In the United States, anesthesia care can be provided by anesthesiologists or nurse anesthetists. Typically, a nurse anesthetist must be supervised by a physician, usually an anesthesiologist, but sometimes the proceduralist. However, in 2001, the Executive Branch of the US Federal Government released a rule allowing states to “opt-out” of the federal requirement that a physician supervise the administration of anesthesia by a nurse anesthetist. Since its inception, 17 states have opted out with 10 specifying access to anesthesia care as being relevant to the “opt-out” decision. However, whether opting out has succeeded in increasing access has not been studied fully. To address this issue, we provide descriptive statistics regarding trends in the (population-adjusted) number of anesthetics in the US Medicare population among “opt-out” states compared with non–“opt-out” states. If opting out did increase access, one would expect to see relatively larger growth in the population-adjusted number of anesthetics in “opt-out” states compared with non–“opt-out” states.

METHODS

In the United States, Medicare is a public insurance program that provides health insurance for the elderly (persons aged 65 years or older) or younger persons with specific disabilities such as end-stage renal disease. In 2010, >80% of Medicare beneficiaries consisted of persons aged 65 years or older. As a general rule, Medicare beneficiaries can choose to be enrolled in a traditional fee-for-service plan, for which Medicare is the primary payer, or they can choose to be enrolled in a managed health care plan. Under the latter, Medicare essentially subcontracts out the provision of health care to private health insurers, who bear all the costs for an individual’s care. Approximately two-thirds of Medicare beneficiaries are enrolled in the traditional fee-for-service plan.

Our analysis used the US Medicare Physician Supplier Procedure Summary Master Files, which provide counts of the number of claims submitted on behalf of Medicare fee-for-service beneficiaries. Claim counts for fee-for-service beneficiaries can be stratified by Current Procedural Terminology® code (American Medical Association, Chicago, IL), place of service (e.g., hospital or ambulatory surgery center), and geographic location. By using those data, we obtained a count of the number of claims submitted with an anesthesia Current Procedural Terminology code (00100–01999, excluding 01996, a code used for catheter management) between 1998 and 2013 stratified by state.

In the United States, when an anesthesiologist directs a nurse anesthetist, each party submits a claim for the given anesthetic. Therefore, to avoid double-counting anesthetics, we limited claims to those with the billing modifiers AA (submitted when an anesthesiologist works alone), QX (submitted by a nurse anesthetist when he or she works without medical direction), and QZ (submitted by a nurse anesthetist when he or she works with medical direction). On the basis of these counts, we then defined an “anesthesia utilization rate” as the number of anesthesia claims divided by the population aged 65 years or older, which we obtained from the US Census Bureau. An alternative method of calculating the anesthesia utilization rate
would be to construct a measure based on the total number of units (base units plus time units) generated by a given case. We did not adopt this measure for 2 reasons. First, we did not have data on case length. Second, the number of anesthetics used in our analysis should closely correlate with any measure based on units.1–4

There were 8 cohorts of “opt-out” states: states opting out in 2001 (Iowa), 2002 (Idaho, Minnesota, Nebraska, New Hampshire, and New Mexico), 2003 (Alaska, Kansas, Oregon, and Washington), 2004 (Montana), 2005 (Wisconsin and South Dakota), 2009 (California), 2010 (Colorado), and 2012 (Kentucky). For each cohort, we calculated the average annual anesthesia utilization rate in the 3 years before and the 3 years after “opt-out.” We then calculated the percentage change in the anesthesia utilization rate and compared this change against the change among non-“opt-out” states during the same time period. For example, for states opting out in 2002, we calculated average anesthesia utilization rate from 1999 to 2001 and the average anesthesia utilization rate from 2002–2004.

The results are presented in Table 1. The average anesthesia utilization rates in the 3 years before “opt-out” and the 3 years after “opt-out” for each of the “opt-out” cohorts (states that chose to “opt-out” in 2001, 2002, etc.) is shown. The equivalent values for non-“opt-out” states are also shown.

In the United States, payment for a given anesthetic is determined by the total number of anesthesia units the case generates. A case generates a given number of base units, which is determined by the type of case—for example, in 2014, an anesthetic for a coronary artery bypass graft was assigned 18 base units, whereas an anesthetic for a total knee arthroplasty was assigned 7 base units. In addition, a case generates units based on the time spent by the anesthesiologist in providing care with 15 minutes of time generating 1 unit. Therefore, the total number of units generated is the sum of the base units and the number of units generated by time.

### Table 1. Medicare Anesthesia Utilization Rates for Hospitals and Ambulatory Surgery Centers by Year of “Opt-Out”

<table>
<thead>
<tr>
<th>Cohort</th>
<th>States</th>
<th>“Opt-out” states</th>
<th></th>
<th></th>
<th>Non-“opt-out” states</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>Iowa</td>
<td>3 y before “opt-out”</td>
<td>3 y after “opt-out”</td>
<td>Percentage change</td>
<td>3 y before “opt-out”</td>
<td>3 y after “opt-out”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>194</td>
<td>225</td>
<td>16</td>
<td>210</td>
<td>276</td>
</tr>
<tr>
<td>2002</td>
<td>Idaho, Minnesota, Nebraska, New Hampshire, and New Mexico</td>
<td>191</td>
<td>225</td>
<td>18</td>
<td>217</td>
<td>274</td>
</tr>
<tr>
<td>2003</td>
<td>Alaska, Kansas, Oregon, and Washington</td>
<td>200</td>
<td>241</td>
<td>7</td>
<td>241</td>
<td>266</td>
</tr>
<tr>
<td>2005</td>
<td>Wisconsin</td>
<td>274</td>
<td>251</td>
<td>–9</td>
<td>276</td>
<td>263</td>
</tr>
<tr>
<td>2009</td>
<td>California</td>
<td>157</td>
<td>165</td>
<td>5</td>
<td>263</td>
<td>273</td>
</tr>
</tbody>
</table>

The average anesthesia utilization rates in the 3 years before “opt-out” and the 3 years after “opt-out” for each of the “opt-out” cohorts (states that chose to “opt-out” in 2001, 2002, etc.) is shown. The equivalent values for non-“opt-out” states are also shown.

### RESULTS

Table 1 presents average anesthesia utilization rates in the 3 years before and after “opt-out” for each of the cohorts and the equivalent values for non-“opt-out” states, whereas Figure 1 plots the overall growth in anesthesia utilization rate across “opt-out” cohorts. For example, Iowa was the only state to “opt-out” in 2001. For the 3 years prior (1998–2000), the average anesthesia utilization rate was 194 anesthetics/1000 persons aged 65 years and older, which increased to 225 anesthetics/1000 persons in the 3 years after “opt-out” (2002–2004, 16% increase). By comparison, the average anesthesia utilization rate in non-“opt-out” states increased from...
210 to 276 anesthetics/1000 persons (32% increase). Figure 1 shows that most (4 of 5) “opt-out” cohorts likely experienced smaller growth in anesthesia utilization rates compared with non–“opt-out” states with the sole exceptions being the 2009 cohort (California; 5% increase vs 4% for non–“opt-out” states).

**DISCUSSION**

Understanding how “opt-out” has affected access to anesthesia care can be difficult because many sources of data that could be used to measure access are expensive or otherwise difficult to obtain. To preliminarily explore whether “opt-out” was successful in increasing access, we examined gross trends in the anesthesia utilization rate (population-adjusted number of anesthetics) among US Medicare beneficiaries in “opt-out” states compared with non–“opt-out” states. Overall, we found that most (4 of 5) “opt-out” cohorts likely experienced smaller growth in anesthesia utilization rates compared with non–“opt-out” states, suggesting that “opt-out” was not associated with an increase in access to anesthesia care. We caution that our results are preliminary and are simply a first pass at this issue, particularly because they are descriptive and limited to the fee-for-service Medicare population. Moreover, it is possible that “opt-out” could have increased access in rural areas so that cases previously performed in urban areas are now being done in rural areas. In this scenario, the total number of cases at the state level could remain unchanged, even with an increase in access in rural areas. Further studies should more carefully characterize the significance (statistical and clinical) of any changes in access to anesthesia care associated with “opt-out” and could also consider the effects of “opt-out” among other populations such as patients with Medicaid or private insurance.

**REFERENCES**

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