

HPR POLICY BRIEF

AMERICAN SOCIETY OF ANESTHESIOLOGISTS - HEALTH POLICY RESEARCH

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LACK OF CLINICAL DIRECTION FROM PHYSICIAN ANESTHESIOLOGISTS ASSOCIATED WITH HIGHER PATIENT MORTALITY

EXECUTIVE SUMMARY

In this policy brief, we examine a study titled *Anesthesiologist Direction and Patient Outcomes* in which the relationship between physician direction and patient outcomes is analyzed. In general, it is difficult to determine the effect of anesthesia provider on patient outcome because of the myriad factors that can influence a patient's outcome. However, the authors of this study use robust risk-adjustment techniques not seen in similar studies that greatly increase the validity of their conclusions. This study should inform responsible policy decision-making in the future when comparing anesthesia providers.

- The study found the odds of death to be 8 percent higher and the odds of failure-to-rescue to be 10 percent higher in cases where the administration of anesthesia was not directed by a physician anesthesiologist. This corresponds to 2.5 excess deaths per 1,000 patients and 6.9 excess failures-to-rescue per 1,000 patients with complications.
- The authors employ a wide array of risk-adjustment methods and multiple statistical analyses to fortify the validity of their conclusions.
- Such a statistically sound and conclusive study should be considered when making policy decisions about scope of practice for anesthesia providers.

INTRODUCTION

Determining the effects of anesthesia providers on patient outcomes is a difficult task. There are many factors that may impact these outcomes, so it is critical to adequately adjust for as many variables as possible. The purpose of this policy brief is to examine an independent study published in 2000 titled *Anesthesiologist Direction and Patient Outcomes*¹. In it, Silber et al. explore the relationship between physician direction and patient outcomes. By using Medicare claims data from 245 Pennsylvania hospitals and a host of risk-adjustment methods, the authors effectively analyzed the influence of anesthesiologist direction on patient outcomes.

CASE DEFINITIONS

The authors used a very strict definition of “directed” care to make their comparison. To be considered a directed case, the administration of anesthesia must have been personally performed or directed by an anesthesiologist. All other cases were defined as undirected. This definition of “undirected” includes many cases in which an anesthesiologist or physician was still involved to some extent. Examples of these scenarios include:

- A physician anesthesiologist “supervising” the case. Supervision is defined as a level of physician participation less than direction.
- A physician of an alternate specialty either directing or supervising the case, such as a surgeon or internist.
- If a patient underwent anesthesia procedures on multiple days during his or her stay and there was an absence of direction from a physician anesthesiologist on **any** of the days, the case was defined as undirected.

In fact, the first two scenarios outlined above made up 39 percent of the undirected cases in this study. Because physicians were involved in so many of these “undirected” cases, the study’s results are likely understated.

ROBUST RISK ADJUSTMENT

When examining the relationship between treatment (e.g., provider mix) and patient outcomes, proper risk adjustment is critical to ensure an “apples-to-apples” comparison. Some patients are sicker than others at the start of a case, which could potentially affect the health outcomes being studied. This holds additional implications in research that compares health providers, as physicians are regularly given more severe and/or complicated cases than nurses. Other factors such as patient health history and hospital characteristics could impact the patient outcomes independently of provider mix, and the authors’ ability to adjust for these many factors is this study’s greatest strength.

First, the authors conducted their analysis by including 64 different patient characteristics and 42 diagnosis-related group (DRG) categories in their model to adjust for case mix. Patient characteristics such as demographics, history and emergency room admission were incorporated. When adjusting only for these patient characteristics and case severity mix, the odds of death were 9 percent higher and the odds of failure-to-rescue were 12 percent higher in undirected cases. Both of these values were statistically significant.

What is failure-to-rescue?

Failure-to-rescue is defined as a death in a patient who experienced a complication within 30 days of the procedure. It is in these situations when a health care provider must make quick decisions based on complicated information in order to save the life of the patient.

The authors recognized that hospital characteristics may also play a factor in patient outcomes. To adjust for this effect, they conducted an additional analysis that included 11 hospital characteristics as well as the 106 interaction terms from the first model. When using this highly risk-adjusted model, undirected cases were still associated with greater death and failure-to-rescue rates. The odds of death were 8 percent higher and failure-to-rescue 10 percent higher. Both were statistically significant. These numbers correspond to **2.5 excess deaths per 1,000 patients and 6.9 excess failures-to-rescue per 1,000 patients** with complications.

FURTHER MODEL VALIDATION

To validate these results and confirm adequate risk adjustment, the authors developed a series of alternative statistical models. These models adjusted for various factors – beyond the anesthesia staffing model – that might affect patient outcomes either directly or indirectly. For example, several models isolated the potential effect of the unique characteristics of each of the 245 individual hospitals on patient outcomes. Other models adjusted for the potential bias in results that might be present if pre-surgery mortality risk influenced whether a patient’s anesthesia was medically directed. Additionally, the effects of any other factors that may influence both the staffing model and patient outcomes (these are “confounding” factors) were isolated to focus solely on the relationship between the staffing model and patient outcomes. No matter which of these statistically sophisticated approaches were used for analysis, the study’s conclusions were consistent and remained essentially unchanged.

POLICY POINTS

In this study, the odds of death were 8 percent higher and the odds of failure-to-rescue were 10 percent higher when the case was not directed by a physician anesthesiologist. This corresponds to 2.5 excess deaths per 1,000 patients and 6.9 excess failures-to-rescue per 1,000 patients with complications.

The authors of this study used multiple methods of statistical analysis to validate their model and arrive at their conclusions. They included 117 different interaction terms in their analysis to adjust for patient mix, case severity and hospital characteristics. By utilizing these strong risk-adjustment methods, the authors successfully isolate the relationship between anesthesiologist direction and patient outcomes. As such, this article is an excellent basis for policy decisions.

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