Improving Health Outcomes and Value with Care Pathways: The Otolaryngologist’s Role
Kenneth W. Altman
Otolaryngology -- Head and Neck Surgery 2014 151: 527 originally published online 26 June 2014
DOI: 10.1177/0194599814541785

The online version of this article can be found at:
http://oto.sagepub.com/content/151/4/527

Published by:
SAGE
http://www.sagepublications.com

On behalf of:
American Academy of Otolaryngology- Head and Neck Surgery

Additional services and information for Otolaryngology -- Head and Neck Surgery can be found at:

Email Alerts: http://oto.sagepub.com/cgi/alerts
Subscriptions: http://oto.sagepub.com/subscriptions
Reprints: http://www.sagepub.com/journalsReprints.nav
Permissions: http://www.sagepub.com/journalsPermissions.nav

>> Version of Record - Oct 1, 2014
OnlineFirst Version of Record - Jun 26, 2014
What is This?
Improving Health Outcomes and Value with Care Pathways: The Otolaryngologist’s Role

Kenneth W. Altman, MD, PhD

Abstract

With a growing interest in value-based health care, there is an emphasis on establishing best practice, measuring outcomes, and improving clinical efficiencies. Best practice is a challenging concept with our growing knowledge base, and clinical practice guidelines (CPGs) help establish an approach to prioritize care and reduce practice variation. New challenges are emerging with a larger population of insured patients and a mandate to coordinate care with a shared electronic health record, and these are coupled with a massive growth in computing power. Care pathways (also called critical or clinical pathways) structure the implementation of CPGs, stratify high-risk patients, and provide the opportunity to achieve improved value. These are dynamic processes that are supervised by interdisciplinary teams and have the potential to evolve with new information gathered from each of the steps. As we emerge from single to group medical practices and hospitals to health systems, care pathways will be critically needed for optimal population management in health care.

Keywords

best practice, medical decision making, protocol, care pathway, critical pathway, clinical pathway, population management, otolaryngology

Received April 21, 2014; accepted June 10, 2014.

Background

Standardization and best practice did not exist in the 1800s before Flexner introduced the need for a common medical education curriculum. An improved scientific foundation also fueled advances in medicine, surgery, and patient care through the 1900s. Despite today’s high standards in medicine with the United States Medical Licensing Examination (USMLE), American College of Graduate Medical Education (ACGME), specialty and subspecialty board certification, and Continuing Medical Education (CME) requirements for state licensure, among others, there is still wide variation in the delivery of patient care. Keeping abreast of the latest scientific and medical innovations is made more difficult by the dramatic increase in scientific publications over time, so it is not practical to keep up with all of the advances related to patient care. Figure 1 shows this dramatic growth in annual PubMed-registered publications over the past 60 years, with 98,150 in 1950 to 1,130,737 in 2013. Clinical practice guidelines (CPGs) have therefore evolved to critically review these scientific advances and employ a team approach to create expert consensus for the latest care recommendations.

Keeping up with advances in the science, recommendations for patient care and CPGs is particularly challenging in primary care with the broad scope of problems they treat. Also, there are a growing number of physician extenders, such as physician assistants and nurse practitioners, who do not have the same level of specialty training and who similarly need to keep up with best practice. Protocols or algorithms may be helpful to guide basic decisions in patient care in the outpatient setting.

Figure 1. Annual PubMed-registered publications over the past 60 years, showing the year on the x-axis, and the number published × 1000 (source: www.pubmed.com). In 2013, there were 1,120,197 scientific articles listed in PubMed.
management, but it is paramount to develop these from evidence-based medicine such as CPGs. In a recent systematic review of protocols for reflux disease, 15 were identified in the literature from 2000 to 2010, but only 5 (33%) were based on CPGs.3

The origin of protocols, algorithms, and pathways for process decisions or control dates back to the industrial revolution with the assembly line in manufacturing. But complexity of engineering design demanded improved tolerance, decreased cycle to cycle variation using Standard Operating Procedures, and the need to measure outcomes to improve the process efficiency through identifying the rate limiting steps in the process. This Critical Path Method had its roots in the Manhattan Project and was applied independently at DuPont Chemical Company in 1956 and as a Program Evaluation Review Technique (PERT) for the Polaris missile program in 1958.4 Since that time there have been a number of attempts to introduce the critical pathway approach to medical practice, also termed clinical pathway or care pathways. Karen Zander and Kathy Bower standardized the approach to visiting nurse practices in Boston in 1987. There had also been a substantial effort by the National Health Service (NHS) and others in Europe in the 1990s but with limited success at implementation.

Recent forces have empowered the rapid reemergence of clinical care pathways in the United States. These include:

- tremendous growth in computing power,
- the political mandate for a shared Electronic Health Record,
- insurance company demands for measuring outcomes and lowering costs,
- patient and physician demand for improved efficiency in the timing of care,
- an increasingly Internet-informed public on health issues,
- a physician workforce shortfall due to a number of reasons, and
- an increased portion of care delivered by primary physicians and physician extenders.

**Implementation of Care Pathways**

The ideal process to develop an evidence-based care pathway is outlined in Figure 2. This protocolized approach in medicine lends itself to measurement of outcomes (eg, clinical result, quality of life, cost, and time to resolution), and this information can be used to improve the protocol. Larger disciplines have already begun to embrace formalized medical decision making as a way of standardizing an approach to care.

Garin et al5 created a critical pathway for patients admitted with heart failure. They compared 151 patients in the pathway, with 212 historical control subjects admitted 2 years before the institution of the pathway. The authors found significantly better adherence to clinical practice guidelines using the critical pathway, with more frequent prescription of beta blockers (70% vs 57%) and evaluation of left ventricular ejection fraction (74% vs 58%). Overall, they demonstrated a 28% reduction of the relative risk of death or readmission within 90 days after discharge.

Archibald et al6 from Intermountain Healthcare (which has a significant commitment to care pathways) designed a process for enhanced recovery after colon surgery (ERAS) in 8 community hospitals. The study compared 1673 colon resection patients serving as historical controls to the study period, which included 588 enrolled subjects and 770 non-enrolled patients (not followed on the pathway). Average length of stay was 6.9 days in study population compared to 8.4 days in the historical controls, resulting in a mean hospital cost savings of $1763 per patient.

Carratala et al7 performed a randomized controlled trial of a 3-step critical pathway for community acquired pneumonia.

---

**Figure 2.** Process for the development of an evidence-based care pathway. Following clinical practice guidelines (CPG) development, a clinical protocol or algorithm is structured with consideration for patient flow and assessing the level of risk or severity of disease. The act of identifying rate-limiting steps, measuring and interpreting outcomes, and changing the decision tree in the protocol based on this new information is what makes the process a care pathway.
admitted to 2 hospitals, where 187 patients were randomized to the pathway and 191 received usual care. Median length of stay was 3.9 days in the pathway group compared to 6 days in the usual care group, with no significant differences in readmission, fatality, and patient satisfaction. Just as important, 16% had adverse drug reactions in the usual care group compared to only 5% in the pathway group. These latter 2 studies demonstrate the potential for standardizing an approach to measuring outcomes, applying best practice, and improving care throughout networks of hospitals.

**The Otolaryngologist’s Role**

Husbands et al introduced the use of care pathways to the management of head and neck cancer and observed significant decreases in hospital costs as well as shorter lengths of stay after pathway implementation. Following its introduction, Gendron et al was able to study the durability of this approach to managing patients with major resection and tracheostomy for upper aerodigestive tract cancer. They compared 87 historical controls, with 43 patients on the pathway in year 1 and 82 subjects in subsequent years. Median length of stay (LOS) decreased from 13.0 to 8.0 days since pathway implementation, the intensive care unit LOS decreased from 2.2 to 1.1 days, median total charges declined from $105,410 to $65,919 over 3 years, and postoperative pneumonia decreased from 12% to 1%. The team was also able to demonstrate ongoing improvement in their results over time, reflecting the dynamic process of actively improving and evolving the pathway.

In addition to these examples of care pathways improving outcomes and efficiencies in patient care, there are a multitude of opportunities for otolaryngologists to create pathways. The National Guidelines Clearinghouse lists 2383 CPGs relating to diseases, and a search of otolaryngology topics yield 84 CPGs as of April 2014 (www.guideline.gov). Since otolaryngologists are experts in many of the common problems seen by primary care, we can also take a leadership role in developing these pathways to empower the front lines of patient care. With care pathways identifying high-risk patients, we can be more available for the higher level and surgical care we were trained to deliver.

There are benefits and downsides to rote decisions in medical and surgical care. On the one side, a prescribed protocol should not substitute for the wisdom of a skilled specialist. And the complexity of the patient with certain problems may not fit within a standard template. In a recent commentary, Brietzke introduced the importance of individualizing CPGs to the particular patient and how that may be accomplished. However, structuring relatively simple patient care decisions helps identify more pertinent patients for specialty care and frees us to use our higher order executive functions for more important tasks. As hospitals merge into health systems that are beginning to offer insurance products, reducing costs and improving efficiency will be paramount over performing more services. Coupled with advances in information technology, care pathways provide an avenue for CPG implementation and opportunity to evolve a new best practice in patient care.

**Author Contributions**

Kenneth W. Altman, concept, literature review, manuscript preparation.

**Disclosures**

**Competing interests:** Kenneth W. Altman, consultant Nestle (July 2012).

**Sponsorships:** None.

**Funding source:** None.

**References**


