Center for Health Organization & Transformation (CHOT)

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Advancing Clinic Workflow and Operations

An Advancing Clinic Workflow and Operations project has resulted in a patient flow optimization model that improves the operations of emergency departments, both in terms of efficiency and quality of care. The large-scale computerized system model developed by CHOT researchers at Georgia Institute of Technology models emergency department (ED) operations with greater realism and accuracy than was heretofore possible.

The model takes into account major elements in emergency departments, including patient flow, clinic workflow, staffing, equipment, and beds, etc., and seeks to optimize the system to arrive at the best results for patient outcomes. It allows for systems optimization and global intervention that affect both the quality of care and efficiency of delivery. The model is helping organizations deal with critical issues within emergency rooms. It addresses over-crowdedness where the presence of over 40% of patients with non-urgent medical conditions results in long wait time. Misalignment of services also results in unnecessary long lengths of stay, and, at times decreased quality of care and patient satisfaction.

This work is impacting operations within the emergency department at Grady Memorial Hospital in Atlanta and should be applicable in any ED setting. Technically, the model uses an extensive and time-motion study of patient arrival patterns and service process distributions that are more comprehensive than previous studies. Results are important both for understanding the bottleneck as well as serving as input for the optimization system model.

Economic Impact: The work has economic impacts across the nation. It optimizes resource allocation and improves scheduling and workflow efficiency. It also improves patient flow within EDs, reduces the number of non-urgent patients and the consequent re-directs, and reduces delay in care. This in turn improves quality of care and patient satisfaction. Redirecting 50% of the non-urgent cases results in potential savings of 10 to 14 million USD in health costs per year for Grady patients, and subsequent reductions more millions as length of stay and wait-time for other ER patients are improved. The work is also helping to create a new business model for alternative ER systems for non-urgent and walk-in patients that should reduce over-crowdedness in emergency rooms. This offers an improved revenue model for hospital patient care.

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Optimizing Electronic Medical Record (EMR) Usage – Beyond Adoption

Fundamental difficulties with efficient usage of EMR-based clinical information systems include continual evolution and the inability to analyze large-scale distributed data sets to uncover important information for medical decisions. Medication orders generate about 50,000-55,000 alerts monthly. Such high frequency lead to alert fatigue—users almost total disregard to alerts in general as a result of frequent superfluous pop-ups. Prolonged alert fatigue can negatively impact patient care as true alerts may be ignored. Clinical data from electronic medical records (EMRs), including laboratory and imaging systems, provide a wealth of information for advancing diagnoses, optimizing health care delivery operations, and improving patient care. This project works with alerts that are generated from the EPIC EMR system. Prior to this work there were few specialized strategic procedures for reducing alerts, beyond the standard filters provided by the EMR companies. The Center for Health Organization Transformation CHOT) has developed information technology (IT) approaches to better characterize types of alerts using specialized filters for alert reduction. These automate the characterization and filtering processes so that decision support systems can be implemented on top of the existing EMR systems for more effective alert management.

The EMR medical alert filtering concept and decision support tools should improve quality of care for patients and improve the work environment and morale of health care workers by reducing alert fatigue. Invention disclosure will be filed on the technology. The system can be implemented as a stand-alone information decision support system for use in health systems environments. It can also be licensed to health information technology companies and incorporated within commercial EMR systems. As design and technological development was guided by actual clinical data from EMR systems, the automatic filtering and information decision support system resulting from this work should be applicable to any clinical/hospital with EMR systems. Further, it can be adopted into health information technology companies and incorporated into existing commercialized EMR systems for national distribution.

> **Economic Impact:** This breakthrough can reduce the frequency of inconsequential alerts and provide an IT foundation for improving alert management strategies. It is helping set national standards for shaping the development of health information technology to enhance clinical information management. IT should have positive economic impacts by reducing costs associated with missing critical alerts and with responding to unnecessary alerts.

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Multi-Project Interdependency Mapping

Health care organizations are frequently faced with the problem of simultaneous projects, initiatives, implementations or transformations, without always a clear understanding of how these efforts interrelate or support each other. Multi-project interdependency mapping is a tool applied to multiple transformation in order to increase the absorptive capacity of health care organizations to effectively implement and sustain innovations.

The project relies upon both narrative and numeric responses to standard interview items in detailed interviews with dozens of leaders in each health system. Subsequent mapping is based upon leader's discussion of such interdependencies or linkages among projects, prioritization assigned by leaders to each transformational effort, and these leaders' perceptions of the relative reliance of each effort upon each of four organizational technologies – administrative, information, clinical/work, and social technologies. The organizational technologies framework is derived from theories of control and coordination and socio-technical conceptualization of organizations. The organizational technologies framework was developed by CHOT researchers and has been used to compare and contrast a number of major transformation efforts and is currently being applied in two studies of organizational change.

Economic Impact: Top leadership in two large health systems identified this study as being of critical importance to their organizations' learning and bottom lines. The health systems studied were engaged in numerous transformational programs such as the EMR implementation, Six Sigma, culture change, physician engagement, Baldrige review, and ongoing initiatives around quality, patient safety, and cost-effectiveness.

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