

## Are Critical Pathways Effective in Shortening Hospital Stay?

Pearson SD, Kleefield SF, Soukop JR, et al. Critical pathways intervention to reduce length of hospital stay. *Am J Med* 2001;110:175-80.

### Study Overview

**Objective.** To determine the effectiveness of critical pathways in reducing length of hospital stay.

**Design.** Prospective cohort study.

**Setting and participants.** Patients who underwent coronary artery bypass graft surgery (CABG), total knee replacement, colectomy, thoracic surgery, or hysterectomy at Brigham and Women's Hospital in Boston. Lengths of postoperative hospital stay for patients who underwent 1 of these surgeries during a 2-year baseline period were compared with lengths of stay for all patients treated after critical pathway implementation, whether or not the patients were managed on a pathway. For 3 study procedures (total knee replacement, colectomy, and CABG), researchers obtained data on lengths of stay at 4 neighboring hospitals that did not use critical pathways; changes in lengths of stay at these institutions were compared with changes seen at Brigham and Women's Hospital after pathways were introduced. The study was conducted from 1993 to 1996.

**Main outcome measures.** Postoperative length of stay was the primary outcome variable. Other variables measured were number of deaths, readmissions, and discharges to nursing homes.

**Main results.** 6796 patients underwent 1 of the study procedures; 4299 had surgery before pathway implementation, and 2497 had surgery after implementation. Percentages of patients enrolled in the different pathways varied widely (94% in the hysterectomy group, 78% in the total knee replacement group, 53% in the thoracic surgery group, 36% in the CABG group, and 26% in the colectomy group). Except for CABG, no significant differences in patient characteristics were seen among groups treated before and after pathway implementation. CABG-pathway patients were younger, more likely to be men, and had fewer comorbidities than patients not selected for the pathway.

After pathway implementation, postoperative length of stay decreased 21% for total knee replacement, 9% for CABG,

7% for thoracic surgery, 5% for hysterectomy, and 3% for colectomy ( $P < 0.01$  for all measures). During the 2-year baseline period (ie, before pathways were introduced), average length of stay decreased significantly for all procedures except CABG, with thoracic surgery showing the largest decrease (18%). Mean length of stay also decreased significantly in the first year after pathway implementation. The greatest reductions were 21% (1.4 days) for total knee replacement and 9% (0.8 days) for CABG; a smaller but statistically significant reduction occurred for the other procedures. Notably, average length of stay decreased at similar rates in the 4 neighboring hospitals that did not use critical pathways.

**Conclusion.** Critical pathways were associated with a rapid reduction in postoperative length of stay after all 5 study procedures. However, a similar reduction in length of stay was observed at hospitals that did not implement critical pathways. These findings raise questions about the effectiveness of critical pathways in a competitive environment.

### Commentary

Across the U.S. and Europe, health care institutions are using critical pathways to try to provide quality care at lower costs. First used for surgical procedures such as CABG, pathways are now available for a wide variety of conditions (eg, stroke, acute myocardial infarction), and pressure to use such management strategies is increasing. Few randomized controlled trials have examined pathway efficacy in the general medical area. Only 11 studies were found in a MEDLINE search using the terms *critical pathways* and *randomized controlled trials*. One recent study by Philbin et al [1] showed that use of a critical pathway for congestive heart failure produced a trend toward shorter length of hospital stay; however, this trend was not statistically significant. Another study by Marrie and colleagues [2] demonstrated a significant reduction in hospital stay as well as a reduction in institutional costs when using a pneumonia critical pathway. Notably, no difference in mortality or readmission rates were seen between the 2 study groups (conventional management and management via critical pathway).

The merit of Pearson and colleagues' work lies in the fact

that they conducted a prospective study at different centers, although the study was observational and not experimental. One notable problem is that all institutions included in the study were large academic centers; it would have been interesting to compare outcomes with other centers in the New England area that do not have a house staff or affiliation with a medical school. Also problematic was the high number of hysterectomy patients enrolled in the pathway (94%); the fact that numbers were lower for the other surgery groups introduces the risk of selection bias. In their discussion, the authors do mention this discrepancy but do not provide an explanation. Study design focused on efficiency, and the question of whether overall mortality was affected or if patient satisfaction improved among those entered in a pathway remains unclear.

#### **Applications for Clinical Practice**

Based on results from this study, no association can be made between reduction in length of stay after surgeries such as

CABG, hysterectomy, colectomy, total knee replacement, and thoracic surgery and use of critical pathways. Critical pathways seem to provide a framework allowing for consistent care delivery. There is a great need for further studies examining the effectiveness of critical pathways in general, particularly their effects on morbidity and mortality. At this time, when decisions are made about whether or not to implement a critical pathway, the same rigorous criteria used for assessing the efficacy of any other intervention should be applied.

#### **References**

1. Philbin EF, Rocco TA, Lindenmuth NW, et al. The results of a randomized trial of a quality improvement intervention in the care of patients with heart failure. The MISCHF Study Investigators. *Am J Med* 2000;109:443-9.
2. Marrie TJ, Lau CY, Wheeler SL, et al. A controlled trial of a critical pathway for treatment of community-acquired pneumonia. CAPITAL Study Investigators. Community-Acquired Pneumonia Intervention Trial Assessing Levofloxacin. *JAMA* 2000;283:749-55.

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