National Academies of Sciences, Engineering, and Medicine

GME Outcomes and Metrics

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Examples of data and data linkages that can help quantitatively inform questions of interest for GME

Medicare or other large administrative health claims data (either insurance data or hospital discharge databases) with unique physician identifiers

- We have primarily used Medicare and state inpatient databases (Florida), but new databases (e.g., Optum labs, HCCI) exist

Data on physician characteristics (age, years of experience, medical school, residency, fellowship, gender, scientific publications, etc.)

- Doximity
Have duty hour reforms lowered the quality of physicians completing residency?

We linked data on year of Internal Medicine (IM) residency completion to mortality outcomes of IM doctors providing inpatient care. We compared 1st vs 10th year post-residency doctors over time (difference-in-difference statistical approach).
How do patient outcomes change with years of internist experience?

We linked Doximity data to Medicare data to study whether years since IM residency is associated with differences in 30-day mortality, readmissions, and costs.

Empirical approach: ‘within-hospital’ analysis and focus on hospitalist physicians
How do surgical outcomes change with years of surgeon experience?

<table>
<thead>
<tr>
<th>Surgeon age</th>
<th>No. of surgeries (No. of surgeons)</th>
<th>Adjusted operative mortality (95% CI)</th>
<th>Adjusted risk difference (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>899,215 (46,733)</td>
<td>-0.1% (-0.2% to -0.05%)</td>
<td>&lt;0.001</td>
<td></td>
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<tr>
<td>(for every 10 yrs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Categorical</td>
<td></td>
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<tr>
<td>&lt;40 yrs</td>
<td>150,089 (10,332)</td>
<td>6.6% (6.5% to 6.7%)</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>40-49 yrs</td>
<td>293,878 (17,333)</td>
<td>6.5% (6.4% to 6.6%)</td>
<td>-0.1% (-0.3% to +0.05%)</td>
<td>0.17</td>
</tr>
<tr>
<td>50-59 yrs</td>
<td>285,212 (16,441)</td>
<td>6.4% (6.3% to 6.5%)</td>
<td>-0.2% (-0.4% to -0.06%)</td>
<td>0.006</td>
</tr>
<tr>
<td>≥60 yrs</td>
<td>170,036 (11,316)</td>
<td>6.3% (6.2% to 6.4%)</td>
<td>-0.3% (-0.5% to -0.1%)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Adjusted for patient characteristics, surgeon characteristics, and hospital fixed effects. Standard errors were clustered at surgeon level.
Is where you went to medical school associated with patient outcomes?

Analysis of 951,308 hospitalizations treated by 29,186 IM physicians. Adjusted for patient characteristics, physician characteristics, and hospital fixed effects.

Key question here is whether ‘quality’ of medical school can be measured by ‘hard’ clinical outcomes after physicians complete residency. Similar analysis can be conducted for residency programs.
Do prescribing behaviors depend on where you trained?

Data on opioid prescribing can be linked to Doximity data to see whether physicians training in specific residency programs or medical schools are more likely to prescribe opioids. Would start with quasi-experimental settings where patient selection bias is plausibly addressable (e.g., emergency medicine physicians, hospitalists).

Implication: Specific programs could be identified with the goal of targeted educational interventions. Those interventions can subsequently be evaluated using similar data.
Patient handoffs and mortality

Whether patient handoffs influence patient outcomes is a large GME issue, but it is also an issue after residency, and arguably a greater one.

Patients who are passed-off between hospitalist physicians have substantially higher mortality than patients who are not passed off, despite similarity of patient characteristics.
Recommendations

Lots of data is available but familiarity of researchers with these data and the statistical methods required may be an obstacle, but one that can be addressed.

Measuring residency programs and medical schools by their physicians’ outcomes and not their processes is a useful avenue to consider, but there are challenges.

In addition to Medicare data and Doximity-like data, there are large commercial insurance databases (HCCI, Optum Labs) that are increasingly becoming available to researchers. AAMC, ABIM, and others may also have unique data that can be linked.
Thank you

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