Scope-of-practice laws and expanded health services: the case of underserved women and advanced cervical cancer diagnoses

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ABSTRACT

Background Underserved women (rural, minority or poor) are disproportionally diagnosed with late-stage cervical cancer, indicative of inadequate access to, and use of, preventative healthcare. The Institute of Medicine (IOM) has proposed that nurse practitioners (NP) can address provider shortages among underserved populations, but to reduce shortages, scope-of-practice laws that restrict the delivery of care, must be revised. We examined the IOM recommendation of NP expanded scope-of-practice laws on reducing the disparity of underserved women diagnosed with late-stage cervical cancer.

Methods We examined the cohort of 10 673 women diagnosed with cervical cancer between 2010 and 2014 and reported to the Surveillance, Epidemiology and End Results cancer registry. We linked state-level laws regarding NP scope-of-practice to patients with cancer by their state of residence, diagnosis date and law enactment date. Hierarchical regression was used to explore NP full scope-of-practice law's impact on late-stage cancer diagnoses considering the moderating effect of women living in medically underserved areas. We adjusted for known confounders available in this population-based data set.

Results Medically underserved women living in states with laws that restrict NP full scope-of-practice are twofold more likely to be diagnosed with late-stage cancer; adjusted OR and 95% CI (OR 2.08, 95% CI 1.4 to 3.1). These disparities were not observed among underserved women living in areas with NP full scope-of-practice laws (OR 0.95, 95% CI 0.7 to 1.3).

Conclusions NP full scope-of-practice laws could provide a pragmatic and cost-effective solution to healthcare provider shortages associated with late stage of cervical cancer diagnoses among underserved women.

BACKGROUND

The Pap smear has reduced the mortality of cervical cancer nearly 70% and is one of public health's greatest achievements.[1] Lower or inadequate use of screening technologies for cancers with effective screening tests, like cervical cancer, has been attributed to later stage-at-diagnosis.[2] Over 12 000 women are still diagnosed with advanced stage cervical cancer in the USA each year.[3] Most women diagnosed at a late stage are racial and ethnic minorities, live in rural areas and have lower socioeconomic backgrounds, all who have limited access to care.[4]

Cancer screening is primarily in the domain of primary care providers, physicians and nurse practitioners, identified in this paper as a nurse practitioner (NP). However, the USA has a primary care physician shortage, especially among underserved and rural populations.[5] Conversely, all US states are projected to have a surplus of primary care NPs.[5 6] NPs have historically provided quality care to underserved and rural populations.[6 7]

The Institute of Medicine has proposed that NPs can address provider shortages among rural and underserved populations, but to reduce shortages, scope-of-practice laws must be changed to expand practice for NPs.[8] Currently, over half of US states restrict NP's scope-of-practice. Scope-of-practice laws define where NPs deliver care and with what limitations, restrictions and supervision. Scope-of-practice laws require NPs to have a collaborative agreement with a physician to practice, where the physician must 'sign-off' on care given by the NP. Collaborative agreements frequently require close geographic proximity between the NP and physician, a situation untenable in some underserved and rural areas.[9] Without NP full scope-of-practice laws, states may require fees from NPs for the collaborative agreements with physicians, which eliminates the lower patient cost of NPs relative to physicians.[9 10] Furthermore, without NP full scope-of-practice laws, many insurance companies will not reimburse NPs for their services, making utilisation of Pap smears difficult or impossible for many underserved (rural, minority or poor) patients.[9]

Policies guide laws and frequently face inertia due to powerful and narrow interest groups. Physician and physician groups, such as the American Academy of Family Physicians and the American Medical Association, oppose nurse practitioner full scope-of-practice laws on the grounds of poorer quality-of-care due to less education.[11 12] However, an evidence-based Cochrane Systematic Review does not support this view.[7] Unfortunately, there is a substantial gap between enacted health policies and evidence-based policy research.[13]

Late-stage cervical cancer diagnosis is an ideal outcome to evaluate expanded scope-of-practice outcomes because late stage is indicative of the inadequate use of primary care services, which includes cervical cancer screening. We hypothesise that expanded scope-of-practice laws will increase the availability of NPs to conduct cervical cancer screening in underserved areas. The objective of

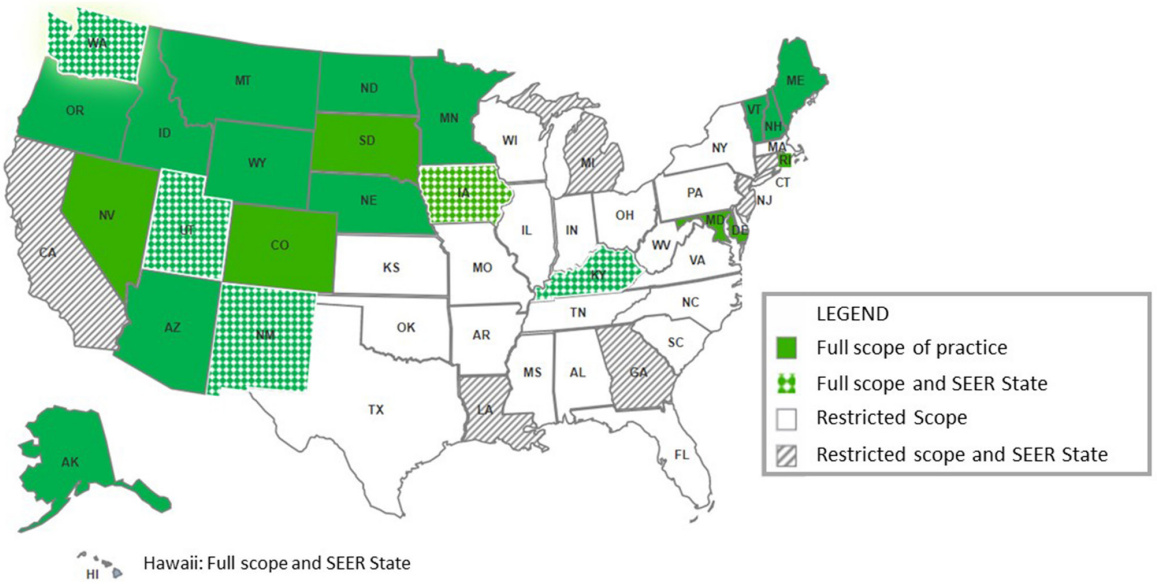

Figure 1 Nurse practitioner scope-of-practice laws (autonomy and reimbursement only) and Surveillance, Epidemiology and End Results (SEER) registry states, 2010–2014.

the current study is to investigate the impact of NP full scope-of-practice laws on disparities among late-stage cervical cancer diagnoses in the underserved compared with adequately served women.

METHODS

Each year, *The Nurse Practitioner* journal publishes Annual Legislative Updates and identifies the legislative issues that have profound impacts among nurse practitioners in the USA. The legislative update includes a list of state-level laws allowing NP full practice authority. NP full scope-of-practice includes independently evaluating patients, ordering and interpreting diagnostic tests, and initiating and managing treatments to the fullest extent of one's education and training.[10 14–17] We identified states that have NP full scope-of-practice laws and the year this law went into effect. Currently, 42% of states have adopted the full scope-of-practice laws. We linked full scope-of-practice status to the Surveillance, Epidemiology and End Results (SEER) dataset by the state of residence for patients with a diagnosis of cervical cancer between 2010 and 2014. We used a public health surveillance system, the SEER cancer registry, which provides a comprehensive source of all newly diagnosed cancer cases that occur in people residing in SEER-participating areas, approximately 28% of the US population.[18] States with available data in the SEER registry who also had full scope-of-practice laws included Hawaii, Iowa, Kentucky, New Mexico, Utah and Washington. States available in the SEER registry who restrict NP full scope-of-practice included California, Connecticut, Georgia, Louisiana, New Jersey and Michigan. See figure 1 for a map of SEER states by scope-of-practice laws. While we were prepared to assess the changes in laws over time, no states in this analysis enacted laws during our study period; therefore, no patients were dropped.

The cancer registry identifies incident cancer diagnoses that are collected from hospitals, physicians and laboratories under mandatory state reporting rules. SEER verifies, aggregates and deidentifies the data, which are made available for research. Data include patient and tumour characteristics, the first course of treatment and follow-up for vital status.[19] Our study dataset includes cervical cancer (*International Classification of Diseases for Oncology*, third edition, code C53.9) among females. We excluded patients diagnosed on a death certificate, at autopsy or those with unknown stage-at-diagnosis or race. The final cohort consisted of 10 673 patients.

Our outcome variable, stage-at-diagnosis, was defined using the American Joint Committee on Cancer criteria documented in the SEER dataset. We defined early stage as IA because the 5-year survival rate is over 90%.[20] Late stage was defined as any stage higher than IA.

Confounders identified in the literature[18 21 22] and available in the SEER dataset included patient age, mutually exclusive race and ethnicity categories, marital status, insurance status and urban or rural residence. County-level education (≤50% or >50% without a high school education) was linked by SEER to American Community Survey data, US Census Bureau.[23] Groupings are in table 1. American Community Survey education data from two 5-year surveys (2009–2013 and 2010–2014) were linked to patients with cancer by the year of diagnosis closest to the median date of the American Community Survey. Two per cent of patients were missing insurance status, so it was assessed as a separate category. We grouped the five per cent of patients with missing marital status with non-married. No other variables were missing.

Since assessment of vulnerable populations is vital when investigating the NP regulatory environment,[24] we assessed medically underserved populations using the Health Resources and Services Administration (HRSA) Medically Underserved Area and Population designations.[25] We linked medically underserved area designations to the patients with cancer by county of residence and year of diagnosis. HRSA bases the medically underserved designation on a combination of variables: provider and population ratios, per cent of the population below 100% of the federal poverty level, per cent of the population over age 64 years and the infant mortality ratio.[6]

Statistical analysis

Frequencies of the two main variables of interest, states with and without NP full scope-of-practice laws and medically underserved

Table 1 Cervical cancer patient characteristics by state NP full scope-of-practice authority status, SEER cancer registry 2010–2014, n=10 673

	States NP full practice authority laws			Standardised effect differences	
Patient characteristic (n=12 099)	Have NP full scope-of-practice authority	Lack NP full scope-of-practice authority	P value	Before weighting	After IPTW
Age (years)					
<40	26.8% (2282)	29.9% (646)	<0.0001	0.12	0.0
40–54	37.1% (3158)	38.2% (823)			
55–59	24.3% (2067)	22.9% (493)			
>60	11.9% (1012)	8.9% (192)			
Race					
Hispanic	26.7% (2239)	11.1% (238)	<0.0001	0.40	0.41
White	45.8% (3905)	71.4% (1538)			
Black	17.4% (1482)	3.3% (72)			
Asian/Pacific Islander American Indian	10.5% (893)	14.2% (306)			
Marital status					
Married	38.0% (3241)	44.6% (961)	<0.0001	0.13	0.0
Not married	61.9% (5278)	55.4% (1193)			
Insurance					
Yes*	91.6% (7766)	89.4% (1926)	0.04	0.06	0.0
No	6.8% (582)	8.1% (175)			
Unknown	2.0% (171)	2.5% (53)			
High school education					
≤50th percentile	56.8% (4840)	22.9% (493)	<0.0001	NA†	
>50th percentile	43.2% (3679)	77.1% (1661)			
Residence				NA†	
Rural	1.3% (113)	18.4% (397)	<0.0001		
Urban	98.7% (8406)	81.6% (1757)			
HRSA designation					
Medically underserved	2.1% (182)	2.7% (58)	0.1	NA‡	
Not underserved	97.8% (8337)	97.3% (2096)			
Stage					
Early§	19.8% (1694)	22.1% (478)	0.01	NA‡	
Late	80.1% (6825)	77.8% (1676)			

*Early is AJCC stage IA, IA1, IA2, not otherwise stated (NOS), Late is all higher stages.
†NA, did not meet criteria for inclusion in the IPTW score were thus added to the model individually.
‡NA, not applicable, these are outcome and main predictor variables and will not be included in the IPTW score.
§Includes women who qualify for Medicare (age 65 years and older) who did not have known insurance status.
AJCC, American Joint Committee on Cancer; IPTW, inverse propensity weighting; NA, not available.

areas, revealed our study population had small cell counts, especially among medically underserved areas in states without NP full scope-of-practice laws (table 1). Thus, we explored inverse propensity weighting (IPTW) to reduce the dimensionality of the covariates before modelling and to increase power.[26] IPTW is a balancing score, balancing covariates between the treated and untreated groups, similar to how treated and untreated patients are balanced in randomised clinical trials.[27] The treatment in this study is NP full scope-of-practice status. IPTW has the most precision when covariate selection includes variables that meet the definition of confounding; are strongly related to the outcome, but weakly related to the treatment.[28] Rural area of residence and education level were highly related with our treatment variable, ORs and 95% CI, respectively, were 0.06 (0.5 to 0.7) and 0.2 (0.2 to 0.3), and they were also weakly correlated with our outcome variable, OR and 95% CI, respectively, 0.9 (0.7 to 1.2) and 1.1 (1 to 1.2). Thus, rural area of residence and education level were dropped from the list of potential IPWT covariates. Baseline covariates chosen for inclusion into the IPTW included age, insurance, race/ethnicity and marital status. IPTW was created by using logistic regression and regressing NP full scope-of-practice status on observed baseline characteristics. Specifically, we added a fixed effects model augmented with a cluster-level main effect, state of residence (δ), to handle the clustered data: $\text{Logit}(e_{hk})=\delta_h+U_{hk}+\alpha$, where U is age, marital status and insurance status. Individual participants are indexed by k in cluster h. The δ_h term absorbs the effects of both observed and unobserved cluster-level covariates protecting against misspecification due to a cluster-level confounder.[29] The range of the propensity scores IPTW was 1.1 to 6.6, with a mean of 2 and median of 1.2. IPTW aims to balance covariates between the treatment groups, so balancing statistics recommended by Austin and Stuart were examined to evaluate the efficacy of IPTW.[27]

First, we used standardised effect differences.[28] IPTW reduced the standardised effect differences between treatment groups by age, insurance and marital status to nearly 0 (table 1). Rosenbaum and Rubin recommend no more than a 10% difference.[30]

IPTW did not balance the variable of race/ethnicity despite different functional forms used in the models as evidenced by the

standardised effect difference before weighting (0.40) and after weighting (0.41). More ethnically diverse states were more likely to have full practice laws. Since including race and ethnicity in the IPTW would not have increased precision, we included race/ethnicity in the model as a covariate and investigated if scope-of-practice laws differentially influenced race/ethnic groups and included it as another interaction term in the model. We also used a graphical method to examine if the propensity score was balanced in the two treatment groups (online supplementary figure 1).[27] Overlap was adequate, so our final IPTW included age, income and marital status.

Second, we weighted our final regression models by the IPTW and used a hierarchical logistic regression model on the outcome of late stage at diagnosis accounting for patients nested within the county of residence (ie, the level at which medically underserved areas and education level are designated) and state of residence (the level at which NP full scope-of-practice laws are enacted). The hierarchical model assists in controlling for unobserved heterogeneity in county-specific and state-specific effects. Since late-stage diagnoses were observed among underserved women, we would expect to see differences between the underserved and adequately served women, especially since NPs historically serve medically underserved women. Therefore, we adjusted the analysis to include effect modification by medically underserved areas. Specifically, let Y_{ijk} denote the status of late stage on ith patient within the jth county within the kth state. Associated with each Y_{ijk} is a vector of covariates, X_{ijk} (including race/ethnicity (individual level), education, rural/urban status, medically underserved areas (county level), full practice laws or not (state level). The two interaction terms in the model were cross products of underserved area and ethnicity, as well as underserved areas and scope-of-practice. The covariates were defined at different levels. We used a three-level hierarchical logistic regression model (random intercept model), where $b_{jk}^{(2)}$ is a random county effect and $b_{k}^{(3)}$ is a random state effect.

$$logit\, E\left(Y_{ijk} | b_{jk}^{(2)}, b_{k}^{(3)}\right) = X_{ijk}\beta + b_{jk}^{(2)} + b_{k}^{(3)}.$$

Model fit for the final model was assessed using reductions in the −2Log Likelihood. We dropped education in the final model because it did not reduce the –2Log Likelihood, was not a confounder to other variables in the model and was not statistically significant.

We hypothesised that late-stage diagnoses (outcome) among the medically underserved relative to the adequately served would vary in areas with and without NP full scope-of-practice laws. Analyses were performed using SAS V.9.4 (SAS Institute, Cary, North Carolina, USA).

RESULTS

Table 1 shows differences in baseline patient characteristics initially considered in the analysis by treatment status (having vs not having full scope-of-practice laws) among the 10 684 study participants. States without NP full scope-of-practice laws had statistically significant larger proportions of whites relative to other race and ethnic groups, higher education level and larger proportions living in rural areas.

Table 2 examines the crude ORs. Table 3 examines the adjusted impact of NP full scope-of-practice laws on late-stage diagnoses. This model includes effect modification by medically underserved status since NPs have historically served underserved women. Among US states without NP full scope-of-practice laws, medically underserved women have a twofold higher odds of being diagnosed with late-stage cervical cancer relative to women living in areas that are not medically underserved (OR and 95% CI 2.08 (1.4 to 3.1)). States with full scope-of-practice laws did not have stage-at-diagnosis disparities among women living in adequately served areas versus medically underserved areas (OR and 95% CI 0.95 (0.7 to 1.3); see table 3). Interestingly, controlling for NP full scope-of-practice laws, populations of women living in rural areas were slightly less likely to be diagnosed at a late stage (OR and 95% CI 0.82 (0.7 to 0.9)). Our results show all race/ethnic groups tended towards lower odds of late-stage diagnoses in states with NP full scope-of-practice laws. However, the results only reached statistical significance at the 5% level for whites, the largest race/ethnic population OR and 95% CI 0.64 (0.5 to 0.9).

Table 2 Crude OR and 95% CIs of being diagnosed with late-stage cervical cancer by race, ethnicity and state NP full scope-of-practice authority status, SEER cancer registry 2010–2014, n=10 673

Variable	Crude OR of late-stage diagnosis
NP scope-of-practice authority laws	
Full	0.88 (0.8 to 0.9)*
Restricted	Reference
Health service areas	
Medically underserved	1.21 (0.9 to 1.7)
Adequately served area	Reference
Race and ethnicity	
Hispanic	1.12 (0.9 to 1.3)
Non-Hispanic black	1.41 (1.2 to 1.6)*
Non-Hispanic other	1.0 (0.9 to 1.2)
Non-Hispanic white	Reference
Residence	
Rural	0.92 (0.7 to 1.2)
Urban	Reference
High school education	
≤50th percentile	1.11 (0.9 to 1.3)
>50th percentile	Reference

*Statistically significant .
NP, nurse practitioner; SEER, Surveillance, Epidemiology and End Results.

DISCUSSION

From our main finding, medically underserved women in states that restrict NP full scope-of-practice laws have twofold higher odds of being diagnosed with late-stage cervical cancer. Disparities among women living in areas with NP full scope-of-practice laws were not observed. This finding adds to the literature regarding the benefits of NP's role in reducing health disparities. The systematic review by Xue *et al* concluded that NP full scope-of-practice laws are a necessary component to improve healthcare utilisation and that expansion of the NP workforce alone are not sufficient.[23]

The primary argument against NP full scope-of-practice laws is patient safety due to NP's lower education level. However, a Cochrane Review in 2005 and others concluded that appropriately trained nurses could provide the same high-quality care and favourable outcomes as primary care physicians.[6 7] Other arguments against NP full scope-of-practice laws are competition between primary care physicians and NPs. However, the Cochrane Review noted that since NPs address previously unmet needs or create demand for care in areas where access is limited, physician workload may not change.[6] Also, nurses are trained

Table 3 Adjusted OR and 95% CI of late-stage cervical cancer diagnosis and effect modification: medically underserved areas by scope-of-practice laws and scope-of-practice by race/ethnicity, SEER cancer registry 2010–2014, n=10 673

Variable	Adjusted OR of late-stage diagnosis*
State NP full scope-of-practice authority laws	–
Medically underserved areas	0.95 (0.7 to 1.3)†
Adequately served areas	Reference
State without NP full scope-of-practice authority laws	–
Medically underserved areas	2.08 (1.4 to 3.1)
Adequately served areas	Reference
Race/ethnicity	
Hispanic	–
Full practice laws	0.88 (0.6 to 1.2)
Not full practice laws	Reference
Non-Hispanic black	–
Full practice laws	0.7 (0.5 to 1)
Not full practice laws	Reference
Non-Hispanic other	–
Full practice laws	0.73 (0.5 to 1)
Not full practice laws	Reference
Non-Hispanic white	–
Full practice laws	0.64 (0.5 to 0.9)
Not full practice laws	Reference
Residence	
Rural	0.82 (0.7 to 0.9)
Urban	Reference
High school education	
≤50th percentile	–‡
>50th percentile	

*Adjusted for age, marital status and insurance status using inverse propensity treatment weighting as well as other variables in the model.
†Shaded cells present effect modification is when one variable (ie, scope-of-practice laws) varies by levels of another (ie, medically and adequately served areas).
‡Education was dropped from the adjusted model because it did not improve –2Log Likelihood, was not a confounder to other variables in the model and was not statistically significant.

to conduct in-depth discussions with patients and may have a distinct advantage during sensitive conversations and delivering education.[31]

Providing quality and cost-effective primary care, in the atmosphere of workforce and financial shortages, will rise as a prominent issue for many state policymakers.[32] HRSA's 2025 projections for primary care physicians outstrips supply in 37 states and demand for physician assistants (PAs) outstrips supply in 9 states.[1] On the other hand, all US regions and states are projected to have a surplus of primary care NPs.[1 6]

Issues such as racial or ethnic discrimination may affect motivation (or self-efficacy) and influence participation in political processes and decision making that can impact health. Given NPs traditional role providing quality care to underserved populations, advocacy for full scope-of-practice in minority areas, as well as rural areas, seems likely. This provides a rationale for our observation of the stronger relationship between race and ethnicity to the treatment (laws) than the outcome (stage-at-diagnosis), making it a poor candidate for inclusion in the propensity weighting. However, the inclusion of race and ethnicity as a covariate showed that both race and ethnicity and scope-of-practice laws were important predictors of late stage at diagnosis for cervical cancer. Our results show all race and ethnic groups tended towards a lower odds of late-stage diagnoses in states with NP full scope-of-practice laws, but the results only reached statistical significance at the 5% level for whites, the largest race/ethnic population. Future research could specifically gather the sample sizes needed to address the implication of race/ethnicity in laws aimed to improve their access to care.

Providing equal access to primary healthcare has been a problem for this nation throughout its history. Policymakers frequently propose potential solutions, but stakeholders rarely reach an agreement. This research supports the notion that NP full scope-of-practice laws are effective for delivering timely quality care to vulnerable populations. Our focus was NP full scope-of-practice laws regarding the delivery of care, not full scope-of-practice laws addressing the prescribing of drugs since drug receipt would not affect the receipt of Pap smears nor stage-at-diagnosis.

Limitations

As with most policy research, we used a nationally representative population. Since policy questions are inherently answered using ecological study designs, our results should be interpreted at the population level to avoid an ecological fallacy. We did not have access to all variables known to influence our main predictor and outcome variables nor variables describing state level variability. However, we included the major potential confounders that can be measured in a population-based setting. Complex relationships influence behaviour in different legislative environments including socioeconomic status, rural versus urban areas, discrimination, racism, political environment, literacy levels, economics, transportation, insurance, culturally sensitive providers and race/ethnicity/gender match between patient and healthcare providers, to name a few. Our study is cross-sectional and cannot establish a causal relationship between scope-of-practice and Pap testing, but we did assess average effects among those undergoing Pap testing in areas with and without full scope-of-practice laws, specifically considering medically underserved areas and controlling for individual and state level effects available to us. Given the multiple influences on legislative environments, many studies in different populations using different study designs and analytical methods are necessary to establish causality such as the Cochrane Systematic Review of this and similar issues.[7] Research on how scope-of-practice laws affect public health endpoints using multiple study designs and emerging methods is an area ripe for exploration. A multipronged approach, such as legislation plus individual interventions to improve cervical cancer screening, would be most effective at reducing disparities.

The use of SEER data has its strengths and limitations as well. Since cancer is a reportable disease, SEER provides a large sample size to accurately measure incidence and stage-at-diagnosis in the geographical areas assessed in this study. Although we have internal validity, generalising the results to states not included in this study may be biased if those states have cultural norms or extenuating circumstances not represented in the states we assessed. Stage-at-diagnosis may also be influenced by HPV vaccination, but would operate under similar assessment mechanisms examined in this study as vaccines are also administered by NPs. We do not have individual predictors of utilisation of healthcare that may have influenced cervical cancer screening.

However, it is generally not feasible to evaluate the impacts of legislation in non-population-based settings.

CONCLUSIONS

Cervical cancer was once one of the most common cancers affecting the USA.[31] However, each year in the USA, over 4000 women die from cervical cancer.[33] Overall, mortality rates have been decreasing, but some US populations and geographic areas still have high death rates, due in large part to the limited utilisation of cervical cancer screening.[34 35] Research and epidemiological studies have demonstrated the efficacy of the NP's role in access to care, including cervical cancer screening among adequately served and underserved women.[24 36] Legislation plays a primary role in supporting healthy behaviours that can prevent more serious diseases in the future.[37] Although this study cannot imply causality, it provides evidence that legislation allowing NP full scope-of-practice reduces the disparity in late-stage cervical cancer diagnoses among medically underserved women. We hope this research sparks interest into the role of different legislative policy environments has on public health and expands the body of literature from nursing specific journals to the community of public health practitioners.

Public health implications

The number of states implementing NP full scope-of-practice laws has increased over 35% over the past few years, indicating there is increasing acknowledgement of the NP's role in providing affordable and quality care to the underserved. However, 29 states currently restrict NP practice in some way. This research provides evidence that NP full scope-of-practice laws may provide positive cervical cancer screening outcomes, especially among vulnerable and underserved women. It appears states are increasingly identifying the advantages of NP full practice authority; in 2016, 21 states had state practice regulations which allow NPs full practice authority, a 34% increase since 2013.[14] This research provides evidence-based support that expanding nurse practitioner scope-of-practice laws, as recommended by the Institute of Medicine, may reduce health disparities in late-stage cancer diagnoses precipitated by a lack of health providers in underserved areas.

What is already known on this subject

- Underserved women are disproportionally diagnosed with late-stage cervical cancer, indicative of inadequate access to, and use of, preventative healthcare.
- The Institute of Medicine has proposed that nurse practitioners can reduce provider shortages among rural and underserved populations, but to reduce shortages, US state-level scope-of-practice laws must be expanded.

What this study adds

- Underserved populations living in states that restrict nurse practitioner scope-of-practice laws are twofold more likely to be diagnosed with late-stage cervical cancer.
- Our results found nurse practitioner full scope-of-practice laws could reduce late stage of cervical cancer diagnoses and reduce disparities among underserved populations.

Policy implications

- This research adds to the increasing evidence-based data that support expanding nurse practitioner scope-of-practice laws to improve access to quality care.

Contributors JS-G: study question, study design, study analysis, study writing. LLW: study analysis, study writing. AS: data management, study analysis, acquisition of data. SMH: conception or design, acquisition of data. W-CT: conception or design, interpretation. ML: analysis of data, interpretation. All authors approved the final version.

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