US Residency Training Before and After the 1997 Balanced Budget Act

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Context  Graduate medical education (GME) determines the size and characteristics of the future workforce. The 1997 Balanced Budget Act (BBA) limited Medicare funding for additional trainees in GME. There has been concern that because Medicare is the primary source of GME funding, the BBA would discourage growth in GME.

Objective  To examine the number of residents in training before and after the BBA, as well as more recent changes in GME by specialty, sex, and type and location of education.

Design  Descriptive study using the American Medical Association (AMA)/Association of American Medical Colleges (AAMC) Graduate Medical Education (ACGME)-accredited programs to examine changes in the number and characteristics of residents before and after the BBA.

Main Outcome Measures  Differences in the number of physicians in ACGME-accredited training programs overall, by specialty, and by location and type of education.

Results  The number of residents and fellows changed little between academic year (AY) 1997 (n=98,143) and AY 2002 (n=98,258) but increased to 106,012 in AY 2007, a net increase of 7,869 (8.0%) over the decade. The annual number of new entrants into GME increased by 7.6%, primarily because of increasing international medical graduates (IMGs). United States medical school graduates (MDs) comprised 44.0% of the overall growth from 2002 to 2007, followed by IMGs (39.2%) and osteopathic school graduates (18.8%). United States MD growth largely resulted from selection of specialties with longer training periods. From 2002 to 2007, US MD training in primary care specialties decreased by 2,641, while IMGs increased by 3,286. However, increasing subspecialization rates led to fewer physicians entering generalist careers.

Conclusion  After the 1997 BBA, there appears to have been a temporary halt in the growth of physicians training in ACGME programs; however, the number increased from 2002 to 2007.

METHODS  The primary source of data for this descriptive study is the annual National GME Census, conducted jointly by the Association of American Medical Colleges (AAMC) and the American Medical Association (AMA). The AAMC and AAMC jointly maintain a database of ACGME-accredited programs, combined specialty programs, and the residents and fellows training in them, including physician characteristics such as gender, type of program, and location of education.

See also pp 1131, 1154 and 1205.
as medical school and sex. This database is updated annually by adding new residents who match into programs through the National Resident Matching Program and information collected through an AAMC follow-up report from medical schools. Starting in July of each year, the National GME Census provides program directors with lists of residents and fellows from the database, and program directors are asked to confirm or modify the training status of trainees who were present in their programs the prior year; add new physicians to their program not already in the AMA/AAMC database; and confirm, edit, or add educational and demographic information.

Approximately 90% of the ACGME programs, with 94% to 98% of all residents and fellows, complete the annual AMA/AAMC National GME Census. Gaps in reporting are filled based on prior-year reporting, results of the National Resident Matching Program, and the AAMC follow-up report from medical schools.

The GME database is generally considered an administrative database. The AAMC Human Subjects Research Protection Program determined that the project did not require institutional review board review.

To address the question of an effect of the 1997 BBA on the total number of residents, we examined change over 5-year periods in the total number of residents and fellows in ACGME-accredited programs and combined specialty programs (for example, internal medicine/pediatrics) from AY 1987 to AY 2007. We also examined recent changes in GME, including resident specialty, type and location of education, and sex. Given that the 1997 BBA capped positions funded by Medicare, a comparison of the characteristics of residents in AY 1997 and AY 2007 would be most useful. However, prior to 2002 there are limitations in the available data. For example, medical school type was unknown for 1363 residents in AY 1997 so that calculating change from AY 1997 to AY 2007 by type of medical education would have been inaccurate. In addition, the switch to an online reporting system for the National GME Census in 2000 led to an undercount of residents, with some residual underreporting in 2001. We therefore compared these characteristics between 2002 and 2007.

To assess how much of the growth in resident physicians came from an increase in new entrants, which increases the total physician supply, we determined the numerical and percentage change in the number of new entrants. New entrants were defined as residents in first-year positions in specialties that can be entered directly from medical school (GY1s) who were reported by program directors as having no prior GME experience or who graduated from medical school the same year as beginning GME. We examined those changes by education type and sex. The term residents includes both residents and fellows in ACGME-accredited programs.

To assess changes in subspecialization rates, we examined changes in the number and percentage of residents who were entering subspecialty training programs. For example, to determine the percentage of internal medicine residents who were subspecializing, we divided the number of first-year trainees in an internal medicine subspecialty in AY 2002 (ie, they began their subspecialty training between July 1, 2002, and August 1, 2002) by the number of residents who completed an internal medicine residency in AY 2001 (ie, they completed the internal medicine residency by June 30, 2002). We used the same method for family medicine, pediatrics, and several other specialties. For the primary care specialties (family medicine, internal medicine, and pediatrics), we used the residual of the specialty-specific subspecialization rates (ie, the percentage who were not subspecializing) to estimate the percentage of all residents who might become generalists.

Because this is a descriptive study with data on almost all trainees, we did not conduct tests of inferential statistics or estimate confidence intervals.

RESULTS

Changes in New Entrants

There was a net increase of 1672 new entrants (7.6%) between AY 2002 and AY 2007. Only 10 of those new entrants were in newly accredited/recognized specialties. Of the increase in new entrants, 1165 (69.7%) were international medical graduates (IMGs). United States medical school graduates (MDs) and DOs represent similar shares of the increase (276 [16.5%] and 273 [16.3%], respectively). Graduates of Canadian medical schools and unknown medical schools decreased by 42. Compared with AY 2002, the numbers of IMGs and DOs entering GME in AY 2007 each increased by 20.7% while the increase in US MD entrants was only 1.8% over the 5 years.

Changes in Total Residents

During the two 5-year periods prior to the BBA (AY 1987 to AY 1997), the number of residents in training grew by 9.8% in each 5-year period. The combined 10-year growth was 20.6%. After the BBA, the growth was 0.1% from AY 1997 to AY 2002 and 7.9% from AY 2002 to AY 2007, for a combined growth of 8.0% (Figure). From 1997 to 2007, the US population increased by 12.6%, leading to a net decrease in the ratio of resident physicians to 100,000 population from 36.7 in AY 1997 to 35.1 in AY 2007.

Between AY 2002 and AY 2007, the overall number of residents increased by 7754. United States MDs made up the single largest component of the overall increase (n=3410), followed by IMGs (n=3041) and DOs (n=1457). The number of residents from Canadian medical schools and unknown medical schools decreased by 154. However, the rate of increase between 2002 and 2007 was only 5.1% for US MDs compared with 11.8% for IMGs and 27.4% for DOs (Table 1). Of the growth in the total number of residents, 171 were in subspecialties first accredited or recognized by the ACGME between AY 2002 and AY 2007 and 13 were in newly accredited or recognized combined specialty programs.
From AY 2002 to AY 2007, specialties that cannot be entered directly from medical school, including subspecialties and those requiring a preliminary year, grew rapidly. The number of residents training in these specialties and subspecialties (across all training years) grew by 21.4% (n=3682). Of the 39 specialties that can be entered directly from medical school, the growth (across all training years) was far slower, with an overall increase of 5.0% (n=4072 residents) from AY 2002 to AY 2007.

Changes by Specialty
From AY 2002 to AY 2007, the specialties with the largest absolute growth, excluding combined specialty programs, were internal medicine, emergency medicine, diagnostic radiology, anesthesiology, and pediatrics (Table 2). There was also growth in the internal medicine and pediatric subspecialties. In terms of relative growth within specialties, excluding combined specialty programs, the most rapid rate of growth was in nuclear medicine (32.2%), neurology (23.2%), plastic surgery (22.0%), otolaryngology (21.6%), and neurological surgery (17.6%).

Although the majority of specialties experienced an increase in total residents, several experienced modest decreases, including family medicine (−273 [−2.8%]), preventive medicine (−82 [−24.6%]), and ophthalmology (−58 [−4.5%]).

Changes by Education Location and Type
The changes for US MDs included major increases in anesthesiology, diagnostic radiology, emergency medicine, pathology, and psychiatry, as well as decreases in primary care specialties (n=−2641 in family medicine, internal medicine, pediatrics, and internal medicine/pediatrics) and obstetrics/gynecology (Table 2). The pattern of growth or decline of IMGs by specialty is almost the inverse of US MDs. There were major increases of IMGs in primary care specialties (n=3286) and obstetrics/gynecology and major decreases in anesthesiology, pathology, and psychiatry. However, there were some specialties and subspecialties in which IMGs increased along with US MDs, including the subspecialties of internal medicine and pediatrics, emergency medicine, and general surgery (Table 2).

The increase in the number of DOs (n=1457) in ACGME training programs was widely distributed among many specialties. The number of DOs increased in primary care specialties and obstetrics/gynecology, but at a slower rate than their increase in many other specialties (Table 2). There was an increase of 202 (76.5%) in internal medicine subspecialties, 134 (76.1%) in physical medicine and rehabilitation, 126 (56.5%) in psychiatry, 110 (37.5%) in emergency medicine, and 48 (63.2%) in pathology.

Table 1. Change in Total Residents and New Entrants by Education and Sex, AY 2002 to AY 2007

<table>
<thead>
<tr>
<th>Type of resident or entrant</th>
<th>AY 2002, No. (%)</th>
<th>AY 2007, No. (%)</th>
<th>% Change</th>
<th>% of Total</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>US MD</td>
<td>66,646 (67.8)</td>
<td>70,056 (66.1)</td>
<td>5.1</td>
<td>44.0</td>
<td>15,409 (16.5)</td>
</tr>
<tr>
<td>IMG</td>
<td>25,783 (26.2)</td>
<td>28,824 (27.2)</td>
<td>11.8</td>
<td>39.2</td>
<td>3,041 (11.8)</td>
</tr>
<tr>
<td>DO</td>
<td>5,327 (5.4)</td>
<td>6,784 (6.4)</td>
<td>30.6</td>
<td>18.8</td>
<td>1,457 (27.4)</td>
</tr>
<tr>
<td>Otherb</td>
<td>502 (0.5)</td>
<td>348 (0.3)</td>
<td>−30.7</td>
<td>−2.0</td>
<td>−154 (−30.7)</td>
</tr>
<tr>
<td>Total</td>
<td>98,258 (100.0)</td>
<td>106,012 (100.0)</td>
<td>7.9</td>
<td>100.0</td>
<td>7,754 (7.9)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of resident or entrant</th>
<th>AY 2002, No. (%)</th>
<th>AY 2007, No. (%)</th>
<th>% Change</th>
<th>% of Total</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>39,279 (40.0)</td>
<td>47,059 (44.4)</td>
<td>19.8</td>
<td>100.3d</td>
<td>7,780 (19.8)</td>
</tr>
<tr>
<td>Male</td>
<td>58,975 (59.9)</td>
<td>58,946 (55.6)</td>
<td>0.1</td>
<td>0.9d</td>
<td>−3 (−0.5)</td>
</tr>
</tbody>
</table>

Abbreviations: AY, academic year; DO, osteopathic school graduate; GME, graduate medical education; IMG, international medical graduate; US MD, US medical school graduate.

New entrants were defined as graduate year 1 without prior training; “graduate year 1” reflects residents in positions that can be entered directly from medical school; “without prior training” is reported by program directors for the individual resident in a graduate year 1 position without prior accredited US training. This is assumed to be equal to new entrants to GME.

Includes graduates of Canadian medical schools and unknown medical schools.

Sex was not indicated for 104 residents in AY 2002 and for 7 residents in AY 2007.

Does not total 100% due to missing data.
Changes in Subspecialization
The percentage of physicians completing training in a range of specialties in addition to primary care who then subspecialized increased (Table 3). For example, a little more than one-third of residents who completed training in orthopedic surgery subspecialized in AY 2002. By AY 2007, more than half subspecialized.

Consistent with this pattern, the number and percentage of physicians completing training in internal medicine, pediatrics, and family medicine and subspecializing has increased. In AY 2002, 2942 physicians entered training in any specialty (excluding the sub-subspecialties of cardiac electrophysiology and interventional cardiology); this is 47.2% of those completing internal medicine in AY 2001, excluding those completing a preliminary year.\(^\text{10}\)

In AY 2007, the number subspecializing had increased to 3618, equal to 54.9% of residents completing internal medicine in AY 2006. Similarly, the number entering pediatric subspecialties increased from 665 in AY 2002 to 989 in AY 2007. This was equal to 26.9% of the 2473 completing a pediatric residency in AY 2001 and 39.0% of those completing in AY 2006. In addition to the internal medicine and pediatric subspecialties, some physicians completing training in these specialties continued in allergy and immunology training (128 in AY 2007) and other specialties.

The total number of residents training in family medicine, internal medicine, pediatrics, and combined internal medicine/pediatric residency programs increased between AY 2002 and AY 2007, from 39 945 to 40 852. (Table 4) However, there was a decrease in the percentage of residents not subspecializing. Based on this, the estimated percentage of all residents in training who will potentially practice primary care decreased from 28.1% to 23.8%. (Table 4).

Changes by Sex
Between AY 2002 and AY 2007, the number of women in GY1 positions with no prior GME increased by 1771 (18.2%) (Table 1). The total number of women in training increased by 7780 (19.8%). In AY 2007, 44.4% of all physicians in training were women, an increase from 40.0% in AY 2002. In 2007, women represented a majority (52.4%) of physicians training in primary care specialties, compared with 48.0% in AY 2002. The percentage of women in

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Table 2. Change in Total Residents From AY 2002 to AY 2007 by Medical Education and Selected Specialties

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Total Residents</th>
<th>US Allopathic Medical School Graduates(^a)</th>
<th>International Medical Graduates(^a)</th>
<th>Doctors of Osteopathy(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary care</td>
<td>40 852</td>
<td>21 837 (~10.8)</td>
<td>15 733</td>
<td>3 182 (~11.4)</td>
</tr>
<tr>
<td>Family medicine</td>
<td>9 330</td>
<td>−273 (~2.8)</td>
<td>3 797</td>
<td>121 (~46.9)</td>
</tr>
<tr>
<td>Internal medicine(^b)</td>
<td>20 226</td>
<td>10 922 (~7.5)</td>
<td>9 080</td>
<td>172 (~21.3)</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>8 052</td>
<td>5 542 (~10.1)</td>
<td>1 938</td>
<td>31 (~19.6)</td>
</tr>
<tr>
<td>Internal medicine/pediatrics</td>
<td>1 444</td>
<td>−119 (~9.3)</td>
<td>190</td>
<td>33 (~21.0)</td>
</tr>
<tr>
<td>Surgical specialties</td>
<td>16 280</td>
<td>14 036 (~4.8)</td>
<td>1 938</td>
<td>31 (~19.6)</td>
</tr>
<tr>
<td>Surgery (general)</td>
<td>7 680</td>
<td>2 082 (~26.7)</td>
<td>1 448</td>
<td>98 (~7.3)</td>
</tr>
<tr>
<td>Other surgical specialties</td>
<td>8 600</td>
<td>5 54 (~6.7)</td>
<td>4 67</td>
<td>89 (~23.5)</td>
</tr>
<tr>
<td>Other specialties</td>
<td>28 357</td>
<td>20 825 (~16.0)</td>
<td>5 162</td>
<td>−115 (~18.3)</td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>4 993</td>
<td>3 795 (~26.7)</td>
<td>700</td>
<td>−74 (~51.6)</td>
</tr>
<tr>
<td>Emergency medicine</td>
<td>4 479</td>
<td>3 810 (~12.7)</td>
<td>257</td>
<td>105 (~69.1)</td>
</tr>
<tr>
<td>Neurology</td>
<td>1 590</td>
<td>1 381 (~27.2)</td>
<td>590</td>
<td>87 (~17.3)</td>
</tr>
<tr>
<td>Obstetrics and gynecology</td>
<td>4 770</td>
<td>3 386 (~32.4)</td>
<td>1 008</td>
<td>35 (~61.4)</td>
</tr>
<tr>
<td>Pathology/anatomic clinical</td>
<td>2 283</td>
<td>−1 (~0.3)</td>
<td>1 490</td>
<td>411 (~38.4)</td>
</tr>
<tr>
<td>Physical medicine and rehabilitation</td>
<td>1 184</td>
<td>674 (~23.0)</td>
<td>1 96 ~173 (~46.9)</td>
<td>3 10 (~76.1)</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>4 653</td>
<td>2 890 (~51.6)</td>
<td>1 421</td>
<td>−259 (~15.4)</td>
</tr>
<tr>
<td>Radiology (diagnostic)</td>
<td>4 405</td>
<td>3 923 (~12.8)</td>
<td>3 15</td>
<td>−63 (~16.7)</td>
</tr>
<tr>
<td>Subspecialties</td>
<td>13 369</td>
<td>1 481 (~22.8)</td>
<td>4 652</td>
<td>86 (~22.8)</td>
</tr>
<tr>
<td>Internal medicine subspecialties</td>
<td>9 681</td>
<td>5 479 (~16.0)</td>
<td>3 686</td>
<td>62 (~20.3)</td>
</tr>
<tr>
<td>Pediatric subspecialties</td>
<td>2 813</td>
<td>1 826 (~53.9)</td>
<td>823</td>
<td>174 (~26.8)</td>
</tr>
<tr>
<td>Surgical subspecialties</td>
<td>8 757</td>
<td>669 (~34.1)</td>
<td>1 43</td>
<td>70 (~59.5)</td>
</tr>
<tr>
<td>All specialties and subspecialties</td>
<td>7 154</td>
<td>5 384 (~12.8)</td>
<td>1 362</td>
<td>−143 (~9.5)</td>
</tr>
<tr>
<td>Total</td>
<td>106 012</td>
<td>70 056 (~5.1)</td>
<td>28 824</td>
<td>3 041 (~11.8)</td>
</tr>
</tbody>
</table>

Abbreviation: AY, academic year.\(^a\) Medical school type was not indicated for 84 residents in AY 2002. Graduates of Canadian medical schools are excluded.\(^b\) Internal medicine includes preliminary internal medicine.

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these specialties in AY 2007 varied from 72.8% in pediatrics to 43.9% in internal medicine. While women were more likely to select primary care specialties than men (45.5% of all women compared with 33.0% of all men in training in AY 2007), the percentage of all female residents training in primary care specialties decreased from 48.8% in AY 2002 to 45.9% in AY 2007.

**COMMENT**

Based on the change in the number of residents and fellows in ACGME-accredited programs over 5-year intervals before and after the BBA, it appears that the cap on Medicare-supported GME positions was associated with at least a temporary decrease in the growth in GME positions. The examination of the available data helps to explain where the growth after 2002 has occurred: (1) an increase in entrants into GME; (2) increasing rates of subspecialization, leading to residents remaining in training longer; and (3) new ACGME-accredited subspecialties and combined programs. While graduates of US allopathic medical schools represented the largest component of growth overall, IMGs comprised most of the growth in entry-level GME.

Several explanations for the recent growth despite the continued cap on Medicare GME, the largest source of funding for GME, should be considered. The first issue is whether the apparent growth is real or merely reflects limitations of the data and methods. Approximately 10% of programs with an estimated 2% to 6% of all residents do not complete the National GME Census on an annual basis. For any resident whose status was not updated, the status was imputed based on National Resident Matching Program data and information reported in prior year(s). While there were no substantial changes in data collection and analysis methods, the AAMC and AMA strive to improve data reporting by program directors, and it may be that a small amount of the apparent growth in GME reflects these improvements. However, the ACGME also collects data on the number of residents— independent of the AMA/AAMC National GME Census—and their data show a comparable increase (9.0%) in the number of residents between AY 2002 and AY 2007. The consistency of the results supports the accuracy of our finding of growth in GME.

Another possible methodological limitation is that our data do not include residents in AOA-accredited programs and fellows in nonspecialty—ACGME-accredited programs. It is possible that these programs may have experienced declines that would offset some or all of the apparent increases in residents in ACGME programs. However, the number of interns and residents in AOA-accredited programs has also been increasing. We also examined new ACGME-accredited programs to determine if some were existing DO programs becoming dually accredited. Between AY 2002 and AY 2007, there were 3 DOs training in newly accredited ACGME programs that had been AOA-accredited programs. Therefore, the growth in the number of residents does not appear to be the result of counting trainees in existing AOA-accredited programs that received ACGME accreditation during the study period.

Currently, Medicare funding covers some of the costs of approximately 93,400 residents in training. The 2003 Medicare Modernization Act authorized the redistribution of Medicare GME funding for residency positions that were not being used by teaching hospitals to other hospitals, with pri-

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### Table 3. Changes in Subspecialization Rates for Selected Specialties

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Residents Completing Program Who Subspecialized, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AY 2002</td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>9.5</td>
</tr>
<tr>
<td>Dermatology</td>
<td>14.3</td>
</tr>
<tr>
<td>Family medicine</td>
<td>2.6</td>
</tr>
<tr>
<td>Internal medicine&lt;sup&gt;a&lt;/sup&gt;</td>
<td>47.2</td>
</tr>
<tr>
<td>Neurology</td>
<td>38.3</td>
</tr>
<tr>
<td>Orthopedic surgery</td>
<td>34.1</td>
</tr>
<tr>
<td>Pathology</td>
<td>48.8</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>26.9</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>44.9</td>
</tr>
<tr>
<td>Radiology</td>
<td>30.7</td>
</tr>
</tbody>
</table>

Abbreviation: AY, academic year.
<sup>a</sup>Internal medicine excludes the sub-specialties of clinical cardiac electrophysiology and interventional cardiology.

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### Table 4. Estimated Percentage of Total Residents Who Will Become Primary Care Physicians

<table>
<thead>
<tr>
<th>Academic Year 2002</th>
<th>Total No. of Residents in Primary Care Residency Programs</th>
<th>Estimated to Not Pursue Further Specialty Training, %</th>
<th>Estimate of Future Primary Care Physicians&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family medicine</td>
<td>9603</td>
<td>97.4</td>
<td>9353</td>
</tr>
<tr>
<td>Internal medicine</td>
<td>21,136</td>
<td>52.8</td>
<td>11,163</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>7699</td>
<td>73.1</td>
<td>5629</td>
</tr>
<tr>
<td>Primary care subtotal&lt;sup&gt;b&lt;/sup&gt;</td>
<td>39,945</td>
<td>73.1</td>
<td>27,652</td>
</tr>
<tr>
<td>% of Total graduate medical education</td>
<td>40.7</td>
<td>28.1</td>
<td>38.5</td>
</tr>
</tbody>
</table>

<sup>a</sup>Assumes that those not entering subspecialty training will go into primary care practice.
<sup>b</sup>The primary care subtotal includes residents in combined internal medicine/pediatrics programs.
While states do provide fund- 

cration of Medicare fund-

al distribution were already above their cap. 

Other possible explanations of the 

growth have to do with the potential ef-

fects of other funding sources. There are 

3 other notable sources of funding that 

are far smaller than Medicare but may 

have had an effect: the Office of Veter-

an’s Affairs, state GME funding, and fed-

eral funding for children’s hospitals. Al-

though there has been a recent limited 

increase in GME Veteran’s Affairs– 

funded positions, few if any of these 

new positions were in place by AY 

2007.14 While states do provide fund-

ing for GME in several ways, includ-

ing through Medicaid reimbursement 

of teaching hospitals and, in some 

states, direct grants, funding during the 

past several years appears to have been 

relatively stable or declining.15 Fed-

eral Children’s Hospital GME, which 

goes to children’s hospitals to support 

training of physicians in pediatric spe-

cialties, was first authorized in 1999 and 

increased from $40 million in federal 

fiscal year 2000 to $305 million in fis-

cal year 2004.16 This may have contrib-

uted to the increase of 811 physicians 

(40.5%) training in pediatric subes-

pecialties. 

The recent growth in GME could also 

be related to the implementation of 

ACGME duty-hour rules that took 

effect nationally on July 1, 2003. It is 

possible that some hospitals con- 

cluded that adding residents was the 

most cost-effective way of covering ser-

vices that might not otherwise be cov-

ered because of the limit on the num-

ber of hours a resident could work 

under the new work rules. However, 

some of the specialties most affected by 

duty-hour rule changes (eg, surgical spe-

cialties, including general surgery) 

increased less rapidly over the last 5 

years than the overall growth in resi-

dents (5.5% for surgical specialties, 

including general surgery, compared with 

7.9% overall). 

Recent reports by the federal gov-

ernment and others have forecast phy-

sician shortages.17,18 There have been 
calls to increase medical school enroll-

ment and calls for an increase in GME 

positions to help meet future needs.19-21 

Recent surveys of enrollment plans of 

MD and DO programs indicate that ex-

isting and planned schools are likely to 
genenerate an increase of more than 5300 

US MD and DO graduates per year by 

AY 2016 compared with AY 2006.22,23 

Assuming an average of 4 years of GME 

training per resident, this growth in an-

nual graduates would require more than 

21 000 additional GME positions dur-

ing the next decade. A further expa-

nsion in training positions, particularly 

entry positions to accommodate the in-

crease in US MD and DO graduates, is 

uncertain. If GME positions do not con-

inue to expand, then new MD and DO 

graduates are likely to reduce the in-

flow of IMGs and result in little net 
growth in practicing physicians. 

These data also confirmed a con-

tinuation in a number of patterns that 
have been previously described in the 
literature. Major shifts in the specialty 
distribution of US medical school 
graduates in training occurred during 
AY 2002-2007, including the sus-
tained shift away from primary care specialties.24-26 The specialties with the 
greatest increase in US MD graduates 
between AY 2002 and AY 2007 (anesth-
esiology, diagnostic radiology, emer-
gency medicine, pathology, and psy-
chiatry) allow for more control over 
hours worked than most specialties, 
which appears to be important for 
younger physicians.27 With the excep-
tion of psychiatry, these specialties 
are also generally well compensated.28 
There have been concerns about po-
tential or real shortages in anesthesi-
ology, emergency medicine, and psychiatry,29-31 as well as in subspecial-
ties of internal medicine32,33 and pedi-

iatrics34; US MDs increased in all of 

these specialty areas. However, despite 

reports of shortages in adult primary 
care,35 the number of US MDs training 
in internal medicine and family medi-
cine has declined over the past 5 years. 

While the overall numbers of physi-
cians training in primary care special-
ties was steady, the increasing rate of 

subspeciality training, especially in 

internal medicine and pediatrics, is 

leading to a net decrease in the num-

ber of new physicians available to 

enter generalist practice. The actual 
decrease in new generalists may be 
even greater than it appears because of 
an increase in internists becoming 

hospitalists who are not available to 

provide primary care in the commu-

nity.36 Although women continue to be 

more likely to enter primary care than 

men, the percentage of women pursu-

ing subspecialty training and entering 

specialties historically dominated by 

men continues to increase. Since fe-

male physicians tend to work fewer 
hours than male physicians,37,38 the 
changing gender mix may also lead to 
a future decrease in the full-time equiva-

lent supply of physicians in practice. 

In conclusion, although there ap-

teur appears to have been a temporary halt in 

the growth of physicians training in 

ACGME programs shortly after the 

1997 BBA, the number has been in-

creasing from 2002 to 2007.

Author Contributions: Dr Brotherton had full access to all of the data in the study and takes responsibility 
for the integrity of the data and the accuracy of the data analysis. 

Study concept and design: Salsberg, Rockey. 

Acquisition of data: Brotherton, Jackson. 

Analysis and interpretation of data: Salsberg, Rockey, 

Rivers, Brotherton, Jackson. 

Drafting of the manuscript: Salsberg, Rockey, Jackson. 

Critical revision of the manuscript for important in-

tellectual content: Salsberg, Rockey, Rivers, Brotherton. 

Statistical analysis: Salsberg, Rivers, Jackson. 

Administrative, technical, or material support: Salsberg, 

Rockey, Rivers, Brotherton. 

Study supervision: Salsberg, Rockey. 

Financial Disclosures: None reported. 

Funding/Support: The AAMC provided support for Mr 

Salsberg, Ms Rivers, and Mr Jackson for this re-

search. The AAMA provided support for Drs Rockey 

and Brotherton for this research. 

Role of the Sponsor: The sponsors had no role in the 

design of the study; collection, management, analy-

sis, and interpretation of the data; and preparation, 

review, or approval of the manuscript. 

Additional Contributions: We thank the Depart-

ment of Census and Self-reported Data at the AAMA 

and the Division of Health Care Affairs at the AAMC 

for administering the National GME Census.

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REFERENCES