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Health Management Technology for Catastrophic Medical Conditions

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Summary

Background. The excessive growth of health care expenditures in the United States is widely acknowledged. Costs are anticipated to double by the year 2006. The intractable issue which remains before health care leaders is how to appropriately restrain these costs while not sacrificing a desired level of care quality. A variety of management approaches have been developed in pursuit of more rational and cost-effective use of health resources. Current management approaches have proven inadequate in stemming health care cost inflation and have raised increasing concerns about their negative impact on the quality of health care.

Method. One group has created and operated a data and structured, expert consensus-driven health management technology for the management of catastrophic medical conditions, including severe brain and spinal cord injury and severe multiple trauma and burns, since 1992 and has recently applied this same technology to high risk neonates and organ transplants. This integrated, severity risk adjusted, delivery system incorporates adequate clinical data capture and analysis, coupled with empirically derived management principles and consensus expert clinical judgment.

Interpretation. Preliminary data analysis indicates that patients treated under the Paradigm/Health model experienced an improvement in the health care process, improved quality in health care delivery and outcomes, and overall cost reduction.

Keywords: Health management technology, costs of care paradigm health corporation, evidence based care traumatic brain injuries.

Introduction

The excessive growth of health care expenditures in the United States and elsewhere is widely acknowledged, and annual expenditures are anticipated to double by the year 2007 reaching 16.6% of the United States Gross Domestic Product, or 2.1 trillion dollars [1, 2]. The intractable issue, which remains before health care leaders, is how to appropriately restrain these costs while not sacrificing a desired level of care quality. A variety of management approaches have been developed in pursuit of more rational, standardized and cost-effective use of health resources. Current management approaches have proven inadequate in stemming health care cost inflation and have raised increasing concerns about their negative impact on the quality of health care [3, 4, 5]. Further, there is a low probability that most present techniques can have a significant beneficial impact in the future [6], especially on very complex, costly medical conditions. This paper describes a management approach that has proven successful with a subset of these complex conditions: namely, severe brain and spinal cord injury, severe multiple trauma and burns, and high-risk neonates, and most recently organ transplants. It is proposed that this same model can serve as a template for other complex conditions. We will first briefly review limitations of current medical care management methodologies, and then introduce a new health management technology and structure which represents a novel and powerful methodology to appropriately and rationally achieve cost containment and quality of care.

In the United States, health care today, while of generally high quality, is marked by inconsistent and, at times, inappropriate delivery of services. Commonly, physicians rely upon their own unsystematic clinical observations drawn primarily from personal experience in making treatment decisions. Decisions made and conclusions drawn reflect the unsystematic biases of a given physician and contribute to marked variability in practices among clinicians and to the escalation of medical costs [7, 8]. In addition, the complexity of modern health care, involving co-morbidities, questions of long-term outcomes overlaying short-term acute care management, and complex outcome constructs such as “quality of life” versus solely “biologi-

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a Severe congenital heart defects, pediatric oncology, children with complex multiple needs, AIDS, etc.
cal viability”, is itself an impediment to making rational treatment and reimbursement decisions. Evidence-based medicine (EBM) has emerged in an attempt to ground medical decision-making (and by corollary health care funding decisions) in scientifically sound, experimentally based knowledge [9]. Where applicable, EBM is extremely powerful in determining what is or is not “medically” necessary, indicated, or harmful. However, many (if not most), health care interventions have not met (and are unlikely to ever meet) the degree of scientific certainty inherent in EBM. Much of health care is too complex with inadequate data to allow evidence-based decisions. Seemingly straightforward clinical interventions are now understood to have second, third, and fourth order interactions with other outcome determinants that preclude obvious cause and effect conclusions [10].

Given the costs and complexity in the delivery of modern health care, multiple management methodologies have been developed to restrain inappropriate health care and escalating costs: price controls (limiting reimbursement for individual or aggregate services); preferred provider organizations (PPO’s); reduced rates from contracted providers in return for an expected increase in volume; utilization review (UR—external review of need for ongoing prescribed services); case management (primarily a nurse UR function without sufficient expertise or power to affect the care process, especially for complex conditions); financial risk-transferring techniques such as diagnosis related group reimbursement (DRGs—provider reimbursement based on specific diagnostic code); and capitating payment for populations (provider reimbursement based upon a “per member per month” rate of payment regardless of services provided.) While undoubtedly of some effect, these methodologies are widely seen as heavy-handed, arbitrary, and intrusive, such that short-term savings (reflected in reduced premiums for the next annual insurance contract cycle) has become the primary determinant of “success” for health plans. In particular, it has been documented that neither the purchasers nor the providers of health care have developed methods of capitation or delivery which successfully lead to appropriate high quality care for patients with complex chronic or disabling conditions, or conditions of relative infrequency [11, 12, 13, 14].

To summarize, current health care management methods have not been adequately effective either clinically or financially and are widely acknowledged to be heavy-handed, uninformed, arbitrary and inflexible. What effectiveness there is appears to be approaching maximal impact. In addition, they are increasingly aversive to the patient and practicing physician, and are in many instances harmful to quality care, particularly so for the most complex conditions. These changes in health care have produced a highly charged, emotional milieu with lack of a general consensus on how to rationally and fairly approach these cost-quality dilemmas.

Methods and Results

A Prototype Solution

In response to the evident deficiencies of early management efforts as well as the enormous costs associated with both short and long term treatment of complex conditions (first year costs over a million dollars per case for the severest conditions), it is critical that a new management system be implemented that incorporates adequate clinical data capture and analysis, coupled with empirically derived management principles (including but not limited to EBM). Such a system must also recognize the limitations of a purely data and science driven management approach, and integrate these where necessary with a structured approach based upon consensus expert clinical judgment. For the past eight years the authors have participated in the development of such a system at Paradigm Health Corporation (PHC). The model incorporates a technology of health management for complex conditions which makes systematic use of many newer methodologies such as evidence-based medicine, Ellswod’s concept of a “technology of patient experience” [15], (i.e. the comprehensive capture and analysis of large clinical and economic data sets which characterize the treatment pattern and outcomes of complex conditions longitudinally over prolonged periods), virtual integrated delivery systems, capitation based upon appropriate risk-adjustment, comprehensive process and outcomes measurements, application of medical expertise by qualified physicians, specialists, and others.

PHC’s model is designed to ensure that each provider along the continuum of complex care has the necessary expertise to identify and address the appropriate clinical problem(s) with the most efficient resource consumption in order to provide the optimal clinical outcomes. To do so, PHC assigns a core team of experts to each case. The critical members of this Complex Medical Event Management Team (CMET) include physician specialists, specialist nurse network managers (NWMs), and directors of clinical service (DCSs). The specialist physician medical directors (PMDs) and medical specialist consultants (MSCs) are practicing specialist physicians across the United States under contractual arrangement with PHC who provide high level clinical expertise for assessment of current problems, identifying reasonable target outcomes, planning of continuum of care strategies, projections of appropriate resources, and prospective management interventions. They are board certified physicians in one or more medical and/or surgical specialties with a practice expertise and focus appropriate to the management of the diagnostic categories assigned. The NWMs are registered nurses with extensive case management expertise, particularly in the management of complex injury, most of whom have earned advanced degrees and certification in the fields of rehabilitation, critical care nursing, neonatal nursing, and case management. These NWMs are under contractual arrangement with PHC and work within close proximity of the pa-
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In addition to having an expert driven management team, PHC's model also considers it essential to have providers and facilities that have the clinical expertise to treat such highly complex patients. Identifying these providers can be a significant challenge. For example, Joint Commission on Accreditation of Healthcare Organizations (JCAHO) certification does not necessarily ensure a facility's capacity to provide top-quality care for highly complex problems. The concept of centers of excellence (COE) to identify facilities with such diagnosis or condition-specific capabilities arose in response to this issue and PHC identifies, qualifies, and contracts with premier providers (COEs). Frequently, difficulty exists moving patients from local facilities to regionally based COEs (some located a considerable distance from the patient's home and families). In these circumstances PHC applies high levels of medical expertise "at a distance" via electronic consultations between the CMT and the attending clinicians. Overall, PHC creates a capability to manage very complex patient care and recovery across the continuum of care, providing oversight, access to data on outcomes of various treatment choices, and a broader level of expertise to its program providers (especially attending physicians), allowing appropriate allocation of resources, and greater understanding of total costs compared to traditional systems. By feeding this information back to physicians, facilities and health administrators, Paradigm provides a powerful foundation for understanding the consequences of care decisions for complex medicine. PHC contributes to the health care process, following Eddy's suggestion,

"The solution to practice variability is not to remove the decision-making power from physicians, but to improve the capacity of physicians to make better decisions. To achieve this solution, we must give physicians the information they need; we must institutionalize the skills to use that information; and we must build processes that support, not dictate, decisions" [16]."

To provide such information, education, advice, and economic incentives to all providers of care (and to payers where appropriate), and to measure performance against norms, it is imperative that a comprehensive database be used, one that is designed to capture information at injury/illness onset and throughout the entire course of care, including intervals after recovery is complete. Measures must include prediction, process, and outcome variables. PHC has established such an objective database that allows for meaningful analysis of the effect of various pathways of care by various providers upon objective outcomes of appropriately risk-adjusted populations of complex medical patients (appropriate Severity Risk Adjustment "SRA" is applied to each complex medical condition PHC manages). This database is kept in an electronic relational format that allows complex statistical analyses to be effectively performed.

Inherent in the PHC database model is the identification of appropriate clinical outcomes and the measurement of these outcomes to determine if in fact they have been achieved. Health care driven by appropriate outcomes has a variety of benefits. It allows patients in any phase of treatment, from acute injury or illness through complete reintegration into society and work, to be operationally described and classified [17] or grouped. It thus serves as a foundation upon which specific treatment interventions can be arranged and evaluated regarding appropriateness of resource utilization (both expected and actual). Paradigm has developed clinical outcome definitions that are objective and meaningful to all the stake holders of complex conditions, i.e. the patients, the providers and the payers. These operational outcomes set the foundation for a system of communication and accountability for the stakeholders, upon which financial and operational contractual agreements can operate.

To meet the above data requirements while still achieving statistically significant conclusions, it is necessary to have a great number of cases. As a practical matter, this requires a data set from a very large population of lives at risk, especially a nationally based collection. Paradigm operates nationally to collect objective, comparable data that can meet this volume requirement. This allows as well the capacity to measure and do comparisons on regional variations in care provision, processes of care, relevant outcome, and cost. Thus, for example, the observed fact that some regions of the country have much shorter in-patient treatment stays for brain and spinal injuries, burns and high-risk anastomoses could be interpreted as representing either appropriate cost efficiency or inappropriate withholding of care. PHC is able to use objective clinical and financial analysis rather than subjective opinion to make this determination. In addition, as advances in care are introduced by any provider in a complex care system, it can quickly and virtually "automatically" be compared with results already achieved by conventional methods by other providers and informed decisions can then be made about cost-benefit.

Discussion

The escalation in health care costs as well as current medical practice that lacks both scientific rigor and fiscal accountability are increasingly recognized as limitations inherent in traditional medical management. Data driven management has emerged as a new strategy in health care management. According to some observers, these changes in health care and medical practice reflect nothing less than a true paradigm shift for our health care system. For nearly a decade, PHC has integrated these strategies and applied them with measurable success to complex medical conditions, which characteristically represent the most clinically difficult and costly problems in medicine. The PHC system has done so for over 4400 such cases in its eight years of clinical operation, 1283 of which have been cases of severe traumatic brain injury. In each of these managed cases specific objective and auditable clinical and financial outcomes were achieved and measured. A variety of evidence has suggested that these outcomes and costs are significantly improved over non-PHC managed cases of equal complexity. More methodologically complete investigations are currently underway to quantify these results. The authors believe the systematic construction and organization of this system, as well as its demonstrated generalizability, make it of international interest to all medical.
and health policy readers. The elements and construction of this system in its entirety constitutes a new management paradigm for health care.

References


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