Legislations Mandating Insurance Coverage Are Highly Effective in Delivering Surgical Care of Transgender Patients

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Background: Although gender-affirming surgery is increasingly performed, few studies have examined any temporal correlation between legislations mandating transgender care and the actuation of such surgical care.

Methods: We assembled a retrospective cohort utilizing the National Inpatient Sample database from 2000 to 2018. We stratified utility trends of gender-affirming surgery based on insurance payer types and regions in a crisscrossing effort to detect any temporal or cause-effect relationship between legislations and outcomes. All regions according to the latest National Inpatient Sample categorization were examined based on the nature of their member state’s legislations relating to gender-affirming care coverage. Diametrically, opposite regions were selected for further comparisons. Interrupted time series analyses were used to demonstrate any significant uptrend since implementation of relevant legislations.

Results: In states with explicit inclusion of gender-affirming care, our interrupted time series analyses showed a significant increase in the number of patients on state-dependent insurance (Medicaid and private insurance) receiving gender-affirming surgery around the time during which state legislations began mandating care ($P < 0.01$) and thereafter ($P < 0.01$). This significance was not seen in the same regions among patients under nonstate-dependent payers (Medicare and self-pay), nor was it seen in either payer group in states without explicit inclusion of gender-affirming care. At the federal level, statistical significance was noted among Medicare recipients across all states around the time federal legislations took effect and thereafter.

Conclusion: Legislations mandating coverage seem highly effective in actuating surgical care of transgender patients in corresponding jurisdictions, which may provide a roadmap for further care expansion. (Plast Reconstr Surg Glob Open 2022;10:e4496; doi: 10.1097/GOX.0000000000004496; Published online 31 August 2022.)

INTRODUCTION

Transgender individuals, whose gender identity differs from their sex assigned at birth, are estimated to comprise 1.4 million adults and 150,000 teenagers in the United States. As a result, transgender patients may choose to undergo gender-affirming surgery as a means of aligning their gender and sex identities. There are numerous types of gender-affirming procedures, ranging from facial feminization/masculinization, and breast augmentation/mastectomy, to vaginoplasty/phalloplasty.

Increased awareness and societal acceptance paired with legislative changes have caused a significant increase in the use of gender-affirming surgery. Between 2000 and 2014, gender-affirming procedures for transgender patients tripled in number. While gender-affirming surgery is cost-effective in improving transgender patients' quality of life, fewer than half of states have laws in place directing the explicit inclusion of transgender healthcare within state insurance mandates.

Section 1557 of the Affordable Care Act implemented protections that prevented discrimination based on sexual orientation and gender identity, which forced insurance companies to begin covering medically necessary gender-affirming hormones and procedures. At the federal level,
transgender care was not included in Medicare coverage until late 2014, when the US Department of Health and Human Services overturned the prohibition on Medicare coverage of gender-affirming surgery. Despite the dramatic overall increase in transgender surgery in recent years, there has been scarce scrutiny over how impactful legislations are in leading to coverage of these procedures. With disparate insurance mandates across state lines, there exists a need to establish such relationships to further support transgender surgical needs in a wider swath of the population.

Herein, using the National Inpatient Sample (NIS), we analyze utility trends of gender-affirming surgery over the years. These trends are stratified based on insurance payer type (ie, Medicaid, Medicare, private insurance, and self-pay) and regions. To limit the background noise that comes hand-in-hand with coding for outpatient surgery, our analysis focuses solely on inpatient gender-affirming surgery as reflected in the NIS database. We aim to unequivocally demonstrate a high level of temporal concordance of increased utility of gender-affirming surgery following enactment of legislations mandating coverage of transgender surgical care. Given the profound impact such legislations are shown to have had, we hypothesize that legislative approaches are a highly effective tool in ensuring surgical care to transgender patients.

METHODS

Study Design

We assembled a retrospective cohort utilizing the NIS database, including all available participant user files from 2000 to 2018. The NIS database is structured to include a stratified sample of discharges from US hospitals, covering over 97% of the American population. We identified all patients diagnosed with transsexualism (TS) or gender identity disorder (GID), as described by Canner et al. The institutional review board’s approval at Lahey Medical Center was obtained in June 2021 before the use of the NIS database.

Patient Cohort from NIS

Analyzed variables included patient demographics, payer type, diagnoses, and procedures. Diagnoses were classified according to International Classification of Diseases Ninth Revision (ICD-9) and Tenth Revision (ICD-10) codes depending on participant user file year. Due to the shift to ICD-10 codes in 2015, ICD-9 codes were utilized for analyses between the year 2000 and the third quarter of 2015, as suggested by procedures outlined by the NIS database documentation. The specific ICD-9 codes and patient identifiers used to select gender-affirming procedures were chosen in accordance with the procedure outlined by Canner et al.

Insurance Coverage

To analyze the impact of state mandates on gender affirmation surgery, we aimed to compare states that differed based on their inclusive versus exclusive coverage of gender-affirming procedures. In 2012, state identifiers for patients and hospitals included in the NIS database were removed to ensure patient confidentiality. Hospitals, instead, are bundled into one of nine census divisions according to the state and region in which the hospital is located. Due to the lack of state-specific analysis available through the NIS database, our analysis was dependent on hospital census divisions including states that either fell in the category of inclusive coverage or exclusive coverage. To begin this analysis, we first categorized all 50 states and the District of Columbia into two categories: (1) states that explicitly include Medicaid coverage of gender-affirming healthcare (n = 23) or (2) states that explicitly exclude or have no explicit statement regarding Medicaid coverage of gender-affirming healthcare (n = 28; Fig. 1; Table 1). Next, we identified hospital census divisions as defined by the NIS database that exclusively included states that fell under one of the categories listed above.

Census division 1 (ME, NH, VT, MA, RI, and CT) and census division 2 (NY, PA, and NJ) contain states that have state mandates, as manifested by Medicaid policies, with explicit inclusion of transgender healthcare. For simplicity purposes, we term those as inclusion states. Census division 6 (KY, TN, MS, and AL) and census division 7 (OK, TX, AR, and LA) contain states that have Medicaid policies with either explicit exclusion or no explicit statement of transgender healthcare (Fig. 1; Table 1), which we term as exclusion states. Data analyzed before 2012 (in which hospitals had state-specific identifiers) were grouped according to their placement in the hospital census divisions as listed above to ensure a cohesive analysis.

Statistical Analysis

Patient baseline demographics, procedures, and payer status were collected and categorized according to our inclusion criteria. To assess the impact of policy change around 2015–2016 for patients who underwent gender-affirming procedures, an interrupted time series analysis was implemented. This study design utilized segmented regression to estimate the longitudinal impact after interested time points and whether there was a significant change in procedure numbers. All analyses were performed on R studio version 3.4.
RESULTS

Between the years 2000 and 2018, our analysis of the NIS database included a weighted estimate of 79,440 patients with a diagnosis of TS or GID. Of these patients, 7287 (9.2%) had a gender-affirming procedure (Fig. 2). The mean age of included patients was 35.6 ± 17.6, and the majority identified as white (60.6%). The most common type of gender-affirming surgery among our sample was genital reconstruction (n = 4925; Table 2).

The most common payer was private insurance (34.1%; n = 26,995), followed by Medicaid (30.6%; n = 24,195), Medicare (21.1%; n = 16,655), and self-pay (9.4%; n = 7415; Table 2). When analyzed over the study period, large shifts in payer status were revealed among patients receiving gender-affirming surgery.

We chose to group payers based on whether their policies are impacted by state-specific legislation. Ultimately, this led to the creation of two groups of payers: (1) payers impacted by state-specific legislature, such as Medicaid and private insurance, and (2) payers who are not impacted by state-specific legislature, such as Medicare and self-pay. Next, these two groups were analyzed between hospital census divisions 1 and 2 (inclusion states with explicit inclusion of gender-affirming care) as compared with hospital census divisions 6 and 7 (exclusion states with explicit exclusion or no explicit statement of gender-affirming care). Our findings demonstrated significant upward trends in the number of patients utilizing Medicaid and private insurance among inclusion states as compared with exclusion states (P < 0.01; Table 3; Fig. 3), while patients utilizing Medicare and self-pay showed relatively similar trend lines between inclusion states and exclusion states (P < 0.01; Table 3; Fig. 3). Conversely, the number of patients who used Medicare as their payer for gender-affirming surgery began to decrease in 2015 and did not demonstrate a large difference between hospitals in inclusion states versus exclusion states (P = 0.013; Fig. 4; Table 4).

The interrupted time series analysis assessed the temporal impact of transgender healthcare policy changes by comparing the Medicaid and private insurance group to the Medicare and self-pay group across inclusion states and exclusion states. Legislative changes in Medicaid and private insurances were introduced in 2015 and implemented in 2016 thereafter. Thus, we chose to start our time series analysis in 2016. However, legislative changes in the federally mandated Medicare program were introduced in 2014 and implemented in 2015; thus, we analyzed a time series starting in 2015. We found that Medicaid and private insurance showed a significant increase in the number of patients receiving gender-affirming surgery [79.13 (95% CI, 35.59–122.66) P < 0.01] only among inclusion states during the year 2016. This trend has continued to climb since 2016 for Medicaid and private insurances, with the number of patients analyzed among this group showing significant growth between the years 2016–2018 [68.73 (95% CI, 49.48–87.98) P < 0.01] (Table 3). When Medicare was analyzed independently between inclusion states and...
Table 1. State-by-state Status of Medicaid Coverage of Gender-affirming Surgery

| Division | State | Stance on Transgender Healthcare | Year Implemented |
|----------|-------|----------------------------------|------------------|
| 1        | ME    | Inclusive                         | 2019             |
|          | NH    | Inclusive                         | 2017             |
|          | VT    | Inclusive                         | 2015             |
|          | MA    | Inclusive                         | 2015             |
|          | RI    | Inclusive                         | 2015             |
|          | CT    | Inclusive                         | 2015             |
| 2        | NY    | Inclusive                         | 2016             |
|          | NJ    | Inclusive                         | 2017             |
|          | PA    | Inclusive                         | 2016             |
| 3        | WI    | Inclusive                         | 2019             |
|          | MI    | Inclusive                         | 2019             |
|          | IL    | Inclusive                         | 2019             |
| 4        | IN    | No explicit statement             | N/A              |
|          | OH    | Explicit exclusion                | 2019             |
|          | MO    | Explicit exclusion                | 2019             |
|          | ND    | No explicit statement             | N/A              |
|          | SD    | No explicit statement             | N/A              |
|          | NE    | Explicit exclusion                | 1990             |
|          | KS    | No explicit statement             | N/A              |
|          | MN    | Inclusive                         | 2017             |
| 5        | IA    | Previously excluded care but now insurers have the option to include or exclude; falls under an in-between category |
|          | TX    | Explicit exclusion                | 2006             |
| 6        | TN    | Explicit exclusion                | N/A              |
|          | NS    | No explicit statement             | N/A              |
|          | AL    | No explicit statement             | N/A              |
| 7        | OK    | No explicit statement             | N/A              |
|          | AR    | Explicit exclusion                | 2021             |
|          | LA    | No explicit statement             | N/A              |
|          | ID    | No explicit statement             | N/A              |
|          | MT    | Inclusive                         | 2017             |
|          | WV    | Explicit exclusion                | 1992             |
|          | NV    | Inclusive                         | 2018             |
|          | UT    | No explicit statement             | N/A              |
|          | CO    | Inclusive                         | 2017             |
|          | AZ    | Explicit exclusion                | 2004             |
|          | NM    | No explicit statement             | N/A              |
| 8        | AK    | Explicit exclusion                | 2010 but a 2019 lawsuit challenging this policy is currently under review |
|          | WA    | Inclusive                         | 2015             |
|          | OR    | Inclusive                         | 2015             |
|          | CA    | Inclusive                         | 2016             |

DISCUSSION

In this current study, we aimed to demonstrate an unequivocal temporal relationship between legislative advancements in advocating for transgender care and when such care was being actuated and delivered. To demonstrate causation, we examined the relationship between different legislative and geographical settings. Insurance types within these settings served as internal controls. To accurately accomplish these goals and to ensure literature cross comparability, we canvassed the NIS using the same group of codes as published by Canner et al.\(^\text{6}\) in a landmark 2018 \textit{JAMA Surgery} article. Beyond federal guidance and mandates, we suspected that the most sensitive impact on transgender surgical care utility would manifest locally in response to state-specific mandates, since, as also reported by Canner et al.,\(^\text{6}\) most transgender patients are covered under private insurance or Medicaid (Table 2), both of which strictly conform to state regulations. Specifically, divisions 1 and 2 (inclusion states) mandate explicit inclusion of gender-affirming care, whereas divisions 6 and 7 (exclusion states) mandate explicit exclusion or have no explicit statement of gender-affirming care. We rationalized that if any difference could be detected, comparison of these two polar-opposite groupings would enable us to see it. Furthermore, while Medicaid and private insurance are stipulated at the state level, self-pay and Medicare are far less influenced by state legislations, therefore serving as convenient internal controls. As such, we found an astonishing increase in the utility of gender-affirming surgery in inclusion states not only when compared with the same insurance type cohort in exclusion states, but also when compared with their internal control of Medicare and self-pay patients from the same inclusion states. In addition, the up-trending curve of Medicaid and private insurance patients in inclusion states diverged from all the rest of the curves (Fig. 3). This started in 2015, just when the most populous inclusion states, such as Massachusetts, Connecticut, New York, New Jersey, and Pennsylvania, began implementing their inclusive transgender care mandates (Table 1). These findings were quantified with our interrupted time series analysis, which demonstrated that patients covered under Medicaid and private insurance in inclusion states were significantly more likely to receive gender-affirming surgery in 2016 and in the years thereafter. On the contrary, patients in inclusion states utilizing Medicare and self-pay to cover their gender-affirming surgery did not show a significant increase in the utility of gender-affirming surgery in response to these state legislations (Table 3). These findings are remarkable in that within the same geographical region, presumably with similar cultural and political demographics, only the population covered by state-dependent insurance carriers would show any uptick in utilization of transgender surgical care if there were state legislative mandates to do so, and only in a fashion that is temporally related to when such mandates were rolled out.

Admittedly, we also noted a relatively smaller and more transient increase in the overall number of patients receiving gender-affirming procedures among exclusion states. Reasons for this increase may be several-fold, such as the
elevated number of Medicare patients receiving gender-affirming surgery in 2015, as seen in Figure 4, in response to the aforementioned 2014 federal legislation. A smaller contributor could also be the indirect effect of that legislation on increased overall cultural awareness of transgender surgical care, even in states where legislative and cultural inclines may be more conservative. Underpinned by the same rationale, a nearly identical jump in 2015 was also seen among Medicare patients among inclusion states. This trend is understandably similar as Medicare is a national healthcare plan, and legislative changes apply equally across all states. These increases fall in line with the lift of Medicare exclusions on gender-affirmation-related care in late June 2014 and implementation in 2015. 

Unexpectedly, transgender healthcare in exclusion states showed a small but notable increase followed by a swift decrease in utility of Medicaid/private insurance-covered gender-affirming surgery among the most recent years studied (Fig. 3), a region-specific situation that proved seemingly difficult to explain. Upon closer examination of the raw data, we noticed that this short-lived blip in exclusion states could be traced to a possible aberrancy from one specific state. Additional research delving into region-specific legislation that may have impacted gender-affirming surgery coverage within this area may be necessary to analyze the idiosyncrasies that influenced surgical coverage in that particular circumstance. Despite this aberrancy, the utility of gender-affirming surgery among exclusion states demonstrated a much lower number of patients receiving gender-affirming surgery as compared with inclusion states. Therefore, region-specific legislation

Table 2. Patient Demographics

| Variable                  | Description             | Value (%) |
|---------------------------|-------------------------|-----------|
| Patients                  |                         | 79,440    |
| Age (SD)                  |                         | 35.6 ± 17.6 |
| Sex category              | Male                    | 39,430 (49.6) |
|                           | Female                  | 35,235 (44.4) |
|                           | Missing                 | 4775 (6.0) |
| Gender-affirming surgery  | Yes                     | 7287 (9.2) |
|                           | No                      | 72,153 (90.8) |
| Type of gender-affirming  | Genital reconstruction  | 4925 (67.5) |
| procedure                 | Chest reconstruction    | 1085 (14.9) |
|                           | Abdominal surgery       | 1145 (15.7) |
|                           | (ie, hysterectomy)      |           |
|                           | Other gender-affirming  | 2300 (31.5) |
| procedure                 |                         |           |
| Primary payer             | Medicare                | 16,655 (21.0) |
|                           | Medicaid                | 24,195 (30.5) |
|                           | Private insurance       | 26,995 (34.0) |
|                           | Self-pay                | 7415 (9.3) |
|                           | No charge               | 555 (0.7) |
|                           | Other                   | 3290 (4.1) |
|                           | Missing                 | 325 (0.4) |
| Length of stay            | Median (IQR), days      | 4 (2–7)   |

Table 3. Interrupted Time Series Analysis Analyzing the Impact of All Policy Changes in the Year 2016 and the Time Thereafter

| Insurance                   | Division | Coefficient | Estimate | CI       | P     |
|-----------------------------|----------|-------------|----------|----------|-------|
| Medicare and self-pay       | 1 and 2  | Policy change | -10.93   | -76.01   | 54.14 | 0.72 |
|                            |          | Time since  | 1.04     | -27.73   | 29.82 | 0.94 |
| Medicaid and private insurance | 1 and 2 | Policy change | 79.13    | 35.59    | 122.66 | <0.01 |
|                            |          | Time since  | 68.73    | 49.48    | 87.98 | <0.01 |
| Medicare and self-pay       | 6 and 7  | Policy change | -21.60   | -103.97  | 60.77 | 0.58 |
|                            |          | Time since  | 0.33     | -36.10   | 36.75 | 0.99 |
| Medicaid and private insurance | 6 and 7 | Policy change | -45.10   | -183.41  | 93.21 | 0.30 |
|                            |          | Time since  | -17.35   | -55.55   | 66.78 | 0.85 |

Note: We used policy changes beginning in 2016, since time estimates impact from years 2016–2018.
may have a profound impact on transgender patients’ access to gender-affirming surgery.

A small increase in the utility of gender-affirming care among self-pay patients in inclusion states was also noted. This may be due to cohort effects, arising from the culturally liberal nature of Northeastern states, better care access in those states, or a response to the nationwide loosening of federal restrictions on gender-affirming care.

Interestingly, analysis of Figure 4 highlights that the increase in Medicare patients seeking gender-affirming surgery largely dissipated after 2015 (as quantified in Table 4). It is known that Medicare only covers patients who are older than 65 or those who are disabled, both patient demographic strata with a comparatively lower likelihood to seek gender-affirming surgery (corroborated in Table 2). With an out-of-gate phenomenon in response to the novel 2014 legislation, we postulate that this transient increase in gender-affirming procedures might have covered many of these patients in 2015 who had been waiting (many for their whole lives) for pertinent coverage.

Fig. 3. Gender-affirming surgery utility by payer type. The number of patients utilizing Medicaid and private insurance to pay for gender-affirming surgery was shown to drastically increase among hospital census divisions 1 and 2 as compared with hospital census divisions 6 and 7. On the contrary, the number of patients utilizing Medicare and self-pay to pay for gender-affirming surgery remained relatively similar among hospital census divisions 1 and 2 and 6 and 7, with a less significant increase in recent years.

Fig. 4. Gender-affirming surgery among Medicare recipients. Among patients using Medicare as their payer for gender-affirming surgery, the temporal trend among patients in divisions 1 and 2 as compared with 6 and 7 remained relatively similar. A large spike in utility was seen in 2015, after the US Department of Health and Human Services overturned the prohibition on Medicare coverage of gender-affirming surgery in 2014.
We suspect that this trend will continue as increased insurance coverage and societal acceptance allow more patients to receive gender-affirming care before reaching the age of 65.

The management of transgender patients continues to evolve across the United States, and legislative changes have shifted significantly in the last decade to adapt to the needs of these patients. Although transgender patients are now widely accepted socially and politically, more work must be done to ensure that this patient population is not disadvantaged simply due to the state in which they reside and its corresponding legislature.

Due to the nature of this study, several limitations must be addressed. Insurance coverage is an incredibly heterogeneous topic as it pertains to who can receive coverage (ie, minors) as well as the type of gender-affirming procedures that are covered. Moreover, the social, political, and economic differences among states may impact both patient and provider ability to receive and offer gender-affirming care, respectively. Although these limitations likely have an impact on the accessibility of care within individual states, our paper is among the first to broadly show the impact of expansion of coverage for gender-affirming surgery on their utility within specific regions of the United States. Although our findings do not prove a direct causal effect relationship between coverage-expanding legislations and delivery of the covered services in transgender care, we have established not only an unequivocal temporal relationship between the two but also a definitive geographically dependent and insurance-related response in such care delivery to those pertinent legislations on multiple levels.

Still, our results highlight that a large degree of disparity remains within regions of the United States, likely secondary to societal acceptance and political legislation within these areas. As transgender healthcare-inclusive reform continues to grow and equality prevails among societal norms nationwide, we hope that policymakers and governing bodies will ensure that insurance coverage continues to adapt to allow for gender-affirming surgery coverage across state lines, for all patients alike.

### CONCLUSIONS

We have, in this study, unequivocally demonstrated significant impacts of relevant legislative initiatives on the delivery of transgender care. Given the work that still remains to be done for the transgender community, we aim for our findings to serve as evidence on the effectiveness of legislative approaches, both at state and federal levels, to ensure expanded transgender care.

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