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I

The Future of Nursing Education[1]

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SUMMARY AND CONCLUSIONS

"Learn the past, watch the present, and create the future."

In October 2009, Don Berwick and I were out of the country when we received invitations from Susan Hassmiller to co-author a background paper on the future of nursing education for the Robert Wood Johnson Foundation/Institute of Medicine (RWJF/IOM) Committee on the Future of Nursing. Initial conversations led to long lists of potential topics to be covered. Inevitably, we kept coming back to the question: What would be useful to committee members who deserved a base for their deliberations that was focused and helpful? In the end, we decided that detailed descriptions of the current challenges and recommendations for the future of nursing education from two people were not the answer. Instead, we requested and received permission to challenge five leaders, in addition to ourselves, to write short papers focused on recommendations addressing the most important three issues from each of their perspectives.

With input from the RWJF/IOM Committee members and staff, we chose five esteemed (and busy) leaders and asked them to rise to this challenge within 10 weeks. Each person agreed, and each met the deadline. There were no group discussions, and, since each of us submitted our papers at the same time (no one finished early!), no one altered his or her content based on reading someone else's contributions.

[1] The responsibility for the content of this article rests with the authors and does not necessarily represent the views of the Institute of Medicine or its committees and convening bodies.

The seven papers are reprinted below, followed by a summary of the themes that emerged across papers. How does it match what *you* would have written?

SUMMARY

The authors of the preceding papers came from the Northeast, South, Midwest, and Western parts of the country. One is a distinguished physician colleague, and the nursing educators are comprised of three professors (one a dean emeritus) and three current deans. Each has exerted leadership—in science, teaching, practice, and policy—for multiple decades. Each leads initiatives that extend beyond the boundaries of their places of employment. One is the current president of the American Academy of Nursing. What can we learn across the issues each chose to raise?

The style of the papers differed, so what was called a recommendation, conclusion, or issue varies. I extracted each major point, regardless of label. These major points from all authors are included in the categories below. Following each theme, authors for whom this was a major point are listed in regular font. Some additional authors mentioned the same point but not at the level of recommendations, conclusions, or major issues, and their names are listed in *italics*. Finally, I organized themes using categories that the RWJF/IOM committee chose for panel presentations at their upcoming meeting (what to teach, how to teach, where to teach), adding a few remaining categories so that all major points were included.

What to Teach (or What Students Should Learn)

- Competencies necessary for continuous improvement of the quality and safety of health care systems—patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics (Berwick, Cronenwett, *Tanner*)
  - Mastery of knowledge of systems, interpretations of variation, human psychology in complex systems, and approaches to gaining knowledge in real-world, local contexts (Berwick)
  - Skills and methods for leadership and management of continual improvement, for nurse-teachers and nurse-executives (Berwick)
- Competencies needed in new care delivery models
  - Population health and population-based care management (Tanner)
  - Care coordination (Tilden)
- Knowledge based on standardized science prerequisites (Dracup, Tanner)
- Health policy knowledge, skills, and attitudes (Tilden)
- Competencies related to emerging health needs—e.g., geriatrics (Tanner)

How to Teach

- Guide students in integrating knowledge from clinical, social, and behavioral sciences with the practice of nursing to enhance development of clinical reasoning skills (Cronenwett, Dracup, Tanner, *Tilden*)
- Enhance opportunities for interprofessional education (Cronenwett, Dracup, Gilliss, Tilden, *Tanner*)
  - Evaluate and test models of interprofessional education, including timing, determination of what levels of students should learn together, and what content is most effectively delivered with interprofessional learners (Tilden)
- Develop and test new approaches to pre-licensure clinical education, including use of simulation (Dracup, Tanner)
- Involve students in interprofessional quality improvement projects (Berwick, Gilliss, *Cronenwett*)
- Develop model pre-licensure curricula that incorporate best practices in teaching and learning and can be used as a framework for community college–university partnerships (Tanner)

Where to Teach

- In baccalaureate and higher degree programs (Aiken, Cronenwett, Dracup, Gilliss, Tanner, Tilden)
  - Significantly increase the number and proportion of new registered nurses who graduate from basic pre-licensure education with a baccalaureate or higher degree in nursing (Aiken, Cronenwett)
  - Require the BSN for entry into practice (Dracup, *Tilden*)
  - Support community college/university partnerships that increase the number of associate degree graduates that complete the baccalaureate degree (Dracup, Tanner)
  - Allow community colleges to provide baccalaureate degrees (Dracup)
- In post-graduate residency programs
  - Develop and test clinical education models that include post-graduate residency programs (Tanner)
  - Implement requirement of post-graduate residency for initial relicensure (Cronenwett, Tanner)
- In health care settings that foster day-to-day change and improvement (Berwick)
- In programs built on strong academic–practice setting partnerships (Cronenwett, Gilliss)
  - At Academic Health Centers, promote governance structures that combine the strategic, rather than operational, oversight for nursing (Gilliss)

- In settings that are models of integrated care where care coordination skills can be developed (Tilden)

Who Teaches (Characteristics of Desired Faculty Members of the Future)

Increase the number of faculty members:

- Whose criteria for appointment and advancement include recognition of practice-based accomplishments, including engagement in the work of improving health care (Berwick, Gilliss, Dracup, Cronenwett)
- Who can move easily during careers between practice and academe (Gilliss)
- Who shorten their career paths from BSN to doctoral degree (Aiken, Dracup)
- Who maintain professional certification and/or clinical competence (Gilliss)
- Who build alliances with faculty in other disciplines (medicine, engineering, business, public health, law) (Gilliss)
- Who are capable of leading efforts to advance interprofessional education (Dracup, Tilden)

Recommendations: To Nursing Organizations

- Ensure that schools produce ever-increasing numbers of nurse practitioners for primary care roles at a time when expanded access to health care will increase society's need for primary care providers (Cronenwett, Gilliss)
  - Challenge current credit-heavy requirements and test teaching innovations that improve competence while reducing program credits (Gilliss)
- Support the faculty development necessary to bring about the magnitude of reforms in nursing education recommended in the Carnegie study, necessitated by advances in nursing science and practice and guided by advances in the science of learning (Tanner)
- Advance post-master's DNP education, maintaining specialist preparation at the master's program level (Cronenwett, Gilliss)
  - Fund initiative to facilitate professional consensus that DNP programs should be launched as post-master's program for the foreseeable future (Cronenwett)
  - Clarify the expectations for nurse scientists interested in translational research—will both the DNP and the PhD be required? Will the DNP alone be sufficient for tenure-track positions in research-intensive universities? (Dracup)

- Include as accreditation criteria for nursing education programs:
  - Substantive nursing education–service partnerships, e.g., in shared teaching and clinical problem solving (Cronenwett, Gilliss)
  - Interprofessional education (Cronenwett, Dracup, Gilliss, Tilden)
  - Development of competencies in health policy (Tilden)
  - Student/faculty participation in or leadership of teams that work to improve health care (Berwick, Cronenwett)
  - Student competency development related to health policy (Tilden)
- Identify top ten areas of needed faculty development and provide public recognition for success (Gilliss)
- Support a learning collaborative of state boards of nursing willing to implement regulatory requirements for transition to practice residency programs as a prerequisite for initial re-licensure (Cronenwett)
- Require proof of a nurse's participation in or leadership of teams that work to continuously improve the health care system for renewal of certification (Berwick)
- Urge testing of interprofessional teamwork and collaboration and health policy competencies in licensure exams (Tilden)

Recommendations: To Government and Other Organizations

- Increase scholarships, loan forgiveness, and institutional capacity awards to increase the number and proportion of newly licensed nurses graduating from baccalaureate and higher degree programs (Aiken, Cronenwett)
- Increase scholarships, loan forgiveness, and institutional capacity awards for graduate nurse education at master's and doctoral levels (Aiken, Dracup)
- Redirect Medicare GME nursing education funds to support graduate nurse education (Aiken, Dracup, Tanner)
- Redirect Medicare GME nursing education funds from hospital-based pre-licensure programs to postgraduate residency programs (Cronenwett, Tanner)
- Promote innovation and evaluation of novel approaches to improving preparation for the practice of nursing through expanded Title VIII funding (Cronenwett, *Tanner*)
- Invest in nursing education research, related particularly to the evaluation of multiple pathways to licensure (Tanner)
- Use CTSA or other research facilitation structures to promote knowledge development at the point of care, translation of knowledge into practice, practice improvements, and interprofessional education (Dracup, Gilliss)

- Create a federal health professions workforce planning and policy capacity in the Executive Branch (Aiken)
- Expand authorities for Title VII/VIII funds to support development and evaluation of interprofessional education innovations (Gilliss)
- Expand Nurse Faculty Loan Programs and other loan forgiveness/scholarship programs that produce more faculty (Aiken, Dracup)
- Encourage public and private resource investments that incentivize students and nursing programs to expedite production of qualified nurse faculty by shortening the trajectory from entry into basic nursing programs through doctoral and post-doctoral study (Aiken, Dracup)
- Use Perkins funds to incentivize community college nursing programs to increase the proportion of their nursing students who complete their initial education with a BSN (Aiken)
- Increase programs that support greater production of nurse practitioners for primary care (and remove legal barriers to interprofessional education and practice) (Aiken, Cronenwett)
- Fund a longitudinal study to track state-based data on number and proportion of new nurse graduates from ADN vs. BSN/higher degree programs (Cronenwett)
  - Advance media attention to states that exemplify "best practices" in the distribution of new nurse graduates from ADN vs. BSN programs (Cronenwett)
- Include health services research (in addition to drug and treatment intervention trials) in initiatives to enhance comparative effectiveness research (Aiken)
- Require universities and colleges (presidents, provosts, deans) to support infrastructures and mandates for interprofessional education (Tilden)

CONCLUSION

The recommendations of seven leaders committed to the development of future generations of health professionals included some expected diversity of views. Nonetheless, given the long list of issues that would have been covered had we chosen to write one comprehensive paper, a remarkably small number of themes emerged. Hopefully, these rich ideas and themes can be used to inform the deliberations of the RWJF/IOM Committee on the Future of Nursing. Even more hopefully, a collective national response to these important issues will create a future that meets nursing's obligations to the society it serves.

NURSING EDUCATION POLICY PRIORITIES

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Nursing is one of the most versatile occupations within the health care workforce. In the 150 some years since Nightingale developed and promoted the concept of an educated workforce of caregivers for the sick, modern nursing has reinvented itself a number of times as health care has advanced and changed (Lynaugh, 2008). As a result of nursing's versatility, new career pathways for nurses have evolved attracting a larger and more diverse applicant pool and a broader scope of practice and responsibilities. Nursing, because of its versatility, has been an enabling force for change in health care along many dimensions including but not limited to the evolution of the high-technology hospital, the possibility for physicians to combine office and hospital practice, length of hospital stay among the shortest in the world, reductions in the work hours of resident physicians to improve patient safety, extending national primary care capacity, improving access to care for the poor and rural residents, and contributing to much needed care coordination for the chronically ill and frail (Aiken et al., 2009). Indeed, with every passing decade, nursing has become a more integral part of health care services to the extent that a future without large numbers of nurses is impossible to envision.

A POLICY CHALLENGE

From a policy perspective, nursing's versatility is important to note for the simple reason that nursing has evolved faster than public policies affecting the profession. The result is that nursing's forward progress to better serve the public is hampered by the constraints of outdated public policies involving government education subsidies, workforce priorities, scope of practice limitations and regulations, and payment policies. An important priority in national health care reform is achieving better value for the expenditures made on health services. Since health care is labor intensive, getting more value will depend in large part on enhancing productivity and effectiveness of the workforce. Nurses represent a large and unexploited opportunity to achieve greater value.

The purpose of this paper is to identify and discuss several key changes in nursing education policy that are critically needed to shape the nurse workforce to best serve the health care needs of the American public in the years ahead. It is written with the assumption that nurse scope of practice and payment policy reforms will take place over the near term to remove some of the existing barriers to nurses practicing to the full extent of their education and expertise. This assumption is based on steady progress in removing barriers to nursing practice at the state level and language in current national health reform legislation show-

ing greater neutrality in the designation of types of health professionals who can participate in and lead new initiatives in primary care and chronic care coordination. Changes in nursing education policies are needed to ensure that the nurse workforce of the future is appropriately educated for anticipated role expansions and changing population needs.

Five priority recommendations regarding the future of nursing education are advanced for consideration by the RWJF Committee on the Future of Nursing at the IOM:

- Increase and target new federal and state subsidies in the form of scholarships, loan forgiveness, and institutional capacity awards to significantly increase the number and proportion of new registered nurses who graduate from basic pre-licensure education with a baccalaureate or higher degree in nursing.
- Increase federal and state subsidies for graduate nurse education at the master's and doctoral levels in the form of scholarships, loan forgiveness, and institutional capacity with a priority on producing more nurse faculty.
- Encourage public and private resource investments to incentivize students and nursing programs to expedite production of qualified nurse faculty by shortening the trajectory from entry into basic nursing education through doctoral and post-doctoral study by expedited bachelor of science in nursing (BSN) to PhD programs and comparable innovations.
- Create a federal health professions workforce planning and policy capacity in the Executive Branch with authority to recommend to the President and the Congress health workforce policy priorities across federal agencies and departments.
- Recommend the inclusion of health services research on various forms of nursing investments in improving care outcomes including comparisons of the cost effectiveness of improving hospital nurse-to-patient ratios, increasing nurse education, and improving the nurse work environment. At present comparative effectiveness research is more focused on drug and treatment intervention trials than on innovations in care delivery including workforce interventions.

PRIORITY FUNDING TO INCREASE INITIAL BSN GRADUATES

Every year the percent of new registered nurses graduating from associate degree programs increases, and it is now over 66 percent of all new nurse graduates. Multiple blue ribbon panels on nursing education, including the just released Carnegie Foundation Report on Nursing Education (Benner et al., 2010) as well as health workforce reports to Congress for two decades, have concluded that there is a substantial shortage of nurses with BSN and higher education to meet

current and future national health care needs. Advances in medical science and technology, the changing practice boundaries between medicine and nursing, and the increase in the share of the population with multiple chronic health conditions create a level of complexity in health care that requires a more educated health care workforce. Nursing is the least well educated health profession by far but the one experiencing the greatest expansion in scope of practice and responsibilities. The National Advisory Council on Nurse Education and Practice (NACNEP) (1996), policy advisors to the Congress and the U.S. Secretary of Health and Human Services on nursing issues, urged almost 15 years ago that policy actions be taken to ensure that at least 66 percent of nurses would hold a baccalaureate or higher in nursing by 2010; the actual result is closer to 45 percent. As described in the sections below, growing evidence suggests that the shortage of nurses with BSN and higher education is adversely affecting a number of dimensions of health care delivery now and these problems will only become exaggerated in the future.

Quality of Hospital Care

A growing body of research documents that hospitals with a larger proportion of bedside care nurses with BSNs or higher qualifications is associated with lower risk of patient mortality. Aiken and colleagues (2003) in a paper published in the *Journal of the American Medical Association* (*JAMA*) showed that in 1999, each 10 percent increase in the proportion of a hospital's bedside nurse workforce with BSN qualification was associated with a 5 percent decline in mortality following common surgical procedures. A similar finding was published by Friese and associates for cancer surgical outcomes (Friese et al., 2008). Aiken's team has replicated this finding in a larger study of hospitals in 2006. Similar results have been published for medical as well as surgical patients in at least three large studies in Canada and Belgium (Estabrooks et al., 2005; Tourangeau et al., 2007; Van den Heede et al., 2009).

This research has motivated the American Association of Nurse Executives, the major professional organization representing hospital nurse chief executive officers who employ 56 percent of the nation's nurses, to establish the BSN as the desired credential for nurses. Many hospitals, particularly teaching hospitals and children's hospitals, are acting on the evidence base by requiring the BSN for employment. Nurse executives in teaching hospitals have a goal of 90 percent BSN nurses, and community hospital nurse executives aim for at least 50 percent BSN-prepared nurses (Goode et al., 2001). Since only 45 percent of bedside care nurses have a BSN, many executives cannot reach their goals.

Access and Costs

There is some research evidence that the cost effectiveness of nursing improves with a more educated workforce. In Aiken's *JAMA* paper, evidence was

presented to show that the mortality rates were the same for hospitals in which nurses cared for 8 patients each, on average, and 60 percent had a BSN and for hospitals in which nurses cared for only 4 patients each but only 20 percent had a BSN (Aiken, 2008; Aiken et al., 2003). More research is needed to assess the comparative value of investing in different nursing strategies that evaluate the relative cost and outcomes of increasing nurse staffing, educational levels, and improving the organizational context and culture of the nurse work environment. At this point the evidence is encouraging that a more educated hospital nurse workforce might allow for a smaller nurse workforce without adversely affecting patient outcomes. If confirmed in future research, this finding could have important implications for both cost of hospital care and for the number of nurses actually needed in the future to staff hospitals.

In the ambulatory sector, there is a strong research base documenting that nurses with advanced clinical training, usually master's degrees in advanced clinical practice, provide primary care with outcomes comparable to, and in some domains like symptom control and satisfaction better than, those of physicians and with lower costs (Griffiths et al., 2010; Horrocks et al., 2002). Rand researchers estimated, for example, that the state of Massachusetts could save up to $8 billion over a decade by attracting more advanced practice nurses and removing barriers that prevent them from practicing at the full level of their education and expertise (Eibner et al., 2009). Increased use of advanced practice nurses is one of the very few practice innovations currently underconsidered in national health reform, including medical homes and chronic care coordination, that would yield net cost savings nationally according to Rand researchers (Hussey et al., 2009).

How the Shortage of BSN Nurses Impacts Future Nurse Supply

As argued above, the shortage of BSN nurses has implications for health care quality and safety, access, and costs of care. A less well recognized consequence of the shortage of BSN nurses is a shortage of faculty which could have a long-term impact on national production capacity of nurses for the future.

The Department of Labor estimates that 600,000 new jobs will be created for nurses over the next 10 years, the highest rate of new job production for any profession (Bureau of Labor Statistics, 2009). In addition, over a half million nurses in the current workforce, which has an average age of around 48, will reach retirement age over the same period, resulting in the need for over a million nurses to be added to the national workforce. The good news is that there is tremendous interest in nursing as a career in the United States after a century of difficulty attracting the best and brightest to nursing. The reasons for this unprecedented interest are multifaceted, having to do with attractive incomes, averaging nationally $65,000 a year and higher in some locations, better job prospects than in other employment sectors, and perceptions of personally satisfying work helping others. If we can take advantage of this unprecedented interest and expand nursing school production, future nursing shortages could be greatly attenuated.

The bad news is that nursing schools do not have the capacity to absorb the great windfall in applicants. Estimates suggest that at least 40,000 qualified applicants to nursing schools are being turned away each year (AACN, 2009). There are several reasons why nursing schools are unable to accept the influx of applicants. Nursing schools have expanded enrollments steadily for more than a decade with graduations increasing from about 75,000 in 1994 to 110,000 in 2008. Resources of all kinds are now stretched and schools are having difficulty expanding further. Institutions of higher education in general are experiencing serious budget constraints and as a result are slowing enrollment growth. Additionally the shortage of nursing faculty has become a major constraining factor.

A strategy for ameliorating the nurse faculty shortage that has received little attention to date is to increase entry-level education of nurses to produce a larger pool of nurses likely to obtain graduate education. In a recent paper in *Health Affairs* Aiken and colleagues provided a cohort analysis to determine the highest education achieved by nurses receiving their basic or initial nursing education between 1974 and 1994 (Aiken et al., 2009). We found that choice of initial nursing education program—associate degree or baccalaureate—was the major predictor of final educational attainment. Close to 20 percent of nurses irrespective of initial nursing education obtain a higher degree. However, of the 20 percent of associate degree nurses who obtain an additional degree, 80 percent stop at the baccalaureate degree. Of the 20 percent of nurses with a baccalaureate degree who go on for additional education, almost 100 percent obtain at least a master's degree. This is an important finding for the design of policy interventions since investments in encouraging BSN education have not distinguished between RN-to-BSN programs and basic BSN programs. The yield for teachers is entirely different between the two types of programs. If the current scenario of distribution of nurses by type of basic education had been reversed since 1974 and 66 percent of nurses had graduated from BSN programs instead of 33 percent, we estimate that there would be over 50,000 more nurses with master's and higher degrees today.

We concluded in our *Health Affairs* paper that it was a mathematical improbability that the nurse faculty shortage could be solved without changing the distribution of nurses by type of basic education. There are simply not enough nurses who obtain a master's or higher degree to meet the dramatic increase in demand for clinicians, administrators, teachers, and leaders who require a graduate degree.

What would be the expected yield in terms of nursing faculty that would be likely to obtain by increasing basic BSN education? To answer this we undertook an analysis of the National Sample Surveys of Registered Nurses over time to explore whether career trajectories of nurses with graduate education had changed over time. The answer is yes—significantly. For example, in 1982, 17 percent of nurses with master's degrees and 62 percent of nurses with doctorates were in faculty positions compared to only 7 percent of master's and 41 percent of nurses with PhDs in 2004. Nurses with graduate degrees are selecting positions in

clinical care and administration in ever larger numbers. The yield for teachers is clearly greater for those who earn doctoral degrees which argues for policies that aggressively recruit BSN nurses into expedited doctoral education thus bypassing the master's, which has a very clinical curriculum and a different end objective focused on producing clinicians. Probably for historical reasons, many schools build their curricula sequentially from BSN to MSN to doctoral degree. However, the clinical master's in specialty practice has little to do with learning to teach or to conduct research. The clinical masters is not a building block for doctoral study but a terminal degree like the MBA or the Masters in Engineering. In order to address the faculty shortage two things would have to happen simultaneously. More nurses would need to initiate basic nursing education at the baccalaureate level AND expedited BSN to PhD programs would need to be expanded to interest students in teaching careers earlier and expedited to bypass the clinical masters that emphasize career trajectories in clinical care. The clinical master's is not a building block for doctoral education but a different career pathway.

Tying educational loan forgiveness to teaching is a reasonable supplemental strategy along with a focus on BSN to PhD education to help offset lower incomes in faculty positions. Actually closing the gap between practice and academic salaries is not feasible. The gap exists in every practice discipline including medicine, law, business, and engineering. University faculty salaries vary for different fields depending upon market factors but not enough to close the gap between teaching and practice within disciplines. Combining clinical and academic responsibilities for nurse faculty is a potential strategy for enhancing faculty incomes. However, in only a few nursing specialties like nurse anesthesia or executive positions are rates of remuneration for clinical nursing care high enough to offset lower academic salaries for teachers with joint clinical appointments.

Articulation programs aimed at facilitating additional education for RNs with less than a baccalaureate degree have been tried for decades and do little to produce more teachers. Once nurses qualify for licensure, 80 percent do not seek further education. Oregon has the most innovative approach to improving articulation between associate degree and baccalaureate programs by standardizing requirement; the Oregon program has twice the success rate of the national average with 40 percent of associate degree nurses obtaining the BSN. However, the Oregon articulation initiative would not solve the shortage of teachers because most of those who get the BSN will not go for a second additional degree. RN-to-MSN programs would have a somewhat higher yield for teachers than RN-to-BSN completion courses but not nearly as high a yield as BSN-to-PhD programs.

Associate degree education is appealing to policy makers because it seems to offer upward mobility and it is less expensive and more geographically accessible. However, data suggest in the case of registered nurses that initial qualification for licensure at the associate degree level actually constrains educational and

career mobility compared to those who initially qualify at the bachelor's degree level. The advantages of associate degree education, lower out-of-pocket costs and geographic proximity, can be offset in the case of nursing by public subsidies for educational costs and distance learning. The length of associate degree and baccalaureate programs are not significantly different because of licensure requirements. Maintaining three (including diploma) educational pathways for nurses that at least on the surface do not seem radically different have a dramatic impact on the upward educational mobility of nurses thus contributing to the shortage of faculty and other nurses requiring graduate-level education.

The majority of countries with health care comparable to the United States have moved to standardize nursing education at the baccalaureate entry level including the European Union. States have the authority in the United States to set licensure requirements for nursing. Prospects for standardizing education of nurses through licensure changes across 50 states are not good. However, financial incentives imbedded in public subsidies for nursing education could have a significant effect on changing patterns of education just as payment incentives change medical practice patterns.

The IOM Committee should recommend increasing public subsidies for basic nursing education—federal and state—and tying these funds to the production of baccalaureate graduates. Policies should be neutral on types of institutions—community colleges or 4-year colleges and universities—that could benefit from funding. Capitation funding on the basis of BSN graduates from basic education programs could be effective in shifting the proportion of graduates toward more with BSN qualifications. Coupled with increased funding for graduate nurse education, this could be an effective strategy for addressing the faculty shortage along with shortages of advanced practice nurse clinicians and administrators.

IOM committee members in a previous discussion of this option asked what the yield would be for faculty positions in increasing baccalaureate graduates. Additional research is needed to answer this important question directly. However, we know from existing research that BSN initial graduates are three times more likely to get a master's degree and twice as likely to get a doctoral degree than associate degree nurses (Aiken et al., 2009), which would likely produce more teachers. Because the current yield of teachers is relatively low overall among nurses with graduate degrees—only 7 percent of master's graduates and 41 percent of doctoral graduates electing faculty positions—policies to increase baccalaureate initial education would have to be accompanied by efforts to increase the teacher yield. Promising strategies to increase the teacher yield among those with graduate credentials include scholarship and educational loan repayment for those in teaching roles and funds to expand BSN-to-PhD expedited programs. And investments in more baccalaureate nurse graduates would also likely return additional benefits in the form of better quality, improved access, and efficiency for those electing clinical practice roles, an outcome in the public's interest.

INCREASED FEDERAL AND STATE FUNDING FOR GRADUATE NURSE EDUCATION

The evidence is strong that the growth of advanced nurse practice has contributed to improved access to general care (Aiken et al., 2009). Over the past decade advanced practice nurses have largely staffed the new retail clinics that currently provide about 3 million ambulatory visits a year at an estimated per visit cost of below the average cost to a physician office. Additionally, advanced practice nurses have enabled the largest expansion of Community Health Centers (CHCs) since the Great Society Program; CHCs currently provide over 16 million visits in 7,300 sites to largely underserved people. In total, advanced practice nurses are estimated to provide up to 600 million ambulatory patient visits a year, a national primary care capacity enhancement that will become increasingly critical to access in a context of primary care physician shortage.

The rate of production of new advanced practice nurses (APNs) which had been growing steadily since the 1970s has been flat in recent years. Interest among nurses in advanced practice roles appears strong but the shortage of student financial aid for graduate nurse education has a chilling effect on enrollment growth. It is difficult for many nurses to forego employment income to attend graduate programs full time without scholarships or loans which are in short supply. The major source of funding for graduate nurse education is Title VIII annual appropriations which currently total about $60 million (estimate for graduate education only, not all of Title VIII funding), compared to $2.4 billion for direct graduate medical education for physicians. A large proportion of APN students pursue graduate education on a part-time basis which slows the production of new graduates. Employer tuition benefits, an important source of educational assistance for practicing nurses, have been reduced during the economic downturn, eroding available financial support for graduate nurse education, particularly at the master's level which is generally required for advanced nurse clinical practice.

Medicare, since its inception, has paid for a share of graduate medical education. It has also reimbursed some hospitals for a portion of their nursing education costs. An analysis we conducted of 2006 HCRIS data from the Centers for Medicare and Medicaid Services (CMS) suggested that Medicare funding for nursing education was slightly less than $160 million annually, a small amount compared to medical education investments, but almost as much as all of Title VIII funding for nursing in that year. CMS has a larger estimate of $300 million in Medicare payments for nursing education but we cannot verify that estimate with publicly available data. But whether Medicare funding is $160 million or $300 million annually, policies governing expenditures are very different from how the funds are spent in support of medical education, the amount is large relative to other sources of federal support for nursing education, and the funding does not materially affect the supply of nurses or the quality of nursing

care for the elderly (Aiken and Gwyther, 1995). Most of the funds are limited to hospital-sponsored diploma nursing schools which currently prepare less than 5 percent of new RNs annually. Also five or six states account for almost half of Medicare nursing education funding because of the location of the relatively few surviving diploma nursing schools.

A number of workforce studies and commissions, including a 1997 IOM committee, have called for the realignment of Medicare funding for nursing education to graduate nursing education (IOM, 1997). The health reform bill passed by the Senate proposes a small demonstration of up to five hospitals to test Medicare payments for graduate nursing education. While better than no progress at all, the proposed demonstration is too small to significantly advance a change in Medicare policy that is long overdue.

There is sufficient information available now as suggested by the Institute of Medicine in 1997 to realign Medicare nursing education funding to graduate nursing education. This could be a budget-neutral programmatic shift which would more than double current federal funding levels for graduate nursing education and serve as a significant stimulus for increased production of advanced practice nurses to meet the multitude of existing and emerging needs resulting from the continuously changing boundaries between nursing and medicine.

FEDERAL AUTHORITY ON HEALTH WORKFORCE POLICIES

There is little effective health workforce policy-making at the federal level. The modest nursing policy capacity is located within the Health Resources and Services Administration, an agency within the Department of Health and Human Services (HHS) with little of its own funding and no authority to engage CMS which controls Medicare nursing education funding or the Department of Education, where the largest funding for nursing education resides in the form of Carl Perkins Act funding for community colleges.

Patterns of basic pre-licensure education for nurses have changed dramatically in the 45 years since the nation's last major health reform—Medicare and Medicaid. In 1965, over 85 percent of nurses received their basic education in hospital-sponsored diploma programs; now less than 5 percent do. The percentage of registered nurses receiving training in associate degree programs was less than 2 percent in 1965 but is over 66 percent today. Baccalaureate nursing programs produced about 10 percent of new nurses in 1965, which increased to about a third of new nurses by 1980 and has been stable there for 30 years (Aiken and Gwyther, 1995). Current Medicare policies for support of nursing education as implemented by CMS are still based on nursing education patterns that existed when Medicare was passed but that are practically irrelevant today. CMS has been resistant to proposals to realign existing Medicare support for nursing education to graduate nursing education through multiple different administrations in Washington.

The single largest source of federal support for nursing education is the Department of Education's funding for community colleges through the Carl Perkins Act. Perkins funds exceed $8 billion annually. A high priority should be set on examining whether and how Perkins funds could be targeted to incentivize community college nursing programs to increase the proportion of their nursing students who complete their initial education with a BSN. There are numerous feasible strategies to do this including having community colleges offer the BSN as in Florida and other states as well as innovative partnerships with 4-year colleges and universities perhaps using state-of-the-art distance learning technologies supported by Perkins funding.

The most influential of the many commissions on nursing over the decades was the 1982 IOM study *Nursing and Nursing Education: Public Policies and Private Actions*. That study made a recommendation involving an organizational change within HHS that dramatically altered national nurse leadership and nursing education. The recommendation was to move the responsibility and budget authority for nursing research from HRSA to NIH where research was highly visible and influential. The establishment of the National Institute of Nursing Research within two decades fundamentally transformed the engagement of nursing in evidence-based innovations to improve health outcomes, helped create new and important interdisciplinary research and research training collaborations, and improved the relevance and quality of nursing education in universities. The proposal to establish a nursing workforce authority at a higher level of the federal government could have an equally influential impact on the adequacy of the national nurse workforce.

FINAL THOUGHTS

The Commission on the Future of Nursing has considered many important aspects of the education and practice of nursing. Of the many types of recommendations the committee might consider, recommendations regarding federal (and state) funding of nursing education are among the most actionable and potentially influential in creating a future for nursing that serves the public's interests in patient-centered accessible health services at affordable costs. What is good for the public is genuinely good for nursing. Using public nursing education policy as a vehicle for achieving a better balance between the qualifications of nurses and national health care needs could result in great return on investment now and in the years ahead.

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PREPARING NURSES FOR PARTICIPATION IN AND LEADERSHIP OF CONTINUAL IMPROVEMENT

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"I see." said the nurse,
"You're saying that I have two jobs: doing my job, and making my job better."

In the 20 years since I first heard that comment from my colleague, Paul Batalden, MD (retold January 2010), who was quoting a participant in a course he was teaching on health care improvement, I have never heard a more succinct summary of the modern view of the pursuit of quality in a complex system. It is a deceptively simple idea, replete with implications for the preparation, self-image, support, and daily life of the professional. It represents a comprehensive goal for the modern nurse and for those who wish to prepare people for that role.

The capacity to "make my job better" is not inborn. Nor is it usually taught in professional education. What professional education, including nursing education, has more reliably focused on is the content of the job—the subject-matter knowledge and cognitive and manipulative skills to care for patients in existing processes and institutions. Standards exist for how one ought to perform tasks, including dynamic tasks like problem-solving; professional preparation instills mastery of those tasks, and professional licensure and certification allege to assure achievement of that mastery.

W. Edwards Deming, one of the great theorists and teachers of improvement in systems contexts, distinguished this discipline-specific and subject-matter knowledge, which tells one, in effect, "how to be a nurse," from what he called "Knowledge for Improvement" (or, less felicitously, "Profound Knowledge") (Deming, 1994), which would tell one "how to improve nursing" or, more accurately, "how to help improve the system of which nursing is a component." Mastery of the first—subject-matter mastery—does not confer mastery of the second—knowledge for improvement. This form of knowledge invites attention to the system in which professional work is conducted.

In some ways it is surprising how little our pedagogy promotes appreciation of systems of care. Arguably, most graduates of most health professional educational programs suffer from considerable "functional illiteracy" about the systems in which they work. Few emerge from their studies with a well-developed sense of responsibility for the performance of these systems, even though they work in those systems and depend on them every day.

The evidence of serious deficiencies in the performance of health care as a system is overwhelming and incontrovertible. It fueled the findings and recommendations of the landmark Institute of Medicine report, *Crossing the Quality Chasm*, in the year 2001, which claimed: "Between the health care we have and the care we could have lies not just a gap but a chasm" (IOM, 2001, p. 1). Its

diagnosis—incapable systems of care: "In its current form, habits, and environment, American health care is incapable of providing the public with the quality health care it expects and deserves" (IOM, 2001, p. 43). The *Chasm* report established six "Aims for Improvement" of care, which now compose a canonical list:

- safety (reducing harm from care);
- effectiveness (increasing the reliability of alignment between scientific evidence and practice, reducing both underuse of effective practices and overuse of ineffective ones);
- patient-centeredness (offering patients and their loved ones more control, choice, self-efficacy, and individualization of care);
- timeliness (reducing delays that are not instrumental, intended, and informative);
- efficiency (reducing waste in all its forms); and
- equity (closing racial and socioeconomic gaps in quality, access, and health outcomes).

In the decade since the *Chasm* report, the social imperative for all six of these improvements has increased, with perhaps special emphasis lately on "efficiency" as the costs of American health care have come to appear less and less sustainable. Activities in health care policy, management, and payment have increased, with more or less coherence, in pursuit of those goals. Yet the response from health professionals (and the faculties who train them) to shoulder accountability for health system performance has been limited, and in many places virtually absent.

If, as the *Chasm* report alleges, the current system of care is "incapable" of the needed improvement, then, logically, pursuit of the IOM Aims for Improvement requires that the system change. Nursing, like any health care profession, can become an object of change, or an agent of change. The latter role will require a new form of professionalism with new skills in system redesign.[2]

Nursing is positioned well to be a change agent. One recent national project to reduce patient injuries, the Institute for Healthcare Improvement's 100,000 Lives Campaign (McCannon et al., 2006) translated the IOM aims of "safety" and "effectiveness" into operational form as "bundles" of evidence-based care procedures, such as the "Central Line Bundle" to prevent catheter-associated

[2] Some elements of that new professionalism have been labeled in the reformulation of goals of resident training by the Accreditation Council for Graduate Medical Education (ACGME) as "systems-based practice" and "practice-based learning and improvement." The Association of Boards of Medical Specialties (ABMS) were "partners" in the definition of competencies both for initial certification (after residency) and for Maintenance of Certification—a process adopted now by each medical specialty member of the ABMS. The latter means that every practicing medical specialist will be required to demonstrate performance improvement in practice in order to maintain their board certified specialty status.

bloodstream infections, the "Ventilator Bundle" to present respirator-associated pneumonias, and Rapid Response Teams to intercept patient deterioration with early warning, diagnosis, and treatment. Hundreds of hospitals reported success in improved patient outcomes, and a recurrent pattern included activated nurses, supported to standardize their own processes of care according to the Institute for Healthcare Improvement (IHI) "bundles," and empowered and supported to monitor and enforce those standards across disciplines, including with their physician colleagues (Berwick et al., 2006). Present steadily at the point of care, committed to excellence and reliability, equipped to measure locally, biased toward teamwork, and, crucially, encouraged to innovate locally to adapt changes to local contexts, nurses proved the ideal leaders for changing care systems and raising the bar on results.

Some relevant education innovation are well under way. The pioneering work of the Quality and Safety Education for Nurses (QSEN) project (Cronenwett et al., 2007) and the adoption by the American Association of Colleges of Nursing of the QSEN quality improvement competencies in *The Essentials of Baccalaureate Education* for undergraduate nursing education is heartening and opens the possibility that students across the professions will develop similar competencies for the improvement of care. Further, QSEN's work on faculty development (Cronenwett et al., 2009a) and graduate nursing education (Cronenwett et al., 2009b) to extend these ideas into all of nursing professional development is exciting. IHI's Open School for the Health Professions is an interprofessional educational community that helps students from all the health professions to acquire the skills to become change agents for health care improvement.

From the viewpoint of nursing education, the capacity to help improve systems of care has two big elements: (a) personal skills and (b) a context of leadership and management that allows those skills to thrive in action. Nursing education fit for the needs of the 21st century will attend to both.

PERSONAL SKILLS: THE CATEGORIES OF KNOWLEDGE FOR IMPROVEMENT

Deming's four "profound knowledge" categories offer a useful framework for education goals and achievements for nurses capable of helping to improve systems:

1. Knowledge of Systems
2. Knowledge of Variation
3. Knowledge of Psychology
4. Knowledge of How to Gain Knowledge

Let us explore each.

Knowledge of Systems

"Knowledge of Systems" refers to understanding the technical characteristics of complex systems, in which factors like interdependency, feedback loops and other nonlinear dynamics, uncertainty, and sensitivity to small changes constantly operate. Without systems knowledge, one approaches work (or life in general) as a series of lists, with a mentality of checking off tasks, with assumptions of direct and linear cause-and-effect dynamics. The world, or the organization, is modeled like a machine, and simplification seems helpful. In health care, of course, things rarely work that way. In clinical work, medications can have remote, delayed, and confusing side effects; organs interact in complex and powerful ways; patient status can be unstable, with feedback loops that spiral into sudden disasters and unwelcome surprises. Well-trained nurses are familiar with system dynamics of that sort: they understand the pituitary-adrenal-hypothalamic axis; they have studied family systems; and they are alert always to medication interactions and the effects of organ failure on physiology. Each of these requires "knowledge of systems," that is, knowledge of the body as a system, for appropriate diagnosis and response.

Where "knowledge of systems" is less robust in the preparation of nurses (as well as most other health professionals) is in understanding the work of health care as a system. This ignorance is the harvest less of intent than of historical accidents. In effect, modern health care is an assemblage of component roles, disciplines, and institutions built up more or less independently, and often without much regard for their interactions. Nurses and doctors who will work together for their entire professional lives rarely train together for even a single day. Tasks are compartmentalized. In many medical records "nursing notes" remain separate from "physicians' notes," and in many hospital wards the "Nurses' Conference Room" and "Nursing Rounds" are separate from the "Doctors' Conference Room" and "Medical Rounds." The fragmentation runs deep, as reflected in language, oaths, uniforms, schedules, and prerogatives.

In addition, the processes of care themselves, by which I mean the flows and steps through which patients, specimens, information, and ideas pass, are often unclear and designed, if at all, only unconsciously. No one is really sure what all the steps are that a patient traverses from admission to diagnosis to treatment to discharge, and no one is in charge of the entire flow. In Paul Batalden's words, health care lacks the "catwalks" that make processes visible, and therefore analyzable, in manufacturing. It is very hard to manage and improve what one cannot see or understand, and "process illiteracy" confounds health care redesign often.

This is not inevitable. "How do we do that?" is a perfectly reasonable and tractable question for almost any set of interdependent deeds in health care, just as long as someone is in a position to ask and to mobilize the information to find the answer. The answer may prove embarrassing—there may be no stable process

at all, or the one that does exist can look, upon inspection, absurdly wasteful or unscientific; but, the ability to examine and study processes opens the door to changing processes, which is on the road to improving them.

I am not a nurse, but my guess is that nursing educators will have no difficulty at all recognizing some educational goals in which "knowledge of systems" is already a high priority. For example, I suspect that nursing training for some specialist roles, such as for participation in an open heart surgery team, is full of attention to system dynamics of all sorts. No patient has ever gotten successfully onto and off of a heart–lung machine without exquisite attention by an entire team to process steps, interdependencies, and interactions, likely very consciously designed and monitored.

The task in modernization of nursing education is to generalize the pursuit of system knowledge into all that nursing is and does. Topics of relevance may include (a) health care as a system, (b) general systems theory, (c) queuing theory and flow in care systems, (d) reliability and reliability engineering, (e) lean production, and (f) resilience (Spear, 2008). In the important and special arena of safety, system topics include (g) human factors science (Reason, 1990), (h) team communications and collaboration, (i) failure mode and effect analysis, and (j) properties of high-reliability organizations (Weick and Sutcliffe, 2007), to name a few.

Knowledge of Variation

Professor George Box has said, "All systems produce information on the basis of which they can be understood." The new professional capable of leading and participating in improvement knows how to hear and use that information.

Measurement is abundant in health care, as nurses well know. Nurses spend an inordinate proportion of their time documenting and recording things; they measure all the time. However, measuring is not at all the same task as *using* measurement, especially using measurement to improve. When measuring for improvement (as opposed to measuring for judgment or measuring for selection), one is either (a) observing variation to extract ideas or (b) introducing variation to study the consequences.

Observing variation is what nurses do every day in recording a patient's vital signs, for example. The aim is inference: either that the patient is stable, or that a systematic or sudden change in status is under way. In effect, every blood pressure or temperature measurement is a test of a hypothesis that either "something special is going on" or "nothing special is going on." Nurses in that role are like other scientists—continually measuring and making repeated inferences (Berwick, 1991).

How well they do that helps to determine patients' outcomes. "Is the antibiotic working as expected?" "Is the blood pressure coming under control?" "Is the patient entering, or staying in, proper fluid balance?" Upon the answers to

those questions, based on proper interpretation of variation, rest crucial decisions about maintaining or changing theories and therapies. The challenges of proper interpretation are significant, and neither physicians nor nurses yet today receive sufficient instruction in how to understand variation correctly. The consequence of failure are what Dr. Deming referred to technically as two forms of "tampering." The first form is to react to a random change in a measurement—such as a temporary rising temperature or a temporarily falling blood pressure—as if it were informative ("the antibiotic is not working," or "this patient needs more pressor") when, in fact, the observed fluctuation is only random, and would revert if nothing new were done. The converse form of tampering is to classify a change as characteristic of a system when, in actual fact, it is not at all likely to be representative of the general system from which it comes. This misinterpretation can lead one to make a wholesale change in response to a special event, as when our transportation security system radically alters inspection regimes in response to a single, unlikely-to-be-repeated threat.[3]

As modern medical care and monitoring multiply the volume of information and the number of measurements flooding the nurse at the front line, the demand for technical sophistication in interpreting physiological and biochemical variation rises steadily. The modern nurse should be equipped as never before with the knowledge to interpret variation correctly, to avoid tampering, and to increase agility in appropriate response.

What applies to patients applies to systems of care, as well. The "vital signs" of health care as a system are numerous and, like measurements of patients, increasing in availability daily. System characteristics include, for example, waiting times and delays, rates of complication and outcomes of surgery and other interventions, infection, and mortality, patient satisfaction, costs and levels of waste and efficiency, safety levels and adverse events, and levels of variation in approaches to diagnosis and treatment. Many such measurements are appearing in new forms of accountability of health care organizations and professionals to payers, regulators, accreditation agencies, consumer groups, and licensing bodies. The psychology of such external measurement can be quite negative, inducing fear, anger, and sometimes deceptive practices even among the most committed professionals, but this negative cycle ought not to obscure a basic fact: that the improvement of health care systems requires very much the same type of measurement, used internally, that scrutiny bodies demand and use for other purposes externally (James et al., 2003). Ideally, even if no one else required measurement of infection rates or surgical outcomes, clinicians, themselves, ought to seek them avidly as a crucial resource for making care better.

[3] The technical description of the first form of tampering is "reacting to common cause variation is if it were of special cause"; the second form is "reacting to special cause variation as if it were of common cause." Knowing the difference between "special cause" and "common cause" variation is at the heart of modern statistical process control.

Modern nurses will, of necessity, have to learn the tasks involved in measurement for scrutiny and compliance—that's the hard fact. But, modernized nursing education will emphasize far more the role and use of system metrics as a support to the continual improvement of health care along all six of the IOM dimensions. Individual nursing practice will, in that mode, include avid measurement and sophisticated interpretation to answer questions of the form: "How is our system doing at X, and what can the variation tell us about how to do better?"

Measurement for improvement goes far beyond mere observation. It includes systematic, local interventions—making changes in processes of care and assessing and learning from the consequences of those changes. An important boundary exists between formal scientific investigations—experiments that ought to invoke the whole apparatus of planning and human subjects protection that are now required in some settings—and the daily practice of continual improvement through the introduction and assessment of better local processes—the "Plan-Do-Study-Act" approach that is at the core of modern improvement methods, and about which we will have more to say below. That said, the modern nurse ought to be equipped to participate in and often to lead systematic changes in work processes, and to assess their effects on the outcomes desired (Langley et al., 2009).

Knowledge of Psychology

Largely because interdependency, especially interdependency among people, is so much a characteristic of complex systems like health care, human nature and psychology play a strong role in the success or failure of improvement efforts. Dr. Deming had in mind a rather long list of the components of "psychology" whose understanding and mastery underpin successful improvement work. One short subset of relevant skills is this:

- Conflict resolution and negotiation;
- Group process and meeting management;
- Forging and maintaining cooperation and coalitions;
- Adult learning;
- Understanding motivation, especially intrinsic motivation;
- Communication and signaling; and
- Maintaining a culture of safety.

The unifying concept among these topics is "managing and improving interpersonal relationships," which can be daunting in a context of high pressures on production, historical boundaries among disciplines and subsystems, hierarchy, and high risk. Scholars of so-called high reliability organizations (HROs) (Weick and Sutcliffe, 2007) nonetheless find that it is exactly under conditions of stress, risk, and complexity that relationships matter the most in determining success. It may be impossible for nurses unilaterally to effect better relationships unless

other professionals aim to do the same, but nurses are so central to health care processes that they may well be able to take the lead.

Knowledge of How to Gain Knowledge

Learning in complex systems is, itself, complex. Nonlinear systems confound attempts to develop and enforce simple models of cause and effect, and so traditional, hypothetico-deductive methods to explore cause and effect often fail. We know that in the daily life of parenting, marital relationships, and team sports, where "continual learning and improvement" replaces "planned experiment" as an approach for gaining knowledge.

Even where firm, cause-and-effect knowledge exists in science-based health care—the knowledge, for example, that antibiotic A will almost always kill bacterium B—the application of that knowledge runs straightaway into the messy world of complex systems. That is, reliably getting the antibiotic safely into the body of a patient with that germ turns out to be a constant challenge as systems fail (the order got lost), unpredicted side effects occur (the patient is on an incompatible other drug), local circumstances become highly relevant (the drug is unfamiliar to the new doctor), and errors multiply (the bacteriological report was on the wrong patient). The fact is frustrating and inescapable: in health care, as in any complex enterprise, the simple, scientific facts lie fallow without continual adaptation to local contexts.

The consequence for improvement is this: almost all effective improvements require continual, local experimentation—local growth in knowledge. All improvement requires change (although not all changes are improvements), and proper change requires continual learning. A modern workforce, including modern nurses, is fully equipped to act as "scientists at work." When the nurse quoted at the top of this essay said, "I have two jobs: my job and improving my job," she was entering a world of continual trial and learning for both of those roles.

We might call the subject, scarily, "epistemology," for it involves, after all, a theory of knowledge, itself: the idea that human beings in complex systems best acquire new knowledge by making changes and studying the effects of those changes. But, it is in fact not so arcane at all. This is the form of learning that all healthy people use in almost all the common endeavors of their daily lives—the endeavors that they care about and are in some degree of control over: sports, hobbies, loving relationships, cooking, dieting, and getting a good night's sleep. In every single case, the individual who wishes to get better finds ways continually to test new approaches, knowing that, as we all know: "If you continue to do what you've always done, you'll always get what you've always gotten." That's not good enough for your tennis game or your gardening, and it's not good enough for the work of health care, either.

The jargon of modern improvement is "PDSA"—"Plan-Do-Study-Act." This describes a simple, iconic cycle of aim-setting, testing, reflection, and change

based on reflection. The modern nurse who intends to "improve the job" effectively needs to be a master of the "PDSA Cycle" at work. Unlike in gardening or tennis, PDSA at work is not a solo enterprise. Almost all forms of organized quality improvement activity today involve teams; groups, not soloists, carry out the tasks of will building, measurement, idea generation, design and conduct of small-scale tests of change, reflection, and guidance to further action. These compose quality improvement projects. For a modern nurse, participation and leadership in such project work is the form taken of action based on "knowledge about how to gain knowledge."

LEADERSHIP AND MANAGEMENT SKILLS

The four areas of skill and knowledge explored above—systems, variation, psychology, and epistemology—compose a strong set of goals for modernized nursing education on behalf of quality improvement. One key element is missing, however—the context of leadership and management that allows those skills to thrive. Not all nurses will become formal system leaders during their careers, but those who do will more effectively nurture system improvement if they understand how to lead improvement.

A full exploration of "leadership for improvement" is beyond the scope of this essay, and numerous resources are readily available attempting to describe what leaders need to know in order to foster improvement in the systems they lead (Reinertsen et al., 2008). However, a few leadership-dependent elements deserve special mention because they interact so strongly with the topics addressed above:

- Setting Aims and Building Will to Improve
- Measurement and Transparency
- Finding Better Systems
- Supporting PDSA Activities, Risk, and Change
- Providing Resources

When leaders, including nursing leaders, establish these and other preconditions in the work setting, they can effectively liberate the energy and wisdom of the front-line staff and middle managers to incorporate continuous improvement into their daily work, and they stand a better chance of ensuring that these good-hearted, local improvement efforts align with and support the most important strategic goals of the organization and system as a whole. Just as good teachers in a classroom make it possible for students to become active learners, so do good managers make it possible for nurses and all health professionals to become active, curious, effective, and, ideally, joyous improvers.

SUMMARY

Modern health care demands continual system improvement to better meet social needs for safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity. Nurses, like all other health professionals, need skills and support to participate effectively in that endeavor, and, often, to lead it. Nursing education is poised to accelerate progress by embedding health care improvement skills in all phases of professional formation.

Following are recommendations intended to support this vision:

1. Preparation of nurses should include mastery of knowledge of systems, interpretation of variation, human psychology in complex systems, and approaches to gaining knowledge in real-world contexts.
2. During professional preparation, nurses-in-training should experience and reflect upon active involvement in multidisciplinary quality improvement projects and work settings that foster day-to-day change and improvement.
3. During professional preparation, nurses-in-training should experience, reflect upon, and develop the knowledge, skills, and attitudes that create competence in patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics.
4. Preparation of nurse-teachers and nurse-executives should include acquiring and practicing skills and methods for the leadership and management of continual improvement.
5. Organizations that license and certify nurses or accredit nursing education programs should require evidence of nurses' preparation for participation in or leadership of teams that work to continuously improve health care systems and individual and population health.

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NURSING EDUCATION PRIORITIES FOR IMPROVING HEALTH AND HEALTH CARE

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The health professions derive autonomy for establishing professional standards and regulatory mechanisms from a social contract that assumes professionals will act in the best interests of the societies they serve. Proposed changes in nursing education, therefore, must derive from broad societal aims. In the United States, we face few challenges as daunting as the one before us, namely to simultaneously improve the health of populations, enhance the patient experience of care (including quality, access, and reliability), and reduce, or at least control, the per capita cost of care (Berwick et al., 2008). Among the many issues that nursing educators could be called upon to address to meet these aims (Cleary et al., 2010; Forbes and Hickey, 2009), I have chosen three that, if addressed, would have significant impact on nursing's ability to meet society's needs as outlined by the above "triple aim."

CONCLUSION I. In order to meet the nation's need for nurses, people with strong academic preparation need to be educated in collegiate nursing programs in far greater numbers than they are today.

In 1992, Fagin and Lynaugh reviewed the history of nursing education and proposed that societal needs for nursing as an occupation (i.e., a vital work serving the public) and as a profession (i.e., a living body of knowledge and skills) were best met if the proportion of nurses prepared at the baccalaureate (BSN) level exceeded those prepared in associate degree (ADN) and diploma programs (Fagin and Lynaugh, 1992). They proposed three methods (direct transfer linkage, partnership projects, and nurse associate programs) to end the bifurcation of nursing education between universities and community colleges and to ensure that graduation patterns did not result in a workforce with the majority of the country's nurses possessing the associate's degree as their highest level of educational preparation. Although features of each of Fagin and Lynaugh's (1992) proposed methods can be found in programs implemented during the last two decades (for instance, improvements in articulation agreements, partnership projects like the Oregon Consortium for Nursing Education, and differentiation of North Dakota licensure levels), our nation continues to produce far more pre-licensure graduates from ADN than BSN programs annually (roughly 60/40 percent if one includes RN–BSN transition degrees [Aiken et al., 2009]).

The literature debating the relative merits of pre-licensure education at ADN and BSN levels is large and beyond the scope of this paper. Some evidence sug-

gests that the percentage of nurses prepared at the BSN level on hospital units is positively correlated with better patient outcomes (Aiken et al., 2003), and during times when no shortage of nurses exists, the baccalaureate graduate is now the preferred new graduate hire. Nonetheless, most states continue to educate greater numbers of ADN than BSN graduates every year. In North Carolina, new pre-licensure graduates who completed programs in 2006 included only 29 percent who were graduates of BSN or entry-MSN programs (North Carolina Institute of Medicine, 2007). Including the RN-BSN graduates, the total proportion of BSN or higher degree graduates in 2006 rose to only 36 percent (North Carolina Institute of Medicine, 2007). Some states graduate even lower proportions of BSNs among their new nurse graduates each year (California Strategic Planning Committee for Nursing, 2010). Fagin and Lynaugh's (1992) predictions concerning the diminishing educational levels of the overall composition of the nursing workforce have come true.

States invest in the above combination of nursing pre-licensure programs for many reasons, not the least of which are the lower costs in faculty salaries and student tuition/fees associated with associate degree programs. But another important factor is the geographic distribution of ADN programs, which are more likely to be offered in rural and other medically underserved communities than are BSN programs in American colleges and universities. The Urban Institute, in its recent study of the nursing workforce, reported that medical personnel, including nurses, tend to work near where they are trained, so the distribution of support for nursing education matters (Bovbjerg et al., 2009). Nursing personnel are needed in virtually every community in America, and ADN programs help ensure that the nation has a broader geographic distribution of nursing personnel than we could attain with BSN graduates alone.

Nonetheless, we have created a huge problem with our current educational patterns. By educating more ADN than BSN graduates, we have narrowed the pipeline of nurses likely to go on to graduate school.

The greater the number of nurses in basic practice, the greater the number of nurses needed in advanced roles, such as nurse managers, nurse executives, clinical nurse specialists, and faculty. Health care reform bills may enable greater access to primary care, thus escalating the need for nurse practitioners and midwives. All of these roles require that nurses seek graduate education.

Nurses who receive their pre-licensure education in colleges and university programs are overwhelmingly more likely to go on to graduate school than graduates of ADN programs. Using North Carolina licensure data, Bevill and colleagues (2007) analyzed the pursuit of higher educational degrees of RNs from two cohorts. They reported:

> Only 26% of the 2,418 members of the 1983-84 cohort at 20 years and 17% of the 4,211 members of the 1993-94 cohort at 10 years pursued higher degrees, and just 19% and 12% of the respective cohorts did so in nursing. More than 80% of all nurses in either cohort who attained a master's degree in nursing

> or a doctorate in any field began their nursing career with a bachelor's degree. (Bevill et al., 2007, p. 60)

Aiken and colleagues (2009) reported similar results from a national study. They found that of the nearly 1.4 million nurses who obtained ADN or BSN degrees between 1970 and 1994, only 6 percent of the nurses with original ADN degrees had gone on to earn graduate (master's or doctoral) degrees, whereas nearly 20 percent of the original BSN graduates had done so. Though improving overall educational levels with programs that smooth the pathway from ADN to BSN are valuable, the critical need is to assure an adequate pipeline for graduate education by expanding the capacity of current and future BSN programs.

One important innovation of the last decade has been the opening of accelerated BSN (ABSN) programs for students who already have college degrees in another field. A previous argument advanced in favor of ADN education as a response to nursing shortages (that is, that you could produce new nurses in 2 years instead of 4), became obsolete as universities opened programs that educated BSN graduates in 12–18 months. Currently, there are 218 ABSN programs in the United States and an additional 57 programs that accelerate students in a direct path to a master's degree (AACN, 2009a). ABSN programs, while addressing the need for new nurses in basic practice, have served as an unusually successful pipeline for advanced practice (APN) master's programs. They attract students who bring rich backgrounds from other fields, academically successful students, and students who are motivated and know what they want from a career (AACN, 2009a). Bentley (2006) and Brewer and colleagues (2009) found that the accelerated program graduates, when compared to traditional nursing bachelors degree graduates, were more likely to be male, nonwhite, and older, thus addressing the need for increased diversity in nursing. Brewer and colleagues (2009) also reported that the accelerated graduates often moved quickly into management positions.

In February 2009, the American Association of Colleges of Nursing reported 2008–2009 survey data from 663 nursing schools (87 percent of total number of collegiate-level programs) showing that almost 50,000 qualified applicants to collegiate nursing programs were turned away (AACN, 2009a). The most frequently cited reason was insufficient faculty (63 percent) (AACN, 2009a).

To ensure the future ability of nursing education to meet societal needs, therefore, we must increase our capacity to educate college/university-bound students. These graduates will expand the number of nurses in basic practice, but they will also address other critical needs, namely our shortages of nursing faculty and primary care advanced practice nurses.

An additional benefit derives from the fact that students exposed to health care leaders at early stages in their career, as collegiate students are, are likely to become the nursing leaders of tomorrow. (Personal note: At the 2009 Sigma Theta Tau International Biennial Convention, among the nursing leaders honored

with prestigious Founders' Awards, each in accepting their award spoke about the importance of exposure to distinguished nursing leaders early in their careers.)

RECOMMENDATIONS

1. Fund a longitudinal national study to track the percentages of new nurse graduates per year from ADN/diploma vs. collegiate pre-licensure programs by state. Include tracking of data regarding faculty shortages, primary care nurse practitioner and basic nursing shortages by state, with the goal of better understanding the relationships between new nurse educational levels and critical societal needs.
2. Advance media attention to states that exemplify "best practices" in the distribution of new nurse graduates derived from ADN versus BSN programs.
3. Through capitation approaches, direct enrollment expansion funds (from private or public sources, especially federal Title VIII funds) that ensure expansion of pre-licensure programs at colleges/universities until such a time as there is greater equity in production of new nurse graduates.

CONCLUSION II. To meet societal needs for primary care providers, nursing education needs to expand the numbers of annual graduations from programs that prepare nurse practitioners.

Although health care reform legislation remains unfinished, the United States may extend health insurance to more than 30 million Americans with a promise that they (and all currently insured citizens) will have access to high-quality and affordable care. Shortages of primary care physicians, nurse practitioners, and physician assistants are severe under current conditions and will escalate dramatically (as Massachusetts is currently experiencing) if Congress passes the bills under consideration (New England Healthcare Institute, 2009). Health care costs will have to be reduced or contained, or the nation will face an economic burden that is unsustainable. Under any likely scenario, the need for nurse practitioners (NPs) will increase dramatically.

In the most recent academic year, approximately 7,500–8,000 students graduated from NP programs (AANP, 2009). Of the 125,000 NPs practicing today, most qualify as primary care providers (49 percent family, 18 percent adult, 3 percent gerontological, and 9 percent pediatric specialties) (AANP, 2009). Currently, the vast majority of students complete educational requirements for certification exams in their NP specialty at the end of master's (MSN) programs. Recently, Doctor of Nursing Practice (DNP) programs have been introduced, adding competencies related to organizational systems leadership for quality improvement, information systems and patient care technology, health care policy, interprofessional collaboration and clinical prevention for improving patient and

population health (AACN, 2006b). These competencies, currently provided in post-master's DNP programs almost exclusively, build on specialty practice education received in MSN programs and, in most cases, practice experience from basic practice, administrative, or faculty roles. It is beyond the scope of this paper to describe fully the rationale for the practice doctorate (AACN, 2004), but major reasons include the demand for formal practice-centered education and scholarship opportunities beyond those provided by the master's degree and equity issues with other health professionals who have converted their professional master's programs to professional doctorates in programs equivalent in length to most nursing master's programs (e.g., physical therapy, pharmacy, etc.).

Most schools of nursing with graduate programs (approximately 475) feel tremendous pressure (whether or not they have the resources to mount quality DNP programs) to convert their master's or post-master's DNP programs to DNP programs that prepare NPs for entry into practice because of the American Association of Colleges of Nursing position statements on the DNP, as represented below:

> AACN members have endorsed the transition from specialty nursing practice education at the master's level to the DNP by the target goal of 2015. AACN recognizes the importance of maintaining strong interest in roles (e.g., nurse practitioner, clinical nurse specialist, nurse midwife, and nurse anesthetist) to meet existing health care needs. In response to practice demands and an increasingly complex health care system, programs designed to prepare nurses for advanced practice nursing will begin the transition to the practice doctorate for nurses who initially want to obtain the DNP, as well as for nurses with master's degrees who want to return to obtain the practice doctorate. AACN will assist schools in their transitioning to the DNP and in their efforts to partner with other institutions to provide necessary graduate level course work. Specialty focused master's level programs will be phased out as transition to DNP programs occurs. Master's programs will continue to be offered and will prepare nurses for advanced generalist practice. (AACN, 2006a, p. 12)

No licensure or certification requirements mandate this change to date. Even the Commission on Collegiate Nursing Education (CCNE), the autonomous accrediting agency associated with AACN which will accredit DNP programs, has to date said nothing about requiring a transition to entry-to-practice DNP programs

The entry-level DNP has been opposed by a minority within the profession since its conception (Dracup et al., 2005; Meleis and Dracup, 2005). Recently, some AACN member deans and the National Organization of Nurse Practitioner Faculties submitted letters to the AACN Board requesting that they remove the threat of the 2015 date for requiring the transition to entry DNP programs (personal communications, November 2009). With a dearth of qualified faculty, many programs of uneven quality are being mounted. But the bigger issue is that

faculty members have begun to realize what a tremendous investment of faculty and student time is required to complete the DNP. Doctoral requirements for independent projects/dissertations are important for building the capacity for DNPs to contribute to quality improvement and translational science, but they take time and commitment to scholarly approaches to inquiry. Schools are realizing that they cannot educate the same numbers of DNPs per year at the entry level as they are currently graduating at the MSN level.

Inevitably, a transition to DNP programs for entry into NP practice would reduce the production of NPs at exactly the time when the country may experience a dramatic increase in need. We have not yet seen a decrease in the number of MSN graduates per year, because only a small number of schools have phased out MSN specialist programs to date. To increase, or even maintain, the current annual graduation numbers of primary care NPs would require funds (from students and schools) to pay for at least one additional year of study for each graduate, sufficient numbers of qualified faculty members to teach the additional year's program content and supervise individual scholarship projects, and more preceptors for the additional hours of supervised clinical time. These are significant costs during a period of economic downturn that has reduced budgets for almost all schools of nursing.

The irony is that the literature is replete with results of studies showing that the NP workforce, as currently trained, provides patient care of high quality. Pohl and colleagues (2010) reviewed the literature in a recent background paper for the January 2010 Josiah Macy Conference, *Who Will Deliver Primary Care and How Will They Be Trained?* Their summary stated:

> NPs have practiced in a variety of models, and the outcomes of their practices have been studied for more than 40 years. Repeatedly, when quality of care has been assessed in studies that are highly rated on strength of evidence, NP providers have been found to provide equivalent, and in some cases, superior care. Because of the supervision requirements and payment models that have funded physicians as heads of practices, evidence about relative costs of care using various primary care provider mix teams has been difficult to obtain. Such studies are needed prior to implementation of any public policy that would reimburse primary care at significantly higher costs. (Pohl et al., 2010, pp. 182–183)

Rather than mandating the increased costs to students, faculty and schools of nursing that would be required to convert to entry DNP programs now, all pressure to start DNP entry programs should be removed, allowing the external environment (societal needs, school budgets, student and employer demand) to settle the issue over time. At a minimum, nursing education should commit to a transition period that will not diminish production capacity at a time of critical societal need. Many organizational leaders (maybe even AACN, and definitely CCNE) would welcome an external voice that emphasized that the needs of patients and society should take precedence over professional aspirations at this time.

RECOMMENDATIONS

1. Fund a project that would include RWJF/IOM committee members and representatives of relevant professional organizations involved in APN certification, accreditation, education and practice. Provide facilitative leadership (like Ellen Kurtzman did for the RWJF-funded project to achieve consensus on establishing a Nursing Quality and Safety Alliance) for reaching consensus that DNP programs should be launched as post-master's programs for the foreseeable future so that nursing maintains or increases the numbers of NP graduates each year.
2. As a secondary goal in the process above, ensure that nursing master's programs remain targeted at *specialist* preparation, not generalist preparation as currently proposed by AACN.
3. Fund the development of briefs aimed at state governors and attorney generals that emphasize the importance (to the cost/quality of health care in their states) of removing legal, regulatory, or reimbursement policy barriers to the ability of nurse practitioners to serve as primary care providers or leaders of patient centered medical homes or other methods of patient care delivery.

CONCLUSION III. New models of education are needed to ensure that the competencies required to do the work and improve the work of nursing and health care are embedded in nursing education programs.

Nursing education programs began to transition out of hospital-based, apprenticeship programs into academic settings (colleges/universities and community colleges) over 50 years ago. Aligning nursing education with the dominant American approach to professional preparation in other fields fostered numerous gains for the advancement of knowledge, the development of faculty and advanced practice roles, and the quality of nursing education and practice. Throughout the decades, however, nursing leaders have been challenged by the separation of academic and practice worlds and the difficulties associated with building sufficiently strong links between practice and academe to ensure that nursing students develop the competencies that make them able to work effectively in health care settings (Cronenwett and Redman, 2003; Fagin, 1986). Recent studies of newly licensed registered nurses illustrate that the gap remains (Kovner et al., 2010; Pellico et al., 2009). For example, the new nurses in the study by Pellico and colleagues called for more educational experiences involving 8-hour clinical days, more realistic patient/nurse ratios, and better preparation for communication activities such as change-of-shift reports, delegating, rounding with physicians, and charting (Pellico et al., 2009).

Added to this perennial problem, the first decade of the 21st century was marked by a series of IOM reports outlining the problems with health care qual-

ity and safety. In response, the pace of change in practice settings escalated, as new quality improvement processes and measures were adopted, and data about quality and safety became transparent to the public. By and large, full-time faculty members in schools of nursing were uninformed about these changes as they developed. Not surprisingly, Kovner and colleagues found that 39 percent of new nurses in a 2008 survey thought they were "poorly" or "very poorly" prepared or "had never heard of" quality improvement, although BSN graduates reported significantly higher levels of preparation in evidence-based practice and assessing gaps in teamwork and collaboration (Kovner et al., 2010).

Since 2005, RWJF has funded the Quality and Safety Education for Nurses (QSEN) project (Cronenwett et al., 2007, 2009a, 2009b) to address the challenge of educating nurses who will be prepared to continuously improve the health care systems in which they work. Faculty have available two websites with resources for developing teaching strategies aimed at the knowledge, skills, and attitudes that must be developed to achieve competence in patient-centered care, teamwork and collaboration, evidence-based practice, quality improvement, safety, and informatics (Cronenwett et al., 2007)—namely the QSEN website at www.qsen.org and the Institute for Healthcare Improvement Open School at http://www.ihi.org/IHI/Programs/IHIOpenSchool/. A series of faculty development conferences and national forums on this topic are being launched by QSEN (through UNC and AACN) to provide further support for embedding these topics in nursing programs.

The rapidity with which nursing faculty can become "out of touch" with the requirements of current practice was made evident during this decade (Sherwood and Drenkard, 2007), and there is much yet to learn about how to overcome the negative consequences of the gaps between nursing education and practice. The Carnegie Commission funded a study of professional formation across multiple disciplines, and a recent book by Benner and colleagues (2009) described a call for radical transformation of nursing education. To the point being raised here, the multiyear study concluded that there needs to be better integration of coursework with clinical experiences, so that coursework and classroom learning are tied to what actually happens in patient care rather than being studied in the abstract. Faculty, they argue, must help students make the connection between acquiring and using knowledge, so that students develop clinical reasoning skills for the diverse, complex practice that is nursing (Benner et al., 2009). Faculties cannot perform these functions unless they possess clinical expertise or work closely with nurses in practice at each step from curriculum design to development of simulation, classroom and clinical teaching strategies, and assessment of student performance. Likewise, there are great challenges associated with teaching system competencies (as opposed to the competencies related to the care of individual patients), such as interprofessional teamwork and collaboration, safety sciences, or quality improvement, when faculty are not actually doing the work of improving health care systems themselves.

Nursing faculties and their practice partners have tried a variety of strategies to continuously improve the preparation of students for practice. Some examples (without citing a huge literature) are capstone courses with staff nurse preceptors, dedicated education units, faculty practices, inter-professional learning experiences, cross-appointing nursing staff on faculties and faculty members on patient care units, requiring teachers of undergraduate students to practice at least a day a week, hiring clinical experts to help faculty develop cases for simulated clinical teaching, and keeping student clinical experiences in one institution for greater depth in exposure to safety cultures, quality improvement projects, and electronic health records. More innovation is needed, along with studies that will help identify "best practices" for dissemination.

The other major barrier to achieving effective practice competencies is the lack of a structured and financially supported residency training program during the first year of initial licensure as a nurse. Because schools of nursing prepare pre-licensure graduates as generalists, newly licensed nurses, by definition are not prepared with the knowledge and skill base for practice with specific patient populations. Wherever a new nurse begins practice, a period of mentored supervision and support should be provided. The National Council of State Boards of Nursing is working to promote criteria for the transition to practice period that would need to be met before the new nurse was relicensed at the end of the first year of practice (NCSBN, 2009). AACN and the University Healthsystem Consortium offer support, and accreditation through CCNE, for nurse residency programs aimed at BSN graduates (AACN, 2009b). Nonetheless, no consistent requirement for nurse residencies reinforces the importance of this phase of education for the practice of nursing.

RECOMMENDATIONS

1. Promote innovation and evaluation of novel approaches to improving preparation for the practice of nursing through designated Title VIII (HRSA, USPHS) funding mechanisms.
2. Urge accrediting bodies (CCNE and NLNAC) to require evidence that faculty have the practice expertise or effective clinical partnerships to prepare students for the work of nursing practice and improving the work of nursing and health care.
3. Promote funding mechanisms for the development and testing of new methods of interprofessional education through simulation, case studies, and clinical practice.
4. Promote innovation and evaluation of models that engage nursing faculty in the work of improving health care.
5. Support learning collaboratives of state boards of nursing who are willing to work out the issues related to implementing regulatory requirements for transition to practice residencies as a prerequisite for initial relicensure.

6. Require that any hospitals receiving GME monies for "nursing education" devote those resources to supporting transition to practice residency programs.

FINAL THOUGHTS

The exercise of choosing only three areas of focus for this paper makes me realize the challenge that RWJF/IOM committee members face as you decide what actions to take to ensure that nursing meets the needs of the public for the foreseeable future. I hope the ideas from these collective papers on the future of nursing education assist you in your difficult but important task.

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NURSING EDUCATION: RECOMMENDATIONS FOR THE FUTURE

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The nature of nursing has changed drastically over the past few decades. The complexity of care in many diverse settings, the role of advanced practice nurses as independent providers, and the growing recognition of the important role of scientific evidence upon which to base nursing practice have changed the way nurses are viewed by the public and the way they should be educated. The complex demands of practice combined with a shortage of experienced practitioners in many of the health care professionals have created opportunity and, in some areas, a state of potential crisis. As health care reform looms and the population continues to age, nursing education must embrace these challenges, expanding and improving on what it offers currently to better prepare the nurse of the future.

Many issues face the nursing profession today; all seem to be filled with odd contrasts.

- Nursing is a profession characterized by a highly complex practice with nurses often making life and death decisions. Yet the formal education required to prepare clinicians for this challenging practice is less than any of the other health professions (i.e., nurses can currently practice with a 2-year associate degree and 80 percent who enter the profession with this degree choose not to get further formal education in the form of another degree) (Aiken et al., 2009).
- The projections for nursing shortages in the near future are alarming, but the urgency of those shortages are blunted by the current economic crisis that has kept many nurses in the workforce and has reduced vacancy rates. The seeming resolution of the shortage has diverted the attention of the media and government to other problems and has reduced the chances that nursing education will receive the resources it needs to expand enrollments.
- A current and projected faculty shortage is a serious impediment to solving the preparation of new nurses, but nursing faculty remain one of the most poorly compensated categories of nurses.
- Nursing is a profession that increasingly must be based on science and strong empirical data and yet the number of scientists within it to generate new knowledge remains disappointingly small.
- Nursing is a profession charged to care for a highly diverse population of patients and yet it remains highly nondiverse in gender, race, and ethnicity. The lack of diversity among nurses, with the consequent discordance

between clinician and client, serves to reduce the effectiveness of the care nurses provide.

- Finally, it is a profession that must have strong interprofessional relationships with other members of the health care team to be effective and yet nurses (and other health professionals) are educated traditionally in silos with little exposure to students in other health professions and no formal opportunities to develop team skills.

This list is undoubtedly incomplete. Even taken alone, it underscores the need for a critical reappraisal of how we educate the next generation of nurses and what recommendations we make to federal and state governments, as well as to the organizations responsible for accrediting nursing educational programs, to provide appropriate preparation and economic support to the next generation of nurses.

Three issues will be highlighted in this paper: the shortage of nurse scientists, the lack of educational preparation for preparing nurses to provide patient-centered care within an interprofessional team of health care providers, and the lack of effective formal teaching in pre-licensure programs in the areas of nursing science, natural and social sciences, humanities, and leadership. Two of the three are particularly germane to university-based schools of nursing who are facing severe faculty shortages and to practicing clinicians who make decisions each day based on tradition rather than empirical evidence. The third area was highlighted in the recent Carnegie Foundation Report on nursing education (Benner et al., 2010) and has important ramifications for the entire nursing profession and for the future health of our nation.

THE SHORTAGE OF NURSE SCIENTISTS

According to the most recent survey of the RN population conducted by the Health Resources and Services Administration (HRSA) in 2004, the number of RNs in the United States is 2.9 million (U.S. Department of Health and Human Services, 2006). The number of nurses prepared at the master's or doctoral level rose to 376,901, which was an increase of 37 percent from 2000 (U.S. Department of Health and Human Services, 2006). Although 13 percent of nurses hold a graduate degree, only 1 percent have a PhD and are prepared to conduct independent research in their field. In fact, only 555 students graduated with a PhD in nursing in 2009, a number that has been relatively unchanged for the past decade (AACN, 2009). Thus, the numbers of nurse scientists working to create the empirical data upon which nursing practice is based is trivial compared to the need.

Why do so few nurses pursue doctoral study? The problem is not access. The number of PhD programs has doubled over the past two decades; however, the number of nursing graduates prepared at the PhD level has remained essentially

unchanged (AACN, 2009). Three reasons for the continuing shortage of nurse scientists can be posited. First, educational preparation at the associate degree or hospital diploma level serves as an impediment to easy access to graduate study. In 2004, 34 percent of registered nurses (n = 981,238) reported the associate degree as their highest level of nursing or nursing-related education, while 18 percent (n = 510,209) held a hospital diploma (U.S. Department of Health and Human Services, 2006). Over 50 percent of nurses today would face approximately 8–9 years of formal university-based education in order to receive a PhD compared to the 4–5 years required to attain a PhD in other disciplines that require a baccalaureate degree. Entry into the nursing profession at the associate degree level serves as a disincentive for the majority of nurse graduates to continue further study to the PhD level (Cleary et al., 2009). Even more disheartening is that the fact that the number of nurses whose highest educational degree in nursing is the associate degree has increased by 232 percent since 1980 (U.S. Department of Health and Human Services, 2006). Moreover, the vast majority of these nurses (i.e., those who obtain an associate degree to practice nursing) do not pursue a bachelor's degree anytime in their career. In 2004, only 21 percent of RNs initially educated in associate degree programs had received a baccalaureate degree, while only 6 percent of this population had gone on to obtain a MS or PhD degree (Aiken et al., 2009). Thus, nurses prepared at the associate degree level are highly unlikely to undertake doctoral study during their careers.

Second, nurses have more interruptions in their careers and often begin doctoral study at a later age than individuals in other disciplines. The nursing profession traditionally has viewed clinical experience as a prerequisite to graduate education and new graduates were encouraged to practice clinically by faculty and peers between degrees rather than continuing straight on to obtain a PhD. This career path has resulted in the norm of nurses returning for a master's degree in their mid-thirties to become an advanced practice nurse (e.g., nurse practitioner or clinical nurse specialist) or administrator, then returning to the workforce for another decade, and finally returning to graduate school to obtain a PhD in their late thirties or even older. Nurse scientists complete their doctoral degrees, on average, at the age of 46, which limits the number of years they have to build a scientific program and contribute to the scientific base of nursing practice (Dracup et al., 2009). To help reverse this trend, many nursing schools have developed programs that admit students into graduate programs directly from undergraduate or master's programs and faculty are slowly changing their commitment to this model of advisement.

Third, faculty salaries provide an important disincentive to return to school to obtain a PhD. Although academics in all disciplines are rarely compensated at the same level as their peers in industry, the disparity for nurses is one of the largest. Nurses working as clinicians make, on average, 30 percent more than assistant professors, who typically make from $50,000 to $70,000 at the assistant professor level (Dracup et al., 2009). Advanced practice nurses make, on average, 100 to 150 percent more than assistant professors (Cleary et al., 2009). In a recent

survey conducted by the American Association of Colleges of Nursing (AACN) to describe the nursing faculty shortage, respondents cited inadequate salary as the number one cause of the faculty shortage (Fang and Tracy, 2009).

Besides the three reasons cited above to explain the low number of PhD-prepared nurses, the development of a professional doctorate (i.e., the Doctor of Nursing Practice or DNP) is also a trend worth noting. The degree was introduced in 2004 by the American Association of Colleges of Nursing (AACN) with a recommendation by its members to adopt the DNP degree for all advanced practice nurses by 2015. The degree is designed as the terminal degree for nursing practice and may be combined with a PhD for nurses interested in conducting translational science. The reasons given by the organization at the time of adoption were the following: the rapid expansion of knowledge underlying nursing practice; increased complexity of patient care; national concerns about the quality of care and patient safety; shortages of nursing personnel which demands a higher level of preparation for leaders who can design and assess care; shortages of doctorally prepared nursing faculty; and increasing educational expectations for the preparation of other members of the health care team. The degree has been a source of contention within the profession and has evoked concerns by various physician and nursing organizations (AMA, 2010; Dracup et al., 2005). However, DNP programs have mushroomed across the states with 92 currently awarding degrees and another 102 in the planning process (AACN, 2009). Whether or not DNP programs will attract applicants that would not have been interested in a PhD is unknown and what affect it will have on future PhD applications is also unknown. However, it is important to note that the program is focused on preparing its graduates "to fully implement the science developed by nurse researchers prepared in PhD, DNSc, and other research-focused nursing doctorates" (AACN, 2010). Its graduates are not expected to contribute scientific discoveries or to lead interdisciplinary teams of scientists. Thus, the DNP will not meet the need for more nurse scientists and it may contribute to their shortage.

Recommendations Related to Shortage of Nurse Scientists

- **Address the pipeline.** A major impediment to attracting the large number of nurses scientists needed in the future is the high percentage of nurses prepared in community colleges. Federal and state funding needs to be allocated to creating innovative solutions to assisting graduates of community colleges to get BS degrees such as allowing community colleges to award BS degrees (a controversial but attractive option) or developing programs like the Oregon model where all nursing students are enrolled in the university and have the option of completing a fourth year to attain their BS degree (Tanner et al., 2008).

  It would be helpful if the committee clarified the role of the DNP for the broader community and considered the impact of DNP programs on the shortage of PhD graduates. It is currently not clear whether universi-

ties will appoint DNP graduates to tenure-track positions, but clarification of this point will be important for the profession as it continues to clarify the differences between the two doctoral degrees. Do nurse scientists conducting translational research need both a DNP and a PhD? If the answer is yes, the pipeline has just become longer.

- **Augment federal and state funding for PhD students and their research.** One way to compensate for low faculty salaries is for nursing students to be relieved of their educational debt. The Nurse Faculty Loan Program under Title VIII creates a student loan fund within individual schools of nursing that students can access. Students who teach at a school of nursing following graduation cancel up to 85 percent of their educational loans plus interest. In 2007 and 2008, 729 students were funded nationally each year, a 43 percent decrease from the preceding years.[4] With almost 4,000 students in PhD programs in nursing during those same years, as well as an unknown number studying in other disciplines, this program needs to be strongly augmented and widely publicized.

  A second program under Title VIII provides educational grants to schools (i.e., Advanced Education Nursing Grants) that can be used to support students in graduate programs. Again, the amount available for individual schools is paltry compared to the need. For example, the University of California San Francisco School of Nursing receives an average of $200,000 of AEN funds annually to support 720 graduate students. Student debt is inevitable and the dream of a faculty position fades quickly.

  Funding for pre- and post-PhD research and study is available through the National Institute of Nursing Research, but again this funding has been severely limited. Historically the Institute was funded at one of the lowest rates among all the institutes at the National Institutes of Health since its inception, which limits its ability to support doctoral students.

  Two other new sources of funding are pending and require strong support by the Committee on the Future of Nursing. Nursing organizations have long urged Congress to redirect Medicare funding (GME funds) that currently is restricted to hospital diploma nursing education toward graduate education (Aiken et al., 2009). This change would give hospitals incentive reimbursement for students and allow hiring of additional faculty. Also, capitation grants (similar to the Nurse Training Acts of 1971 and 1975) would allow schools to recruit additional doctoral students as well as improve facilities and hire faculty. The bleak outlook

[4] Source: Division of Nursing, Health Resources and Services Administration 2006–2008 as summarized in AACN's Congressional Requests: A Focus on Promoting Access to Quality Health Care.

for nursing faculty shortages will not change without massive changes in federal support for nursing education.

A LACK OF INTERPROFESSIONAL COLLORATION IN EDUCATION

In both acute and chronic health care settings, there is mounting evidence that interprofessional practice models are effective in improving patient outcomes, patient and provider satisfaction, and health care costs (IOM, 2004; Needleman and Hassmiller, 2009). However, these models of interprofessional practice are not based on the educational experiences of health care professionals, who are most often taught in university departments or schools that function as educational silos that encourage little or no contact with students from other professions. Students from schools of medicine, nursing, and pharmacy, for example, rarely share courses, participate in discussion groups, or experience faculty (and therefore role models) from health care professions other than their own during their formal education. The tradition of educational isolation in the health care disciplines encourages the maintenance of historical stereotypes and discourages the communication skills and understandings that are essential for effective teams.

Unfortunately, assembling multiple professionals together in a single clinical setting after graduation does not guarantee interprofessional collaboration will occur, despite the fact that it is increasingly recognized as fundamental to the quality and safety of patient care. Role confusion can abound. For example, physicians and nurse practitioners share many of the same role functions despite a very different philosophical orientation, which can be source of conflict and differing priorities. Clinical nurses specialists and social workers both focus on the family system, which may lead to confusion of responsibilities and functions. Professional organizations may fuel professional rivalries by conducting various turf protection exercises, particularly related to reimbursement. Hospitals, where much of health care is delivered, have rigid organizational structures and professional hierarchies that often serve to create a "we" vs. "they" structure within the different disciplines represented on a team that is the antithesis of a highly functioning team. Students need to gain the skills of communication and collaboration across health care disciplines early in their careers if they are to function effectively in professional teams.

The benefits of creating an interprofessional educational experience are great. Students are able to exchange different theoretical perspectives, address historical stereotypes, and develop communication and leadership skills that are critical to highly functioning teams in the clinical setting (Spear and Schmidhofer, 2005). An important benefit from the standpoint of university administrators is the potential for sharing resources, including expert faculty, space, and physical equipment. For example, an increasing number of universities are beginning to build simulation centers designed for interprofessional student teams to par-

ticipate in exercises designed to increase teamwork. Sharing a single simulation center provides the various professional programs with opportunities for realistic interprofessional learning that are difficult to arrange in real clinical practice. The simulation exercises build confidence before contact with real patients and provide a safe environment where mistakes become learning opportunities. Working together on patient scenarios and real-life case studies can also improve teamwork and promote better understanding between professions.

So if collaboration and effective communication among disciplines is so valuable, why is it so little in evidence in nursing education? Some of the reasons are historical. Student nurses in hospital diploma programs were often taught by medical faculty. When nursing education moved out of the hospital setting, some nurse educators were eager to shed the tradition of medical faculty as well. Medical schools, in turn, migrated to universities decades before schools of nursing. This difference in timing meant that many schools of medicine were established without any school of nursing, and they still do not have a nursing program in the same university. Nursing programs are now housed in community colleges or in universities that do not have schools of medicine or other health disciplines. Curricula for different health professions were developed without collaboration from other disciplines. The most egregious symptom of the lack of collaboration in education is the large number of medical programs that are on different academic calendars than the other health care disciplines in their same university, making it difficult for students to have a platform for collaboration.

Ultimately it is the responsibility of educators in the various disciplines to create a learning environment in which students, preceptors, and patients may teach and learn from one another. They can do this through a variety of strategies:

- A single orientation day for the health professions that introduces the philosophy of interprofessional education,
- Joint faculty appointments,
- Shared courses across schools that includes the completion of assignments by interdisciplinary teams,
- Interdisciplinary student-managed clinics,
- Social networking sites that include students from all health professions, and
- Interprofessional social events sponsored by the university.

Educated in an interdisciplinary model, individuals entering the workforce will do so with the mindset that collaboration among all health care practitioners is how patient care should be approached. The mindful inclusion of interprofessional educational experiences potentially will lead to more effective communication across disciplines and ultimately patient care that is safe, cost-effective, and of high quality.

Recommendation Related to Interprofessional Collaboration in Education

- **Develop and implement strategies to reward interprofessional collaboration in nursing education.** The development of the Clinical and Translational Science Awards by NIH is a model of how to develop a culture of interdisciplinary teams where none existed. Creating an award structure that demanded interdisciplinary collaboration among scientists forged many researcher alliances on university campuses. Similarly, the education of health professionals must be viewed through a different lens than is currently used. Accrediting bodies and university review committees should include interprofessional collaboration as part of the criteria for a quality nursing program, as well as the programs of other health professions such as medicine and pharmacy. Expectations for interprofessional collaboration must be set in university program reviews, accreditation criteria, and individual faculty promotion criteria if a change in culture is to be achieved.

PRELICENSURE NURSING EDUCATION

This third area is the easiest and the hardest to present. It is the easiest because it has recently been the topic of an exhaustive study by the Carnegie Foundation. It is the hardest because the findings of their study are complex and required a full-length book to present (Benner et al., 2010). After numerous site visits and countless interviews, the authors made 26 recommendations that deserve serious consideration by the committee. It seems that to ignore the major findings of the first systematic study of nursing education in decades would be folly.

Briefly, the research team of Benner and colleagues focused on a variety of basic nursing programs by which students are prepared to take the NCLEX-RN examination and become registered nurses as well as one RN-to-BSN program. They visited two community college programs (billed as 2 years in length but often 4 years because of the required prerequisites and waiting list times), three generic baccalaureate programs, two fast-track second baccalaureate degree program of 14–18 months designed for students with a bachelor's degree in another field, a single diploma program offered through a freestanding school of nursing affiliated with and sponsored by a hospital (2–3 years in length), and a single master's entry level program that provided a prelicensure program for students with a bachelor's degree in any subject followed by a 2-year master's program. The researchers identified three areas of apprenticeship in basic nursing programs: acquiring and using knowledge and science, developing skilled clinical reasoning, and ethical comportment and formation. They found the latter two areas adequately or more than adequately addressed in the educational programs they reviewed. They found the former sadly deficient across all programs where students were often subjected to thousands of power point slides as a substitute

for knowledge transfer. Given the complexity of patient care in today's demanding environment and the increasing independence of nurses who must judge among various treatment alternatives and select the best course of action, the lack of nurses' preparation for their role in terms of scientific principles and clinical knowledge is somewhat astounding and clearly disturbing.

The review team found the variety of prerequisites across programs troubling, particularly in light of the large number of applicants coming with a degree from another bachelor's degree program. Some nursing programs had stringent science prerequisites while others had almost none. They were concerned that, in particular, RN-to-BSN programs often did not have the depth of science courses required for grounding appropriate clinical knowledge. Ultimately the sciences required to prepare students for nursing education must be rigorous and similar across programs.

Finally the pedagogies of the classroom were noted to be sadly deficient compared to the effective pedagogies of teaching in the clinical setting. Classroom instructors need to adopt the teaching methods that are so effective in the clinical world of patient care, while also increasing the quality and level of nursing science, natural and social sciences, and humanities.

Recommendations Related to Prelicensure Education

- **Standardize Prerequisites.** The lack of standardization across different programs means that students in the same program bring varying degrees of preparation to their learning of the clinical science required for care of patients. The profession must create a standard list of relevant prerequisites in the humanities, natural sciences and social sciences that all programs would be expected to adopt.
- **Require the BSN for entry into practice.** This is perhaps the most contentious of recommendations but also the one that has eluded the profession for the past five decades. The various entry paths into the profession have been confusing to the public and to other health professionals. It will be important to provide incentives for nurses with AD degrees to return for a BSN or, when possible, a MS degree. Articulated programs will be crucial as we move towards an all BSN entry into the nursing profession.
- **Consider more effective teaching strategies related to the transfer of clinical science in the preparation of new nurse graduates than currently used.** A great deal of research has been conducted over the past two decades on problem-based learning and other teaching strategies effective in engaging students in learning. According to Benner and colleagues (2010), many of these have not been adopted by faculty teaching the formal component clinical science. They recommend that pedagogies be developed and used to keep students focused on the

patient's experience. Medical pathology and disease mechanisms are best taught in direct association with patients' illness experiences, psychosocial responses, and needs for self-care. Simulation exercises, case studies, and group experiences can all be used to enhance learning. Since many of these learning strategies have been adopted by our colleagues in the other health sciences, models are available. National repositories of case studies would be of great support in this transition from the "death-by-PowerPoint" lecture format to a more student-engaged and patient-focused format.

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NURSING EDUCATION: LEADING INTO THE FUTURE

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"Nursing is the protection, promotion, and optimization of health and abilities; prevention of illness and injury; alleviation of suffering through the diagnosis and treatment of human responses; and advocacy in health care for individuals, families, communities, and populations."

—Social Policy Statement (American Nurses Association, 2003)

INTRODUCTION

The educational preparation required for a career in nursing today is not what it was in 1971, nor should it be. Sadly, Benner, Sutphen, Leonard, and Day (2010) have reported that too often nurse educators replicate their own educational experience for students, failing to recognize the many reasons why such preparation is inadequate to meet the needs of today's nurse. In fact, nursing education is not the business of preparing nurses for today, but for tomorrow.

The invitation to identify three critically important areas of reform in nursing education has proven to be a more difficult assignment than was initially obvious to me. A lifelong educator, I feel as though I have been given three wishes. If I could "rub the lamp" and change three things, what would they be? Why would I select these reforms and how would I undertake the needed changes? The invitation, not a simple intellectual exercise, begs the question of me—"What am I, in my capacity as a leader in nursing education, doing to address the future?" And the personal vulnerability lies in confronting the possibility that if I identify three reforms that have little relationship to my daily work, I may be part of the problem.

To contextualize my comments, I offer a few observations about my career and point of view. I have worked as a nurse educator in baccalaureate and higher degree programs since 1974. My appointments have taken me to public and private institutions, secular and religious, and most often to large academic health centers. Over the last 25 years, my classroom and mentoring activities have focused on the preparation of advanced practice nurses for primary care and the preparation of nurse scientists; I have remained in contact with entering, second degree students in nursing by teaching a course on leadership. Since 1993, I have held major administrative responsibilities, first as a department chair, later as a dean, and currently as a dean and vice chancellor in a large academic health center within a university distinctive for its culture of interdisciplinarity.

REFORMING NURSING EDUCATION: THREE PRIORITIES FOR ACTION

The complexity of today's world could not have been imagined when nursing instructor Gwendolyn Fortune followed me from hospital room to hospital room during my senior year clinical rotation in Team Leading. I have often recalled her insistence that I make good use of my time while conducting patient rounds, doing at least three or four things at once: check on the condition of the patient, make sure the room is clean and the facilities are in good working order (e.g., night lights have working bulbs), that no unnecessary equipment has been left in the patient's room and that the members of the care delivery team have completed their assignments as scheduled. Although I was a successful pupil, at 21 years of age I found her to be a bit overbearing and exceptionally humorless. Years later, I looked back on my educational experience with her and realized two things: (1) being organized, observant and able to multi-task were all valuable assets; and (2) her name was "Miss Fortune."

The skills gained under the direction of Miss Fortune have continued to be valuable to me, despite the changes in the patterns of care delivery and the movement away from team leading. She introduced me to basic management and I will always be grateful. The anecdote also serves as a reminder that while some lessons are enduring, and the basic skill sets timeless, much of the content of nursing education has changed. The body of knowledge required for safe practice has grown geometrically, as have the tools for accessing information, and the skills required for the safe delivery of care. Educational reforms must address how we improve access to needed and relevant information for students within nursing, how we develop the nurse's ability to access and use information following program completion and how the educational pathway is ordered to assist in build a career pathway in clinical nursing. I believe the three reforms I have selected will address these broad concerns.

> **REFORM 1. Place greater emphasis on the development of committed partnerships that will enrich nursing education programs, specifically partnerships with nursing service, medical education, and a select group of disciplines that are especially relevant to health and health care delivery (engineering, business, policy, law, and the environment).**

The fractured relationship between nursing education and nursing service must be repaired. Although somewhat exaggerated, many would generalize that academic nurses view nurses in service delivery as anti-intellectual and, conversely, the service delivery community views academic nursing as irrelevant and out of touch. The chasm works against the progress of both communities, communities that are actually one, separated by two distinct corporate missions.

A variety of structures designed to bring nursing education and service into closer alignment were implemented at the University of Florida (Dorothy M. Smith), Rush (Luther R. Christman), Rochester (Loretta C. Ford), and Case Western Reserve (Joyce Fitzpatrick) in the 1970s. In several of these models, one leader was appointed to oversee both education and service delivery. Dually appointed faculty members were expected to teach and deliver care or provide leadership in the care delivery setting. Faculty complained that their days were unending and the combined work of delivering clinical care and teaching was impossible. By the 1990s these models unraveled and the leadership functions were again assigned to separate leaders, one for education and one for service. By necessity and given a world of competing demands, the delivery of care requires an immediate focus on the life and death needs of patients, the "tyranny of the urgent," and this overrides the needs of students or scholarly projects, which are less time-sensitive. But the separation of education and service has resulted in a practice–education gap that is growing. Benner and colleagues suggest that the problem is largely due to nursing education's inability to keep up with changes in the service sector (Benner et al., 2010).

The problem is not new. In 1983, the Institute of Medicine report, *Nursing and Nursing Education: Public Policies and Private Actions*, included the following recommendation:

> Closer collaboration between nurse educators and nurses who provide patient services is essential to give students an appropriate balance of academic and clinical preparation. (IOM, 1983)

That 27-year-old report urged the federal government to offer grants that would promote collaboration.

The American Association of Colleges of Nursing has advocated for the development of strategic partnerships between education and service and their website includes profiles of selected arrangements that appear to be successful. The American Organization of Nurse Executives website lists materials for education and service partners to evaluate their collaborations. Calls for education–service partnerships continue in the nursing literature (Gilliss and Fuchs, 2007).

Recommendation 1: Where possible, particularly at Academic Health Centers, promote governance structures that combine the strategic, rather than the operational oversight for nursing.

Recommendation 2: Require the demonstration of an education–service partnership in accreditation criteria for education and service settings, to include such activities as

shared governance, shared teaching, shared clinical problem solving, and participation in continuing education.

Today's faculty shortage is thought to relate, in part, to salary disparities between education and service. The median annual salary for a beginning registered nurse (who may not have a college degree) was $62,089 in April 2009 (Salary Wizard, 2010); the median salary for a doctorally prepared assistant professor was $89,973 in 2009 (Fang et al., 2009). Although the salary difference of approximately $28,000 may seem a large increase, the additional educational expenses combined with opportunity costs of returning to school may be daunting for some nurses. The implementation of the Nursing Education Loan Repayment Program has eased the financial pain for those nurses who wish to direct their careers toward roles in education. The loan program now repays 60 percent of the qualified loan balance in exchange for 2 years of service in an approved shortage facility. An additional 25 percent may be negotiated for a third year of service (HRSA, 2010). The program holds the promise of preparing more faculty members to teach, but that does not address the development of specific competencies required to teach in clinical areas. In fact, many newly doctorally prepared nurses anticipate moving into faculty roles where they can redirect their careers toward nonclinical pursuits. The faculty shortage is real, but the more specific problem is identifying faculty talent to teach in the clinical area. Those competencies are in short supply and we need to create incentives to promote the development or maintenance of clinical expertise and clinical engagement.

Recommendation 3: Require nurse faculty members to maintain professional certification and tie these qualifications to educational accreditation. Develop institutionally based incentives for faculty to maintain clinical competency, such as participation in a faculty practice plan.

In many fields the careers may reflect a migration from industry to education to public service and back. This has not been typical in nursing. Movement from the practice setting to the educational settings and back has not been valued. Rather, a distinct skill set and preparation has been identified for each role. Increasingly, educators are expected to have a background in curriculum design, tests and measurement and pedagogy. The criteria for advancement in the academy represent yet another barrier. Adhering to the standards set by most universities, academic nursing programs impose specific, rigorous and rather narrow criteria for appointment and promotion. These criteria rely more heavily on scholarly accomplishments than on practice acumen. The net effect is the evolution of a professorate with limited knowledge and experience in the practice environment (which is seen as a distraction to the development of a program of

research) and limited understanding of how to prepare graduates for the realities of practice.

> **Recommendation 4: Expand criteria for faculty appointment and advancement to include recognition of practice-based accomplishments, including leadership, innovation and evaluation. Normalize the career movement between the practice and educational settings within nursing.**

Every report published by the IOM for the last decade has called for the use of teams for the delivery of care. (I am completely confident that one of my fellow authors will go into this issue in detail, but I will list the recommendation for the record.) Reports suggesting that teams do affect better patient care outcomes (Grumbach and Bodenheimer, 2004), but there is very little evidence that effective educational approaches for co-education of members of the health care team have been enacted, evaluated, and replicated. Team work is an essential skill in today's health care delivery system and students must be prepared to function on teams. Incentives must be direct programs toward making this change.

> **Recommendation 5: Promote funding initiatives that will plan and implement classroom and clinical co-education of health care providers, particularly nursing and medicine. Explore existing federal mechanisms to sustain worthwhile results, for example the combined use of Titles VII and VIII for models within primary care.**

Although universities organize themselves into orderly pods called disciplines, real-world problems seldom emerge as discipline-specific. The order imposed by disciplines directs those within the discipline toward a quasi-proprietary body of knowledge, provides a set of tools for discovery, and frames data elements systematically to promote problem solving. But, the down side of that order is that disciplines tend to bring the same basic set of information and solutions to novel problems. Said another way, if your only tool is a hammer, then all your problems look like nails. Some believe that multidisciplinary collaboration has moved from the periphery to the core of our work in universities (University Leadership Council, 2009). The problems we face are simply too diverse and complex to approach with old solutions. The content and problem solving approaches used within the discipline of nursing will be enhanced through closer educational exchange with other disciplines.

> **Recommendation 6: Although others sources provide greater detail on the specific curricular changes needed (see Benner et al., 2010), alliances with other disciplines**

will yield new approaches to the problems faced in nursing education and service delivery. In particular content and practical experiences should be developed with engineering, business, public and health policy, legal, and environmental experts.

REFORM 2: Recognize the important role that *translation* will play in strengthening nursing education, improving nursing practice and connecting the two.

The IOM report, *To Err is Human: Building a Safer Health Care System* estimated in 1999 that many as 98,000 people die in hospitals each year as a result of medical error (IOM, 1999). Further, these errors have been estimated to cost approximately $37.6 billion each year; roughly half of the expense is attributable to preventable errors (AHRQ, 2010). In the decade since that report was published the care delivery community has undertaken needed reforms to appoint patient safety officers and promote cultures of safety that will assist in the creation of a quality and safety conscious work environment. Within the education community the Robert Wood Johnson Foundation sponsored the Quality and Safety Education for Nurses (QSEN) project (Cronenwett et al., 2009), directed by Linda Cronenwett. The lessons of the QSEN project provide some direction for other areas in which there are education–practice gaps.

In brief, Cronenwett and colleagues found that faculty interested in creating a quality and safety curriculum acknowledged their limited expertise and willingness to engage in a collaborative. With a relative small financial package, teams from a group of 15 schools participated in an educational collaborative that developed and implemented systematic curricular changes that were clinically relevant. In this case, critically important knowledge was disseminated to the educational environment.

Recommendation 7: Identify the top ten priority areas for faculty learning and use similar, evidence-based approaches to accelerating the development of expertise/capacity (learning collaborative) in key areas. Provide public recognition for those educational environments that have developed expertise in the ten areas. Encourage a service-delivery focused organization, such as the American Organization of Nurse Executives, to lead the identification of topics and the development and implementation of the recognition.

Conversely, useful evidence produced within the academy does not always find its way into clinical practice. Numerous sources cite the frequent disconnect between practice decisions and the evidence that would support them (IOM,

2001; Melnyk and Fineout-Overholt, 2005). The management of information, though improved through technology, requires additional resources for use in the clinical setting.

> **Recommendation 8: Enlist nursing education (that is, faculty and students) in clinically based activities supporting knowledge development and process improvement at the point of care.**

The establishment of the Doctor of Nursing Practice (DNP) has been controversial within nursing (Dracup et al., 2005; Meleis and Dracup, 2005) and beyond (Landro, 2008). The design and implementation of DNP programs has varied considerably from Columbia University's focus on the development of doctorally prepared advanced practice nurses who can utilize skills and knowledge to independently provide expert nursing care in all care settings (Columbia University, 2010), to programs like Duke's that focus on leadership, innovation, and translation and aim to a prepare nurse leaders for interdisciplinary health care teams who will work to improve systems of care, patient outcomes, quality and safety (Duke University, 2010).

Although one can argue that the lack of curricular standardization in these programs is problematic for the public and the profession, their popularity is clear. In 2009, the AACN reported that 92 DNP programs were currently enrolling students and another 102 DNP programs were in the planning stages. From 2007 to 2008, DNP program enrollments nearly doubled from 1,874 to 3,415. During that same period, the number of DNP graduates increased from 122 to 361 (AACN, 2010). Data available from the AACN's 2009 Enrollment Survey indicate that enrollments in research-focused doctoral nursing programs have continued to increase slightly (from 3,439 in 2004 to 3,976 in 2008) while DNP enrollments increased from 170 to 3,415 during the same interval (Fang and Bednash, 2009). The obvious conclusion is that the programs are meeting a need. Anecdotally, our students report they would never have been interested in a PhD; they want to advance their understanding of how to effect improvements in the health care environment.

> **Recommendation 9: Advance the Doctor of Nursing Practice (DNP) as a vehicle for the preparation of advanced practice nurses for leadership roles in translation—to include examination of evidence, innovation, policy revision, and dissemination.**

At Duke we have developed the Duke Translational Nursing Institute (DTNI), housed within and partially funded by the NIH-supported Clinical and Translational Science Award (the Duke Translational Medicine Institute). We have hired experts to facilitate inquiry by staff nurses at the point of care; hired experts to

facilitate the evaluation of innovative models of care; and hired experts to study the barriers and facilitator of dissemination of change. We have begun a small grants program and hired staff to consult on research design and analysis, and manuscript development.

Recommendation 10: Promote the creation of research facilitation structures that promote knowledge development at the point of care, the testing and evaluation of innovative models of care, and the study of implementation. Build incentives into funding mechanisms that encourage a variety of forms of similar collaboration. Explicitly promote the development of and translation of knowledge into nursing practice and practice improvements through the CTSA mechanism.

REFORM 3: Commit to the preparation of masters prepared *specialists* in nursing, and prepare these graduates to deliver care that is safe, culturally competent, high value/low cost, and patient-centric.

For over 30 years, the research literature has consistently substantiated the safety and quality of care delivered by masters-prepared nurses, particularly nurse midwives and nurse practitioners delivering primary care (Brown and Grimes, 1995). Today 1,400 Certified Nurse Midwives (CNMs), 28,000 Certified Registered Nurse Anesthetists (CRNAs), 125,000 Nurse Practitioners (NPs), and over 2,300 Clinical Nurse Specialists (CNSs) are providing advanced practice nursing in the United States. The proposal to move all specialty preparation to the doctoral level and use the master's degree in nursing to prepare generalist by 2015, as advanced by the American Association of Colleges of Nursing, has not been based on evidence that this will improve the quality of care delivered.

Further, the probability is high that an extended educational pipeline would deter qualified nurses from continuing through the doctorate. At a time when the nursing education community is being called upon to produce more primary care providers to meet the growing national need for primary care, such a proposal seems ill timed, if not irresponsible. Justifications that current masters program curricula are over-credited should not substitute for more careful examination of how to teach the specialty content in a fewer number of credits.

Finally, current employers of masters prepared nurses have expressed concern that there are no roles/no needs for the masters prepared generalists and they are unlikely to hire them.

Recommendation 11: Advocate for the continued preparation of the specialist at the masters level; encourage market forces, rather than professional societies and educational

accrediting groups, to drive a change that appears profession-centric, rather than in the interests of improving patient care.

Recommendation 12: Challenge the current credit-heavy requirements in existing masters programs to test innovations in teaching that would improve competence and reduce program credits. If models of care delivery using masters prepared nurse generalists are available, conduct rigorous evaluations of their use and outcomes, including value, to serve as the basis of proposed changes.

Upon reflection, this list of reforms and specific recommendations does correspond to many of my ongoing responsibilities; however, the opportunity to review the work of others and consider the limits of my own actions has served as a catalyst to do more next week. The responsibility for the educational and personal development of the nursing work force has vast and far reaching consequences for nursing and for health care. Rapid social changes, acceleration in knowledge development, and the development of new tools for managing information will not go away. We must change our approach to ensure that it addresses the context and the goal. We must lead with the future in mind.

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TRANSFORMING PRE-LICENSURE NURSING EDUCATION: PREPARING THE NEW NURSE TO MEET EMERGING HEALTH CARE NEEDS

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ABSTRACT

Evidence is accumulating that nurses completing pre-licensure programs are not equipped with the essential knowledge and skills for today's nursing practice, nor prepared to continue learning for tomorrow's nursing. Citing the need to improve quality and increase capacity, this paper offers three recommendations for transforming nursing education: (1) Create new nursing education systems which use existing resources in community colleges and universities and which provide for common prerequisites and a shared competency-based nursing curriculum and instructional materials. (2) Convene one or more expert panels to develop model pre-licensure curricula which: (a) can be used as a framework by faculty in community college-university partnerships for development of their local curriculum; (b) are based on emerging health care needs and widely accepted nursing competencies as interpreted for new care delivery models; (c) incorporate best practices in teaching and learning. (3) Invest in a national initiative to develop and evaluate new approaches to pre-licensure clinical education, including a required post-graduate residency under a restricted license. The author notes that these changes will require significant investment in the reforms, as well as in nursing education research and faculty development. The return on investment would be improved educational capacity and a better prepared nursing workforce, responsive to emerging health care needs and rapidly changing health care delivery systems.

TRANSFORMING PRE-LICENSURE NURSING EDUCATION: PREPARING THE NEW NURSE TO MEET EMERGING HEALTH CARE NEEDS

The Carnegie Foundation for the Advancement of Teaching joins a chorus of calls for transformation of pre-licensure nursing education (Benner et al., 2009b). Citing the shift of significant responsibility to nurses for managing complex medical regimens, as well as increasing complexity of community based practices, Benner and colleagues concluded that nurses entering the field are not equipped with the essential knowledge and skills for today's practice nor prepared to continue learning for tomorrow's nursing (p. 31). They found (1) weak curricula in natural sciences, technology, social sciences and humanities, and in developing cultural competency; (2) weak classroom instruction and limited integration between classroom and clinical experiences; (3) limited strategies in helping

students develop habits of inquiry, raising clinical questions, seeking evidence for practices; (4) faculty and student perception that students are ill prepared for their first job and dissatisfaction with the teaching preparation of current nursing faculty; (5) and multiple pathways to eligibility for the licensure examination, with tremendous variability in prerequisites, the curricular requirements, and the quality of offerings.

The Carnegie study is one of many citing the inadequate preparation of nurses for today's practice in complex, acute care environments (Berkow et al., 2008; Burritt and Steckel, 2009; Joint Commission on Accreditation of Healthcare Organizations, 2002; NCSBN, 2001) There is a growing body of evidence that confirms registered nurses are indeed essential to patient safety (AHRQ, 2007) and experts warn of further compromise in patient safety and care quality as experienced nurses retire in droves and the ratio of new graduates to experienced nurses increases (Orsolini-Hain and Malone, 2007) . While 84–88 percent of new graduates are employed in hospital-based practice for their first position (Kenward and Zong, 2006; Kovner et al., 2007), increasing numbers of nurses have migrated to non–acute care settings. Currently only 60 percent of all nurses practice in hospitals while over 40 percent of nurses practice in non–acute care settings, such as ambulatory clinics, nursing homes, schools and public health (HRSA, 2004). As care continues to shift from hospitals to community-based settings, as the population ages and care management in the community becomes more complex, and as new health care needs emerge, a new kind of nurse will be needed. Educational programs must be redesigned to better prepare this nurse.

In addition to these quality issues, educational capacity issues must also be addressed. The projected shortage of nurses is well documented (Buerhaus et al., 2009) and academic institutions have done a remarkable job of increasing enrollments (AACN, 2010; NLN, 2009a) but without further action, the supply of new nurses will fall well short of the demand as a result of serious limitations in educational capacity. In the 2006–2007 year, over 40 percent of qualified applicants for pre-licensure programs did not gain admission (NLN, 2008) and in 2008–2009, approximately 40,000 qualified applicants were turned away from nursing programs (Kovner and Djukic, 2009). Principal causes for limitations in educational capacity: shortage of qualified faculty, insufficient number, quality and type of sites for clinical education and budgetary constraints (AACN, 2010; NLN, 2006, 2009a, 2009b).

In this paper, I offer three recommendations related to transformation of pre-licensure education which address the quality and capacity issues and which provide for the possibility of leveraging existing resources in order to make critical changes. I will use models currently being tested in Oregon, the Oregon Consortium for Nursing Education (Gubrud-Howe et al., 2003; Tanner et al., 2008), as well as in Hawaii and regions of California as an exemplar of some of these recommendations.

Recommendation 1: Create new nursing education systems which use existing resources in community colleges and universities and which provide for common prerequisites, a competency-based nursing curriculum and shared instructional resources.

Rationale

Entry into practice at the bachelors level, as recommended in the Carnegie report, has been on the profession's agenda since 1965. Few would argue against the notion that more education is better, and there is growing evidence that the level of education is strongly correlated with patient outcomes (Aiken et al., 2003, 2008; Estabrooks et al., 2005; Torangeau et al., 2007). Yet community colleges are a vital resource to meet educational capacity requirements. The roughly 1,000 community college nursing programs (NLN, 2009a) provide access to education in rural and underserved communities, educating approximately 60 percent of all new graduates each year (HRSA, 2004). The nearly 700 baccalaureate programs prepare approximately 31 percent of new graduates each year (AACN, 2010; HRSA, 2004). There are nearly 600 baccalaureate completion programs, many of which boast articulation agreements that smooth the transition from associate degree to the bachelors, yet only 20.6 percent of associate degree graduates continue for the bachelors' degree (HRSA, 2004). The net effect of a disproportionately small pool of bachelors' degree graduates is simply fewer nurses who are eligible and likely to continue for the advanced education necessary to become faculty (Aiken et al., 2009).

One approach to capitalizing on community college nursing program resources to increase the number of baccalaureate graduates is to allow community colleges to offer the bachelors' degree. Sixteen states have changed regulations to allow community colleges to offer baccalaureate degrees, and several have launched bachelors in nursing programs (Community College Baccalaureate Association, 2008).

The current patchwork of educational programs is inefficient. Community college "two-year programs," typically take 3 or more years to complete. Prerequisites vary widely across programs; students who may meet the course requirements for admission to one school's program do not meet those of another school. Nursing curricula, while containing similar content and meeting similar accreditation standards, are also quite variable in terms of sequence and credit hour allocation; program faculty varying in number from as few as 4 or 5 faculty in smaller programs to well over 50 each invest considerable time and resources in developing and maintaining their own program's curriculum and instructional resources. The variation in curricula creates additional challenges in clinical education: staff nurses who frequently provide supervision for students from multiple programs, at varying levels, and differing instructional goals, may end

up very unclear about what students might be safely expected to do (MacIntyre et al., 2009).

Exemplar

One model for addressing these inefficiencies and for improving access to baccalaureate education is a partnership between community college and university programs. The Oregon Consortium for Nursing Education (OCNE) was designed to increase capacity for baccalaureate education by making best use of scarce faculty, classrooms, and clinical education resources (Gubrud-Howe et al., 2003; Tanner et al., 2008) Eight community colleges and the five campuses of the public university school of nursing developed and implemented a shared, competency-based curriculum that culminates in a bachelors degree. What sets this model apart from traditional articulation agreements is that the curriculum is standard across all partner campuses: nursing faculty from full partner schools developed and approved a common curriculum plan (including competencies, benchmarks, course titles, descriptions, credit hour allocation and outcomes) as well as academic standards for student admission and progression. The potential for increasing faculty capacity and productivity is beginning to be realized, as faculty from one campus can fill in and teach a course on another campus, and as instructional materials (such as examinations, case studies, scenarios for simulations) are developed and made accessible to all faculty through a web-based searchable database linked to the curriculum.

OCNE admitted its first class of students in fall of 2006, and is engaged in a Robert Wood Johnson Foundation (RWJF)–funded evaluation study of outcomes, including student performance measures and degree completion. Early results are encouraging, as roughly 40 percent of graduates from community college partner schools have enrolled in the courses required for baccalaureate completion (Tanner et al., 2008). Needs for program improvements are being identified, including improved advisement and services for students transitioning from community college to the university, development and implementation of statewide interprofessional educational experiences, and provision for ongoing faculty development. Similar statewide or regional university–college partnerships are being planned in at least five other states with the Hawaii statewide consortium positioned to implement in fall 2010.

Recommendation 2: Convene one or more expert panels to develop a model pre-licensure curriculum which: (1) can be used as a framework by faculty in community college–university partnerships for development of their local curriculum; (2) is based on emerging health care needs and widely accepted nursing competencies as interpreted for

new care delivery models; (3) incorporates best practices in teaching and learning.

Rationale

Demands for a new kind of nurse have been abundant for the last two decades, fueled, in part, by vast changes in the nursing practice environment, including a tremendous increase in the complexity and acuity of patient care in the hospital setting, decreased lengths of stay and the shift of care and recovery to the home and community, explosion of new technologies, exponential growth of information and knowledge, clear identification of the "quality chasm" (IOM, 2001) and the recognition of the significance of nursing in patient safety (IOM, 2003). New competencies have been promulgated to address the quality chasm and patient safety goals (IOM, 2003; Cronenwett et al., 2007), geriatric care (AACN, 1998), clinical prevention, and population-based care (Allan et al., 2005) among many other areas and incorporated into requirements for accreditation (CCNE, 2009; National League for Nursing Accreditating Commission, 2008).

Demographic changes alone demand different a different focus in prelicensure programs. The number of older adults in the United States will almost double between 2005 and 2030, presenting multiple challenges for the health care system (He et al., 2005). The majority of older adults suffer from at least one chronic health condition. The fastest growing segment growing segment of the population is the "over 85" age group, and it is estimated that a minimum of 50 percent of this group will require help with activities of daily living (He et al., 2005; IOM, 2008). Direct care workers are the primary providers of paid hands-on care to older adults, and together with families, provide the majority of care for adults in community based care settings. Registered nurses in community-based settings have responsibility for guiding, teaching and/or supervising these caregivers, yet have little training or experience in how to work effectively with them.

While the amount of geriatric/gerontologic content and experiences in prelicensure programs has increased in the last decade, it is still uneven, and effective teaching is hampered by lack of faculty expertise (Berman et al., 2005; Gilje et al., 2007; Ironside et al., 2010). Most curricula are organized around traditional nursing specialties (e.g., maternal–child, pediatrics, medical–surgical, or some slight variation in name such as adult-health) and clinical experiences are largely centered in acute care settings (McNelis and Ironside, 2009). Clinical education which focuses geriatrics occurs principally in nursing homes (with some noteworthy exceptions), and often in the first year of the nursing program when students may fail to appreciate the complexities of providing care to older adults (Ironside et al., 2010). Although interprofessional geriatrics education has been promoted (AACN, 1998) and geriatrics competencies (AACN, 1998) are similar

across disciplines (Mezey et al., 2008), most health profession education continues to occur in silos (Barnsteiner et al., 2007).

Curricular changes over the last decade have tended to be additive, rather than transformative, i.e., adding content or circumscribed courses as new competencies appear in the literature (Ironside, 2004; NLN, 2003). The majority of nurse educators first learned to be nurses in content-laden, highly structured curricula, and few have received advanced formal preparation in curriculum development, instructional design, or performance assessment. Faculty, tending to teach as they were taught, focus on covering content (Duchscher, 2003), a practice reflected more recently in the Carnegie study; they see curriculum mandates as a barrier to creating engaging, student-centered learning environments within their schools (Schaefer and Zygmont, 2003).

O'Neil (2009) makes a compelling argument for a major overhaul of nursing curricula. He suggests that traditional nursing competencies such as care management, patient education, public health intervention, and transitional care will dominate in a reformed health care system, as it inevitably moves toward emphasis on prevention and management over acute care. But he points out that ". . . these traditional competencies must be reinterpreted for students into the settings of the emergent care system, not the one that is being left behind. This will require faculty to not only teach to these competencies but also creatively apply them to health environments that are only now emerging" (p. 318). It is critical that we revisit possible and optimal expectations for entry level nurses, based on population needs and likely changes in care delivery models, then align pre-licensure and residency programs accordingly. Revamping curricula collaboratively with other health professions schools (Mezey et al., 2008) provides opportunity for meaningful interprofessional collaboration.

Advances in the science of learning also support curriculum overhaul. While nursing education research is sparse, a growing body of research on learning from a variety of other fields supports the need for active engagement of the learner, and a focus on deep learning of the discipline's most central concepts (Bransford et al., 2000; Weimer, 2002). As pointed out in the Carnegie study, the typically content-laden nursing curriculum results in superficial coverage of content, a failure to engage students in rehearsing for clinical practice by grappling with real-life clinical situations, and a failure to integrate across knowledge, clinical reasoning, skilled know-how and ethical comportment. Faculty complain about the demand to cover content, fearing that students will not pass their licensure examination (Schaefer and Zygmont, 2003) and, as the Carnegie study suggests, faculty need guidance in what is essential content in the curriculum, as well as how to teach it in a way that engages students. Bain (2004), from his study of expert teachers describes this practice:

> Teachers in our study . . . believe that students must learn facts while learning to use them to make decisions about what they understand or what they should do.

> To them, "learning" makes little sense unless it has some sustained influence on the way the learner subsequently thinks, acts, or feels. So they teach the "facts" in a rich context of problems, issues and questions. (p. 29)

The integrative teaching described in the Carnegie study is in stark contrast to the belief and related practices that "students cannot learn to think, to analyze, to synthesize, and to make judgments until they 'know' the basic facts" (Bain, 2004, p. 29).

A recent example illustrates ways in which content can be reduced in order to provide for pedagogies of integration and engagement. In separate studies, Giddens (2007) and Secrest, Norwood, and Dumont (2005) showed that only one fourth to one third of approximately 120 health assessment techniques typically taught in the standard health assessment course are used routinely by nurses in practice across settings. They suggest that this content could be significantly reduced, teaching fewer techniques well, and adding others only as they relate to specific situations and can be taught in the context of clinical judgment. Changes like this could result in a significant reduction of content, overall, providing opportunity for the integrative teaching and learning that is so aptly illustrated in the Carnegie study.

The content-laden curriculum, and resulting ineffective teaching practices, is a long-standing problem which is likely to be exacerbated as practices change, and new competencies are mandated. It is a problem which is unlikely to be successfully resolved by the individual faculty in the over 1,700 nursing programs across the county. Guidance from an expert panel, proposing curriculum models which meet the growing list of competencies, with processes for rapid cycle changes in curriculum content, will be necessary to lead essential changes in pre-licensure curricula.

Exemplar

The curriculum developed and implemented by OCNE partners is based on assumptions such as these above. Faculty assumed that their students would practice in an environment vastly different from the current one, one in which there would be fewer RNs; by equipping RNs with expanded skills related to delegation, coordinating care, community-based and population-based practice, use of data to affect outcomes and collaborative team management, better use can be made of RNs' full scope of practice, skills, and expertise. In this curriculum, fundamentals of nursing have been redefined as evidence-based practice, culturally sensitive and relationship-centered care, leadership and clinical judgment, with these concepts and others introduced early in the context of health promotion and spiraled throughout the curriculum. Through a 2-year faculty development program, faculty leaders in the OCNE partner programs applied advances in the science of learning by intentionally reducing content, to focus principally

on the most prevalent health problems and practices. Instructional approaches have been dramatically altered toward case-based instruction, integrating simulation, drawing on best practices in the development of these approaches. In this competency-based program, the faculty role is shifting from the delivery of content to the development of learning activities that will lead students to competent performance. The RWJF study of the OCNE program includes measures of classroom teaching fidelity which allow for study of teaching practices linked with learning outcomes.

Recommendation 3. Invest in a national initiative to develop and evaluate new approaches to pre-licensure clinical education, including a required post-graduate residency under a restricted license.

Rationale

Pre-licensure clinical education has remained essentially unchanged for at least 40 years (Tanner, 2006). As a derivation of hospital-based apprenticeships, students are placed in clinical settings, mostly acute care, and assigned to provide care for one or more patients. They learn through providing care to these patients, while being supervised by clinical faculty, with varying degrees of support by staff nurses employed by the clinical agency (McNelis and Ironside, 2009; Chappy and Stewart, 2004). Because the experience is organized around individual patients, students may be rarely engaged with the full scope of nursing decision making, including linking patient outcomes with larger systems issues (MacIntyre et al., 2009) or population-based care management. The nature and quality of students' clinical experience is highly dependent on events that occur during the time of placement, leaving to chance such experiences as interdisciplinary teamwork, managing crisis situations, and working with families in the provision of care (Gubrud-Howe and Schoessler, 2008). Because the focus of learning is necessarily on acute care, there is little practical experience in strategies for management of chronic conditions, health behavior change, or coordinating care across settings. There is scant empirical literature supporting the traditional model of clinical education; indeed, the evidence that graduates feel unprepared for practice (Benner et al., 2009b) and that first-line managers are dissatisfied with the level of preparation suggest that the model is not effective (Berkow et al., 2008).

Importantly, the pervasive use of this approach as the primary clinical education model results in limited capacity; the number clinical sites is cited as a major barrier to enrollment expansions (AACN, 2009) and effective clinical teaching (McNelis and Ironside, 2009).While the use of high-fidelity simulation has been proposed as a solution to these limitations in capacity, and early studies about its effectiveness are promising (Harder, 2010), there is little evidence that it expands

faculty capacity, and little guidance about what portion of clinical experience can be replaced with simulation.

The required number of clinical hours varies widely from one program to another, and most state boards of nursing do not specify a minimum number of clinical hours in pre-licensure programs (NCSBN, 2008). It is likely that many of the clinical hours do not result in productive learning. Students spend much of their clinical time doing routine care tasks repeatedly, which may not contribute significantly to new learning. Faculty report spending most of their time supervising students in hands-on procedures leaving little time focused on fostering development of clinical reasoning skills (McNelis and Ironside, 2009).

There have been some advances in clinical education, resting on strong academic–service partnerships. Preceptorships are widely used, and a recent integrative review suggests that they are at least as effective as traditional approaches (Udlis, 2006), while conserving scarce faculty resources. The Dedicated Education Unit (DEU) is receiving increasing attention as a viable alternative for expanding clinical education capacity (Moscato et al., 2007). In this model, units are dedicated to instruction of students from one program. Staff nurses who want to teach as clinical instructors are prepared for this role, and faculty expertise is used to support the development and comfort of the staff nurse as clinical teacher. Early results suggest the DEU can dramatically increase capacity and have a positive effect on student and nursing staff satisfaction; a multisite study funded by the RWJF is currently under way to evaluate outcomes of the DEU model. A variety of other clinical partnerships have been designed to increase capacity in the face of a nursing faculty shortage (Baxter, 2007; DeLunas and Rooda, 2009; Kowalski et al., 2007; Kreulen et al., 2008; Kruger et al., 2010).

There is an expanding body of evidence supporting the cost-effectiveness of postgraduate residencies. In 2002, the Joint Commission on Accreditation of Healthcare Organizations recommended the development of nurse-residency programs, a recommendation most recently endorsed by the Carnegie study. Successful programs have been launched by Versant (Beecroft et al., 2001, 2004, 2006); the AACN and University Health System Consortium developed a model for post-baccalaureate nurse residencies (Goode and Williams, 2004; Krugman et al., 2006; Williams et al., 2007, and AACN recently adopted accreditation standards for these programs [CCNE, 2009]) The National Council of State Boards of Nursing has developed a regulatory model for transition to practice programs, recommending that state boards of nursing enforce a transition program through licensure (NCSBN, 2008, 2009).

Residency programs are predominantly supported in hospitals and larger health systems, with a focus on acute care. Indeed, this has been the area of greatest need as most new graduates gain employment in acute care settings (Kovner et al., 2007) and the proportion of new hires (and nursing staff) that are new graduates is rapidly increasing. It is clear that even the best nursing programs cannot adequately prepare new graduates to work in the current acute care environment (Goode et al., 2009).

It is essential that programs outside of acute care settings be developed and evaluated. Given the demographic changes on the horizon, the shift of care from hospital to community-based settings, the need for nursing expertise in chronic illness management, care of the older adults in home settings, and in transitional services, nurses need to be prepared for new roles outside of the acute care setting. It follows that new types of residency programs appropriate for these types of roles need to be developed and become part of the regulatory framework.

In sum, in order to increase educational capacity, improve educational outcomes, and better prepare graduates for the seismic shifts likely to occur in practice, there is an urgent need to develop and test new pre-licensure clinical education models including postgraduate residencies.

Exemplar

One model is currently being implemented and evaluated by OCNE programs, funded by the Department of Education, Fund for Improvement of Postsecondary Education (Gubrud-Howe and Schoessler, 2009), which includes some of the following desired features (Tanner, 2006):

- Focus on learning outcomes, rather than on placements and completion of clock hours, considering essential competencies such as the development of clinical judgment, ethical comportment, interprofessional teamwork, technical proficiency and new competencies required in contemporary professional practice.
- Contain a variety of learning activities, designed to achieve specific learning outcomes, and taking into account the level of the student, the acuity of the patient, the complexity of the desired learning, and the skill of the faculty.
- Incorporate research on learning and best practices identified by the Carnegie study pointing to (1) the type of preparation the student would do in anticipation of the clinical learning; (2) the interaction between faculty and student to support learning (e.g., questioning, guiding); (3) the type of debriefing used to help the student learn the major lessons of the activity; (4) approaches to assessing student learning; and (5) guidance provided to the student for reflecting on the activity.
- Include integrative or immersion experiences which recognize and incorporate the growing body of literature about apprenticeships and situated learning (e.g., Lave and Wenger, 1991) deliberate practice (e.g., Ericsson, 2004), development of expertise in practice (Benner et al., 2009a), preceptorships, and academic–service partnerships.
- Integrate simulation as a complement to "hands-on" clinical experience using best available evidence to plan scenarios and incorporate into the clinical education curriculum (Harder, 2010).
- Recognize the need to vary the student-to-faculty ratio and time on task,

depending on the nature of the learning activity, the level of the student and the patient population.

- Support clinical nursing staff in clinical instruction, without overtaxing clinical resources, and at a level appropriate for the level of the student and the patient population.

SUMMARY

Implicit in these recommendations is the need for significant investment in nursing education research and in faculty development. While there is obvious need for research in nursing pedagogies, there is also a critical need for evaluation of the multiple pathways to nursing licensure. For example, fast-track curricula for students with second degrees have increased exponentially in the last 5 years, with very little evidence of their effectiveness, and virtually no study of curricular structures and instructional methods appropriate for this population of students (Cangelosi and Whitt, 2005). Yonge and colleagues (2005) reviewing nursing education research spanning 1991–2000 found that 80 percent had no identified funding source. Broome (2009) in calling for investment in the science of nursing education, points to the link between quality of research and funding. It seems implausible that the replacement of half of the nursing workforce during the next decade can be effectively addressed without building a stronger scientific basis for nursing education. Similarly, faculty development is critical in order to bring about the magnitude of change recommended here and in the Carnegie study.

Taken together, these recommendations echo those of the Carnegie Foundation study, calling for transformation of pre-licensure education. It will require partnership across all levels of nursing education and health systems, redirecting Medicare funding from hospital based pre-licensure programs to postgraduate residency and advanced practice programs, expanding Title VIII funding, and other federal resources for support of educational reform. The return on investment would be improved educational capacity and a better prepared nursing workforce, responsive to emerging health care needs and rapidly changing health care delivery systems.

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THE FUTURE OF NURSING EDUCATION

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The Committee on Quality of Health Care in America of the Institute of Medicine concluded that "the American health care delivery system is in need of fundamental change. The current care systems cannot do the job. Trying harder will not work. Changing systems of care will" (Committee on Quality of Health Care in America, 2001, p. 4). Since the publication of the IOM's quality chasm reports, numerous organizations have called for changing not only systems of care, but also systems of health professions education, realizing that it will be the clinicians of the future who can most effectively change how care is delivered. Health professions education has overall seen little fundamental change in the past 50 years and is in urgent need of new vision. New goals are needed to improve the degree to which the practice of graduates improves the health of the population; enhances the patient's experience of care; and reduces or controls the per capita cost of care.

BACKGROUND

Education in the health professions is expected to produce graduates proficient in core competencies as specified by the Pew Health Professions Commissions (*Recreating Health Professional Practice for a New Century*, Pew, 1998) and the Institute of Medicine (Greiner and Knebel, 2003). These competencies focus on issues of professional behavior (e.g., ethical standards, cultural competence) and focus of care (e.g., prevention, primary care) with the overarching intent to (1) provide patient-centered care, (2) apply quality improvement principles, (3) work in interprofessional teams, (4) use evidence-based practices, and (5) use health information technologies. Although there is wide agreement and support for these competencies, curricula have been slow to change. Faculty, themselves educated in past eras, laden curricula with factual content delivered in turgid lectures, often portrayed in dense PowerPoint slides. Students graduate with ample factual knowledge but often with little sense of integration and poor ability to function in interprofessional teams or coordinate care effectively across the multiple care settings which most patients travel.

The Carnegie Foundation for the Advancement of Teaching (http://www.carnegiefoundation.org/) recommends innovations in teaching in nursing and medicine with three emphases—integration (students' ability to connect basic, clinical, and social science knowledge with clinical experience); systems improvement (student opportunities to improve the health care system); and professionalism (students' acquisition of the qualities of professionalism including the formation and adoption of the shared values, behaviors, and aspirations of the

profession). Its recent report, *Educating Nurses: A Call for Radical Transformation* (Benner et al., 2010), calls for teaching that invites students to develop a sense of salience, clinical reasoning, and clinical imagination. To achieve this, the best teachers must teach well beyond disembodied content, teaching students instead "how to *be* a nurse who uses evidenced-based knowledge and cultivates habits of thinking for clinical judgment and skilled know-how. Their (the best teachers') teaching is integrative and patient-centered . . . these teachers coach their students, engaging them in experiential learning to develop situated knowledge, skills, and ethical comportment" (p. 15).

The looming workforce shortages in most clinical disciplines demand that educators prepare graduates for greater flexibility across disciplinary boundaries and less entrenched, siloed thinking. Many organizations speak to this. For example, the Association of Academic Health Centers cites decentralized decision-making in health workforce education and weak national health workforce policy as reasons for the growing crisis in the future supply of health professionals, and calls for urgent corrective action to improve and finance training (*Out of Order, Out of Time,* 2008). The national Physicians Foundation recommends that physicians cede much clinical management "downstream" to nurse practitioners and physician assistants with the physician's consultative oversight (*Physicians and Their Practices Under Health Care Reform*, 2009, www.physiciansfoundation.org/FoundationReportsDetails). These positions by physicians indicate a greater acceptance of nursing's key place on the team in the care delivery enterprise.

In the past few years, enlightened nursing education has been moving from content-based curricula taught within segregated compartments, such as care settings isolated from each other and isolated disease-based content, to concept-based, integrated curricula that emphasize evidence-based care and clinical decision making across settings, ages, and diagnoses. New American Association of Colleges of Nursing (AACN) *Essentials* documents reflect these changes. While encouraging, this movement is slow and falls short of radical reform.

Focus of the Paper

This paper focuses on three target areas for emphasis in nursing education—interprofessional education, education for care coordination, and education for health policy—each essential for a transformed health care system. In such a system, nursing care must be recognized by the American public, policy makers, and others on the health care team as an indispensable ingredient to quality care. Each of these targets for curricular reform calls for pedagogy that emphasizes integration and hands-on application well beyond factual content. This will require faculty development so that teachers engage and excite students. Each of the targets should become fundamental content for baccalaureate, master's, and doctoral nursing education, with increasing levels of complexity and expectations

for application and outcome. Together the three target areas could serve as pillars on which to structure the curriculum.

Others will likely select other targets for change, and there are many from which to choose. Increasing requirements for admission to nursing schools, training and recruiting a more diverse faculty, funding mechanisms for programs and students, improving mechanisms for assessing student performance, reducing and strengthening the myriad, often confusing pathways of nursing education, dealing with the issue of minimum education for entry into practice, and achieving new standards for nursing education—all are topics urgently needing new vision and bold change for the profession to receive the recognition and credit it deserves.

A major barrier of nursing education for the advancement of the profession, and specifically for embracing the three target areas of this paper, is nursing education at the community college level. Since 2006, the majority of new nurses who sit for the NCLEX-RN licensure exam each year are graduates of community college associate degree programs. The nursing profession's inability to insist that professional nursing requires a minimum of a 4-year baccalaureate degree gravely impedes the stature of the profession. Because associate degree students are less likely to be educated in academic health centers, they have less proximity and exposure to students of medicine or most other health professions. Additionally, after graduation, other health professionals are disinclined to welcome collaborative teamwork with nurses who do not hold a baccalaureate degree. Further, the three topics of this paper vastly exceed community college curricula. Therefore, a premise of this author is that the nursing profession must require the BSN as minimum education for initial licensure for practice. It simply can no longer allow infighting and special interests to dominate. Doing so has resulted in an average lowering of education for nurses over the past 40 years, during a time in history when other health professions have been increasing their education requirements.

INTERPROFESSIONAL EDUCATION

Medical errors and care fragmentation are major problems that beg for change in health professions education. Poor communication among clinicians and resulting disparities in care priorities have been well documented. For example, in one study of an inpatient unit, only 48 percent of physicians talked to the RN on their team, and in only 13 percent of cases did the MD and the RN have complete agreement on the care priorities of the day (Evanoff et al., 2005).

One outgrowth of this problem has been a move, primarily in England, Canada, and the United States, to bring health professions students in academic health science universities and medical centers together for periods of interprofessional education (IPE). Defined as "occasions when two or more professions learn with, from and about each other to improve collaboration and the quality of care" (Barr et al., 2005), such education is based on the premise that

students' greater familiarity with each others' roles, competencies, nomenclatures, and scopes of practice will result in more collaborative graduates. Graduates from programs with IPE training will be ready to work effectively in patient-centered teams where miscommunication and undermining behaviors are minimized or eliminated, resulting in safer, more effective care and greater clinician and patient satisfaction. Specifically, IPE is thought to achieve collaboration in implementing policies and improving services, prepare students to solve problems that exceed the capacity of any one profession, improve future job satisfaction, create a more flexible workforce, modify negative attitudes and perceptions, and remedy failures in trust and communication (Barr, 2002).

Efforts have been made to evaluate the effectiveness of IPE in improving outcomes, typically including increased student satisfaction, modified negative stereotypes of other disciplines, increased collaborative behavior, and improved patient outcomes. However, IPE's effect is not easily verified since control group designs are expensive, reliable measures are few, and time lapses can be long between IPE and the behaviors of graduates. Barr and colleagues reviewed 107 evaluations of IPE in published reports, judged to be of sufficient quality for inclusion according to Cochrane review standards (www.cochrane.org), and found support for three outcomes: IPE creates positive interaction among students and faculty; encourages collaboration between professions; and improves aspects of patient care, such as more targeted health promotion advice, higher immunization rates, and reduced blood pressure for patients with chronic heart disease (Barr et al., 2005). In further work, Reeves et al. (2009) reviewed six later studies that met methodology inclusion criteria as randomized controlled trials, controlled before-and-after studies, and interrupted time series design studies. Four of the studies found that IPE improved aspects of how clinicians worked together, such as an improved working culture and decreased errors in an emergency department, improved care management for domestic violence victims, and improved knowledge and skills of clinicians caring for mental health patients. The remaining two studies found that IPE had no effect at all. Although empirical evidence is mixed, there is widespread theoretical agreement and anecdotal evidence that students who demonstrate teamwork skills in the simulation lab or at the bed- or chair-side with patients will apply them beyond the walls of their academic programs, particularly if valued and reinforced by the care environments in which they later work.

In the early days of IPE, students graduated into patient care environments in which siloed and hierarchical systems predominated, thus creating a significant disconnect between their college-based learning and post-graduation experience. Now, 10 years into the widespread reforms triggered by the IOM's searing *Quality Chasm* reports, the practice environments students enter tend to reinforce rather than discourage cooperative behaviors and attitudes. This shift suggests a readiness for IPE and fuels the momentum among health science universities toward a growing acceptance of IPE in curricula.

IPE goes well beyond classroom-type courses comprised largely of didactic lectures, considered ineffective in cultivating team-based behaviors. Sitting side-by-side in lecture halls produces little student engagement with either the faculty or other students. From a pedagogical perspective, IPE learning comes from conjoint reflection, problem solving, and experience. Effective IPE training produces much more than the sum of its parts, rather, it generates interprofessional discourse that shapes collaborative thinking and behavior. IPE typically takes one or more of three approaches: (1) clinical skills lab simulation activities using manikins or standardized patients in case scenarios often videotaped to facilitate review and reflection, (2) service learning projects that enhance students' civic engagement often with diverse communities, and (3) specific patient group clinics such as in the care of geriatric or HIV/AIDS patients.

Barriers to IPE exist (Gilbert, 2005) but are surmountable. Jurisdictions of faculty and professional organizations abound. Different accrediting bodies are loath to yield control over traditional curricula and standards. Space in curricula, with their emphasis on factual content over synthesis, integration, and cooperation, is limited. Relatively rigid academic calendars control course schedules. Other barriers pertain to motivating faculty. How to reward and give faculty credit for IPE when the traditional reward systems such as promotion, tenure, and merit raises are governed within, not across, professions. Resources of the various deans to support IPE likely differ. Typically schools of nursing have smaller overall budgets than schools of medicine but a higher percent of funding that supports the education mission. Medical school faculty typically are expected to generate a larger proportion of their salaries through clinical practice and/or research. When done well IPE can be expensive for many reasons, e.g., small groups with stability over time to allow for reflection and the development of trust, and/or expensive equipment for simulations. These budgetary issues can contribute to different levels of willingness of deans to support IPE.

Recommendations

1. Students at all levels of nursing education—baccalaureate, master's, and doctoral—must have exposure to IPE training and demonstrate competence in interprofessional collaboration.
2. Since academic curricula tend to resist change unless pressured by external forces such as accreditation requirements and licensure/certifying exam content, major education and standard-setting organizations must cooperate to bring about IPE. In addition, endorsement of IPE must come from the highest levels within academic settings, including presidents, provosts, and deans.
3. Nursing faculty need development in IPE teaching, which requires structure and funding. The traditional notion of "teacher as expert" urgently needs replacement with teacher as coach and facilitator. Faculty, whose average age nationally is in the mid-50s, need the tools to make this transition. In

addition, since most nursing faculty are not active in practice, their own clinical experience is often dated and sometimes based on past unsatisfying interprofessional relationships, making them poor champions for IPE.

4. The level and timing of bringing various students together requires analysis and pilot testing because of students' varying educational pathways and readiness for IPE. For example, evaluate pairing senior medical students with graduate nursing and allied health students, in an effort to have students bring relatively comparable amounts of university education and clinical exposure to the experiences.
5. IPE should be structured around knowledge, skills, and competencies to include: interpersonal and listening skills; techniques for constructive dialogue and disagreements; how "evidence" in evidence-based practice is weighted; systems thinking and problem solving; engaging patients and families as active participants in care; verbal and nonverbal communication within the care team; effective data reports and displays; stereotypes and prejudices; and appreciating alternative conceptual frameworks and points of view.

EDUCATION IN CARE COORDINATION

Both the health professions literature and the popular press note that failures in patient care coordination are widespread in the United States. Indeed, fragmented care, lost records, hand-offs without full information, poor return of information from specialty care after referral, unnecessary and redundant procedures and services—and the attendant patient fatigue, frustration, and costs—are the very heart of the quality chasm. This problem is particularly acute for the 125 million people with chronic illness, disability, or functional limitations, and for the elderly whose numbers will swell in the decades ahead. Short hospital stays have exacerbated the problem.

Historically, primary care physicians coordinated their own patients' care within and across settings, but this function has all but been lost for myriad reasons, including the growth in hospitalist care, patient self-referrals to specialists, the breakdown in communication between primary care and specialty care, financing constraints on physician time, and overall uncoordinated systems of information technology. Failures in care coordination also can be traced to curricula where the competencies required are assumed to be intuitive and thus minimized or overlooked altogether.

Serious consequences result from poor care coordination. Especially worrisome is the post-hospital fate of patients. One study of care transitions found that 19 percent of patients experienced adverse events following discharge from a U.S. teaching hospital, most of which were avoidable and typically related to poor communication (Forster et al., 2003). In another survey, 48 percent of newly discharged patients reported not receiving information about side effects of new prescriptions ordered at discharge (Schoen et al., 2005). In a study of urgent care

patients, in 33 percent of cases information such as medical history and laboratory results was absent. In half the cases, the information was essential to patient care (Gandhi, 2005).

As defined by the National Quality Forum (2006), care coordination should meet patients' needs and preferences for information and services across settings over time. This facilitates beneficial, efficient, safe, and high-quality patient experiences and improved health care outcomes. Qualities and principles of care coordination include an enduring patient relationship and an established and up-to-date care plan that anticipates routine needs, manages acute, episodic, and chronic care needs and tracks progress toward goals that are jointly set by the health care team and the patient/family. Care coordination ensures information flow to and from referrals to specialty care or community services; ensures that all team members, including the patient, are apprised of tests and services with results readily available; reconciles medication orders and educates patients and families about side effects and medication management; and reduces opportunities for error. Care coordination requires linguistically and culturally competent communication with the patient and family, and seeks and responds to patient/family questions and feedback.

Yawning gaps in care coordination are rallying many health professions organizations to search for solutions. For example, the American Board of Internal Medicine Foundation structured its annual Forum on this topic in 2007, and later spearheaded a consortium, referred to as the SUTTP Alliance (Stepping Up to the Plate for Managing Transitions in Care) comprised of 10 medical specialty societies, including the American College of Physicians, the American Academy of Family Physicians, and the Society of Hospital Medicine. Nurses are the logical and ideal clinicians to fill the role of care coordinator, yet a similar alliance among nursing organizations is absent. Germane to this paper, curricula in care coordination in nursing education are underdeveloped.

Nursing research has produced important findings about advance practice nurses as care coordinators. Brooten's early work on care of low-birth-weight infants (Brooten et al., 1986) showed significant cost and quality improvement for early discharge and follow up home care by advance practice nurses (APNs). Naylor and colleague's (1999, 2004) studies of a transitional care model by APNs for older cardiac patients post-hospitalization also demonstrated positive effects of nurse-managed transitional care. In these models, APNs tailored post-discharge services to each patient's situation and followed patients by telephone and home visits. The intervention emphasized patients' and caregivers' goals, individualized plans of care developed and implemented in collaboration with patients' physicians, educational and behavioral strategies to address needs, and coordination and continuity of care across settings. Overall outcomes were positive across a series of studies, showing lower rehospitalization rates, fewer hospital days when readmitted, substantial cost savings, and greater patient satisfaction with care.

Another superlative example of care coordination is On Lok Senior Health Services for older adults living in San Francisco. For over 30 years, On Lok has used multidisciplinary teams, electronic medical records, capitated payment, and a full range of services (including transportation, housing, meals, adult day health services, and geriatric aides who make frequent home visits) to provide seamless transitions for nursing home-eligible frail elders at lower cost than usual care. On Lok became the model for similar institutions around the Unitd States through the Program of All-Inclusive Care for the Elderly (PACE) (Bodenheimer, 1999).

Another care coordination model is Tom Bodenheimer's "teamlet" (Bodenheimer and Laing, 2007), dyads that are a subset of the larger health care team and comprised of a physician and, ideally, an experienced nurse or an APN. Patients enter "an expanded encounter," in which pre-, post-, and between-visit care is continually monitored and coordinated by the nurse. Ingredients for success include making sure the patient understands advice and direction and agrees with the plan of care; communicating and interpreting laboratory and other diagnostic tests, and continually looping information between the patient and family, the physician, other care providers such as clinical pharmacists and allied health. Bodenheimer notes that ideally the coach would be an RN or an advanced practice nurse, but in their absence, a medical assistant could be trained for the role.

Thus, the role of care coordinator as patient advocate, communicator, assessor, and intervener, ideally suited to what nurses do best, presents a huge opportunity for nursing education. But, as implied by Bodenheimer, the nursing profession will be bypassed if nurses fail to seize the opportunity. To do so, however, requires that nursing school curricula incorporate not just the knowledge underlying the competencies of the role but convey the importance of the role to students by threading the concept and competencies of care coordination throughout the curricula. As already mentioned, most nursing curricula currently teach compartmentally, not across systems. Courses, particularly in the baccalaureate program where attitudes about nursing and nursing care are first formed, focus on content and skills in specific discrete clinical settings. Faculty generally teach within, not across, settings of care. Often the master's level Clinical Nurse Specialist program is the only track with a course or parts of courses that address care transitions and care coordination, and this content may be confused with case management, the latter being a more limited concept usually applied to containing costs within reimbursement systems.

Interprofessional education discussed above will by itself, improve graduates' competence in care coordination because many of the competencies students learn in IPE are relevant. However, there is a body of knowledge and sets of skills, attitudes, and role-related behaviors specific to care coordination that should be integrated throughout the levels of nursing education rather than confined to episodic IPE training.

Recommendations

1. BSN students should be placed for clinical training in new models of integrated care that require care coordination, such as accountable care organizations within universities or medical homes.
2. MSN students should study the research cited above that shows the effectiveness of APN transitional care. Components of MSN clinical training should include the care coordination role.
3. Across education levels of nursing education, care coordination should be structured around knowledge, skills and competencies to include: advanced assessment skills appropriate for senior baccalaureate and master's/DNP students; interpersonal and communication skills necessary for the ability to communicate with patients and families with a high degree of sensitivity and cultural competence, as well as the science-based skills necessary to communicate effectively with physicians and others on the health care team; competencies in care planning that integrate the biological, social, and psychological needs of patients; understanding of and ability to seek and apply evidence-based protocols and national standards for patient conditions; and payment and social services systems to better address the full range of patients' and families' needs.

HEALTH POLICY EDUCATION

In large measure nursing education must remain patient focused. This makes sense for an applied discipline whose goal is the prevention or amelioration of illness and the improvement in the wellbeing of patients, families, and communities. However, a major lesson of the past 20 years is the degree to which health systems and policy shape the health both of populations and individual patients. Yet nursing students gain only a glimmer that health policy at multiple levels, from the hospital unit to the federal government, affects not only their practice but ultimately the fate of patients. Few educational programs include more than a token course on health policy, typically only at the graduate level. Since nursing education curricula generally treat health policy as extra rather than core, the naiveté of graduates, is no surprise. With few exceptions, nurses generally view themselves as being shaped by, not shaping, policy.

Since nurses largely take a back seat to policy processes, the profession's input has been relatively invisible, certainly compared to that of medicine (Mechanic and Reinhard, 2002). Few nurses, when asked "What is nursing?" include health policy as a component of what nurses do (Gebbie et al., 2000). Missed opportunities for nursing to shape legislation or wade into legislative debates are all too common. One example is the recent Centers for Medicare and Medicaid Services (CMS) rule that restricts reimbursement for such "never events" as pressure ulcers, certain catheter-related infections and injuries, and certain surgical site

infections. The majority of these conditions can be prevented by excellent nursing care, yet the nursing profession has not effectively convinced the Congress or the American public that nursing care is the key ingredient safeguarding the public from these problems (Leavitt, 2009).

Another example is the "killing grandma" and "death panel" controversy, sparked by wording in the August 2009 congressional health care reform bills. Thousands of nurses across the country have daily, intimate contact with patients and families in the throes of decision making about DNR orders, advance directives, and other end-of-life issues. Nurses have close personal knowledge about how they and other clinicians facilitate discussions and considerations about palliative care and life-extending treatments. Despite this, nurses were largely silent in the face of widespread public misunderstanding and resulting acrimonious outcry over what is intended in counseling patients facing such decisions. This silence is surely an outgrowth of the inattention of nursing curricula to health policy.

The Healthy People Curriculum Task Force, convened by the Association of Academic Health Centers and the Association of Teachers of Preventive Medicine, with representatives from medicine, nursing, pharmacy, and physician assistants, as well as their educational associations recommended the following four domains fundamental to health professions curricula on health policy (http://www.atpm.org/CPPH_Framework/index.html):

- Organization of clinical and public health systems (connecting the pieces of the system; connecting clinical care to public health structures)
- Health services financing (underlying determinants of cost and options for payment and cost containment; comparison to health systems of other countries)
- Health workforce (understanding the roles and responsibilities of other health professionals)
- Health policy process (introduction to the impact of policy on health and clinical care, the processes involved in developing policies, and opportunities to participate in those processes, whether within a local institution or state or federal legislation)

Medicine has advocated the inclusion of these domains in all medical school curricula (Riegelman, 2006). Nursing curricula should do no less.

As emphasized above, health policy curricula are needed at the baccalaureate, master's, and doctoral levels of nursing education, with increasing scope and complexity as the student advances. Political competence requires continuing skill development that begins early in students' education, thus setting the course toward the graduate's life-long engagement.

Baccalaureate students need to understand the role of policies at the unit level that shape the environment in which they will eventually work. Workplace policies (e.g., mandatory overtime, nurses' authority to close beds to new admis-

sions based on professional judgment of adequate staffing, school nurses' authority to teach reproductive information) lend themselves for students' analysis and can help students clarify their own biases and potential ethical conflicts.

Another example of the type of policy work ideal for analysis by baccalaureate, and even graduate, nursing students pertains to the Robert Wood Johnson Foundation and the Institute for Healthcare Improvement project, Transforming Care at the Bedside (www.ihi.org/IHI/Programs/TransformingCareAtTheBedside/). TCAB is an excellent teaching–learning vehicle for students to gain understanding of local policy and how it is shaped. Originally designed as a way to improve hospital work environments so that more nurses would seek (and stay) in positions on medical–surgical units, TCAB also addresses care improvement processes, such as rapid PDSA (plan-do-study-act) cycles for gathering data to influence patient care policies. Faculty should engage baccalaureate students in this TCAB literature, with application in clinical assignments and an emphasis on policy implications and processes. In addition, baccalaureate students need an understanding of the important role that nursing organizations can play so as to encourage their involvement both as students and as graduates.

Graduate education in nursing, both at the master's and doctoral levels, should be infused with multiple learning experiences in health policy, including both explication and hands-on experience. Building on the foundation from the health policy curriculum at the baccalaureate level, APN students need to be actively involved in political processes that affect the care they will deliver in the future. At this stage of their education, they should be expected to understand the link between evidence and policy, i.e., the role that data can play in illuminating problems and capturing the attention of policy makers. IPE can provide collaborative efficiencies so that interprofessional student groups engage together in policy projects.

AACN's *DNP Essentials* (www.aacn.nche/DNP/pdf/Essentials.pdf) includes "Health Care Policy for Advocacy in Health Care" (Essential V), which expects DNP graduates to engage in the health policy process, whether through institutional decision-making, influencing organizational standards, or governmental actions. It is expected that students will be oriented to the principles of social justice, particularly in advocating for the underserved. Examples of hands-on assignments include preparing and presenting a policy brief analyzing a state or national health policy issue or problem related to access, utilization, cost, or quality; writing a letter (not to be sent) to an editor or an elected official on a health issue; and educating the lay public through speaking at local Rotary or other civic organization.

At the PhD level, student understanding of how to impact health policy moves specifically to the role of research. The focus at this level should be on advanced knowledge of political processes within the state and federal government and on the competencies needed to articulate research findings persuasively. Students should understand how to plan their doctoral studies and related work,

such as scholarly projects and the dissertation, toward the end goal of becoming influential. Many authorities (e.g., McBride et al., 2008) urge researchers to engage end users when framing research since those in position to make policy frequently complain that the research they need is rarely available. A useful exercise for PhD students early in their program is to meet with a state or federal elected member to discuss topics of mutual interest in improving health or health care and determining what evidence may be useful in future policy agenda.

Linking research findings to health policy formulation requires a set of specific skills which should be core to PhD education. These range from the concrete, for example, selecting a title for a policy brief or media report that reflects the key take-away message (since busy policy makers will overlook material that does not draw them in quickly), to the more conceptual, e.g., learning the separate perspectives of legislators who make policy and researchers who study health problems, which Hinshaw refers to as "moving between two cultures" (Hinshaw, 2008).

Recommendations

1. In addition to health policy courses at baccalaureate, master's, and doctoral levels, health policy objectives should be threaded throughout the curriculum, ideally embedded in every course and reflected in course assignments. Using probing questions that invite student reflection, synthesis, integration, and deduction, faculty should lead students to articulate the policy implications in everything they study.
2. Accreditation and licensure/certifying examinations must ramp up their expectations for student competencies related to health policy.
3. Health policy education should be structured around knowledge, skills and competencies to include: policy-related relationship building skills; techniques for crafting testimony and writing effective white papers and position statements; effective use of numeric and narrative data to emphasize evidence-based information; working with the media; critiquing the ethical aspects of health policy in terms of vulnerable populations; mastering health policy terminology; understanding legislators' perspectives; techniques for policy analysis; legislative processes in policy development; roles of stakeholders and special interest groups; and advocacy and strategies to influence policy.

EPILOGUE

The RWJF/IOM Initiative on the Future of Nursing will yield transformational recommendations for the nursing profession at a critical time in history for nursing and for America's health care system. There is much to reform in nursing education, from agreement about the minimum degree for entry into practice to

producing graduates with the requisite knowledge, skills, and interprofessional competencies they will need. This paper has reviewed the rationale for and curricular implications of three target areas—*interprofessional education*, education for *care coordination*, and education for *health policy*—around which to restructure education at the baccalaureate, master's, and doctoral levels. The author acknowledges the difficulties in changing entrenched curricula and habits of faculty educated in past eras. But one remains optimistic, given the many examples of progress already made (Benner et al., 2010) that an enlightened profession with a will for change can bring about a refreshing new future for nursing education.

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