

## CARE PROCESSES

# Relationship Between State Malpractice Environment and Quality of Health Care in the United States

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**Background:** One major intent of the medical malpractice system in the United States is to deter negligent care and to create incentives for delivering high-quality health care. A study was conducted to assess whether state-level measures of malpractice risk were associated with hospital quality and patient safety.

**Methods:** In an observational study of short-term, acute-care general hospitals in the United States that publicly reported in the Centers for Medicaid & Medicare Services Hospital Compare in 2011, hierarchical regression models were used to estimate associations between state-specific malpractice environment measures (rates of paid claims, average Medicare Malpractice Geographic Practice Cost Index [MGPCI], absence of tort reform laws, and a composite measure) and measures of hospital quality (processes of care, imaging utilization, 30-day mortality and readmission, Agency for Healthcare Research and Quality Patient Safety Indicators, and patient experience from the Hospital Consumer Assessment of Healthcare Providers and Systems [HCAHPS]).

**Results:** No consistent association between malpractice environment and hospital process-of-care measures was found. Hospitals in areas with a higher MGPCI were associated with lower adjusted odds of magnetic resonance imaging overutilization for lower back pain but greater adjusted odds of overutilization of cardiac stress testing and brain/sinus computed tomography (CT) scans. The MGPCI was negatively associated with 30-day mortality measures but positively associated with 30-day readmission measures. Measures of malpractice risk were also negatively associated with HCAHPS measures of patient experience.

**Conclusions:** Overall, little evidence was found that greater malpractice risk improves adherence to recommended clinical standards of care, but some evidence was found that malpractice risk may encourage defensive medicine.

The tort liability system in the United States is purported to compensate persons who are injured by negligence and to deter negligent conduct.<sup>1</sup> With regard to medical malpractice, the system performs the first function poorly. Only 2%–3% of patients injured by negligent care ever access the civil justice system, and only a fraction of those patients receive compensation, while plaintiffs who have not actually been hurt by substandard care may be rewarded.<sup>2–4</sup>

Despite these shortcomings, tort litigation remains the nation's primary approach to address medical malpractice because of a belief in tort deterrence theory.<sup>5–7</sup> This “deterrence hypothesis” posits that the threat of malpractice liability incentivizes providers to avoid delivering negligent care. However, although physicians may alter their behavior in response to the perceived risk of lawsuit, they may not do so in a manner that results in meaningful risk reduction.<sup>8</sup>

Few studies have directly examined whether increased liability pressure improves patients' health care outcomes or experiences. We conducted a study to explore the relationship between state medical liability environment and hospital-level measures of quality of care. We hypothesized that despite

the expected relationships between malpractice environment and quality measures, as dictated by deterrence theory, we would not find consistent associations between malpractice environment and hospital-level quality measures.

## METHODS

### Ethical Issues

This observational study using publicly reported data on hospitals did not constitute human subjects research and thus was exempt from Institutional Review Board approval.

### Measures of Hospital Quality

Hospital quality data for Medicare-certified hospitals came from the Centers for Medicare & Medicaid Services (CMS) Hospital Compare public database, which has previously been described by others in detail.<sup>9–13</sup> We used publicly reported 2011 data for the following Hospital Compare measure sets:

- Acute myocardial infarction (AMI) process-of-care
- Heart failure (HF) process-of-care
- Pneumonia process-of-care
- Surgical Care Improvement Project (SCIP)
- Outpatient imaging efficiency measures
- Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) patient satisfaction measures

- 30-day risk-adjusted mortality and readmission measures
- Agency for Healthcare Research and Quality Patient Safety Indicators (AHRQ PSIs)

A total of 44 different Hospital Compare measures were studied.

Using data from the 2010 American Hospital Association (AHA) Annual Survey, we controlled for hospital ownership (private not-for-profit, private for-profit, and government); bed size (<100, 100–199, and ≥ 200 beds); rural location; whether a hospital was a member of a hospital system or network (a group of hospitals, physicians, other providers, insurers and/or community agencies that work together to deliver a broad spectrum of services to the community), and teaching status (residency program approved by the Accreditation Council for Graduate Medical Education, medical school program reported to the American Medical Association, and/or membership in the Council of Teaching Hospitals and Health Systems).<sup>14</sup>

**Process-of-Care Measures.** Specific process-of-care measures for AMI, HF, pneumonia, and surgical care are described in Table 1. For consistency across process-of-care measures, we limited our analyses to those that were scored out of 100%. Measures exhibiting too little variation (100% of hospitals scoring 75% or above on a measure) were excluded. Because process measures were negatively skewed, a dichotomous variable was created for each measure indicating whether a hospital scored at or above 95%.<sup>15</sup> Analyses using alternative thresholds yielded consistent results and are not reported here.

**Outpatient Imaging Efficiency.** Hospital Compare outpatient imaging efficiency measures evaluate hospital-level incidence rates of six different outpatient imaging utilization patterns (Table 1). Dichotomous variables were created to indicate whether a hospital was in the top quartile nationwide on each imaging measure (top quartile corresponded to the highest rates of efficient utilization).<sup>16</sup>

**Patient Experience.** We modeled 10 different HCAHPS patient experience measures (Table 1). The percentage of a hospital's survey respondents giving the highest rating for each domain was treated as a continuous variable.

**30-Day Risk-Adjusted Readmission and Mortality.** Hospital Compare 30-day risk-adjusted readmission and mortality rates for AMI, HF, and pneumonia were modeled as continuous variables (Table 1).

**AHRQ PSI.** Five PSIs capturing rates of various adverse events per 1,000 discharges (Table 1) were modeled as continuous variables.

### Measures of State-Level Malpractice Environment

Four types of measures were used to characterize the level of risk in state malpractice environments (Table 2), as we now describe,

**Paid Malpractice Claims per 100 Physicians.** Data on the number of paid malpractice claims in each state in 2010 came from the National Practitioner Data Bank (NPDB) Public Use Data File. Following previous work,<sup>17,18</sup> we adjusted claim frequency by the number of active nonfederal physicians (MDs) in 2010 reported in the Bureau of Health Professions Area Resource File.

**CMS Malpractice Geographic Practice Cost Index (MGPCI).** State average MGPCI is a measure of how costly the state malpractice environment is to physicians. The MGPCI shows how many times above (or below) the national average malpractice cost a given locality's average cost is. We selected this measure over an alternative measure of costliness of the malpractice environment to physicians—malpractice insurance premiums—because whereas the usual source of malpractice premiums<sup>19</sup> provides reports from a limited number of companies, the MGPCI incorporates information from a broader range of inputs, accounts for differences in insurance carrier market shares, and accounts for differences in physician activity and specialty mix across states.<sup>20</sup>

**Tort Reform.** Malpractice legislation also contributes to state-level malpractice risk.<sup>21–26</sup> The National Conference of State Legislatures' compilation of state malpractice legislation was coded into indicators of whether states had enacted the following provisions: limits on attorney fees, periodic payment, apology protection law, caps on noneconomic damages, pretrial screening panels, expert witness standards, alternate dispute resolution, certificate of merit, patient compensation fund, peer-review panels, and joint and several liability rule reform.<sup>27</sup>

**Composite Measure.** We also used a composite measure of malpractice environment that we developed in a previous study.<sup>28</sup> This composite measure was constructed from a principal components analysis of the number of paid claims per physician; average award size; number of attorneys per capita; average internal medicine, surgery, and obstetrics/gynecology malpractice premiums; and an index of malpractice laws (number of legal provisions *not* enacted).<sup>28</sup>

For the current study, states were grouped into quartiles according to paid claims rates, average MGPCI, and the composite measure of malpractice risk. Adopting a provider perspective, we defined the fourth quartile of each measure as the highest-risk malpractice environment (alternative thresholds yielded similar results).

### Statistical Analyses

To evaluate the association between malpractice environment and each measure of hospital quality, we estimated a series of hierarchical logistic regression models (for dichotomous dependent variables) and hierarchical linear regression models (for continuous variables) with random state intercepts to account for clustering of hospitals within states and

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