AGENDA

1. Educating & Training Minnesota’s Health Workforce - A. Friedman/J. Andrews/ B. Brandt/C. Delaney (pp. 2-112)
Special Committee on Academic Medicine

December 12, 2013

Agenda Item: Educating & Training Minnesota's Health Workforce

☐ review  ☐ review/action  ☐ action  ☒ discussion

Presenters: Vice President Aaron Friedman
John Andrews, Associate Dean, Graduate Medical Education, Medical School
Barbara Brandt, Associate Vice President, Education, Academic Health Ctr
Connie Delaney, Dean, School of Nursing

Purpose:

☐ policy  ☒ background/context  ☐ oversight  ☐ strategic positioning

Outline of Key Points/Policy Issues:

With 6200 students in 62 degree programs, the University of Minnesota educates and trains 70% of the health professionals in Minnesota. Health professional education in Minnesota and nationally faces enormous challenges and is undergoing fundamental change in response to the changing health care environment and ever tighter fiscal resources. The University of Minnesota, with its top ranked health professional schools and long history of innovation, is well poised for the future. It is also a national leader in interdisciplinary education and care - the future of health care in this country and internationally.

The docket materials and committee presentation provide an overview of the University’s health professional programs including a brief tutorial on how health professional students are educated and trained, a discussion of the state’s demand for health professionals, challenges the University faces as the state’s primary educator of Minnesota’s health workforce, and accomplishments to date. There will be specific discussions of the University’s graduate medical education and residency training program; the newly created National Center for Interprofessional Practice and Education and its role in defining new models of clinical care and health professional education nationally; and the University’s nursing programs.

The policy question facing the University is this: How can the University of Minnesota meet the growing and rapidly changing health professional workforce needs of Minnesota?

• Current and growing shortages of providers
• Mix of health providers needed in the state
• Skills and expertise required of providers in a changing health care environment
• Access to rotation sites for experiential education
• Financing of health professional education and training programs
**Background Information:**

The initial meeting of the Special Committee on Academic Medicine in October focused on a general overview of the University’s health sciences schools and programs, academic medicine, and the University’s clinical programs.
Academic Health Center Organizational Chart

Board of Regents

University President
Eric W. Kaler, Ph.D.

Vice President for
Health Sciences
Aaron Friedman

Senior Vice President for
Academic Affairs and Provost
Karen Hanson

Academic Issues

Schools
- School of Dentistry
  Leon Assael, Dean¹
- Medical School
  Aaron Friedman, Dean¹
- School of Nursing
  Connie Delaney, Dean¹
- College of Pharmacy
  Marilyn Speedie, Dean¹
- School of Public Health
  John Finnegan, Jr., Dean¹
- College of Veterinary Medicine
  Trevor R. Ames, Dean¹

AHC Centers & Institutes

Academic Programs/Services
- Associate VP for Education
  Barbara Brandt*
- Associate VP for Research
  Tucker LeBlen*
- Associate VP for Clinical and Translational Science
  Bruce Blazar

Administrative Services
- Associate VP & CFO
  Beth Nunnally*
- Associate VP
  Chief of Staff
  Terry Bock*
- Senior Director of Communications and Public Affairs
  Brian Lucas*
- AHC Counsel
  Keith Dunder*

¹AHC Deans Council
*AHC Operations Team

Note: AHC Deans report to the Provost for academic issues, and up to the VP for Health Sciences for clinical, interdisciplinary, and administrative issues.

November 2012
Board of Regents
Special Committee on
Academic Medicine

Session on
Health Professional Education

December 12, 2013
AHC EDUCATION PROGRAMS
AHC Professional Education Facts

- One of the most comprehensive health sciences centers in the nation
- Six schools: Dentistry, Medicine, Nursing, Pharmacy, Public Health, Veterinary Medicine, and a Center for Allied Health Professions
- 6,200 students in 62 programs (professional, graduate, undergraduate)
- 1,400 faculty
- Educate / train 70% of the health professionals in Minnesota
- Educate at over 1,700 sites across the state: hospitals, clinics, pharmacies, nursing homes, community agencies, and other sites
AHC Professional Education Programs

• Professional Programs
  - Doctor of Medicine (MD)
  - Doctor of Pharmacy (PharmD)
  - Doctor of Dental Sciences (DDS)
  - Doctor of Veterinary Medicine (DVM)
  - Doctor of Physical Therapy (DPT)
  - Doctor of Nursing Practice (DNP)
  - Master of Occupational Therapy (MOT)
  - Master of Public Health (MPH)
  - Master of Healthcare Administration (MHA)

• Graduate Programs: e.g., Bioethics (MS), Health Informatics (MS, MHI, PhD), Nursing (MN)

• Baccalaureate Programs:
  - Bachelor of Nursing (BSN), Bachelor of Dental Hygiene (BSHD), Bachelor of Dental Therapy (BSDT), Mortuary Science (BS), Clinical Laboratory Science (BS)
Health Professions Education

• Highly regulated through accreditation standards, licensure and certification requirements for practice
• High workforce demand driven by an aging population, retirements, and health care reform
• High number of applicants; high retention; and high “on-time” graduation rates
• Lengthy time to educate and train health professionals: didactic and experiential
• Clinical and experiential learning, including over 1,700 affiliated training sites across Minnesota and internationally
• Competencies demonstrated through standardized patients and examinations
• Use of simulation and technology for competency development
• Interprofessional education and training
Length of Doctoral Education
Medicine, Nursing, Dentistry and Pharmacy

**Medicine (MD)**
- 3-4 years High School
- ~4 years BS or BA Degree
- 4 years Medical School
- 3-5 years Required Postgraduate Residency
- 1-5 years Fellowship (Specialty)

**Nursing (DNP)**
- 3-4 years High School
- 4-year Bachelor of Science in Nursing Degree
- 3-year Doctor of Nursing Practice in one of 13 specialties
- Optional post-grad Cert.
Length of Doctoral Education
Pharmacy and Dentistry

Pharmacy (PharmD)
- 3-4 years High School
- 2-3 years Undergrad Study
- 4 years Pharmacy School
- Optional Postgraduate (Residency or Fellowship)
- CE

Dentistry (D.D.S.)
- 3-4 years High School
- ~4 years BS or BA Degree
- 4 years Dental School
- Optional Postgraduate (Specialty)
- CE
Required Clinical Hours per Student

- Dentistry
- Medicine
- Nursing (DNP)
- Pharmacy
- Veterinary Medicine
## Entering Class Size

### Health Professions Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>2000 N</th>
<th>2012 N</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Dentistry</td>
<td>86</td>
<td>98</td>
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<tr>
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<tr>
<td>College of Pharmacy</td>
<td>104</td>
<td>166</td>
<td>60%</td>
</tr>
<tr>
<td>School of Public Health</td>
<td>151</td>
<td>177</td>
<td>17%</td>
</tr>
<tr>
<td>College of Veterinary Medicine</td>
<td>76</td>
<td>99</td>
<td>30%</td>
</tr>
</tbody>
</table>

- Up arrow indicates increase in class size.
## Average Student Debt by Degree

<table>
<thead>
<tr>
<th>Degree</th>
<th># of Graduates</th>
<th>% w/ Loans</th>
<th>Average Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor of Dental Surgery (DDS)</td>
<td>109</td>
<td>85%</td>
<td>$208,005</td>
</tr>
<tr>
<td>Medical Doctor (MD)</td>
<td>217</td>
<td>91%</td>
<td>$158,125</td>
</tr>
<tr>
<td>Doctor of Pharmacy (PharmD)</td>
<td>157</td>
<td>94%</td>
<td>$133,490</td>
</tr>
<tr>
<td>Doctor of Nursing Practice (DNP)</td>
<td>58</td>
<td>94%</td>
<td>$48,733</td>
</tr>
<tr>
<td>Master of Nursing (MN)</td>
<td>66</td>
<td>92%</td>
<td>$48,506</td>
</tr>
<tr>
<td>Bachelor of Science in Dental Hygiene (BS)</td>
<td>23</td>
<td>91%</td>
<td>$33,137</td>
</tr>
<tr>
<td>Bachelor of Science in Nursing (BSN)</td>
<td>124</td>
<td>72%</td>
<td>$34,239</td>
</tr>
</tbody>
</table>
Health Professional Shortage Area - HPSA

Anesthesia Practice by County

MN Rational Service Areas - Mental Health Geographic HPSA Designations

Source: Minnesota Department of Health
Office of Rural Health, May 2007
MN HPSA designations 6_2011.mxd
Major Challenges

• Changing health care environment
• Difficulty predicting future workforce needs and practice models
• Growing disincentives for choosing and practicing primary care
• Reduced state and federal funding for education and training: *impact on tuition and student debt*
• Difficulty finding training/practice sites that model health care the way it should be delivered: *working in teams with providers practicing at the top of their license*
• Access to clinical rotation sites for education
What We Have Done

Increased enrollments in all of our schools

Expanded programs
- Pharmacy in Duluth
- Nursing with Veterans Administration partnership
- Doctor of Nursing Practice - 70% expansion 2014-2024

Developed pipelines
- Minnesota Future Doctors
- Rural Physician Associate Program (RPAP)
- Area Health Education Centers (AHEC)
- Health Careers Centers
- UM Morris and UM Duluth MN collaborative Nursing programming

Developed new degree programs
- Doctor of Nursing Practice and other Advanced Nursing programs
- Dental Therapy

Revamping our curriculum
- Team-based care and interprofessional education
- Greater emphasis on simulation
- Greater emphasis on prevention and wellness
Selected Outcomes for Minnesota

Nationally ranked in primary care

- *US News and World Report* ranks the Medical School 7th in primary care; 3rd in rural medical; and 10th in family medicine

- Our primary care residency slots fill—including Family Medicine for the past 2 years

- Half of our medical students and residents choose primary care

- Our Nursing, Pharmacy, Dentistry, Public Health, Veterinary Medicine and Allied Health programs supply most of the Minnesota workforce in their fields

- Our Doctor of Nursing Practice program is 3rd largest in the country.

- University – Health Systems Collaboration

- National Center for Interprofessional Practice and Education
Policy Questions

How can the University of Minnesota meet the growing and rapidly changing health professional workforce needs of Minnesota?

- Current and growing shortages of providers
- Mix of health providers needed in the state
- Skills and expertise required of providers in a changing health care environment
- Access to rotation sites for experiential education
- Financing of health professional education and training programs
CLINICAL TRAINING AND GRADUATE MEDICAL EDUCATION
Continuum of Medical Education

Years 1 & 2
Duluth
Family Medicine
Rural and Native
American Health

Years 1 & 2
Twin Cities
MD, PhD, other
joint degrees;
Variety of
opportunities

Years 3 & 4
Flexible MD
IMER
RPAP
Range of
clinical sites

GME
Full spectrum
of training
programs

Practicing
Physicians

Medical Students
Resident and
Fellow Physicians

3-4 Years
2 years
2 years
3-8 years
Life long learning
Graduate Medical Education

• Training and education of physicians after Medical School and before specialty certification

• Programs are governed by the Accreditation Council for Graduate Medical Education

• Most GME programs in Minnesota are sponsored either by University of Minnesota or Mayo
GME at the University of Minnesota

• 25 ACGME approved residency programs
• 54 ACGME approved fellowship programs
• 31 other residency/fellowship programs
• 910 residents and fellows
• Primary training sites: University of Minnesota Medical Center, Hennepin County Medical Center, Regions, Veterans Administration Medical Center, Children’s Hospitals and Clinics, HealthEast, Methodist, North Memorial, Duluth.
• 61% of our GME residents stay in Minnesota to practice
GME Training Locations
Top Affiliated Sites

- University of Minnesota Medical Center, Fairview (370)
- Veterans Affairs Medical Center (137)
- Hennepin County Medical Center (97)
- Regions/HealthPartners (90)
- Children’s Healthcare (40)
- HealthEast (39)
- Methodist Hospital/Park Nicollet (32)
- North Memorial Medical Center (32)
- Duluth (29)
- All Others (44)
### Trainees by Specialty 2011

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Care</td>
<td>368</td>
</tr>
<tr>
<td>Family Medicine</td>
<td>154</td>
</tr>
<tr>
<td>General Medicine</td>
<td>117</td>
</tr>
<tr>
<td>General Pediatrics</td>
<td>97</td>
</tr>
<tr>
<td>Expanded Prim. Care</td>
<td>100</td>
</tr>
<tr>
<td>General Surgery</td>
<td>40</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>24</td>
</tr>
<tr>
<td>Obstetrics</td>
<td>36</td>
</tr>
<tr>
<td>Specialty Residents</td>
<td>300</td>
</tr>
<tr>
<td>Surgical</td>
<td>84</td>
</tr>
<tr>
<td>All Other Specialties</td>
<td>178</td>
</tr>
<tr>
<td>Dental</td>
<td>38</td>
</tr>
<tr>
<td>Specialty Fellows</td>
<td>182</td>
</tr>
<tr>
<td>Medicine</td>
<td>82</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>31</td>
</tr>
<tr>
<td>All Other</td>
<td>69</td>
</tr>
</tbody>
</table>
Funding for GME is Complex

- **Hospitals Cover the Bulk of the Cost:** pay residents/fellows stipends and insurance, based on number of years in training and other incidental costs not covered by Medicare School.
  - **Hospitals’ Primary Funding Source is Medicare:**
    - **DME:** Direct Medical Education Payments for resident stipends, based on formula including hospital’s % of Medicare patients.
    - **IME:** Indirect Medical Education Payments intended to cover other costs of GME, based on resident to bed ratio.
  - **Other Hospital Sources:**
    - Clinical Revenues
    - Veterans Administration: pays stipends for residents rotating through VAMC
    - MERC
    - Medicaid: payments through state for resident care of Medicaid patients

- **Medical School pays for administration of the program and other incidental costs not covered by hospitals and the University to invest other funds above the cap.**
  - To innovate, add specialty training in emerging fields and meet workforce demands, requires hospitals have a cap on number of slots and federal funding based on 1996 resident numbers. To:
    - **Veterans Administration:** pays stipends for residents rotating through VAMC
    - **NERC**
    - **Medicaid:** payments through state for resident care of Medicaid patients
    - **Clinical Revenues**
    - **Other Hospital Sources:**
      - **DSH:** payments to help teaching hospitals with care provided to uninsured
      - **MIE:** Indirect Medical Education Payments intended to cover other costs of GME, based on formula including the hospital’s % of Medicare patients
      - **DME:** Direct Medical Education Payments for resident stipends, based on number of years in training; pay for training costs and other direct/indirect costs.

- **Primary Funding Source for GME:** the bulk of the cost: pay residents/fellows stipends and insurance, based on number of years in training and other incidental costs not covered by Medicare School.

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24

29
High Level Bookends
Estimated Revenues and Costs for Student and Resident Education at Affiliated Sites Based on Ratio of Students to Educator

<table>
<thead>
<tr>
<th></th>
<th>1/1 Ratio</th>
<th>2/1 Ratio</th>
<th>3/1 Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Funding to Community Sites:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DME (Estimated)</td>
<td>$9,900,000</td>
<td>$9,900,000</td>
<td>$9,900,000</td>
</tr>
<tr>
<td>IME (Estimated)</td>
<td>$31,500,000</td>
<td>$31,500,000</td>
<td>$31,500,000</td>
</tr>
<tr>
<td>MERC</td>
<td>$20,000,000</td>
<td>$20,000,000</td>
<td>$20,000,000</td>
</tr>
<tr>
<td><strong>Total Revenues</strong></td>
<td>$61,400,000</td>
<td>$61,400,000</td>
<td>$61,400,000</td>
</tr>
</tbody>
</table>

| **Costs to Community Sites:** |              |              |              |
| Preceptor Time (Estimated)  | $134,070,397 | $67,035,199  | $44,690,132  |
| Indirect Costs (Estimated) | $33,517,599  | $16,758,800  | $11,172,533  |
| Resident Contracts         | $54,000,000  | $54,000,000  | $54,000,000  |
| **Total Costs**            | $221,587,997 | $137,793,998 | $109,862,666 |

| **Unfunded Community Costs** |              |              |              |
| $ (160,187,997)             | $(76,393,998) | $(48,462,666) |

Note: This summary provides bookends for talking about the unfunded cost of community preceptor education of U of M health professional students and residents.
The National Center: A New Model for Public-Private Partnership

The National Center for Interprofessional Practice and Education is supported by a Health Resources and Services Administration $4M, five year Cooperative Agreement Award.

In addition, the Josiah Macy Jr. Foundation, the Robert Wood Johnson Foundation, the Gordon and Betty Moore Foundation, and the John A. Hartford Foundation have collectively committed up to $8.1 million in grants over five years to support and guide the center.
National Center Purpose

A coordinating center for interprofessional education and collaborative practice will provide leadership, scholarship, evidence, coordination and national visibility to advance interprofessional education and practice as a viable and efficient health care delivery model.
Trends in Healthcare Creating Need for Redesign of Education and Clinical Practice

1. From uninsured to insured; increased access and demand
2. From non-integrated to integrated care delivery systems
3. From independent to employed providers
4. From fee-for-service to new financial models and payment systems
5. Transitioning emphasis from disease to health
6. From autonomous providers to interprofessional teams
Interprofessional Education and Collaborative Practice

Interprofessional education “occurs when two or more professions learn about, from, and with each other to enable effective collaboration and improve health outcomes.”

Interprofessional (or collaborative) care/practice “occurs when multiple health workers from different professional backgrounds provide comprehensive health services by working with patients, their families, carers (caregivers), and communities to deliver the highest quality of care across settings.”

Health Reform in Minnesota

By the numbers

• 282 Certified Health Care Homes
• 3 Pioneer Accountable Care Organizations (ACO)
• 1 Federally Qualified Health Center ACO
• 30+ Center for Medicare and Medicaid Innovation (“CMMI) Grant Proposals, 4 Awarded
• Accountable Health Communities: +$40M CMMI State Innovations Model Program
The Nexus

Creating the Transformational Nexus for Health

Improved Health and Community Outcomes
National Aims / Triple Aim

The Nexus:
Collaborative linking of academia and the practice of health care.

Team-based Care

Health Professions Education
Orientation and essential skills

Senior Leadership

Faculty, Clinicians, and Practitioners
Operations

Practice Community
Evolving integrated health systems
The National Center Vision

Our Goals:

a. Improved quality of experience for people, families, communities and learners
b. Shared responsibility for achieving health outcomes and improving education
c. Reduced cost and added value in health care delivery and education
Who are the members of an Interprofessional Team?

Teams are organized for optimal health outcomes. Members can include:

- Bioethicists
- Dentistry
- Health Coaches
- Informaticists
- Integrated Health
- Medicine
- Nursing (advanced practice and undergraduate)
- Occupational therapy
- Pharmacy
- Physical Therapy
- Public Health
- Social Work
- and many more
National Center Signature Efforts

Engaging leaders and learners to coordinate and share expert guidance and advance new thinking.

Creating evidence through evaluation, informatics, scholarship and research in the field of interprofessional practice and education.

Advancing new models of practice and education through the Nexus Innovations Incubator, a learning laboratory.

Connecting stakeholders through resources and services to connect stakeholders and advance the field.

Ensuring a long-term commitment to interprofessional practice and education models through sustainability strategies.
School of Nursing
School of Nursing Distinctions

• Ranked 19th in NIH funding among schools of nursing nationally.

• Ranked 21st by US News and World Report, among 400+ graduate schools of nursing nationally.

• Doctor of Nursing Practice ("DNP") program first launched in 2007 is now one of the largest programs in the country.

• DNP specialties in public health nursing and midwifery ranked 4th and 6th respectively by US News and World Report.

• Prepare more than 50% of all advanced practice nurses who teach and practice in Minnesota.
School of Nursing Distinctions

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- Doctor of Nursing Practice ("DNP") program first launched in 2007 is now one of the largest programs in the country.


- Prepare more than 50% of all advanced practice nurses who teach and practice in Minnesota.
• Nurses should practice to the full extent of their education and training.

• Nurses should achieve higher levels of education and training. Eighty percent of RNs should hold a Bachelor of Science in Nursing by 2020.

• Number of doctorally-prepared nurses should double (from 2010 to 2020). Nurses should be full partners, with physicians and other health care professionals, in redesigning health care in the United States.

• Effective workforce planning and policy making require better data collection and information infrastructure.
## Entering Class Size
### Health Professions Programs

<table>
<thead>
<tr>
<th>School</th>
<th>2000</th>
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<th>2013</th>
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<td>76</td>
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<td>30%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## School of Nursing Students

<table>
<thead>
<tr>
<th>Degree Program</th>
<th>Enrollment Fall 2013</th>
<th>Graduates 2012/2013 Academic Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Science in Nursing (for RN)</td>
<td>395</td>
<td>123</td>
</tr>
<tr>
<td>Masters in Nursing (for RN)</td>
<td>127</td>
<td>60</td>
</tr>
<tr>
<td>Doctor of Nursing Practice</td>
<td>275</td>
<td>102</td>
</tr>
<tr>
<td>PhD in Nursing</td>
<td>44</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>899</td>
<td>291</td>
</tr>
</tbody>
</table>
School of Nursing Growth

- One of six schools of nursing selected nationally to partner with local Veterans Health Systems to expand nursing education.
- Master’s in Nursing started in 2003 and now admits 64 students per year.
- System campus recruiting partnerships with Morris, Rochester, Duluth.
- In discussions with U of M Crookston.
• Started in 2007

• First DNP in Minnesota and among the first in the country

• Three-year full-time requiring total of 1,600 clinical hours

• 13 specialties

• Family Nurse Practitioner
• Pediatric Nurse Practitioner
• Women's Health Nurse Practitioner
• Adult/Gerontological Nurse Practitioner
• Psychiatric/Mental Health Nurse Practitioner
• Certified Nurse Midwife
• Pediatric Clinical Nurse Specialist
• Adult/Gerontological Clinical Nurse Specialists
• Nurse Anesthetist

• Public Health Nursing
• Health Innovation and Leadership
• Integrative Health and Healing
• Nursing Informatics
$10 Million Bentson Gift will Enable Growth in the DNP Program
Advanced Practice Registered Nurses (APRNs)

- RNs who have:
  - Completed an advanced graduate-level education program (MS or DNP)
  - Passed a national certification examination in order to practice as
    - Clinical Nurse Specialist (CNS)
    - Nurse Anesthetist (CRNA)
    - Nurse Midwife (CNM)
    - Nurse Practitioner (CNP)

- Have advanced knowledge and skills to:
  - Deliver safe, effective patient care
  - Diagnose and treat health problems
  - Prescribe medications and perform procedures
  - Order and interpret laboratory tests
  - Provide health promotion and prevention counseling
  - Coordinate care, refer patients to other health care providers, and advocate for patients in the complex health care environment.
## Advanced Practice Nursing in Minnesota

- Licensed RNs – 115,820
- Licensed RNs with APRN Certification

<table>
<thead>
<tr>
<th>APRN Role</th>
<th>Number</th>
<th>(5.3% of licensed RNs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Nurse Practitioners</td>
<td>3,658</td>
<td></td>
</tr>
<tr>
<td>Certified Registered Nurse Anesthetists</td>
<td>1,680</td>
<td></td>
</tr>
<tr>
<td>Clinical Nurse Specialists</td>
<td>544</td>
<td></td>
</tr>
<tr>
<td>Certified Nurse Midwives</td>
<td>281</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6,163</td>
<td>(5.3% of licensed RNs)</td>
</tr>
</tbody>
</table>

MN Board of Nursing data, November 2013
Strengths-Based APRN & Physician Utilization Model

- Dx. & Mgmt. of Acute Episodic Minor Conditions
- Dx. of pt. with diagnostic dilemma
- Mgmt. complex co-morbid conditions
- Unstable chronic condition
- Surgery, complex procedures
- Management of stable chronic condition
- Socially high risk, vulnerable populations
- Physiologic birth, health prevention/promotion
- End of life care/symptom management

M. Chesney c. 2013
Health Professional Shortage Area-HPSA

Anesthesia Practice by County

MN Rational Service Areas - Mental Health Geographic HPSA Designations

Source: Minnesota Department of Health
Office of Rural Health, May 2017
MN HPSA designations 6_2011.mxd

University of Minnesota
Driven to Discover
Workforce & Employment Outlook

• National shortage of 91,500 physicians by 2020 including 45,400 primary care and 46,100 specialists. (AAMC)

• 128 Primary care HPSAs and 41 Mental Health HPSAs in Minnesota

• Trends - increasing use of Nurse Practitioners and Physician Assistants as hospitalists and emergency department coverage

• 17% of MN’s population in rural areas; 10-11% of Primary Care Provider workforce in rural areas (MDH, Sep 2013)
Evidence suggests greater patient access in states with less restrictive APRN environments

Autonomous APRN practice states more likely to have APRNs practicing in rural, underserved areas (Skillman et al., 2012)

“By 2010 states with the least restrictive regulations of nurse practitioner practice had a 2.5-fold greater likelihood of patients’ receiving their primary care from Nurse Practitioners than did the most restrictive states” (Kuo, Loresto, Rounds, & Goodwin, 2013)

Nurse-managed health centers could mitigate expected primary care physician shortage (Auerbach et al., 2013)
Workforce & Employment Outlook

- Minnesota nurse practitioners intent to stop practicing in the next 5 years (MDH, Sep 2013):

<table>
<thead>
<tr>
<th>Age</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>34 and Younger</td>
<td>19</td>
</tr>
<tr>
<td>35 to 44</td>
<td>7</td>
</tr>
<tr>
<td>45 to 54</td>
<td>4</td>
</tr>
<tr>
<td>55 and Over</td>
<td>31</td>
</tr>
</tbody>
</table>
PROFESSIONAL EDUCATION

Health Education

Health professional education occurs primarily through the Academic Health Center (School of Dentistry, Medical School, School of Nursing, College of Pharmacy, School of Public Health, College of Veterinary Medicine, and Center for Allied Health Programs) and associated centers, programs, and support services. There are 13 health professional degree programs on the Twin Cities, Duluth, and Rochester campuses that enroll students at the bachelor’s, master’s, and doctoral degree levels (Table 3-18). The University, in collaboration with its affiliated health systems, also trains over 1,200 medical, dental, and pharmacy primary care and specialty residents each year.

Each health professions program experienced net enrollment gains over the past five-year period, with the most significant gains occurring in the School of Nursing, the College of Veterinary Medicine, and the School of Public Health (Figure 3-DD). The School of Nursing enrollment gains are due to growth in the Master of Nursing program and the establishment of the Doctor of Nursing practice program. Growth in the Master of Health Care Administration program

<table>
<thead>
<tr>
<th>Program</th>
<th>UMN School</th>
<th>Degree Awarded</th>
<th>Campus</th>
<th>Fall 2012 Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Hygiene</td>
<td>School of Dentistry</td>
<td>B.S.</td>
<td>Twin Cities</td>
<td>44</td>
</tr>
<tr>
<td>Dental Surgery</td>
<td></td>
<td>M.D.H.</td>
<td>Twin Cities</td>
<td>11</td>
</tr>
<tr>
<td>Dental Therapy</td>
<td></td>
<td>D.D.S.</td>
<td>Twin Cities</td>
<td>413</td>
</tr>
<tr>
<td>Medicine</td>
<td>Medical School</td>
<td>M.D.</td>
<td>Duluth, Twin Cities</td>
<td>959</td>
</tr>
<tr>
<td>Mortuary Science</td>
<td></td>
<td>B.S.</td>
<td>Twin Cities</td>
<td>57</td>
</tr>
<tr>
<td>Physical Therapy</td>
<td></td>
<td>D.P.T.</td>
<td>Twin Cities</td>
<td>150</td>
</tr>
<tr>
<td>Nursing</td>
<td>School of Nursing</td>
<td>B.S.N.</td>
<td>Rochester, Twin Cities</td>
<td>378</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M.N.</td>
<td>Twin Cities</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D.N.P.</td>
<td>Twin Cities</td>
<td>322</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>College of Pharmacy</td>
<td>Pharm.D.</td>
<td>Duluth, Twin Cities</td>
<td>441</td>
</tr>
<tr>
<td>Public Health</td>
<td>School of Public Health</td>
<td>M.P.H.</td>
<td>Twin Cities</td>
<td>402</td>
</tr>
<tr>
<td>Healthcare Admin</td>
<td></td>
<td>M.H.A.</td>
<td>Twin Cities</td>
<td>143</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>Center for Allied Health Programs</td>
<td>M.O.T.</td>
<td>Rochester, Twin Cities</td>
<td>92</td>
</tr>
<tr>
<td>Clinical Lab Sciences</td>
<td></td>
<td>B.S.</td>
<td>Rochester, Twin Cities</td>
<td>113</td>
</tr>
<tr>
<td>Veterinary Medicine</td>
<td>College of Veterinary Medicine</td>
<td>D.V.M.</td>
<td>Twin Cities</td>
<td>398</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>4,058</td>
</tr>
</tbody>
</table>

Source: Academic Health Center, University of Minnesota
contributed to the gain in the School of Public Health enrollment and planned, incremental class size increases in the College of Veterinary Medicine have raised its enrollment over the past five-year period.

The health professions programs remain in strong demand with the Twin Cities campus Medical School showing the greatest number of applications (Table 3-19).

In 2012, there were 1,276 health professional degrees granted by the University—up from 1,197 in 2011 (Table 3-20). Academic Health Center (AHC) programs currently train nearly 70 percent of Minnesota's health care workforce and sponsor the state's only pharmacy, dentistry, and veterinary medicine programs.

Recent data show that the AHC trains:

- 79 percent of the state's dentists
- 55 percent of the state's advance practice nurses and nursing faculty
- 66 percent of the state's pharmacists
- 80 percent of the state's medical school graduates

Graduation rates in the health professions programs are quite high. As illustrated in Figure 3-EE, the graduation rates of all of the 2008 matriculating classes across the health programs exceed 80 percent.

### Table 3-19. Fall 2012 Enrollment in Health Professional Degree Programs, all campuses

<table>
<thead>
<tr>
<th>Program</th>
<th>Applications</th>
<th>Offers</th>
<th>Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Lab Science B.S.</td>
<td>236</td>
<td>58</td>
<td>55</td>
</tr>
<tr>
<td>Dental Therapy B.S.D.T &amp; M.D.T</td>
<td>28</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Dental Hygiene B.S.</td>
<td>129</td>
<td>23</td>
<td>21</td>
</tr>
<tr>
<td>Dentistry D.D.S.</td>
<td>1,198</td>
<td>187</td>
<td>98</td>
</tr>
<tr>
<td>Medicine-Duluth</td>
<td>1,487</td>
<td>87</td>
<td>60</td>
</tr>
<tr>
<td>Medicine-Twin Cities</td>
<td>3,669</td>
<td>298</td>
<td>170</td>
</tr>
<tr>
<td>Nursing B.S.N.</td>
<td>705</td>
<td>144</td>
<td>128</td>
</tr>
<tr>
<td>Doctor of Nursing Practice</td>
<td>141</td>
<td>88</td>
<td>77</td>
</tr>
<tr>
<td>Master of Nursing</td>
<td>305</td>
<td>67</td>
<td>62</td>
</tr>
<tr>
<td>Master of Occupational Therapy</td>
<td>471</td>
<td>88</td>
<td>48</td>
</tr>
<tr>
<td>Pharm.D.</td>
<td>674</td>
<td>122</td>
<td>107</td>
</tr>
<tr>
<td>Master of Public Health</td>
<td>1,014</td>
<td>521</td>
<td>174</td>
</tr>
<tr>
<td>Veterinary Medicine D.V.M.</td>
<td>948</td>
<td>193</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11,005</strong></td>
<td><strong>1,887</strong></td>
<td><strong>1,110</strong></td>
</tr>
</tbody>
</table>
Table 3-20. Health professional degrees awarded, all campuses, 2012

<table>
<thead>
<tr>
<th>Program</th>
<th>UMN/School</th>
<th>Degree Awarded</th>
<th>Campus</th>
<th>Number Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Hygiene</td>
<td>School of Dentistry</td>
<td>B.S.</td>
<td>Twin Cities</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M.D.H.</td>
<td>Twin Cities</td>
<td>4</td>
</tr>
<tr>
<td>Dental Surgery</td>
<td></td>
<td>D.D.S.</td>
<td>Twin Cities</td>
<td>109</td>
</tr>
<tr>
<td>Dental Therapy</td>
<td></td>
<td>B.S.D.T., M.D.T.</td>
<td>Twin Cities</td>
<td>9</td>
</tr>
<tr>
<td>Medicine</td>
<td>Medical School</td>
<td>M.D.</td>
<td>Duluth, Twin Cities</td>
<td>217</td>
</tr>
<tr>
<td>Mortuary Science</td>
<td></td>
<td>B.S.</td>
<td>Twin Cities</td>
<td>33</td>
</tr>
<tr>
<td>Physical Therapy</td>
<td></td>
<td>D.P.T.</td>
<td>Twin Cities</td>
<td>45</td>
</tr>
<tr>
<td>Nursing</td>
<td>School of Nursing</td>
<td>B.S.N.</td>
<td>Rochester, Twin Cities</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M.N.</td>
<td>Twin Cities</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D.N.P.</td>
<td>Twin Cities</td>
<td>58</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>College of Pharmacy</td>
<td>Pharm.D.</td>
<td>Duluth, Twin Cities</td>
<td>157</td>
</tr>
<tr>
<td>Public Health</td>
<td>School of Public Health</td>
<td>M.P.H.</td>
<td>Twin Cities</td>
<td>180</td>
</tr>
<tr>
<td>Healthcare Admin</td>
<td></td>
<td>M.H.A.</td>
<td>Twin Cities</td>
<td>74</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>Center for Allied Health Programs</td>
<td>M.O.T.</td>
<td>Rochester, Twin Cities</td>
<td>39</td>
</tr>
<tr>
<td>Clinical Lab Sciences</td>
<td></td>
<td>B.S.</td>
<td>Rochester, Twin Cities</td>
<td>49</td>
</tr>
<tr>
<td>Veterinary Medicine</td>
<td>College of Veterinary Medicine</td>
<td>D.V.M.</td>
<td>Twin Cities</td>
<td>89</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>1,276</td>
</tr>
</tbody>
</table>

Source: Academic Health Center, University of Minnesota

Figure 3-EE. Graduation rates for 2008 cohort

Source: Academic Health Center, University of Minnesota
More than half of the 2012 graduates in selected health professions programs indicated they used loans to finance their education. A majority of all students at the health professional doctorate level supported their education with loans (Table 3-21).

The health profession schools and programs strive to foster learning environments where differences are valued and learners are trained to be culturally competent professionals prepared to meet the needs of populations served. This requires active recruitment and retention of students, faculty, and staff from underrepresented groups and from programs designed to increase diversity in the healthcare workforce. Racial, ethnic, and gender distributions (respectively) of health professions students over the past five years are illustrated in Table 3-22 and Figure 3-FF. The racial, ethnic, and gender statistics have remained constant during the five-year period.

In 2012, 169 (20.3 percent) of the 832 students enrolled in the Medical School self-identified as multicultural.

The Duluth campus of the Medical School is ranked second in the nation for enrolling and graduating Native American students. The 2012 BSN degree students within the School of Nursing comprised 378 students, 74 (18.6 percent) of whom self-identified as American Indian, Asian, Black, Hawaiian, Hispanic, or international. Of the 478 students enrolled in the School of Dentistry programs (dental, dental hygiene,

![Figure 3-FF. Health professional students by gender, all campuses, 2008-12](image)

Source: Academic Health Center, University of Minnesota

**Table 3-21. Health professional student loans, all campuses, 2012**

<table>
<thead>
<tr>
<th>Program</th>
<th>Number of Graduates</th>
<th>% with Loans</th>
<th>Average Loan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor of Dental Surgery (D.D.S.)</td>
<td>109</td>
<td>84.4%</td>
<td>$208,005</td>
</tr>
<tr>
<td>Medical Doctor (M.D.)</td>
<td>217</td>
<td>90.8%</td>
<td>$158,125</td>
</tr>
<tr>
<td>Doctor of Pharmacy (Pharm.D.)</td>
<td>157</td>
<td>94.3%</td>
<td>$133,490</td>
</tr>
<tr>
<td>Master of Nursing (M.N.)</td>
<td>66</td>
<td>92.4%</td>
<td>$48,506</td>
</tr>
<tr>
<td>Bachelor of Science in Dental Hygiene (B.S.)</td>
<td>23</td>
<td>91.3%</td>
<td>$33,137</td>
</tr>
<tr>
<td>Doctor of Nursing Practice (D.N.P.)</td>
<td>58</td>
<td>58.6%</td>
<td>$48,733</td>
</tr>
<tr>
<td>Bachelor of Science in Nursing (B.S.N.)</td>
<td>124</td>
<td>71.8%</td>
<td>$34,239</td>
</tr>
</tbody>
</table>

Source: Academic Health Center, University of Minnesota

**Table 3-22. Racial and ethnic diversity in health professional programs, all campuses, 2008-12**

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian</td>
<td>1.5%</td>
<td>1.6%</td>
<td>1.8%</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Asian/Pacific/Hawaiian</td>
<td>7.2%</td>
<td>7.0%</td>
<td>7.4%</td>
<td>7.2%</td>
<td>8.0%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>4.1%</td>
<td>4.3%</td>
<td>4.1%</td>
<td>3.6%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Chicano/Latino</td>
<td>2.0%</td>
<td>2.2%</td>
<td>2.2%</td>
<td>1.8%</td>
<td>1.6%</td>
</tr>
<tr>
<td>International</td>
<td>2.3%</td>
<td>2.1%</td>
<td>2.3%</td>
<td>2.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>White</td>
<td>75.9%</td>
<td>78.5%</td>
<td>76.4%</td>
<td>73.6%</td>
<td>72.0%</td>
</tr>
<tr>
<td>Unknown</td>
<td>6.0%</td>
<td>4.3%</td>
<td>5.8%</td>
<td>9.8%</td>
<td>10.8%</td>
</tr>
</tbody>
</table>

Source: Academic Health Center, University of Minnesota
and dental therapy), 96 (or 20.1 percent) self-identified as multicultural. In the College of Pharmacy, 100 (or 22.7 percent) of the 441 students self-identify as international, African American, American Indian, Asian, or Hispanic. In the Clinical Laboratory Sciences program, the student enrollment in 2012 comprised 46.4 percent black/African American, Asian, Latino and Hispanic, and Pacific Islander ethnicities.

The University offers a number of workforce pipeline programs to promote health careers in underrepresented groups and increase diversity in the health professions. The Health Careers Center (HCC) offers a variety of resources and events for high school students and undergraduates at the University. It also has a partnership with the Office of Undergraduate Admissions to host prospective students and their families twice weekly to learn about educational choices in the Academic Health Center. Services include high-quality, well-informed, in-person meetings with pre-health students and career changers. An estimated 7,000 to 10,000 pre-health students and their families meet with or attend an HCC event or course each year. The Health Careers Center hosted over 2,500 students in the high school visit program for 2012. In 2012, over 9,800 K-12 students participated in 42 Minnesota Area Health Education Center Network health careers exploration programs throughout Minnesota.

Minnesota’s Future Doctors (MFD) is a multi-year program designed to provide opportunities for Minnesota residents—those who are economically disadvantaged, members of a group underrepresented in medicine, or from a rural background—to prepare to apply to medical school. MFD students demonstrate high academic potential and are the first ones in their families to attend college. To date, the program has admitted a total of 324 scholars. Of those, 235 have decided to continue pursuit of a career in medicine. At this point, 77 of those scholars have been accepted into medical school and the remaining 158 plan to apply in the near future.

The School of Dentistry offers the Saturday Academy, which is designed to encourage science-based careers and an interest in dentistry among high school students from underserved communities. Now in its second year, participants are partnered with dental students and spend 20 Saturdays taking science and math classes as well as participating in hands-on dentistry-related activities at the School of Dentistry. The Summer Dental School Experience offers disadvantaged undergraduate students science review classes, Dental Admission Test (DAT) preparation, hands-on experiences in dental simulation, and health disparities sessions that culminate in a poster presentation to students, faculty, and staff.

The University’s health profession programs provide a critical infrastructure to healthcare in Minnesota as a pipeline for workforce development and biomedical research. The programs also generate significant economic impact.

- **Workforce development:** The University educates and trains nearly 70 percent of the health professionals in Minnesota in cooperation with a network of major affiliates, including Hennepin County Medical Center, the Minneapolis Veterans Affairs Health Care System, Regions Hospital, Children’s Hospitals and Clinics, and a major partner, Fairview Health Services.

- **Health impact:** Health profession students are trained in over 1,500 healthcare delivery sites throughout Minnesota, with many sites in rural or underserved communities. Throughout the clinics and hospital sites, AHC health professionals see more than one million patients each year.

- **Economic impact:** Every $1 million in federal grant money that the AHC receives generates more than $2 million in new business activity in Minnesota.

- **Research impact:** The AHC faculty oversee more than $400 million in research grants each year, accounting for half of the University’s entire research portfolio.

The Academic Health Center is nationally recognized for developing new models of interprofessional practice and education that will have profound health benefits. In September 2012, the U.S. Department of Health and Human Services Secretary Kathleen Sebelius announced that the University of Minnesota was designated the nation’s sole coordinating center for interprofessional education and collaborative practice after a peer-reviewed competitive process. Now named the National Center for Interprofessional Practice and Education, this $12M public-private partnership between the Health Resources and
Services Administration and four private foundations leads, coordinates, and studies the advancement of collaborative, team-based health professions education and patient care as an efficient model for improving quality, outcomes, and cost. It is the sole center to provide leadership, scholarship, evidence, coordination, and national visibility to advance interprofessional education and practice as a viable and efficient health care delivery model. By aligning the needs and interests of education with health care practice, the National Center aims to create a new shared responsibility for better care, added value, and healthier communities.

The National Center’s efforts are grounded in nine interdependent goals intended to enhance interprofessional education and collaborative practice, as outlined by Health Resources and Services Administration (HRSA):

1) Provide unbiased, expert guidance to the health care community on issues related to Interprofessional Education and Collaborative Practice (IPECP);

2) Provide supporting evidence to build the case for IPECP as an effective care delivery model to engage patients, families, and communities in their own healthcare;

3) Identify exemplary IPECP environments to serve as training sites where IPECP competencies can be modeled, learned, and practiced;

4) Prepare academic and practice faculty and preceptors to teach interprofessional competence through curriculum development and ongoing quality improvement activities;

5) Collect, analyze, and disseminate data metrics to assess the effectiveness of IPECP models;

6) Coordinate IPECP scholarly, evaluation, and dissemination efforts to share innovative, evidence-based, best-practice IPECP models;

7) Evaluate the impact of team-based care on patient, family, and community health and healthcare outcomes;

8) Develop new, and support and/or enhance existing, team-based IPECP programs across the US; and

9) Convene and engage IPECP thought leaders, educators, practitioners, and policy-makers to build consensus and bring national attention to IPECP agenda.

Center initiatives at the national, state, and local levels are underway. Numerous national and state organizations have approached National Center leadership for engagement and presentations including: Josiah Macy Jr. Foundation, Robert Wood Johnson Foundation, Gordon and Betty Moore Foundation, John A. Hartford Foundation, Office of Senator Al Franken, Office of Congressman Collin Peterson, Office of Congressman Keith Ellison, Office of Congresswoman Betty McCollum, U.S. Department of Veterans Affairs, American Medical Association, IBM Corporation, and the Institute for Health Care Improvement. The center’s director and deputy director were invited to the White House Health Policy Meeting in fall 2012.

The work of the National Center will further advance the existing work in interprofessional education and practice occurring throughout the health professions programs at the University. The work of the National Center is grounded in the Minnesota 2008 health care reform legislation and the relationship with the Academic Health Center programs. The rapidly changing delivery environment in Minnesota and the nation challenges health professions education to match pace.

An emerging effort in Minnesota, “The Minnesota Nexus,” is the learning laboratory for National Center concepts and ideas. It is the interface created between key stakeholders and the University of Minnesota to better align the transformational changes in care delivery with the challenges of educating and training the next generation of health professionals. The state’s health systems leaders, policymakers, and educators perceive a gap between what health care education provides and the needs of patients, families, and communities. To address this gap, in September 2012 representatives from the University, Minnesota health systems, and other key stakeholders gathered to identify issues and priorities and develop action plans for educating and training health professionals to practice collaboratively. The idea for The Minnesota Nexus emerged from that meeting and will serve to lead the nation as a living laboratory for the National Center for Interprofessional Practice and Education.

With rapid changes in the healthcare landscape the health professions programs strive to create learning
environments and experiences to best prepare students for practice in integrated delivery systems. In early 2013 the School of Nursing opened the Bentson Healthy Communities Innovation Center. This 11,000-square-foot center comprises a suite of rooms that simulate nursing care environments across the continuum of healthcare including:

- A home with a kitchen and a family room equipped with large digital screen for practicing health care from a distance, using the center’s telehealth technology;
- A room in an extended care facility that features a ceiling-mounted patient lift and state-of-the-art beds with built-in scales;
- A large ward room, where pre-licensure students use mannequins to learn basic nursing interventions like taking vital signs and performing IV therapy;
- An ICU simulation room, where students can practice managing a critically ill patient; and
- Three fully equipped clinic rooms.

Designed with guidance from an interdisciplinary group of healthcare and design professionals, the simulation center features 38 remotely controlled video cameras, interactive video conferencing capability, and a medication-dispensing technology room. The center will provide students with unprecedented opportunities to engage in complex simulated health scenarios in interprofessional teams, use sophisticated telehealth technology, and learn emerging health records technology. Students work with sophisticated, remotely-controlled mannequins that simulate patient conditions and responses to nursing interventions and treatments; these interactions can be recorded for later review and can help identify areas for improvement.

The School of Nursing enrolls nearly 900 undergraduate and graduate students each year and prepares 55 percent of the state’s advanced practice nurses.

The Bentson Center’s name honors the Bentson Foundation’s lead gift of $3.7 million toward the $7.8 million project.
Transforming Patient Care:
Aligning Interprofessional Education
with Clinical Practice Redesign

Rapid redesign of healthcare delivery, stimulated in part by the Affordable Care Act, is occurring alongside, but independently of, health professions educational reform. On the delivery side, change is being driven by three simultaneous aims: improving the patient’s experience of care, improving the health of individuals and populations, and reducing the per capita cost of health care (the “Triple Aim”). On the education side, there is growing awareness of the importance of achieving team-based clinical competencies as an essential public good. Key to these efforts is the recognition that health care today involves professionals working together in collaborative, interdependent care systems and in partnership with the people served by these systems.

Missing from these many laudatory and innovative efforts is the ability to connect practice redesign with interprofessional educational reforms. Historically, health professions education and healthcare practice have developed and functioned separately, with little recognition that the two are inextricably linked.

In recent years, the Josiah Macy Jr. Foundation has promoted change in health professions education, focusing particularly on interprofessional education. This work is based on the belief that healthcare professionals who learn about, from, and with each other will be more likely to develop the competencies needed to work effectively together to care for patients and communities. The Foundation believes that this educational reform effort must be coordinated with related efforts to redesign healthcare delivery to be team-based and responsive to individual, family, and community needs. The two realms should not be changed in isolation. Educational reform must incorporate practice redesign, and delivery system change must include a central educational mission if we are to achieve enduring transformation.

Making this important linkage between interprofessional education and collaborative practice will create an environment within which all participants learn, all teach, all care, and all collaborate. It invites recognition that better outcomes for individuals and populations; better
quality, safety, and value within healthcare systems; and better education, training, and life-long professional development of healthcare workers are all connected. It also expresses the responsibility of all healthcare professionals to meet the needs of the individuals, families, and communities they serve as their highest goal, by developing and sustaining a culture of mutual respect between and among the different health professions.

In January 2013, the Foundation brought leaders in health professions education and healthcare delivery together to discuss how they might align their efforts to connect great learning and great practice. Conference participants discussed a commissioned paper that lays out a vision for a high-functioning healthcare system with empowered patients and engaged teams of practitioners and learners. They also discussed case studies featuring interprofessional education and collaborative practice efforts currently underway.

During the conference, participants reached a consensus vision for the joint future of healthcare education and practice: We envision a healthcare system in which learners and practitioners across the professions are working collaboratively with patients, families, and communities and with each other to accomplish the Triple Aim. Participants agreed that this vision is achievable if all sectors of the education and practice communities work together with mutual respect and professionalism.

Based on this shared vision, conference participants crafted recommendations for immediate action in five areas:

1. Engage patients, families, and communities in the design, implementation, improvement, and evaluation of efforts to link interprofessional education and collaborative practice.

2. Accelerate the design, implementation, and evaluation of innovative models linking interprofessional education and collaborative practice.

3. Reform the education and life-long career development of health professionals to incorporate interprofessional learning and team-based care.

4. Revise professional regulatory standards and practices to permit and promote innovation in interprofessional education and collaborative practice.

5. Realign existing resources to establish and sustain the linkage between interprofessional education and collaborative practice.

The recommendations in each of these areas are presented below. They are interdependent and of equal importance; each one necessitates the others. While many more recommendations to improve the education and practice of health professionals were proposed and considered during the conference, we present only those that are directly related to achieving the linkage of interprofessional education and practice.

We do not underestimate the magnitude of the change in culture that will be required to accomplish all of these recommendations. However, conference participants agreed that these steps must be taken if we are to achieve the Triple Aim of better care, better health, and lower costs.

Furthermore, because of the rapid changes already taking place and the constraints on further growth in healthcare costs, there is great urgency in meeting this need. While full implementation of these changes will involve actions beyond the scope of each educational institution or healthcare system, much can be accomplished today at the local level by the engagement of educational and healthcare delivery leaders in the spirit of this report. We urge everyone in a position of responsibility to take steps within their own areas of jurisdiction now, while also participating in the more general recommendations outlined.
Recommendation I

Engage patients, families, and communities in the design, implementation, improvement, and evaluation of efforts to link interprofessional education and collaborative practice.

If the alignment of education and practice is to be successful, it must be informed by the needs and preferences of the patients, families, and communities served. All of us — patients, families, communities, clinicians, faculty members, students, healthcare leaders, policymakers, and society at large — are part of the same healthcare system. And we all share the benefits when our healthcare system is aligned with and responsive to individual and collective needs.

A growing body of evidence demonstrates that incorporating patient preferences contributes to higher-value health care. Value also is enhanced when patients, families, and communities assume increased responsibility for factors influencing health. Thus, the future of health care should be one in which we all learn, all teach, all care, and all collaborate at every level of the healthcare system — from the development of policies to the daily interactions of patients and providers. This is a future first and foremost characterized by more engagement.

Engagement refers to deliberate and consistent efforts by all healthcare professionals and healthcare systems to advance the central role of patients, families, and communities in defining what matters to them; to promote informed and shared decision making regarding plans of care; to foster shared accountability for actions related to these plans; and to assure reciprocal and respectful relationships. The ultimate goal is to assure that patient, family, and community perspectives inform system-level design of health professions education and patient care. Achieving this goal will require changing expectations for health professional competencies, accreditation standards, and the measurements used to gauge success.

1. **Convene a national group to identify effective methods for patient, family, and community engagement in the design and evaluation of models linking interprofessional education and collaborative practice.**

A public-private partnership of federal agencies and private foundations would be the ideal convener. The group’s deliberations will be informed by the existing work of the Institute for Patient-and Family-Centered Care, the Centers for Medicare and Medicaid Partnership for Patients, the Institute for Healthcare Improvement, the Patient-Centered Outcomes Research Institute, and local and national healthcare systems with experience in team-based care, such as the Geisinger Health System and the Veterans Health Administration. The group would engage educational institutions, healthcare systems, professional associations, and regulatory organizations in disseminating its results.

2. **Ensure that expectations of patients, families, and communities inform the competencies used to guide the development of new models linking collaborative practice and interprofessional education.**

Over the past decade, much effort has gone into the delineation of the professional competencies needed to achieve the Institute of Medicine’s aims for health care: safe, timely, effective, efficient, equitable, and patient-centered. More recently, the Interprofessional Education Collaborative has defined the competencies most relevant to interprofessional learning and team-based care. Although the competencies reflect considerable professional wisdom, they should be further informed by
patient, family, and community needs and expectations.

3. **Revise accreditation standards to ensure input from patients, families, and communities.**

Evidence that patient, family, and community voices influence the design, implementation, evaluation, and continuous improvement of systems of learning and care should be a prerequisite for successful accreditation. Accrediting bodies for education and healthcare should revise their policies to incorporate standards of patient, family, and community engagement.

**Recommendation II**

Accelerate the design, implementation, and evaluation of innovative models linking interprofessional education and collaborative practice.

Innovators already are designing new models linking interprofessional education and collaborative practice. In order to achieve widespread alignment of education and practice redesign, many more approaches must be developed. Robust evaluation tools that can be used to link successful models to improved outcomes and to accelerate the spread of those models also are needed.

These early models should be classified on the basis of their key attributes, learning impact, patient and population health outcomes, and effects on healthcare costs. Successful models could then serve as prototypes for launching and testing additional models. Lessons learned should be rapidly disseminated, so that progressively more sophisticated education-practice partnerships can be developed in the future.

Broadly based coalitions with a shared vision and a common understanding of priorities are needed to advocate for this effort. Creative approaches to patient and community engagement and explicitly designed measures for success are needed. Such coalitions must include academic health centers, large healthcare systems, community health organizations, and advocacy groups.

1. **Develop broadly based coalitions to align education and clinical practice.**

Broadly based coalitions must help inform the operational design of the education-practice interface. Private-public partnerships among government agencies and foundations can facilitate further creation of these coalitions. The National Center for Interprofessional Practice and Education is the result of such a public-private partnership. The Robert Wood Johnson Foundation’s Aligning Forces for Quality initiative also could be a force for linking interprofessional education and practice.

Among the key stakeholders for these coalitions are: patients, families, community leaders, academic health centers and other health professions schools, health systems, community health organizations, public health and social services agencies, and local chapters of health professional organizations. Students and their local and national professional organizations are powerful forces for change and should be included as well.

The National Center for Interprofessional Practice and Education will be an appropriate locus for some of this work. However, many other initiatives will be needed at the local, regional, and national levels. National professional organizations (such as the Interprofessional Education Collaborative) and national quality organizations (such as the Institute for Healthcare Improvement and National Quality Forum) should provide guidance and assistance.
2. Develop scenarios to advance alignment between interprofessional education and collaborative practice.

The scenario-building process should start with the development of a shared vision around the core values of achieving the Triple Aim through interprofessional education and collaborative practice. Because educational and practice resources will continue to be constrained, it is essential that new, creative scenarios for the education-practice interface be developed without delay. The alignment between education and practice must be explicit and interdependent, and improvement must be viewed as a shared responsibility. The goal is to build new models linking education and practice that bring real and measurable value to individual and population health.

3. Develop metrics to evaluate the impact of models linking education and practice on learning, on patient and population health, and on healthcare costs.

There is a paucity of rigorous measures to evaluate the impact of linking interprofessional education and collaborative practice. There is a need to support new scholarship in this area, including the development of evaluation protocols that go beyond process measures and identify the most effective models, tying them to the Triple Aim outcomes. There also is a need to apply known scholarship in teamwork from other fields, such as business and education, to healthcare. The Centers for Medicare and Medicaid Services, the National Institutes of Health, the Patient-Centered Outcomes Research Institute, the National Quality Forum, the Health Resources and Services Administration, and the Agency for Healthcare Research and Quality should all share an interest in supporting this work in partnership with private foundations.

Academic institutions and healthcare systems need to recognize the importance of this work in allocating resources and in promotion policies.

Recommendation III

Reform the education and lifelong career development of health professionals to incorporate interprofessional learning and team-based care.

An alliance of education and practice will only be successful if the healthcare workforce is appropriately prepared for collaborative work. This must begin with pre-licensure education and continue for a professional lifetime. Professional development must become a shared responsibility of educational institutions and healthcare delivery systems.

Increasing numbers of healthcare system leaders and policymakers have recognized that achieving the Triple Aim will require more widespread adoption of new models of interprofessional education and collaborative practice. Despite this knowledge, health professions education still inadequately values interprofessional education and learning in team-based care. To change this will require a partnership of teaching institutions and delivery systems to create learning environments and teachers that model interprofessional collaborative practice.

1. Incorporate interprofessional team-based competencies into all health professions education programs.

Adopting or modifying existing interprofessional competencies — such as those issued by the Interprofessional Education Collaborative — should be undertaken without delay. Common language and standards need to be developed and incorporated into
policies for professional certification and institutional accreditation across the health professions and across the continuum of education.

Similar work needs to be done by delivery-system accrediting bodies, such as the Joint Commission and National Committee for Quality Assurance, and incorporated into credentialing and privileging policies and procedures for hospitals, medical homes, and healthcare organizations. Competencies can be revisited periodically as better ways to enhance interprofessional learning and team performance become available.

The National Center for Interprofessional Practice and Education should work collaboratively with the Interprofessional Education Collaborative and other professional and educational organizations to build a repository of robust case studies and implementation strategies for the competencies.

2. **Expand faculty development programs to prepare health professionals for effective interprofessional learning, teaching, and practice.**

Relatively few health professions faculty have participated in interprofessional education programs. Traditionally trained educators and health professionals, whether in academic health centers or community-based settings, are generally unable to model interprofessional competencies or mentor students in collaborative work across professions.

The Macy Foundation has supported a pilot interprofessional faculty development program, and the Interprofessional Education Collaborative has hosted several faculty development institutes. Broad expansion of these types of efforts will be necessary. Cataloging best models and lessons learned should be one of the priorities of the National Center for Interprofessional Practice and Education.

3. **Incorporate interprofessional team-based competencies in performance reviews of health professionals in clinical and academic settings.**

Performance feedback should be provided with an eye to interprofessional as well as professional competence. Institutional, professional, and government licensure review processes should all incorporate interprofessional elements in their frameworks. In addition and where appropriate, faculty evaluations should include feedback from both students and patients regarding teaching of team-based competencies.

4. **Develop new models of clinical education to prepare health professionals for team-based care.**

The clinical education of health professionals is fragmented and discontinuous. Newer educational models that emphasize continuity of patient care over time and across settings should be replicated. Increasing the number of longitudinal, team-based experiences will lead to greater opportunities for students to build relationships with patients, families, teachers, and other clinicians. Wider deployment of such models would increase opportunities for interprofessional training experiences and better prepare students for team-based care.
Recommendation IV

Revise professional regulatory standards and practices to permit and promote interprofessional education and collaborative practice.

If the alignment of interprofessional education and collaborative practice is a goal of the healthcare system, then professional regulation should reflect that goal. Efficient models of care and education take advantage of significant overlaps in knowledge, skills, core commitments, accountabilities, and professional imperatives of the different health professions. Good teamwork requires team members to understand and agree upon their roles and to encourage each other to function at the highest levels of their education and training.

This currently is not always the case for all health professionals or all healthcare delivery systems. But, when these conditions are met, interprofessional clinical education is possible, and health professionals learn how to contribute their unique strengths to achieve the Triple Aim. When these conditions are not met, professionals learn to function in silos and are less likely to develop the skills needed to collaboratively improve health and health care.

1. **Revise accreditation and certification standards to eliminate barriers to efficient and effective team-based care and clinical interprofessional education.**

   Standards and policies of accrediting and certifying bodies should be revised so that they require interprofessional education and training in collaborative team-based care, promulgate policies that approve the use of interprofessional faculty members and preceptors, and allow acceptance of interprofessional continuing education courses.

   Health professionals should be able to teach students based on their areas of expertise and scopes of practice rather than simply on the basis of their professional backgrounds. Learners should be able to accrue credit towards certification and recertification based on the relevance of the learning experience to their practice, and faculty from all health professions should be able to contribute to the experience of all learners.

2. **Revise state and federal laws and regulations to eliminate barriers to efficient and effective team-based care.**

   Regulatory policies generally lag behind advances in healthcare education and clinical quality improvement methods. Legislators, governors, attorneys general, professional societies, and patient and community advocacy groups, while mindful of their obligation to protect the public, should advocate for regulatory relief so that health professionals receive appropriate training to function in interprofessional teams at the highest levels of their education and training. There is an urgent need for collaboration across the health professions to update state licensure practice acts and scope of practice regulations.

3. **Create incentives for institutional privileging policies that support linking efficient and effective team-based care and clinical interprofessional education.**

   Innovations in interprofessional education and collaborative practice — and ultimately the achievement of the Triple Aim — are often impeded by institutional decisions about professional privileges. Institutional privileging should be based on documented training, certification and licensure, and demonstrated expertise within legal scopes of practice. Restrictions that artificially limit patient (and learner) access to the full variety of health professionals qualified to provide care inhibit innovations in
team-based care and interprofessional education.

Institutions may need incentives to open up practice privileges to the full extent of applicable laws and regulations. Accreditors, such as the Joint Commission and insurers/payers, including Medicare and Medicaid, could help by requiring non-exclusionary privileging practices as a part of accreditation or insurance contracts.

Recommenation V

Realign existing resources to establish and sustain the linkage between interprofessional education and collaborative practice.

The alignment of interprofessional education and practice can take place only if current resources are reconfigured to accomplish this goal. It must become the new way of doing business to achieve the Triple Aim.

Transformation of the U.S. healthcare system will require new financial models and creatively aligned incentives. The resources available for change include financial and human assets provided by government and the private sector. These resources, which currently are widely scattered and poorly coordinated, reside in healthcare delivery systems, educational institutions, health insurance companies, private foundations, and public agencies and the communities they serve, to name but a few.

Creating an effective, efficient, and sustained linkage between interprofessional education and collaborative practice will require that all resources be brought “to the table” and shared in support of the Triple Aim. It will require the development of new incentives, including innovative payment systems, to motivate participants engaged in system redesign. And it will require training and, where necessary, retraining in systems-based practice, performance improvement, and public health — all conspicuously underrepresented in the education of most health professionals today.

Transformative change will require substantive engagement of health system executives, educational leaders, insurers, and professional organizations, as well as students and users of health services. Health system administrators and education and training program directors should be included, along with clinical professionals, patients, families, and community advocates. Together they will need to negotiate the use of resources across organizational boundaries, redirecting existing resources and identifying new resources where possible.

1. Delineate the resources presently or potentially available for supporting the linkage of interprofessional education and collaborative practice.

Understanding the resources for clinical education will be essential in determining how they might be shared more effectively in the future. At each site, this will require an environmental scan of existing and potential resources. This should include the type, source, and ownership of all relevant resources and whether and how they are being used to promote effective linkages between interprofessional education and collaborative practice.

Health system assets include delivery systems, service lines, facilities, their own education programs, contracting services, information systems, providers, administrators and support personnel, quality improvement systems, and financial resources. Educational system assets include expertise in teaching and learning, evaluation systems, research and reporting, learners in the health professions, clinical faculty expertise, affiliation networks, accreditation linkages, and financial resources. Community and public resources include primary care networks, federally
2. **Develop new models of resource sharing among organizations that integrate interprofessional education and practice.**

New models of shared governance, organizational management, and accountability must be developed, as well as new approaches to reallocating resources between practice and educational partners and across relevant health professions. New model formation is anticipated to happen predominantly at the local level, but buy-in at organizational and policy levels will be essential as well.

At the local level, educational and practice institutions will need to plan, implement, and evaluate model teams of integrated learners, including where they are deployed and what will be the expected outcomes for teams and individuals, the evaluative approaches used, and the expected impact on the Triple Aim. Within these new models, incentives for those engaged in care provision and workplace learning need to be aligned to achieve sustainability.

These efforts will need human and financial resources to promote and achieve alignment of incentives, establish sustainable decision making, and provide oversight of the education-practice interface resulting from the overlap between participating practice and educational institutions.

3. **Demonstrate a positive value proposition for linking interprofessional education and practice.**

Achieving these new models requires each institution to assess the expected value added and create a plan to achieve that value. It requires reallocating resources from programs not adding value, and providing some up-front investment that can be recovered from achieving the Triple Aim. Individual value propositions may vary, but an effective business case, including a positive return on investment and a plan for continuous improvement, is essential. Savings garnered from achieving the Triple Aim need to be reinvested in further enhancing the practice and education interface.
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The conclusions and recommendations from a Macy conference represent a consensus of the group and do not imply unanimity on every point. All conference members participated in the process, reviewed the final product, and provided input before publication. Participants are invited for their individual perspectives and broad experience and not to represent the views of any organization.

The Josiah Macy Jr. Foundation is dedicated to improving the health of the public by advancing the education and training of health professionals.
October 23, 2013

The Honorable Terri E. Bonoff
Chair, Higher Education and Workforce Development Committee
Minnesota Senate

The Honorable Gene Pelowski, Jr.
Chair, Higher Education Finance and Policy Committee
Minnesota House of Representative

Dear Senator Bonoff and Representative Pelowski:

Pursuant to Laws of Minnesota 2013, Chapter 99, Article 2, Section 27, Subdivision 1, we submit the following report on the University of Minnesota’s Medical School capacity.

As the state’s land grant institution, the University of Minnesota is committed to preparing the state’s future health professional workforce. With a mission of education, research, and service, we prepare 70% of Minnesota’s physicians, advanced practice nurses, dentists, public health professionals, pharmacists, allied health professionals, and veterinarians.

The University of Minnesota has one of the largest medical student enrollments in the country. It has one of the highest percentages nationally of students choosing primary care careers. It is known nationally for its programs to train physicians for rural practice. Over two thirds of the University’s medical students and residents stay in Minnesota to practice.

Although the demand for physicians and other health professionals is growing, the University has no plans at this time to expand its medical student enrollments. The major bottleneck is the lack of residency training positions and funding in Minnesota and nationally. Residency training, which follows graduation from medical school, is required for licensure and lasts from three to ten years, depending on the medical specialty. Resident training positions are paid principally by federal Medicare and state MERC funds. A cap on the number of training positions set by the federal government in 1997 and reduced federal and state funding for residency training programs has meant that until these issues are addressed, it makes no sense to increase medical school enrollments. There will be no place to train them.

We look forward to working with you on the serious challenges facing Minnesota in meeting the state’s health professional work force needs. Please let me know if you have any questions about the report or would like additional information.

Sincerely,

[Signature]

Aaron Friedman
Dean, Medical School
Vice President for Health Sciences

Driven to Discover™
Overview
Anticipating physician workforce needs 20 years into the future is a challenge made both more necessary and more difficult by the changing environment of health care delivery. Meaningful projections must consider a range of complex factors—and no two studies utilize the same approach or variables. In a working paper released in June 2013, the Organization for Economic Co-operation and Development analyzed 26 health workforce projection models produced by 18 member countries. The OECD found that each of the studies considered a different set of variables in producing its forecasts. The American Association of Medical Colleges recently published *Physician Workforce Projections in an Era of Health Care Reform*, a paper that defines the following factors as having the greatest influence on physician supply and demand:

**Supply =**

\[
\text{Current (physician hours)} + \text{New (graduate medical education enrollment, international medical graduates)} - \text{Exits (age, economy)} \times \text{Efficiency (teams, structure, tools)}
\]

**Demand =**

\[
\text{Population (size, demographics)} \times \text{Health (prevalence, incidence)} \times \text{Utilization (access, structure, supply)}
\]

To our knowledge, projections available to date for Minnesota take some but not all of these variables into consideration.

We provide this background to illustrate the difficulty of identifying one set of data that best illustrates the future need for physicians in Minnesota. Health workforce studies are complex, costly and reliant on assumptions. Although we consulted with the Minnesota Department of Health and the Metro Minnesota Council on Graduate Education (MMCGME) and searched the literature, we were unable to locate a single study that provided all the information requested by the legislature. In order to meet the legislature’s request, we have combined data from multiple reliable sources and made some assumptions of our own. We have taken care to clearly identify our sources, how our projections were calculated and the predictions on which our projections are based.

Our resulting projections rely on multiple assumptions (spelled out in this document). The task of drafting this response to the legislature underscores the need for a comprehensive, Minnesota-centric analysis of health care workforce needs.
The Residency Bottleneck

We appreciate the legislature’s inquiry into future physician demand. We noticed, however, that most of the questions posed by the legislature focus on medical school graduation rates without taking into consideration the number of learners we are able to accommodate in residency training. Residency, or Graduate Medical Education (GME), is the component of physician training that follows medical school. Residency training is required for licensure and lasts from three to ten years, depending on the medical specialty. The sequence of training is as follows:

<table>
<thead>
<tr>
<th>College:</th>
<th>Medical School:</th>
<th>Graduate Medical Education (GME)</th>
<th>Continuing Professional Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA or BS degree</td>
<td>MD degree</td>
<td>Postgraduate Residency (Required)</td>
<td>Fellowship (Specialty dependent)</td>
</tr>
<tr>
<td>4 years</td>
<td>4 years</td>
<td>3-5 years</td>
<td>1-5 years</td>
</tr>
<tr>
<td>Throughout career</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Resident training positions are paid principally by federal Medicare and state Medical Education and Research Cost (MERC) funds. GME looms as the bottleneck that will have the greatest impact on our ability to meet the state’s future workforce requirements.

The equation for supply on page one of this document points out that the number of residency slots is a key factor in determining the number of physicians available to meet future demand. The state could significantly increase its medical student enrollment, but without a corresponding increase in GME positions, we would not be able to provide a higher number of new clinicians. The number of GME training slots is limited by the federal 1997 Balanced Budget Act and fluctuations in federal and state financial support. In fact, Congress is currently considering significant additional reductions in funding for GME. Stable funding is essential to the success of residency training. The uncertain funding climate has long term repercussions for Minnesota’s health care workforce: a high percentage of those who complete training here remain in Minnesota to practice. 67% of Minnesota’s current active physicians completed medical school or GME training within the state; 34.7% completed medical school here; 64.6% completed GME training in Minnesota; 31.9% completed both medical school and GME training in Minnesota. According to studies nationally, most physicians practice within a 100 miles of where they did their residency training. Without a simultaneous increase in in-state residency positions, an increase in the number of students moving through our medical school would have little impact on the number of physicians available to practice in Minnesota. An increase in residency positions will require a change in GME funding formulas at the federal and state levels, however.
### Historical Data on Applications, Admissions and Matriculation

1. Provide the number of applicants seeking admission to the school for the academic term commencing in the fall of 2013 and the number admitted.

<table>
<thead>
<tr>
<th>Program</th>
<th>Number of Applicants</th>
<th>Number Admitted (Began Training)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical School, Twin Cities Campus</td>
<td>3830</td>
<td>163</td>
</tr>
<tr>
<td>Medical School, Duluth Campus</td>
<td>1674</td>
<td>60</td>
</tr>
<tr>
<td>MD/PhD program, Twin Cities Campus</td>
<td>213</td>
<td>07</td>
</tr>
<tr>
<td>TOTALS, all programs</td>
<td>5,717</td>
<td>230</td>
</tr>
</tbody>
</table>
2. Provide the number of applicants admitted to the school for each of the fall academic terms from 2000 through 2012.

Medical school enrollment has held steady for the 13 years included in the table below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Applicants</th>
<th>Number Admitted (Began Training)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MD/Twin Cities</td>
<td>MD/Duluth</td>
</tr>
<tr>
<td>2012</td>
<td>3627</td>
<td>1487</td>
</tr>
<tr>
<td>2011</td>
<td>3522</td>
<td>1279</td>
</tr>
<tr>
<td>2010</td>
<td>3338</td>
<td>1281</td>
</tr>
<tr>
<td>2009</td>
<td>3224</td>
<td>1352</td>
</tr>
<tr>
<td>2008</td>
<td>3162</td>
<td>1413</td>
</tr>
<tr>
<td>2007</td>
<td>3028</td>
<td>1330</td>
</tr>
<tr>
<td>2006</td>
<td>2493</td>
<td>1281</td>
</tr>
<tr>
<td>2005</td>
<td>2260</td>
<td>954</td>
</tr>
<tr>
<td>2004</td>
<td>2130</td>
<td>625</td>
</tr>
<tr>
<td>2003</td>
<td>1987</td>
<td>498</td>
</tr>
<tr>
<td>2002</td>
<td>1645</td>
<td>647</td>
</tr>
<tr>
<td>2001</td>
<td>1654</td>
<td>744</td>
</tr>
<tr>
<td>2000</td>
<td>1696</td>
<td>730</td>
</tr>
</tbody>
</table>
3. Provide the number of medical school graduates projected for each of the next ten years. At this time, the University of Minnesota has no plans to increase the number of medical students on either the Twin Cities or the Duluth campus, given the bottleneck in the number of available residency training slots. We anticipate that the number of medical school graduates for each of the next ten years will remain at today’s levels of 230 annually.

4. Provide the number of graduates projected to remain and practice in Minnesota after graduation for each of the next ten years. GME programs affiliated with the Metro Minnesota Council on Graduate Medical Education (which include the University of Minnesota and several smaller community based programs) graduate approximately 200 residents and fellows each year who enter directly into practice. Approximately 65% or 130 remain in Minnesota to start their careers. These figures represent all Minnesota residency graduates except those who have gone through training programs affiliated with Mayo. This number is not expected to increase at any time in the next ten years because the number of graduate medical education positions (residencies) is capped at 1996 levels by the Balanced Budget Act of 1997. No increase in positions is anticipated, and, in fact, threats to MERC funding may actually trigger a decrease in total positions available. We anticipate that the number of residents/fellows completing their graduate training in each of the next ten years will remain at today’s levels.

5. Describe the plans of the university to increase the capacity of the school. The University of Minnesota has no plans to increase capacity at either the medical school or graduate training level at this time.

6. Provide the most recent and accepted analysis concerning the need for physicians in Minnesota in the future, including time frames of the next five, ten, 15 and 20 years. The need must be stated in the aggregate and in specialty practice areas.

We researched a number of sources but were unable to locate data that addressed all of the components requested. Our solution was to draw estimates based on data from two different primary sources:
- Our baseline data came from a 2012 study produced by the Metro Minnesota Council on Graduate Medical Education that analyzed licensure data of physicians practicing in Minnesota
- Our estimates for future supply and demand were derived from the 2008 report from the Health Resources and Services Administration (HRSA), “The Physician Workforce: Projections and Research into Current issues Affecting Supply and Demand” (http://bhpr.hrsa.gov/healthworkforce/reports/physwfissues.pdf). In this report, HRSA projects changes in supply/demand by specialty in five year increments through 2020. We identified the percentage increases used by specialty for each five year time period and applied them to our baseline data.

The following two tables project physician supply and demand in Minnesota through 2020. We could find no reliable projections for growth in demand by specialty beyond 2020, so we have not provided projections through 2033.
### Active, Licensed MN Physicians by Specialty per MMCGME study

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<td><strong>809</strong></td>
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Projected Physician SUPPLY by Specialty per HRSA increase estimates at 2015 and 2020
2012 baseline data by specialty from MMCGME study on Minnesota licensure data.

Projected increase rates by specialty from 2008 HRSA report: The Physician Workforce: Projections and Research into Current Issues Affecting Supply and Demand (http://bhpr.hrsa.gov/healthworkforce/reports/physwissues.pdf); Exhibit 51: Baseline FTE Supply Projections of Active Physicians

*Average increase, all board certified disciplines, 2012 to 2015, is 4.27%. This percentage increase was used to estimate the increase in the number of physicians without board certification, 2012 to 2015.

**Average increase, all board certified disciplines, 2015 to 2020, is 2.83%. This percentage increase was used to estimate the increase in the number of physicians without board certification, 2015 to 2020.
### Active, Licensed MN Physicians by Specialty per MMCGME study

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Projected Physician DEMAND by Specialty per HRSA increase estimates at 2015 and 2020

M/Workforce Study/Workforce Response to MN Legislature Oct 16 2013
• 2012 baseline data by specialty from MMC/GME study on Minnesota licensure data.
• Projected increase rates by specialty from 2008 HRSA report: The Physician Workforce: Projections and Research into Current issues Affecting Supply and Demand (http://dhhr.hrsa.gov/healthworkforce/reports/physwfisues.pdf); Exhibit 52: Baseline Physician Requirements Projections
• *Average increase, all board certified disciplines, 2012 to 2015, is 6.69%. This percentage increase was used to estimate the increase in the number of physicians without board certification, 2012 to 2015.
• **Average increase, all board certified disciplines, 2015 to 2020, is 6.95%. This percentage increase was used to estimate the increase in the number of physicians without board certification, 2015 to 2020.

Observations from These Supply and Demand Projections
• The licensure data we used as our baseline corresponds to an AAMC figure for total active patient care physicians in Minnesota.
• The total physician supply predicted for 2020 by our tables corresponds to supply figures for Minnesota projected in a Georgetown study based on Bureau of Labor Statistics data: http://www9.georgetown.edu/grad/gpi/hpi/cew/pdfs/Healthcare_States_082212.pdf
• Overall physician demand is projected to be 13,743 in 2020, while supply is projected to be 12,913. The gaps are particularly acute in non-primary care specialties.
• Our tables project that two primary care disciplines will not have a shortage of physicians in Minnesota by 2020: pediatrics and Ob/GYN. The disciplines of family medicine and general internal medicine are projected to have a shortage of 138 physicians in 2020, but this estimate is significantly less than the shortage of 1,000-3,000 primary care doctors projected in a separate study in Minnesota Medicine (http://minnesotamedicine.com/PastIssues/February2013/PrimaryCareisattheHeartofHealthReform.aspx). The Minnesota Medicine analysis included an Affordable Care Act (ACA) demand factor, which may be missing from our HRSA projections. Yet another study, released in September, 2013 by the Robert Graham Center, estimates that Minnesota will need 608 additional primary care physicians by 2020. This figure is in line with the growth in supply and demand projected by our tables. The same study goes on to project that by 2030, Minnesota will need 1,187 primary care physicians over current levels (Petterson, S.M., Cal, A., Moore, M., Bazemore, A. State-level Projections of Primary Care Workforce, 2010-2030. September 2013, Robert Graham Center, Washington, D.C.)
• In non-primary care, all disciplines are projected to have a shortage of physicians in Minnesota by 2020.

Assumptions Incorporated into These Projections:
• The HRSA report projects a percentage increase for each specialty for the nation as a whole, not for Minnesota specifically. Minnesota’s increase rates may differ from the national rates.
• The HRSA report projected a percentage increase for each specialty for the period 2010 to 2015. We applied these same percentage increases to predict increases by specialty from 2012 to 2015.
Weaknesses of Our Study:

- The HRSA study was published in 2008 but used 2000 data as its baseline. The assumptions used in drafting these reports may differ from the actual outcomes that have been realized in the interim. More recent projections by specialty would have been preferred, as they would have taken into account influences that were not foreseeable in 2000. For example, these projections were made prior to authorization of the Affordable Care Act. How would more up to date projections take the ACA into account?

- Workforce reports use many different definitions of “active physician;” it is not always possible to compare two reports and be confident that they are using the same parameters. Variables that may or may not be factored into a report’s definition of physician include:
  - Does the definition of physician include residents? Doctors of Osteopathic Medicine?
  - Does the definition reflect FTEs or count all physicians as one unit, even if they are working less than full-time?
  - Does the definition include all active physicians? Licensed physicians? Physicians practicing within Minnesota? Physicians active in direct patient care?

- The HRSA increase projections take nationwide physician age and retirement into account. In 2012, 13.82% of active physicians practicing in Minnesota were age 66 or older. Over the next ten years, an average of 350 Minnesota physicians per year will reach age 65. It is unclear how Minnesota’s age/retirement rates compare to the national data reflected in the HRSA projections.

- The impact of these workforce projections does not take into account care by non-physician providers such as physician assistants, doctors of nursing practice/nurse practitioners, and other team-based models of care.
The Uncertain Future of Medicare and Graduate Medical Education

John K. Iglehart

In America's freewheeling economy, the nation's supply of physicians has fluctuated widely over decades, driven by countless decisions of individuals, private organizations, and governments. In this complicated mix, the federal government has remained a strong supporter of graduate medical education (GME), the pathway through which medical students must pass to become licensed independent doctors. The government's commitment is embedded in the Medicare program, which in 2010 contributed $9.5 billion to teaching hospitals in support of the training of some 100,000 residents, with few questions asked. In the future, though, the financing of GME, the capacity of the health care workforce, and the specialty mix of physicians are likely to come under greater scrutiny by Congress and the administration for several compelling reasons.

The next test of whether Medicare's support of GME may be in jeopardy will occur in the deliberations of a bipartisan panel of 12 members of Congress, called the Joint Select Committee on Deficit Reduction, which has been charged with recommending ways to cut the federal deficit by at least $1.2 trillion over the next decade. If the panel reaches agreement by a deadline of November 23, Congress would consider the recommendations in an expedited up-or-down vote by Christmas. If Congress rejects the package, government spending will automatically be cut by $1.2 trillion over the next 10 years, split between domestic and defense programs. In earlier high-level negotiations that at the last hour enabled President Barack Obama to raise the government debt ceiling, policymakers had discussed ways to cut the federal deficit but could not reach agreement. Among the ways identified was reducing Medicare's support of GME, a recommendation made last December by the National Commission on Fiscal Responsibility and Reform.1 However, another factor that relates to Medicare and the training of the nation's physician workforce also figures into the equation. Once President Obama signed the Affordable Care Act (ACA) into law, the government, in essence, took on a new obligation to ensure that the millions of people who gain coverage in 2014 will have access to adequate health care. This surge in demand raises the question: Who will care for these previously uninsured individuals if reductions in Medicare's GME support should cut the capacity of programs to train new physicians?

In this report, I will briefly describe the recommendation of the national commission (appointed by President Obama to "reduce excess payments to hospitals for medical education") that has served as the basis for budget-deficit discussions to cut these payments. I will take stock of other workforce issues that apply to doctors, including current estimates of physician shortages and the absence of a consensus on how many physicians are enough, provisions in the ACA to expand the number of primary care practitioners, and implications of the payment cap Congress imposed on Medicare's GME support 14 years ago. I will also cite the 16 new allopathic and osteopathic medical schools that either have opened or soon will open (with another dozen or so in earlier stages of development) and report opinions of health care leaders who assert that state laws restricting advanced practice nurses from rendering care up to their level of training should be reconsidered, particularly when physicians are in short supply.

**RECOMMENDATION OF THE BOWLES-SIMPSON COMMISSION**

Last December, the national commission chaired by Erskine Bowles, chief of staff to President Clinton, and former Republican Senator Alan Simpson of Wyoming, issued its report calling for a re-
duction in the federal deficit of $4 trillion over the next decade. The commission, which included 14 senior Democratic and Republican congressional leaders, voted 11 to 7 in favor of its recommendations but fell short of the 14 votes necessary to send them to the House and Senate for an up or down vote. One of its many recommendations called for bringing Medicare's GME payments "in line with the costs of medical education by limiting hospitals' direct GME payments to 120% of the national average salary paid to residents in 2010." Furthermore, the commission said that the "add-on payments" (totaling about $6 billion a year) that Medicare makes to teaching hospitals for their indirect medical education expenses should be reduced; these payments are based on the number of residents the hospitals employ. For every 10 residents per 100 beds, a teaching hospital receives a 5.5% add-on adjustment to its Medicare payment rate for hospital care. By reducing it to 2.2%, which the Medicare Payment Advisory Commission had estimated would more accurately reflect indirect costs, the Bowles-Simpson commission said Medicare's reduced GME support would cut federal expenditures by $6 billion by 2015 and by $60 billion by 2020.

REPORTS OF PHYSICIAN SHORTAGES

With time running out on the date (August 2) Treasury Department officials warned that the government would run out of money to meet its financial obligations, 63 Democrats and 1 Republican (Rep. Patrick Meehan of Pennsylvania) wrote in a letter to House and Senate leaders that "rumors abound on possible [GME] cuts." They emphasized that the GME cuts that were being discussed "would have a profoundly negative impact" on medical training programs at a time when the United States is "on the cusp of a crisis in access to both specialty and primary care physicians due to a growing physician workforce shortage." This urgent plea contrasts with the little attention that government has paid in recent years to the capacity of the nation's health care workforce, despite warning signs contained in an array of government and private-sector reports that physician shortages either already exist or soon will exist in particular geographic areas and in a growing number of specialties.

Virtually all these reports were issued before the enactment of the ACA, which is certain to accelerate demand for more health care. The Association of American Medical Colleges is projecting a physician shortage of 62,900 doctors, including 29,800 in primary care, by 2015. The association also estimates that the shortage will be more than twice that number (130,600) by 2025, as the population grows and ages, as doctors retire at a rate similar to that of new entries, and as lifestyle priorities crimp physician productivity and advances in medical innovation.

In addition to the association's national forecast, 62 other reports that have been issued in the past decade by state governments, universities, medical societies, and private foundations have also identified physician shortages in underserved areas and in many specialties. There are skeptics who maintain that unless physicians are steered through incentives to practice in areas in which doctors are scarce, many will continue to settle in attractive locales where "supply is already highest." Moreover, Dr. David Goodman, a Dartmouth Medical School pediatrician and researcher, added in testimony before the Senate Finance Committee that an increased supply of physicians is not reliably associated with better health outcomes, quality of care, or satisfaction for patients. To avoid getting caught up in the debate over the precise dimensions of a physician shortage, a foundation report that was authored by academic medical leaders simply recommended a goal of "maintaining the current ratio of approximately 250 doctors for every 100,000 people."

CONGRESSIONAL FOCUS ON PRIMARY CARE SHORTAGES

During the ACA debate, Congress ignored estimates of physician shortages in various specialties and instead took incremental steps to address the dwindling interest among medical school graduates in primary care. The Association of American Medical Colleges estimated that between 2000 and 2009, the number of U.S. medical school graduates who are likely to become primary care doctors fell by 31%. One recent forecast estimated that by 2019, between 4307 and 6940 additional primary care doctors would be needed to care for newly insured patients, a second report placed the number between 6400 and 7400. In 2010, there were about 205,000 generalist physicians (general and family practice, general internal medicine, general pediatrics,
and geriatrics) who were active in patient care (Dall T: personal communication). The ACA directs Medicare to pay a 10% bonus for 5 years (2011–2015) under the program’s fee schedule to all family physicians, internists, geriatricians, nurse practitioners, and physician assistants who provide 60% of their services in qualifying evaluation and management codes. A similar bonus was provided to general surgeons, but to earn it they must practice in a medically underserved area. The law also requires states to increase Medicaid payment rates to Medicare levels in 2013 and 2014 for providers who deliver certain primary care services. A primary care researcher, Dr. Robert Phillips, characterized the changes as appreciated but “a small reversal of fortunes compared to the much larger shift to other specialties” as a result of Medicare’s fee schedule. The ACA and the economic stimulus program tripled the field strength of the National Health Service Corps, infusing it with $1.8 billion over the next 5 years. The corps provides scholarships and loans to practitioners in return for a minimum 2-year commitment to provide primary care in underserved communities.

Other provisions of the ACA created a National Health Care Workforce Commission, charging it with informing Congress on workforce trends, as well as a National Center for Health Workforce Analysis (which is housed in the Health Resources and Services Administration) and state health care workforce development grants to expand data collection and research. The Government Accountability Office appointed the commission’s 15 members and named as its chairman Peter Buerhaus, a professor of nursing at Vanderbilt University. Five of the 15 commissioners are physicians. Given the strong Republican opposition to the ACA, advocates of the new commission have been unable to secure an appropriation of $3 million to launch its operations. Thus far, the commission’s activity has been limited to one conference call.

**IMPLICATIONS OF MEDICARE’S GME PAYMENT CAP**

In 1997, six major medical organizations declared in a consensus statement that the United States was on the verge of a serious oversupply of physicians. As a consequence, they said, the number of entry-level GME positions should be more closely aligned with the number of graduates of U.S. medical schools, and “this realignment should be achieved primarily by limiting federal funding of GME positions.” Congress, with virtually no objection from legislators, placed a payment cap on how much support Medicare could provide to GME programs. With the payment cap still in place 14 years later, fast-forward to the reform debate, in which senior Democrats, pressed by academic medicine, proposed to lift the cap and expand the number of Medicare-funded GME positions by 15% (to 115,000). To the dismay of other medical organizations, the American Academy of Family Physicians opposed the amendment, asserting that additional GME posts should be filled by trainees who planned careers in primary care. Congress declined to increase Medicare’s support for GME, agreeing only to redistribute about 900 unused but authorized GME slots. The law stipulates that most of these positions should be used to train practitioners in primary care and general surgery.

Because of the cap on Medicare’s payments, the expanding number of U.S. medical school graduates, and the continuing influx of some 7000 international medical graduates in search of GME posts every year, before long there will be too few positions to train them all. Currently, about 25% of practicing physicians in the United States are graduates of international medical schools. The slow growth in GME positions — an annual rate of 0.9% over the past decade (Nasca T: personal communication) — contrasts with the increases in enrollment that have occurred in 100 of the 125 allopathic medical schools and a doubling of enrollments in osteopathic medical schools. By 2015, combined first-year enrollment in allopathic and osteopathic schools is projected to reach 26,403, an increase of 35% over 2002 numbers. Eight new allopathic schools and nine osteopathic schools or branch campuses have enrolled their first classes or soon will do so (for details, see Table 1 in the Supplementary Appendix, available with the full text of this article at NEJM.org).

In an interview, Dr. Thomas Nasca, CEO of the Accreditation Council for Graduate Medical Education, expressed concern over the narrowing gap between the number of entry-level GME posts and the growing number of medical school graduates. Nasca said, “We estimate that we will see domestic production of medical school graduates
Functionally surpass our current total number of GME postgraduate year-one pipeline positions (posts that lead to initial specialty certification) by 2015 or sooner, and this does not include some 10,000 non-U.S.-citizen international medical graduates and about 3700 U.S.-citizen international medical graduates who seek GME posts in U.S. teaching hospitals. Figure 1 shows three scenarios that are based on assumptions regarding the availability of GME positions. The first scenario assumes an annual increase of 0.883% in the number of positions (the average annual growth rate from 2001 through 2010). The second scenario assumes that GME positions will hold constant at the 2010 level. The third scenario assumes an annual decrease of 1% in the number of GME positions in recognition of possible reductions in Medicare support. Nasca added, “In the absence of congressional action to lift the cap, or the unlikely prospect of securing other sources of GME support, we face the risk of graduating physicians in the United States who will be unable to obtain the training required to obtain a license to practice independently.”

Florida stands out as a state with four new medical schools but very little activity under way to increase its number of GME positions, despite ranking 43rd in the number of these posts per capita. In an interview, Dr. Michael Whitcomb, a former senior vice president of the Association...
of American Medical Colleges, said that a number of factors have prevented Florida from expanding its GME capacity—financing being only one. "Another is that of community hospitals with the resources to create GME programs, very few are interested in doing so, in part because their medical staffs prefer taking care of patients without the added responsibility of teaching," he said. In New York State, a survey of nonteaching hospitals with at least 70 beds showed that 58.3% were reluctant to develop GME programs with or without new funding because of the challenges they present (Edelman N: personal communication).

PROSPECTS FOR REMOVING THE GME CAP

Given the current concern over the federal deficit, the likelihood that Congress will remove the cap on Medicare's GME support is nil. Indeed, holding on to existing GME support may be the best outcome medical educators can hope to achieve. Even before the budget discussions began in earnest, the House voted 234 to 185 on May 25 to eliminate $230 million in funding authorized by the ACA to support GME training of primary care physicians at community health centers. These facilities, referred to as "teaching health centers," represent the first major federal effort to shift GME training to community-based settings that emphasize primary care. The Senate has not acted on the House-passed bill.

The administration's 2012 budget proposes to eliminate a program that provides an annual appropriation of $317 million to children's hospitals for the support of pediatric GME training. Ignoring the administration's budget request, the House Energy and Commerce Committee cast a bipartisan vote on July 28 to extend the pediatric GME program for 5 years. In its latest set of options on ways to cut spending or raise revenue, the Congressional Budget Office (CBO) said that substantial savings could be achieved by consolidating federal GME support into a grant program for teaching hospitals. Through such a consolidation, the CBO estimated that the government could derive savings of $25 billion between 2012 and 2016 and roughly $69 billion over a decade (2012–2021).

Some states also have begun to cut the support they provide to GME programs through Medicaid. In 2005, a total of 47 states provided GME support of $3.78 billion through Medicaid. By 2009, only 41 states were providing $3.18 billion in such support, and 9 additional states reported they were considering ending their payments to teaching hospitals. More recently, Arizona's legislature eliminated all of its Medicaid GME support, a step educators considered "particularly vexing" because they had a strong working relationship with the program's administrators (Grossman M: personal communication). In addition, Florida and Washington State cut GME funding provided through their Medicaid managed-care programs, Michigan reduced its support for GME, and training support provided by Iowa, Missouri, and Rhode Island appeared to be in jeopardy.

FUTURE ROLES OF NONPHYSICIANS IN TEAM-BASED CARE

Increased attention is being paid to the potential for expanding the roles of advanced practice nurses and physician assistants as first-contact providers, given the length of training for physicians (3 to 7 years after medical school), the limitations in the growth of GME positions posed by the Medicare funding cap, and the promotion of team-based care by the ACA. Even Dr. Richard Cooper, who has been an influential advocate for the training of many more physicians, emphasized in an interview: "The delegation of tasks to a broadened spectrum of caregivers in new models of care must also occur. I envision a reordering of what services physicians, APNs [advanced practice nurses], and PAs [physician assistants] and other workers down the line will be expected to perform, although even then capacity may run short."

In separate interviews, Health and Human Services Secretary Kathleen Sebelius and Dr. Bill Frist, former Senate majority leader from 2002 through 2007, urged examination of state laws that restrict the scope of practice of advanced practice nurses. Sebelius said, "It's hard for me to believe that Congress would preempt state law, but . . . we could put some incentives on the table to encourage that look." Frist said: "To meet the explosive demand for primary health services will require truly disruptive reform of how primary care is delivered. Delivering primary care
will not remain the sole purview of doctors. There are not enough of them, and they are too expensive. Expanding the scopes of practice of PAs and advanced practice nurses simply has to occur." In a recent report issued by the Institute of Medicine, the top recommendation was that nurses be allowed to practice to the full extent of their education and training.\(^9\)

Dr. Darrell Kirch, CEO of the Association of American Medical Colleges, emphasized in another interview that the ACA’s call for delivery-system reform “will require us to take a new view of how we educate and deploy health professionals in all disciplines. To implement more effective delivery models, we need every health care provider working at the top of their license in high-performing teams. This creates an imperative for academic medical centers to respond with new approaches to training, as well as research regarding which educational and care models work best.”

The fits and starts of physician-workforce policy in the United States have been on display during the past several decades, with warnings of shortages and surpluses at different times. More than anything perhaps, such ambivalence underscores the uncertainty among policymakers of what government’s legitimate role is in setting a course that is flexible enough to account for the many variables that periodically crop up. Medicare’s GME support escaped unscathed in the recent wrangling over the debt ceiling, but it may well be a target again as the new congressional deficit-cutting committee identifies ways to reduce the federal deficit by $1.2 trillion over the next decade. Of its 12 members, Senator John Kerry (D-MA) has been the most outspoken advocate of maintaining Medicare’s current level of GME support. Defending that position against the competing claims for the federal dollar of an array of other stakeholders may prove a tall order in the quest for deficit reduction.

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Mr. Iglehart is a national correspondent for the Journal.

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REPORT RECOMMENDATIONS

Key Messages

- Nurses should practice to the full extent of their education and training.
- Nurses should achieve higher levels of education and training through an improved education system that promotes seamless academic progression.
- Nurses should be full partners, with physicians and other health care professionals, in redesigning health care in the United States.
- Effective workforce planning and policy making require better data collection and an improved information infrastructure.

Recommendations

Recommendation 1: Remove scope-of-practice barriers. Advanced practice registered nurses should be able to practice to the full extent of their education and training. To achieve this goal, the committee recommends the following actions.

For the Congress:

- Expand the Medicare program to include coverage of advanced practice registered nurse services that are within the scope of practice under applicable state law, just as physician services are now covered.
- Amend the Medicare program to authorize advanced practice registered nurses to perform admission assessments, as well as certification of patients for home health care services and for admission to hospice and skilled nursing facilities.
- Extend the increase in Medicaid reimbursement rates for primary care physicians included in the ACA to advanced practice registered nurses providing similar primary care services.
- Limit federal funding for nursing education programs to only those programs in states that have adopted the National Council of State Boards of Nursing Model Nursing Practice Act and Model Nursing Administrative Rules (Article XVIII, Chapter 18).

For state legislatures:

- Reform scope-of-practice regulations to conform to the National Council of State Boards of Nursing Model Nursing Practice Act and Model Nursing Administrative Rules (Article XVIII, Chapter 18).
- Require third-party payers that participate in fee-for-service payment arrangements to provide direct reimbursement to advanced practice registered nurses who are practicing within their scope of practice under state law.
For the Centers for Medicare and Medicaid Services:

- Amend or clarify the requirements for hospital participation in the Medicare program to ensure that advanced practice registered nurses are eligible for clinical privileges, admitting privileges, and membership on medical staff.

For the Office of Personnel Management:

- Require insurers participating in the Federal Employees Health Benefits Program to include coverage of those services of advanced practice registered nurses that are within their scope of practice under applicable state law.

For the Federal Trade Commission and the Antitrust Division of the Department of Justice:

- Review existing and proposed state regulations concerning advanced practice registered nurses to identify those that have anticompetitive effects without contributing to the health and safety of the public. States with unduly restrictive regulations should be urged to amend them to allow advanced practice registered nurses to provide care to patients in all circumstances in which they are qualified to do so.

Recommendation 2: Expand opportunities for nurses to lead and diffuse collaborative improvement efforts. Private and public funders, health care organizations, nursing education programs, and nursing associations should expand opportunities for nurses to lead and manage collaborative efforts with physicians and other members of the health care team to conduct research and to redesign and improve practice environments and health systems. These entities should also provide opportunities for nurses to diffuse successful practices.

To this end:

- The Center for Medicare and Medicaid Innovation should support the development and evaluation of models of payment and care delivery that use nurses in an expanded and leadership capacity to improve health outcomes and reduce costs. Performance measures should be developed and implemented expeditiously where best practices are evident to reflect the contributions of nurses and ensure better-quality care.

- Private and public funders should collaborate, and when possible pool funds, to advance research on models of care and innovative solutions, including technology, that will enable nurses to contribute to improved health and health care.

- Health care organizations should support and help nurses in taking the lead in developing and adopting innovative, patient-centered care models.

- Health care organizations should engage nurses and other front-line staff to work with developers and manufacturers in the design, development, purchase, implementation, and evaluation of medical and health devices and health information technology products.
• Nursing education programs and nursing associations should provide entrepreneurial professional development that will enable nurses to initiate programs and businesses that will contribute to improved health and health care.

Recommendation 3: Implement nurse residency programs. State boards of nursing, accrediting bodies, the federal government, and health care organizations should take actions to support nurses’ completion of a transition-to-practice program (nurse residency) after they have completed a prelicensure or advanced practice degree program or when they are transitioning into new clinical practice areas.

The following actions should be taken to implement and support nurse residency programs:

• State boards of nursing, in collaboration with accrediting bodies such as the Joint Commission and the Community Health Accreditation Program, should support nurses’ completion of a residency program after they have completed a prelicensure or advanced practice degree program or when they are transitioning into new clinical practice areas.

• The Secretary of Health and Human Services should redirect all graduate medical education funding from diploma nursing programs to support the implementation of nurse residency programs in rural and critical access areas.

• Health care organizations, the Health Resources and Services Administration and Centers for Medicare and Medicaid Services, and philanthropic organizations should fund the development and implementation of nurse residency programs across all practice settings.

• Health care organizations that offer nurse residency programs and foundations should evaluate the effectiveness of the residency programs in improving the retention of nurses, expanding competencies, and improving patient outcomes.

Recommendation 4: Increase the proportion of nurses with a baccalaureate degree to 80 percent by 2020. Academic nurse leaders across all schools of nursing should work together to increase the proportion of nurses with a baccalaureate degree from 50 to 80 percent by 2020. These leaders should partner with education accrediting bodies, private and public funders, and employers to ensure funding, monitor progress, and increase the diversity of students to create a workforce prepared to meet the demands of diverse populations across the lifespan.

• The Commission on Collegiate Nursing Education, working in collaboration with the National League for Nursing Accrediting Commission, should require all nursing schools to offer defined academic pathways, beyond articulation agreements, that promote seamless access for nurses to higher levels of education.

• Health care organizations should encourage nurses with associate’s and diploma degrees to enter baccalaureate nursing programs within 5 years of graduation by offering tuition reimbursement, creating a culture that fosters continuing education, and providing a salary differential and promotion.
• Private and public funders should collaborate, and when possible pool funds, to expand baccalaureate programs to enroll more students by offering scholarships and loan forgiveness, hiring more faculty, expanding clinical instruction through new clinical partnerships, and using technology to augment instruction. These efforts should take into consideration strategies to increase the diversity of the nursing workforce in terms of race/ethnicity, gender, and geographic distribution.

• The U.S. Secretary of Education, other federal agencies including the Health Resources and Services Administration, and state and private funders should expand loans and grants for second-degree nursing students.

• Schools of nursing, in collaboration with other health professional schools, should design and implement early and continuous interprofessional collaboration through joint classroom and clinical training opportunities.

• Academic nurse leaders should partner with health care organizations, leaders from primary and secondary school systems, and other community organizations to recruit and advance diverse nursing students.

**Recommendation 5: Double the number of nurses with a doctorate by 2020.** *Schools of nursing, with support from private and public funders, academic administrators and university trustees, and accrediting bodies, should double the number of nurses with a doctorate by 2020 to add to the cadre of nurse faculty and researchers, with attention to increasing diversity.*

• The Commission on Collegiate Nursing Education and the National League for Nursing Accrediting Commission should monitor the progress of each accredited nursing school to ensure that at least 10 percent of all baccalaureate graduates matriculate into a master’s or doctoral program within 5 years of graduation.

• Private and public funders, including the Health Resources and Services Administration and the Department of Labor, should expand funding for programs offering accelerated graduate degrees for nurses to increase the production of master’s and doctoral nurse graduates and to increase the diversity of nurse faculty and researchers.

• Academic administrators and university trustees should create salary and benefit packages that are market competitive to recruit and retain highly qualified academic and clinical nurse faculty.
Recommendation 6: Ensure that nurses engage in lifelong learning. Accrediting bodies, schools of nursing, health care organizations, and continuing competency educators from multiple health professions should collaborate to ensure that nurses and nursing students and faculty continue their education and engage in lifelong learning to gain the competencies needed to provide care for diverse populations across the lifespan.

- Faculty should partner with health care organizations to develop and prioritize competencies so curricula can be updated regularly to ensure that graduates at all levels are prepared to meet the current and future health needs of the population.
- The Commission on Collegiate Nursing Education and the National League for Nursing Accrediting Commission should require that all nursing students demonstrate a comprehensive set of clinical performance competencies that encompass the knowledge and skills needed to provide care across settings and the lifespan.
- Academic administrators should require all faculty to participate in continuing professional development and to perform with cutting-edge competence in practice, teaching, and research.
- All health care organizations and schools of nursing should foster a culture of lifelong learning and provide resources for interprofessional continuing competency programs.
- Health care organizations and other organizations that offer continuing competency programs should regularly evaluate their programs for adaptability, flexibility, accessibility, and impact on clinical outcomes and update the programs accordingly.

Recommendation 7: Prepare and enable nurses to lead change to advance health. Nurses, nursing education programs, and nursing associations should prepare the nursing workforce to assume leadership positions across all levels, while public, private, and governmental health care decision makers should ensure that leadership positions are available to and filled by nurses.

- Nurses should take responsibility for their personal and professional growth by continuing their education and seeking opportunities to develop and exercise their leadership skills.
- Nursing associations should provide leadership development, mentoring programs, and opportunities to lead for all their members.
- Nursing education programs should integrate leadership theory and business practices across the curriculum, including clinical practice.
- Public, private, and governmental health care decision makers at every level should include representation from nursing on boards, on executive management teams, and in other key leadership positions.
Recommendation 8: Build an infrastructure for the collection and analysis of inter-professional health care workforce data. The National Health Care Workforce Commission, with oversight from the Government Accountability Office and the Health Resources and Services Administration, should lead a collaborative effort to improve research and the collection and analysis of data on health care workforce requirements. The Workforce Commission and the Health Resources and Services Administration should collaborate with state licensing boards, state nursing workforce centers, and the Department of Labor in this effort to ensure that the data are timely and publicly accessible.

- The Workforce Commission and the Health Resources and Services Administration should coordinate with state licensing boards, including those for nursing, medicine, dentistry, and pharmacy, to develop and promulgate a standardized minimum data set across states and professions that can be used to assess health care workforce needs by demographics, numbers, skill mix, and geographic distribution.

- The Workforce Commission and the Health Resources and Services Administration should set standards for the collection of the minimum data set by state licensing boards; oversee, coordinate, and house the data; and make the data publicly accessible.

- The Workforce Commission and the Health Resources and Services Administration should retain, but bolster, the Health Resources and Services Administration's registered nurse sample survey by increasing the sample size, fielding the survey every other year, expanding the data collected on advanced practice registered nurses, and releasing survey results more quickly.

- The Workforce Commission and the Health Resources and Services Administration should establish a monitoring system that uses the most current analytic approaches and data from the minimum data set to systematically measure and project nursing workforce requirements by role, skill mix, region, and demographics.

- The Workforce Commission and the Health Resources and Services Administration should coordinate workforce research efforts with the Department of Labor, state and regional educators, employers, and state nursing workforce centers to identify regional health care workforce needs, and establish regional targets and plans for appropriately increasing the supply of health professionals.

- The Government Accountability Office should ensure that the Workforce Commission membership includes adequate nursing expertise.
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NEW MODELS OF CARE

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Nurse-Managed Health Centers And Patient-Centered Medical Homes Could Mitigate Expected Primary Care Physician Shortage

ABSTRACT Numerous forecasts have predicted shortages of primary care providers, particularly in light of an expected increase in patient demand resulting from the Affordable Care Act. Yet these forecasts could be inaccurate because they generally do not allow for changes in the way primary care is delivered. We analyzed the impact of two emerging models of care—the patient-centered medical home and the nurse-managed health center—both of which use a provider mix that is richer in nurse practitioners and physician assistants than today’s predominant models of care delivery. We found that projected physician shortages were substantially reduced in plausible scenarios that envisioned greater reliance on these new models, even without increases in the supply of physicians. Some less plausible scenarios even eliminated the shortage. All of these scenarios, however, may require additional changes, such as liberalized scope-of-practice laws; a larger supply of medical assistants, licensed practical nurses, and aides; and payment changes that reward providers for population health management.

The Affordable Care Act will substantially increase the number of insured Americans over the coming decade. In the context of an aging population and the expansion of insurance coverage, the act promotes shared-savings models and increases preventive care and wellness benefits for people who are already insured—measures likely to increase demand for primary care services. The act also contains various provisions to increase the number of primary care providers through grants and scholarships aimed at training additional providers and through reimbursement rate increases that may encourage students and residents to pursue primary care careers.

Some of these factors have been included or at least considered in models that aim to forecast the supply of and demand for primary care physicians. Other work has used models that emphasize the important role of nonphysician providers such as physician assistants and nurse practitioners in primary care. Yet both sets of models have a key shortcoming: In general, they assume that the current “production function” for primary care services—specifically, the number and type of providers required to provide primary care to a given population—is fixed. In other words, they implicitly assume that the number of full-time-equivalent primary care physicians available today is, on average, the optimal amount needed for a given population and that, with slight adjustments for factors such as population aging, this amount will not change appreciably in the future.

These assumptions, however, could be far from the mark, rendering shortage projections biased or even irrelevant if the production function for primary care can, indeed, be changed. Many innovations seek to fundamentally change
how primary care is delivered. These innovations have the potential to drastically change the number of providers—combined with other inputs such as technology and patients' self-management—needed to provide a given number of primary care services to a population. In this article we highlight the potential impact of two of those innovations, the patient-centered medical home and the nurse-managed health center, on forecasts of primary care provider shortages or surpluses.

The following two aspects of the medical home are particularly salient in considering the production function for primary care services: team-based care and the adoption of technology. Team-based care is a key aspect of the medical home, which delivers the core functions of primary care using a workforce mix that includes physicians, advanced-practice and other nurses, physician assistants, pharmacists, nutritionists, social workers, educators, and care coordinators. Despite the added cost of additional providers, the care team has the potential to provide high-quality, comprehensive care for a larger number of patients with the use of practice innovations such as electronic health record systems and care coordination.

Nurse-managed health centers, also known as nursing centers or nurse-led clinics, provide a full range of primary care and some specialty services. They are managed and operated by nurses, with nurse practitioners (many of whom are or will become doctors of nursing practice) functioning as the primary providers. Typically affiliated with academic health centers today, nurse-managed health centers could—if they became more prevalent—greatly reduce the need for primary care physicians.

The staffing patterns for these models of care have not been rigorously examined or compared with prevailing staffing patterns in current arrangements of primary care delivery. To fill the gap in knowledge about the potential impact of these alternative models, we used multiple modalities to investigate the workforce requirements in three models of primary care delivery: the status quo, representing the current mixture of models observed today; the medical home; and the nurse-managed health center.

We integrated these findings and their implications into an analysis of supply and demand for primary care physicians, nurse practitioners, and physician assistants. We used existing literature to derive estimates of shortages or surpluses of each provider type in a status quo scenario, in which the primary care production function did not change. We then estimated primary care provider shortages or surpluses in various alternative scenarios featuring different degrees of penetration of the medical home and nurse-managed health center models in the United States and reflecting the current uncertainty about the panel sizes (number of patients per provider) of these emerging models.

Our goal was not to create precise projections, given the uncertainty of many variables. Instead, it was to show how projections would change under different scenarios involving greater or lesser adoption of new models of care delivery and depending on how those models were staffed.

Other emerging models that we did not include in our analysis, such as retail clinics, also make innovative use of nonphysician providers and provide a growing proportion of primary care needs to some populations. Our results, however, are illustrative of what might occur under such other models.

Study Data And Methods
Our basic approach has three steps. First, we forecast the supply and demand for physicians, nurse practitioners, and physician assistants in primary care in 2025, using estimates from existing literature that essentially hold the production function of primary care fixed. Second, we unpack that production function by estimating how many providers, on average, are used to care for a given population under the following three models of primary care delivery: status quo (combining all current models except the medical home and nurse-managed health center), the medical home, and the nurse-managed health center. Third, we provide alternative forecasts of provider shortages or surpluses in which the following two elements of the production function vary: the prevalence of the medical home and nurse-managed health center in primary care delivery, and the panel size (used as a measure of productivity) of the medical home.

Estimated Provider Supply and Demand
We used published estimates of supply and demand for primary care providers, accounting for expected increases in demand resulting from the Affordable Care Act. As is standard practice, we assumed that supply and demand for providers were balanced in 2010, and we applied independent forecasts of supply and demand in 2025 to estimate potential surpluses or shortages.

Physicians: For physician demand (our measures of physician supply and demand include doctors of osteopathy), we employed the estimates of Stephen Pettersson and coauthors. They began with estimates of primary care physician supply and demand in 2010 from the American Medical Association Physician Masterfile and adjusted the estimates down-
ward, accounting both for physicians who had likely retired and for those such as hospitalists and emergency physicians, who are not generally considered to work in primary care. Petterson and coauthors’ final estimate of supply was 210,000 primary care physicians in direct patient care in 2010. The authors estimated growth in demand based on the growth and aging of the US population and the effects of the Affordable Care Act, concluding that 261,000 physicians would be needed in 2025.

We applied the Association of American Medical Colleges’ forecast of 3 percent growth in the supply of primary care physicians from 2010 to 2025 to Petterson and coauthors’ 2010 supply baseline. Thus, our estimated supply of physicians in 2025 was 216,300, which we rounded off to 216,000.

**Nurse Practitioners:** Our estimate of the current supply of nurse practitioners actively providing primary care was based on an analysis performed by the Agency for Healthcare Research and Quality that, in turn, was based on National Provider Identification data. That figure—60,000 in 2010—was lower than other estimates of the primary care nurse practitioner workforce. However, like the estimate of physicians by Petterson and coauthors, it counted only providers actively practicing primary care, instead of all of those trained in primary care specialties. In addition, it was similar to estimates we obtained from our own analysis of data from the National Sample Survey of Registered Nurses from 2008, in which we included only those professionals specializing in primary care and having the title of nurse practitioner.

For the estimated growth in the supply of primary care nurse practitioners by 2025, we used a recently published forecast of the growth in the supply of all nurses practicing with the title of nurse practitioner between 2010 and 2025. We assumed that the rate of growth in the supply of primary care nurse practitioners would be the same as the estimated rate for nurse practitioners overall. We also assumed that demand for both nurse practitioners and physician assistants would grow at the same rate as that for physicians.

**Physician Assistants:** For the current supply of physician assistants working in primary care, we relied on the same source that we used for nurse practitioners, which estimated that 30,000 physician assistants (roughly a third of all physician assistants) were practicing in primary care in 2010. This figure was similar to estimates from the American Academy of Physician Assistants.

We found no recent published forecasts of supply. Thus, we used recent trends in the number of physician assistant graduates—specifically, 37 percent growth between 2001 and 2010—as a proxy for expected supply growth. Graduation trends for nurse practitioners and physicians over this period were roughly equivalent to published forecasts of the growth in supply for these two types of providers, which suggests that our approach gave us a reasonable approximation of supply growth for physician assistants.

**Estimated Production Function** We estimated provider-to-population ratios under each care model (status quo, medical home, and nurse-managed health center), using published literature (as described in the online Appendix) combined with data from two surveys. The first survey was of primary care practices that participated in the Pennsylvania Chronic Care Initiative (one of the largest multipayer medical home pilots in the United States). The second was our own survey of nurse-managed health centers, administered to a convenience sample of sixty-nine sites. For our survey, we obtained contact information from the National Nursing Centers Consortium. Details of these surveys and of how we derived staffing figures for each model are provided in the online Appendix.

We then combined the staffing data algebraically with 2010 estimates of provider supply. The remaining providers (those not in a medical home or nurse-managed health center) were assigned to the status quo model.

**Surplus and Shortage Analysis** Finally, we estimated provider surpluses and shortages under a number of scenarios that varied the prevalence of the medical home and nurse-managed health center models as well as the medical home panel size.

**Default Assumptions:** We assumed the proportion of the population served by a nurse-managed health center for primary care in 2010 to be 0.5 percent, based on current estimates of 2.5 million patient visits annually to nurse-managed health centers combined with estimates of total primary care visits in the United States. We assumed that 15 percent of primary care visits took place in medical homes in 2010, based on an article that estimated 13.5 percent of practices would qualify as medical homes in 2008. For all models, we assumed that panel sizes per physician, nurse practitioner, and physician assistant would be similar to the numbers in 2010.

**Forecast Methodology:** The provider staffing of each model, derived from the analysis described in the online Appendix, was assumed to stay constant throughout the forecast window, but the proportion of primary care delivered through medical homes and nurse-managed health centers was allowed to grow. The
medical home panel size was also allowed to vary.  

For example, assume a representative group of 10,000 US residents. In 2010, 15 percent of them (or 1,500 residents) were assumed to be in a medical home. The medical home staffing ratios described below suggest that 6.1 physicians would be used per 10,000 residents. Thus, a population of 1,500 would require 0.915 (or 15 percent of 6.1) physician.

For our baseline forecast of provider demand in 2025, we assumed that all models had 24 percent growth in demand (as explained above, we based this figure on data from Petterson and coauthors), resulting in a demand for 1.13 physicians to care for the original population of 1,500 (which would have grown slightly by 2025) in the medical home.

Under some forecast scenarios, we changed the medical home’s 15 percent share of primary care while holding its staffing constant. If we assumed that three times the share of the population (45 percent) received care from a medical home, the initial 10,000 population would demand 3.39 (three times 1.13) medical home physicians.

We compared the supply and demand forecasts for each scenario to derive estimates of surpluses or shortages of each provider type.

**Limitations** Our projections have several limitations. As with all such exercises, the accuracy of the projections depends on the accuracy of the forecast models and the assumptions used as inputs. The published projections of provider supply and demand that we relied on contain tremendous uncertainty. In contrast to our assumptions, primary care might attract renewed interest among medical students, demand for nurse practitioners and physician assistants might be either less or more than that for physicians, or nurse practitioners might move away from primary care. Our essential results, however, are insensitive to these default forecasts: They are driven more by the provider ratios and the assumptions used in the alternative staffing models.

With respect to the staffing assumptions, our findings about how these models are staffed were based on the limited amount of data available in the current literature, in addition to what we could obtain from several convenience samples—of fifty-four medical homes and twenty-five nurse-managed health centers—described in the Appendix. These practices might not be representative, but our alternative scenarios illustrate the sensitivity of provider shortage forecasts to plausible changes in delivery models in the future. In addition, our models did not include explicit projections for, or consideration of, other types of workers who provide valuable care inputs that can overlap with those of the clinicians studied, such as registered nurses, medical assistants, and clinical pharmacists.

Also, as mentioned above, we did not explicitly account for other models such as retail clinics. In fact, visits to retail clinics grew rapidly between 2007 and 2009 and now outnumber those to nurse-managed health centers. Many visitors to the clinics also have primary care providers elsewhere, and thus one could consider the care provided by clinics as more complementary than comprehensive. Nevertheless, given the clinics’ reliance on nonphysicians, the omission of this segment of primary care from our models makes our results somewhat understated.

Finally, our projections are necessarily sensitive to model assumptions—most notably, assumptions about the future prevalence of each type of primary care model—and uncertainty regarding the panel sizes that each primary care model will be able to achieve. The patient-centered medical home model has been diffusing rapidly throughout the US health care system. In contrast, nurse-managed health centers have faced some major barriers, as discussed below. Because of this considerable uncertainty, we developed an interactive online tool (available from http://www.streamlinedataworks.com/caremodels.html) to allow readers to alter the assumptions made in this article and test the sensitivity of our findings to variations in these assumptions.

**Study Results**

**Provider Supply Forecasts** The supplies of clinically active full-time-equivalent primary care physicians, nurse practitioners, and physician assistants are expected to grow between 2010 and 2025 (based on literature forecasts discussed in the Study Data and Methods section), but at markedly different rates (Exhibit 1). Because of much stronger expected growth in the numbers of nurse practitioners and physician assistants relative to those of physicians, the share of primary care providers who are physicians is expected to shrink from 71 percent to 60 percent. Strikingly, there were nearly four primary care physicians for every nurse practitioner in primary care in 2010, but in 2025 we project that there will be just over two physicians per nurse practitioner.

**Primary Care Model Staffing** We estimated demand for providers in other three models of care delivery based on data obtained from observations of actual staffing at a number of practices under each model, combined with estimates from the literature (additional details are in
the online Appendix). Those data are summarized in Exhibit 2, which tabulates the number of providers used under each model per 10,000 residents.

Importantly, the medical home and nurse-managed health center appear to use higher proportions of nurse practitioners and physician assistants than do other models of care today, on average. We estimated that the medical home uses 0.1 more nurse practitioner and physician assistant per physician, holding panel sizes constant, implying that roughly 12 percent fewer physicians would be needed to care for a given population. The nurse-managed health center is staffed almost entirely with nurse practitioners, supplemented by registered nurses, medical assistants, and other personnel not included in Exhibit 2.

**Forecast Scenarios** We used the results in Exhibits 1 and 2 to estimate provider surpluses or shortages under different sets of assumptions (Exhibit 3). The forecasts vary the following three aspects of the future composition and nature of primary care delivery models: the prevalence of the medical home and of the nurse-managed health center, and the panel size of the medical home. Exhibit 3 shows the results for a set of scenarios that we chose for illustrative purposes. As stated above, readers can experiment with their own assumptions and test the effect of those assumptions on provider surpluses and surpluses online (http://www.streamlinedataworks.com/caremodels.html).

► **Status Quo Scenario**: Our status quo scenario projected a shortage of 45,000 primary care physicians in 2025 (the supply was 20 percent below demand), a surplus of 34,000 nurse practitioners (the supply was 48 percent above demand), and a surplus of 4,000 physician assistants (the supply was 10 percent above demand) (Exhibit 3).

These projections stem from complex models that incorporate information such as cohort and retirement trends on the supply side and population growth and insurance coverage assumptions on the demand side. Yet they also rest on the simple but common assumption that future primary care delivery models will, in the aggregate, use the same level of provider staffing per unit of the population as they do today. Instead, as described below, our alternative scenarios estimated staffing levels for the three different delivery models and then varied the prevalence of those models in the future.

► **Greater Prevalence of Medical Homes**: This scenario assumed that the medical home would provide 45 percent of the nation’s primary care in 2025, growing from 15 percent in 2010. That is a significant change, but it is possible, given recent rapid growth of this model of care delivery.

In this scenario the shortage of primary care physicians was reduced from that of the status quo scenario by about a quarter, from 45,000 to 35,000 (Exhibit 3). Furthermore, because we assumed that the medical home model used a slightly higher proportion of nurse practitioners and physician assistants per physician than the status quo, the demand for nonphysician providers increased in this scenario. That made a dent in the projected surplus of nurse practitioners and changed the small projected surplus of physician assistants to a small deficit.

► **Greater Prevalence of Nurse-Managed Health Centers**: This scenario assumed that the nurse-managed health center would provide 5 percent of the US primary care in 2025, up from 0.5 percent in 2010. This change had almost the same effect on the projected shortage of primary care physicians as the previous scenario did (Exhibit 3). In addition, it reduced the sur-
plus of nurse practitioners by nearly half because of the intensive use of nurse practitioners in nurse-managed health centers. However, the surplus of physician assistants, who are not used in this model of care delivery, increased.

**Greater Prevalence of Both:** This scenario assumed that the changes in both of the two previous scenarios occurred. Accordingly, only half of primary care was delivered outside of nurse-managed health center and medical home models, down from approximately 85 percent in 2010. These changes cut the physician shortage nearly in half and reduced the nurse practitioner surplus by two-thirds (Exhibit 3). The supply of physician assistants was very close to the demand.

**Different Panel Sizes:** The final two alternative scenarios included the changes in the previous scenario, with the medical home providing 45 percent of primary care and the nurse-managed health center providing 5 percent. We then varied the medical home panel size by 20 percent in either direction, increasing it in one scenario and decreasing it in the other. We did this to take into account the considerable uncertainty surrounding the medical home panel size. It is not clear if the medical home model will allow each provider to serve more patients or if appointment times will lengthen, resulting in each provider’s seeing fewer patients. We found ambiguous evidence in the literature and in our primary survey data (see the Appendix) on this question. The 20 percent variation we used in the latter two scenarios is within the range of case-study evidence of panel-size changes possible with the medical home.

Not surprisingly, because of the high prevalence of the medical home assumed in these two scenarios, provider surpluses and shortages were quite sensitive to the panel size of the medical home. When the panel size grew by 20 percent, the physician shortage was nearly eliminated, but when the panel size shrank by 20 percent, the shortage returned to near the figure in the first scenario (Exhibit 3). The physician shortage would be eliminated if, for example, the second-to-last scenario increased the panel size by 30 percent instead of 20 percent.

**Discussion**

The forecast scenarios reveal several broad themes that have important implications for health policy and workforce planning. First, current forecasts of supply and demand suggest large shortages of physicians and surpluses of nurse practitioners. Our physician supply forecasts reproduce those produced by other researchers. However, recent data suggest that all of these estimates may be somewhat pessimistic: they were constructed before what appears to be an upswing, albeit small, in primary care residency choice among medical students, for example.

Our projected surplus of nurse practitioners resulted from the rapid future growth in the supply of these providers that is expected, combined with their relatively limited use in primary care today. At some level, demand for each type of practitioner separately may be undefined and overlapping if team-based practice expands, which would make surplus and shortage forecasts less meaningful.

Second, the alternative scenarios reveal that
Practices set their panel sizes for a number of reasons, but a key factor is profitability.

surplus and shortage estimates can vary greatly under different sets of reasonable assumptions about models of primary care delivery. Most workforce forecast models do not allow for these variations, assuming instead that today’s use of physicians in care delivery will remain essentially fixed indefinitely. The forecast physician shortage of 20 percent could be nearly eliminated with continued growth in the emerging medical home and nurse-managed health center models and a 20 percent increase in the panel size of an average medical home provider, which should be achievable.

Although the degrees of expansion assumed in some of our scenarios may be unlikely, they remain illustrative and are in line with past rates of growth. Moreover, a growing ratio of nurse practitioners to physicians entering the workforce may make such expansion more likely. In general, these findings suggest that forecasts of provider shortages and surpluses should be used with caution; in particular, they suggest that predicted physician shortages may be overstated.

Third, our forecast scenarios reveal additional insights about each of the two new models of care delivery that we investigated. Expanding the prevalence of the nurse-managed health center in primary care by only a relatively modest amount could greatly diminish expected provider imbalances. Because this model relies almost exclusively on nurse practitioners instead of physicians and physician assistants, any growth in the model would mitigate physician shortages.

We derived panel sizes from our survey and did not vary them in most of our scenarios. Since the nurse-managed health center accounted for a relatively small proportion of total primary care in all of the scenarios, changes in its panel size had a relatively small impact on shortage and surplus projections.

However, panel sizes are not irrelevant. As part of our data collection process, we conducted several discussions with some of the respon-
dents to our nurse-managed health center staffing survey so that we could better understand issues regarding panel sizes and whether they might grow or shrink. Nurse-managed health centers have a historical mission to treat underserved populations. Thus, their panel sizes are already essentially at their maximum, given operational constraints and funding streams that may include not only contracts with payers and governments but also grants, donations, and direct payments from uninsured patients.

A more important area of uncertainty regarding the impact of the nurse-managed health center model on workforce needs is whether the model will, in fact, provide an increasing portion of primary care in the United States. A key determinant in whether the model can expand beyond its current relatively small niche—most centers today are part of academic medical centers serving low-income populations—will be if it can attract enough patient volume to expand.24

Patients and payers are sometimes reluctant to accept this model of care. In response, the Affordable Care Act provided up to $50 million in direct grants ($15 million of which has been authorized thus far) to support the centers.25 The act’s provisions that expand insurance coverage for low-income populations could also add to the viability of the model as a potentially low-cost alternative to more traditional primary care. However, barriers to the model’s expansion remain to be overcome, including restrictive scope-of-practice laws that require physicians’ involvement in certain care processes and patients’ perceptions of nurse practitioners and preferences for providers.26,27

The staffing of the medical home does not appear to differ as radically from standard models as that of the nurse-managed health center. Even if the medical home model expanded to provide 45 percent of primary care in the United States, up from approximately 15 percent today, the projected shortage of primary care physicians would be reduced only modestly (Exhibit 3). However, if indeed the medical home does account for a larger portion of primary care in the future, its average panel sizes will become a key issue in assessing future workforce adequacy.

Practices set their panel sizes for a number of reasons, but a key factor is profitability. Team-based care, panel management and outreach, delegation of tasks to medical assistants, electronic and phone visits, and the elimination of unnecessary care should all enable providers to care for more patients. Yet practices may decide to convert these “efficiencies” into longer patient visits, thus maintaining or even shrinking panel sizes rather than growing them.28,29

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Then again, incentives surrounding panel size could change if fee-for-service medicine accounts for a diminishing share of providers’ payer mix, with the further expansion of accountable care organizations and other forms of global payment or shared-savings models. Many medical home pilot programs, including the one in which most of the Pennsylvania sites we studied participated, have in fact included a per patient payment of some sort. Those pressures would push practices to use the tools described above to increase their panel sizes (adding a new patient to the panel generates more revenue than seeing the same patients more frequently, which is generally not the case under fee-for-service), thus alleviating projected provider shortages without requiring any increase in provider supply beyond what is currently projected.

Conclusion
Projections suggest that if nothing changes in the delivery of primary care, the United States may face a substantial shortage of primary care physicians and surpluses of nurse practitioners and physician assistants by 2025. Yet plausible shifts in primary care delivery models substantially affect those projections. Increases in diffusion of the medical home and of the nurse-managed health center would both work to reduce demand for physicians. In addition, if the potential for increased panel size under the team-based approach of the medical home is realized, the result could be an adequate supply of physicians, even accounting for increased demand resulting from the implementation of the Affordable Care Act.

To achieve that goal may require other changes, such as liberalization of scope-of-practice laws to allow nurse practitioners and physician assistants to perform expanding roles; an increased supply of medical assistants, licensed practical nurses, and aides to perform other key functions in new models of integrated care; and payment approaches that reward providers for population health management and large panel sizes instead of face-to-face visits with physicians.

NOTES