of patients, both internal and external, converge and compete for placement in these scarce beds. At the time of a transfer request, knowledge of the real-time bed supply is essential to expedite a timely transfer. Without the ability to assign an appropriate bed, a transfer patient may experience delayed or declined acceptance to the tertiary care center. Constant coordination between TSAP and BMC is paramount to process smoothing for transfer patients. An example of BMC function is represented in Table 3.

TTD

TTD facilitates rapid mobilization of patients to tertiary care centers. TTD assigns clinical transport team (TT) level of care (basic, advanced, or critical care) and mode of transport (such as ambulance, helicopter, or airplane) when making transport arrangements. Once a mode of transport and the TT level of care are determined, the appropriate team is dispatched to transport a patient. Communications between TTD and TT are critical when coordinating patient arrival time, providing updated clinical information, and linking the TT to specialty physicians for medical direction during transport. As patients are mobilized, TTD communicates essential information to receiving tertiary care providers preparing for patient arrival. An example of TTD function is represented in Table 4.

System Design

TSAP, BMC, and TTD were identified to be the 3 core components of a transfer center system. Each of these compo-