

# Medical Malpractice Payment Reports of Physician Assistants/Associates Related to State Practice Laws and Regulations

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## ABSTRACT:

**Purpose:** Authorizing physician assistants/associates (PAs) to provide care to patients and removing restrictive laws and regulations without sacrificing patient safety is essential to meet the needs of patients and the US healthcare system. The aim of this observational study was to determine if states with permissive compared to restrictive PA scope of practice laws and regulations had higher instances of medical malpractice payment reports (MMPR), a proxy of patient harm.

**Design:** This observational study examined 10 years (2010-2019) of medical malpractice payment reports data from the National Practitioner Data Bank (NPDB) compared to the laws and regulations of states for the same period.

**Results:** Negative binomial regressions indicated no statistically significant differences in MMPR rates between states with permissive versus restrictive PA practice laws and regulations. Five of six practice reforms decreased or had no significant effect on PA and physician MMPR occurrences. One reform was associated with a weak but statistically significant increased risk of MMPRs for PAs and a trend toward a decreased risk for physicians.

**Conclusion:** This study suggests that removing restrictive laws and regulations to PA practice does not increase overall risks to patients or increase rates of malpractice within US healthcare.

## Introduction

The US healthcare system is one of the most complex and high-cost health systems globally. Despite spending nearly twice on healthcare as a share of the economy as other countries, the US has the highest rate of avoidable deaths, one of the lowest life expectancies, higher chronic disease burdens, and other health disadvantages in comparison with comparable nations.<sup>1</sup> In addition, physician and provider shortages, a rising number of natural and health emergencies, increasing numbers and ages of healthcare beneficiaries, greater complexity of conditions and comorbidities, ongoing disparities in health outcomes, and other factors threaten US healthcare.<sup>2,6</sup>

The high per capita cost of care, low value per cost, and other factors have caused policy experts (eg, The National Academies of Sciences, Engineering, and Medicine and The Hamilton Project), regulatory agencies (eg, US Department of Health and Human Services, US Department of Treasury, and US

Department of Labor), and other stakeholders to recommend changes to the US health system. The recommended changes include authorizing qualified healthcare practitioners, such as physician assistants/associates (PAs), to practice to the full extent of their training and qualifications without restrictive state laws and regulations that limit their scope of practice (SOP) or impose requirements on physician collaboration.<sup>7-11</sup>

State laws and regulations have been imposed on the PA profession in part to address health and safety concerns, yet there is a lack of evidence that these laws and regulations affect patient safety. Some PA practice laws and regulations and physician collaboration requirements have been noted to be unnecessary, unjustified, costly, and potentially detrimental.<sup>8-11</sup> Proponents of permissive PA practice laws and regulations note the demonstrated quality, cost-effective care provided by PAs, care that has been shown in many ways to be comparable to that of physicians.<sup>8-15</sup> The available evidence demonstrates favorable PA practice laws

and regulations increase patient access, lower healthcare costs, positively affect quality of care, and reduce preventable healthcare amenable deaths.<sup>8-10, 16-18</sup> Past research has noted that PAs have lower rates of malpractice and lower malpractice payments when compared to physicians.<sup>19-20</sup> In addition, the comparable and sometimes complementary services PAs provide compared to physicians are associated with high levels of patient satisfaction, and patients report that PAs are trusted, valued practitioners who provide safe and effective healthcare and improve health outcomes.<sup>11, 21-23</sup>

Despite the evidence supporting the benefits of PAs and the removal of restrictive SOP laws and regulations, there is opposition from some physicians, physician groups, and regulators primarily based on an unfounded assertion that permissive PA practice laws and regulations threaten patient safety and should be opposed.<sup>24-25</sup> Other opponents are concerned permissive laws and regulations will result in increased malpractice payments and premiums.<sup>26-27</sup>

If, as suggested by opponents, permissive PA practice laws represent a threat to patient safety and an increased risk of malpractice, there should be a greater number of malpractice payments against PAs in states with permissive compared to restrictive PA practice laws and regulations. Reported malpractice payments serve as an approximation of the acts or omissions constituting medical errors or negligence, are highly correlated with adverse patient outcomes, and have been used as a surrogate measure of serious adverse medical events.<sup>28-30</sup> It is also important in an assessment of risk, and consistent with other research, to analyze potential transference of risk from one group of practitioners (ie, PAs) to another (ie, physicians) with changes in collaborative practices.<sup>31</sup> Therefore, this study evaluated if PA practice laws and regulations affect the number of medical malpractice payment reports (MMPR) for PAs and physicians within the US, including Washington, DC.

## Methods

Data for the number of MMPRs against PAs and physicians (allopathic and osteopathic physicians combined) between 2010 and 2019 were obtained from the National Practitioner Data Bank (NPDB) Public Use Data File<sup>32</sup> as of March 31, 2023. Data from the NPDB were used because the database is the most comprehensive national source of information about practitioners' malpractice and medical discipline records.<sup>33</sup>

This 10-year span of data was selected for analysis as it was the most recent period prior to temporary regulatory waivers enacted due to COVID-19 and to allow for expected delays in reporting of aggregated judgements,<sup>19</sup> both of which would have confounded the analysis. The number of MMPRs for PAs and allopathic and osteopathic physicians that occurred in each state and year of the 10-year data period were extracted and used to develop a variable reflecting the number of MMPRs for each practitioner type used in subsequent data analysis.

Additional control variables from the Agency for Healthcare Research and Quality's (AHRQ) Social Determinants of Health dataset were included in the analyses.<sup>34</sup> From this dataset, the number of employed PAs and physicians per state and Washington, DC, population of each state and Washington, DC, county-level unemployment rate,

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**IF, AS SUGGESTED BY OPPONENTS, PERMISSIVE PA PRACTICE LAWS REPRESENT A THREAT TO PATIENT SAFETY AND AN INCREASED RISK OF MALPRACTICE, THERE SHOULD BE A GREATER NUMBER OF MALPRACTICE PAYMENTS AGAINST PAs IN STATES WITH PERMISSIVE COMPARED TO RESTRICTIVE PA PRACTICE LAWS AND REGULATIONS.**

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and county-level income per capita were derived for each data year. Consistent with prior research on SOP reform and MMPR events, data relating to the presence of joint and several liability reforms, limits on punitive and non-economic damages, and apology laws were included.<sup>31</sup>

Six elements of an ideal PA SOP that allow for optimal practice were identified based on recognized standards, industry experts, and regulatory agencies (Table 1).<sup>8-9, 35</sup> These ideal factors eliminate physician supervisory requirements and allow collaborative practices, if needed, to be determined at the practice level based on institutional policies and the training, experience, and competency of the individual PAs. The state laws and regulations for all 50 states and Washington, DC, as published in the annual *PA State Laws and Regulations* from 2010 through 2019 and confirmed with legislative and regulatory tracking software,<sup>36-45</sup> were independently reviewed by 2 researchers to ensure data accuracy. Any discrepancies in analysis, for which there were

few, were reviewed by a policy expert and consensus was obtained.

Each of the SOP elements were assigned a code to perform statistical analysis for each year in which they were in effect (Table 1). A restrictive component identified in either a state's laws or regulations for an element was assigned a "0". The express exclusion of a restrictive component or the absence

of restrictive language in laws or regulations for an element was assigned a "1". State laws were used to determine the nominal assignment in instances where there was a discrepancy between the laws and regulations due to a delay in regulatory updates. A change in an SOP element was then assigned to the year following a legislative amendment or a revision of a regulation. This was done to

**Table 1**  
**PA scope of practice elements analyzed**

Elements, definitions in state laws and regulations, and assignments	
<b>PAs practice in collaboration or have no formal statutory relationship with a physician.</b>	
<ul style="list-style-type: none"> <li>• <b>Permissive:</b> The working relationship between a physician and a PA is described as collaboration and/or there is the absence of the term "supervision" or "supervising physician."</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Restrictive:</b> The working relationship a physician has with a PA is defined as supervision or there are terms like "supervising physician" or "physician supervision."</li> </ul>
<b>Physicians may collaborate with an unlimited number of PAs.</b>	
<ul style="list-style-type: none"> <li>• <b>Permissive:</b> There is an absence of a limit or a specific number of PAs with whom a physician may collaborate or supervise.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Restrictive:</b> There is a maximum number of PAs, either total or at one time, with whom a physician may collaborate or supervise.</li> </ul>
<b>No physician co-signature or specific mandated review is required on medical record documentation or orders.</b> <i>*Did not review or include any requirements, if present, for co-signature of prescriptions.</i>	
<ul style="list-style-type: none"> <li>• <b>Permissive:</b> There is no requirement (explicit or implied) for physician co-signature of medical record documentation or orders made by a PA. Any review of medical records or orders, if required, can be performed on a sample of records, periodically, or 'in accordance with accepted standards.'</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Restrictive:</b> There is a requirement for physician co-signature on all or some portion of medical record documentation and/or orders made by a PA or for some duration of time (eg, co-signature required for new PAs or PAs new to a practice or specialty).</li> </ul>
<b>Scope of practice determined at the practice site.</b>	
<ul style="list-style-type: none"> <li>• <b>Permissive:</b> There is no requirement that a regulatory body approve a PA's scope of practice or the services they may perform.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Restrictive:</b> Some or all PAs must have their scope of practice or a list of services they perform approved by a regulatory body.</li> </ul>
<b>PAs practice without the need for the physical presence or proximity of a physician.</b>	
<ul style="list-style-type: none"> <li>• <b>Permissive:</b> There are no requirements for a physician to be within proximity of a PA (either by time or distance), have an in-person meeting with a PA, or ever be present at the practice site. Any quality review, if required, does not specify it must be done in-person or face-to-face.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Restrictive:</b> There are requirements that a physician have a periodic on-site presence at a facility in which a PA practices, proximity requirements (defined by time or distance) to a PA during the PA's practice, or in-person meeting requirements.</li> </ul>
<b>Scope of practice is determined by the training and competency of the PA; not limited to the scope of a collaborating physician.</b>	
<ul style="list-style-type: none"> <li>• <b>Permissive:</b> There is no language limiting a PA's scope of practice to a component of a collaborating/supervising physician's scope of practice or specialty.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Restrictive:</b> There is language limiting a PA's scope of practice to a component of a collaborating/supervising physician's scope of practice or specialty.</li> </ul>

control for interstate variations in legislative and regulatory schedules and is consistent with the methodology of citations in the *PA State Laws and Regulations* books. It also accounts for some inevitable delay for regulatory or legislative changes to be incorporated into practice. Summary statistics

for the variables used in this study can be viewed in Table 2.

### Negative Binomial Regression Analysis

A series of multilevel regression analyses were calculated to explore the predictive relationship

**Table 2**  
**Summary statistics**

Variable	Mean	Std Dev	Min	Max
<b>Physician Associate (PA) Counts</b>				
Medical Malpractice Payment Records (MMPRs)	3.75	5.63	0	36
MMPR severity: Temporary injury	0.85	1.52	0	11
MMPR severity: Permanent injury	2.07	3.68	0	28
MMPR severity: Death	1.23	2.09	0	16
<b>Physician (MD &amp; DO) Counts</b>				
Medical Malpractice Payment Records (MMPRs)	130.77	194.97	0	1398
MMPR severity: Temporary injury	29.57	51.65	0	500
MMPR severity: Permanent injury	74.12	112.40	0	726
MMPR severity: Death	40.23	58.21	0	327
<b>Scope of Practice (SOP) Factors</b>				
Relationship with physician not defined as supervisory	0.05	0.22	0	1
No physician collaboration/supervision ratio restrictions	0.22	0.41	0	1
No physician co-signature requirements	0.59	0.49	0	1
No physician on-site/proximity or in-person/meeting requirements	0.34	0.47	0	1
SOP determined at practice site	0.63	0.48	0	1
PA SOP not limited by collaborating/supervising physician SOP	0.10	0.31	0	1
Permissiveness of SOP regulations in Practice State	0.13	0.34	0	1
<b>Control Factors</b>				
State population (millions)	6.17	6.95	0.55	39.28
Total PAs	2089	2420	103	14943
Total MDs	13015	23887	1193	140148
Total DOs	1466	1727	64	6909
Joint and several liability reform	0.82	0.38	0	1
Punitive damages cap	0.62	0.49	0	1
Non-economic damages cap	0.46	0.50	0	1
Apology law	0.76	0.43	0	1
Average county percentage in poverty	15.11	3.85	8.32	25.72
Averaged county unemployment rate	6.31	2.41	2.48	13.97
Averaged county real income per capita (thousand \$)	26.82	5.77	17.62	56.15

Note: The number of observations for all variables is 510. For scope of practice factors and tort reforms, mean values reflect the proportion of state-years within the sample frame where the regulatory changes were in effect. Practitioner counts reflect PAs, MDs, and DOs who were not employed by the federal government.

between SOP elements and MMPR occurrences for PAs and allopathic and osteopathic physicians (combined) within each state across the data years. After examining the data, negative binomial regressions were selected due to the presence of overdispersion. A significant empty negative binomial model was found, indicating MMPRs varied between states(s) across the years(t) included in the analysis ( $\sigma^2_{\mu_{st}} = 0.365$   $p < 0.001$ ).

Subsequent log-linked negative binomial regression analyses were calculated to identify how the overall regulatory environment in a state during the data period impacted the occurrences of MMPRs. The basic estimating equation took the following form:  $MMPR_{st} = \exp(\beta_0 + \beta_1 SOP_{st} + \beta_2 Torts_{st} + \beta_3 X_{st} + Y_s + \tau_t + \ln(pop_{st}) + \epsilon_{st})$  where MMPR represents the number of malpractice counts, or the severity of an incident of malpractice, against practitioners in state  $s$  in year  $t$ . Due to insufficient counts to analyze more granular cases of MMPRs, MMPRs coded in the NPDB as minor temporary injury and major temporary injury were categorized in this study as *temporary injury* and four categories of permanent injuries were classified as *permanent injury*. MMPRs coded as death were also included in the analysis, but insignificant injuries and emotional injuries were not due to insufficient PA data.

The presence of the SOP elements in state  $s$  at time  $t$  are represented in the equation by SOP indicator variables. An additional indicator code was created to classify states with 4 or more permissive SOP elements as *permissive states*

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#### A SERIES OF MULTILEVEL REGRESSION ANALYSES WERE CALCULATED TO EXPLORE THE PREDICTIVE RELATIONSHIP BETWEEN SOP ELEMENTS AND MMPR OCCURRENCES FOR PAs AND ALLOPATHIC AND OSTEOPATHIC PHYSICIANS (COMBINED) WITHIN EACH STATE ACROSS THE DATA YEARS.

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and those with three or fewer permissive SOP elements as *restrictive states*. *Torts* represents the litigiousness of states based on their passage of the previously mentioned tort reforms; *X* represents the state level control factors of unemployment, percent of the population in poverty, and income per capita. To account for variance across years, variables used within the model were within-state cluster centered. Indicator variables for each state

( $Y$ ) and year ( $\tau$ ) were included. The natural log of the annual state population was used as an offset variable, as opposed to the number of PAs or physicians, due to the conflating influence of the regulatory environment on the population of practitioners within a state. Regressions were analyzed using IBS SPSS version 29.

#### Results

There were no significant interactions between states having permissive practice environments (with 4 or more permissive SOP elements) compared to restrictive states (with 3 or fewer SOP elements) and the number of MMPR occurrences (Table 3).

There were also no statistically significant interactions between instances of overall PA MMPRs and a state having joint and several liability reforms, limits on punitive and non-economic damages, or apology laws (Table 4). However, certain SOP elements had a significant effect on the number and severity of MMPRs for PAs and physicians (Table 5). The results for each series of models are detailed in the following sections.

**MMPR Occurrences.** A significant regression equation was found predicting the relationship between the number of MMPRs in a state and the regulatory environment within a state ( $p < 0.001$ ,  $\beta = -14.41$ ), indicating the passage of PA SOP elements may influence the occurrence of MMPRs within a state. Two SOP elements were found to have a significant impact on the number of PA MMPRs. States enacting legislation allowing PAs to practice outside the scope of practice of their collaborating/supervising physician had a statistically significant 58.3% reduction in PA MMPRs ( $IRR = 0.417$ , 95% CI 0.309-0.592 [ $\beta = -0.875$ ,  $p < 0.001$ ]). Conversely, removing physician co-signature requirements lead to a 16.2% increase in PA MMPRs ( $IRR = 1.162$ , 95% CI 1.001 – 1.349 [ $\beta = 0.150$   $p < 0.05$ ]; Table 3). Physician MMPRs were also significantly affected by changes to PA SOP ( $p < 0.001$ ,  $\beta = -10.76$ ). When relationships with physicians were not defined as supervisory ( $p < 0.05$ ,  $\beta = -0.29$  [ $IRR = 0.745$ , 95% CI 0.586 – 0.948]), there were no physician supervision/collaboration ratio restrictions ( $p < 0.05$ ,  $\beta = -0.16$  [ $IRR = 0.853$ , 95% CI 0.735 – 0.990]), and PAs could practice outside the scope of practice of their supervising/collaborating physician ( $p < 0.01$ ,  $\beta = -0.25$  [ $IRR = 0.782$ , 95% CI 0.671 – 0.910]; Table 3) physician MMPRs decreased.

**MMPR Severity.** Permissive states were no more likely than restrictive states to have PAs committing MMPRs resulting in temporary injury, permanent injury, or death. However, some SOP elements were related to MMPR severity. PA MMPRs resulting in temporary injury occurred less frequently when relationships were not defined as supervisory ( $p < 0.05$ ,  $\beta = -2.02$ ) and when PA SOP was not limited by the SOP of their supervising or collaborating physician ( $p < 0.001$ ,  $\beta = -0.90$ ). However, PA MMPRs resulting in temporary injury increased in instances when there were no physician on-site/proximity or in-person/meeting requirements ( $p < 0.05$ ,  $\beta = 0.24$ ). PA SOP not being limited

by the SOP of their supervising or collaborating physician related to a reduction in the number of PA MMPRs whose outcome was permanent injury ( $p < 0.001$ ,  $\beta = -1.13$ ). Additionally, PA SOP not being limited by the SOP of their supervising or collaborating physician also predicted fewer death related PA MMPRs ( $p < 0.01$ ,  $\beta = -0.69$ ; Table 5).

## Discussion

While there were statistically significant interactions between some elements of PA practice reforms and PA and physician MMPRs, having a more permissive regulatory environment for PAs was not associated

**Table 3**  
**Interaction between MMPRs (PAs/Physicians) and Scope of Practice (SOP) regulatory factors**

SOP Factor	IRR(SE)	95% Confidence Interval		p
		Lower Bound	Upper Bound	
<b>Physician Assistant/Associates (PAs)</b>				
Relationship with physician not defined as supervisory	0.663 (0.259)	0.399	1.101	0.112
No physician collaboration/supervision ratio restrictions	0.946 (0.126)	0.738	1.211	0.659
No physician co-signature requirements	1.162 (0.076)	1.001	1.349	0.048*
No physician on-site/proximity or in-person/meeting requirements	1.006 (0.087)	0.847	1.194	0.949
SOP determined at practice site	1.062 (0.082)	0.904	1.247	0.463
PA SOP not limited by collaborating/supervising physician SOP	0.417 (0.152)	0.309	0.592	0.000***
Permissive State	1.100 (0.175)	0.780	1.551	0.588
<b>Physicians (MDs &amp; DOs)</b>				
Relationship with physician not defined as supervisory	0.745 (0.122)	0.586	0.948	0.017*
No physician collaboration/supervision ratio restrictions	0.853 (0.076)	0.735	0.990	0.036*
No physician co-signature requirements	0.910 (0.050)	0.826	1.003	0.058
No physician on-site/proximity or in-person/meeting requirements	1.016 (0.058)	0.907	1.138	0.783
SOP determined at practice site	0.967 (0.052)	0.873	1.071	0.520
PA SOP not limited by collaborating/supervising physician SOP	0.782 (0.078)	0.671	0.910	0.002**
Permissive State	1.160 (0.104)	0.945	1.424	0.154

N=510. Values reflect incident rate ratios. Standard errors in parentheses. State population used as offset variable. Models also include tort-related laws, averaged county unemployment rates, averaged county-level real income per capita, and the averaged percent of the county living in poverty.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

with an increase in PA MMPRs between 2010 and 2019. Therefore, this study finds no evidence that creating a permissive practice environment will lead to an increase in MMPRs. In fact, almost all the PA SOP elements included within these statistical models illustrate that creating a more permissive PA practice environment leads to a reduction in MMPRs for PAs and physicians. The exact cause of the decreased overall MMPRs is unknown, but allowing PAs and physicians to have flexible collaboration determined at the practice site may result in more meaningful collaboration, optimized practice, and efficiency of care that improves healthcare and reduces risk.

Allowing PAs to practice consistent with their training and experience, and not limiting their SOP to that of a collaborating/supervising physician, was associated with a highly significant decrease in MMPRs for both PAs and physicians. Allowing PAs to practice in collaboration with physicians or have no formal statutory relationship with a physician and authorizing physicians to collaborate with an unlimited number of PAs significantly decreased the risk of MMPRs for physicians without affecting the occurrence of MMPRs for PAs. Allowing PA SOP to be determined at the practice site and not requiring a physician to be onsite or in proximity to a practicing PA had no significant effect on PA or physician MMRP occurrences.

Not requiring physician co-signature was associated with a relatively weak ( $\beta = 0.150$ ), but statistically

significant ( $p = 0.048$ ) increased risk of MMPRs for PAs while a trend toward a decreased risk for physicians was approaching significance ( $p = 0.058$ ). These findings may represent a more accurate attribution of care and accountability rather than an overall increased risk to patients.

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**ALLOWING PAs TO PRACTICE CONSISTENT WITH THEIR TRAINING AND EXPERIENCE, AND NOT LIMITING THEIR SOP TO THAT OF A COLLABORATING/SUPERVISING PHYSICIAN, WAS ASSOCIATED WITH A HIGHLY SIGNIFICANT DECREASE IN MMPRS FOR BOTH PAs AND PHYSICIANS.**

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Furthermore, an interpretation of these findings is limited by the fact that there was considerable interstate variability in laws and regulations related to co-signature, with some states mandating co-signature of all medical records of a PA and other states only requiring a physician signature for a limited number of PAs, certain percentage of medical records, or specified time. Conversely, physicians may have been required to co-sign medical records in the absence of state laws or regulations requiring it due to billing mechanisms like “incident to” or split (or shared) billing. Therefore, this element may be influenced by confounding factors to a greater

**Table 4**

**Malpractice events and severity by state permissiveness and tort reforms**

Measure	Malpractice	Temporary Injury	Permanent Injury	Death
<b>Physician Associates (PAs)</b>				
Permissive state	-0.078 (0.176)	-0.440 (0.299)	-0.077 (0.279)	0.226 (0.264)
Joint and several liability reform	0.218 (0.119)	0.332 (0.207)	0.173 (0.180)	0.271 (0.190)
Punitive damages cap	-0.047 (0.090)	-0.177 (0.148)	0.019 (0.137)	0.139 (0.146)
Noneconomic damages cap	0.072 (0.078)	0.178 (0.127)	-0.011 (0.118)	0.164 (0.123)
Apology law	0.055 (0.091)	-0.013 (0.148)	0.025 (0.137)	0.070 (0.146)

N=510. Values reflect incident rate ratios. Standard errors in parentheses. State population used as offset variable. Models also include individual scope of practice regulations, averaged county unemployment rates, averaged county-level real income per capita, and the averaged percent of the county living in poverty.

Note: Due to limited instances of PA MMPRs, categories in the NPDB dataset were combined based on categorization as “temporary” or “permanent” injury. Emotional and insignificant injuries were not included in the analysis. States with 4 or more SOP reforms were classified as permissive states.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$  (no values in this table were statistically significant).

extent than other SOP elements. Given that and the relatively weak association between the independent (physician co-signature) and dependent (PA MMPRs) variables, further research is needed prior to assuming the correlation implies causation.

This research, supporting similar findings that relaxing state laws and regulations does not result in harmful or low-quality care<sup>11-18</sup>, should assuage fears that eliminating restrictive PA practice elements will lead to an increase in PAs' patients having serious adverse medical events. It should also alleviate concerns that rates of malpractice would increase.

## Limitations

There were several limitations to the study. Although the NPDB is the largest national database of MMPRs, there may be some, although limited, non-compliance in reporting by entities and claims against corporations or hospitals may not identify individual practitioners.<sup>46</sup> There is also variability in elapsed time between a negligent act or omission and a malpractice report to the NPDB; however, there are fewer elapsed years for aggregated judgements for PAs than physicians and the timeframe of the data analyzed should allow for delayed reporting.<sup>19</sup> In addition, data in the

**Table 5**  
**SOP factors and reported severity of malpractice events**

SOP Factor	Malpractice	Temporary Injury	Permanent Injury	Death
<b>Physician Associates (PAs)</b>				
Relationship with physician not defined as supervisory	-0.412 (0.259)	-2.021* (0.964)	-0.198 (0.360)	-0.596 (0.444)
No physician collaboration/supervision ratio restrictions	-0.056 (0.126)	0.129 (0.193)	-0.167 (0.197)	0.004 (0.192)
No physician co-signature requirements	0.150* (0.076)	0.161 (0.112)	0.121 (0.115)	0.229 (0.118)
No physician on-site/proximity or in-person/meeting requirements	0.006 (0.087)	0.241* (0.122)	-0.075 (0.134)	-0.026 (0.135)
SOP determined at practice site	0.060 (0.082)	0.050 (0.130)	0.164 (0.124)	-0.048 (0.126)
PA SOP not limited by collaborating/supervising physician SOP	-0.875*** (0.152)	-0.896*** (0.269)	-1.133*** (0.247)	-0.689** (0.223)
Permissive state	0.095 (0.175)	-0.470 (0.299)	-0.046 (0.276)	0.324 (0.261)
<b>Physicians (MDs &amp; DOs)</b>				
Relationship with physician not defined as supervisory	-0.294* (0.122)	-0.285 (0.162)	-0.208 (0.135)	-0.455** (0.170)
No physician collaboration/supervision ratio restrictions	-0.159* (0.076)	-0.035 (0.086)	-0.257** (0.086)	-0.277** (0.095)
No physician co-signature requirements	-0.094 (0.050)	-0.042 (0.055)	-0.124* (0.054)	-0.096 (0.061)
No physician on-site/proximity or in-person/meeting requirements	0.016 (0.058)	0.168** (0.064)	0.002 (0.064)	0.035 (0.071)
SOP determined at practice site	-0.033 (0.052)	-0.011 (0.059)	0.019 (0.057)	-0.149* (0.064)
PA SOP not limited by collaborating/supervising physician SOP	-0.246*** (0.078)	-0.246** (0.090)	-0.264** (0.086)	-0.313*** (0.098)
Permissive state	0.149 (0.104)	-0.021 (0.120)	0.244* (0.176)	0.300* (0.131)

N=510. Values reflect incident rate ratios. Standard errors in parentheses. State population used as offset variable. Models also include tort-related laws, averaged county unemployment rates, averaged county-level real income per capita, and the averaged percent of the county living in poverty.

Note: Due to limited instances of PA MMPRs, categories in the NPDB dataset were combined based on categorization as "temporary" or "permanent" injury. Emotional and insignificant injuries were not included in the analysis.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .



NPDB may not comprehensively and definitively correspond with unsafe practice or patient harm.

Another limitation unrelated to the NPDB is that some acts or omissions of PAs may have been attributed to a physician or employer under the doctrine of respondent superior and not reported as an MMPR of a PA; however, a review of case law

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**THIS RESEARCH, SUPPORTING SIMILAR FINDINGS THAT RELAXING STATE LAWS AND REGULATIONS DOES NOT RESULT IN HARMFUL OR LOW-QUALITY CARE, SHOULD ASSUAGE FEARS THAT ELIMINATING RESTRICTIVE PA PRACTICE ELEMENTS WILL LEAD TO AN INCREASE IN PAs' PATIENTS HAVING SERIOUS ADVERSE MEDICAL EVENTS.**

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demonstrated that liability for the acts or omissions of a PA are generally assigned to a PA, even when a physician has explicit or implied liability as a collaborating physician.<sup>47</sup>

This study could not account for some state, practice, and PA factors that may affect MMPRs. While the statistical model controlled for some economic factors like unemployment and income per capita, other economic characteristics of a state and individual attitudes toward litigation could affect the findings. Additionally, practice characteristics were unable to be assessed but may be relevant. These characteristics include but are not limited to PA utilization, patient complexity, workplace culture, the extent to which laws and regulations were followed, and how quickly changes in laws and regulations were adapted into practice. The individual characteristics of PAs (eg, experience, specialty, etc.) that may affect clinical outcomes are not available within the NPDB or AHRQ data and therefore could not be included in this model.

Another limitation is in the interpretation of state laws and regulations and the categorization of the SOP elements. A restrictive designation was given regardless of whether an element applied in all or only limited circumstances. Additionally, although most elements could be easily delineated as permissive or restrictive, some state laws and regulations used vague language that had to be interpreted, and Board directives related to laws and regulations at the time could not be

ascertained. However, any random error in interpretation, with over- and under-interpretation equally probable, was likely minimized by the large number of data points. Additionally, by assessing the risk of malpractice against the overall leniency or restrictiveness of a state, the effects of variations in individual components were minimized.

The findings of physician MMPRs have limited extrapolation beyond their intent to ensure there was no overall increase in the rates of MMPRs among PAs and physicians or a transference of risk from one group of practitioners to another with changes to collaboration requirements. The various PA practice laws and regulations may affect physician practice differently, and changes in PA laws and regulations are not likely to influence the rates of MMPRs among physicians who do not collaborate with PAs.

Despite the limitations, the NPDB represents the most comprehensive source of practitioners' malpractice and medical discipline records. This is the first study to examine PA practice laws and regulations and their relationship to PA and physician MMPRs, and it demonstrates no evidence that states with permissive compared to restrictive PA practice laws and regulations had higher instances of MMPRs or patient harm.

## Conclusion

The findings of this study provide evidence that restrictive PA SOP elements can be eliminated from state laws and regulations without adversely affecting MMPRs or patient safety. Removing barriers to optimal practice environments for PAs improves access to high-quality, cost-effective care while maintaining patient safety. Less restrictive state PA laws and regulations will allow PAs to meet the medical needs of patients while increasing benefits for patients and the US healthcare system.

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