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Projections and Opportunities for an Increasing Demand for Dietetics Practitioners:

2011 Dietetics Workforce Demand Study Results and Recommendations

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WORKFORCE DEMAND STUDY

ICON KEY

 Continuing Education Article  Online Extra  Podcast Online at www.andjrnl.org

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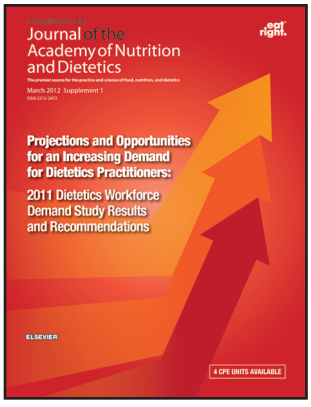

ON THE COVER
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Dietetics Workforce Demand Study Task Force Supplement: An Introduction

Susan H. Laramee, MS, RD, LDN, FADA; Margaret Tate, MS, RD

You can and should shape your own future; because if you don't somebody else surely will—Joel Barker, Futurist and Expert in the Concept of Paradigm Shifts

UNDERSTANDING THE FUTURE of the dietetics profession and the role of dietetics practitioners during the next decade demands an in-depth understanding of the factors in the environment driving the profession. To effectively meet these challenges, dietetics practitioners will be required to use available data to understand future needs and to make changes. To achieve these goals, the Dietetics Workforce Demand Study Task Force (Figure 1), appointed by the Commission on Dietetic Registration, has completed a comprehensive review and future projections based on Task Force members' best understanding of the profession in 2011. In the more than 30 years since the first, and only, dietetics workforce demand study was conducted and published, the profession has grown steadily and consistently in each decade, with dietetic practitioners continuing to expand the roles within various sectors of dietetics practice and variety of practice settings (Figure 2).

In the 21st century, the Academy of Nutrition and Dietetics will need to continue to rapidly identify future trends for the practice development, education, and credentialing needs of dietetics practitioners and the clients they serve. Understanding the workforce allows the Academy to better align its strategy and resources to adequately support the dietetics practitioner and develop new practitioners to achieve the profession's goals and position the profession to meet future demands. Many have visions of the future that include the recognition, rewards, and respect for the profession that dietetics practitioners so richly deserve. To reach this vision, the Academy is challenged by the need to confront three major goals: increase entrants into the profession; learn to work effectively, proactively, and, when appropriate, in partnership with competitors; and support dietetics practitioners in the development and advancement of career skills and competencies that meet the demands of society and the workplace.

This Supplement reports the work of the Dietetics Workforce Demand Study Task Force during the period 2009-2011. A major component of the work has included an extensive examination of the factors influencing workforce supply and demand, and this Supplement presents articles that are based on these factors and that support the work of the Task Force.

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Peter L. Beyer, MS, RD

Figure 1. Commission on Dietetic Registration Dietetics Workforce Demand Study Task Force, 2011-2012.

FUTURE CHANGES DRIVING DIETETIC WORKFORCE SUPPLY AND DEMAND: FUTURE SCAN 2011 TO 2021

The Future Scan identifies the 10 change drivers anticipated to have the greatest impact on the dietetics profession's workforce supply and demand and presents the research supporting each driver. Drivers with the highest anticipated impact are aging of the population and profession, workforce education and entry to the profession, interdisciplinary teaming, and population risk factors and nutrition initiatives that will increase demand.

FOUR FUTURES FOR DIETETICS WORKFORCE SUPPLY AND DEMAND: 2011-2021 SCENARIOS

Using four scenarios that depict a range of different supply to demand ratios (namely, Underprepared for the Future, Preferred Future, Feared Future, and Overproduced Future) this article illustrates the critical changes and choices that lie ahead for the profession. The scenarios were used to explore how the future might unfold and to explore the critical choices that will be needed during the next decade.

POPULATION RISK FACTORS AND TRENDS IN HEALTH CARE AND PUBLIC POLICY

This article provides the technical, in-depth background for understanding population risk factors that will affect the dietetics profession in the coming decade, the current workforce, and the anticipated shifting intervention approaches and changing practice roles.

FRAMEWORK FOR ANALYZING SUPPLY AND DEMAND FOR SPECIALIST AND ADVANCED PRACTICE REGISTERED DIETITIANS

Based on a review of how registered dietitians (RDs) are currently practicing in spe-

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Practice sector	Examples of sector roles
Health promotion/disease prevention	• Assess needs and implement Nutrition Care Process • Develop, deliver, and evaluate individual and population-based health-promotion/disease-prevention programs involving food, nutrition, health, and fitness • Translate evidence-based research into practice
Public policy/advocacy	• Inform, influence, advocate, and assist in development, implementation, and evaluation of food and nutrition policy, regulations, and legislation that promote sound practices for the health of the public as well as improvement in food-manufacturing policies, nutrient quality, and safety of foods • Translate evidence-based research into practice
Clinical health care	• Implement Nutrition Care Process for clients • Serve as autonomous food and nutrition expert on health care team • Translate evidence-based research into practice • Organize, manage, and monitor effectiveness of medical nutrition therapy for patients with complex nutrition and health issues and present findings in scientific publications and at conferences • Advocate advancement of food and nutrition services within the health care environment • Develop systems and protocols to improve patient and client care and satisfaction
Management of food and nutrition service systems	• Plan, organize, direct, control, and evaluate provision of food and/or nutrition services • Work to meet customer expectations and achieve vision/objectives of department and organization • Serve as contributing member of institution management or administrative team • Translate evidence-based research into practice
Research	• Design, implements, analyze, and interpret research related to health, nutrition, food, food production, nutrition care process, service systems, education, etc • Disseminate research findings • Translate evidence-based research for practitioners
Higher education	• Develop curricula and programs to meet goals of students, accrediting bodies, and current and emerging professional roles • Define and measure student outcomes • Design, apply, and evaluate teaching methodologies • Teach and apply evidence-based research

Figure 2. Roles of dietetics practitioners in various practice sectors. Source: American Dietetic Association. *Report to the House of Delegates: Final Report of the Phase 2 Future Practice and Education Task Force.* July 15, 2008 (unpublished).

cialist roles and the opportunities for advanced practice, this article provides current supply information and opportunities for dietetics practitioners to develop future practice roles.

AN OVERVIEW OF THE INTENTIONS OF HEALTH CARE REFORM

This article presents a summary of health care reform legislation and describes its impact on the dietetics profession so far, and its implications for the future.

DIETETICS TRENDS AS REFLECTED IN VARIOUS PRIMARY RESEARCH PROJECTS: 1995-2011

This analysis of 12 research projects (eg, dietetics practice audits, compensation and benefits surveys, and member-needs assessments) conducted in the past 16 years presents trends related to workforce supply and demand.

DIETETICS SUPPLY AND DEMAND: 2010-2020 QUANTITATIVE REPORT

Conducted by the Lewin Group, this report is a review of the supply and demand drivers with projections for the workforce supply and demand for the next decade. Mathematical modeling—one that can be used by the Academy moving forward—was used to develop the projections.

While considering the future and the changes that will affect the dietetics profession, it is clear that both RDs and dietetic technicians, registered, may need to make substantial changes in their practice in order to remain on the cutting edge. The world is moving at lightning speed, and the success of dietetics practitioners will depend on how fast we can reinvent ourselves to maintain our relevance. The goal is to position the profession to thrive in this rapidly changing environment—to create opportunities out of the challenges that dietetics practitioners will encounter. Dietetics practitioners need to be the change agent that steers the profession in the direction of a desirable future. To create this desired future will require a shared responsibility between the Academy and the individual members.

Experts have defined the characteristics that individuals need to succeed in a continually changing setting, whether at home or work. Adaptability and risk taking will be essential. The profession will no longer be able to afford the luxury of expecting perfection—perfection paralysis will get the profession nowhere. Instead, dietetics practitioners will need to learn to move quickly then reassess to determine if additional changes are needed. Future success will also require the acceptance of ambiguity, uncertainty, and continued change. In addition, dietetics practitioners will need to be resilient and flexible, as the ability to "go with the flow" will be imperative for a winning tomorrow. Dietetics practitioners come from a science-based educational background, so some of the characteristics or qualities for successfully navigating change are

outside the comfort zone for many dietetics practitioners, but maintenance of technical expertise is essential throughout development of the skills and characteristics necessary for the new tomorrow.

Ten years from now, professional practice in dietetics might be very different from what it is today. Dietetics practitioners will need to become lifelong learners and continually be in the process of participating in focused training or retooling. Members of the profession have the technical nutrition expertise, but additional skills—including interpersonal skills, leadership, interdisciplinary team skills, and communication—will be needed for the workplace of tomorrow. Dietetics practitioners must be able to maximize opportunities by influencing change at all organizational levels, which will necessitate the development of business skills, including management and administration, to demonstrate value by measuring cost-effectiveness. Communicating the worth of dietetics practitioners using business language will be imperative to influence people in leadership positions, such as policy makers and administrators.

Employers will continue to move away from hiring based on credentials to hiring based on skills, and dietetics practitioners will need to demonstrate that they possess those skills. Dietetics practitioners will also need to broaden their perspective and begin looking at and understanding the larger health care or foodservice environment that affects them. In other words, they will need to begin seeing the world from a much larger, more holistic viewpoint than just food and nutrition alone.

While reading this Supplement, readers are encouraged to consider how the next decade will affect the profession and what their role will be in the future of nutrition and dietetics. Each RD and dietetic technician, registered has the ability to shape the future by supporting entry of new professionals into the profession, strategically dealing with competition, and continuing development of the technical and business skills and competencies needed to succeed.

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Future Changes Driving Dietetics Workforce Supply and Demand: Future Scan 2012-2022

Marsha Rhea, MPA, CAE; Craig Bettles, MA

EXECUTIVE SUMMARY

The dietetics profession faces many workforce challenges and opportunities to ensure that registered dietitians (RDs) and dietetic technicians, registered (DTRs) are at the forefront of health and nutrition. The profession must prepare for new public priorities, changes in population, and the restructuring of how people learn and work, as well as new advances in science and technology. In September 2010, the Dietetics Workforce Demand Task Force, in consultation with a panel of thought leaders, identified 10 change drivers that affect dietetics workforce supply and demand. This future scan report provides an overview of eight of these drivers. Two change drivers—health care reform and population risk factors/nutrition initiatives—are addressed in separate technical articles. A change matrix has been included at the end of this executive summary. The matrix contains a summary of each change driver and its expected impact and is designed to present the drivers in the context of a larger, dynamic system of change in the dietetics profession. The impact of any of these change drivers individually and collectively in a dynamic system is uncertain. The outcome of any change driver is also uncertain. The dietetics profession faces many choices within each change driver to meet the workforce challenges and seize the opportunities for leadership and growth.
J Acad Nutr Diet. 2012;112(suppl 1):S10-S24.

THE DIETETICS WORKFORCE Demand Study Task Force commissioned this future scan, as well as a series of technical articles to inform its workforce projections. Signature i, LLC—with assistance from Trend Spot Consulting—designed and facilitated a 1-day workshop on September 27, 2010, with 14 thought leaders offering diverse perspectives on the future of the field. Through analysis and prioritization, the thought leaders (Textbox) narrowed the possible trends and issues shaping the profession to 10 change drivers. After facilitating this session, futurists Marsha Rhea from Signature i, LLC and Craig Bettles from Trend Spot Consulting researched eight of the change drivers. This futures scan is the synthesis of a wide-ranging literature scan using futurist methodologies to identify and analyze changes and their implications.

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HOW TO READ THIS FUTURES SCAN

This futures scan has been designed to serve two purposes: to help the profession explore the future, and to support the Dietetics Workforce Demand Task Force in creating scenarios to use in modeling workforce supply and demand projections. Each change driver opens with a narrative image of the future that comes from the futures scan research and meets the standards of plausibility and probability. However, it is not intended to present a view of the expected future, but rather to demonstrate implications for workforce supply and demand.

Each section presents a Figure that contains a summary statement of that change driver, lists some of the workforce challenges and opportunities, and then closes with a statement assessing the impact on the dietetics workforce. How much of an impact each change driver will have on supply and demand is indexed as low, middle, or high. This is a subjective index that is a first step toward a quantitative estimate of the relative influence each change driver should have in modeling dietetics workforce supply and demand.

A future research directions section follows for each change driver. These short summaries explain key or provocative findings from the futures scan. Selected references are included for those who want to read more about these trends, issues, and developments.

Change Drivers Matrix

The change driver matrix (Figure 1) offers an at-a-glance view of the change drivers and makes it easier to consider how they might interact with one another in a scenario view of workforce supply and demand.

Aging Population Drives Opportunities and Challenges

Figure 2 summarizes the dietetics workforce implications of an aging population.

The US Census Bureau has projected that the elderly population, those aged 65 years and older, will grow by >36% between 2000 and 2020. Keeping this growing population healthy and involved in and contributing to society is a key challenge for the future and an opportunity for the dietetics profession.

The "Baby Boomers"—a generation whose 65th birthday celebrations started in 2011—are the leading edge of a rapidly aging America. The Boomers are not only the largest generation to enter retirement, they are also the most educated, wealthiest, and most diverse generation to enter retirement. For both personal and financial reasons, many members of this generation will remain active in the workforce and their communities after retirement.

Keeping elderly workers engaged is also a priority for many organizations. Older workers have valuable skills and experience but are looking for more flexibility in work arrangements as they get older. This desire will lead to expansions of flex-scheduling, phased retirement, mentorship programs, and company wellness programs.

Keeping the Boomers active and involved will require better health and wellness programs. Aging dramatically increases the risk of preventable chronic diseases and disability. Much of this can be prevented with better nutrition combined with physical and mental activity.

Change Driver	Summary	Impact	Change Index
Aging population drives opportunities and challenges	Aging of the US population will usher in widespread changes in US communities and workforce and health care systems.	An aging population will create opportunities for registered dietitians and dietetic technicians, registered in institutionalized care settings as well as in private health and wellness programs. However, replacing an aging population of dietitians and finding dietitians willing and able to serve the growing geriatric population will prove challenging.	H[a]
Population and workforce diversity challenges professions to change	The dietetics profession needs to develop cross-cultural skills and knowledge of other cultures to grow in a more diverse country.	Growing diversity in the United States will drive demand for community food programs and nutrition counseling. However, dietetics practitioners are not well-placed in culturally diverse communities to seize these opportunities.	M[b]
Workforce education meets job market demands	A more diverse student population seeks flexibility, convenience, and affordability in education to prepare for and maintain employability.	While many more students will need postsecondary education to get a job, they will want more assurance that dietetics education leads to immediate and sustained employment.	H
Interdisciplinary teaming drives innovation	Interdisciplinary teams will drive innovation and solve problems in all kinds of arenas where nutrition matters.	The profession will have to be assertive and opportunistic to secure positions in a world where competencies and credentials are less important than teaming and problem-solving.	H
Generalists gain edge on specialists	Dietetics practitioners can thrive as adaptable generalists if they cultivate an interdisciplinary perspective and leadership qualities that employers value.	Without career adaptability, there could be too many dietetics practitioners for declining fields and too few for emerging opportunities.	M
Technology transforms nutrition counseling	Technologies will empower customers, clients, and patients to manage their own diet.	Dietetics practitioners who can develop these technologies will be in demand. Others will need to shift to higher-value services that cannot be programmed into expert systems.	M
Personalized nutrition evolves	New personal health testing and monitoring technologies will create opportunities for dietetics practitioners.	Dietetics practitioners are well-placed for a shift to a health care system that focuses on predicting and preventing disease. However, the scientific knowledge and technical skill needed could create a split between general practitioners and those with advanced training until the technology matures.	H
Food industry transforms for public priorities	The food industry responds to public priorities to transform the current food supply chain into a more healthful, safer and more sustainable system.	Without a systematic pipeline for feeding qualified candidates into these opportunities, the dietetics profession could easily lose out to others in this job market.	L[c]
Health care reform boosts access to dietetics services	Dietetics practitioners are valued members of coordinated care teams and deliver consistent nutrition therapies to people with chronic diseases.	The law creates the conditions to prove the value of dietetics practitioners in promoting health; it does not ensure that dietetics practitioners will be the only ones to provide these services.	M
Population risk factors and nutrition initiatives increase demand	Widespread chronic disease, obesity, and socioeconomic challenges make nutrition initiatives and life-course interventions a public priority.	Public support and funding for population health initiatives and prevention strategies are very uncertain. While the opportunities for dietetics practitioners to intervene across the life-course are extensive and exciting, more dietetics practitioners will need to shift into these new practice roles.	H

Figure 1. Change drivers matrix. [a]H=high; [b]M=medium; [c]L=low.

The aging of the US population will usher in widespread changes in US communities, the workforce, and the health care system.

Workforce Challenges

- Dietetics will experience an attrition rate of 2% to 5%
- Not enough RDs[a] and DTRs[b] are going into geriatric care
- Less than 5% of health care spending is spent on prevention

Workforce Opportunities

- Increased demand for geriatric care, especially in institutional settings
- Older career changers may consider nutrition careers
- Businesses offering wellness programs for senior workers

Workforce Impact

An aging population will create opportunities for RDs and DTRs in institutionalized care settings as well as in private health and wellness programs. However, replacing an aging population of dietitians and finding dietitians willing and able to serve the growing geriatric population will prove challenging.

Change Index: High

Figure 2. Aging population implications. [a]RD=registered dietitian; DTR=dietetic technician, registered.

The growth of Boomers, combined with the need to keep them active and involved, will create opportunities for a range of geriatric care specialties focused on prevention.

Future Directions Research

The Aging of America. The aging of America is rapidly forcing industries across the country to develop new ways to keep older Americans in good health as they volunteer in the community and are involved in the workforce. The US Census Bureau projects that the elderly population, those aged 65 years and older, will grow by an estimated 120% by 2050. The majority of those individuals will be interested in leaving the workforce or altering their work lives, prompting organizations across the country to develop new ways to keep talented and knowledgeable older workers on their payrolls (1). The problem is most acute in the health professions, where a rapidly aging workforce is encountering increased demand from an aging population. In the dietetics profession, based on historical workforce data, dietetics expects to experience a rate of attrition (dietetics practitioners who leave the workforce for reasons of emigration, extended leave, retirement, or death) of 2% to 5%, which will have an impact on supply (2). Some of the methods used by businesses to keep older Americans engaged in the workforce include flex-scheduling, phased retirement, tailored benefit packages, mentorship programs, support services for elderly workers, and wellness programs (2).

The "New Older" American. Greater resources and higher educational attainment throughout their lifetimes will likely mean that retiring Baby Boomers will be in better overall health, will work or volunteer in their communities longer, and will demand better geriatric care in their retirement. In 2011, the first of the Baby Boomers (those born between 1946 and 1964) will turn 65 and begin to leave the workforce. The Baby Boomers, particularly those born earlier, were the most educated generation in American history. According to Census Bureau data, 43% of men and 40% of women aged 55 to 64 years have attained some type of college degree. Correspondingly, the Baby Boomers are also one of the wealthiest generations to enter retirement. However, Baby Boomers also have a smaller pool of potential family caregivers than current older people because of smaller family sizes and higher divorce rates (3).

The Needs of the "Oldest Old." Greater longevity because of better nutrition, safety, and medical care means that the "oldest old"—those aged 85 years and older—have become the fastest growing cohort among age groups. According to Census Bureau projections, the population of this group is expected to grow by 377% by the year 2050. These individuals are the most frequent per-capita users of health care services. They often suffer from multiple chronic diseases and receive aggressive end-of-life care (4-6).

Healthy Aging. Keeping the growing generation of elderly people healthy and involved is vital to adapting to the aging of America. Older people are at higher risk for a variety of preventable chronic health problems, including certain types of cancer, cardiovascular disease, diabetes, and osteoporosis. According to research published in the *New England Journal of Medicine*, almost 75% of elderly people have at least one chronic illness, and roughly 50% have at least two chronic illnesses. Even more alarming is the rise in disability. Recent research conducted by The Rand Corporation shows substantial increases in disability among those aged 50 to 64 years. Increases in the disability of the population will likely lead to higher levels of unemployment, underemployment, and need for home care in the future (7).

Registered dietitians (RDs) can play a vital role in preventing chronic disease and disability in elderly patients and clients by providing good nutrition counseling as part of a comprehensive health and wellness program. Such programs, focused on improving diet and increasing mental and physical activity, can greatly lower the incidence of chronic disease and disability. Unfortunately, the US health care system is primarily focused on treating disease rather than preventing it. The Centers for Disease Control and Prevention estimates that 75% of the nation's health care spending—approximately $5,300 per person in the United States each year—is spent on chronic disease. Only approximately 3% is spent on public health and primary prevention activities, compared with approximately 84% allocated to some form of care from physician services to hospital care to prescription drugs, according to the Kaiser Family Foundation (8).

Population and Workforce Diversity Challenges Profession to Change

Figure 3 summarizes the dietetics workforce implications of population and workforce diversity.

Global migration is reshaping the future of America. High rates of immigration during the last 20 years have led to vibrant immigrant communities across the United States. Although the bleak US job market has slowed down immigration in the last 2 years, these communities remain some of the fastest growing in the United States, and children of recent immigrants are the fastest growing segment of the US population.

However, many of these growing communities suffer from poor health related to diet, exercise, and social and environmental conditions. These groups need programs that target behavior change in schools, universities, and community centers. Good government- and foundation-sponsored programs that target these points of interaction exist, but their reach is limited. Many of these programs, particularly school and college foodservice and food programs, need to be overhauled to improve nutrition and provide more nutrition counseling to improve eating habits.

Creating meaningful change in communities of color requires a high level of cultural competence. Meals are a chance for family and friends to come together, share stories, and build bonds of identity and meaning, and every community has its own cultural approaches to food and nutrition. Professions that wish to make a meaningful impact in culturally diverse communities will need to embrace diversity at all levels (including racial, ethnic, and sex). For many professions, this will require improving cultural competency, raising awareness, and actively recruiting new members from these communities.

The dietetics profession needs to develop cross-cultural skills and knowledge of other cultures to grow in a more diverse country.

Workforce Challenges

- Dietetics practitioners will need to develop cultural competency to reach new communities
- The dietetics profession needs to become more diverse to match the diversity of the communities its practitioners serve
- Dietetics practitioners will need to partner with community leaders and other health professionals to address the root causes of poor nutrition

Workforce Opportunities

- Poor nutrition will drive demand for community dietetics practitioners
- Foodservice and consulting dietetics practitioners will be vital to improving school food programs
- Increased funding for chronic disease prevention will drive demand for dietetics practitioners

Workforce Impact

Growing diversity in the United States will drive demand for community food programs and nutrition counseling. However, dietetics practitioners are not well-placed in culturally diverse communities to seize these opportunities.

Change Index: Medium

Figure 3. Population and workforce diversity implications.

Future Directions Research

America Becoming More Diverse. The US Census Bureau forecasts that by 2050, minority populations will outnumber non-Hispanic whites because of a combination of population growth and immigration. The Urban Institute observes that children in immigrant families (87% of whom are US citizens) are the fastest growing segment of the nation's youth population. An analysis of black and Hispanic households performed by the US Department of Agriculture between 1999 and 2005 showed that these households experienced food insecurity at far higher rates than the national average and food insecurity impacts children in these households the hardest. Hunger is linked to decreased school performance and behavioral problems. These problems can persist later in life, leading to decreased economic production and a lower quality of life. Community- and school-based food programs, which are an important area of growth for RDs, are a vital component of health and nutrition in underserved communities, especially in culturally diverse communities (9).

Inequity and Impact of the Obesity Epidemic. Obesity is growing across the United States, but it is impacting communities of color the hardest. The Brookings Institute recently estimated that obesity cost the US economy >$215 billion annually in premature death, medical costs, and lost productivity. Even more alarming is the growing trend of obesity among children. The number of adolescents who are overweight has tripled since 1980 and is disproportionately impacting communities of color. According to the US Department of Health and Human Services, roughly 16% of all adolescents aged 6 to 19 years are overweight, compared to 22% of Mexican-American children and 20% of African-American children (10).

Community Assistance Nutrition Programs Vital. The prolonged economic recession has increased the importance of nutrition assistance programs administered by the federal government. The Supplemental Nutrition Assistance Program, also known as the Food Stamp Program, now serves more than 1 in 8 Americans. In 2008, according to the Food and Nutrition Service, the number of people eligible for, and the number of participants in, the Supplemental Nutrition Assistance Program increased by 5% and 7%, respectively. Increases in participation rates have been driven by increased outreach to low-income families and engagement of community partners by state agencies. Unfortunately, many of these outreach programs are endangered by recent state budget shortfalls and the end of federal economic stimulus funds (11-13).

The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides supplemental foods, nutrition education, and health care referrals to low-income women, infants, and children up to 5 years of age who are at nutritional risk. The WIC program has experienced considerable growth in participation: In 2010, according to the Food and Nutrition Service, the average monthly participation in the WIC program comprised 9.1 million individuals. Like the Supplemental Nutrition Assistance Program, the WIC program is vulnerable to budget reductions as the federal fiscal year 2012 and future year's budgets are debated in the US Congress (11-13).

There has also been growth in the need for the National School Lunch Program, the National School Breakfast Program, and other food programs for children. National School Lunch Program provides one third of the energy a child needs during the day and, according to the US Department of Agriculture, is often the most nutritious meal of the day for the 19 million children who receive free or reduced-price lunches. Both the participation rate of the program and the number of children receiving free lunches have increased steadily in the last decade, particularly among minority students (11-13).

Dietetics Practitioner Diversity Gap. The growing diversity of the nation is not matched by diversity in the dietetics profession and this can affect quality of care. Recent data obtained by Readex Research estimate that 84% of RDs and 81% of DTRs are non-Hispanic white, compared with 74% of the entire US population. There is also a considerable sex gap in the profession. Within the profession, 96% of RDs and 95% of DTRs are women. Population diversity at the student level largely mirrors the larger body of the profession, with slight increases in Hispanic students (2). Numerous studies have shown a correlation between increased diversity and quality of care in culturally diverse communities.

Workforce Education Meets Job Market Demands

Figure 4 summarizes the dietetics workforce implications of workforce education.

More diverse and older students are more likely to opt for professional and career education that fast-tracks them into employment. Institutions and alternative education providers that can meet the needs of these nontraditional students are thriving. They are using online education and creative scheduling to make learning more convenient and flexible.

Continuing education now supports people as they pursue serial careers. "Earn while you learn" takes on new meaning, as most people will have to study for their next occupation even as they pursue their current career. Companies that can provide diverse, cutting-edge training will have a strong recruiting advantage over competitors that offer fewer opportunities to improve their workers' skills and knowledge.

In the health care professions, students are migrating to either 2-year programs or advanced degrees to prepare for employment opportunities. Interprofessional learning is gaining momentum as institutions change to educate health care professions to work as a team. Students in many fields are interested in interdisciplinary learning to improve their employ-

A more diverse student population seeks flexibility, convenience, and affordability in education to prepare for and maintain employability.

Workforce Challenges

- Dietetics education may have low visibility as an option for the growing number of nontraditional students
- Dietetics education will have to meet student demand for flexibility and outcomes
- Professional preparation and continuing education need to be more seamless and adaptable

Workforce Opportunities

- Interprofessional learning could expand the number of dietetics and nutrition specialists
- Health care career opportunities are growing and are perceived as more secure

Workforce Impact

While many more students will need postsecondary education to get a job, they will want more assurance that dietetics education leads to immediate and sustained employment.

Change Index: High

Figure 4. Workforce education implications.

ability in a fast-changing, team-oriented world.

Colleges and universities are adjusting to new standards and measures for outcomes assessment. Accountability for results comes through accreditation, student financial aid requirements, and third-party rating sources. After a decade of public and personal austerity and job insecurity, students will demand a proven return on their financial investment in postsecondary education.

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Older and More Diverse Student Population. In 2007, the percentage of American college students who were minorities was 32%. The National Center for Education Statistics estimates that by 2020, the resident population will be 64% non-Hispanic white, 13% black, 17% Hispanic, and <6% Asian/Pacific Islanders. By 2050, the US Census Bureau says <53% will be non-Hispanic white; 16% will be black; 23% will be Hispanic origin; 10% will be Asian and Pacific Islander; and about 1% will be American Indian, Eskimo, and Aleut (14,15).

A Chronicle Research Service survey of college and universities found only approximately half of the 121 responding institutions believe that in 2020 their enrollments will be primarily made up of traditional-age, full-time students. The enrollment of nontraditional-age students in postsecondary education in 2007-2008 (the last data available at the time of publication) was 19.1% students between the ages of 25 and 39 years and 4.7% students between 40 and 64 years (16). Student population trends indicate an increasing number of low-income high school graduates who will need financial assistance or have to combine college education with employment (17).

College Affordability Critical to Students. Any workforce initiative to entice more students into a particular career must factor in what it could cost to secure education for that field. According to the College Board, most undergraduates enroll at institutions where tuition and fees are relatively low. Of all degree-seeking undergraduates in the academic year 2008-2009, more than 41% are seeking associate degrees in public community colleges, where tuition and fees averaged $2,713 in the 2010-2011 academic year. An additional 36% are enrolled at in-state, public, 4-year institutions, where tuition and fees averaged $7,605 in 2010-2011. On average, full-time students who enrolled in public 4-year colleges and universities received approximately $6,100 and students in 2-year public colleges received $3,400 in grants from all sources and tax benefits in 2010-2011 (18).

Rapid Growth of Online Education. In 2007, roughly 1 million students in grades 9 through 12 were enrolled in online courses—a number 22 times greater than in 2000, but still representing only approximately 1% percent of all education courses nationally. Christensen and Horn (19) suggest that in approximately 6 years, 10% of all courses will be computer-based, and by 2019, approximately 50% of courses will be delivered online. The shift to online education is growing not only in the formal education system, but also in professional development and continuing education required for certification. Approximately 1.8 million students are enrolled in degree and certificate programs in for-profit colleges that rely extensively on online learning (19).

Students Want à la Carte Convenience. More students will attend classes online, study part-time, take courses from multiple universities, and stop and start their college education. Students will demand more options for taking courses to make it easier for them to do what they want when they want to do it (17).

Bifurcation of Health Care Professions. Analysis of National Center for Education Statistics and American Medical Association data show a small increase in associates of the arts degrees for allied health professions and a large increase in master- and doctoral-level degrees. This bifurcation may be occurring because the job market favors specialized skills at lower costs, while the professions seek more advanced degrees to boost salaries and prestige. Collier found that advanced degrees do not deter student interest in a health professions career (20).

Transformative Learning for Health Care. The Commission on Education of Health Professionals for the 21st Century calls for a new century of transformative professional education involving three fundamental shifts, that is, from seeking professional credentials to seeking core competencies for effective teamwork in health systems; from institutions adopting their own educational models to creative adaptation of global resources to address local priorities; and from isolated to collaborative education and health systems throughout the world. The Commission on Education of Health Professionals for the 21st Century proposes these core competencies for all health professions: patient-centered care, interdisciplinary teams, evidence-based practice, continuous quality improvement, use of new informatics, and integration of public health.

In fact, the Commission on Education of Health Professionals for the 21st Century posits that these core competencies can become objective criteria for reclassifying the role and scope of health professionals. Instruction should be reformed to promote interprofessional and transprofessional education that breaks down silos and enhances collaborative learning and teaming. Educational institutions should exploit the power of information technology for instruction reform, faculty development, and access to global resources through networks, alliances, and consortia (21).

Incorporating team-based learning across the disciplines into education for health professions has long been viewed as desirable, although widespread implementation has not become a reality (22). The Institute of Medicine in 2009 called for redesigning continuing education for the health professions to bring health professionals from different disciplines together in carefully tailored learning environments. This change would align learning with team-based health care de-

Interdisciplinary teams will drive innovation and solve problems in all kinds of arenas where nutrition matters.

Workforce Challenges

- Emotional intelligence and leadership are as critical as intellect and technical skills
- Registered dietitians will have to shed self-limiting views of their identity to seize new opportunities
- Work scopes and core competencies will be blurred and redefined

Workforce Opportunities

- Nutrition is central to health and critical to solving many health-related challenges
- Registered dietitians can assume new roles as team leaders and coordinators
- Teaming could bring together the three primary sectors of dietetics: clinical, health promotion/prevention, and food production and foodservice

Workforce Impact

The profession will have to be assertive and opportunistic to secure positions in a world where competencies and credentials are less important than teaming and problem-solving.

Change Index: High

Figure 5. Interdisciplinary team implications.

livery. Continuing professional development would stretch beyond the classroom to the point of care (23).

Outcomes Assessment and Accountability. Assessment of learning outcomes provides external accountability and fosters internal efforts to improve. Accreditation agencies, certification organizations, and licensing boards spur most assessment of learning outcomes now, although the federal government is taking a greater interest as its financial role in higher education increases. Some students may use third-party assessments in choosing a school, but other factors like accessibility and cost are more important to students (24).

Interdisciplinary Teaming Drives Innovation

Figure 5 summarizes the dietetics workforce implications of interdisciplinary teaming.

The innovators in health care, science, business, and government programs are using interdisciplinary teams to manage complexity and solve tough challenges. Dietetics practitioners will have many more opportunities to have their knowledge and skills become part of the solution in health care, public health, research, and industry.

Many professions will find it increasingly difficult to draw hard lines around their work scope and competencies to exclude others. Instead, they will be asked to accept a more fluid and collaborative environment that relies on and rewards successful teaming.

Health care is reorganizing around the concept of high-functioning teams to address problems. The medical home and chronic care models depend on coordinated care teams. Health promotion and prevention initiatives rely on interdisciplinary strategies to create healthy communities and individuals.

Interdisciplinary teams are essential to scientific research and product development. Corporations are trading their cross-functional teams for more ad-hoc connections to expertise inside and outside their enterprise that can swarm to problems, solve them, and quickly disband.

Dietetics practitioners with sufficient interdisciplinary literacy and leadership skills are joining and leading teams where nutrition plays an integral role. They are on the frontlines of chronic-disease management. They are helping food research and development teams reformulate more healthful products and are planning efforts to organize communities for active living and healthful eating.

Future Directions Research

Team-Based Care Vital in Complex Situations. Teams already dominate actual practice in increasingly complex health settings. A study in 12 Pennsylvania hospitals found that a multidisciplinary team could get results similar to those of specially trained physicians for patients in intensive care units. The researchers speculated this outcome is possible because multidisciplinary teams facilitate the implementation of best practices, including the application of evidence-based treatments, potentially adverse drug indications identified by pharmacists, and application of respiratory therapy and nurse-driven protocols to reduce ventilation time and shorten the length of intensive care unit stay (25).

Medical Homes Coordinate Patient-Centered Care. The health care reform law includes a number of provisions promoting the use of "patient-centered medical homes," a concept strongly endorsed by the Institute of Medicine and several physician groups. A medical home coordinates "caring and continuous healing relationships centered around patient needs and values." Medical homes will dramatically improve care for people with one or more chronic diseases and are an important element in a related care model called the "chronic care model." Under these approaches, each patient has an ongoing relationship with a personal physician who leads a team of patient care providers responsible for providing all the patient's health care needs and, when necessary, arranging for appropriate care with other qualified physicians. Nutrition therapy and counseling could be an important aspect of the medical home and chronic care models (26).

The US Department of Veterans Affairs (VA) is undertaking a transformation to have at least 80% of its clinics using the medical home model by 2012. Among the core features of the VA transformation are team-based care that emphasizes continuity; a bigger role for nurses in coordinating care; e-mail, secure messaging, and other alternative forms of contact with patients; and more attention on behavioral health issues. The VA follows several smaller-scale efforts by systems such as Kaiser Permanente and Group Health Cooperative. The VA's nationwide experiment is viewed as a critical test of how to adapt the concept in diverse settings. RDs are expected to have a key role on these teams (27).

The Centers for Medicare and Medicaid (CMS) has established a new innovation center to provide a seamless care experience, better health, and lower costs. CMS is undertaking demonstration projects of the medical home concept for primary care in eight states, an initiative to provide more coordination of care in health clinics, and a new state plan option that coordinates care for patients with at least two chronic conditions (28).

Accountable Care Organizations Represent Another Reform Innovation. Under the health care reform law, CMS will authorize accountable care organizations in 2012. Accountable care organizations are networks of physicians and other providers who work together to improve the quality of health care services and reduce costs for a defined patient population. Although reimbursement will still be managed on a fee-for-service basis, accountable care organizations will receive part of any savings as an incentive to deliver integrated care. Kaiser Permanente, Mayo Clinic, and the Cleveland Clinic are trailblazers in accountable care. CMS hopes to expand the concept beyond hospitals to physician networks (29).

Task Competencies Blur Roles and Scopes. The Commission on Education of Health Professionals for the 21st Century observed that "the walls between task competencies for different professions are porous, allowing for task shifting and task sharing to produce practical health outputs that would not be possible with sealed competencies." Health care professional education needs to do a better job in both team-based learning and interprofessional education. Team-based learning is an instructional approach aimed at preparing students for effective, collaborative work within a cohesive group. Interprofessional education involves students of two or more professions learning together—especially about each other's roles—by interacting with each other within a common educational agenda (21).

Community-Based Health Requires Collaborative Teams. Engaging the community to change health behaviors requires collaboration with health departments, employers, community leaders, and medical care providers. This team can include nonphysician clinicians—including dietetics practitioners, pharmacists, social workers, case workers, and occupational or physical therapists—to help patients focus on exercise and healthful eating habits beyond the clinical setting. Potential care for people with chronic diseases could include reimbursed group visits, patient-directed self-management teaching, case management, and educational home visits (30).

RDs Contribute to Interdisciplinary Research. Major health issues and scientific challenges often require interdisciplinary teams. The National Institutes of Health has an interdisciplinary research program as part of its current roadmap to build bridges between the biological sciences and the behavioral and social sciences. Three of the new multidisciplinary research programs—at the University of North Carolina at Chapel Hill, the University of Texas Southwestern Medical Center in Dallas, and the University of Washington—are bringing together investigators to address the nation's obesity epidemic. These research efforts span nutrition, biomedicine, genetics, psychology, epidemiology, health behavior, public health, urban planning, economics, and public policy (31).

In clinical care, nutrition clinical scientists and RDs with research training can lead and play a key role in these teams and help accelerate knowledge translation and transfer to practice. These interdisciplinary research teams are also working in the food and pharmaceutical industries. RDs play an important role in reviewing and translating the science for policy and marketing purposes. By participating in these research teams, RDs contribute their expertise, and develop the knowledge to ensure nutrition has a recognized role in creating and maintaining health (32). Although doctoral-level researchers and scientists are currently more likely to participate in these interdisciplinary research teams, all dietetics practitioners have the potential to make important contributions to this continuous flow of learning between research and practice.

Registered dietitians (RDs) can thrive as adaptable generalists if they cultivate the interdisciplinary perspective and leadership qualities future employers will value.

Workforce Challenges

- Most health care professions are developing advanced and specialty practice
- Career mobility requires continuing education and training as well as personal risk-taking and openness to new opportunities
- Business and leadership knowledge and skills may not be a priority in academic preparation

Workforce Opportunities

- RDs can migrate with health care out of the clinical setting
- RDs may be a step ahead in adopting the skills to lead interdisciplinary teams
- Management opportunities offer better compensation and career growth

Workforce Impact

Without career adaptability, there could be too many RDs for declining fields and too few for emerging opportunities.

Change Index: Medium

Figure 6. Generalist and specialist career path implications.

Swarming Teams for Chaotic Environments. Gartner says that by 2020, a new form of teaming, called "swarming" will help organizations adapt to work that is less routine and characterized by increased volatility and hyperconnectedness. Gartner defines swarming as "a work style characterized by a flurry of collective activity by anyone and everyone conceivably available and able to add value. Swarms form quickly, attacking a problem or opportunity and then quickly dissipating. Swarming is an agile response to an observed increase in ad-hoc action requirements, as ad-hoc activities continue to displace structured, bureaucratic situations." For example, in the future, dietetics practitioners might be part of swarms of experts targeting specific public health challenges or trying to improve a hospital's outcomes for a particular patient segment or innovating on a new product line for the food industry. Individuals in a swarm may only know one another through weak links. People will navigate their personal, professional, and social networks to survive and exploit swarms for business benefit. Hyperconnectedness will lead to a push for more work to occur in both formal and informal relationships across enterprise boundaries (33).

Generalists Gain an Edge on Specialists

Figure 6 summarizes the dietetics workforce implications of generalist and specialist career paths.

Career security and growth depends most on continued learning and a willingness to help organizations adapt and change. New entrants to the dietetics profession will need to be broadly educated for careers that will morph many times to meet new demands for food and nutrition expertise.

Employers of all types want to hire potential leaders who can innovate, solve problems, and organize diverse individuals into results-oriented teams. People with a career portfolio of different work experiences and project knowledge are more attractive candidates to prospective employers than those who have followed a defined career pathway. With old roles and boundary lines blurring in every field, organizations need people who have proven they can learn deeply and quickly and become specialists and change agents for the moment in the latest opportunity.

Core knowledge and skills are still necessary to enter the dietetics profession. RDs with the business acumen to develop and improve programs and services and lead teams of people are the ones who ascend the career ladder. They serve in executive and director positions and assume major responsibility for the success of their organizations.

A small number of specialists do thrive as on-call experts and researchers. They deliver their advanced knowledge to other practitioners and organizations through such channels as consultancies, centers of excellence, expert systems, and telemedicine.

Future Directions Research

Experience and Increased Responsibility Valued More than Specialization. The Academy illustrates dietetics education and career progression in its career development "double helix" diagram guide (34) as moving through stages from novice to beginner, competent, proficient,

advanced practice, and expert. This double helix diagram affirms that as dietetics practitioners gain knowledge and skills, they advance in their career. The Academy's compensation data suggest that pursuing a focus area as a specialization is not a proven path to financial success. Specialization is not common among RDs and is rarely rewarded by increased compensation. In 2009, only 19% of RDs specialized in focus areas. Only a few of those employed in these focus areas earned substantially more than a general practitioner. For example, a clinical RD specializing in cardiac nutrition earned $21.11/h, less than the generalist clinical RD who earned $21.75/h. RDs specializing in oncology did only slightly better at $21.91/h. The best-paid focus area was the pediatric/neonatal RD at $22.85/h. However, the best-paid RD was a generalist working as an outpatient RD at $23.72/h (2).

As with most professions, the most highly paid RDs are executives and directors managing large budgets and supervising many employees. Wages are trending upward for RDs with a professional focus in weight management, diabetes, and pediatrics. However, the greatest wage growth is in research, sales, and public relations and marketing; the latter two occupations are likely generalists in dietetics who have honed very specialized business skills through practice (2).

Uncertain Value of Advanced Degrees. Advanced degrees or training in other health care professions appear to expand graduates' job scope or functions beyond that of entry-level professionals and increase their level of practice autonomy. Advanced practice nurses earn higher salaries than registered nurses. However, RDs who completed entry-level or postprofessional masters' degrees did not report greater marketability for more positions. Health care professionals with advanced degrees tend to have higher self-esteem and attain a higher profile within the profession as writers, researchers, and leaders (35).

Employers Value Generalist Skills. Workforce skills surveys routinely report that employers want a variety of basic skills, such as reading and writing, critical thinking, problem-solving, teamwork, professionalism, and leadership. Employers are adding emerging priorities to their wish list, such as innovation and creativity, cultural competency, and digital literacy (36,37). The Commission on Dietetic Registration has conducted employer surveys that also attest to a preference for professionalism, management, and leadership skills.

Broad Education Increases Career Flexibility. Career counselors advise young people to become broadly educated and versatile to keep their career options open in a fast-changing world. Workforce projections are unreliable; tomorrow's high-demand occupations can quickly become oversupplied or out of date. The most useful skill is to know how to learn for the multiple careers people are likely to have in a lifetime. The more broadly educated people are, the more options they will have when it comes to choosing and changing careers. The best career strategy is to choose employers who offer substantial education benefits and professional development (38).

Multidisciplinary and Multidimensional Jobs Grow. Some employers search for people with hybrid careers who have combined the expertise of two distinct careers to address new challenges. They provide a multidisciplinary outlook in such fields as consulting, technology development, and research and development (39). Winterfeldt and colleagues (40) sum up future demand for multidisciplinary knowledge in dietetics nicely as follows:

> *Dietetic jobs will evolve from being narrowly defined and task-oriented to more multidisciplinary and multidimensional roles; nothing will be permanent . . . . Members of the profession will have to bring a generalist mindset to the practice area. Job flexibility will be a reality as professionals move in and out of careers and organizations many times throughout their lives.*
> *[Dietetics is a] generalist profession with the capability of easily moving into multidisciplinary and multifunctional careers . . . . The new healthcare environment will see dietetic professionals managing multiple departments or providing transdisciplinary health services, in which nutrition is only part of the practice role. In the future, it will not be uncommon to see food and nutrition experts earn dual degrees in medicine, pharmacy, nursing, physical therapy, law or hotel and restaurant management.*

Change Agent Skills for Health Systems. Commission on Education of Health Professionals for the 21st Century recommends health professionals strive to acquire competencies and undertake functions beyond their purely technical tasks—such as teamwork, ethical conduct, critical analysis, coping with uncertainty, scientific inquiry, anticipating and planning for the future, and most importantly leadership of effective health systems. The commission advocates for transformative learning that develops leadership attributes and produces "enlightened change agents" who can address local challenges and innovate with their colleagues and communities to achieve health and well-being (21).

Technology Transforms Nutrition Counseling

Figure 7 summarizes the dietetics workforce implications of technology transformations.

A radically different landscape for the delivery of nutrition information and counseling is technologically feasible in fewer than 10 years.

The technology will exist to wirelessly capture nutrition and physical activity data in health records contained on smartphones. Customers at restaurants could electronically access a full range of nutrition information, and food products could contain radiofrequency identification tags that can be easily scanned to input nutrition information. Unobtrusive armbands will be available to capture daily activity and energy expenditures and customers will have access to software that uses expert systems to help them develop and adhere to their own health and nutrition goals.

What is not clear is whether people will embrace these new technologies, abandon privacy concerns to gain these benefits, or adopt the lifestyle changes they will encourage.

Researchers will also be able to aggregate health data to develop nutrition information and recommendations for entire communities. To address privacy concerns, nutrition data collected by customers from their wireless devices could be stripped of any personal identifiers and combined with health data from personal health records. The results could be linked to changes in public policy or the physical environment, such as the addition of new bike lanes in a community.

New methods of delivery, from social media to virtual worlds, will allow health care providers to reach and interact with patients in different cities or even countries. Health providers will interact with patients on multiple levels, from simple "tweets" to online videos.

Future Directions Research

Future Role of Health and Nutrition Information. Proactive patients are currently using the Internet to access information about health and nutrition and using that information to make better decisions about their health. Missing from this vast array of Web resources are expert systems that deliver health information directly to patients when and where they need it—but this is changing. Software companies are working on new tools designed to capture real-time information and refining it based on the profiles of individual users. These systems could easily merge with existing expert systems that mimic expert knowledge and judgment, creating systems that bridge the health knowledge and literacy gap between patients and health care providers. Increasingly, this information will be available at a moment's notice on the In-

Technologies will empower customers, clients, and patients to manage their own diet.

Workforce Challenges

- Improved automation and delivery of nutrition information will provide competition for low-value services
- New software could provide a low-cost, personalized way to deliver nutrition counseling
- New technologies will require continuous learning
- Fragmentation of the health care system will delay the deployment of new technologies

Workforce Opportunities

- Demand for nutrition information in food systems will increase
- Expert systems can improve patient care and free time for dietitians to provide higher-value services
- Virtual worlds will provide more avenues to reach and influence patients
- Advanced modeling and simulation technology will allow greater personalization of diet plans

Workforce Impact

Dietetics practitioners who can develop these technologies, and the nutrition information that supports them, will be in demand. Others will need to shift to higher-value services that cannot be easily replicated by expert systems.

Change Index: Medium

Figure 7. Technology transformations implications.

ternet and on mobile devices like smartphones (41,42).

The Evolution of a Virtual Nutrition Coach. One deterrent to using online tools for tracking nutrition and physical activity is that they rely heavily on users to input data. These systems appeal to highly motivated users, such as professional athletes or those suffering severe health problems. However, studies of average users have shown poor adherence and not much linkage between the use of the tools and changes in physical activity or diet.

That outcome may change as physical hyperlinks make it easier for anyone to capture real-time information in any eating situation (43). For example, a smartphone could use global positioning systems, a type of physical hyperlink, to access nutritional information on menus items when a customer steps into a store. When the customer makes a purchase, the phone could automatically track the nutritional value of purchased items using credit card data. Consumers could then run applications on their smartphones to track this information in comparison with personal health goals.

Eventually, a virtual nutrition coach that provides real-time nutrition counseling could emerge. The coach would draw on the patient's health information as well as nutrition information about foods consumed—all accessed through physical hyperlinks. Expert systems inside the virtual nutrition coach would mimic the knowledge base of health care providers to provide nutrition counseling and life coaching.

Government Support for Informatics. Many experts are counting on the broader implementation of informatics to reduce medical errors, reduce health expenses, and improve food safety and nutrition. The 2009 American Recovery and Reinvestment Act included $30 billion in funding and incentives to encourage the adoption of health information systems. The food safety bill that was signed into law by President Obama in January 2011 beefs up regulations for food safety, provides more funding for enforcement, and speedier surveillance of potential outbreaks. Improved informatics systems for food producers and regulators will be needed to meet many of the food safety and record-keeping requirements established in the bill (44).

Informatics can also be used in public health to detect and intervene to create healthy communities. One of the immediate goals of the government is to develop an interoperable national health information infrastructure. Information captured from patients could then be used to conduct long-range outcomes research on patients from the community level to the national level (45). In the future, information on diet, exercise, and health from personal and home health monitoring will be included in these records. (More information on health monitoring is presented in the section of this article about the evolution of personalized nutrition). RDs could use this information to evaluate the impact of new public health policies and changes in the physical environment of a community.

Delivering Care through Virtual Worlds and Social Media. Virtual worlds and social media may soon become another avenue in which dietetics practitioners interact and provide nutrition counseling to patients. Currently, virtual worlds such as Second Life are mostly used for entertainment, but some large companies have begun to invest time and money in utilizing virtual worlds in how they conduct business. For example, IBM (Armonk, NY) is heavily invested in such programs, putting more than $10 million into virtual worlds to reach customers and even conduct virtual meetings. Virtual worlds are just one part of a larger expansion of social media that can be used to reach customers and encourage behavior change. Leading businesses and health care providers are using online Web portals to set up visits and track data. Video visits and online chats can be captured and recorded for future reference. Instant messaging or tweets can be used to give reminders about healthful eating. Patients can join patient groups that provide knowledge, support, and encouragement for participants. All of these tools help provide a web of support to improve health and encourage behavior change (46).

Personalized Nutrition Evolves

Figure 8 summarizes the dietetics workforce implications of personalized nutrition.

Advances in science and technology are transforming health care from a system focused on the treatment of disease to a system that stresses prediction and prevention. Nutrition counseling will be a key component of this shift, opening new opportunities for dietetics practitioners. RDs with expertise in preventing life-threatening genetic metabolic disorders through nutrition intervention and counseling will lead the way.

The human genome project has opened up new fields of medicine devoted to predicting and preventing disease. However, this progress is likely just the early stages in a long discovery process, as researchers continue to explore the molecular pathways inside the cell. Researchers are also developing a more holistic understanding of biological systems through the field of systems biology that should lead to more effective tests and treatments for disease.

Patients and health care providers will also have the ability to monitor health both in the home and in the community. There are already wireless devices, placed in the home, that are able to track weight loss, energy expenditure, and a wide range of molecules in the blood, such as blood sugar. Future devices will be able to wirelessly monitor a wider range of health indicators and track this information in a personal health record.

New personal health testing and monitoring technologies will create opportunities for dietetics practitioners.

Workforce Challenges

- New testing and monitoring technologies will demand specialized knowledge and/or experience
- Reimbursement will lag behind the adoption of new technology
- Outcomes research will determine relative value of dietetics practitioners services

Workforce Opportunities

- Early testing will identify the best candidates for nutrition intervention and counseling, thereby expanding reimbursement for these services
- Better outcomes research will shift funds to prevention rather than treatment, creating more demand for nutrition counseling and intervention
- Opportunities for dietetics practitioners will appear first in sports nutrition and geriatric care.

Workforce Impact

Dietitians are well-placed for a shift to a health care system that focuses on predicting and preventing disease. However, the scientific knowledge and technical skill needed could create a split between general practitioners and those with advanced training until the technology matures.

Change Index: High

Figure 8. Personalized nutrition implications.

Wireless home and community monitoring, combined with privacy protections, will build a strong scientific base for conducting outcomes research. Better outcomes data should shift the focus of health care reimbursement to prevention, including lifestyle and nutrition counseling.

Future Directions Research

Emerging Health Monitoring Technology. New health monitoring technologies will improve outcomes research and could illuminate the value of preventive care and nutrition counseling, opening up reimbursement for these services. A number of technologies for monitoring health from sophisticated blood glucose monitors to the humble bathroom scale already exist in the home. Technology developers are using recent advances in wireless networking and computing power to create newer, smarter versions of these old devices. They are also expanding the ability to collect health data with new devices such as floors that monitor for falls, mattress pads that monitor sleep patterns, and air monitors that check for pollutants, among many others.

Health-monitoring technology will likely move slowly into specific populations at high risk for expensive diet- and lifestyle-related illnesses mainly due to the limitations of current health-monitoring technology. First, many of these technologies are new and expensive. Second, collecting and monitoring the data requires a large time commitment from both the patient and the health provider. Third, there are legitimate concerns about data privacy. Technology developers are well aware of these concerns and are working to develop solutions, such as technology that is easier to use, better protocols, and data security and collection programs that automatically use the data to spot concerning health problems (47).

Evolution of Genomics in Dietetics. In the near future, it will be commonplace for patients to be fully screened for a range of genetic disorders, creating new demand for advanced practice RDs. Advances in genetic testing have led to the early diagnosis of numerous nutrition-related disorders, creating a unique and rapidly growing group of advanced practice RDs. These RDs use genetic testing, usually of newborns, to identify serious genetic metabolic disorders, such as phenylketonuria. Early testing combined with nutrition intervention and counseling can prevent serious, debilitating, and life-threatening disability. However, several hundred genetic metabolic disorders remain for which screening tests do not currently exist. Testing for these disorders is likely to expand as the price of genome sequencing falls. Cheaper sequencing will lead to a wider range of testing for genetic disorders and a broader range of knowledge that can be used to develop new tests and therapies (48).

New Opportunities Created by Systems Biology. Systems biology will create new opportunities for dietetics practitioners. Systems biology is an emerging field that draws heavily on the advances of computer technology and what are loosely termed the *-omic* sciences, such as genomics, proteomics, transcriptomics, glycomics, and metabolomics. Systems biology seeks to create a more holistic understanding of biological processes, which will lead to rich, complex understanding of the emergent properties of biological systems (49). The -omic sciences are related fields of study that look at the role of molecules and molecular mechanisms inside and outside the cell. Understanding the emergent properties of biological systems will create a better understanding of the environment's role in the creation of disease and help researchers develop new tests for metabolic disorders as well as new options for treatment (50). Many of these treatments will require intensive nutrition counseling, creating new opportunities for RDs and potentially new fields of advanced practice dietetics (51).

Personalized Health and Nutrition Outcomes. Researchers, with appropriate safeguards for privacy and data security, can use data collected from genetic testing and health-monitoring technology to identify new ways to prevent disease, provide new interventions, and monitor patient outcomes. In many cases, these researchers are finding the best way to prevent disease is through nutrition intervention combined with lifestyle changes. This is hardly news for many patients or health providers, but the ability to identify high-risk groups early combined with the ability to collect data for outcomes research could dramatically alter the way the health care system works. Treatment plans, including nutrition and lifestyle changes, can be personalized to the individual patient, leading to less waste in the system, fewer dangerous and unnecessary procedures, and fewer complications from inappropriate medications. Better outcomes research will also open up reimbursement for lifestyle and nutrition counseling to prevent expensive chronic diseases. In this new health care system, the focus will shift from the often expensive tasks of treating disease to predicting and preventing disease before it happens (52).

Food Industry Transforms for Public Priorities

Figure 9 summarizes the dietetics workforce implications of food industry priorities.

More consumers are interested in healthful and ethical eating. They expect to know where their food comes from, the route it took to get it to their table, and what it will do for their health. Food companies from production to consumption must now answer to consumer preferences and government demands to support public health and environmental priorities.

Companies are reworking and repositioning their food products and services to meet these new demands. They are working to build public trust and competitive advantage through the nutritional value and environmental impact of their prod-

The food industry is responding to public priorities to transform the current food supply chain into a more healthful, safer, and more sustainable system.

Workforce Challenges

- Widespread consumer acceptance of more healthful, more sustainable diets is uncertain
- Competitors are better placed in the foodservice industry to seize future opportunities
- The public associates registered dietitians with health care rather than foodservice

Workforce Opportunities

- Entrepreneurial niches will open up for risk-takers
- These career opportunities might make the dietetics profession attractive to people with business and environmental interests
- Food is a necessity and jobs will always exist for those who provide it

Workforce Demand Impact

Without a systematic pipeline for feeding qualified candidates into these opportunities, the dietetics profession could easily lose out to others in this job market.

Change Index: Low

Figure 9. Food industry priorities implications.

ucts. Price, convenience, and marketing still make or break food businesses, but consumers are less willing to give up these advantages at the expense of health, safety, and sustainability.

People are still living hectic lives but they have different expectations even of what fast food should be. Once engaged in asking the right questions about their relationship with food, more consumers are interested in the source, quality, and variety of the food they eat.

Food is recognized as a key indicator of quality of life and consumed as a celebration of health and good living. People are becoming fascinated by the culinary arts and seek more knowledge and experience in nutrition planning and food preparation. This rediscovery of the joy of cooking is happening in homes, restaurants, and other dining experiences.

Future Directions Research

RDs Better Compensated in Foodservice and Manufacturing. Only approximately 1 in 5 RDs is working in foodservice management, business, or consulting, according to an analysis of surveys (2). The best-paid RDs are executives in any field; in 2009, among the subsequent top nine positions with regard to salary, six were in nonclinical care positions, such as public relations and marketing, research and development, director of food and nutrition services, sales representative, school foodservice, and manager of nutrition communications. The best wages are found in pharmaceutical and food manufacturing, distributing and retailing, and contract food management (2).

Long-Term Eating Preferences Difficult to Forecast. Estimating demand for dietetics practitioners requires a good understanding of future patterns in food consumption. Demographics and economic studies can provide some clues to what future eating preferences might be. However, these studies assume future seniors will eat like today's seniors do and ethnic populations will retain cultural traditions in future generations.

However, there are some changes in eating patterns that can be expected, creating opportunities for dietetics practitioners. An aging population is more likely to eat at home, driving demand for in-home delivery of prepared foods. Growth in per-capita income and education levels will drive demand for quality and diversity over quantity. Higher education levels, higher income levels, and trend toward healthy aging could lead to a growing preference for varied diets featuring more fruits, vegetables, and fish. All of these changes in eating patterns are likely to shift the food system to become more service-oriented, creating opportunities for dietitians working in the foodservice industry (53).

Multinational Food Companies Adopt Public Health Priorities. Major multinational food companies are signing onto global compacts to address obesity, diabetes, and chronic diseases. For example, PepsiCo (Purchase, NY) is reformulating and revising its products to encourage healthful eating. Leading companies are also realizing the importance of collaboration with their consumers and public groups to prevent chronic disease (54). The Dow Jones Sustainability Index and the Global Reporting Initiative provide independent monitoring and incentives to urge food manufacturers, distributors, and retailers to participate in socially responsible practices.

Food Safety, Quality, and Sustainability Linked. Ensuring food safety and quality and reducing environmental impacts are all related operational challenges for food producers, processors, distributors, and retailers. The food service sector is lagging behind the food retail sector in operations research to achieve food safety, quality, and sustainability. Hazardous analysis critical control point systems provide a structured way to identify food-safety risks. This system has been adapted to include nutritional control points to protect product quality. More research is needed in the dynamic process of quality change and nutritional values. Any assessment of sustainability in the food industry must consider life-cycle assessments across the entire supply chain from product development to consumption (55).

Job Opportunities from Food Labeling Law. A new requirement in the health care reform law mandates restaurants post kilocalorie counts for menu items. A number of prominent US cities such as New York, NY; San Francisco, CA; Seattle, WA; Philadelphia, PA; and Portland, OR, have already mandated menu labeling in fast-food restaurants; however, the federal mandate is meant to override the patchwork of varying laws in municipalities across the country. This could be a near-term employment boost for RDs skilled in nutrient analysis and may, over time, encourage more restaurant owners and chefs to partner with RDs skilled in the culinary arts (56).

Industrialized Food System Backlash. A series of recent popular books and documentaries have warned consumers about large-scale agricultural and food corporations. They argue that US corn subsidies have contributed to poor diets and that concentrated animal feeding operations threaten food safety and the environment. Many consumers and food businesses are rejecting the industrial way of producing food and transitioning to local and regional producers for better-quality food. Restaurants and catering services, including some fast-food restaurants, have been instrumental in the local food movement (57).

Global Challenge of Food Security and Sustainability. Food prices are climbing globally, threatening the food security of even prosperous nations. Food consumption in the developing world is growing. Rising oil and energy prices make food more expensive to produce and process. Farmland is being converted to house growing populations in residential communities and support economic development. Climate change is expected to disrupt growing seasons. Global water shortages threaten the food supply. Fisheries are declining and collapsing (58).

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Linking food recommendations to environmental and health outcomes will be required to ensure food security for the future. However, corporate decision makers and makers of public policy are involved in a vigorous debate as to what truly sustainable food recommendations should include (58). Does a sustainable diet minimize water, energy, pesticides, and carbon emission? Should it also promote humane treatment of animals and economic opportunity for poor farmers?

Europe is currently leading the movement to incorporate environmental sustainability into food policies. For example, the Barilla Center for Food and Nutrition in Italy has proposed a double food pyramid for the European Union that illustrates that foods with higher recommended consumption levels also have a lower environmental impact (59).

CONCLUSIONS

Future scanning is a systematic approach to identifying and analyzing change, which is inherently never static. The eight change drivers in this future scan report are an assessment of how the world is changing in ways that could influence dietetics workforce supply and demand. Another group of experts making a similar assessment at a future date may choose an entirely different set of change drivers, and their assessment could lead to different insights, scenarios, and assumptions about workforce supply and demand. Future scanning should be a continuous study of key trends and issues to discover the change drivers that could have the greatest impact on the future. The most valuable outcome of future scanning, however, is not scoring the likely impact of different trends and issues; it is anticipating the future challenges and opportunities that arise from these changes.

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Four Futures for Dietetics Workforce Supply and Demand: 2012-2022 Scenarios

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EXECUTIVE SUMMARY

The four future views of dietetics workforce supply and demand that will be discussed in this paper illustrate the critical changes and choices ahead for the profession if registered dietitians and dietetic technicians, registered want vital roles in nutrition, food, and health. These scenarios were built using a four-quadrant approach based on workforce supply and demand. This yielded four views: a preferred future of high supply, high demand; an underprepared future of low supply, high demand; an overproduced future of high supply, low demand, and a feared future of low supply, low demand. These scenarios are not projections about the future; rather, they are designed to help the profession prepare for the future. Registered dietitian leaders participating in a scenario workshop judged either the overproduced or underprepared scenarios to be the most likely future and the preferred future to be the most challenging for the profession.
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THE FOUR FUTURE VIEWS OF dietetics workforce supply and demand that will be discussed in this article illustrate the critical changes and choices ahead for the profession if registered dietitians (RDs) and dietetic technicians, registered (DTRs) want vital roles in nutrition, food, and health. The Commission on Dietetic Registration commissioned the development of these scenarios to better understand and analyze how different change drivers can interact together in a dynamic system to increase or decrease future workforce supply and market demand. Although workforce supply and demand in a market economy can be volatile, wise leadership and stewardship can smooth out the rough transitions and guide this profession to a preferred future.

The Dietetics Workforce Demand Task Force directed this futures research and scenario process with the assistance of futurists Marsha Rhea and Craig Bettles. The scenario development process collected the best thinking from leaders within and outside the Academy of Nutrition and Dietetics. In the first step in this futuring process, a panel of thought leaders helped identify 10 change drivers for in-depth research. (See "Future Changes Driving Workforce Supply and Demand: Future Scan 2012-2022" in this Supplement.) This future scan was shared with 31 leaders, including representatives of the Dietetics Workforce Demand Study Task Force, authors of the technical papers that examined supply and demand issues for this task force, Academy staff, and consultants in a 1-day scenario workshop held January 27, 2011. The leaders worked systematically in teams to sketch out the scenarios and discuss the implications of the four future views. The consultants then fully developed these scenarios, which are presented in this report. (The Sidebar provides a description of the methodology and the Text Box presents a list of scenario workshop participants.)

Statement of Potential Conflict of Interest and Funding/Support: See page S34.

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WHAT ARE SCENARIOS?

Scenarios are alternative descriptions or stories that describe how the future might unfold. They are designed to systematically explore future challenges and opportunities and aid in strategy development. Scenarios are not predictions of the future; rather, they envision possibilities and encourage people to think about how to navigate successfully across different circumstances that might be encountered.

These scenarios are delivered in present tense because they are conceived as if they are written at the time they are occurring and describe what one would see.

The scenarios developed in this report are designed to examine supply and demand for RDs and DTRs during a 10-year time frame. The scenarios serve the following three purposes:

- create an integrated view of future possibilities for the next decade;
- challenge current assumptions and aid in learning; and
- provide leaders with insights about the choices they face in seeking a preferred future.

THE FOUR-QUADRANT APPROACH

These scenarios were built using a four-quadrant approach, as shown in Figure 1. Supply was placed on the horizontal axis and demand on the vertical axis. This framework created the following four different zones:

1. **Underprepared Future:** The underprepared scenario looks at a future where RDs and DTRs experience high demand for their services, but supply of qualified practitioners does not meet demand.
2. **Preferred Future:** The Preferred Future scenario envisions a future where demand and supply for RDs and DTRs are both increasing.
3. **Feared Future:** In the Feared Future scenario, both demand and supply for RDs and DTRs decreases.
4. **Overproduced Future:** This scenario looks at a future where demand for dietetics services is decreasing while the supply of RDs and DTRs looking for work remains high.

These scenarios are designed to look specifically at how the drivers of supply and demand could work together to create a new future for the profession. They are snapshots of the future rather than an economic projection. An economic model of supply and demand seeks equilibrium creating either a rise or a decrease in the cost of dietetics services and practitioners entering or leaving the field.

SCENARIO ELEMENTS

Each scenario team first selected five change drivers that would be instrumental in creating an alternative view of the

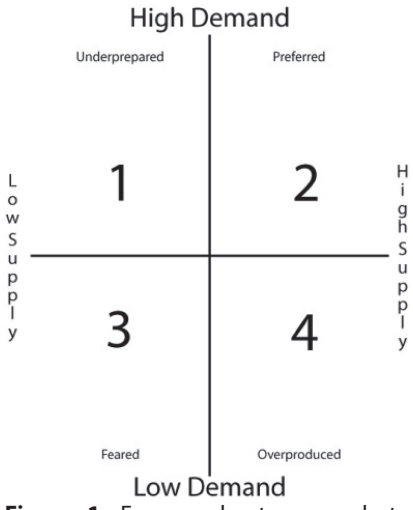

Figure 1. Four-quadrant approach to supply and demand of registered dietitians (RDs) and dietetic technicians, registered (DTRs).

future. Figure 2 shows the distribution of the top five change drivers across the scenarios. Three teams selected the same three drivers as critical to the profession's future, they are aging population, population and workforce diversity, and proliferation of interdisciplinary teams. By contrast, no team identified personalized nutrition as a key driver. The authors took the liberty of inserting elements of the other change drivers into the scenario narratives where appropriate.

The teams were asked to describe what might happen in society and within the profession in the span of a decade. The authors fleshed out participants' stories and worked to make each scenario even more distinctive, using the implications for the profession elicited from the workshop discussion. The authors proposed possible indicators of change that might signal that the changes in a particular scenario are unfolding, and they used their professional judgment to craft strategic questions for the profession to respond to the challenges in each scenario. The probability rating that appears atop each scenario is an assessment by the workshop participants of how likely these scenarios are. The participants gave both the preferred and feared future scenarios a low probability rating, while both the underprepared and overproduced scenarios were viewed as highly probable.

READING THE SCENARIOS

Each of the scenarios tells a different story about changing conditions and their effect on workforce supply and demand. How might the profession respond and evolve to each scenario? The profession is successful in each scenario when it is pursuing a strategy that is diverse, inclusive, and expansive. Where the scope narrows and RDs and DTRs miss opportunities, workforce supply and demand suffer. Two of the critical storylines playing out across the scenarios are how well the education system responds and adapts to changing market conditions and how well the profession positions itself on interdisciplinary teams.

Following are four possible futures for dietetics workforce supply and demand:

- **Can-do diverse dietitian (Preferred Future):** Dietetics practitioners grow in number and diversity of thought, experience, and background expands. RDs and DTRs seek out leadership positions that allow them to affect policy and create opportunities in education, prevention, food management, and health care. RDs and DTRs become valued members of interdisciplinary

Change Driver	Summary	Scenarios Affected by Change Driver
Aging population drives opportunities and challenges	The aging of the US population will usher in widespread changes in US communities and the workforce and health care systems.	Underprepared Future Preferred Future Feared Future
Population and workforce diversity challenges professions to change	Dietetics practitioners need to develop cross-cultural skills and knowledge of other cultures to grow in a more diverse country.	Underprepared Future Preferred Future Overproduced Future
Interdisciplinary teams drive innovation	Interdisciplinary teams will drive innovation and solve problems in all kinds of arenas where nutrition matters.	Preferred Future Feared Future Overproduced Future
Workforce education meets job-market demands	A more diverse student population seeks flexibility, convenience, and affordability in education to prepare for and maintain their employability.	Underprepared Future Overproduced Future
Generalists gain edge on specialists	Dietetics practitioners can thrive as adaptable generalists if they cultivate an interdisciplinary perspective and leadership qualities that employers value.	Preferred Future Feared Future
Technology transforms nutrition counseling	Technologies will empower customers, clients, and patients to manage their own diet.	Feared Future Overproduced Future
Food industry transforms for public priorities	The food industry responds to public priorities to transform the current food supply chain into a healthier, safer and more sustainable system.	Underprepared Future Feared Future
Health care reform boosts access to dietetics services	RDs and DTRs are valued members of coordinated care teams and deliver consistent nutrition therapies to people with chronic diseases.	Underprepared Future Overproduced Future
Population risk factors and nutrition initiatives increase demand	Widespread chronic disease, obesity, and socioeconomic challenges make nutrition initiatives and life-course interventions a public priority.	Preferred Future
Personalized nutrition evolves	New personal health testing and monitoring technologies will create opportunities for RDs and DTRs.	None

Figure 2. Potential impact of change drivers on future scenarios for registered dietitians (RDs) and dietetic technicians, registered (DTRs).

care teams bringing a broad background and specialized knowledge about food and nutrition to address population risk factors.

- **Value-deficient registered "dinosaur" (Feared Future):** RDs and DTRs are unable to adapt to external forces and prove their value in the changing health care and business environment over the next decade. Although many RDs have chosen the security of clinical nutrition, tightening constraints in health care are undermining the regulations and policies that protect their scope of practice. Poor employment prospects turn off young, diverse dietetics practitioners who choose other fields that offer more reward and advancement.
- **Expiration-date dietetics practitioner (Underprepared Future):** An aging population, changes in the food industry, and health care reform boost the demand for nutrition services. However, too few RDs and DTRs have the up-to-date knowledge and skills to meet these opportunities. Competitors of dietetics practitioners, regardless of credential status, are filling roles that RDs and DTRs could and should fill.
- **Misplaced and displaced dietetics practitioner (Overproduced Future):** During the next decade, dietetics education programs overproduce credentialed dietetics practitioners who are unable to demonstrate value, connect with people of different cultures, and succeed in emerging and growing practice settings. New technologies automate the time-consuming parts of the RD and DTR scope of practice, especially in clinical nutrition and traditional foodservice.

CAN-DO DIVERSE DIETETICS PRACTITIONER SCENARIO: PREFERRED FUTURE

The following description of society and the profession in 2022 depicts how the can-do diverse dietetics practitioner scenario (Figure 3) could play out.

Society 2022

Policy makers realize the importance of addressing the root causes of poor health and seek those with broad experience with food and nutrition. New regulations and taxes are passed to improve the transparency of menus and penalize overprocessed and unhealthful foods. Budgets are increased for food and nutrition education programs in schools and underserved communities.

Increased immigration forces health professionals to develop high levels of cultural competency, especially in the areas of food and nutrition. Second- and third-generation immigrants use their knowledge and love of food to find new and more healthful ways to prepare traditional dishes. They are supported by a larger cultural shift that focuses on the sustainability of food from the farm to the table to its interaction with the body.

A larger elderly population combined with growing obesity leads to a higher number of patients suffering from multiple chronic diseases. These patients drive higher health care costs, forcing the health care system to focus on prevention. Payment systems are changed to encourage health care teams that can prevent and manage chronic diseases through diet and lifestyle changes.

Profession 2022

Leaders in the profession work relentlessly to ensure that preparatory and continuing education programs are relevant to the marketplace and develop RDs and DTRs for dynamic and changing careers. Young and mid-career dietetics practitioners are encouraged to develop a diverse skill set. RDs and DTRs develop lateral thinking and other problem-solving skills that strengthen their ability to offer food and nutrition solutions in a wide range of situations. Students are encouraged to pursue dual degrees that allow them to focus on business skills, organizational management, public health, foreign languages, and other relevant areas. Through frequent interactions with diverse communities, the profession attracts more diverse students into the profession.

In schools and community care centers, dietetics practitioners become the focal point for improving health and nutrition. They use their knowledge of food and nutrition to build food programs that meet the distinctive needs of the communities they serve. Realizing that this knowledge is never enough, RDs and DTRs work tirelessly to update their managerial and team-building skills to collaborate with other leaders in their organizations and communities.

Businesses in the food industry come under increased pressure from customers and policy makers to be more transparent and provide better nutrition. They seek RDs who combine strong nutrition knowledge with managerial skills and high levels of cultural competency. This growing

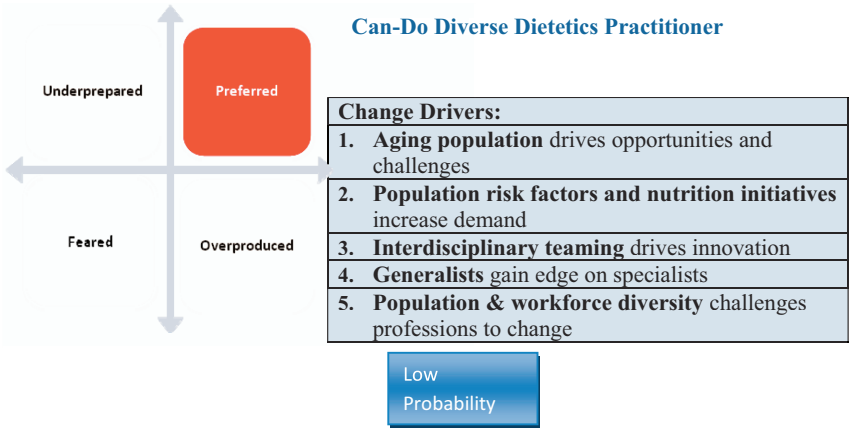

Figure 3. Depiction of the can-do diverse dietetics practitioner scenario.

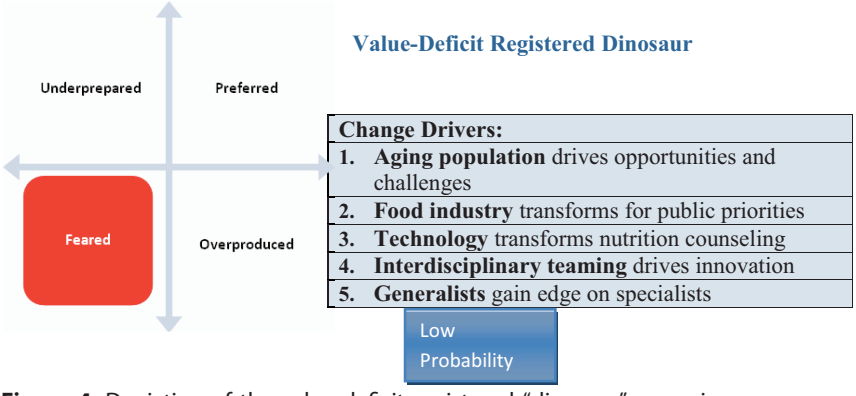

Figure 4. Depiction of the value-deficit registered "dinosaur" scenario.

Sidebar: Methodology for the Future Futures Scenario Development

This project employed a thorough futures scanning and scenario development methodology to critically assess future changes and their implications for dietetics workforce supply and demand. The Workforce Demand Study Task Force from its outset began exploring possible forces of change. The task force designed a project that used an array of technical authors to define and study the current conditions and commissioned Signature i, LLC to conduct a futures research project to systematically study the future. Marsha Rhea, president of Signature i, LLC and Craig Bettles, president of Trend Spot Consulting, collaborated in this futures research and designed and facilitated the thought leaders panel to identify the change drivers and the scenario workshop to frame the scenarios.

The Task Force began the futures research component of the Dietetics Workforce Demand Study with an expert panel of 14 thought leaders from inside and outside the profession for a 1-day workshop in September 2010 to scout and identify key drivers of change. Rhea and Bettles researched 8 of the 10 change drivers, forecasting their likely direction over the next 10 years and analyzing their potential implications for the profession. Two other change drivers—population risk factors and health care reform—were researched in separate articles and included in brief as part of the project's futures research. This scan was used to prepare the scenario workshop participants for their work.

The 31 workshop participants were guided through a series of exercises designed to frame four alternative views of the future using a four-quadrant approach. Supply was placed on the horizontal axis and demand on the vertical axis. This framework created four different zones:

1. Underprepared Future: The Underprepared scenario looks at a future where RDs and DTRs experience high demand for their services, but supply of qualified practitioners does not meet demand.
2. Preferred Future: The Preferred Future scenario envisions a future where demand and supply for RDs and DTRs are both increasing.
3. Feared Future: In the Feared Future scenario, both demand and supply for RDs and DTRs decreases.
4. Overproduced Future: This scenario looks at a future where demand for dietetics services is decreasing while the supply of RDs and DTRs looking for work remains high.

The workshop participants were each assigned to teams to develop scenarios for one of the four quadrants (Figure 2). For each scenario, the workshop participants first selected five change drivers that would be instrumental in creating their alternative view of the future.

The scenario teams were asked to describe what might happen in society and the profession in the span of a decade. They gave each scenario a preliminary probability rating of high, medium, or low to assess how likely these scenarios are. Following a world café format, members of the different scenario teams rotated into discussions with each scenario team leader and scribe to probe and improve all the scenarios.

In a final exercise in the workshop, all participants rated the scenarios for their probability and preferability. They gave both the preferred and feared future scenarios a low probability rating, while both the underprepared and overproduced scenarios were viewed as highly probable. They also identified the preferred future as the most challenging for the profession.

After the workshop, Rhea and Bettles fleshed out their stories to make each scenario even more distinctive and formatted the workshop learning around each scenario as it appears in this report. They drew the implications for the profession out of the scenario workshop discussion. The authors proposed possible indicators of change that might signal the changes in a particular scenario are unfolding. They used their professional judgment to craft strategic questions for the profession to answer to respond to the challenges in each scenario.

The creation of these scenarios is just one step in an ongoing process designed to help the profession prepare for the future. These scenarios informed the Workforce Demand Task Force as it developed an in-depth analytical projection of supply and demand for RDs and DTRs. The Lewin Group, a national health care and human services consulting firm, modeled these projections. The technical papers, future scan, scenarios, and workforce modeling projections are all essential components of the Dietetics Workforce Demand Study. Collectively, they are powerful tools to inform and guide the profession in making wise choices about the future of dietetics workforce supply and demand and can inspire the profession's vision for the future.

area of the profession works with businesses to improve the nutritional value of food, produce detailed nutritional information for consumers, and help businesses comply with new regulations and taxes designed to improve nutrition and food safety.

RDs assume leadership and problem-solving roles in interdisciplinary care teams focused on preventing and treating chronic diseases. DTRs also experience demand growth as the health care industry seeks extenders able to manage larger volumes of nutrition information and manage automated systems for tracking nutrition and health. Many RDs and DTRs are continuously learning how to identify and lead new opportunities to use healthful food, sound nutrition, and prevention and wellness programs to transform individuals, organizations, and society.

Implications of this scenario include the following:

- Academy members actively help develop public policy and look to improve the health of society through better health and nutrition.
- The education system is nimble and operates as a continuum to prepare and update the profession's knowledge and skills to meet the changing demands of a competitive workplace.
- Greater flexibility and opportunities encourage professionals with diverse skill sets to enter the field.
- Diversity of the workforce increases and better reflects the population the profession serves.

Indicators of change will include the following:

- Increase in public policies designed to improve food quality or discourage unhealthful food with taxes.
- Pressure for change and reform of food provided in institutions from schools to nursing homes.
- Extension and reform of community food programs and greater resources devoted to coordinated public health strategies to address chronic diseases and promote wellness.
- Movement by the Centers for Medicare and Medicaid Services to implement payment reforms, including medical homes, accountable care organizations, bundling of payments, and capitation payments for services.

Strategic Questions

- How can the profession secure more influence in public policy discussions?
- What beliefs, behaviors, and skills will RDs and DTRs need to develop to play a leading role on interdisciplinary teams?
- How can the profession better reach out to diverse communities to encourage them to consider dietetics as a career?
- Can the dietetics education system be responsive to emerging opportunities and changing conditions in the marketplace?

VALUE-DEFICIT REGISTERED DINOSAUR: FEARED FUTURE

The following description of society and the profession in 2022 depicts how the value-deficit registered dinosaur scenario (Figure 4) could play out.

Society 2022

Tight budgets by federal, state, and local governments force deep spending cuts in the programs that directly affect health and nutrition. The cuts are driven by a sluggish economy and an aging population that puts large strains on health care budgets and retirement plans.

Health care reform is blocked in the courts and underfunded by federal and state governments. A fragmented fee-for-service model remains as the dominant system for health care services. Hospitals and physicians are tempted to seek profit through expensive procedures and technology. Policy makers tinker with payment systems in an attempt to control costs rather than pass meaningful health care reform. Prevention programs are defunded and many care providers leave health care altogether.

Food insecurity and chronic disease become a national disgrace. Community food and education programs are cut, leading to higher rates of food insecurity and poorer diet in underserved communities. Federal food programs are also cut, thereby rolling back improvements in the availability and quality of food available in schools.

Profession 2022

RDs are seen as insular and are unable to demonstrate the value of nutrition counseling. As a result, legislation and policy protect very little of the RD scope of practice. The profession is too comfortable with the status quo and does not fight against changes that harm both the profession and society.

Dietetics education remains clinically focused, despite shrinking opportunities in the health care arena. Young dietetics practitioners are not taught the business skills they need to succeed in the marketplace or the soft skills needed to effectively team with other care providers in clinical settings. RDs retain a deep knowledge base in clinical nutrition, but they prefer performing patient assessments rather than acquiring the soft skills to change patient and client behaviors and integrate into interdisciplinary teams.

Young, dynamic, and diverse future professionals are turned off by a profession that has forfeited its essential and appealing connection to food. Older dietetics practitioners retire from the food industry, leaving too few RDs to shape market trends in food and nutrition. Those interested in food pursue culinary and hospitality degrees that will position them for business success in the food industry.

Qualified students interested in the science of nutrition opt for careers as doctors, physician assistants, and nurse practitioners, where they can better use their nutrition knowledge to provide primary care. They develop a concentration in the basics of food nutrition through online courses. Others with an aptitude for technology work directly on the technology systems that help patients manage their nutrition intake. Although the number of nontraditional students needing a fast and sure route to jobs is growing, they choose other fields that offer accelerated education and more secure employment.

Competition from other providers of nutritional services is fierce across all practice areas. Demand for RDs drops as the competition takes over different practice areas. Continuing-education opportunities for mid-career professionals are sparse, making the bulk of the profession vulnerable to competition. Prospective RDs discover the extent of discouragement among current RDs and steer clear of this dying profession.

Both society and the health care system suffer as discouraged RDs and DTRs exit the workforce. The mass media becomes the dominant source of nutrition information and other providers, with less grounding in nutrition science, are filling the void in nutrition and dietetics care.

Implications of this scenario include the following:

- New technologies for managing diet lead to de-emphasis on larger population risk factors, endangering the long-term health of the country.
- Food programs and the food industry suffer from poor nutrition as a result of budget cuts and the retirement of experienced RDs and DTRs.
- New students choose other education programs that either focus on clinical care or food rather than trying to incorporate both through a dietetics education.

Indicators of change will include the following:

- Changes in health care payment systems that attempt to cut out ancillary providers, including RDs and DTRs.
- High numbers of retirement among RDs and DTRs, particularly in foodservice and the food industry.
- Continued budget cuts in food programs at the federal, state, and local level, particularly for schools, vulnerable populations, and communities.

Strategic Questions

- How can the profession build a better base of evidence for the value of dietetics services?
- Where can the profession be successful in advocating for food programs that serve poor and vulnerable populations and communities?
- How can the profession encourage RDs and DTRs to leave familiar roles and redefine their role and the future of the profession?
- Can the profession do a better job of managing its competitive position in good and bad times?

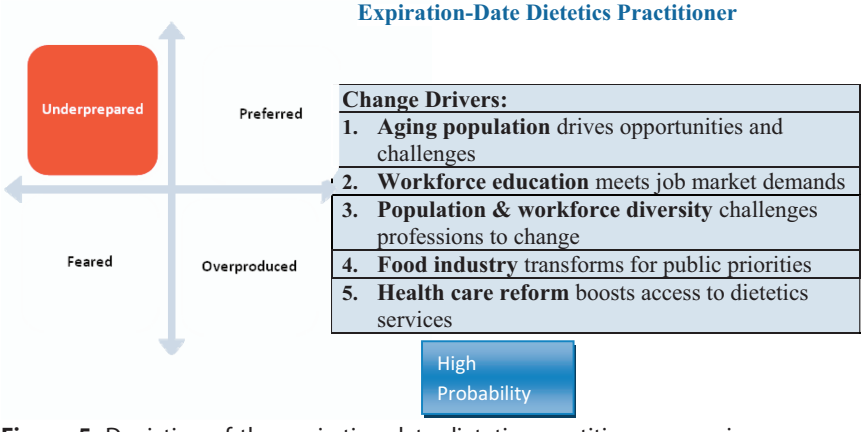

Figure 5. Depiction of the expiration-date dietetics practitioner scenario.

EXPIRATION-DATE DIETETICS PRACTITIONER: UNDER-PREPARED SCENARIO

The following description of society and the profession in 2022 depicts how the expiration-date dietetics practitioner scenario (Figure 5) could play out.

Society 2022

The retirement of "Baby Boomers" over the next decade dramatically changes the landscape for work and health care across the United States. Retiring Boomers increase the demand for health care services, better nutritional options, and wellness services to keep them healthy and active. These retirements affect every profession, as retiring Boomers cause labor shortages and loss of institutional knowledge.

Consumers demand more healthful food and more transparency of nutrition information. Food labeling laws and sales taxes on overly processed and unhealthful food become more common in cities and states. These regulatory changes are promoted by state and local governments looking to improve the health of their populations and reduce health care inflation.

Health care professions that can demonstrate the value of their prevention services—especially in treating and preventing chronic disease—see growth in a much more value-oriented health care landscape. Payment systems are changed to focus more on prevention and quality of care. Medical homes and accountable care organizations become much more prominent. Evidence-based medicine becomes the cornerstone of these changes and the focal point for reimbursement of services.

Profession 2022

Demand for nutrition services increases during the next decade, but there are several bottlenecks and other problems that prevent dietetics practitioners from seizing opportunities in the marketplace. RDs and DTRs who have the right skill set are able in high demand and their rising salaries push up overall compensation in the profession.

Bottlenecks in the education system limit the supply of RDs and DTRs. Many students—especially those unable to find internships—are discovering that they can pursue careers in nutrition without becoming an RD. Demand for DTRs is also high, but the relatively low number of DTR programs limits supply. In response, many organizations simply retrain other workers to fill these positions when DTRs are not available. Other professions, having understood their importance, are better trained to use the data coordination and expert decision systems now so ubiquitous in hospitals, food industry, and public health, because they have updated their preparatory and professional development programs.

Food labeling laws and other regulations increase the demand for professionals with business skills, knowledge of food, and a deep level of nutrition knowledge. Unfortunately, the education system rarely prepares entry-level RDs with the business skills and knowledge of food necessary to compete for these opportunities. However, students with a deep skill set in these three areas are able to find numerous and rewarding opportunities in the food industry.

Many Baby Boomers and mid-career professionals from the food, hospitality, and other industries look to nutrition services as a second career. They supplement their knowledge of food or business skills with nutrition training. Often they are able to parlay high demand for nutrition services into consulting opportunities that support a phased retirement that many Baby Boomers value.

The growing size and influence of communities of color also affect the number and quality of students entering the profession. A lack of racial diversity in the profession combined with little outreach to diverse communities leads to a lack of awareness about the profession. Instead, these students seek other routes to pursue their love of food and interest in nutrition.

The fastest growing areas in health care are in gerontology and personalized medicine. Evidence-based research continues to highlight the importance of nutrition counseling in preventing and treating chronic disease, especially among the growing ranks of elderly people. RDs who specialize in these areas see increased opportunities and better financial compensation for their services. Medical homes and accountable care organizations further increase demand for nutrition services in clinical care teams, hospitals, and nursing homes.

Implications of this scenario include the following:

- Salaries rise for RDs who have business skills, deep knowledge of food, or interest in working in gerontology and personalized nutrition.
- Increased demand allows students to find employment opportunities without finding limited internship opportunities and becoming registered.
- Mid-career and semi-retired professionals from other industries enter the field, although they often do not pursue registration.
- New programs for training mid-career and semi-retired professionals increase demand for nutrition educators, particularly those in food science.
- The profession remains very heterogeneous, discouraging students of color from entering the profession and limiting the profession's growth.
- High demand for DTRs, combined with a small number of programs, leads to the creation of new programs.

Indicators of change include the following:

- Demographic changes including the aging of the population and increased immigration
- Continued implementation of health reform law, especially payment reform that promotes medical homes and accountable care organizations.
- Lack of change in curricula of dietetics programs, particularly around the development of business skills and food knowledge.
- A drop in the number and appropriateness of internships offered, leading to declines in dietetics practitioners seeking registration.

Strategic Questions

- How can the profession manage its own aging ranks while laying claim to the opportunity to pro-

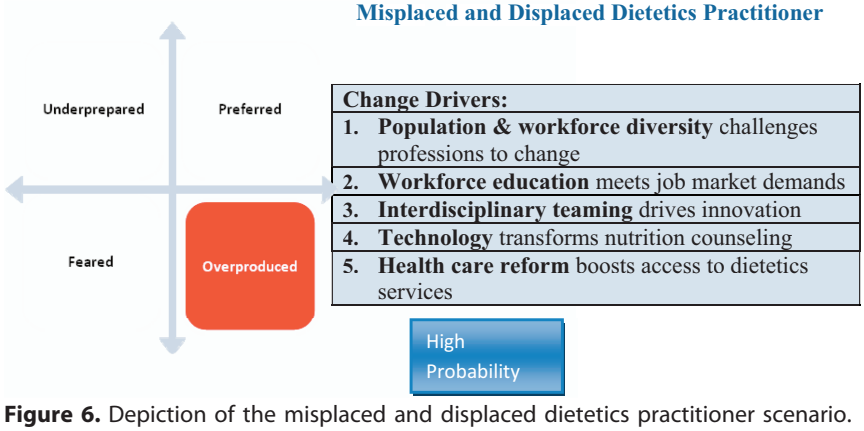

Figure 6. Depiction of the misplaced and displaced dietetics practitioner scenario.

Text Box: Scenario Workshop Participants

The Commission on Dietetic Registration and the Dietetics Workforce Demand Study Task Force express gratitude to these individuals who contributed their time and expertise in developing these scenarios.

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(continued)

mote the essential role of nutrition in healthy aging?
- How can the profession encourage students to be entrepreneurs and provide them with the business skills they need to succeed in the food industry?
- Are there alternative pathways to acquire the required knowledge and experience to become credentialed in current and emerging practice areas?
- Should the profession consider expanding DTR programs to promote and fulfill the demand for nutrition services?

MISPLACED AND DISPLACED DIETETICS PRACTITIONER: OVERPRODUCED SCENARIO

The following description of society and the profession in 2022 depicts how the misplaced and displaced dietitian scenario (Figure 6) could play out.

Society 2022

New technology and public policy improve the health of the nation. Everyday life is wireless and a wide range of home-monitoring devices exist to capture and analyze health information. The country grows much more diverse as different cultures and ways of understanding food flourish.

Professionals who succeed in this vibrant workforce combine problem-solving skills, technical skills, and cultural competency. Routine work is automated or outsourced to cheaper, less-skilled workers. The one area where the United States excels is in creating interdisciplinary teams that can innovate and solve tough challenges. These teams are increasingly connected across geographic boundaries using virtual worlds and other technological tools for collaboration.

The ability to capture health information and personalize it for individual patients revolutionizes health care. Automated systems capture health information and consumers are empowered to use that information to improve their health. Policy makers are also able to use health information from their communities to implement changes in the physical environment that directly improve health.

Increased automation in food planning and preparation decreases the demand for low-skilled workers in the food industry. Food businesses need food science and nutrition advice in new product design and development as well as in creating sustainable operations. People also take pleasure in fine dining and locally grown and artisan food experiences.

Profession 2022

Dietetics education programs continue to produce RDs with strong clinical skills de-

Text Box: Scenario Workshop Participants *(continued)*

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(continued)

signed to help them compete in a health care landscape that has largely passed them by. New software emerges that can use captured data to provide nutrition counseling tailored either to the individual or the community. Wireless home-monitoring technology captures nutrition and physical activity data in health records. Technology providers use this information to create automated systems that can generate detailed nutrition assessments and plans. Similar systems are used to manage menus at facilities from schools to nursing homes.

The opportunities for RDs and DTRs to get involved in the development of new technology are missed by a profession that is risk-averse and inflexible. Other practitioners, such as primary care providers, are much more successful in influencing the development of new technology and integrating it in their practices. They keep track of new systems for managing nutrition and regularly recommend these systems to their patients. These systems also make it easy for the physician and the patient to monitor progress on meeting nutrition and physical activity goals.

Vibrant, diverse communities bring their own unique cultural approach to food and nutrition, but these new approaches to food and nutrition are ignored by the dietetics profession. The profession is less focused on food and therefore less interested in learning about new flavors, ingredients, and styles of food. Other public health practitioners with greater cultural competency seize the leadership in prevention and health promotion.

The dietetics profession is like a poorly planned city where the supply and distribution of services and needs are poorly matched to the diverse needs of its citizens. There is intense congestion in the hospital sector, where RDs in clinical practice like other health service providers concentrate and compete. Few RDs are interested in meeting nutrition needs in poorer communities. RDs working in the food industry or other businesses are so few in number and their experiences so far removed from the majority of the profession that they can seem as mysterious and isolated as businesses can become when they are tucked away in remote industrial parks. And there is a great need for innovation and creativity to promote vitality and renewal within the dietetics profession, just as arts and entertainment districts help create thriving cities. The dietetics profession abounds with missed opportunities to make a greater contribution to every community's quality of life.

Implications of this scenario include the following:

- Consumers and other care providers use new technology for

Text Box: Scenario Workshop Participants *(continued)*

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nutrition planning and assessments, eliminating many of the low-value services of RDs and DTRs.
- Health and wellness becomes the domain of other professions that provide nutrition counseling as only one of many services.
- New trends and movements are not utilized by the profession, as they lack connections with the communities innovating in food.
- RDs and DTRs compete for fewer opportunities in what were once high-demand areas and they are unable and unwilling to move to new and more promising practice settings.
- Overproduction of RDs and DTRs occurs in clinical practice settings. If this overproduction should occur across diverse roles in dietetics, an oversupply could potentially become a positive catalyst for creating new and innovative services.

Indicators of change include the following:
- Widespread use of new automated tools for tracking and managing diet and the integration of these technologies in the practices of competitors
- Decreased diversity in the profession relative to larger society
- Substantial mismatches between careers sought and jobs available
- Lack of any change in the curricula of dietetics education programs

Strategic Questions
- Which technology companies are innovating in nutrition tracking and management and how can the profession partner with them?
- Could an oversupply of RDs and DTRs be turned from a liability into a strategic asset for creating workforce demand?
- What role does education play in creating the conditions for a mismatch between the knowledge and skills of the dietetics workforce and marketplace demand?
- What is the future of specialties and advanced practice in a fast-changing world where today's expertise can be built into tomorrow's expert decision system?

CONCLUSIONS

Scenario Insights about the Profession's Future

The most revealing insight from these scenarios occurred at the end of the scenario workshop. The participants were asked to pick the scenario outline they considered the most likely to occur and the one they considered the most challenging to the profession. They voted by placing dots on the four quadrants representing the scenarios (see Figure 7).

The split between the underprepared and the overproduced future as the most likely scenarios highlights an important challenge for the profession. On the surface, the scenarios are polar opposites and it would seem odd that they would both be selected as the most likely scenarios for the future. The dichotomy reflects an inability on the part of the dietitians to influence two critical aspects of future demand and supply. Similar to other health

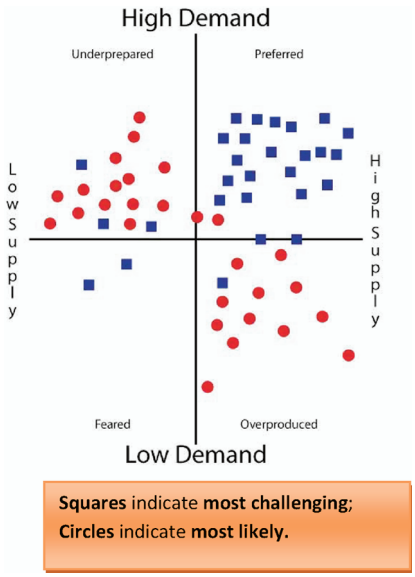

Figure 7. Scenarios deemed most likely and most challenging by workshop participants.

care providers, only some elements of dietetics scope of practice are protected by regulation. Limited ability to protect scope of practice opens up the profession to increased competition from other health care providers. In addition, changes in health care payment systems stemming from health care reform are introducing challenges and opportunities that open the profession to competitive pressures.

The leaders of the profession are concerned that the dietetics education system is very averse to change and might be unable to produce enough RDs and DTRs with the skills demanded by future employers. Instead, they could easily produce too many practitioners with too few of the right skills to succeed in the future marketplace. In the final analysis, the profession can only succeed if it does a better job of attracting and training diverse, creative, and skilled dietitians.

RDs and DTRs need a solid evidence base to demonstrate their value and unique contribution in different situations and practice settings. When that value is in question, they risk being considered dinosaurs or they are roughed up in the mismatched worlds of an underprepared or overproduced future. When this value is demonstrated, it generates new opportunities and makes defending the scope of practice less important.

By their own frank admission, the workshop participants found the Preferred Future the most challenging. The profession will have to be assertive and opportunistic to secure positions in a world where teaming and problem solving trump competencies and credentials. Too many in the profession currently see dietetics as a job rather than a profession. They are not ready to step up to the growing opportunities in population-based nutrition care and prevention and wellness initiatives or to claim the leadership roles envisioned on interdisciplinary teams. The profession's efforts to adapt must be as intensely focused on updating the knowledge and skills of the more than 80,000 RDs now credentialed as they are on attracting and educating new entrants to the profession. After working together to create the four future views of dietetics workforce supply and demand, these leaders expressed a sense of urgency that the window of opportunity might close before the profession can see what is ahead and adapt.

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STATEMENT OF POTENTIAL CONFLICT OF INTEREST:

Author C. Bettles: C. Bettles, co-author, is president of Trend Spot Consulting. Trend Spot Consulting provides scanning research, facilitation, and consulting services to organizations to help them better understand and respond to future challenges and opportunities. This article drew on knowledge and learning gained through work with other clients including: American Association of Medical Society Executives, Commission on Dietetic Registration, American Dental Hygienists' Association, American Society of Mechanical Engineers, Association for Professionals in Infection Control and Epidemiology, the Institute for Alternative Futures and One Economy.

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Population Risk Factors and Trends in Health Care and Public Policy

Betsy Haughton, EdD, RD, LDN; Jamie Stang, PhD, MPH, RD, LN

EXECUTIVE SUMMARY

Many factors affect the current and future practice of dietetics in the United States. This article provides an overview of the most important population risk factors and trends in health care and public policy that are anticipated to affect the current dietetics workforce and future of dietetics training and practice. It concludes with an overview of the state of the current workforce, highlighting the opportunities and challenges it will face in the future. Demographic shifts in the age and racial/ethnic composition of the US population will be a major determinant of future the dietetics profession because a growing population of older adults with chronic health conditions will require additional medical nutrition therapy services. Dietetics practitioners will work with an increasingly diverse population, which will require the ability to adapt existing programs and services to culturally diverse individuals and communities. Economic factors will affect not only the type, quantity, and quality of food available in homes, but also how health care is delivered, influencing future roles of registered dietitians (RDs) and dietetic technicians, registered (DTRs). As health care services consume a larger percentage of federal and corporate expenditures, health care agencies will continue to look for ways to reduce costs. Health promotion and disease prevention efforts will likely play a larger role in health care services, thus creating many opportunities for RDs and DTRs in preventive care and wellness. Increasingly, dietetics services will be provided in more diverse settings, such as worksites, community health centers, and home-care agencies. To address population-based health care and nutrition priorities effectively, dietetics practice will need to focus on appropriate evidence-based intervention approaches and targets. The workforce needs to be skilled in the delivery of culturally competent interventions across the lifespan, for all population groups, and across all levels of the social-ecological model for primary, secondary, and tertiary prevention. Because there is an assumption that the dietetics profession will experience rates of attrition of 2% to 5% based on historical workforce data, an important consideration is that the current dietetics workforce is limited in terms of diversity. An increasingly diverse population will demand a more diverse dietetic workforce, which will only be achieved through a more focused effort to recruit, train, and retain practitioners from a variety of racial, ethnic, social, and cultural backgrounds. In addition, the geographic distribution of RDs and DTRs must be addressed through strategic planning efforts related to dietetics training to provide access to and delivery of services to meet population needs. Furthermore, the health care workforce is projected to bifurcate as a result of growth in demand for the "frontline workforce" that works in direct patient contact. This bifurcation will require the dietetics profession to consider new practice roles and the level of education and training required for these roles in relation to how much the health care delivery system is willing and able to pay for services. There are many challenges and opportunities for the dietetics workforce to address the changing population risk factors and trends in health care and public policy by working toward intervention targets across the social-ecological model to promote health, prevent disease, and eliminate health disparities. Addressing nutrition-related health needs, including controlling costs and improving health outcomes, and the demands of a changing population will require careful research and deliberation about new practice roles, integration in health care teams, workforce supply and demand, and best practices to recruit and retain a diverse workforce.
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THERE ARE MANY FACTORS THAT have an impact on the current and future practice of dietetics. Demographic shifts in the US population, changes in the prevalence rates of acute and chronic diseases, consumer trends in health care, changes in economic conditions that have an impact on access to healthful food, and shifts in public policy all affect the demand for and utilization of dietetics services. Although it can be difficult to project future trends, current data are useful for estimating the influence of these indicators.

This article, part of a series of technical articles to guide the dietetics profession as we move forward to meet the changing demands for dietetics services, will attempt to gather and evaluate data regarding these factors and determine how they will affect dietetics training and practice. This article will also provide a snapshot of the current dietetics workforce, including strengths, weaknesses, and gaps.

Meets Learning Need Codes 1000, 1040, 1080, 4000, and 4080. To take the Continuing Professional Education quiz for this article, log in to www.eatright.org, click the "My Profile" link under your name at the top of the homepage, select "Journal Quiz" from the menu on your myAcademy page, click "Journal Article Quiz" on the next page, and then click the "Additional Journal CPE Articles" button to view a list of available quizzes, from which you may select the quiz for this article.

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POPULATION RISK FACTORS

Demographic Trends Affecting the Practice of Dietetics

In 2009, there were 307 million residents in the United States, an increase of 26 million since 2000 (1). The US Census Bureau estimates the US population will comprise approximately 420 million people by 2050 (2,3). More than 30% of the growth in the US population is attributed to immigration (4); the proportion of residents who were born outside of the United States increased from 6% to 12% between 1980 and 2007 (5).

The racial and ethnic distribution in the United States will continue to change through the middle of this century. By 2050, it is estimated that 50% of the population will be white non-Hispanic, 14% black, 24% Hispanic, 8% Asian, and 4% other (3). The shift in the racial and ethnic background of the US population will require that dietetics practitioners be knowledgeable of the health care needs and food-related customs of people from a variety of backgrounds, including those from other parts of the world. Furthermore, differences in health behaviors and beliefs, traditional health practices, chronic disease risk factors and prevalence rates of disease, disparities in health risk factors and outcomes, and trends in disability will have an impact on the demand for and requirements of dietetics services. Dietetics education and training programs will need to provide appropriate learning opportunities so that dietetics practitioners are prepared to meet the needs of an in-

creasingly diverse population of consumers.

The age distribution across the US population is also expected to change dramatically over the next few decades. Through the middle of the century, the percentage of older Americans—individuals aged 65 years and older—will increase from 12% to 20% of the entire population, representing the largest shift to date in age-related demographics. Currently, approximately one quarter of the US population is younger than age 18 years, a proportion that is projected to remain largely unchanged through at least 2050 (1-3). Furthermore, although people aged 18 to 44 years and 45 to 64 years currently compose approximately 38% and 25% of the population, respectively, by the middle of the century, these percentages are anticipated to decline to 34% and 22%, respectively.

The changes in percentages of people aged 65 and older will occur because of generational changes in birth rates as well as increased life expectancy. Life expectancy has increased dramatically in the past century among all racial and ethnic groups; however, racial and ethnic disparities in life expectancy exist. White males born in 2006 can expect to live 76 years, whereas their black counterparts can expect to live 70 years; white females born in 2006 can expect to live 81 years compared with 77 years for black females (6,7). Furthermore, although women have consistently lived longer than men and continue to do so, the sex gap in life expectancy has been closing, and it is anticipated that this trend will continue during the next few decades.

Longer lifespans and an aging population will likely result in increased prevalence of chronic diseases more common among older adults, such as hypertension, diabetes, end-stage renal disease, some types of cancer, Alzheimer's disease, and dementia and will affect the demand for dietetics services as these chronic health conditions frequently dietary intervention. Older adults are also more likely to be admitted to hospitals and nursing homes, where dietetics practitioners (registered dietitians [RDs] and dietetic technicians, registered [DTRs]) will oversee their nutrition care.

Home care services for elderly people also will be in demand as life expectancy increases, and RDs and DTRs will be needed to manage the nutrition care of acutely and chronically ill older adults and are likely to work as part of a comprehensive home health care team.

However, much of this impact on demand is contingent on funding. An increased need does not automatically result in increased reimbursement.

Socioeconomic Factors Limiting Access to Healthy Food

Access to food will continue to be an issue for many Americans. In addition to limitations of daily activity, there is a variety of reasons why individuals lack access to healthful foods, including limited access to food within the community, lack of housing with food storage and preparation capabilities, and economic factors that affect the ability to purchase food. The proportion of individuals living in poverty is currently estimated at 14.3% (8). There are disparities in rates of poverty, however, with 9% of whites, 26% of blacks, 25% of Hispanics, and 12% of Asian Americans living in poverty. More than one in five children lives in poverty, compared with 13% of people aged 18 to 64 years and 9% of adults aged 65 and older. Among those living below the poverty line are 7% of working families, 25% of households affected by unemployment, and 15% of households affected by layoffs (9). Compared with individuals living in higher-income households, individuals living in poverty are less likely to have adequate access to health care services and adequate food supplies.

Approximately 15% of the US population experienced food insecurity—defined as a reduced quality, variety, or desirability of diet with little or no indication of reduced food intake—in 2008 (10,11). Approximately 6% of US residents reported very low food security, defined as multiple indications of disrupted eating patterns and reduced food intake (10,11). The prevalence of food insecurity varies greatly, with the highest rates among families living in poverty, single-parent families with children, and nonwhite households. Individuals and families living in large cities or rural areas experience food insecurity more often than those living in suburbs or small cities and towns.

Regional differences exist with food insecurity—it is most common in the South, moderately common in the Midwest and West, and least common in the Northeast. Families and individuals living in poverty are eligible for food-assistance programs, such as the Supplemental Nutrition Assistance Program (SNAP); the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); Child and Adult Care Feeding Program; Summer Food Service Program; and The Emergency Food-assistance Program (12). Food-assistance program use is common among food-insecure households, with 55% utilizing the National School Lunch Program, SNAP, and/or WIC (13). One in five food-insecure households obtains food from a food pantry and 3% eat meals at an emergency food kitchen. All children can participate in the National School Breakfast and Lunch Programs; however, the costs of the meals vary by family income. Similarly, all adults older than 65 years can participate in congregate dining programs with out-of-pocket costs varying by income status. As food-assistance programs continue to grow to meet the increasing demand of families and individuals living in poverty, opportunities to consult with or administer these programs and services will present for RDs and DTRs.

Access to an adequate supply of healthful foods is an issue that affects people of all income levels and is of concern to many dietetics practitioners. Data from the US Department of Agriculture suggest that approximately 6% of US households experience access-related problems that limit the purchase of the type or quality of food. Among US households, 3% live from one-half mile to 1 mile from a supermarket and lack access to a vehicle or other mode of transportation; 2% live at least 1 mile from a supermarket and do not have vehicle access (13)—this situation is more prevalent in low-income rural and urban areas, the same areas in which food insecurity rates are higher.

RDs and DTRs in the community nutrition and public health sectors will continue to play an important role in the area of food insecurity and food access. These roles will include direct service provision; program management; outreach and marketing of programs; evaluation of food and nutrition assistance programs; and, over the next few decades, administration of food and nutrition assistance programs designed to meet the needs of the increasingly diverse population.

Trends in Chronic Diseases and Health Conditions

Overweight and obesity are common health conditions associated with an increased risk for cardiovascular disease, stroke, type 2 diabetes, some types of cancer, hypertension, osteoarthritis, and gallbladder disease (14-18). Currently, 68% of adults have a body mass index (BMI; calculated as kg/m^2) >25 (classified as overweight) and 34% are obese, with a BMI >30 (14). Among adults, 6% have a BMI >40. Although the prevalence of overweight and obesity has increased considerably in the past several decades, recent data suggest that the rates have remained more stable in the past 8 years (14).

The incidence of overweight (BMI ≥85th percentile but <95th percentile for age and sex) among US children and adolescents is 32% (19). Seventeen percent of youth are considered obese (BMI ≥95th percentile), and 12% have a BMI ≥97th percentile for age and sex. Overweight and obesity among youth are correlated with higher rates of hyperlipidemia, hypertension, liver disease, sleep disorders, orthopedic disorders, and obesity later in adulthood (20). As with adults, the dramatic increase in rates of child and adolescent overweight and obesity seen in the past 2 decades seems to be leveling off; however, it is not clear if this trend will continue long-term (19).

The health care costs associated with obesity and related comorbid conditions

are thought to be substantial. A recent study indicates that health care costs related to obesity are mounting for private and public payers (21). Diet and physical activity are considered the cornerstones of lifestyle management in preventing and treating overweight and obesity among youth and adults (15,20).

Heart disease is currently the leading cause of death among US adults, followed by cancer, stroke, chronic lower respiratory disorders, accidents (unintentional injuries), and diabetes (22,23). Age-adjusted rates of mortality from cardiovascular disease and stroke have decreased substantially in the past 50 years; however, the rates of underlying chronic conditions that contribute to cardiovascular and cerebrovascular mortality remain high. Hypertension, a risk factor for both diseases, is present in 32% of adults aged 45 to 64 years, with 51% of adults aged 65 to 74 years reporting hypertension (22). Nutrition, physical activity, and weight management are key elements in the prevention and treatment of hypertension, heart disease, and stroke (24).

Elevated serum cholesterol levels place individuals at higher risk for cardiovascular disease. During the past 2 decades, the proportion of the US population with high cholesterol levels declined from 20% to 16%, partly as a result of public education and screening for hypercholesterolemia and the introduction of medications to reduce serum cholesterol levels (22). Women are more likely to have elevated cholesterol levels than are men of the same age. For example, 24% of women aged 65 years and older have elevated cholesterol levels compared with 11% of men in that same age bracket. Medical nutrition therapy (MNT) and advice to increase physical activity and reduce intake of dietary and saturated fat, often provided by RDs, are considered the first lines of treatment for hyperlipidemia (24).

Diabetes is a risk factor for cardiovascular disease and an individual cause of mortality. The age-adjusted rates of diabetes have increased in the past 2 decades. Recent estimates suggest that 11% of the adult population older than 20 years has diabetes (22,23,25). Rates of diabetes increase with age—2.5% of adults aged 20 to 39 years old, 10% of adults aged 40 to 59 years, and 23% of adults aged 60 and older have diabetes. Rates are higher among nonwhite populations and among men of all racial and ethnic backgrounds.

Prediabetes, or impaired glucose tolerance, is present in an estimated 7% of US adolescents and 26% of US adults, or 57 million Americans (25). It is expected that rates of diabetes and prediabetes will continue to increase as the population ages. Other factors that can increase diabetes rates include high rates of overweight and obesity among children and adults and increases in the number of nonwhite people in the United States who are at higher risk for these conditions.

Approximately one third of cancers are related to poor nutrition and lack of physical activity, with up to 20% of cancer mortality related to overweight and obesity (26). These lifestyle risk factors have been associated with higher rates of cancer in the breast, ovaries, endometrium, colon, kidney, esophagus, pancreas, and gallbladder. Being overweight or obese can increase the likelihood of cancer recurrence and decrease survival rates for some types of cancer. RDs will continue to play an important role in the treatment of cancer using MNT, and RDs and DTRs increasingly will be involved in cancer prevention by providing nutrition education and lifestyle management, including obesity prevention and treatment.

A substantial proportion of the US population suffers from a limitation of activity; that is, reductions in physical, mental, and emotional well-being that interfere with the ability to engage in age-appropriate daily activities, including the planning, preparation, and consumption of meals, related to chronic health conditions (27,28). Currently, 9% of school-aged children and up to 25% of adults aged 18 to 65 years have a limitation of activity (29). In adults older than 65 years, the rate of limitation of activity in the noninstitutionalized population is estimated at 62%. For older adults, the typical causes are primarily musculoskeletal conditions, followed by mental illness, heart disease, hearing loss, diabetes, pulmonary disease, and dementia. Among children, learning disabilities, attention-deficit hyperactivity disorder, other neuromuscular conditions, speech disorders, and intellectual disability are the leading causes of activity limitations. Preterm birth (birth before 37 weeks' gestation) and low birth weight (birth weight $<$2,500 g) are risk factors for disabilities among children. In the past 4 decades, rates of low birth weight and very low birth weight (birth weight $<$1,500 g) have increased (22). As technology to save the lives of premature and very-low-birth-weight babies advances, it is expected that rates of disability among children secondary to these causes will also increase.

Nutrition services are key components of treatment for many of the causes of limitations of activity, such as the following:

- Individuals with sight and musculoskeletal disorders often require specialized education to enable them to shop for and prepare food and to feed themselves.
- Many of the medications used to manage symptoms of physical and mental health-related chronic conditions that limit daily activity have implications for nutritional status requiring dietary intervention and monitoring.
- Schools are mandated to provide food substitutions or modifications for children with special health care and/or dietary needs (30).
- Specialized nutrition support is often required for preterm and low birth weight babies.

RDs and DTRs will play a vital role in meeting the needs of individuals with limitations of activity in home, schools, and social service and community agencies serving disabled individuals and residential care settings, in addition to more traditional acute-care facilities.

MNT is a key component in treating many of the chronic conditions mentioned previously; in fact, it is considered the cornerstone of treatment for diabetes, hypertension, and cardiovascular disease (24,31-33). If there is funding, increases in rates of these chronic conditions should create more demand for RDs to provide MNT services in acute-care, ambulatory-care, and community-based settings.

Lifestyle risk-factor modification and weight-management services are essential components of health-promotion and disease-prevention programs. RDs and DTRs will play a more frequent role in providing lifestyle and weight-management services as part of health-promotion and disease-prevention efforts within worksites, schools, community clinics, health clubs, social service programs, and other community settings.

TRENDS IN HEALTH CARE AND PUBLIC POLICY

Traditionally, health care has been delivered in acute-care settings through hospitals and hospital-based services. Advances in health care and industry-wide implementation of cost-savings strategies have led to a dramatic change in the delivery of health care services. Individuals increasingly receive health care services in ambulatory rather than acute-care facilities. In 1990, there were 1,213,327 hospital beds available in the United States, but by 2007, there were 945,199 beds available (22). Many former hospital-based services, including renal dialysis, minor operations, and management of conditions such as newly diagnosed diabetes are now performed on an outpatient basis, often in independent facilities that are not associated with a hospital or other health care system.

Patients with complex medical conditions, often requiring ongoing MNT services, are discharged early from hospitals with increasing frequency (22). Data from the National Hospital Discharge Survey show that the average length of inpatient hospital stay was 7.3 days in 1980, but only 4.8 days in 2005 (34), with most patients spending 3 days or less in a single visit. More and more often, patients are

required to seek care in an outpatient setting or in their homes. Thus, RDs will more commonly provide MNT in smaller and more specialized facilities within community health centers and related organizations or within the homes of homebound, ill patients rather than within acute-care settings.

MNT has been proven cost-effective, particularly with regard to outpatient nutrition services for chronic health conditions such as diabetes, hyperlipidemia, and hypertension (35,36). (There is evidence for health care cost improvements from inpatient MNT, but it is not as strong as the evidence for outpatient nutrition services.) Home management of complex medical conditions requiring parenteral nutrition has been shown to reduce health care costs by $4,860 to $5,400 per month (Canadian dollars)* (37). As health care costs continue to rise, such cost-effective services offered within homes will likely increase. Preventive health care services will also play an increasingly important role.

In 2010, the *Patient Protection and Affordable Care Act* (HR 3590) became law. Under this legislation, the next decade expects to see reforms in the current health care system designed to expand health care coverage to most Americans, to reduce the growth of health care costs over time, and to ensure that Americans have access to affordable health insurance that meets their lifetime needs (38). Following are two important aspects of this historic legislation that will affect the provision of dietetics and nutrition services in the next decade (39):

- the reorientation of the health care system away from acute disease management and toward a preventive care and wellness model; and
- the implementation of an improved health care delivery and payment system that integrates health care services of multiple providers through an emphasis on medical homes and community health centers.

Funding for public health and prevention services included in the *Patient Protection and Affordable Care Act* will strengthen community-based services such as employee screenings and wellness programs, incentives for employees who meet health targets (such as weight loss and improved serum lipid profiles), and reimbursement for annual wellness exams. An emphasis on developing health-promotion and disease-prevention programs in rural and underserved areas is included in this new health care legislation, which might provide expanded roles for RDs, particularly in the area of annual wellness exams. Rural health initiatives can also increase the demand for RDs and DTRs to offer telehealth services, defined by the Academy of Nutrition and Dietetics as follows (40):

> *. . . the use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health, and health administration, [that] includes both the use of interactive, specialized equipment, for such purposes as health promotion, disease prevention, diagnosis, consultation, and/or therapy, and noninteractive (or passive) communications, over means such as the Internet, E-mail, or fax lines, for communication of broad-based nutrition information that does not involve personalized nutrition recommendations or interventions.*

The Centers for Medicare and Medicaid Services recognizes RDs as health care providers who can provide telehealth services for select medical conditions, including diabetes and some forms of kidney disease (41). Telehealth and other electronic forms of conveying MNT and/or health-promotion and disease-prevention services will open avenues for RDs to reach individuals and groups that might not currently have access to dietetics services. Dietetics education programs will need to teach future practitioners the skills necessary to adopt and utilize electronic health communication technologies.

A mandate for nutrition labeling on select restaurant menus and vending machines is also included in the *Patient Protection and Affordable Care Act*. This requirement will provide additional opportunities for RDs and DTRs to work with commercial foodservice operations to analyze recipes, develop more nutrient-dense foods, and improve menu options for individuals who wish to eat a healthful diet away from home.

Intervention Approaches to Address Population-Based Health Care and Nutrition Priorities

Addressing these population priorities requires a dietetics workforce that is skilled in delivering interventions informed by research across the lifespan; for all population groups; and across all levels of the social-ecological model for primary, secondary, and tertiary prevention. Although there are myriad intervention models and approaches, this article will briefly introduce life-course interventions—complemented by health-equity approaches that are delivered across the levels of the social-ecological model—as a conceptual framework to consider the current dietetics workforce in relation to population priorities. These interventions will be described in this section and are depicted in the Figure.

Life-Course Theory-Based Interventions. One way to conceptualize the importance of nutrition across the life cycle is life-course theory, which proposes that biological and behavioral risk and protective factors determine health trajectories (42,43). Specifically, optimal health trajectories result when risk factors are reduced and protective factors are increased throughout life, but especially during key developmental periods. Dietetics practitioners then, have a role in healthy aging from preconception onward by timing appropriate and effective interventions that will have future and long-term impacts on health (44). These interventions are to reduce risk factors and increase protective risk factors during each critical developmental period and typically are delivered to individuals, families, and small groups.

As the overall US population ages, the dietetics workforce will need knowledge and skills related to geriatric nutrition and delivery of services in a variety of access points, including senior home care with and without home-delivered meals, assisted living and extended care facilities, and nursing homes. They also will need to be skilled not only in chronic disease prevention and treatment, but also in how to work with elderly people, who might have limited mobility and might wish to remain actively engaged in their own food purchasing, food preparation, and storage activities. It will not be enough to advise these individuals regarding "what" and "how" to eat, as these active seniors will want and need to prepare and consume meals consistent with their mobility. At the same time, as new health technologies help sustain and extend life, dietetics practitioners will need skills to help promote health for young and old, including those with metabolic disorders, developmental delays, and physical activity limitations.

Health Equity and Social Determinants of Health Models. Health disparities disproportionately affect particular population groups, such as minority populations, those less educated, and those living in poverty (45,46). Individuals within these groups might know what a healthful diet is, but what they consume is influenced by social, governmental, and legal systems that negatively affect their ability to consume a healthful diet

**This study was performed using Canadian dollars as the measurement. The conversion to US dollars would be $3,738-$4,154 (based on a conversion factor of $1.3 Canadian:$1 US dollar, using the average historical Canadian/American exchange rate data found at http://research.stlouisfed.org/fred2/data/EXCAUS.txt on January 10, 2012).*

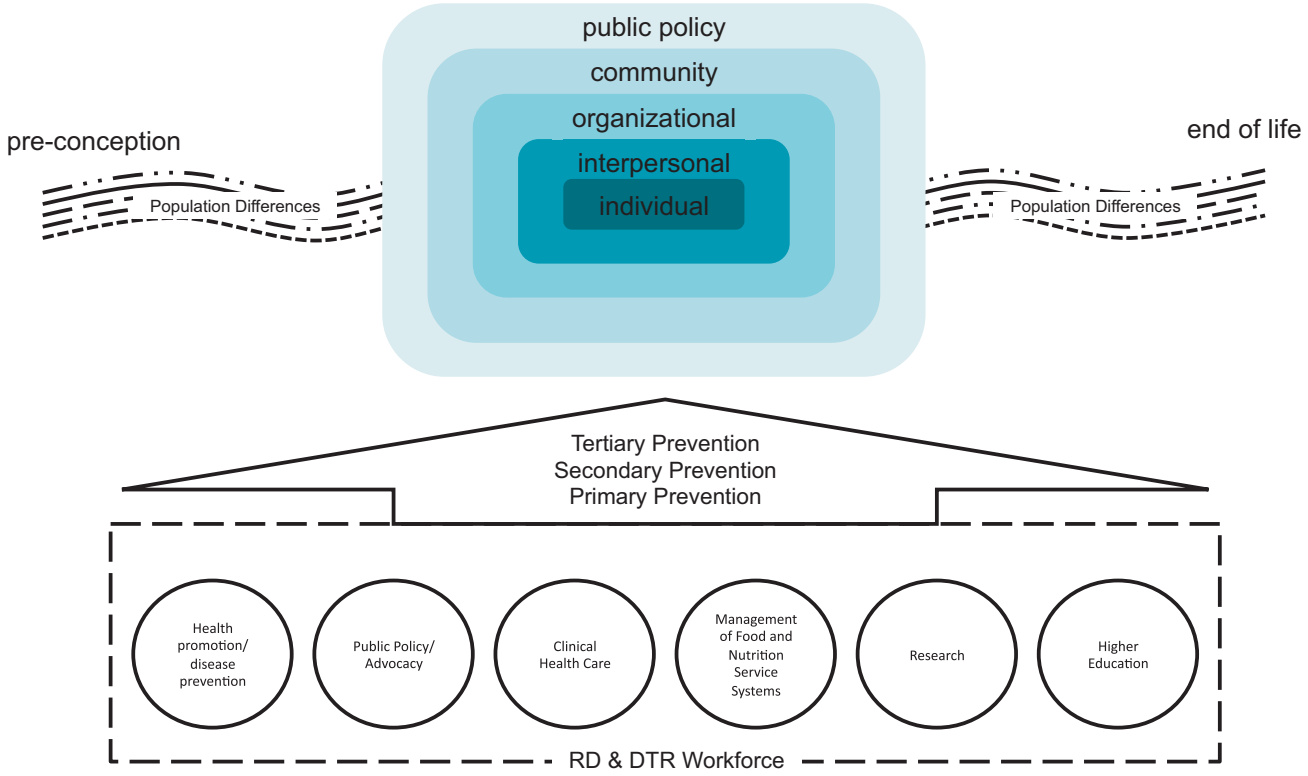

Figure. Framework for dietetics practice as prevention and interventions across the social-ecological model to promote health and eliminate health disparities through the life course. Figure concept courtesy of Shannon Looney, Knoxville, TN.

and be physically active—for example, fresh fruits and vegetables might not be available or affordable, and neighborhoods might be unsafe for physical activity (47,48). If dietetics practitioners are to help address health disparities to optimize health trajectories, then they need knowledge and skills regarding environmental and policy interventions that integrate principles of social justice, human rights, and social capital and that can focus on the economic and social barriers that promote or prevent the procurement, preparation, and consumption of healthful foods (49,50). These interventions require population- and system-level knowledge and skills of dietetics practitioners.

Culturally Competent Interventions and Systems. One characteristic that life-course, social determinants of health, and health-equity interventions have in common is that they need to be culturally competent to be accessible to all. Cultural competence is defined by Cross and colleagues (51) as "a set of congruent behaviors, attitudes, and policies that come together in a system, agency, or among professionals and enable the system, agency or those professionals to work effectively in cross-cultural situations." According to this definition, cultural competence relates not only to how individual dietetics practitioners practice and interact with others who are different from themselves, but also to the means by which their workplaces make services culturally accessible to all.

Whether dietetics practitioners are interacting with individual patients or clients, families, community members, or other health professionals with whom they work, they need to have awareness, knowledge, and skills that enable effective cross-cultural interactions that positively affect interventions and professional exchanges (52-55). Although individual cultural competence is important, dietetics practitioners also need the knowledge and skills to participate in crafting institutional policies and practices that are culturally competent and in collecting and using disparity data that can be applied to design effective interventions for specific populations (38,56,57).

Closely aligned with cultural competence is workforce diversity (58,59), which is frequently described by demographic characteristics of the workforce, such as race and ethnicity, compared with those of the population served. Although diversity itself will not make individuals or organizations culturally competent, it will help to promote use of nutrition and health care services by under-represented groups, who are more likely to seek services from professionals whom they see as similar to themselves (58). Thus, the dietetics and nutrition workforce needs to be culturally competent as well as diverse.

Levels of Prevention. The life-course approach is consistent with promoting health and preventing overweight and obesity and chronic diseases. Primary prevention requires approaches to avert biological risk factors, such as elevated serum cholesterol and hypertension, and to increase protective factors, such as access to safe and affordable, healthful foods. Examples of primary prevention are environmental and policy approaches to increase physical activity, such as street-scale urban design and land-use policies (60), policies to support local food systems, nutrition and calorie labeling in restaurants and vending machines, policy interventions about types of foods available in schools (61,62), worksite wellness programs to promote healthful eating and physical activity (63), point-of-decision prompts to encourage stair use (60), social support interventions in communities to increase physical activity (64), and behavioral interventions to reduce screen time (65).

Secondary prevention requires approaches to reduce existing risk factors. These interventions can be delivered with individuals and small groups, such as intensive behavioral interventions for adults with hyperlipidemia (66) and for sustained weight loss in obese adults (67).

Secondary prevention also can be delivered as targeted media campaigns for early detection and screening and as nutrition education and food-assistance programs to reduce nutritional risk, such as that provided through WIC.

Tertiary prevention requires clinical approaches to treat disease. Examples are case-management interventions to improve glycemic control in diabetes-management programs (68), behavioral and family-based counseling as part of multicomponent pediatric weight-management programs to treat overweight children (35,36), and multicomponent coaching and counseling interventions to reduce and maintain weight loss (69).

Each of these three prevention levels requires different knowledge and skill sets. Primary prevention requires practitioners to consider interventions that change the wide range of influences on individual and population behaviors. Secondary prevention requires practitioners to consider how to reduce risk factors, which can be influenced not only by the environments where people live, work, and play, but also by how people interact with each other and what they know about what constitutes a healthful diet and how to select, prepare, and consume it. Tertiary prevention requires practitioners to focus on disease treatment and then, specifically, to consider how to engage the individual and the family and caregivers with whom he or she interacts to control, treat, and ameliorate the disease through MNT.

Intervention Targets. While primary, secondary, and tertiary prevention describe the purpose of nutrition interventions, the social-ecological model conceptualizes intervention targets (70,71), which influence what and how people eat and how physically active they are. At the individual level, interventions are designed to change what people know, their skills, and behaviors, so that they have improved eating and health outcomes; these intervention strategies increase motivation, self-efficacy, and behavioral capability. At the interpersonal level, interventions are designed to change how people within an individual's social network influence that person's eating and physical activity; these intervention strategies include parenting interventions, buddy programs, and approaches to change social norms about appropriate food-portion sizes. Interventions at the individual and interpersonal levels include nutrition counseling in outpatient settings and peer group sessions in WIC facilities or a worksite.

At the institutional/organizational level, interventions are designed to change the policies, practices, and environments of where people go to school, work, and eat away from home—for example, moving a school from simple awareness of the need to change competitive food policies to adopting new policies that are implemented and institutionalized as standard practice (72).

Community-level interventions are intended to change the neighborhood and community environments where people live—for example, by improving access to healthful foods and safe places to be physically active. Example interventions are participatory research strategies that engage community members in assessing their neighborhood environments, including access to healthful and affordable food, and then in developing projects to reduce barriers and take advantage of opportunities. Policy and system-level interventions are intended to change the social structures, policies, and systems that affect many of the other intervention targets in the social-ecological model; these intervention strategies include political action, lobbying, and policy advocacy to reform health care, including the role of nutrition and dietetics and nutrition and menu labeling regulation development and food-assistance guidelines. Community-, policy-, and system-level interventions focus on population health.

Research and Practice

The overall dietetics workforce will need knowledge and skills to participate in primary, secondary, and tertiary interventions across the life course and target different levels of the social-ecological model. The knowledge and skills used, which require critical thinking skills for analysis and decision making for participating in activities such as analyzing research publications, will need to be informed by current research. It also is important to recognize the important role that some dietetics practitioners will have in generating and contributing to this research, which can range from the most basic level (eg, from the genomic, subcellular, cellular, and multiorgan system levels) to that of human behaviors related to eating and physical activity and to that of environments and policy that influence these behaviors (eg, levels of the social-ecological model) (73).

Current Dietetics Workforce: Who Are They and How Do They Practice?

In 2008, the Academy of Nutrition and Dietetics Foundation and Commission on Dietetic Registration (CDR) completed a comprehensive needs assessment of US dietetics practitioners using a stratified probability sample (74,75). Results from this study estimated a total of 75,418 RDs and 4,027 DTRs at that time. Current data about this workforce can be considered in relation to population priorities and used to estimate future workforce needs to address these priorities.

Workforce Diversity

RDs are, as a group, predominantly female, white/non-Hispanic or Latino, and in their mid-40s; a substantial proportion are considering retirement by 2019 (74,75). The proportion of males is very low among RDs and DTRs (4% of DTRs and 3% of RDs).

DTRs are more diverse with regard to a number of racial and ethnic indicators. More DTRs compared with RDs are black (6% of DTRs vs 2% of RDs), Hispanic or Latino (4% vs 3%), or "other" (2% vs 1%), and fewer are white/non-Hispanic (78% vs 84%) or Asian (3% vs 5%). A striking difference in the two groups is that DTRs in general are older than RDs, with a median age of 48 years compared to a median age of 45 years among RDs. Only 12% of DTRs, compared with 25% of RDs, are younger than 35 years. More than 20% of DTRs and RDs (23% for both) are 55 years or older, which is the time frame for considering early retirement and retiring (74,75). Indeed, based on historical workforce data, there is an assumption of an attrition rate (a percentage that comprises CDR-credentialed dietetics practitioners who will leave the workforce for reasons of emigration, extended leave, retirement, or death) of 2% to 5% in dietetics (76). This suggests an aging workforce comparable to that of the US population overall and of other health professions, including nursing (77).

As a largely female, older, and white/non-Hispanic workforce, these data suggest that the profession has an important responsibility to address not only cultural competence as the nation becomes increasingly more diverse, but also diversity of the future workforce itself through recruitment and retention strategies to promote diversity and replacements due to retirements.

Current and Future Practice Areas

The majority of RDs and DTRs, 48% and 51%, respectively, currently practice in clinical health care (Table 1). This suggests that almost half of all RDs and DTRs are especially involved in tertiary and secondary prevention and in individual-level and interpersonal-level interventions related to clinical health care. It is less clear how the remaining DTRs and RDs are practicing relative to the three prevention levels or the social-ecological model. However, there is growing emphasis on the importance of primary prevention and environmental and policy interventions with regard to their impact on population health—and this translates to an important role for dietetics practitioners who are trained with the necessary skill sets. How dietetics practitioners position themselves to be part of these interventions might be critical for future practice.

Table 1. Primary practice areas for registered dietitians and dietetic technicians, registered, working in the dietetics profession: 2008 needs assessment compared to new practice areas

Primary practice area (2008)[a]	Registered dietitian (%)[a]	Dietetic technician, registered (%)[a]	New practice areas (2010)[bcd]
Clinical, inpatient	21	29	Clinical health care
Clinical, outpatient	17	1	
Clinical, long-term care	10	21	
Community nutrition	11	8	Health promotion/disease prevention
Food and nutrition management	8	15	Management of food and nutrition services
Consultation/business practice	4	1	NA[e]
Education/research	8	5	Research
			Higher education
Multiple	11	10	NA
Other	4	3	NA
			Public policy/advocacy

[a]Source: Rogers (75).
[b]Source: American Dietetic Association. Report to the House of Delegates: Final Report of the Phase 2 Future Practice and Education Task Force. July 15, 2008, unpublished.
[c]Source: Gilbride J, Parks S, Dowling R. Framework for analyzing supply and demand for the dietetics profession. 2011, unpublished.
[d]Source: Collier (78).
[e]NA=not applicable.

Shifting Intervention Approaches and Changing Practice Roles

Comprehensive health care reform stipulated in the *Patient Protection and Affordable Care Act* and projections about the future health care workforce have implications for the dietetics profession over the long-term. As noted previously, the health care reform bill has three goals:

- health insurance coverage for the uninsured;
- improved affordability and stability of coverage for those with health insurance; and
- slow growth of health care costs (38).

Implementation will shift from a fee-for-service payment model to preventive, patient-centered approaches, including the patient-centered medical home and accountable care organization models, and a reformed delivery system with more primary care providers, medical homes, and community-based health centers (39).

While future dietetics practitioners will continue to have a role in tertiary prevention, particularly related to chronic disease management, they clearly have the potential for expanded roles in primary and secondary prevention in individual- and interpersonal-level interventions. As members of specialized and integrated care teams, dietetics practitioners will play an important role, but they will need to position themselves to other team members and to health insurers as recognized providers of nutrition and dietetics services.

At the same time that health care reform is implemented, health care employers, insurers, and individuals will continue to look for ways to control health care costs, particularly related to personnel. Health care workforce projections from the Bureau of Labor Statistics for 2008 to 2018 are for substantial growth in the "frontline workforce" of health care personnel with a bachelor's degree or less and who will have extensive direct patient contact [(78-80) (and American Dietetic Association. *Report to the House of Delegates: Final Report of the Phase 2 Future Practice and Education Task Force.* July 15, 2008, unpublished; Gilbride J, Parks S, Dowling R. Framework for analyzing supply and demand for the dietetics profession, 2011, unpublished), such as home health aides and personal and home care aides. As health care costs increase, individuals also will seek lower-cost alternatives. For example, elderly adults may seek home-based care instead of long-term, institutionalized care. Others may seek services offered by health educators or fitness trainers and aerobics instructors to help them change their diet and become more physically active. This growing trend of the frontline workforce has been noted within the public health nutrition workforce through enumeration surveys conducted by the Association of State and Territorial Public Health Nutrition Directors since 1985. For example, data from 1999-2000 and 2006-2007 enumerations suggest a considerable increase in the proportion of breastfeeding peer counselors (0.4% vs 12.6%) working with the WIC program (81). Whereas the Bureau of Labor Statistics projects that RD and DTR positions will grow at rates of 9.2% and 13.9%, respectively, from 2008 to 2018, these increases are less than that projected for other sectors of the health care workforce, such as home health aides (50.0%), personal and home care aides (46.0%), recreation and fitness workers (21.2%), and health educators (18.1%) (79). These projections suggest an important role for dietetics practitioners, who will remain providers of patient-care services, but also might assume increased responsibilities as consultants and managers of those in the frontline workforce, who will have more extensive and expanded direct-care contact.

Related to growth of the frontline workforce is bifurcation of the health care workforce (78), as the proportions of personnel with lower levels of education (associate's degree or less) and those with higher levels of education (graduate degree) increase, but the proportion of staff with bachelor's degrees decreases. The tension of employers trying to control personnel costs and professional associations trying to advance their professions will only continue. It will be important for the Academy of Nutrition and Dietetics and CDR to consider what level of education and training is appropriate in relation to how much employers are willing to pay (78,82,83). What qualifications are required for future dietetics positions and what will the market bear for quality, nutrition-related health outcomes? Currently, survey findings range from 34% of RDs having an advanced degree in dietetics, food, nutrition, or a related field (74,75) to up to half of all RDs having any advanced degree (85), whereas only 1% of DTRs having an advanced degree

Table 2. State-specific ratios of dietetics practitioners per 100,000 population, United States

	Population Ratio						
	RDs[a]			DTRs[b]			
State	n	RD per 100,000[c]	Rank	State	n	DTR per 100,000[c]	Rank
North Dakota	356	55.0	1	Maine	105	8.0	1
New Hampshire	480	36.2	2	Ohio	721	6.2	2
Minnesota	1,894	36.0	3	Wisconsin	226	4.0	3
Nebraska	641	35.7	4	Connecticut	107	3.0	4
Massachusetts	2,287	34.7	5	Minnesota	144	2.7	5
Vermont	209	33.6	6	New York	526	2.7	6
Connecticut	1,179	33.5	7	Pennsylvania	230	1.8	7
Wisconsin	1,875	33.2	8	New Hampshire	23	1.7	8
Rhode Island	341	32.4	9	Nebraska	31	1.7	9
Ohio	3,728	32.3	10	New Jersey	143	1.6	10
South Dakota	261	32.1	11	Florida	265	1.4	11
Colorado	1,574	31.3	12	North Dakota	8	1.2	12
Kansas	871	30.9	13	Washington	82	1.2	13
Iowa	925	30.8	14	Missouri	70	1.2	14
Pennsylvania	3,749	29.7	15	Indiana	73	1.1	15
Maryland	1,692	29.7	16	Arizona	74	1.1	16
Washington	1,970	29.6	17	California	405	1.1	17
Montana	283	29.0	18	Illinois	129	1.0	18
New York	5,578	28.5	19	Colorado	47	0.9	19
Idaho	441	28.5	20	Oregon	35	0.9	20
New Jersey	2,437	28.0	21	Massachusetts	56	0.8	21
Delaware	246	27.8	22	Arkansas	24	0.8	22
Michigan	2,738	27.5	23	Virginia	64	0.8	23
Utah	747	26.8	24	Maryland	46	0.8	24
Kentucky	1,150	26.7	25	Vermont	5	0.8	25
Illinois	3,435	26.6	26	Louisiana	30	0.7	26
Maine	349	26.5	27	West Virginia	12	0.7	27
Missouri	1,579	26.4	28	South Dakota	5	0.6	28
Louisiana	1,184	26.4	29	Tennessee	37	0.6	29
North Carolina	2,460	26.2	30	Idaho	9	0.6	30
Hawaii	336	25.9	31	Michigan	57	0.6	31
District of Columbia	153	25.5	32	Rhode Island	6	0.6	32
Tennessee	1,584	25.2	33	North Carolina	47	0.5	33
Alaska	175	25.1	34	Kentucky	21	0.5	34
Indiana	1,600	24.9	35	Texas	119	0.5	35
Oklahoma	911	24.7	36	Nevada	12	0.5	36
Virginia	1,923	24.4	37	Delaware	4	0.5	37
Alabama	1,140	24.2	38	South Carolina	18	0.4	38
Oregon	911	23.8	39	Alabama	17	0.4	39

(continued on following page)

Table 2. State-specific ratios of dietetics practitioners per 100,000 population, United States *(continued)*

	Population Ratio						
	RDs[a]			DTRs[b]			
State	n	RD per 100,000[c]	Rank	State	n	DTR per 100,000[c]	Rank
Mississippi	698	23.6	40	Kansas	10	0.4	40
Arkansas	679	23.5	41	Oklahoma	13	0.4	41
California	8,416	22.8	42	District of Columbia	2	0.3	42
Wyoming	120	22.0	43	Montana	3	0.3	43
Texas	5,136	20.7	44	Iowa	9	0.3	44
Arizona	1,304	19.8	45	New Mexico	5	0.2	45
New Mexico	397	19.8	46	Georgia	24	0.2	46
Florida	3,644	19.7	46	Mississippi	7	0.2	47
Georgia	1,879	19.1	48	Wyoming	1	0.2	48
South Carolina	870	19.1	49	Alaska	1	0.1	49
West Virginia	310	17.0	50	Utah	3	0.1	50
Nevada	422	16.0	51	Hawaii	1	0.1	51
Puerto Rico	202	5.1	52	Puerto Rico	1	0.0	52

[a]RD=registered dietitian.
[b]DTR=dietetic technician, registered.
[c]Based on personal communication (with Chris Reidy, RD, September 2010) and Readex Research (74).

(74,75). What level of education and credential is required to address individual and population needs (84)? Training a qualified and marketable workforce will require educational institutions and programs to have goals and curricula aligned with workforce and population needs (82).

Location of the Dietetics Workforce in Relation to Population Need

The location of dietetics practitioners geographically and within communities can affect availability, access, and delivery of services, which raises additional questions about the dietetics workforce. Are there areas where there are shortages in dietetics services? Within communities and within facilities and agencies, how well do the types and numbers of dietetics practitioners match the needs of individuals and populations served? Answers to these questions relate to health equity and quality of care. For example, medically underserved, minority, and rural populations typically have more limited access to health care and higher rates of chronic disease (86). Shortages of primary care health professionals have been identified in >75% of rural counties; many of these counties have no primary care provider (87). Similarly, RD shortages in rural communities also exist (39).

There are limited data and research available on where dietetics practitioners are located; whether they practice at the primary, secondary, or tertiary prevention levels; and how they practice across the lifespan and across the levels of the social-ecological model. Moreover, there are few staffing ratio recommendations available to interpret the number of people served by dietetics practitioners in these different capacities. The staffing recommendation used for public health dietetics practitioners with population/system responsibilities in support of core public health functions is 1:50,000 (88), but this recommendation dates to 1978 and its validity has not been tested.

Currently, the Academy of Nutrition and Dietetics Research Committee and Clinical Nutrition Management Dietetic Practice Group is developing inpatient staffing models for RDs (89). The WIC program also has been involved in research to develop professional staffing requirements for local WIC agencies (90). However, even with staffing ratio recommendations, it is difficult to determine workforce shortages and needs because the distribution of personnel differs across and within states and within communities and facilities (91).

A gross view of the overall dietetics workforce across the United States is revealing in this regard. Table 2 shows the number of RDs and of DTRs per 100,000 population, based on 2009 state populations and data from CDR (Chris Reidy, CDR Executive Director, personal communication, October 2010). The state-specific ratios (expressed per 100,000 people) range from 55.0 in North Dakota to 16.0 in Nevada—so, in contrast to Nevada, where there are only 16 RDs for every 100,000 residents, North Dakota, representing the best ratio of RDs per person, has 55 RDs for every 100,000 people in need of primary, secondary, and tertiary prevention, across the lifespan, and for interventions across the social-ecological model. These data demonstrate important state-specific differences in available RDs per population and suggest considerable differences in the availability of RDs for needed services, technical assistance/consultation, supervision, and management.

Table 2 reveals some additional points worth noting:

- Among the 10 states with the best ratio of RDs per 100,000 people, five are in the New England region of the United States.
- The ratios of DTRs per 100,000 are even lower than that for RDs, ranging from the best ratios of 8 DTRs per 100,000 in Maine to 0.1 DTRs per 100,000 in Hawaii.
- Among the top 10 states for the best ratios of RDs per population, six states—New Hampshire, Minnesota, Nebraska, Connecticut, Wisconsin, and Ohio—also have the best ratios for DTRs.

- Among the 10 states with the worst ratios for RDs per population, three states—New Mexico, Georgia, and Wyoming—also have the worst ratio for DTRs per population.

There is a paucity of research about why these ratios exist and what their implications are, which also suggests another challenge for the dietetics workforce: understanding the dietetics infrastructure, including what it is like (eg, the numbers and types of nutrition-related personnel, qualifications, experience, professional development needs, and how and where they practice) and its relationship to health care and health outcomes.

CHALLENGES AND OPPORTUNITIES

There are clear needs for the current and future dietetics workforce to address nutrition-related chronic disease across prevention levels and across the life-course by working toward intervention targets across the social-ecological model to promote health, prevent disease, and eliminate health disparities. How this labor force works within the practice areas identified by Rogers (92) is affected by the cost of health care and health care reform to control costs and improve health outcomes as quality and efficiency of care are improved (93). Nutrition and dietetics has an important role in preventive services and as a therapeutic agent in chronic-disease management. As the demand for prevention and health care services increases, members of the dietetics profession will need to think carefully about new practice roles, particularly related to environment and policy interventions and integration in health care teams, and work with an increasingly bifurcated health care workforce, which might require more consultation and technical assistance. In addition, the profession as a whole needs to think carefully about how to promote recruitment and retention of a diverse and culturally competent workforce that also is skilled in helping develop culturally competent systems of care in the agencies, facilities, and communities where they work.

It will behoove the profession to consider not only where dietetics practitioners are located, but also what staffing ratios are appropriate for different intervention targets, such as population/system-level interventions and clinical and ambulatory care interventions. There is a clear need for research related to the nutrition and dietetics workforce to understand the relationship of the workforce supply with demand and how the workforce fits with other health care professionals. The challenges are considerable, but proactive leadership, willingness to explore options, and engagement with a broad spectrum of stakeholders will help shed light on how to plan for the future.

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Framework for Analyzing Supply and Demand for Specialist and Advanced Practice Registered Dietitians

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EXECUTIVE SUMMARY

The number of credentialed dietetics specialists—approximately 15% of the profession—is proportionately higher than those in other allied health and nursing professions. Credentialed specialists seem to receive greater compensation earlier in their career, but this advantage neutralizes as length of time in the profession increases. A larger proportion of younger registered dietitians (RDs) are specialists, which may mean an increase in supply of specialists in the future. There is considerable interest in creation of health promotion and foodservice management credentials. Consideration should be given to collaborating with other organizations to explore new models of recognition or credentialing for narrow areas of focus. Creating a methodology that can differentiate the tasks and approaches to practice that are unique to advanced practitioners compared with specialists has been a challenge. Prior research has not succeeded in identifying the differences in what advanced practitioners do. Future research to isolate advanced practice must take practice approach into account. A new, research-based, credential for advanced practitioners is possible, or a recognition program for advanced practice RDs could be considered. Precise supply and demand for specialty and advanced practice RDs cannot be measured. Thus, in this technical article, the authors share the available information regarding supply and demand with regard to dietetics specialists and advanced practitioners. It seems there are distinctions among the various levels of practice and recognition of their value to the profession and to the health of the public.
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THE SUPPLY AND DEMAND FOR specialist and advanced practice dietitians (RDs) is based on skill sets within a scope of practice. Dietetics practice is grounded in a broad scientific, educational platform and shaped by historical, environmental, medical, and social trends. It is within this wide-ranging framework that focus areas of specialist and advanced practice dietetics have emerged. Though common among allied health fields, this gradual process of advancement, is not as well defined in dietetics—especially in the nonclinical segments—compared with other health professions.

Since 1975, the Academy of Nutrition and Dietetics (Academy) has debated and discussed the value of specialists and advanced practice RDs, studied the issues, and implemented new credentials (1). Using the Standards of Practice/Standards of Professional Performance as a template, several groups have published documents that describe what RDs do at the entry (generalist), specialty, and advanced levels of practice (2-12) and provide background information for comparing practice types.

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The most recent definitions of practice levels have been established by the Academy's Council on Future Practice (13). The helix in the 2011 Council on Future Practice report (13) illustrates how practitioners progress from competent to proficient to specialist and advanced/expert. The key definitions in the Textbox may assist in understanding the definitions, criteria, and distinctions between entry, specialist and advanced practice RDs and the various focused areas of practice.

This technical article synthesizes what is known about dietetics specialists and advanced practitioners. The status of credentialing and what is known about supply and demand are reviewed. The article concludes with barriers, opportunities, and implications for addressing the supply and demand of specialty and advanced practice dietitians.

AVAILABILITY AND SUPPLY OF RD AND MULTIDISCIPLINARY SPECIALIST CREDENTIALS

Many RDs engage in generalist practice, but some RDs also focus on specific patient populations such as geriatrics and pediatrics, diseases such as cancer or diabetes, and nutrition interventions such as nutrition support. From 2005 to 2010, the number of RDs earning specialist practice credentials offered by the Commission on Dietetic Registration (CDR) tripled. Part of this growth was fueled by the addition of three new credentials (Table 1). However, the number (supply) of RDs certified in the more established specialties has also increased.

RDs earning specialist practice credentials offered by CDR represent 2.5% of RDs. A 2008 Needs Assessment (14) asked respondents about the value of the market for CDR credentials and certifications. Approximately four in 10 RDs responded that CDR credentials were valued in the market—specifically, renal (47%), pediatric (48%), oncology (44%), gerontological (41%), and sports nutrition (47%) credentials.

Professional boards other than the CDR—such as the National Board for Nutrition Support Certification (15) and the National Certification Board for Diabetes Educators (16)—provide credentials for RDs. The Certified Diabetes Educator (CDE) credential was launched to standardize practice relative to patient education across disciplines. The Certified Nutrition Support Clinician credential (CNSC) combined the Certified Nutrition Support Dietitian, Physician, and Nurse credentials into a single certification in 2008 and enabled pharmacists and physician assistants to take the exam in 2009. Current numbers of dietetics practioners and others with these certifications are in Table 2. Approximately 12.5% of RDs have credentials in nutrition support (almost 3,500 certified RDs) and diabetes education (nearly 6,500 RDs). For diabetes educators, demand may have been fueled by the requirement that certified personnel be available to meet requirements for a certified diabetes center. This requirement has not been established for other specialties, but the total number of certified diabetes educators suggests the specialist creden-

Table 1. Supply of registered dietitian specialists certified by the Commission on Dietetic Registration, 2005-2010[a]

	Year					
Specialist area	2005	2006	2007	2008	2009	2010
Pediatric	356	384	409	420	452	547
Renal	338	328	380	370	380	443
Sports dietetics	—	59	159	233	339	415
Gerontology	—	—	151	171	238	320
Oncology	—	—	—	147	218	370
Totals	694	771	1,099	1,341	1,627	2,095

[a]Source: Christine Reidy, RD, Executive Director, Commission on Dietetic Registration, November 12, 2010.

Table 2. Multidisciplinary certifications for specialist and advanced practice by discipline

	Certification		
Discipline	Certified Nutrition Support Clinician[a]/Certified Nutrition Support Dietitian	Certified Diabetes Educator[b]	Board Certified Advanced Diabetes Management[c]
Dietetics	3,478	6,476	104
Medicine	115	0	0
Nursing	84	8,966	494
Pharmacy	32	780	54
Physician assistant	2	0	0
Other		382	
Total	3,711	16,604	652

[a]Source: Michelle Spangenburg, MS, RD, Program Director for Education, American Society for Parenteral and Enteral Nutrition, November 19, 2010.
[b]CDE Data are from Count by State of Health Care Professionals Holding the Certified Diabetes Educator Credential. http://www.ncbde.org/documents/statecount0110.pdf. Accessed December 6, 2010.
[c]The Board Certified Advanced Diabetes Management certificate has recently been redeveloped. Numbers are approximate. Source: Dawn Sherr, American Association of Diabetes Educators (AADE), November 29, 2010.

tials within this clinical aspect of the profession are valued if staffing with certified personnel is a prerequisite for reimbursement or a quality indicator.

Approximately 15% of RDs are credentialed as specialists, which is considerably higher than for other allied health and nursing professions. The number of RDs certified in other areas, such as school nutrition and foodservice, is unknown. The considerable increase in number of specialists in 2010 over previous years suggests a new demand for the credentials either by the practitioners themselves or the employers.

FUTURE DEMAND FOR SPECIALIST CREDENTIALS

Demand for specialist credentials may be influenced by several factors. In 2008, the Bureau of Labor Statistics (BLS) estimated that from 2008 to 2018, there will be a 9% growth in the employment of RDs and dietetics practitioners. The BLS acknowledged in its report that RDs with "specialized training, an advanced degree, or certifications beyond the particular State's minimum requirement should enjoy the best job opportunities" (17). The report further stated that RDs specializing in renal and diabetes or gerontology nutrition will professionally benefit from the growing number of persons who need such care (17).

According to a 2009 survey of 5,120 RDs (14), approximately 40% believe there is market value in board certification. Approximately 37% of those surveyed supported certification in health promotion; 19%, food/food protection and foodservice management and clinical health care; approximately 12%, public policy; 11%, research; and 8%, higher education. The survey showed higher interest in certification among younger RDs, which bodes well for increases in certificates and credentials and suggests that the number of specialists' credentials may grow quickly during the next decade. According to CDR data regarding age of board-certified specialists, depending on specialist credential, 29% to 39% of specialists are aged ≤35 years and 53% to 73% are aged ≤44 years, with the exception of renal specialists, where only 13% are aged ≤35 years and only 40% are aged ≤44 years.

A key factor that has affected the number of specialist RDs is the accreditation requirement for health care facilities. As mentioned previously, a recognized diabetes program must retain a certified diabetes educator on staff in order to be reimbursed for services. If this type of accreditation is applied in other types of health care facilities or if recognition for other types of programs is developed as a condition for reimbursement, changes in the number of RDs who must maintain certification as a job requirement may be profound, but unpredictable.

Economics and Specialists

A 2006 study noted that RDs expect additional salary when they obtain additional skills (18), and in most cases, RDs with additional certificates and education receive greater compensation than those without certification (19). At the 50th percentile of salary grades, RDs with licensure and certi-

fication generate more income than those without licensure and certification. However, this advantage declines as salaries rise to the 75th percentile and above. The reason for this trend is unknown.

It is possible that certification is more often used by RDs as a vehicle to enter a specialty area of practice. Experienced specialists may decide not to recertify as they gain experience and do not require the external validation of their specialty knowledge or are promoted to positions with higher salaries. It is also possible that RDs with the highest salaries are in management, education, and research positions, where certifications and licensure are not a job requirement and are often unavailable.

Employers can affect the demand for specialty credentialed RDs by developing a ladder strategy within the organization. In 2004, the US Department of Defense created nonphysician health care provider boards (that include RDs) with identified specialist credentials (ie, pediatric, renal, and metabolic) and allowed for a difference in pay (20). This pay differential requires maintenance of the specialty credential. If more employers took this approach, it is possible that the market for specialty and advanced practice would increase. However, it is difficult to estimate how many employers have similar programs in place. Legislation or accreditation programs for centers treating certain types of patients could also influence demand and ultimately increase salaries for specialty dietitians, as it has for certified diabetes educators. It is unknown if legislative or accreditation requirements are changing in this direction.

Specialty Certification in Other Health Professions

As summarized in Table 3, the number of specialists in other professions is small compared with the total number of practitioners. As noted previously, the percentage of RDs who obtain specialist certification is larger than for other health professions—approximately 15% of total RDs. The reason for this is unknown but could be the breadth of dietetics encourages specialization, or employer demand or respect for the credential.

ADVANCED PRACTICE IN DIETETICS

The profession of dietetics has identified advanced practice RDs as distinct from specialist RDs for many years. Specialist practice is seen as a step, but not the only route, to advanced practice. Clearly defining advanced practice in a way that is widely understood by all RDs continues to be a challenge. Determining a methodology that can differentiate which skills and practice approaches are unique to advanced practitioners will continue to be a complex task until advanced practice is clearly defined and generally understood by all RDs. Obtaining support for advanced practice from all segments of the profession and aligning unique advanced practice skills with value in the marketplace will also be difficult.

The Academy has investigated, expanded, and differentiated practice levels for RDs several times since first considering the concept in 1972 (21). The first examination of RD practice beyond the entry level was the 1989 task inventory analysis (22), followed by a role delineation study in 1991 (23,24). This research identified characteristics of advanced-level practitioners compared with beyond-entry–level RDs that were used as criteria for advanced practice RDs (the Fellow of the American Dietetic Association [FADA]).

In the mid-2000s, CDR conducted an advanced-level dietetics practice audit (25) that identified advocating for resources and conducting research as components of advanced practice. The authors of the audit concluded that evidence supports that practice area differentiation exists in advanced practice dietetics (25). This study did not support the pursuit of a broad advanced practice credential but suggested future studies concentrate on distinct practice sectors such as clinical health care and foodservice management. An advanced practice audit focusing on clinical nutrition—the largest dietetics practice segment—is slated for 2012.

In clinical nutrition practice, two advanced practice models have been proposed. Skipper and Lewis (26) proposed a model of advanced practice in medical nutrition therapy based on aptitude, attitude, context, expertise, and approach to describe advanced practice RDs. Brody and colleagues found that in clinical nutrition, the following characteristics emerged as defining advanced-level practice: providing patient-centered care, using a comprehensive and discriminating approach, applying advanced knowledge and expertise, communicating with patients and the health care team, and using advanced interviewing and counseling strategies (27). Both studies are consistent with findings of Bradley and colleagues (24). Similar studies in nonclinical settings found distinctions between levels of practice (28-30). It is probable that employers have incorporated some advanced practice characteristics into career ladders, but the numbers who have done so are unknown.

Advanced Practice Credentials and Supply

Two advanced credentials in dietetics, FADA—whereby Fellows met advanced practice criteria, and completed a written approach to practice as part of a portfolio to demonstrate that their respective approaches to practice were at an advanced level—and board certified advanced diabetes management (BC-ADM), have been developed. The BC-ADM credential is offered by the American Association of Diabetes Educators. The FADA credential was initiated in 1994 but has been inactive since 2002. More than 350 RDs hold the FADA credential and approximately 100 hold the BC-ADM credential. The small number of RDs who attained either of these advanced practice credentials raises the issue of if offering advanced practice credentials is economically feasible. Although original FADA projections anticipated up to 300 applicants annually, actual applications were in the range of 40 to 50 per year. A 2008 survey of RDs determined that as many as 33% of respondents to the 2008 Needs Assessment desired advanced certification, which is projected to be almost 25,000 RDs (14). Yet, it is unknown if these individuals would actually apply for advanced practice certification.

Limited data are available to estimate the supply of advanced practice RDs. Bradley and colleagues (24) estimated 3.5% to 4.3% of the RD membership represented advanced practice RDs in the early 1990s, and in 2010 Brody, using similar criteria to that of Bradley and colleagues, estimated 9.9% of RDs met the criteria for advanced practice in the clinical health care area (27). With rounding, a range of 3,000 to 8,000 RDs could be advanced practice RDs. However, a precise number of RDs practicing at an advanced level is unknown.

Educational Opportunities for Specialist and Advanced Practice RDs

In 2011, 42% of RDs had a master's of science or doctoral degree in nutrition and 8% had a master's of science or doctoral degree in another field (31). It is unknown if these degrees were earned in preparation for specialty or advanced practice roles. In fact, little is known about how RDs educate themselves for specialty and advanced practice roles.

Residencies have been proposed to enhance clinical knowledge and skills. Although limited residencies are available in dietetics, most are concentrated in subspecialty clinical areas such as nutrition support, pediatrics, diabetes, and renal nutrition under the supervision of an expert-level mentor (32). A few fellowships provide short-term opportunities for hands-on practice in neonatal nutrition, pediatric nutrition, and nutrition support, among others. Although RDs report that they desire these opportunities (33), institutions have not consistently made funding available to develop fellowships or to support RDs who are accepted into them. An exception is nutrition for children with special health care needs, where federal funding was used to establish a few programs. New advanced practice residency guidelines have been published by the Accreditation Council for Education in Nutrition and Dietetics (34).

Other routes to advanced practice may develop; continuing professional education can support advancement through selection of activities to promote career growth such as advanced degree programs; post-professional certificate programs in areas such as weight management, informatics, or health care management; and professional activities, including writing, research, leadership, and mentorship (35). More formal education via graduate coursework and graduate nutrition degrees is

Table 3. Numbers of clinicians credentialed by specialty in allied health professions with specialty certification

Profession	Specialty area	Number credentialed	Approximate percentage of the profession credentialed
Pharmacy	Pharmacotherapy	6,712	
	Oncology pharmacy	969	
	Psychiatric pharmacy	587	
	Nuclear pharmacy	516	
	Nutrition support pharmacy	440	
	Ambulatory care pharmacy	N/A[a]	
	Total	9,224	**1%**
Physical therapy	Orthopaedics	6,157	
	Geriatrics	1,109	
	Pediatrics	1,011	
	Sports	854	
	Neurology	841	
	Cardiovascular and pulmonary	148	
	Clinical electrophysiology	146	
	Women's health	82	
	Total	10,348	**5.5%**
Occupational therapy	Pediatrics[b]	65	
	Physical rehabilitation[b]	19	
	Gerontology[b]	12	
	Mental health[b]	10	
	Low vision[c]	17	
	Feeding, eating, and swallowing[c]	11	
	Environmental modification[c]	6	
	Driving and community mobility[c]	3	
	Total	**143**	< 1%
Speech pathology	Fluency disorders	166	
	Swallowing and swallowing disorders	127	
	Child language	109	
	Total	402	< 1%

[a]N/A=not available.
[b]Board certification.
[c]Specialty certification.

also available. How relevant these courses and degrees are to specialist and advanced practice RDs and the number of RDs who take advantage of these educational opportunities is not known.

An advanced practice education option—the practice doctorate degree—was suggested by Christie and Kight (36) in 1993 as a way to elevate the role of the clinical RD. Despite long-standing support from the profession—and that such degrees are becoming more popular in other allied health professions—the academic community has been slow to offer practice-based doctoral degrees in dietetics. Skipper and Lewis (19) found that RDs were more interested in these advanced education programs than employers and educators. The three greatest advantages of the professional doctorate degree, as identified by clinical RDs, included increased salary, sense of accomplishment, and respect from other health care professionals. Employers were interested in hiring RD graduates of professional doctoral degree programs but expressed concern about paying higher salaries. Such advanced practice doctorate programs would support competencies or tasks representative of advanced practitioners in the clinical nutrition practice segment (26).

Definition of Focus Area of Dietetics Practice and Criteria for Specialist and Advanced Practice Registered Dietitians (RDs)[a]

Focus Area of Dietetics Practice
Definition: Defined area of dietetics practice that requires focused knowledge, skills, and experience.
Rationale: The term *focus area* relates to how a practitioner specializes in a specific area of practice.
Specialist
Definition: A practitioner who demonstrates additional knowledge, skills, and experience in a focus area of dietetics practice by the attainment of a credential.
Rationale: The term *specialist* requires a credential.
Criteria for Specialist
1. Designated education
2. Designated experience
3. Characteristics
   - The appropriate skills, knowledge, and/or behaviors are exhibited and demonstrated.

Advanced Practice
Definition: A practitioner who demonstrates a high level of skills, knowledge, and behaviors. This individual exhibits a set of characteristics that include leadership and vision and demonstrates effectiveness in planning, evaluating, and communicating targeted outcomes.
Rationale: The term *advanced practice* is now used after a careful review of the Academy's Standards of Practice and Standards of Professional Performance in the various focus areas of dietetics practice and the literature for other professions.
Criteria for Advanced Practice
1. **Education** (minimum)
   - Master's or higher degree from a US regionally accredited institution or an equivalent degree.
2. **Experience** (minimum)
   - >8 years as an RD (based on Bradley [24]).
   - The continuation of advanced practice and/or management in a focus area of practice is well documented.
   - Commission on Dietetic Registration Professional Development Portfolio learning plan has focus on advanced practice education.
   - Ethics guide the practitioner's decision-making process.
3. **Credentials**
   - Possesses an advanced practice credential, if available. Currently the following credential is available to RDs: Board Certified in Advanced Diabetes Management.
4. **Characteristics**
   - Exhibits and demonstrates the skills, knowledge, and/or behaviors of an advanced practice RD within the past 5 years.
   - Evidence of ongoing development and willingness to explore/experience new opportunities or situations.

[a]Used with permission, Council on Future Practice of the Academy of Nutrition and Dietetics.

DEMAND

The future demand for RDs may increase for a number of reasons. According to the BLS, opportunities in the following health care-related labor areas are on the rise: aging, health disparities, special needs individuals, outpatient, and home care (17). RDs in some of these areas may need more independence in practice, thus requiring higher-level skills and autonomy, which a specialist and/or advanced practice RD credential can indicate. The demand for generalists is addressed elsewhere.

An aging population is likely to increase demand for specialists in geriatric nutrition, for example. However, narrowing this discussion to specialists and advanced practitioners limits what can be said about demand. We anticipate growing demand for specialists and advanced practice RDs based on the following:

- Projected increases in health problems associated with aging, diabetes, and obesity will augment the need for RDs with specialized knowledge and skills in these areas of practice.
- CDEs and other specialists will be needed in increasing numbers so that specialized treatment centers may maintain accreditation.
- Interest in the health benefits, allergies, and sensitivities associated with foods may expand the need for RDs who specialize in food composition; furthermore, better diagnostic tests may provide early identification of the need for lifestyle changes, including nutrition.
- A 2009 Institute of Medicine report, *Redesigning Continuing Education in the Health Professions*, suggests that, with an emphasis on improved care and better continuing education, interprofessional continuing education, broad-base professional development, and assessment of competency models will be developed to improve patient care and safety in the future (37). These types of programs may lead to more multidisciplinary credentials and more demand for certified professionals. Dietetics specialists may continue to expand their scope of practice in areas such as medication management, feeding tube placements and evaluation, waived point-of-care laboratory testing, and physical assessment to help coordinate care in disease-specific areas. This expansion in scope could lead to increased professional opportunities for these specialists.

Another market for advanced practitioners is in food and nutrition policy related to water and food safety issues, applied food and nutrition research regarding the altering food supply and impact of food on health, and food and nutrition systems with regard to the high proportion of individuals being fed via institutional settings such as schools and assisted living. In higher education, the need for faculty prepared at advanced levels, especially at the doctoral level, continues to be high.

BARRIERS AND ISSUES REGARDING SPECIALIST AND ADVANCED PRACTICE RDs

In a meta analysis (38) of 14 qualitative studies on barriers and enablers to role de-

Potential credential for RDs	Practice Segment				
	Health promotion	Policy	Clinical health care	Systems management	Research
Clinical Research Certification[a]			Certified Clinical Research Associate (CCRA) or Certified Clinical Research Associate (CCRC) or Certified Principal Investigator (CPI)		Certified Clinical Research Associate (CCRA) or Certified Clinical Research Associate (CCRC) or Certified Principal Investigator (CPI)
Research Administrators Certification Council[b]				Certified Research Administrator (CRA) or Certified Pre-award Research Administrator (CPPA)	Certified Research Administrator (CRA) or Certified Pre-award Research Administrator (CPPA)
Project Management Certification[c]	Project Management Professional (PMP) or Certified Associate in Project Management (CAPM) or Program Management Professio nal (PgMP) or PMI Scheduling Professional (PMI-SP) or PMI Risk Management Professional (PMI-RMP)		Project Management Professional (PMP) or Certified Associate in Project Management (CAPM) or Program Management Professional (PgMP) or PMI Scheduling Professional (PMI-SP) or PMI Risk Management Professional (PMI-RMP)	Project Management Professional (PMP) or Certified Associate in Project Management (CAPM) or Program Management Professional (PgMP) or PMI Scheduling Professional (PMI-SP) or PMI Risk Management Professional (PMI-RMP)	
Regulatory Affairs Certification[d]		Regulatory Affairs Certification (RAC)			
Clinical Research Associates[e]			Certified Clinical Research Professional (CCRP)		Certified Clinical Research Professional (CCRP)
Licensed Professional Counselors[f]			National Certified Counselor (NCC); Certified Clinical Mental Health Counselor (CCMHC); National Certified School Counselor (NCSC); Master Addictions Counselor (MAC); Certified Rehabilitation Counselor (CRC)		
Certified Health Education Specialist[g]	Certified Health Education Specialist (CHES) and Master Certified Health Education Specialist (MCHES)				

(continued on next page)

Figure. Potential credentials for registered dietitians (RDs) in various practice segments for combining jobs.

velopment of specialist and advanced nursing roles, barriers included role ambiguity, lack of professional autonomy, perceived ambivalence of professional regulatory bodies in relation to the role of specialists and advanced practitioners, lack of educational standards, and low pay. Many of these barriers are more pronounced in dietetics, affecting the entire profession as well as the specialists and advanced practitioners because of the fluidity of the scope of practice with different licensures, certifications, and state variability, along with the lack of research on specialist and advanced practice RDs in many areas. According to

Potential credential for RDs	Practice Segment				
	Health promotion	Policy	Clinical health care	Systems management	Research
Quality Management Certification[h]				Certified Professional in Healthcare Quality (CPHQ)	
Culinary Service Professionals[i]	Personal Certified Chef (PCC)			Certified Culinary Administrators (CCA) or Certified Culinary Educator (CCE)	
Certified Food Manager or Certified Food Executive[j]				Certified Food Manager and Certified Food Executive	
National Restaurant Association Foodservice Management Professional[k]				Foodservice Management Professional (FMP)	
Certified Culinary Professional[l]	Certified Culinary Professional (CCP)			Certified Culinary Professional (CCP)	
American Institute of Health Care Professionals[m]	Health care life coach		Health care life coach		

[a] Source: Association of Clinical Research Professionals. http://www.acrpnet.org/MainMenuCategory/Certification/CertificationGuides.aspx. Accessed November 26, 2010.
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[g] Source: National Commission for Health Education Credentialing. http://nchec.org/exam/eligible/ches/. Accessed November 26, 2010.
[h] Source: National Association for Quality Healthcare. http://www.cphq.org/. Accessed November 26, 2010.
[i] Source: American Culinary Federation. http://www.acfchefs.org/Content/NavigationMenu2/Careers/Certification/Initial/default.htm. Accessed November 26, 2010.
[j] Source: International Food Service Executives. http://www.ifsea.com/professional_inside.cfm?catid=9285. Accessed November 26, 2010.
[k] Source: National Restaurant Association. http://managefirst.restaurant.org/downloads/pdf/fmp_application.pdf. Accessed November 26, 2010.
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[m] Source: American Institute of Health Care Professionals. http://www.aihcp.org/ceu-program-life-coach.htm. Accessed November 26, 2010.

Figure. Potential credentials for registered dietitians (RDs) in various practice segments for combining jobs *(continued).*

data collected by CDR (personal communication, November 2010), RDs' primary reason for not applying for board certification as specialists is that such specialized credentials are not generally required by employers. With regard to pursuing advanced practice, in other studies, RDs have cited the time to obtain additional education and money for tuition—and, depending on the employer, the lack of tuition assistance—as barriers (18,39,40).

The Council on Future Practice's recommendation to use the word "specialist" only to describe RDs with a credential results in ambiguity as to how to describe RDs practicing in areas where the cohort is too small for creation of a credential to be practical. Delineating the focus area of RDs in narrow practice segments without a credential needs to be considered—especially among health professionals who refer patients or clients to RDs. The move from a focused area of practice to recognition as a specialist via a credential requires a reasonable pool of practitioners to justify the cost of the development and maintenance of the credential. Currently CDR subsidizes the cost of the five specialist boards as a means to advance the profession by providing RDs with the opportunity to demonstrate competence in a specialty area of practice.

Distinguishing the RD credential from other food, health, and wellness credentials and professional titles is difficult enough for the general public, especially considering that multiple health professions include nutrition services and counseling as part of the scope of work, including nurses and nurse practitioners, dental hygienists and dentists, pharmacists, physician assistants, and physicians (40). The lack of licensure and regulation in some states and wide variation in employment titles further confuses which professionals are the most knowledgeable to provide nutrition information. It may need to be the responsibility of health care providers to educate consumers about why a specialist is needed.

Two popular specialist credentials, the CDE and CNSC, are not available exclusively to RDs. It is possible but unknown whether nurses, pharmacists, and other health professionals who hold these certificates are performing roles associated with the RD profession, thus reducing the demand for RDs in some areas. These multidisciplinary certifications may also confuse administrators and others with hir-

ing authority as to whether an RD with a CDE or CNSC certification is needed on staff rather than another professional with the same certification.

Demand for these multidisciplinary credentials has increased over time because of shortages among other health care professionals, especially nurses and pharmacists. Markets for RDs with specialist credentials have also been influenced by accreditation standards and the economy. Although many companies prefer hiring credentialed staff and promote their available specialists as a marketing tool, these positions are often viewed as "value added" and the number of such positions available is directly influenced by changes in referral patterns and economics.

In the nursing and social work professions, the tasks performed at the advanced practice level are distinct and may be defined by law and, as a result, entry-level professionals are reluctant to violate their scope of practice and encroach on advanced practice roles. Within dietetics, there is a clear need for greater regulation to further delineate specialist and advanced practice roles. The long-standing acceptance of RDs as entry-level experts and the relative newness of the Standards of Practice and Standards of Professional Performance—combined with the absence of a legislated scope of practice in many states—have been barriers to clearly outlining specialist and advanced practice RDs roles.

The research on advanced practice suggests that the clearest distinction between advanced practice RDs and other RDs is approach to practice (24,26). The practice may be similar in terms of tasks performed (eg, assess and diagnose), but the approach to advanced practice appears to be distinct from entry-level practice. Research is needed to define advanced practice broadly and demonstrate the value of advanced practitioners to internal and external stakeholders. Without documented outcomes of what advanced practice RDs can offer employers, patients, and the profession, formalization and recognition of the role will be challenged.

There also is a need to define when RDs should refer patients and clients to an RD working in a focused area, a specialist, or advanced practice RDs. Distinctions between individual scope of practice clarify for RDs when they should consider an activity to be beyond their skill set. In the dietetics community, unlike in the physician community, clear distinctions in scope of practice have not been defined and institutionalized. Thus, it is essential that individual dietetics practitioners use the scope of practice framework to perform a personal assessment to determine their own scope of practice until such distinctions are established. Specialists and experts will have to delegate more tasks related to routine care to subordinate RDs and DTRs if they want significant compensation differences.

Employment Issues

Within health care institutions, the decision to identify specialist credentials as preferred rather than required is often driven by the lack of individuals with the credential to fill open positions. This limitation impedes salary distinctions across the career ladder. That RDs at any level are often perceived as assisting rather than leading the nutrition care process may affect the career ladder as well. Many state and federal regulations require that a licensed, independent practitioner write the diet order, but this requirement may reduce the perceived value of having specialists and experts in dietetics. Health care teams need to learn the value of RD specialists and advanced practice RDs in prescribing diets and assisting clients in translating the prescription into practice. Unfortunately, federal and state regulations may impede this progress. Efforts to reduce tensions between regulatory restrictions and ability to practice at the highest level of dietetics scope of practice are essential.

IMPLICATIONS FOR THE PROFESSION

Despite the barriers identified here, the profession of dietetics needs to promote recognition of specialist and advanced practice RDs for the health of the public, for the advancement of the discipline, and to attract and retain RDs. Because of health care reform and a shift in the public's focus to healthful eating, RDs at all practice levels have rich opportunities. The Figure lists potential credentials that could augment the career potential of an RD, divided by the employment sectors suggested by the Council on Future Practice (13).

The field of dietetics needs a clear distinction between competent entry-level practice and practice at the specialist and advanced practice levels. Within the profession, one step is to define competencies that are beyond the scope of the entry-level RD graduates of programs accredited by the Accreditation Council for Education in Nutrition and Dietetics; the second step is to conduct practice audits to validate the differences in practice. Formalized mechanisms are necessary to identify specialist and advanced practice RDs—not just for the purposes of referral but to serve as mentors to developing RDs.

CONCLUSIONS

It is impossible to assess market demand for advanced practitioners until *advanced practice* in dietetics is defined. There is a need to nurture a balance between market demand and a focus on advanced-level practice. The Academy continues to place a high priority on the ongoing work related to defining advanced practice.

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An Overview of the Intentions of Health Care Reform

Pepin Andrew Tuma, JD

EXECUTIVE SUMMARY

If upheld as constitutional, the Patient Protection and Affordable Care Act that passed in 2010 promises to change health care delivery systems in the United States, partly by shifting focus from disease treatment to disease prevention. Registered dietitians (RDs) have already taken an active role in health care areas that stand to be directly affected by provisions in the health care reform bill. However, nutrition's vital role in preventing diseases and conditions potentially could translate to additional opportunities for RDs as a result of this reform. Specific dietetics-related areas targeted by health care reform include medical nutrition therapy for chronic conditions and employee wellness incentive programs. However, dietetics practitioners are not necessarily established in the language of the bill as the essential providers of specific services or as reimbursable practitioners. Thus, although it is possible health care reform could affect demand—and, in turn, supply—of RDs, the actual effect of this legislation is difficult to predict. J Acad Nutr Diet. 2012;112(suppl 1):S56-S63.

THE PATIENT PROTECTION AND Affordable Care Act that passed in 2010 (1) consists of two separate but closely related pieces of legislation (henceforth referred to as Acts). On March 21, 2010, the US House of Representatives agreed to the version of health care reform that the US Senate passed on Christmas Eve 2009; President Barack Obama signed this jointly approved bill into law on March 22, 2010. Then, on March 23, 2010, the House and Senate approved a second measure (2) amending certain portions of the jointly passed bill, which President Obama signed that same day. These Acts are intended to achieve three main goals (3):

- provide coverage for 32 million uninsured Americans;
- improve affordability and stability of insurance for those who already have it; and
- slow the growth of health care costs to reduce the federal budget deficit.

Passage of the Acts put the United States on the path of a new health care paradigm that may have substantial implications for the supply and demand of dietetics practitioners. Under the new framework, health care will begin to shift away from the current fee-for-service payment model to one focused on preventive care and wellness; a patient-centered approach to treating multiple chronic diseases; and a reformed delivery system that includes more primary care providers, medical homes, and community-based health centers. As the Academy of Nutrition and Dietetics (Academy) and policymakers understand, these changes are vitally necessary to achieving the Acts' related goals of improving affordability and stability of insurance for those who already have it and slowing the growth of health care costs and reducing the federal budget deficit.

The next stage of health care reform will be defined by legal and constitutional challenges to the Acts, ongoing fiscal constraints, and through the process of the Acts' implementation through state and federal rulemaking and state legislation. Irrespective of the initial constitutional challenges, there is broad agreement among experts and policymakers that the paradigm shift toward prevention and a reformed delivery system are critical components of substantive health care reform. The implementation stage began almost immediately following passage of the Acts and will continue for more than a decade. In many ways, this phase of the legislative enactment process is the most important for ensuring that registered dietitians (RDs) and dietetic technicians, registered (DTRs) play an integral role in the provision of health care pursuant to the Acts.

RDs have already played a role in many areas related to issues brought up by health care reform, including testifying before Congress regarding nutrition-related health care issues and advocating for cost-effective and quality-effective care, consulting restaurants regarding compliance with menu labeling requirements, working to ensure a role in accountable care organizations (ACOs) and patient-centered medical homes (PCMHs), and providing the best and often the most cost-efficient medical nutrition therapy services (it is worth noting that the Acts seek to expand these services for additional chronic conditions). To fit within a reformed delivery model, however, RDs must be able to demonstrate their cost- and clinical effectiveness relative to other providers. Even as the shifting paradigm brings more focus to precisely the beneficial disease prevention and management work that RDs do, it is a big unknown at this time exactly how and the extent to which the Acts, if constitutionally upheld, will translate into new opportunities—and jobs—for RDs.

Statement of Potential Conflict of Interest and Funding/Support: See page S63.

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AN OVERVIEW OF THE INTENTIONS OF HEALTH CARE REFORM

Preventive Care and Wellness in Health Care Reform

In the United States, 45% of the population has one or more chronic conditions, including obesity and diabetes, and 75% percent of aggregate health care spending goes to treating patients with chronic disease (4). However, although the vast majority of these chronic diseases are preventable, <1% of total health care spending in 2009 went toward prevention (4). Furthermore, in the 2009 American Recovery and Reinvestment Act, better known as the economic stimulus package, the largest fraction of the stimulus funds—one sixth or $122 billion—went to the US Department of Health and Human Services, but <1% of that, approximately $1 billion was allocated for prevention and wellness (5). Nevertheless, advocates for preventive care claimed even this small percentage as a historic victory, particularly the $650 million dedicated to chronic disease prevention, and

Sidebar: Background on Rulemaking

There is a complex regulatory process (often referred to as rulemaking) that will flesh out the Acts' framework for health care reform and thereby determine the details of health care policy in the United States. Regulations may be of three types: proposed, interim final, and final. Usually an agency faces a statutory deadline (ranging from 45 days to a year following enactment) for drafting a regulation, a process taking into account the complexity of the issue, the competing interests the rule-makers must consider, the urgency to get regulations in place, and other variables. If the cost of regulatory compliance could be considered expensive, the agency may refer the proposed rule to the Office of Management and Budget, located in the Executive Office of the President, for review and a cost analysis.

At this point, the proposed rule, and any attendant cost data, is published as a Notice of Proposed Rule-Making in the Federal Register (www.federalregister.gov), the government's daily record of the executive branch's proposed and final regulations, documents, meeting notices, and other events and information.

A unique feature of the rulemaking process is the open period for public comments on an agency's proposed regulation. Like other member-based associations, the Academy provides comments on relevant proposed regulations. These comments are based on position papers, evidence analysis, and insight from appropriate Dietetic Practice Groups. Individual comments are also welcome. The Academy's comments are posted at www.eatright.org in the Public Policy section under Rules and Regulations.

The comment process often becomes animated, especially if groups perceive that their interests are threatened. Dueling analyses often follow—sometimes these analyses are prepared by private research firms or academics, contracted to the organizations with a deep interest in the proposed rule, detailing why the proposed rule is or is not in the public's or their members' interest. Although the rule-making process can excite intense association or industry advocacy (it is not uncommon for an agency to receive thousands of comment letters and other communications regarding a proposed regulation), the effort is often driven by data.

At the conclusion of the comment period, the agency reviews the data and comments collected before issuing its final rule. Although it is not obligated to include in the final regulation the comments it has received, the agency is required to explain why it has chosen to reject (or accept) the arguments presented for change in its proposed rule. A variation agencies occasionally employ is the "interim final" regulation, in which a final rule is issued and takes effect immediately, but the public is provided with a brief period for comments, generally 2 to 4 weeks. Agencies have been known to operate under interim rules for years.

Final agency rules are included as part of an agency's administrative law in the US Code of Federal Regulations. For example, among scores of other regulations, earlier regulations of the US Food and Drug Administration governing nutrition labels for packaged food products and Centers for Medicare and Medicaid Services requirements for facilities to receive Medicare and Medicaid payments for services are included in the US Code of Federal Regulations.

sustained increases in funding are anticipated (5) within a positive implementation scenario.

The Acts include numerous large and small grants and initiatives that, taken together, reflect the government's genuine shift in focus—a shift that is likely to affect the practices of many health care professionals, as well. For example, the Acts were slated to provide substantial seed money (up to $50 million in grants in fiscal 2010) to clinics "managed by advanced practice nurses, [which] provide services to underserved or vulnerable populations without regard for insurance or income, and [are] affiliated with a university of another qualified health center" (6). RDs and DTRs will have the opportunity to compete for new preventive and wellness funds and in the best-case scenario would receive significantly increased referrals for nutrition and preventive care through private insurers and government. Shifts in demand for RDs as a result of the Acts can occur on the micro level as well: In the case of RDs, the Acts allow sufficient general wellness incentives (averaging $940 to $2,350 annually for employee-only coverage) for employees who meet an employer's specified health targets (eg, targets related to weight, cholesterol, or tobacco use); employers could hire RDs to help them meet the targets and still net a substantial portion of the incentive if successful (7).

The Figure includes rulemaking details for those provisions in the Acts where RDs are specifically included or contemplated, including (if available) the agency charged with authority and any set deadlines, and the Sidebar briefly explains the rulemaking process overall. See the Text Box for a list of online and Academy resources that help to explain implementation and application of health care reform.

Preventive care and wellness efforts will be directed in large part toward attacking the growing obesity epidemic, one of the most significant health care problems in the United States and the etiology of many comorbid conditions. Although the Acts specifically support a potentially expanded role for medical nutrition therapy, expanded coverage of basic nutrition services for seniors has not been emphasized with regard to health care reform. Despite recent efforts by the Centers for Medicare and Medicaid Services to expand coverage for certain additional preventive services, it remains unclear whether RDs will be specifically named as directly reimbursable providers.

Preventive medicine is also of major concern among the pediatric population; almost one third of children in the United States aged 10 to 17 years were overweight as of 2007, and roughly half of those children qualified as obese (obesity rates rose in 36 states since a sampling performed in 2003) (8). However, despite new initiatives by private insurers and government programs from Medicaid to the State Children's Health Insurance Program that routinely emphasize childhood preventive medicine, fewer than one half of children and adolescents receive the level of recommended preventive care for illnesses and conditions, including diabetes (9).

The Acts specifically emphasize preventive care for diabetes for the following two reasons (10):

- The prevalence of the costly epidemic is growing parallel to increases in obesity; it doubled between 1986 and 2006 to be present in 24 million Americans and cost the United States $174 billion in 2007.
- According to the US Department of Health and Human Services, "if the disease is caught in the prediabetes stage, initiating lifestyle changes can reduce the risk of developing diabetes by 58%."

The government's shift in focus to preventive care raises important questions for a profession that is generally described as either "science based" or "evidence based." The Acts generally require coverage in government or group health plans without cost-sharing only for the preventive services recommended (with a rating

Provision	Senate H.R. 3590—Patient Protection & Affordable Care Act *with amendments from* House H.R. 4872—Reconciliation Act of 2010
Health Aging. Preventive Services for Adults Aged 55 to 64 Years	The Acts establish a grant program for state and local health departments and Indian tribes for public health interventions, community preventive screenings, and referral and treatment for chronic diseases for individuals aged 55 to 64 years. Intervention activities include improving nutrition and increasing physical activity.
Workforce	The Acts call for an analysis of the current health care workforce (including RDs) to determine gaps in delivery of care in underserved communities. Effective dates vary based on program.
Wellness/Prevention for Employees	The Acts allow the US Departments of Health and Human Services and Labor to set discounts up to 50% of insurance premiums if the wellness program is determined beneficial for the employee. Effective January 1, 2011.
School-Based Health Clinics	The Acts establish grants to launch school-based clinics. Optional services include nutrition counseling, but providers are not specifically listed. Authorized to be appropriated $50,000,000 for fiscal year 2010.
Prevention Task Forces, etc.	The Acts establish a Preventive Services Task Force and a Community Preventive Services Task Force. Effective upon passage into law. The Acts establish a Prevention and Public Health Investment Fund; funding is set at $2.4 billion for 2010 and increases up to $4.6 billion by 2019.
Medicare Preventive Services	The Acts adjust current law to allow the Centers for Medicare and Medicaid Services (CMS) to determine whether and how to expand existing and establish new preventive services. Medical nutrition therapy beyond renal and diabetes care is specifically included in the list of services that CMS may potentially expand. The Acts eliminate cost-sharing (copayments and deductibles) for preventive services, making preventive care free for Medicare recipients. Effective January 1, 2011. The Acts provide for an annual wellness visit that includes personalized prevention plan services with a health care assessment. Along with physicians and nurses, RDs are listed as screening and counseling providers, and CMS must establish appropriate reimbursement policies and rules for referral. Specifically, CMS must determine when a referral is warranted and how many counseling sessions a patient can receive. CMS has 18 months from the March 23, 2010, enactment date to finalize regulations.
Medicaid	The Acts establish a 5-year grant program to encourage Medicaid beneficiaries to adopt healthier lifestyles, specifically related to weight reduction, cholesterol reduction, prevention of the onset of diabetes, and diabetes self-management. CMS will set the parameters for awarding grants. The Acts include coverage for those preventive services recommended by the US Preventive Services Task Force (USPSTF). Because USPSTF currently recommends "intensive nutrition behavioral counseling" for adults with hyperlipidemia and "other diet-related chronic diseases," CMS must determine (1) what constitutes "diet-related chronic diseases" for purposes of coverage and (2) who may provide the intensive counseling. USPSTF recommends referral to an RD after physician treatment. Effective January 1, 2011. Cost-sharing (copayments and deductibles) for these preventive services are also eliminated. Effective January 1, 2011.
Home Health	The statute provides for a demonstration program for direct, home-based patient care. CMS will set the parameters, and although RDs are listed as possible providers, it is merely a recommendation and not a requirement. Because the pilot program may later be broadly adopted with potentially significant impact for the profession, the Academy of Nutrition and Dietetics can assist practitioners working in the home health sector who want to show the benefits of having an RD provide nutrition services. Interested parties should follow carefully the rules for the program and application procedures when they are proposed in the coming months for more details and to determine their eligibility for the program. Effective January 1, 2012.
Medical Homes	*Medicaid:* The Acts allow for medical home waivers for state-coordinated programs focusing on (1) diabetes treatment and prevention and (2) treating cardiovascular disease and those considered overweight. Nutritionists are listed among providers, thus allowing for the inclusion of RDs, although the legislation does not identify them specifically. Instead, given their different licensing requirements and scope of practice, the legislation defers to individual states to decide whether RDs or others should be permitted to provide these services. Effective January 1, 2011. *Community Setting:* The Acts establish the medical home in public health programs and recommend the dietitian be included as a qualified provider and part of the medical home team, but CMS is given the authority to make the final determination.
Nutrition Labeling of Menu items at Chain Restaurants	The Acts require chain restaurants with at least 20 outlets to post calories on menus, menu boards (including drive-thru windows), and food display tags, with additional information (fat, saturated fat, carbohydrates, sodium, protein, and fiber) available in writing upon consumer request. The Acts require national uniformity so that there is consistency in information provided, and states and localities will not be able to impose their own requirements on these establishments. Calorie labeling must also be affixed to vending machines. The US Food and Drug Administration is to issue a proposal 1 year after enactment.
Child Obesity Demonstration project	The Acts fully fund $25 million (until 2014) for a demonstration project aimed at reducing childhood obesity in community-based settings and schools through educational, counseling, and training activities. Effective immediately.

Figure. Dietetics-relevant provisions of US health care reform and implementation dates. [a]Patient Protection & Affordable Care Act (1) with amendments from The Health Care Education and Reconciliation Act of 2010 (2). [b]RDs=registered dietitians. [c]Centers for Medicare and Medicaid Services.

Text Box: Online and Academy Resources for Understanding Health Care Reform

Implementation Resources

A number of particularly useful independent resources (eg, think tanks, universities, foundations, journalistic enterprises, and governmental and quasi-governmental entities) have created and constantly maintain impressive repositories of information, critical analyses, and other detail about implementation often offered in an extremely approachable format:

Health Reform GPS

http://www.healthreformgps.org/

Health Reform GPS was established by the Robert Wood Johnson Foundation and the George Washington University School of Public Health and Health Services to provide information about health reform implementation.

Navigating the Implementation Process: Reform Overview

Health Reform GPS

http://healthreformgps.org/wp-content/plugins/as-pdf/generate.php?post=211

This document from Health Reform GPS presents a short overview of the health care reform law, with a separate section on immediate reforms.

Health Reform Implementation Time Line

The Kaiser Family Foundation

http://healthreform.kff.org/timeline.aspx

This in-depth timeline separates the provisions of the Patient Protection and Affordable Care Act into subsections and tracks the implementation of health reform between 2010 and 2018. Subsections include insurance reform, Medicare, Medicaid, prescription drugs, prevention and wellness, tax changes, workforce, and quality improvement.

Near-Term Changes in Health Insurance

Health Affairs and Robert Wood Johnson Foundation

http://www.rwjf.org/files/research/62628.pdf

This health policy brief focuses on reforms to the private insurance market for 2010 and 2011, providing an implementation timeline. (Last updated May 4, 2010.)

Health Insurance Reform and Your State: The Case for Change

US Department of Health and Human Services

http://healthreform.gov/healthcarestatus.html

This interactive Web site features a map of the United States that allows users to read about the health reform changes that have been implemented to date or are pending in each state.

State Decision-Making in Implementing National Health Reform

National Governor's Association

http://www.nga.org/Files/pdf/1003HEALTHSUMMITDECISIONMAKING.PDF

This comprehensive discussion draft written before health care reform was enacted outlines the major challenges states will face as a result of its passage. The draft is intended to help states better formulate solutions for the difficult decisions they may face.

State Actions to Implement Federal Health Reform

National Conference of State Legislatures

http://www.ncsl.org/?tabid=20231

This document consists of a state-by-state table outlining health reform implementation efforts via legislation and via governors' executive orders. Among state efforts are the creation of task forces, the appointment of officials for health reform implementations, and proposals of legislation to alter or oppose federal actions.

New Rules For States in Health Reform Implementation

Alan Weil and Raymond Scheppach

http://content.healthaffairs.org/content/29/6/1178.full

This 5-page article published in June 2010 stresses the importance for states to have a thorough knowledge of reform and detailed vision for implementation to ensure not only that residents obtain affordable coverage and the best access to health care coverage, but also that the state takes full advantage of multiple opportunities to obtain federal funding. (Subscription required.)

Implementing State Health Reform: Lessons for Policymakers

G.Volk and A. Jacobs

http://www.rwjf.org/healthpolicy/product.jsp?id=59668

This article, published April 7, 2010, identifies the key questions that must be considered by policymakers during the process of implementing health care reform and provides a set of related considerations—particularly what must happen operationally before and after implementation.

General Online Resources with Updated/Changing Content

Academy of Nutrition and Dietetics: http://www.eatright.org/healthcarereform/

The Alliance for Health Reform: http://www.allhealth.org/

The Robert Wood Johnson Foundation: http://www.rwjf.org/healthpolicy/

The Kaiser Family Foundation: http://healthreform.kff.org/

The Commonwealth Fund: http://www.commonwealthfund.org/

Academy Publications and *Journal of the Academy of Nutrition and Dietetics* articles

Position of the American Dietetic Association: The roles of registered dietitians and dietetic technicians, registered in health promotion and disease prevention. Available at: http://www.eatright.org/About/Content.aspx?id=8385.

Academy of Nutrition and Dietetics Resources for Health Practitioners: RDs in the Medical Home Model of Care (provides detailed information for RDs about positioning oneself as an integral part of the medical home team. Available at http://www.eatright.org/HealthProfessionals/content.aspx?id=7057.

Peregrin T. Next on the menu: Labeling law could mean new career opportunities for RDs. *J Am Diet Assoc.* 2010;110(8):1144-1147.

Stein K. A national approach to restaurant menu labeling: The Patient Protection and Affordable Health Care Act, section 4205. *J Am Diet Assoc.* 2010;110(9):1280.

Stein K. Nutrition beyond the numbers: Counseling clients on nutrient value interpretation. *J Am Diet Assoc.* 2010;110(12):1800.

Stein K. It all adds up: Nutrition analysis software can open the door to professional opportunities. *J Am Diet Assoc.* 2011;111(2):214.

of "A" or "B"*) by the US Preventive Services Task Force (USPSTF) (after it has completed its review process and assessed the available evidence). The USPSTF's published methods seemingly favor randomized clinical trials, a method that many health care providers argue is too restrictive for evaluating evidence and may "inadvertently exclude many important findings and fail to support further relevant research" (11). As clinical practice—particularly among pediatrics—shifts from its focus on curing disease and infections to promoting health and reducing risks, Sege and De Vos (11) assert the following:

> *The tools used to gather evidence and measure the effects of health care interventions have not kept pace. Thus, the evidence supporting new, effective public-health-based approaches to child health promotion has not been given sufficient weight in the formulation of guidelines for care and reimbursement. Unless the existing evidence framework is modernized and broadened, health care reform efforts that promote evidence-based care may inadvertently limit the use of effective interventions and may undermine advances in child health.*

Recognizing this unique situation, the Acts cover "evidence-informed preventive care and screenings" for "infants, children, and adolescents" as provided in the comprehensive guidelines supported by the Health Resources and Services Administration. As a result, it is critical to develop and collect data and outcomes that present empirical evidence that will drive demand for RD-provided nutrition care services.

**The US Preventive Services Task Force has five classifications for recommendations of health care services (A, B, C, D, or I) based on strength of evidence and magnitude of net benefit. A rating of A indicates a strong recommendation and that there is good evidence that the service improves health outcomes and benefits substantially outweigh the potential risks; a rating of B indicates a recommendation for the service and that there is fair evidence that the service improves health outcomes and benefits outweigh risks. (Source: Grade definitions: Strength of recommendations. US Preventive Services Task Force Web site. http://www.uspreventiveservicestaskforce.org/3rduspstf/ratings.htm. Accessed July 1, 2011.)*

Health Disparities and Access to Care

Recognizing existing health disparities and the fact that prevention is not a cure-all (given that millions are unaware they have diabetes and millions more fail to get necessary care to stay healthy once diagnosed), the Acts expand access to coverage, improve quality of health care delivery, and make efforts to address disparities by investing in data collection and research about disparities and by focusing on cultural competency for health care providers (10). RDs are highly qualified health care professionals who could help meet the growth in demand for obesity-related preventive services that could be produced by the Acts incentivizing paradigm.

Health disparities arise in the context of delivery systems. Minority and rural populations often experience the following:

- limited access to and the inability to afford health care;
- limited access to qualified health care professionals, particularly primary care providers; and
- higher-than-average rates of chronic disease.

Although rural and minority populations experience many similar disparity rates (and, to be sure, rural areas often include substantial minority populations), the short supply of health care professionals is particularly acute in rural counties: 77% of rural counties have a primary care health professional shortage, and 10% of rural counties have zero primary care physicians (12). Of the 65 million Americans in communities with primary care provider shortages, 50 million live in rural areas (13).

The short supply of RDs in rural America is similarly problematic. Compounding the health professional shortage is the fact that rural residents are among the least healthy overall, with "rates of chronic disease such as diabetes, heart disease, high blood pressure and obesity that are greater than urban or suburban populations" (12). The Acts provide opportunity to better align the existing and anticipated demand of underserved populations with supply.

The Acts mandate free preventive services (eliminating out of pocket costs for covered preventive care for everyone) to help curb chronic disease and provide for technologies, including telehealth, that allow health professionals like physician specialists and RDs to remotely perform tasks that generalists or allied health professionals may be technically or legally unqualified to perform (12). Because both community health centers and the National Health Services Corps serve as a vital health care safety net for rural and minority communities (providing preventive and primary health care services to 17 million people at more than 7,500 sites nationwide), the Acts set aside $11 billion over 5 years for health center expansion initiatives (12). The future of community health center expansion is uncertain in the current political and fiscal environment, however, with the Obama Administration using some of the set-aside funds to keep centers operational at existing levels (14). These facilities and populations will continue to demand the services of RDs and DTRs whether provided remotely or while physically present, but funding shortages may preclude that demand from being met.

To assist those who lack access to providers or the ability to afford coverage, the Acts include two Medicaid-related mechanisms: the expansion of Medicaid to cover approximately 16 million additional people with incomes below 133% of the federal poverty level, and an increase in 2013 and 2014 in the historically low reimbursement rates for Medicaid that is intended to result in a significantly increased supply of providers willing to accept Medicaid (12). The expansion of Medicaid could result in significant opportunities for Academy members if state and federal regulators see the demonstrated value and benefit of having an RD provide the following particular services covered by Medicaid under the Acts:

- Medicaid will cover preventive services recommended by USPSTF, including "intensive nutrition behavioral counseling" for adults with "other diet-related chronic diseases," an as-yet undefined phrase that could potentially include millions of beneficiaries who traditionally and disproportionately experience chronic diseases related to overnutrition and undernutrition;
- all preventive services will be free to Medicaid beneficiaries to avoid the possibility that copayments or other cost-sharing might dissuade them from obtaining preventive care; and
- home- and community-based waiver services help people remain in their homes and communities, rather than be institutionalized. These waivers allow an alternative to placing Medicaid-eligible individuals in hospitals, nursing facilities, or intermediate care facilities for the developmentally disabled, and provide services that are not covered, or are limited, under the traditional Medicaid program.

Delivery System Reform

According to Health Reform GPS, "A core purpose of the health reform law is to advance reforms in health care delivery through innovations in payment, technology, and other tools that have been shown to improve quality and reduce unnecessary or harmful spending. The primary policy engine for accomplishing health

system change is the expanded authority given to the Secretary of Health and Human Services to undertake major pilot programs in health care delivery and organization that can be 'scaled up' as evidence of their impact emerges" (15).

Furthermore, the Commonwealth Fund notes (16):

> *Health reform will increase investments in primary care while testing innovative payment methods designed to reward high quality and value. The creation of a Center for Medicare and Medicaid Innovation will provide a platform for developing new approaches to paying for health care to encourage greater quality and efficiency. Currently, providers are paid more for providing more services, more complicated procedures, and more expensive care. The long-run viability of the health care system depends on paying for and providing care in a way that yields value for the resources spent.*
>
> *For example, instead of paying providers according to the current fee-for-service model, Medicare and other payers may pay according to how well providers manage the care and health of their patients with chronic illnesses, like diabetes. Or they may start "bundling" payments for hospital procedures—instead of separate payments to hospitals and doctors involved in a patient's care, a single reimbursement would cover an entire hospital stay for a medical procedure.*
>
> *Under these payment approaches, providers demonstrating superior patient outcomes and prudent use of resources would be rewarded. Those who provide unnecessary, duplicative, or avoidable services may not fare as well, and might strive to improve their care.*

Thus, health care delivery is expected to change dramatically as a result of health care reform—but it is an open question at this stage as to how this change will influence demand for RDs or DTRs. RDs looking to enhance professional opportunities and increase demand for nutrition services will likely benefit from focusing on demonstrating beneficial, cost-effective affects on patient outcomes under new payment approaches.

The PCMH and ACO models may provide new opportunities for dietetics practitioners to work with other health care professionals in a frontline patient-management role. Pharmacists, physicians, nurses, and others in multidisciplinary teams are shown to be effective in fighting patients' chronic conditions, when each performs specialized tasks in collaboration with the others. Specialization and integrated care teams are the keys to the success of the PCMH model (17):

> *[H]ealth centers often rely on physicians to perform care management functions that could be effectively performed by another member of the care team, such as a nurse or medical assistant. Recent studies have demonstrated the importance of providing care management services that are well integrated with the patient's regular source of care. Using team members within the practice to provide clinical care management, care coordination, and patient self-management services frees up providers' time, enables staff to work at the highest level their licensure or certification allows, and improves health outcomes for patients.*

Although the Acts make RDs eligible for payment as part of a medical home team, they do not require that RDs are included on health care teams. Thus, the onus is on RDs to use effective outcomes data to convince PCMH teams that they can bring a high level of effective services to patients more efficiently than the team can provide without them. Similarly, the Acts identify RDs as possible, but not required, providers of home health services for a demonstration program. Opportunities to optimally increase demand for RD-provided services will require funding, implementation strategy, and recognition of the value of and need for nutrition services in these new models.

The PCMH and ACO models have applicability for those in the social safety net, and experts are examining how "[p]ublic hospitals and clinics, federally qualified health centers, rural health centers, and free clinics for the medically underserved—collectively referred to as safety net health centers or practices—regularly deliver on some aspects of the medical home model" (17). These safety net health centers will be crucial in delivering access to health care in underserved populations. Many of these centers are health care clinics collocated in schools to enhance care coordination and "integrate behavioral health and specialty care into care delivery." The Acts include grants to encourage their development and identify nutrition counseling by nonspecified providers as an optional service (17).

Marketplace and Industry for Dietetics Practitioners

Although much of health care reform relevant to RDs and DTRs involves clinical practice, the paradigm shift directly affects RDs and DTRs working in virtually all other areas. Health care reform clearly creates a demand for professionals qualified to provide nutrition services, but regulations will determine qualifications and eligibility. Even before passage of the Acts, the Bureau of Labor Statistics (BLS) anticipated a 9.2% growth rate in the number of "dietitians and nutritionists" between 2008 (60,000 employed) and 2018 (66,000 anticipated to be employed) (18). However, given growth and net replacements, the BLS anticipates a total of 26,000 job openings for "dietitians and nutritionists" in 2018 (18). Workforce capacity remains a concern, however, and the Commission on Dietetic Registration has been actively studying the issue.

Within the marketplace for dietetics practitioners, clinical practice remains the largest practice area as well as one of the least well compensated. Nonclinical RDs and clinical RDs both have competitors in the marketplace for nutrition-related services; however, clinical RDs in heavily regulated facilities generally are protected from a serious competitive threat. The marketplace in which nonclinical RDs operate is substantially less regulated, and these RDs face competition in supplying nutrition services from traditional health care providers, nontraditional and holistic health care providers, and other professionals, including personal trainers. In growth areas such as prevention and wellness, client consulting, and private practice, an array of competitors is already supplying would-be clients with personalized health education and nutrition counseling where it is profitable and legal for them to do so.

The Academy is acutely aware of the competition RDs and DTRs face and the likelihood that health care reform may increase competitive supply in some practice areas. The Academy is actively engaged in developing new strategies for succeeding in this competitive environment and in ensuring that only genuinely qualified and licensed RDs practice dietetics in states that require licensure.

Competition and Rulemaking

The extent to which competition is present and the type of professional with whom RDs will compete depends on a number of factors, including the following:

- any applicable regulations or state laws limiting the eligibility of non-RDs to provide the nutrition services;
- the entity or individual paying for the services; and
- supply, specifically whether the number and capacity of available RDs in the area are sufficient to meet the entirety of the demand.

As government funding for preventive care and wellness increases and private insurers continue expanding coverage to include additional reimbursements for visits to dietetics practitioners, it is reasonable to expect growth in the number

of health care professionals willing to provide nutrition counseling.

RDs will likely face hearty competition in growth practice areas from other professionals; it is possible that the credentials required of these professionals may be less rigorous academically and experientially than those of RDs. Each state will make draft regulations during the health care reform implementation phase to set eligibility standards for each of the services detailed previously that will effectively define RDs' and DTRs' competition for years to come.

HEALTH CARE REFORM AND ADVOCACY FOR RDs

Nutrition is expected to be included as a component of preventive services and as a therapeutic agent in the management of chronic disease, and there are likely to be additional opportunities for the profession as a result of health care reform. There are a number of important factors that could complicate members' ability to seize these potential opportunities:

- The Acts' inclusion of nutrition does not specifically include RDs or DTRs, and it remains unclear whether the provision of these services will be required from RDs or from other health professionals.
- The Acts merely authorize the creation of the new programs and policies and, thus, only may increase demand for services provided by RDs and DTRs. The Acts do not appropriate (ie, actually fund) the monies necessary to carry out most of the new programs, and do not guarantee that any enhanced professional roles or new opportunities are reserved specifically for RDs or DTRs.
- Competitors are engaged in aggressive advocacy efforts that—in the absence of a countervailing RD presence—may result in RDs being undervalued and omitted from state programs and delivery of services.
- The Supreme Court may overturn the Acts in whole or in part, and it is unclear the extent to which legislative efforts to delay and defund initiatives and implementation will be successful.

Health care reform has the potential to increase demand for RDs, but this outcome is not a given. So, although health care reform's focus on nutrition and preventive care will likely benefit the profession to some extent, RDs can be assured of far greater benefits by advocating for state and federal regulations that specifically identify RDs and DTRs as capable providers of particular services and positioning themselves as essential components of the coordinated health care team.

CONCLUSIONS

Health care reform will affect nearly all Americans, especially those covered by Medicare and Medicaid, and it is sure to have a profound influence on health care providers. This reform will be especially true for RDs in instances where federal and state statutes and regulations may pit RDs in competition for reimbursements and eligibility standards with other providers. RDs know that their body of knowledge, training, and skills are unique in the delivery of health care. Furthermore, they know the importance of sharing this expertise with agency officials whose regulations will shape the care given the patients they treat.

A number of experts are questioning states' capacities for implementing health care reform and expanding their Medicaid programs, and RDs are almost certain to see notable variance among states in the manner and extent of implementation (16).

The regulatory process is of paramount importance to RDs. It is where the details of statutes are set, including such important considerations as which providers may participate in health care delivery and the circumstances of that participation. Examples of the future regulations under health care reform that could broadly affect dietetics practitioners include:

- determining funding and grants for nutrition programs;
- setting parameters for various health care demonstration and pilot programs often by Centers for Medicare and Medicaid Services (including the Patient-Centered Medical Home Project, which was scheduled for implementation in 2010);
- identifying which practitioners will provide services in health care programs, which is especially important because federal regulations often list RDs as providers, whereas federal statutes usually present only recommendations as to who the providers should be; and
- setting Medicare standards for a referral process and reimbursement rates.

Yet the full influence of health care reform on RDs and DTRs cannot be projected, particularly in terms of supply and demand. Although the BLS predicted a 9.2% rate of growth in the profession between 2008 and 2018, these figures were calculated before health care reform legislation was passed and, thus, do not reflect the extent to which this legislation will affect future growth, supply, and demand. Although the total effect remains to be seen, advocacy on behalf of the profession may be members' greatest tool at this time toward ensuring that they, too, benefit from the changes that come with health care reform.

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Dietetics Trends as Reflected in Various Primary Research Projects, 1995-2011

Dick Rogers

EXECUTIVE SUMMARY

At the behest of the Commission on Dietetic Registration (CDR) Workforce Demand Task Force, a retrospective examination and reanalysis of 12 primary research projects (sponsored by CDR and/or the Academy of Nutrition and Dietetics between 1995 and 2011) was undertaken to identify trends in supply of and demand for registered dietitians (RDs) and dietetic technicians, registered (DTRs). The analysis suggests that supply of RDs (and possibly DTRs) lags slightly behind demand—although, in the case of DTRs, that does not necessarily imply that demand is growing (supply was shrinking throughout most of the study period). The population of both groups is aging, and the number of RDs and DTRs reporting expected retirement in the near future is sure to affect supply/demand relationships. Neither group reflects the US population as a whole in terms of either sex or racial/ethnic diversity, and the trend lines in these areas are essentially flat. RD practice is seen to be moving incrementally toward the clinical arena, in inpatient and (increasingly) outpatient settings. The proportion of RDs in clinical long-term-care, as well as in food/nutrition management and consultation/business practice, is decreasing; a longer-term trend away from foodservice is noted. There is small growth in both the prevalence and the compensation of clinical specialists in areas like renal, pediatrics, and weight management at the expense of more general clinical practitioners. In a trend likely related to the increase in clinical practice, RD positions are gradually losing managerial responsibility. DTRs have experienced a similar phenomenon. For almost all RD positions in the clinical arena, registration as an RD is a requirement for employment, suggesting that clinical employment should continue to grow along with the increasing health care demand from an aging population. The DTR credential is not required at similarly high rates. A major supply issue is the relative shortage of DTRs in certain parts of the country, particularly the South. Major effects from the June 2009 inauguration of the Pathway III route to registration as a DTR have been noted.
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TO BETTER UNDERSTAND AND proactively shape the dynamic profession of dietetics, in 2009 the Commission on Dietetic Registration (CDR), the credentialing arm of the Academy of Nutrition and Dietetics (Academy), created a Workforce Demand Task Force, charged with developing and executing a comprehensive and systematic study of workforce supply and demand.

As part of that charge, the Task Force commissioned a number of technical articles designed to provide background information and support development of the actual demand models. The purpose of this technical article is to assemble and analyze existing and ongoing Academy/CDR research statistics to identify and interpret trends related to supply and demand for dietetics practitioners and the credentials.

This article first reviews findings related to registered dietitians (RDs), then presents a similar review for dietetic technicians, registered (DTRs).

Statement of Potential Conflict of Interest and Funding/Support: See page S74.

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SCOPE

Some of the primary research undertaken by CDR and the Academy in recent years has focused on limited segments of the dietetics profession. For this article, only primary research studies representing all credentialed professionals (whether Academy members or not) were of principal interest.

Four research streams were reviewed and, in most cases, reanalyzed:

- Dietetics Practice Audits conducted by CDR in 1995 (1), 2000 (2), 2005 (3), and 2010 (4) (the latter two representing only credentialed professionals in their first 5 years following registration);
- Needs Assessments conducted by the Academy and CDR in 2004 (5) and 2008 (6);
- An RD Employment Survey conducted by CDR in 2008 (Rogers D, Teleconference Presentation to the Commission on Dietetic Registration, August 12, 2008); and
- Compensation and Benefits Surveys of the Dietetics Profession conducted by the Academy and CDR in 2002 (7), 2005 (8), 2007 (9), 2009 (10), and 2011 (11).

See the Text Box for details regarding each study used in this examination.

LIMITATIONS

All of the studies examined were conducted to achieve unique objectives; none was conducted to support demand estimation or modeling. Furthermore, none was primarily intended to track trends in RD or DTR employment. Although some key questions are repeated from survey to survey, changes in phrasing and context from one to the next complicate trend identification.

These studies represent the supply side of the supply and demand equation; all data were provided by dietetics professionals, not their employers. Furthermore, the studies typically did not represent dietetics students or nonregistered professionals (ie, competitors) in great detail, if at all. Although understanding the dynamics of these two groups will ultimately be critical to the Task Force charge, this article does not comment on them.

Most of the data examined were collected before the recession of 2008-2009. What look like longer-term trend lines in the preceding decade may bend in entirely new directions in the aftermath of this economic reality. Only one study examined (the 2011 Compensation Survey [11]) measured the post-recession period, and it is impossible to know whether anomalous results represent an unsettled environment, random variability, or a new normal.

Finally, the usual caveats should be considered as to the representativeness of sample survey data and the margins of error associated with survey estimates.

The findings presented here are interpretations of noisy, often inconclusive trend directions, rather than rigorously

Text Box. Studies Reviewed for the Analysis of Dietetics Trends

Readex Research was involved in data collection and tabulation (and often other services) for all the studies referenced in this technical paper. Details regarding each study are presented as follows.

1995 Audit: Commission on Dietetic Registration (CDR) 1995 Dietetics Practice Audit (1)

Objective: Practice analysis to update and validate exam content for the registered dietitian (RD) and dietetic technician, registered (DTR) credentials.
Sample: Domestic RDs and DTRs stratified by years registered.
Response: 3,761 RDs (68% response rate) and 783 DTRs (60%); 4,544 total.
Data collection: Mail survey.
Reanalysis: Data weighted to population proportions, analyzed by 1-5 and 6+ cohorts.

2000 Audit: CDR 2000 Dietetics Practice Audit (2)

Objective: Practice analysis to update and validate exam content for the RD and DTR credentials.
Sample: Domestic RDs and DTRs stratified by years registered.
Response: 2,533 RDs (65% response rate) and 748 DTRs (58%); 3,281 total.
Data collection: Mail survey.
Reanalysis: Data weighted to population proportions, analyzed by 1-5 and 6+ cohorts.

2005 Audit: CDR 2005 Entry-Level Dietetics Practice Audit (3)

Objective: Practice analysis to update and validate exam content for the RD and DTR credentials.
Sample: Domestic RDs and DTRs in first 5 years of registration, stratified by years registered.
Response: 2,541 RDs (64% response rate) and 522 DTRs (56%); 3,063 total.
Data collection: Mail survey.
Reanalysis: Data reanalyzed for newer registrants (years 1-5)—audit analysis based on entry level defined as years 1-3.

2010 Audit: CDR 2010 Entry-Level Dietetics Practice Audit (4)

Objective: Practice analysis to update and validate exam content for the RD and DTR credentials.
Sample: Domestic RDs and DTRs in first 5 years of registration, stratified by years registered.
Response: 3,172 RDs (74% response rate) and 586 DTRs (69%); 3,758 total.
Data collection: Mixed-mode (mail and Internet) survey.
Reanalysis: Data reanalyzed for newer registrants (years 1-5)—audit analysis based on entry level defined as years 1-3.

2004 Needs: ADA/ADAF/CDR 2004 Needs Assessment (5)

Objective: Needs assessment undertaken by American Dietetic Association (ADA), the ADA Foundation (ADAF), and CDR to better understand the practice and career issues facing dietetics professionals; to learn where each organization is successful in supporting them; and to identify ways in which practitioners, students, and the profession as a whole might be better served.
Sample: Stratified to represent domestic RDs and DTRs (regardless of ADA membership status); non-credentialed practitioners (ADA non-credentialed members, unregistered but registration-eligible practitioners), and dietetics students (ADA members).
Response: 7,886 individuals (66% response rate).
Data collection: Mail survey.
Reanalysis: Data re-analyzed to focus solely on RDs and DTRs years 1-5 and 6+.

2008 Needs: ADA/CDR 2008 Needs Assessment (6)

Objective: Needs assessment undertaken by ADA and CDR to better understand the practice and career issues facing dietetics professionals; to learn where each organization is successful in supporting them; and to identify ways in which practitioners, students, and the profession as a whole might be better served.
Sample: Stratified to represent domestic RDs and DTRs (regardless of ADA membership status); non-credentialed practitioners (ADA non-credentialed members, unregistered but registration-eligible practitioners), and dietetics students (ADA members).
Response: 6,955 individuals (58% response rate).
Data collection: Mixed-mode (mail and Internet) survey.
Reanalysis: Data reanalyzed to focus solely on RDs and DTRs years 1-5 and 6+.

2008 RD: CDR 2008 RD Employment Survey

Objective: To learn the extent to which non-RDs influence decisions to hire, promote, and reward RDs, as well as to develop additional employment data across the population of all RDs (entry-level and beyond).
Sample: Domestic RDs stratified by years since registration and practice area.
Response: 2,874 RDs (60% response rate).
Data collection: Mail survey.
Reanalysis: Data reanalyzed for RDs years 1-5 and 6+.
Reference: Rogers D. Teleconference Presentation to the Commission on Dietetic Registration, August 12, 2008.

2002 Comp: ADA 2002 Compensation and Benefits Survey (7)

Objective: To develop reliable and comprehensive data on compensation and benefits levels for dietetics professionals.
Sample: Stratified to represent ADA domestic Active members (RDs, DTRs, non-credentialed persons; no retirees) plus nonmember RDs and DTRs.
Response: 13,694 individuals (46% response rate).
Data collection: Mail survey.
Reanalysis: Data re-analyzed to focus solely on RDs and DTRs years 1-5 and 6+.

(continued)

Text Box. Studies Reviewed for the Analysis of Dietetics Trends *(continued)*

2005 Comp: ADA/CDR Compensation and Benefits Survey of the Dietetics Profession 2005 (8)

Objective: To develop reliable and comprehensive data on compensation and benefits levels for dietetics professionals.
Sample: Stratified to represent ADA domestic Active members (RDs, DTRs, non-credentialed persons; no retirees) plus nonmember RDs and DTRs.
Response: 12,016 individuals (40% response rate).
Data collection: Mail survey.
Reanalysis: Data reanalyzed to focus solely on RDs and DTRs years 1-5 and 6+.

2007 Comp: ADA/CDR Compensation and Benefits Survey of the Dietetics Profession 2007 (9)

Objective: To develop reliable and comprehensive data on compensation and benefits levels for dietetics professionals.
Sample: Stratified to represent ADA domestic Active members (RDs, DTRs, non-credentialed persons; no retirees) plus nonmember RDs and DTRs.
Response: 11,861 individuals (40% response rate).
Data collection: Mail survey.
Reanalysis: Data reanalyzed to focus solely on RDs and DTRs years 1-5 and 6+.

2009 Comp: ADA Compensation and Benefits Survey of the Dietetics Profession 2009 (10)

Objective: To develop reliable and comprehensive data on compensation and benefits levels for dietetics professionals.
Sample: Stratified to represent ADA domestic Active members (RDs, DTRs, non-credentialed persons; no retirees) plus nonmember RDs and DTRs.
Response: 9,556 individuals (32% response rate).
Data collection: Mixed-mode (mail and Internet) survey.
Reanalysis: Data reanalyzed to focus solely on RDs and DTRs years 1-5 and 6+.

2011 Comp: ADA Compensation and Benefits Survey of the Dietetics Profession 2011 (11)

Objective: To develop reliable and comprehensive data on compensation and benefits levels for dietetics professionals.
Sample: Stratified to represent ADA domestic Active members (RDs, DTRs, non-credentialed persons; no retirees) plus nonmember RDs and DTRs.
Response: 8,853 individuals (30% response rate).
Data collection: Mixed-mode (mail and Internet) survey.
Reanalysis: Data reanalyzed to focus solely on RDs and DTRs years 1-5 and 6+.

Table 1. Employment status of registered dietitians, 1995-2008

Source	n	Working in dietetics (%)	Working outside dietetics (%)	Unemployed (%)
1995 Audit (1)	3,761	75	6	18
2000 Audit (2)	2,533	69	9	21
2004 Needs Assessment (5)	5,085	77	6	16
2008 Needs Assessment (6)	5,120	78	8	14
2008 RD Employment Survey[a]	2,874	77	9	14

[a]Rogers D. Teleconference Presentation to the Commission on Dietetic Registration. August 12, 2008.

Table 2. Percentage of practicing registered dietitians working full time and mean number of hours worked per year, 2002-2011

Compensation and Benefits Surveys	n	Full-time (%)	Mean (h/y)
2002 (7)	8,621	68	1,744
2005 (8)	8,017	70	1,776
2007 (9)	7,768	71	1,786
2009 (10)	6,587	73	1,824
2011 (11)	6,291	77	1,847

tested (or testable) hypotheses. They are offered to provide perspective for the Task Force's deliberations and do not purport to be definitive.

FINDINGS FOR RDs

Growing Demand for RDs May Be Outpacing Supply

From 1995 to 2010 (the latest date for an official count), the CDR Registry grew from 59,269 RDs to 81,645—an annualized rate of +2.2% per year. For the period 2002-2009, which included four measurements in the Compensation Survey series, that annualized rate was +1.8% per year.

Not all RDs are necessarily working in dietetics at any given time. A number of

Table 3. Percentage of registered dietitians registered up to 5 years, percentage aged ≥50 y, and mean age, 1995-2011

Source	n	Registered 1-5 y (%)	Age ≥50 y (%)	Mean age (y)
1995 Audit (1)	3,761	19	—	—
2000 Audit (2)	2,533	19	—	—
2002 Compensation and Benefits Survey[a] (7)	11,607	18	25	42.4
2004 Needs Assessment (5)	5,085	15	—	—
2005 Compensation and Benefits Survey (8)	10,209	16	31	43.3
2007 Compensation and Benefits Survey (9)	10,212	15	36	44.3
2008 Needs Assessment (6)	5,120	14	40	44.8
2009 Compensation and Benefits Survey (10)	8,337	14	41	45.3
2011 Compensation and Benefits Survey (11)	7,646	20	42	45.2

[a]For 2002 Compensation and Benefits Survey, n=9,220 practicing registered dietitians for percent aged ≥50 y and mean age.

Table 4. Expected retirement year of practicing registered dietitians registered ≥6 y, 2008

Expected retirement year	2008 Needs Assessment (6) (n=3,715) (%)
Before 2015	14
2015-2019[a]	17
2020-2024[b]	15

[a]25% expect to retire by 2017.
[b]50% expect to retire by 2023

studies estimated this fraction using the key construct of "practitioner"; that is, one who is currently employed or self-employed in a dietetics-related position, as is noted in the 2002 Compensation and Benefits Survey (7):

> *A dietetics-related position is considered to be any position that requires or makes use of your education, training, and/or experience in dietetics or nutrition, including situations outside of "traditional" dietetics practice.*

The most reliable estimates of practitioner prevalence are found in the two early Practice Audits (1995 [1] and 2000 [2]), the two most recent Needs Assessments (5,6), and the 2008 RD Employment Survey (Rogers D, Teleconference Presentation to the Commission on Dietetic Registration. August 12, 2008). With the exception of the 2000 Audit, they are consistent in the range of 75% to 78% (see Table 1).

Registry growth translates into dietetics employment/self-employment growth, given the more or less constant rate of 77% practicing. (Note that in four surveys from 2004 through 2011, somewhere between 5% and 7% of those registered indicated they have permanently left the profession, accounting for approximately one third of nonpractitioners).

Evidence suggestive that marketplace demand might be somewhat higher than reflected in Registry growth includes recent growth in the percentage of practitioners employed full time and in the estimated number of hours worked per year (see Table 2).

Finally, the median hourly wage earned by all practicing RDs rose from $22.00 in 2002 (7) to $27.24 in 2009 (10)—a 23.8% gain, during a time when the Consumer Price Index rose by 18.6%. Faster-than-inflation wage growth supports a hypothesis that supply is not quite keeping up with demand. However, the 2011 Compensation Survey (11)—the first conducted after the 2008-2009 recession—shows this trend line reversing, where the 2-year gain in median RD wages was only 2.3% (to $27.88), compared to a Consumer Price Index increase of 5.5%.

The RD Population Has Been Aging/Retirements May Soon Affect Supply

As the Registry has grown in numbers, the proportion of professionals in their first 5 years of registration slid steadily from 1995 to 2009. Conversely, measures of age crept upward. Both of these results suggest a dynamic where older professionals continue in the profession (ie, do not retire), whereas new additions swell the totals (see Table 3).

The increase in mean age might be explained by the secular phenomenon of young adults delaying entry to the workforce, but the mean age for those in their first 5 years of registration—30 to 31 years—stayed remarkably steady from 2002 to 2011 (7-11).

The 2008 Needs Assessment (6) asked respondents to estimate the year in which they expect to retire from paid dietetics employment/self-employment. The results for RDs registered ≥6 years (an estimated 86% of all RDs at the time) are sobering (see Table 4).

If these self-reported estimates prove correct, half of all veteran RDs (registered ≥6 years) will retire from the profession by 2023, which could have a profound effect on the supply/demand balance. (There are no data available showing effects, if any, of the 2008-2009 recession on retirement plans.)

Stagnating Diversity in the Profession May Put RDs Out of Synch with Populations Served

The population of the United States continues to grow in racial and ethnic diversity, but RDs remain overwhelmingly white and female. Measurement issues (eg, changing response categories and differing populations) preclude strict comparisons, but the Compensation Surveys (7-11) show essentially no change from 2002 to 2011 in the percentage of RDs who are men (~3%), Asian (~5%), black (~2%), and Hispanic (~3%).

This is true not only for RDs as a whole, but also for the most recent registrants (first 5 years), a group where increasing diversity might especially be expected.

RD Practice Inching toward Inpatient and Outpatient Clinical Nutrition Care

RD practitioner employment by sector has stayed remarkably steady from 2002 to 2011 (as measured by the Compensation and Benefits Surveys [7-11]): approximately 10% self-employed, 30% in for-profit organizations, 40% in not-for-profit organizations, and 20% in government. Employment trends are harder to discern in terms of setting and practice area, primarily because of inconsistency in categories measured, and the reality that many

Table 5. Practice areas of primary positions reported by practicing registered dietitians, 2002-2011

Compensation and Benefits Survey	n	Practice Area: Clinical nutrition, acute care/ inpatient	Clinical nutrition, ambulatory care	Clinical nutrition, long-term care	Community	Food and nutrition management	Consultation and business	Education and research
		%						
2002 (7)	8,621	28.1	13.7	11.8	11.4	13.9	10.7	6.3
2005 (8)	8,017	29.3	14.0	10.9	11.6	13.2	9.9	6.6
2007 (9)	7,768	30.3	15.3	10.5	11.3	12.9	9.9	5.5
2009 (10)	6,587	30.1	17.5	9.2	11.4	12.6	7.4	6.4
2011 (11)	6,291	29.8	17.0	9.4	11.7	12.8	7.3	6.7
Difference 2002-2011 (%)		+1.8	+3.4	−2.4	+0.3	−1.1	−3.4	+0.4

Table 6. Percentages of practicing registered dietitians reporting managerial, supervisory, and budgetary responsibilities, 2002-2011

Compensation and Benefits Survey	n	Responsibility Level: Executive, director, manager, supervisor, coordinator	Directly or indirectly supervise others	Manage a budget
		%		
2002 (7)	9,220	44	48	27
2005 (8)	8,475	41	46	26
2007 (9)	8,364	42	43	24
2009 (10)	7,129	40	43	25
2011 (11)	6,704	40	43	25

Table 7. Percentage of positions requiring the registered dietitian (RD) credential by practice area of primary position, for RDs employed in dietetics, 2008

Practice area	2008 RD Employment Survey[a] n	Positions requiring RD credential (%)
Clinical nutrition, acute care/inpatient	404	98
Clinical nutrition, ambulatory care	246	97
Clinical nutrition, long-term care	195	91
Community	359	66
Food and nutrition management	273	72
Consultation and business	172	52
Education and research	246	64

[a]Rogers D. Teleconference Presentation to the Commission on Dietetic Registration. August 12, 2008.

practitioners may actually participate in multiple categories.

Perhaps the best measure regarding practice area is found in practitioners' self-identification of the positions they hold. The five Compensation and Benefits Surveys (7-11) (as well as several of the others) asked respondents to review a list of 59 standard positions (with brief definitions) and select the one position that most closely matches their own (regardless of actual title). In most surveys, upwards of 95% of responding practitioners selected one of the standard titles (the remainder answered "other," or did not respond to that question). These positions are grouped into seven practice areas as shown in Table 5.

The short-term (2002-2011) declines seen for clinical nutrition–long-term care and food and nutrition management are both reflective of a longer-term trend not easily exemplified in available statistics: the declining involvement of RDs in foodservice. Long-term care is one of the few practice settings that still combines clinical with foodservice responsibilities; its proportion dropped 2.4 points in 9 years. Positions in food and nutrition management fell 1.1 points during that same period. In another measure, among only the newest registrants, involvement with "foodservices" was 22% in 1995 (1) (where multiple answers were allowed); in response to a related (but not identical) question in 2010, positions in "foodservice" were down to 16% (4).

On the other hand, the areas of clinical nutrition–acute care/inpatient and ambulatory care (outpatient) grew by 1.8 and 3.4 points, respectively, between 2002 and 2011. These two practice areas also posted gains in median wage between 2002 and 2011 that were higher than in any other area except for management: specifically, the results were +30.1% for

Table 8. Percentage of positions held by practicing registered dietitians (RDs) that require the RD credential, 2000-2011

Source	n	Positions requiring advanced degree (%)
2000 Audit (2)		
Among all practicing RDs	1,651	83
Among practicing RDs registered 1-5 y	384	83
2005 Comp[a] (8)		
Among all practicing RDs	8,475	81
Among practicing RDs registered 1-5 y	1,473	85
2005 Audit (3)		
Among all practicing RDs	—	—
Among practicing RDs registered 1-5 y	2,312	84
2007 Comp (9)		
Among all practicing RDs	8,364	83
Among practicing RDs registered 1-5 y	1,360	86
2009 Comp (10)		
Among all practicing RDs	7,129	83
Among practicing RDs registered 1-5 y	1,095	87
2010 Audit (4)		
Among all practicing RDs	—	—
Among practicing RDs registered 1-5 y	2,883	83
2011 Comp (11)		
Among all practicing RDs	6,704	84
Among practicing RDs registered 1-5 y	1,396	85

[a]Comp=Compensation and Benefits Survey.

acute care/inpatient, and +28.1% for ambulatory care. (The decline noted in the consultation and business practice area results from declines in essentially three positions: private practice dietitian, consultant, and sales representative, which may be related to the 2008-2009 recession, with almost the entire loss recorded in the 2009 statistics.)

RD Positions Becoming Marginally Less Managerial

In a trend likely related to the growth in clinical practice, there is a slight decline in the proportion of practicing RDs reporting managerial, supervisory, and budgetary responsibilities in the 2002-2009 period (although 2011 results leveled off) (see Table 6).

Among the newest RDs (those registered up to 5 years), supervisory responsibility dropped from 41% in 2002 (7) to 32% in 2011 (11).

Regulation Underpins Clinical Employment Growth

The 2008 RD Employment Survey (Rogers D, Teleconference Presentation to the Commission on Dietetic Registration. August 12, 2008) represented all RDs who are employed in dietetics (omitting those who are self-employed). For 82% of the positions that employed RDs reported, registration as an RD is a job requirement. (For 29%, both the RD credential and a state dietetics license or certification are required; for 53%, only the RD credential is required.) Using the same practice area categories presented in Table 5, that survey found that virtually all employment in the clinical arena requires registration (see Table 7).

In other surveys, the proportion of positions reported as requiring the RD credential has stayed fairly steady over time,

Table 9. Prevalence of selected primary positions held by practicing registered dietitians (RDs), 2002-2011

		Primary Position					
Compensation and Benefits Surveys	n	Clinical dietitian	Clinical dietitian, long-term care	Clinical dietitian, specialist–renal	Pediatric/ neonatal dietitian	Outpatient dietitian, specialist–renal	Outpatient dietitian, specialist–weight management
		← % →					
2002 (7)	8,621	16.5	11.8	2.5	1.9	2.8	0.6
2005 (8)	8,017	16.8	10.8	2.7	2.2	2.8	0.8
2007 (9)	7,768	16.7	10.4	3.1	2.3	3.0	1.1
2009 (10)	6,587	15.5	9.0	3.2	2.5	3.7	1.6
2011 (11)	6,291	14.8	9.3	3.4	2.6	3.7	1.4
Difference 2002-2011 (%)		−1.6	−2.5	+0.9	+0.7	+0.9	+0.9

Table 10. Median hourly wage reported by practicing registered dietitians (RDs) holding Commission on Dietetic Registration specialty certifications, 2011

	2011 Compensation and Benefits Survey (11)	
Certified specialist area	n	Median wage ($/h)
Sports dietetics	42	31.25
Gerontological nutrition	48	31.13
Renal nutrition	77	29.81
Pediatric nutrition	83	29.72
Oncology nutrition	55	28.72
All RDs	6,291	27.88

both for RD practitioners as a whole, and for those newest to the profession (see Table 8).

Registration requirement rates have stayed more or less constant as RD employment has grown, indicating that those types of positions have grown apace with RD supply. Given the concentration of those positions in the clinical arena, one might see growing health care usage by an aging American population as a driver of both past and future demand for such positions.

Clinical Specialization Is Gradually Growing

From 2002 to 2011, four positions on the standard list exhibited modest growth in prevalence; all four are specializations in clinical acute care or ambulatory care settings. The proportions of RDs holding the unspecialized positions of "clinical dietitian" and "clinical dietitian, long-term care" declined (see Table 9).

Specialists in diabetes care (both inpatient and outpatient), oncology, and weight management experienced among the highest percentage gains in median hourly wage between 2002 and 2011, another possible indication of this trend in demand for specialization. Also suggestive of higher demand for clinical specialization are the results from the 2011 Compensation and Benefits Survey (11) that show a positive median wage differential for RDs who hold CDR "certified specialist in . . ." credentials (see Table 10).

Table 11. Percentage of registered dietitians (RDs) holding advanced degrees (master's or higher), 1995-2011

Source	n	Advanced degree (%)
1995 Audit[a] (1)		
Among all RDs	2,837	42
Among RDs registered 1-5 y	636	34
2000 Audit[a] (2)		
Among all RDs	1,651	45
Among RDs registered 1-5 y	384	32
2002 Comp[ab] (7)		
Among all RDs	9,220	48
Among RDs registered 1-5 y	1,880	34
2005 Comp (8)		
Among all RDs	10,209	49
Among RDs registered 1-5 y	1,593	33
2005 Audit (3)		
Among all RDs	—	—
Among RDs registered 1-5 y	2,541	33
2007 Comp (9)		
Among all RDs	10,212	49
Among RDs registered 1-5 y	1,494	33
2009 Comp (10)		
Among all RDs	8,337	51
Among RDs registered 1-5 y	1,188	40
2010 Audit (4)		
Among all RDs	—	—
Among RDs registered 1-5 y	3,172	40
2011 Comp (11)		
Among all RDs	7,646	50
Among RDs registered 1-5 y	1,504	40

[a]Based on practicing RDs.
[b]Comp=Compensation and Benefits Survey.

Rising Education Levels May Outpace Clinical Opportunities

RDs seem to strongly value educational attainment, and a longer-term trend shows that the proportion of those holding advanced degrees has risen for RDs as a whole and, more recently, for those newest to the profession (see Table 11).

But examination of median hourly wages in the 2011 Compensation and Benefits Survey (11) shows relatively little differentiation in pay between those with a bachelor's degree and those with a master's degree for the most prevalent clinical positions (see Table 12).

In these studies, there is little evidence of strong marketplace demand for advanced educational attainment, at least in the clinical area (where more than half of all RDs work).

FINDINGS FOR DTRS

The examination of DTRs is of necessity somewhat less extensive than that of RDs—in part because there has been somewhat less research focus on DTRs, and in larger part because their small numbers relative to RDs preclude in-depth analysis in most samples. The CDR Registry listed 4,239 DTRs in 2010, compared with 81,645 RDs.

Pathway III May Change Everything

When this article was initially drafted, it was limited to studies conducted through

Table 12. Median hourly wages reported by practicing registered dietitians with a bachelor's or master's degree as their highest educational attainment, for selected positions, 2011 (11)

	With a Bachelor's Degree		With a Master's Degree		
Position title	Median wage ($/h)	n	Median wage ($/h)	n	Difference ($/h)
Clinical dietitian	24.04	608	25.48	336	1.44
Clinical dietitian, specialist–renal	26.92	128	28.45	84	1.53
Pediatric/neonatal dietitian	25.00	82	25.96	81	0.96
Nutrition support dietitian	26.44	85	29.21	81	2.77
Outpatient dietitian, general	26.94	136	28.51	133	1.57
Outpatient dietitian, specialist–diabetes	27.40	157	28.85	107	1.45
Outpatient dietitian, specialist–renal	27.02	146	27.00	83	−0.02
Clinical dietitian, long-term care	26.92	381	27.88	215	0.96

Table 13. Percentage of dietetic technicians, registered (DTRs) working in dietetics, percentage of practicing DTRs working full time, and mean number of hours worked per year, 2002-2011

Source	n	Working in dietetics	Full time	Mean h/y
		← % →		
Compensation and Benefits Survey 2002 (7)				
All DTRs	1,892	79	—	—
Practicing DTRs[a]	1,397	—	75	1,853
Compensation and Benefits Survey 2005 (8)				
All DTRs	1,548	80	—	—
Practicing DTRs[a]	1,115	—	80	1,892
Compensation and Benefits Survey 2007 (9)				
All DTRs	1,424	82	—	—
Practicing DTRs[a]	1,057	—	81	1,907
Compensation and Benefits Survey 2009 (10)				
All DTRs	1,054	83	—	—
Practicing DTRs[a]	780	—	84%	1,920
Compensation and Benefits Survey 2011 (11)				
All DTRs	843	80	—	—
Practicing DTRs[a]	759	—	82	1,906

[a]Practicing=working in dietetics.

2010, and a number of findings regarding RDs were more or less echoed in the review of DTRs. However, as shown in the 2011 Compensation and Benefits Survey (11), the June 2009 implementation of the Pathway III route to registration as a DTR appears to have disrupted many of those trend lines. Official 2011 Registry counts are not available at this writing, but the population sampled for the Compensation and Benefits Survey rose from 3,916 DTRs in 2009 (10) to 4,122 in 2011 (11), representing a 5.3% gain that reverses a decade-long decline.

Finding: Supply/Demand Balance Is Now in Question

From 2002 to 2009, the Compensation and Benefits Surveys (7-11) suggested a potential shortage of DTRs, supported by evidence similar to that discussed previously regarding RDs:

- the proportion of DTRs in practice was higher than for RDs and appeared to be rising;
- the proportion of DTRs working full time climbed; and
- the mean hours worked per year grew with each succeeding study.

With 2011 data reflecting the addition of new Pathway III registrants, all those trends reversed, leaving the DTR supply/

Table 14. Geographic distributions of the US population, registered dietitians (RDs), and dietetic technicians, registered (DTRs) by census region, 2011

		2011 Compensation and Benefits Survey (11)	
Census region	United States	RDs (n=7,646)	DTRs (n=1,053)
	← % →		
Northeast	18	19	26
Midwest	22	28	39
South	37	32	17
West	23	21	18

Table 15. Percentage of dietetic technicians, registered (DTRs) registered up to 5 y, percentage aged ≥50 y, and mean age, 2000-2011

Source	n	Registered 1-5 y (%)	Age ≥50 y (%)	Mean age (y)
2000 Audit[a] (2)	748	21	—	—
2002 Compensation and Benefits Survey (7)	1,892[b]	23	27[b]	43.8[b]
2004 Needs Assessment (5)	1,314	16	—	—
2005 Compensation and Benefits Survey (8)	1,548	17	33	45.3
2007 Compensation and Benefits Survey (9)	1,424	17	38	46.3
2008 Needs Assessment (6)	700	14	44	47.4
2009 Compensation and Benefits Survey (10)	1,054	13	46	47.9
2011 Compensation and Benefits Survey (11)	1,053	26	45	46.7

[a]For 2000 Audit, percentage registered up to 4 y.
[b]For 2002 Compensation and Benefits Survey, n=1,498 practicing DTRs for % age ≥50 y and mean age.

Table 16. Expected retirement year of practicing dietetic technicians, registered, 2008

Expected retirement year	2008 Needs Assessment (6) (n=669) (%)
Before 2015	13
2015-2019[a]	15
2020-2024[b]	15

[a]25% expect to retire by 2017.
[b]50% expect to retire by 2023.

demand balance uncertain going forward (see Table 13).

A sobering 41% of DTRs not currently working in dietetics indicated in their responses to the 2011 Compensation and Benefits Survey (11) that they were not working in the field because they could not find dietetics-related employment.

Among DTRs newest to the profession (registered up to 5 years, and thus including the entire cohort of Pathway III registrants), the percentage working in dietetics plummeted from 80% as shown in the 2009 Compensation and Benefits Survey (10) to 72% in 2011 (11). The percentage who work full time dropped from 79% in 2009 to 74% in 2011, and the average hours worked per year dropped from 1,921 to 1,813 (down 6%). Among those not working in dietetics, 57% indicated that it was because they could not find dietetics-related employment. These statistics suggest that the increased supply of DTRs created resulting from the Pathway III option is not (or not yet) fully demanded by the marketplace.

Geographic Imbalance Creates Scarcity in Some Areas

Unlike RDs, whose geographic distribution in the United States more or less mirrors the distribution of the population as a whole, DTR availability (according to the most current Compensation and Benefits Survey) differs materially from one Census Region to the next (see Table 14).

The low level of DTR availability vis a vis population and RDs in the South (and to a lesser extent the West) would seem to undermine the possibilities for creating many of the RD/DTR partnerships that were envisioned when the DTR credential was developed.

The new Pathway III—which grants the DTR credential to individuals with a bachelor's degree without a supervised practice requirement—is seen to be having a major influence on DTRs' educational attainment: in 1995, 16% reported having a bachelor's degree or higher (1), which climbed to 28% by 2009 (10), and jumped again to 36% in 2011 (11). Among the newest registrants (first 5 years), the proportion with at least a bachelor's degree jumped from 24% in 2000 (2) to 55% in 2011 (11).

Older Age of DTRs May Result in More Impending Retirements

From 2000 to 2009, the aging of the DTR population was somewhat more advanced than the aging of RDs, with the proportion of new registrants in the Registry declining, whereas the percentage of DTRs aged 50 years or older and mean age both rose. As was noted among RDs, the results of the 2011 Compensation and Benefits Survey alter those trends (although, on average, DTRs are still somewhat older than RDs) (see Table 15).

Table 17. Employment sector of practicing dietetic technicians, registered, 2002-2011

Compensation and Benefits Survey	n	Self-employed	For-profit	Not-for-profit	Government
		← % →			
2002 (7)	1,498	2	32	48	16
2005 (8)	1,236	2	30	49	17
2007 (9)	1,170	2	29	48	17
2009 (10)	875	2	26	50	19
2011 (11)	843	2	29	46	20
Difference 2002-2009 (%)		—	−6	+2	+3
Difference 2009-2011 (%)		—	+3	−4	+1

Table 18. Percentages of practicing dietetic technicians, registered, reporting managerial, supervisory, and budgetary responsibilities, 2002-2011

		Responsibility Level		
Compensation and Benefits Surveys	n	Executive, director, manager, supervisor, coordinator	Directly or indirectly supervise others	Manage a budget
		← % →		
2002 (7)	1,498	45	51	24
2005 (8)	1,236	43	48	24
2007 (9)	1,170	42	47	21
2009 (10)	875	42	47	23
2011 (11)	843	39	44	23

Table 19. Percentage of positions held by practicing dietetic technicians, registered (DTRs) that require the DTR credential, 2000-2011

Source	n	Among all practicing DTRs (%)
2000 Practice Audit (2)	511	56
Compensation and Benefits Surveys		
2005 (8)	1,236	54
2007 (9)	1,170	56
2009 (10)	875	56
2011 (11)	843	52

Overall DTR response to the retirement question in the 2008 Needs Assessment (6) looked a lot like the response of veteran RDs: Whereas half of veteran RDs expected to retire by 2023, half of *all* DTRs expected to do so (see Table 16).

As noted previously, effects of the 2008-2009 recession on retirement plans are not known.

Stagnating Diversity May Hinder DTRs

DTRs appear to be minimally more diverse than RDs with regard to sex and race/ethnicity (although the statistics are somewhat less reliable), but, as with RDs, there was little change in those measures in the 2002-2011 period, and there is little difference between newer registrants and veteran DTRs in 2011.

DTR Practice May Be Moving Modestly Toward Government Employment

Whereas RD employment by sector was seen to be steady from 2002 to 2009, DTRs showed a notable decrease in the proportion employed by for-profit organizations; conversely, there were increases in positions in the not-for-profit and government sectors. As with other findings for DTRs, the 2011 data are anomalous to the trend lines (see Table 17).

Government employment is the only definitive trend in DTR employment from 2002 to 2011, up four points in that time period. In a related statistic, DTRs report material growth in the prevalence of employment as nutritionists in the Special Supplemental Nutrition Program for Women, Infants and Children, up 1.6 points (to 8.6%) over the 9-year period. Finally, the proportion of DTRs working in the "community" practice area rose from 9% to 14% from 2002 to 2011, whereas the proportion in "food and nutrition management" positions dropped from 26% to 22% (7-11).

DTR Positions Becoming Somewhat Less Managerial

As with RDs, there has been a slow diminution in DTRs' managerial, supervisory, and budgetary responsibilities (see Table 18).

Among the newest DTRs, supervisory responsibility dropped from 52% in 2002 to 38% in 2011 (11).

Registration Benefits DTRs Less than RDs

Most recently, 84% of the positions held by RDs have required the RD credential as

a condition of employment. For DTRs, that figure hovered at around 56% for 9 years, but it fell 4 points according to the 2011 data (11) (see Table 19).

Even in the two biggest clinical practice areas for DTRs—inpatient and long-term care—only approximately two thirds of the positions require the DTR credential (it is near 100% for RDs in those areas). This lower percentage among DTR positions suggests there may be less of a firm correlation between future health care growth and DTR employment in clinical areas.

CONCLUSIONS

None of the trends highlighted in this discussion is of earth-shaking magnitude, yet they may be helpful to the Task Force in its efforts to predict the profession's future. However, past performance is no guarantee of future results; trends may flatten or reverse as the world changes. For this and other reasons, these interpretations should be considered as just one voice in that important conversation.

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Dietetics Supply and Demand: 2010-2020

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EXECUTIVE SUMMARY

The Academy of Nutrition and Dietetics, in conjunction with the Commission on Dietetic Registration (CDR), invited The Lewin Group to undertake an analysis of the dietetics workforce. The purpose of the workforce study was to develop a model that can project the supply and demand for both registered dietitians (RDs) and dietetic technicians, registered (DTRs) (collectively referred to as CDR-credentialed dietetics practitioners) as the result of various key drivers of change. The research team was asked to quantify key market factors where possible and to project likely paths for the evolution of workforce supply and demand, as well as to assess the implications of the findings. This article drew on the survey research conducted by Readex Research and futurist organizations such as Signature i and Trend Spot Consulting. Furthermore, members of the Dietetics Workforce Demand Task Force were a source of institutional and clinical information relevant to the credentialed dietetics workforce—including their opinions and judgment of the current state of the health care market for dietetic services, its future state, and factors affecting it, which were useful and were integrated with the objective sources of data. The model is flexible and accommodates the variation in how RDs and DTRs function in diverse practice areas. For purposes of this study and model, the dietetics workforce is composed of RDs and DTRs. This report presents the results of this workforce study and the methodology used to calculate the projected dietetics workforce supply and demand. The projections are based on historical trends and estimated future changes. Key findings of the study included the following:

- The average age of all CDR-credentialed dietetics practitioners in baseline supply (2010) is 44 years; approximately 96% are women.
- Approximately 55% of CDR-credentialed dietetics practitioners work in clinical dietetics.
- The annual growth rate of supply of CDR-credentialed dietetics practitioners declined from 3% in the early 1990s to 1.5% by 2010.
- The net supply of CDR-credentialed dietetics practitioners is projected to grow by 1.1% annually.
- Approximately 75% of the demand for the dietetics workforce will be met by the 2020 supply of CDR-credentialed dietetics practitioners.
- The aging population, health care reform, increased prevalence of certain conditions (including obesity), and growth in the food industry are key factors affecting the demand.

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THE ACADEMY OF NUTRITION and Dietetics (Academy), in conjunction with the Dietetics Workforce Demand Task Force and the Commission on Dietetic Registration (CDR), invited The Lewin Group to undertake an analysis of the dietetics workforce.

The purpose of the workforce study was to develop a model that can project the supply and demand of both registered dietitians (RDs) and dietetic technicians, registered (DTRs) (collectively referred to as CDR-credentialed dietetics practitioners) as the result of various key drivers of change. The research team was asked to quantify key market factors where possible and to project likely paths for the evolution of workforce supply and demand, as well as to assess the implications of the findings.

The realm of the dietetics workforce, composed of RDs and DTRs, is hereafter collectively referred to as CDR-credentialed dietetics practitioners.

The dietetics workforce is defined as those professionals who are formally trained and registered as CDR-credentialed dietetics practitioners. By this definition, there were 81,645 RDs and 4,239 DTRs in 2010 (1). The authors estimate there were 277 RDs/DTRs per million in the population. A majority (96%) is women and 51% are aged 45 years or older. The implication is that a significant proportion of the workforce will be retiring during the next 15 years.

This projection model estimates changes in both RD and DTR supply and demand. The essence of the interactive model is to illustrate mathematically and graphically the economic components of CDR-credentialed dietetics practitioners in American society. The model is flexible and accommodates diverse practice settings; job futures; and components of demand, both current and anticipated. Drivers of change were incorporated where assumptions were reasonable. Technical articles introduced by CDR's Workforce Demand Task Force aided the research team in its work and modeling efforts. A scenario-planning workshop and monthly conferences with the task force provided guidance in understanding some of the trends and assumptions needed for the model.

The baseline projection of supply for the CDR-credentialed dietetics workforce and demand for dietetics services. The shortfall between the projected demand for dietetics services and supply of the dietetics workforce increases steadily across the decade. Demand, driven by both demographic and economic factors, is projected to grow substantially across the 2010-2020 period and is not specific to the credentialed workforce. This study projects an annual increase in demand for all dietetics services of >3% for the same period. If current supply factors and limitations persist, there will be a shortfall between demand for services and the capacity of the dietetics workforce. By 2020, a projected shortfall of approximately 18,000 full-time workers (or more) may exist.

Supply will grow more slowly—increasing approximately 1% annually—using estimates of current growth of new graduates and assumptions of losses to the workforce as a result of retirement. Higher earnings in the profession will influence retirement rates and weekly hours in the long run. Transitions from one practice sector to another are expected in response to different demand influences and economic incentives.

The baseline supply and demand projection is the sum of projections in the following six practice areas (see Table 1):

- clinical nutrition–inpatient and outpatient;
- clinical nutrition–long-term care;
- community nutrition;
- food and nutrition management;
- consultation and business; and
- education and research.

Statement of Potential Conflict of Interest and Funding/Support: See page S90.

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These practice areas are useful for understanding the job diversity of the CDR-credentialed dietetics workforce and analyzing the separate factors that drive demand for dietetics services. The supply of dietetics practitioners to fulfill positions in specific practice areas is based on historical growth and practice specific proportions of the CDR-credentialed dietetics workforce. The projection of demand for dietetic services is based on factors and change drivers specific to the job roles within each practice area. Of these, the largest growth in demand is expected in the clinical nutrition practice areas. The demand for the inpatient and outpatient practice area is likely to increase more than 42% by 2020. In addition to the highest growth, many clinical work settings require that dietetics practitioners be credentialed as an RD, which limits competition from noncredentialed professionals. Despite a decreasing number of occupied beds, the long-term–care practice area is expected to grow by approximately 36% because of the aging of the population. Food and nutrition management has emerged as the fastest-growing nonclinical practice area. This area is projected to expand by approximately 35% by 2020. Education and research, however, is expected to be the slowest-growing practice area for the dietetics workforce.

The projected increases in demand result from population growth, increases in the elderly population, and increases in per-capita income. Under the Patient Protection and Affordable Care Act, beginning in 2014, an additional 30 million people may eventually be insured. The assumption is that increased demand for health services will influence the demand for dietetic services significantly. The task force agreed that although excess demand for CDR-credentialed dietetics practitioners may result in higher incomes during the next decade, proactive steps should be taken to ensure an adequate supply for the demand forces. Some improvement will occur in the efficient delivery of services, improved outcomes of care using comparative effectiveness research methodologies, and understanding the behavior of the members of the dietetics profession.

The dietetics workforce may find other practitioners providing dietetics and nutrition services with increasing frequency. Leaders in the dietetics profession should consider expanding programs and internships to produce competitive practitioners. Additional and more refined data on the activity of this workforce will improve the sensitivity of the model.

Table 1. Practice areas of dietetics ranked by expected demand growth

Practice area rank	Expected demand growth (%)	Full-time employment shortfall estimate (n)
Clinical nutrition–inpatient and outpatient	42	10,000+
Clinical nutrition–long-term care	36	1,900
Food and nutrition management	35	1,200
Community nutrition	34	2,900
Consultation and business	28	900
Education and research	24	400

DEFINING DIETETICS, RDs, and DTRs

The definition of dietetics—as approved by the Academy in 2010—is the integration, application and communication of principles derived from food, nutrition, social, business, and basic sciences, to achieve and maintain optimal nutritional status of individuals through the development, provision, and management of effective food and nutrition services in a variety of settings.

CDR defines an RD as an individual who has completed the minimum of a baccalaureate degree granted by a US regionally accredited college or university, or foreign equivalent; has met current minimum academic requirements with successful completion of a Didactic Program in Dietetics (DPD) accredited by the Commission on Accreditation for Dietetics Education (CADE) of the Academy; has successfully completed a supervised practice program accredited by CADE; and has successfully completed the registration examination for dietitians. To maintain RD status, the RD must comply with the Professional Development Portfolio recertification requirements (that is, accrue 75 units of approved continuing professional education every 5 years).

CDR defines the DTR as an individual who has met the requirements through one of the following three routes to become a DTR:

- completed a minimum of an associate's degree granted by a US regionally accredited college or university, or foreign equivalent and successfully completed a Dietetic Technician Program accredited by CADE);
- completed the minimum of a baccalaureate degree granted by a US regionally accredited college or university, or foreign equivalent; met current academic requirements (DPD) as accredited by CADE; and successfully completed a supervised practice program under the auspices of a Dietetic Technician Program as accredited by CADE; or
- completed a minimum of a baccalaureate degree granted by a US regionally accredited college/university, or foreign equivalent and successfully completed a Didactic Program in Dietetics as accredited by CADE.

In all three routes, the individual must successfully complete the registration examination for dietetic technicians. To maintain DTR status, a DTR must comply with Professional Development Portfolio recertification requirements (accrue 50 hours of approved continuing professional education every 5 years).

LITERATURE REVIEW

The Lewin Group, with guidance from the task force, undertook a comprehensive literature search to support this workforce study. The purpose of the literature review was to provide background on the existing and possible future workforce environment, as well as setting the stage for the dietetics workforce analysis. The literature review builds on the research conducted between 1965 and 1995, results of which were supplied by the Academy. This literature review is an enhancement to that prior work. This review was aimed at providing answers to the following research questions:

- What does the existing stock of the dietetics workforce look like?
- What are the prominent supply issues of the dietetics workforce?
- What are the prominent demand issues of the dietetics workforce?
- How are the roles of RDs and DTRs changing?

The search identified 42 documents and reports in PubMed, the Cumulative Index to Nursing and Allied Health Literature, and Google Scholar. These documents helped identify the issues affecting the dietetics workforce and guided the development of the demand model by defining the demand factors.

The literature review provided input to the mathematical model. An Excel-based model (version 11.5, 2004, Microsoft Corp, Redmond, WA) was created to

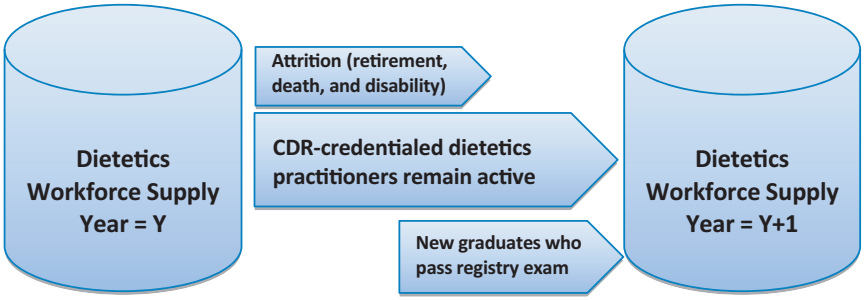

Figure 1. Conceptual framework for estimating supply of dietetics workforce.

provide estimates of supply and demand for CDR-credentialed dietetics practitioners at baseline and projected out 10 years. Year 2010 is used as the baseline year. Findings from the literature review were used to describe the baseline supply and demand as well as the factors affecting supply and demand of the dietetics workforce. The literature review also informed the model about new and emerging roles of the CDR-credentialed dietetics workforce.

SUPPLY AND DEMAND

The Academy is responsible for advocacy of RDs and DTRs. To this end, one strategy was to commission Readex Research to produce biannual Compensation and Benefits Surveys. These surveys collect information on compensation levels and benefits provided to dietetics professionals. Readex Research conducts other studies and analyses based on eligibility, employment, practice levels, and Academy membership. Findings from these studies have informed the model presented in this article with respect to factors affecting supply and demand.

Modeling Supply

The effective supply of CDR-credentialed dietetics practitioners between 2010 and 2020 will depend on the number completing an education and credentialing process, the number retiring or departing the dietitian workforce, and the number of working hours that the workforce supplies to dietetics services on an annual basis. Baseline projections begin with various assumptions. In this model, we assume the number of graduates entering the dietetics workforce remains at the current levels within age and sex categories. However, because the demographic composition of the population shifts over time to an older workforce, average hours of work per practitioner declines.

Supply projections of the dietetics workforce use an inventory model framework (see Figure 1). The projection starts with the number of active CDR-credentialed dietetics practitioners in the base year (ie, 2010) and adds new entrants into the workforce as new graduates of dietetics programs enter the workforce. Supply consists of employed and self-employed CDR-credentialed dietetics practitioners. The attrition (subtraction) aspect of the model consists of CDR-credentialed dietetics practitioners who leave the workforce for reasons of emigration, extended leave, retirement, or death. The baseline projection makes assumptions about supply.

- Baseline counts: The number of CDR-credentialed dietetics practitioners is estimated to be the number of full-time equivalents (FTEs) in 2010 who are registered and currently working.
- New entrants: The number of CDR-credentialed dietetics practitioners completing registration and internship has increased since 1991, but the number of CDR-credentialed dietetics practitioners entering the workforce has remained relatively constant. The expert panel noted that the supply of RDs will be positively affected with the establishment of the new Individualized Supervised Practice Pathways in 2011. These new pathways will address the current shortage of supervised practice opportunities for DPD graduates and individuals with doctoral degrees. This is projected to increase the number of registration-eligible dietitians (Christine M. Reidy, RD, executive director, Commission on Dietetic Registration, oral communication, August 2011).
- Attrition rates: Attrition rates are estimated based on historical trends registry data and newly credentialed dietetics practitioners.

Supply scenarios include a baseline number of new graduates, active supply, and attrition patterns (Table 2). Alternate supply scenarios introduce changes in the capacity of US schools to train and register new dietetics practitioners and changes in retirement. Attrition rates (ie, retirement, death, and disability rate) for CDR-credentialed dietetics practitioners are based on historical attrition rates of the health-related workforce.

Table 2. Supply drivers that influence the number of dietetics practitioners in the workforce

Supply drivers	2010 baseline
Active supply	69,442[ab]
New entrants[c]	RDs ≈ 2,800[c]
	DTRs ≈ 300[c]
Attrition	2% to 5%[d]

[a]This number represents approximately 81% of the 2010 registry.
[b]Source: Commission on Dietetic Registration.
[c]New entrants to the field of dietetics refers to individuals who are newly credentialed.
[d]Assumptions based on historical attrition rates of the health care workforce.

The active supply identified in this study draws on a 2008 age distribution. Registry data from CDR-provided estimates of the total number of CDR-registered dietetics professionals. Active supply was derived as a weighted proportion (81%) of registered professionals who indicated dietetics-related employment in Academy surveys (2-4). A ratio of active supply to FTE was calculated using information on the weighted average number of working hours of the respondents in the 2005 and 2010 Dietetics Practice Audit Surveys (5,6). The rate of change based on historical data, emergence of the third education pathway (the opportunity for DPD graduates to take a registration exam to become a DTR), and current estimates of new entrants were all used to develop projections of annual entrants.

Active supply was also distributed across professional practice areas using Compensation and Benefits Surveys for the years 2002-2009. In contrast, FTE supply was allocated to practice areas based on the 2010 Dietetics Practice Audit Survey (5). Consequently, active supply and FTE supply are distributed differently, displaying the tendency that this workforce has to work in multiple practice areas. Because the proportion of CDR-credentialed dietetics practitioners in each practice area is expected to change over time, the authors drew on historical trends to project the active practitioners and FTEs in these practice areas.

Baseline Supply Characteristics

Trends in Supply of CDR-Credentialed Dietetics Practitioners. This section provides a description of the size and distribution of the dietetics workforce in 2010. It is important to understand the characteristics of the 2010 supply of CDR-credentialed dietetics practitioners in the active workforce because projections are based on the active supply in 2010.

There were 85,884 RDs/DTRs—or 28

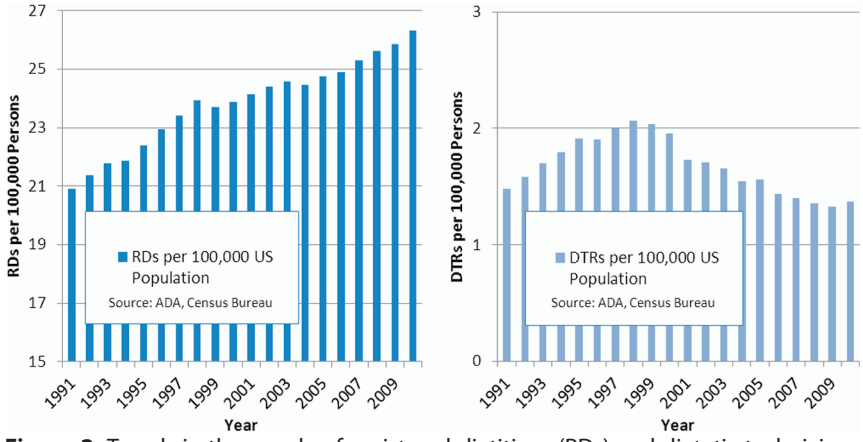

Figure 2. Trends in the supply of registered dietitians (RDs) and dietetic technicians, registered (DTRs). ADA=American Dietetic Association (now called Academy of Nutrition and Dietetics).

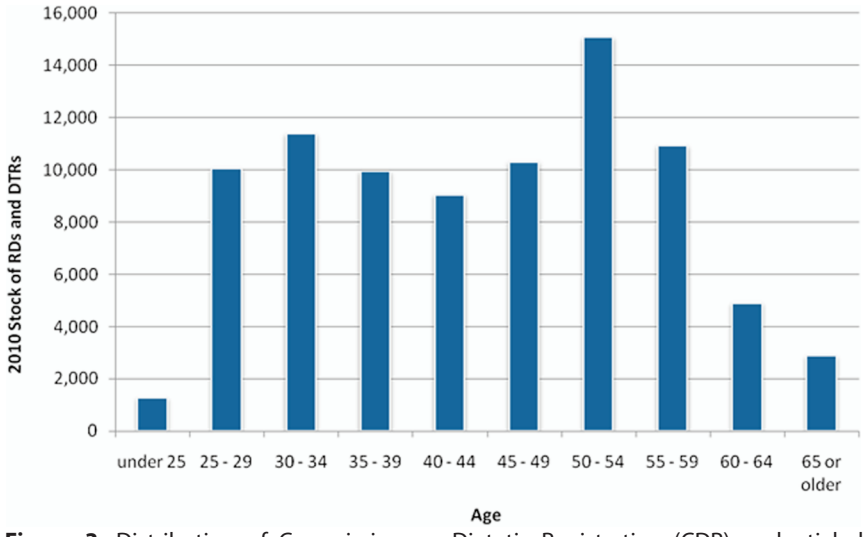

Figure 3. Distribution of Commission on Dietetic Registration (CDR)-credentialed dietetics practitioners in baseline supply by age group. Source: 2010 American Dietetic Association (ADA) Registration Data, and 2008 ADA Needs Assessment (ADA now called Academy of Nutrition and Dietetics).

RDs/DTRs per 100,000 persons—in 2010. As shown in Figure 2, the supply of CDR-credentialed dietetics practitioners per 100,000 persons increased from 22 in 1991 to 27 in 2010, representing a 23% change in the supply per 100,000 persons. During the past 2 decades, the growth in the supply of RDs has been relatively constant (7) (and data provided by CDR staff, February 2011).

Characteristics of the Current Dietetics Workforce. The mean age of the current dietetics workforce is 44 years; the median age is 45 years. More than half of the dietetics workforce is between 20 and 45 years of age, 46% are aged 46 to 64 years, and 3% are aged ≥65 years (see Figure 3). Furthermore, adding to the concerns regarding an aging workforce, >17% of CDR-credentialed dietetics practitioners are in the 50 to 54 years age group. Less than 1% remains in the workforce by age 70 years. A significant proportion of the dietetics workforce aged ≥45 years translates to a significant proportion of the workforce retiring during the next 15 years (4,8) (and data provided by CDR staff, February 2011).

Three quarters of the active dietetics workforce works full-time (35 or more h/wk) and the remainder is part-time (modeled as 20 h/wk on average). Almost 95% of the registered dietetics workforce in 2009 was composed of RDs. Figure 4 shows the historical trends of the CDR-credentialed dietetics workforce. From Academy registry data (provided by CDR staff, February 2011) the percentage of DTRs in the total dietetics practitioner workforce in 2010 was calculated to be 5%.

In 2009, the dietetics workforce consisted of 80,116 registered members. Of these, 51,094 were members of the Academy and 29,022 were nonmembers (2).

Approximately half of RDs held advanced degrees in 2010 (1); some also maintain credentials for specializations, such as pediatric or renal nutrition, nutrition support, and diabetes education (9). DTRs often partner with RDs to screen, evaluate, educate, and manage patients and monitor their progress to prevent diseases such as diabetes and obesity.

Studies on compensation differences for RDs based on sex show that women, despite their significant majority of the workforce, do not have equity on the RD pay scale (10). A median wage gap of $4,965 was observed between male and female RDs, with men obtaining the higher salaries. The authors theorize that salary parity will enable more women to remain in the workforce for longer periods of time (11). Figure 5 illustrates some of the factors that govern the wage gap (approximately 10%) between male and female RDs.

Historical surveys identify a chronic underrepresentation of men within the dietetics workforce and as of 2010, 96% of RDs/DTRs were women. This study of wages did not control for the difference in the hours of work or total workweeks. Historically, men work more hours throughout their career than women. Researchers suggest trends can be changed if internship opportunities are increased, remuneration and prestige of the profession is raised, scholarship programs are enhanced, and investments are made through innovative advertising that can reach minorities (12).

In 2010, RDs' salaries in general were found to be 40% to 45% less than salaries of other nonphysician health professionals. Incomes range from $47,000 (clinical inpatient nutritionists) to $69,000 (food and nutrition management) for CDR-credentialed dietetics practitioners. Nonphysician professionals reimbursed at a higher rate than RDs in 2010 included audiologists, occupational therapists, physical therapists, and speech therapists (13). Figure 6 illustrates wage disparity between RDs and four other health providers.

It is possible that RDs' salaries are at the lowest end of the spectrum because <50% of RDs are in supervisory roles and only one-quarter have any budgetary authority. Higher salaries may be tied to management and leadership positions. These positions require excellent communication skills, being well versed and comfortable with technology, experience in budgeting and financial management, high-order decision making, problem-solving skills, and the ability to expertly manage human resource issues (14). Di-

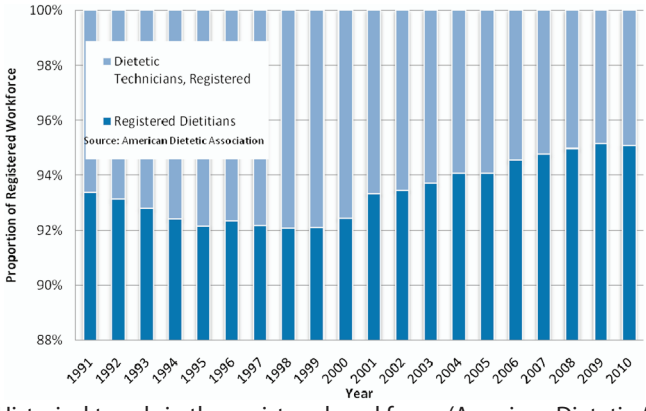

Figure 4. Historical trends in the registered workforce. (American Dietetic Association now called Academy of Nutrition and Dietetics.)

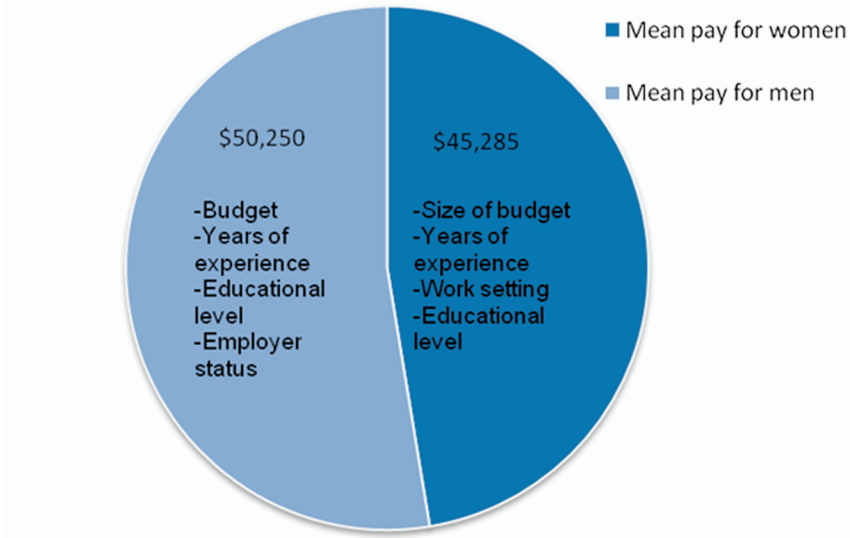

Figure 5. Breakdown of mean pay for registered dietitians by sex (11).

etetics education programs should aim to equip students with these skills.

The scope of management roles of RDs has expanded to foodservice directors in hospitals, which usually report to hospital executives. One study evaluated competencies required for RDs to assume positions of directors in hospitals; it was found that additional competency development was needed to prepare more RDs to assume the role of hospital foodservice directors (15).

Additional management skills include better knowledge of coding practices, patterns of reimbursement and clinical practice that will enhance the role of RDs in the workplace. This is important as Current Procedural Terminology (CPT) codes are available for medical nutrition therapy (MNT) services, and usage of CPT codes has led to enhanced coverage in various settings like Medicare and commercial payers, including managed care, which leads to better reimbursement strategies.

Distribution of CDR-Credentialed Dietetics Practitioners across Practice Areas. The dietetics workforce is distributed across several practice areas. The clinical nutrition practice area consists of clinical inpatient, clinical outpatient, and long-term care. Figure 7 shows that the proportion of CDR-credentialed dietetics practitioners in each of the practice areas has remained relatively constant from 2002 to 2009. The proportion of outpatient clinical practitioners has increased slightly and the proportions of practitioners in long-term care and consultation and business have declined.

Supply Factors

The supply of dietetics practitioners is the annual number of entrants to the dietitian workforce added to those who remain in the workforce (the stock). The stock, in turn, fluctuates depending on a wide set of factors, including economic climate, stagnation of salary, and incentives.

Trends in Registration. The overall trend of dietetics practitioners obtaining CDR credentials has increased since 1991, despite a historical decline in dietetic technicians pursuing registration. Although the stock of DTRs has fluctuated, it has declined substantially from 1998 to 2009 (Figure 8). Newly credentialed DTRs decreased by 75% from 1995 to 2008. The task force suggested that the decline in the stock and entrants may be the result of signaling from employers that registration is a fading job requirement. Data from the Compensation and Benefits Survey show that 16% of jobs held by DTRs did not require registration in 2005 compared with >19% in 2009 (2,16).

A rise in both the stock and entrants into the DTR workforce was observed in 2010. The inauguration of a third registration pathway in 2009 has allowed DPD students to take the registration exam to become DTRs. This new pathway helps relieve the bottleneck of graduates trying to acquire a dietetics internship by providing an alternative route to registration for those desiring to work in a practice area that requires registration. Figure 9 illustrates the pathways for registration.

RDs represent a majority (95%) of employed CDR-credentialed dietetics practitioners. Since 1991, the number of dietetics practitioners holding the RD credential has increased by an average annual rate of 2.3%. RDs make up the majority of the registered dietetics workforce and are predicted to comprise >90% of the workforce as the number of RDs grows. In part, the high proportion of RDs is the result of employer demand for the registration credential. Almost all RDs reported that their credential was required or preferred by their employer.

Figure 10 shows the age distribution of entrants to the field of dietetics. A majority of the new entrants are younger than 30 years.

The literature reviewed suggests that most dietetics practitioners make this career decision while in college (17). Various influencing factors include an interest in nutrition, job enjoyment, and the opportunity to work in a diverse environment. Studies suggest—and the task force reinforced the notion—that recruitment strategies should target high school and college students and that RDs should be invited by the counseling staff at these schools as guest lecturers to talk about dietetics as a career.

Attrition Rates. For modeling purposes, as CDR-credentialed dietetics practitioners (and other health professionals) intend to retire earlier or later than historical trends show, we used annual attrition rates of 2%, 3.5%, and 5%. (Also for the purpose of the model, we defined attrition as any CDR-credentialed dietetics practitioners departing an employment role in dietetics. This relaxed

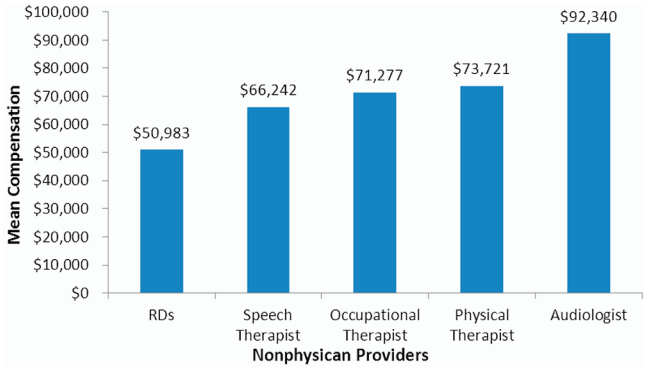

Figure 6. Difference in wages of four types of nonphysician providers in 2010. RDs=registered dietitians. Source: reference (13).

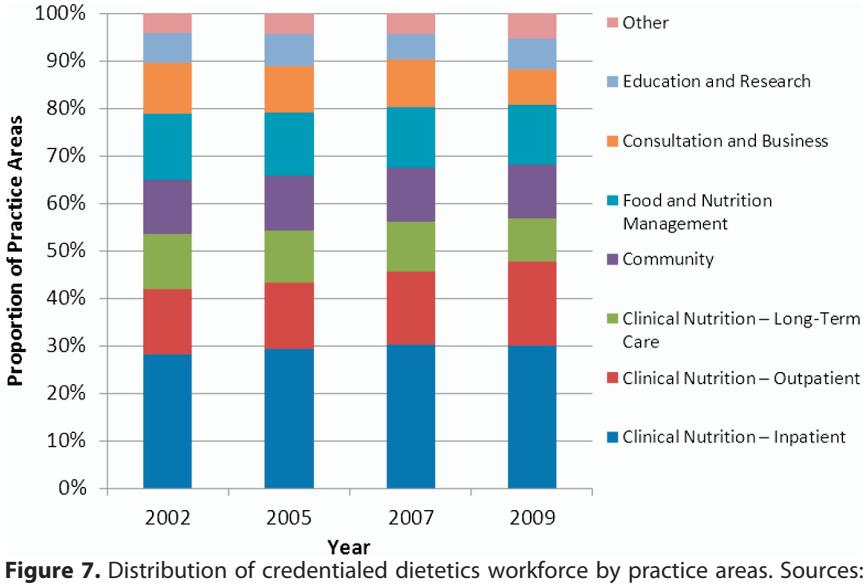

Figure 7. Distribution of credentialed dietetics workforce by practice areas. Sources: references (1-4).

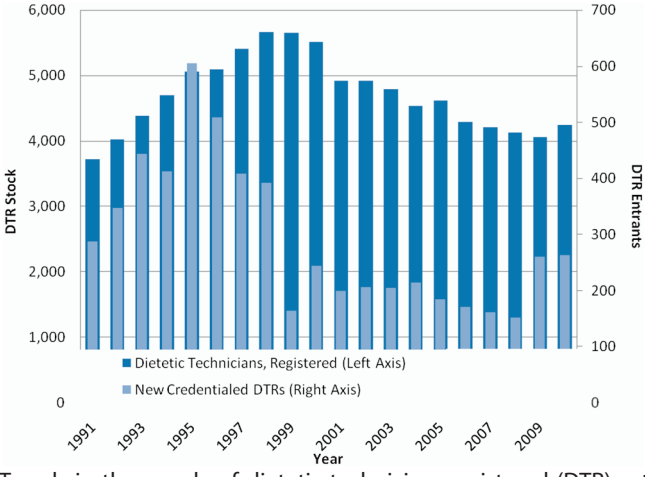

Figure 8. Trends in the supply of dietetic technician, registered (DTR) active supply and entrants (1991-2010). Source: American Dietetic Association Registry Data, 2011 (now called Academy of Nutrition and Dietetics).

definition includes loss due to death, illness, retirement, inactive status, not qualified, and emigration.) The three attrition rates provide comparative analysis. The research team recognizes that the Academy has surveyed members about "intent to retire." Intent to retire survey research has some limitations in validity and reliability. Anticipated retirement age is not a reliable predictor of actual retirement age until practitioners are nearing retirement, as many factors influence the decision to retire (eg, economic bust/boom, family, health, and practice viability).

Unlike other health professionals, CDR-credentialed dietetics practitioners become inactive at an earlier age. Although only 1% of all active CDR-credentialed dietetics practitioners are aged ≥70 years, there is a tendency for retired RDs to maintain membership beyond retirement (Figure 11). The following model assumes all practitioners as retired by age 70.

Hours of Work and Visit Capacity. To approximate FTE supply, we employed an estimate of active supply and an estimate of FTEs per active CDR-credentialed dietetics practitioner using the 2010 Practice Audit Survey (5) to estimate FTE per active practitioner by practice area. For this study, FTE is defined as 32 or more hours per week. Among respondents, 74% were full-time workers and the rest worked part-time (reported by the task force to be 20 hours/week on average, with a range from 8 to 31 hours). For each active dietetics practitioner in the registered workforce, a mean of 27.5 h/wk are worked, accounting for full-time and part-time practitioners. The following calculation was used to develop the total FTE supply for the dietetics workforce for each of the practice areas:

$$FTE\ Supply = Active\ Supply * \left(\frac{Total\ FTEs}{Employed\ Practitioners} \right)$$

Demand

Modeling Demand. The demand was projected for all dietetics practitioners, both credentialed and noncredentialed. Demand was estimated separately for each of the practice areas using different parameters. The sum total of the demand across the practice areas is the overall demand for dietetics and nutrition services.

Modeling Demand for Clinical Inpatient and Outpatient Practice Areas. Projections for the clinical inpatient and outpatient practice areas were based on historical use of dietetics services (ie,

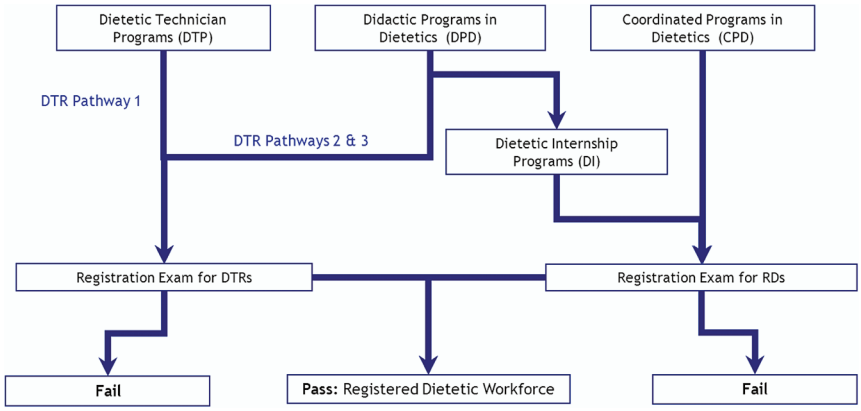

Figure 9. New entrants in dietetics workforce (2010). RD=registered dietitian. DTR=dietetic technician, registered.

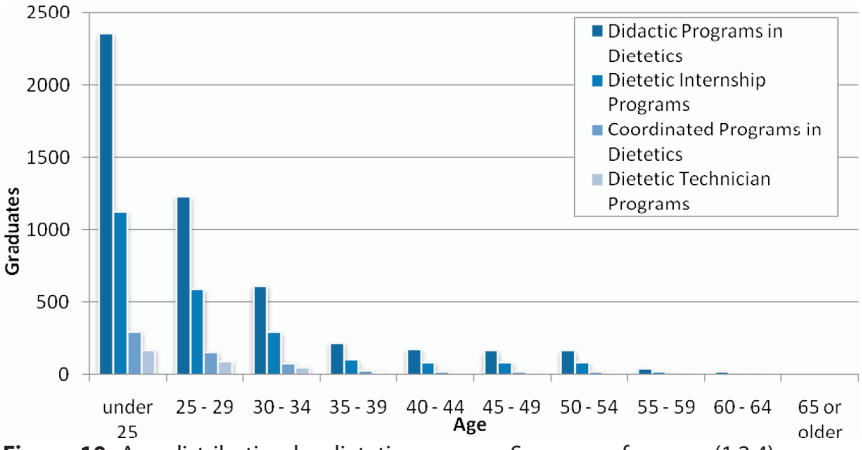

Figure 10. Age distribution by dietetic program. Sources: references (1,2,4).

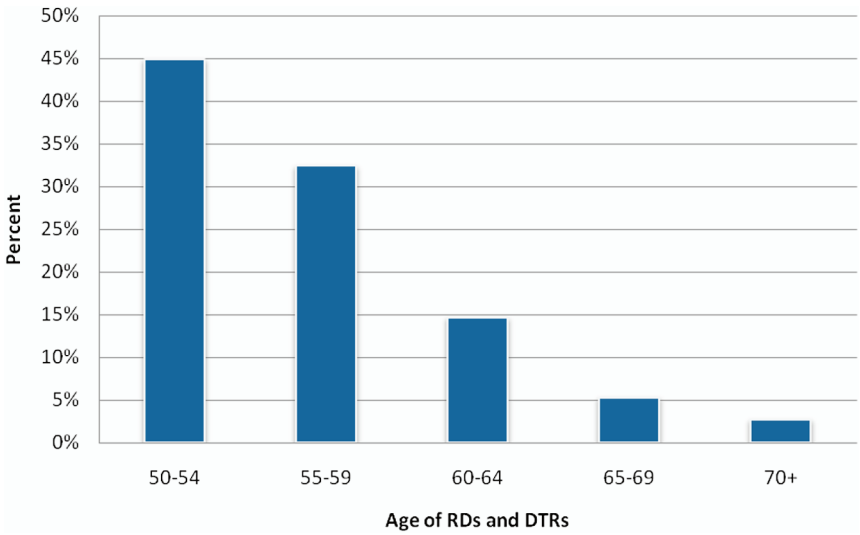

Figure 11. Age distribution of active Commission on Dietetic Registration (CDR)-credentialed dietetics practitioners age 50 and older. RD=registered dietitian. DTR=dietetic technician, registered.

market-based demand) for inpatient and outpatient settings. To develop these estimates, a calculation of the dietetics practitioner to age-specific population ratios was based on use of services. Next, the authors applied these ratios to age-specific population projections to project the demand for dietetics services. The National Center for Health Statistics (NCHS) databases of the National Ambulatory Medical Care Services, the National Hospital Ambulatory Care Services, and the Healthcare Cost & Utilization Project were analyzed across 3 years to arrive at patient age-specific referral rates and use of dietetics services (collectively referred to as NCHS databases). Because NCHS does not provide information on the types of dietetic services provided by CDR-credentialed dietetics practitioners, we also analyzed the Medicare Physician Supplier Service File for 2007-2008 to arrive at the type and distribution of services provided by CDR-credentialed dietetics practitioners. These estimates of use of dietetics services were converted to the time required to complete these visits based on description of the CPT codes (ie, 60 minutes for the initial assessment and 30 minutes for reassessment). The total time required to complete these visits was converted to the demand of RDs' FTE.

We modeled three demand scenarios. A "low" scenario is based on the current FTE supply of CDR-credentialed dietetics practitioners—approximately 64% of the dietetics services were provided by CDR-credentialed dietetics practitioners in 2010. In the moderate baseline projection, based on the change in the number of dietetics services from the Medicare Physician Supplier Service File from 2005 to 2008, we assumed a 1.3% annual growth rate of services provided by CDR-credentialed dietetics practitioners from 2010 to 2020. As a result, by 2020, approximately 74% of dietetic services are expected to be provided by CDR-credentialed dietetics practitioners. In the "high" scenario, we assumed that the CDR-credentialed dietetics workforce has the capability to provide all dietetics services, both clinical and nonclinical (18).

Modeling Demand for CDR-Credentialed Dietetics Practitioners in Other Practice Areas. For practice areas other than clinical inpatient and outpatient, we projected the demand based on historical trends of ratios for the number of CDR-credentialed dietetics practitioners to target population, practitioners to specific institutions, and practitioners to dollar amount. For example, ratios of practitioners to elderly populations for long-term care were calculated. These ratios were developed by using the most recent historical data (Y_1Tn) and the US population or program participants from the same year (P_1Tn). Derived ratios were used to project the demand in practice areas based on the changes in the number and composition of the tar-

Practice area	Demand drivers	Annual rate of change	Source
Inpatient and Outpatient – Clinical Nutrition	Utilization of dietetics services by each age group	0-4y 1% 5-17y 1% 18-24y 3% 25-44y 2% 45-64y 1% 65-74y 4% 75-84y 2% 85+y 1%	NAMCS Medicare Physician Supplier Service File
Long-term Care (LTC) – Clinical Nutrition[a]	US Elderly Population (65+ years)	3.14%	2010-2020 US Census Bureau Population Estimates and Projections
	Patients in beds per elderly population[a]	−1.96% (2001-2011)	AHCA Research and CMS Nursing Facility standard health survey data.
	LTC facilities per elderly population[a]	−2.11% (2001-2011)	AHCA Research and CMS Nursing Facility standard health survey data.
Community Nutrition	Supplemental Nutrition Assistance Program (SNAP) – Participation[b]	8.90% (2000-2010)	USDA, Food and Nutrition Service, SNAP National Level Annual Summary
	SNAP - Other Program Costs[c] per population[a]	4.69% (2000-2010)	
	Supplemental Nutrition Program for Women, Infants and Children (WIC) – Participation[a]	1.50% (2000-2010)	USDA, Food and Nutrition Service, WIC National Level Annual Summary
	WIC – Other Program Costs[a]	4.65% (2000-2010)	
	School-Aged Children (5-18y)	0.79% (2000-2010)	2010-2020 US Census Bureau Population Estimates and Projections
	Federal and State Inmates[a]	0.84% (2000-2009)	2010 Bureau of Justice Statistics Correctional Surveys
	Head Start Funds[a]	2.25% (2000-2010)	Office of Head Start, Enrollment History
Education & Research	DT Enrollment CP Enrollment DPD Enrollment DI Enrollment	−3.28% 1.09% 3.24% 2.39% (1993-2010)	American Dietetic Association
	DT Programs CP Programs DPD Programs DI Programs	−2.16% 0.23% −0.28% 0.25% (1993-2010)	American Dietetic Association
	Federal Grants	2.00% (2007-2010)	NIH Estimates of Funding for Various Research, Condition, and Disease Categories (RCDC)
Business & Consultation	US Corporate Management Payrolls	2.49% (1997-2007)	1997-2007 Economic Censuses, Sector 55: Management of Companies & Enterprises: Corporate, subsidiary, and regional managing offices
Food & Nutrition Management	US Food Service Sales	3.05% (1997-2007)	1997-2007 Economic Censuses, Sector 72: Accommodation and Food Services: Full-service restaurants, Limited-service eating places, and Special food services

Figure 12. Demand drivers by practice areas. [a]Rates of change per population. [b]Due to tremendous program growth over the last 10 years, there is anticipation that the number of participants will plateau. [c]Other program costs include funds for program evaluation. (American Dietetic Association now called Academy of Nutrition and Dietetics.)

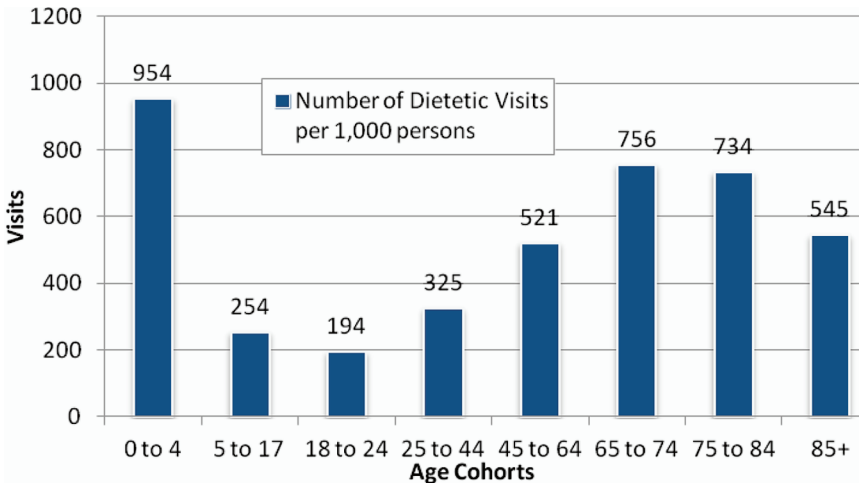

Figure 13. Relative utilization of clinical dietetics services by age cohorts in 2008. (Based on Lewin Group analyses of the National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, and Healthcare Cost and Utilization Project for 2007-2009; and on Lewin Group analysis of the Medicare Physician Supplier Service File for 2007-2008.)

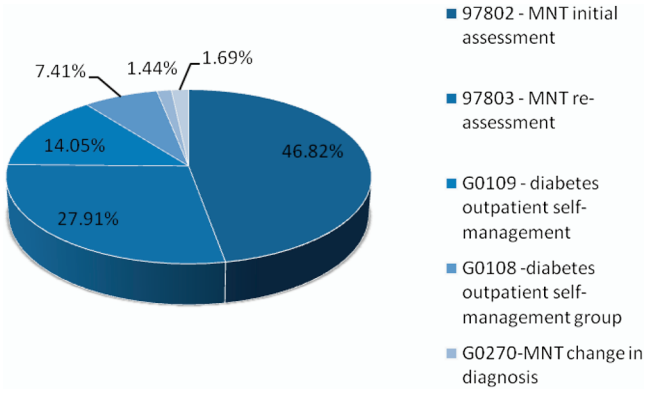

Figure 14. Distribution of medical nutrition therapy (MNT) to Medicare population. Source: reference (19).

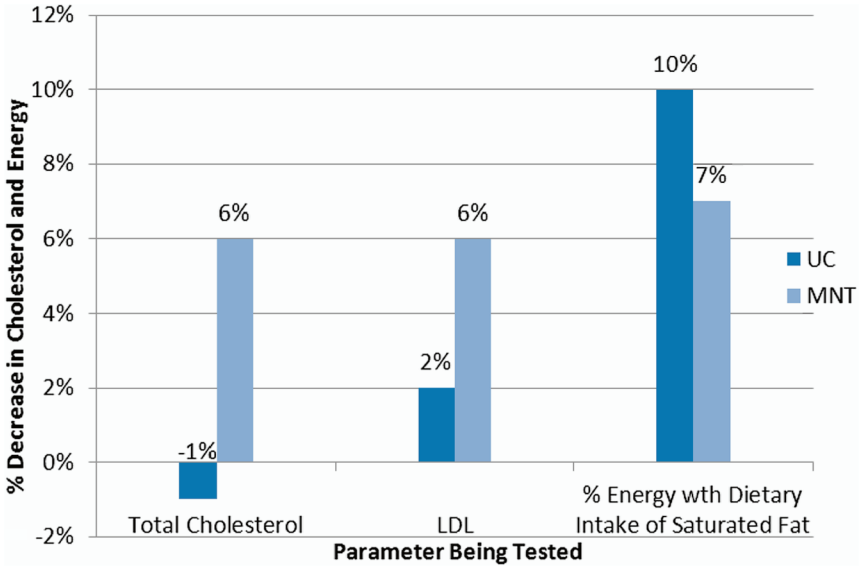

Figure 15. Efficacy of medical nutrition therapy (MNT) vs usual care (UC) for cholesterol and saturated fat levels. LDL=low-density lipoprotein. Source: reference (19).

get population, institutions, and/or funds.*

For example, the historical proportions of long-term–care facility (LF) per elderly population (defined as 65+ years of age) (EP) was determined from 2000-2010 as follows:

$$Y_{T_1} = \frac{EP_{T_1}}{LF_{T_1}} \ldots Y_{T_n} = \frac{EP_{T_n}}{LF_{T_n}}$$

Then, historical trends were calculated and annualized using the following compound formula:

$$\text{Annual } \Delta = \left(\frac{Y_{T_n}}{Y_{T_1}}\right)^{\frac{1}{(n)}} - 1$$

It is assumed that supply and demand are at equilibrium in 2010. Using this assumption, the baseline scenario is then projected by incorporating population growth and historical trends. Figure 12 displays the historical trends incorporated in the Lewin model and the data sources that were used to calculate those trends (based on Lewin Group analyses of the National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, and Healthcare Cost and Utilization Project for 2007-2009).

Limitations of the Demand Model. Unlike many other health professionals, dietetics practitioners provide services to a wide range of industries, large and small. Consequently, the dietetics demand drivers are as specific or as broad as those industries. Practice areas such as consultation and business encompass broader industry demand drivers such as US corporate management payrolls. These practice areas are particularly challenging due to the assortment of jobs within them. Furthermore, corporate firms may hire dietetics practitioners who contribute to production more readily than those who provide wellness programs for employees.

Change drivers in this demand model have different effects on dietetics department staff-

**To project demand in the practice areas of food and nutrition management and business and consultation, industry sales and payrolls are assumed as major drivers. To determine the effect of industry growth on dietetics workforce, the real change in purchasing power was determined. To capture real economic growth in US foodservice and corporate management, fund-based estimates were used and inflation was accounted for by employing the Fisher Equation: $r \approx i - \pi$, where r=real rate of return, i=nominal rate of return, and π=inflation rate.*

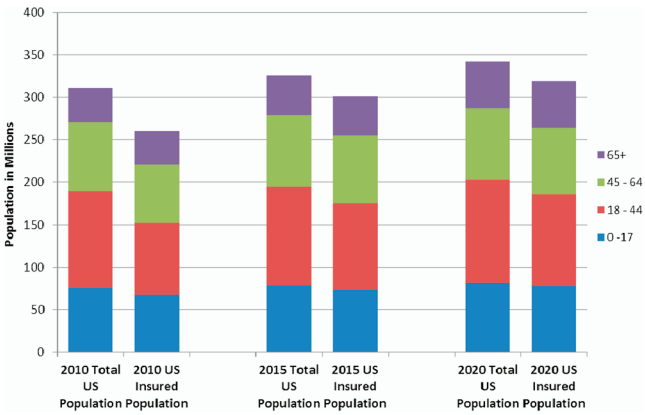

Figure 16. Age distribution of US insured population before and after the health care reform (projected).

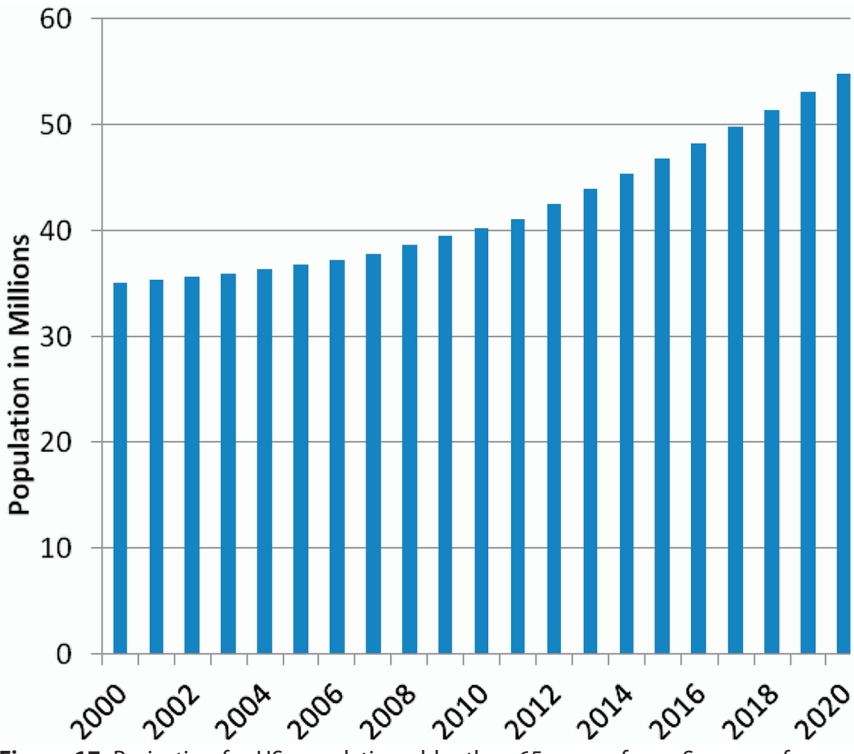

Figure 17. Projection for US population older than 65 years of age. Source: reference (7).

ing across practice areas and settings. Staffing models used by organizations remain somewhat vague because there are knowledge gaps in understanding how they change in industries such as health care, foodservice, and business. For instance, a long-term–care facility may obtain expertise in dietetics by hiring new staff or part-time consultants or outsourcing foodservice all together. The limitations in the model are, therefore, the result of these data limitations and knowledge gaps.

Demand Side Assumptions. Baseline demand projections make the following assumptions.

- Demand: In 2010, supply of CDR-credentialed dietetics practitioners was in equilibrium with demand for dietetics services.
- Demographics: Population demographics will change as projected by the US Census Bureau. The Census estimates project an approximate 80% increase in the population older than age 65 years.
- Demand by practice areas: Demand is disaggregated to reflect the demand for all dietetics practitioners by practice areas. Demand by practice area not only reflects clinical patterns of care but also growth in demand in other practice areas due to increased funding and number of relevant institutions.

Baseline Demand Characteristics

We examined the services currently provided by CDR-credentialed dietetics practitioners. The first part of this section provides an overview of services provided by CDR-credentialed dietetics practitioners in clinical practice areas and assesses demand for dietetic services in clinical practice areas. The second part of this section discusses market-based demand.

Overview of Dietetic Services. Figure 13 represents the number of visits to a dietetics practitioner per 100,000 persons by age group in 2008. The use of dietetics services by the elderly population is three times that of the rest of the population. However, the age cohort with the greatest utilization of services per capita is that consisting of newborns through age 4 years. Although not anticipated, an increase in the birthrate would have the most significant affect on the use of dietetics-related services.

Because the NCHS data did not provide information on the types of dietetics services provided by CDR-credentialed dietetics practitioners, the Medicare Physician Supplier Service File for 2007-2008 were also analyzed to identify the type and distribution of services provided by dietetics practitioners.

Figure 14 displays the distribution of Medicare services by CDR-credentialed dietetics practitioners in 2009. MNT services, a covered benefit under Medicare reimbursement, comprise the largest proportion of dietetic services.

Medicare commenced reimbursement for nutrition counseling for diabetes and renal disease in 2002. MNT is a popular method of providing nutrition guidance because it is cost effective and an RD is able to review and analyze the medical and nutriotion-related history of patients in addition to laboratory values and anthropometric measurements (19). Some states provide coverage for MNT services, especially for obesity, through their managed care programs (20). Studies comparing usual care provided by physicians to MNT services provided by RDs show that MNT services provided by RDs produce better lipid, diet, physical activity, and weight outcomes. Figure 15 shows the efficacy of MNT services with various outcomes.

Market-Based Demand. The estimates of demand for dietetics services are based on market conditions that reflect underlying epidemiologic conditions or "need." These market conditions represent the market

Demand factors	Likely impact	Practice areas affected
Aging population	Increased demand resulting from higher utilization by population of older adults	Clinical inpatient, outpatient and LTC[a]
Health care reform	Increased volume of services provided resulting from increase in coverage for uninsured and emphasis on wellness and prevention in the health care reform act	Clinical inpatient, outpatient and LTC
Population risk factors due to growing prevalence of chronic conditions	Increased demand resulting from higher utilization by chronic condition population	Clinical inpatient, outpatient and LTC
Nutrition initiatives as effective prevention measures	Increased demand	Community nutrition
Technology	Decreased demand resulting from consumer awareness and increased knowledge about diets thanks to easily accessible technological substitutes for dietetic services (eg, Weight Watchers online).	Food and Service Industry

Figure 18. Demand factors and their impact on practice areas. [a]LTC=long-term care.

dynamics that lead to changes in demand for dietetics services. Obesity is a highly prevalent diet-related risk and may lead to an increase in health care costs when combined with other disorders. Obesity can be treated by monitoring diet and regular exercise. One study showed that dietetics practitioner-led weight management and nutrition programs—especially for persons with diabetes who have a high risk of obesity—are cost effective (21). Other research identifies that improving access to RDs or certified nutritionists help in the treatment of obesity (20). The task force identified the diseases that influence demand as a group of chronic diseases such as renal disease, diabetes, heart disease, and cancer.

In the mid-1990s, the expansion of the home care market and the role of RDs as case managers in the holistic approach to health care further influenced demand (22). By 2008, the demand for dietetics-related services was largely divided into the practice areas identified in Table 1.

The task force redefined these practice sectors based on its analysis of the demand for the dietetics workforce.

Demand Factors

Change in many areas will influence demand for RDs over the next decade. These areas include demographic trends, increase in prevalence of chronic conditions, economic growth, policy changes related to health insurance, and technological innovation.

There are many influences on demand such as access to care and insurance coverage. Two main influential areas of demand are demographic trends and prevalence of chronic conditions.

Demographic Trends. The US population is projected to increase in all age groups over the next 20 years; however, growth in the number of people aged ≥65 years is expected to be most rapid. Between 2010 and 2020, growth in the population between the ages of 65 to 84 years is approximately 3.3% annually as the baby boomers begin to turn 65 years old. As noted previously, the use of services provided by CDR-credentialed dietetics practitioners by the population ≥65 years is approximately three times higher than that of the rest of the population. Therefore, as the population ages, the need for services provided by such practitioners will increase. Lewin's analyses of the census data, National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, and Healthcare Cost and Utilization Project estimated that the number of dietetics-related services demanded by the age cohort of 65 to 74 years in inpatient and outpatient settings is expected to rise approximately 50% by 2020.

Increase in Prevalence of Chronic Conditions. The prevalence of chronic conditions and diseases with significant dietetics-related consequences that require advice and direction of care by RDs provides the backdrop for the study (based on National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, and Healthcare Cost and Utilization Project data). The American population can anticipate an increase in obesity and the prevalence of conditions related to obesity, such as metabolic syndrome and diabetes, and the secondary effect of diabetes-related conditions affecting various organs. Such effects will have some predictability and a large element of unpredictability. As the population increases and ages, and nutrition factors become more relevant to the everyday lives of Americans, the demand for services will grow. The population is expected to grow from 310 million in 2010 to 341 million by 2020 (7).

Additional factors that influence demand are economic growth, technological advances, health insurance status, and the effects of growth in population and per-capita income.

Economic Growth. Continued income growth in the United States will result in increased demand for dietetics-related services. Typically, as income increases, demand rises for goods and services that individuals value. Given the increase in consumer value for dietetics services, the demand for CDR-credentialed dietetics practitioners will increase as incomes rise.

Technological Advances. With the increase in technological advances and consumer awareness, consumers are likely to obtain nutrition advice and guidance without individual dietetic consultation.

Insurance Status. As a result of the anticipated implementation of the health care reform laws by 2014, the number of uninsured persons in the US population will decline from 50 million to 22 million, according to a letter from House Speaker Nancy Pelosi from the Congressional Budget Office on March 20, 2010. However, the largest decline in the number of uninsured will occur in the 18 to 24 years age cohort. Compared to other age cohorts, the 18 to 24 years cohort has relatively low use of dietetic services. Figure 16 shows the age distribution of US insured population before and after implementation of health care reform.

Future Demand. Future demand for the services of dietetics practitioners is a function of the prevalence of conditions and the number of institutions needing dietetics services (eg, schools, industries, long-term–care facilities, federal ser-

Supply	Demand
Key Inputs	
Active Supply	Current age-specific utilization of dietetics services
New entrants	Age-specific population projections
Attrition	RD[a] to population ratio based on utilization and population
Modeling Process	
Supply Projection for Y2 =Active supply for Y1+new entrants Y2 – (attrition rate *active supply for Y1)	Demand Projection for Y2 =Age-specific population projections * RD-to-population ratio
Key Factors	
Number of CDR-credentialed dietetics practitioners completing training, retirement rates, registration rate	Economy, population, disease prevalence, change in insurance, dietetic service use, substitution, differences in health behavior, growth of food assistance programs
Modeling Scenarios	
Based on three attrition rates	Market-based rather than needs-based demand

Figure 19. Components of supply and demand projections. [a]RD=registered dietitian.

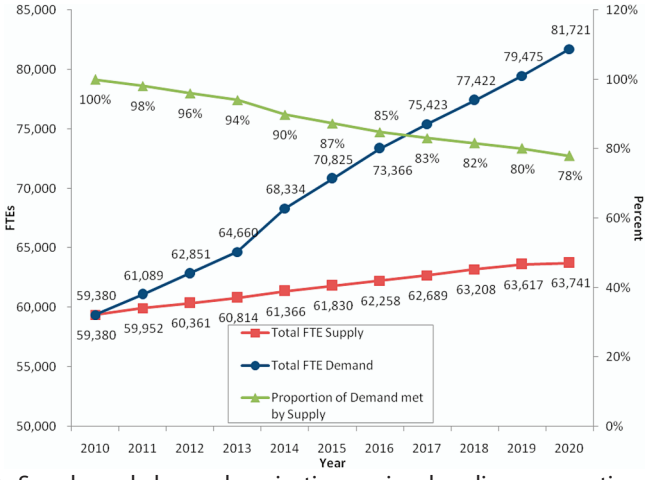

Figure 20. Supply and demand projections using baseline assumptions for 2010-2020. FTE=full-time equivalents.

vices, and other agencies). The two largest anticipated drivers of demand are population growth (particularly the aging of the population as it grows) and the growth in real per-capita income. Figure 17 displays estimates of the population of elderly individuals in the United States and the annual rate of change from 2000-2020.

Based on the estimates of growing demand, the clinical (ie, inpatient, outpatient, and long-term care), community nutrition, and food and nutrition management practice areas are expected to be most affected, followed by the education and research and consultation and business sectors. The clinical practice areas will be affected positively by an increased use by older populations that are greater in number and policy changes resulting from health care reform. The demand for community nutrition services will be influenced by the estimated change in the number of school-aged children, adult inmates, and participants in public nutrition programs (eg, Head Start; the Special Supplemental Program for Women, Infants, and Children; and Supplemental Nutrition Assistance Program). Foodservice industry sales will have an influence on food and nutrition management. Enrollment in academic dietetics programs and government funding of dietetics-related research programs will affect the education and research practice sectors. Figure 18 shows the practice areas that will be most affected by factors affecting demand.

Overall, these factors suggest that demand will increase above the projected increases related to demographic trends. Trends in lifestyle, income, insurance status, and technological advances will likely have a substantial positive influence on demand over the next decade.

PROJECTIONS OF THE SUPPLY AND DEMAND

This section presents estimates of the supply of CDR-credentialed dietetics practitioners and demand for dietetics services from 2010 through 2020. First, this section will present a baseline set of assumptions and projections based on the assumptions. After discussion of the baseline, alternative scenarios are presented.

The projections are designed to accomplish the following three things:

- to illustrate how the workforce model can be applied;
- to provide some insight into the factors that are likely to have important effects on future demand and supply, as well as factors that may be less important—that is, they are intended to provide a sensitivity analysis of factors affecting the future workforce market environment; and
- to provide an overall assessment of the current and future market demand and supply over the next decade.

Figure 19 shows the various components of the supply and demand projections, including the key inputs, the modeling process, key factors, and modeling scenarios.

The research team and the task force recognize that two major factors affect the forecast accuracy of projections. First, the model must be able to reflect, relatively well, the effect on demand and/or supply of anticipated changes in the health care marketplace. In the case of this study, then, the model must be able to reflect the effects of changes in growth in insurance coverage and household incomes, the effects of an aging population on demand, and so forth. Second, the scenarios considered must capture the future path of variables or factors affecting demand and supply. The changes in insurance coverage and income growth, as well as changes in competing providers and disease incidence, must be correctly anticipated.

The first aspect of forecast accuracy depends on the richness and reliability of the data along with the appropriateness of

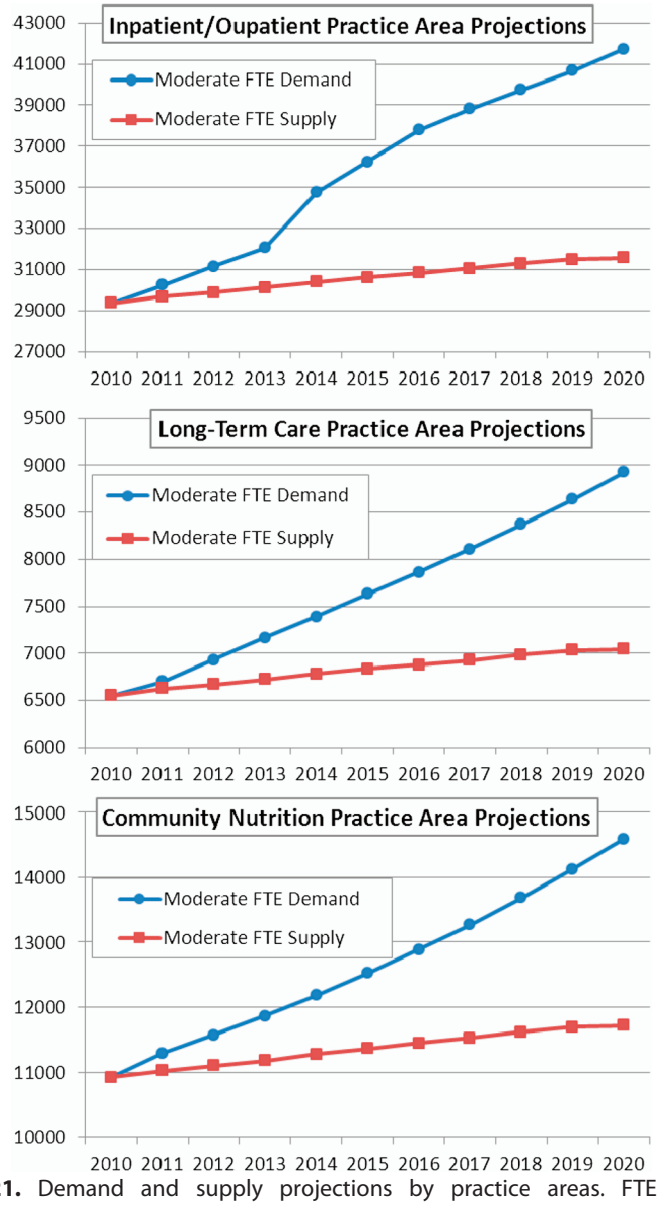

Figure 21. Demand and supply projections by practice areas. FTE=full-time equivalents.

methods for applying these data to capture the relationship between demand and/or supply factors. It also rests on the assumption that relations measured in the past will be preserved in the future; that is, the measured effects are stable over time. The second aspect of forecast accuracy has a component of judgment as well as science. By drawing on sources of information and judgment, including the task force members and our own experience, some of the scenarios can be formulated. As noted previously, the data available for estimating the effects of demand drivers for smaller health professions are often less than ideal. Furthermore, although the predictions have the appearance of accuracy, there are too many variables and related uncertainties to achieve such precision for forecasts far into the future.

Baseline Scenario

The baseline projection of supply and demand for CDR-credentialed dietetics practitioners is shown in Figure 20. Demand, driven by both demographic and economic factors, grows by 40% over the 2010-2020 period. FTE supply also grows, but more slowly, at 7% during the same period. Assuming baseline equilibrium between supply and demand in 2010, the baseline projection shows that the shortage of CDR-credentialed dietetics practitioners will grow to 22% with only 78% of the supply of CDR-credentialed dietetics practitioners meeting the demand in 2020 (Figure 20).

There will be adjustments to the excess demand on the supply side. Higher earnings in the profession will increase the demand for internship positions. If internships are expanded, they are likely to be filled. In addition, higher earnings may encourage some CDR-credentialed dietetics practitioners to delay retirement and others to expand work hours. Both of these factors will work to reduce excess demand.

In addition, excess demand is likely to encourage more practice efficiencies such as group counseling and business models of care for corporations. Since RDs' time will become more valuable, methods for using their time in institutions are likely to become more common. One RD per moderate-sized school district may be adequate to meet the needs of the school-age population. Optimal ratios of RD to schools or school districts may be measures to reduce excess demand. Organizations may choose to place RDs at higher levels in the organization to broaden their influence or RDs may be shared among organizations. If organizations choose to employ a single RD who provides services for multiple school districts, the ratio of RD to school-age children will decrease in response to demand in excess of supply.

Although market factors are likely to mitigate the level of excess demand, the level predicted in these models suggests that proactive interventions on the part of the dietetics community are warranted.

Figure 21 displays the baseline results of the model by practice area. The blue line with circular data points in each exhibit indicates baseline demand and the red curve with square data points indicates baseline supply. Across all practice areas, there is excess demand over supply. The shortage of CDR-credentialed dietetics practitioners is substantially higher in the clinical inpatient and outpatient arena, where registration is often a requirement to practice. This might be a future consequence of the increase in the number of insured individuals resulting from health care reform.

In addition, as seen in Figure 21, market demand is expected to exceed the capacity of the dietetics workforce in food and nutrition management, business/consultation, and education and research. Food and nutrition management will be the fastest-growing nonclinical practice area as demand is projected to increase by 35% over 10 years.

Alternative Scenarios

In the baseline scenarios, we assumed the demand factors based on historical trends and made a very conservative assumption about the level of per-capita personal income growth that would be observed during the next 20 years. In this section, the authors performed sensitivity analysis of

Practice areas	Low	High
Clinical	65% of the dietary services are provided by registered dietitians (RDs)	100% of the services provided by RDs
Clinical long-term care (LTC)	Lower ratio of RD to LTC population—foodservice is contracted out by LTC institutions; more aging in place	More RDs needed in LTC institution due to aging
Community nutrition	Fewer RDs in entitlement programs and schools due to budgetary issues	A higher number of RDs due to shifting public priorities and government funding
Foodservice industry	Increase in consumer awareness=less reliance on RDs	Higher involvement of RDs to offer more healthful diet choices to consumers
Education and research	Limited budget for research and drop in enrollment	Higher enrollment and more government and nongovernment funding for research
Consultation and business	Empowering consumers through advanced technology	Consumer empowerment leads to induced demand

Figure 22. Assumptions regarding demand for dietetics workforce for alternative projection scenarios.

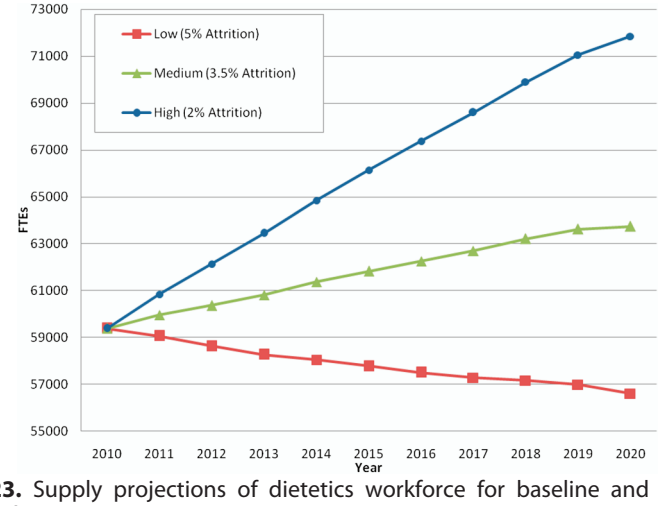

Figure 23. Supply projections of dietetics workforce for baseline and alternative scenarios for 2010 to 2020.

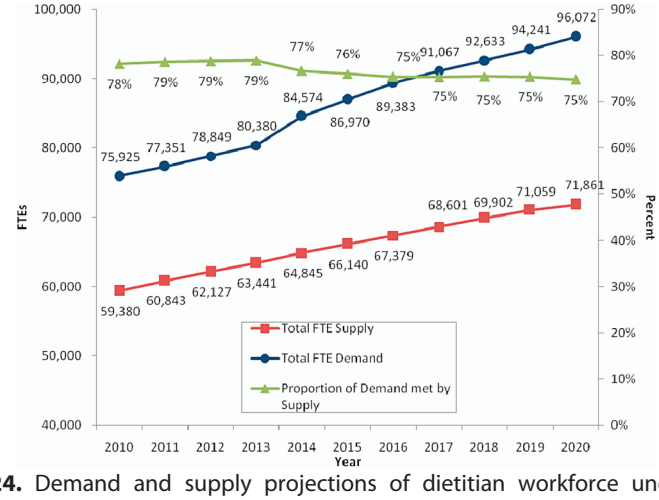

Figure 24. Demand and supply projections of dietitian workforce under "high" scenarios. FTE=full-time equivalents.

baseline projections to include an alternative scenario of "high" and "low" projections. As shown in Figure 22, the alternative demand projections are based on increasing reliance on CDR-credentialed dietetics practitioners for clinical dietetics services, aging, and change in funding for community nutrition and education/research, as well as consumer empowerment.

Given the increasing reliance on CDR-credentialed dietetics practitioners for nutrition counseling, we assumed that patients and consumers would shift the dietetics-related services that are currently provided by other practitioners to CDR-credentialed dietetics practitioners—for instance, RDs have a defining role in providing nutrition counseling to patients with diabetes. This need alone is likely to have the greatest affect on the demand for clinical nutrition services.

The projections for alternative supply scenarios are primarily based on the attrition rates. As shown in Figure 23, for the baseline and alternative scenarios, the authors assumed a 2% and 5% attrition rate for "high" and "low" scenarios, respectively. With a constrained "low" supply estimate, the supply of the CDR-credentialed dietetics practitioners declines to 56,400, whereas with a "high" supply estimate, the supply of the CDR-credentialed dietetics practitioners increases to 72,000.

Based on the assumptions regarding the demand and supply of the dietetics workforce mentioned previously, Figure 24 shows the "high" estimates of supply and demand for the dietetics workforce from 2010 to 2020. The discrepancy between the supply and demand of the dietetics workforce is more pronounced under this "high" scenario compared with the baseline projection. The larger shortfall between supply and demand for the "high" stems from an assumption that CDR-credentialed dietetics practitioners should be able to meet the demand for all dietetic services. In other words, the "high" scenario displays what competing workforces are also supplying, particularly in the clinical practice areas. Only three quarters of the demand would be met by the supply of the dietetics workforce by 2020.

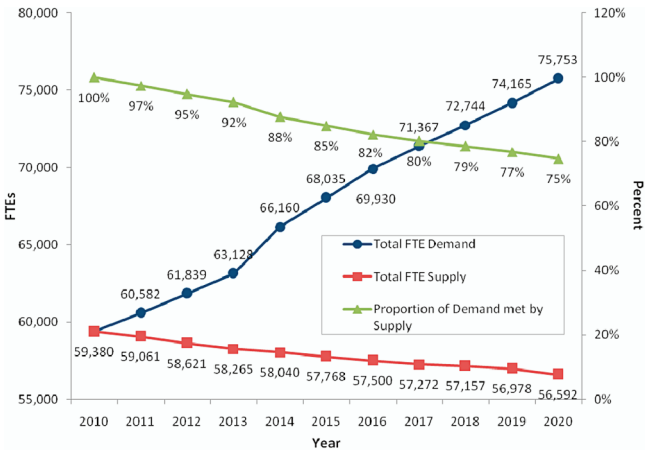

Figure 25. Demand and supply projections of dietitian workforce under "low" scenarios. FTE=full-time equivalents.

The "low" scenario (Figure 25) is similar to the baseline projection in that supply and demand are assumed to be in equilibrium in 2010. In 2010, CDR-credentialed dietetics practitioners provided approximately 64% of dietetics-related services, both clinical and nonclinical. The "low" scenario assumes that the CDR-credentialed dietetics workforce will provide the same level of service, 64% of demand, for the next 10 years. With these assumptions, the shortfall between supply and demand is slightly higher than the baseline projection.

DISCUSSION

The findings of the dietetics projection model indicate excess demand for the services of CDR-credentialed dietetics practitioners in the United States. Several factors are producing this excess. First, the population is both growing and aging. Because the prevalence rate of diet- and nutrition-related conditions are higher for older individuals in the population, the demand for dietetics services grows more than aggregate population. Second, demand increases with per-capita income growth. A modest assumption of a 1% rate of growth (during the past 2 decades in income) has a significant effect on demand. Third, a large number of CDR-credentialed dietetics practitioners are baby boomers. Those RDs aged ≥50 years will leave the workforce or may reduce work hours over the next decade.

Higher earnings in the profession are probable under increasing demand scenarios. If internships are expanded, they are likely to be filled. In addition, higher earnings may encourage some CDR-credentialed dietetics practitioners to delay retirement and others to expand work hours. Both of these factors will reduce excess demand for expanding supply. The authors suggest that excess demand is likely to lead to higher productivity. Because an RD's time will become more valuable, strategies to effectively use an RD's time will become more common. For instance, optimal ratios of RD/DTR to school district populations may be measures to reduce excess demand.

Market factors are likely to increase demand of dietetics services beginning mid-decade. This is largely due to the epidemiology of the population, which is trending toward increasing obesity and chronic disease, health care reform, and the expansion of health care services to 22 million to 50 million people. Such excess demand is likely to further encourage practice efficiencies such as group practices, group education sessions, and improved technology in delivering services. However, excess demand opens up opportunities for noncredentialed dietetics practitioners—such as naturopathic physicians, athletic trainers, nurses, and other health professionals—to provide dietetics-related services. State-level regulatory policies do not appear to have the desired effect on constraining services to one health profession, as desired.

The increased demand for dietetics services can be partially met if a higher proportion of the RDs and DTRs enter the workforce. As of 2010, 76% of the RDs/DTRs were actively working as dietetics practitioners.

Although some strategies of efficiency are likely to mitigate the level of excess demand observed during the next decade, the level of excess demand predicted in these models suggest that proactive interventions on the part of the RD community may be warranted. These interventions include the following:

- expanding the number of internship positions;
- targeting (and marketing) high school counselors, students, and college/university students about the future of the dietetics profession;
- inaugurating a longitudinal cohort study of CDR-credentialed dietetics practitioners with periodic brief surveys to understand workforce behavior and influences of different work settings; oversampling men for these surveys may identify factors useful for recruiting purposes;
- disseminating information about practice efficiency methods and providing support to CDR-credentialed dietetics practitioners undertaking practice efficiency improvements;
- disseminating information on best practices, including information on optimal lengths of follow-up and use of information technology to encourage appropriate follow-up appointments;
- conducting comparative effectiveness research on optimal use of RDs in various practice sectors; and
- creating professional growth opportunities for CDR-credentialed dietetics practitioners in each of the practice areas.

CONCLUSIONS

The supply of dietetics practitioners is expected to increase by at least 7% during the 2010-2020 decade, consistent with growth in many health profession sectors. Employment growth is predicted because of an increasing emphasis on disease prevention through improved dietary habits. A growing and aging population will increase demand for counseling and treatment in hospitals, residential care facilities, schools, prisons, community health programs, and home health care agencies. Employment opportunities in the food industry are expected to grow as a result of increasing population awareness of the importance of diet in overall health and well-being, along with increases in those eligible for dietetics services. An increased public awareness of obesity and diabetes contributes to this demand. Employment opportunities may be in competition from substitutes for RDs. Specialization in renal and diabetes nutrition or gerontologic care may benefit from the growing number of persons with diabetes and the aging of the population.

It appears that the annual demand for dietetics services will outstrip the supply of CDR-credentialed dietetics practitioners throughout the decade. If supply factors and limitations persist, there will be a shortfall between demand for services and the capacity of the dietetics-related workforce. By 2020, a projected shortfall of approximately 18,000 full-time workers may exist. It is important to identify the gaps in supply and demand by practice areas. The excess demand for CDR-credentialed dietetics practitioners could result in demand-driven supply. However, practice areas, such as clinical inpatient and outpatient, also have the lowest average income for CDR-credentialed dietetics practitioners. Excess demand for

CDR-credentialed dietetics practitioners may result in higher incomes over the next 10 years.

Taking proactive steps to produce more efficient services, improve quality of care, and developing adequate practices for the number of clients seen is essential for maintaining high levels of productivity and job satisfaction in the dietetics community while providing the best quality of care for all citizens. Furthermore, leaders in the dietetics profession should consider expanding opportunities to enter the profession to help mitigate the shortfall.

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Additional Resources

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Implications of the Dietetics Workforce Demand Study

Nora Nyland, PhD, RD, CD; Linda Lafferty, PhD, RD, FADA, LDN

THE 2-YEAR DIETETICS WORKFORCE Demand Study included extensive literature reviews, futuristic visioning with expert opinion, public policy examination, analysis of numerous research surveys, and data-based modeling. So what do all of these documents and data reveal? Although all analysts approached workforce demand using different methodologies and perspectives, some common themes emerged and are summarized in the Sidebar. The following narrative addresses the supply and demand factors and next steps that the Dietetics Workforce Demand Study Task Force believes are important and that will immediately influence the future workforce supply and the profession.

SUPPLY/DEMAND FACTORS

Change

Probably the most compelling theme is that change is constant. It arises simultaneously from multiple sources and offers dietetics practitioners both challenges and opportunities.

Demographic Shifts and Population Risk Factors

There are dramatic demographic shifts underway in the age and racial/ethnic composition of the US population, affecting both the practice of dietetics and the dietetics workforce. The aging population increases the need for preventive care, wellness, and chronic-disease management. An aging population and increased cultural diversity will push dietetics practitioners to adapt existing programs and services as well as create new services. In addition, the incidence of overweight and obesity, which are associated with increased risk for chronic diseases such as cardiovascular disease and diabetes, will have a major impact on the dietetics profession.

The aging of registered dietitians (RDs) also affects the profession. With an average member age of 47 years, the lack of sufficient practitioners with the experience needed to fill positions opened by pending retirements will result in demand exceeding supply, especially in upper-level positions.

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Legislation

Although the implementation details of the 2010 *Patient Protection and Affordable Care Act* have yet to be finalized, health care reform is a reality. Currently, nutrition services provided by RDs are not specifically mandated in the act. However, the opportunity exists to enhance professional presence and the provision of those services. Demonstrating the cost-effective benefits of RD services on patient and client outcomes will be critical.

Bifurcation of Health Care Labor Force

The trend of the health care labor force to bifurcate between technically prepared and advanced-level practitioners results in a practice model where advanced-level practitioners direct a cadre of health care providers with a technical or basic level of training. This model increases demand for practitioners at both ends of the education spectrum and gives impetus to the Academy of Nutrition and Dietetics emphasis on defining, recognizing, and supporting multiple levels of practice in a variety of practice areas.

Change Agents

On the whole, RDs have maintained only basic business skills, while medical nutrition skills have expanded. The resulting benefit is that the public has been protected by ensuring, through credentialing and/or licensure, that RDs are the providers of medical nutrition therapy in most states. However, the detriment is that the majority of dietetics practitioners serve in staff rather than leadership/management positions. As a result, leadership of food and nutrition services is often filled by other disciplines.

Interdisciplinary Teams

Interdisciplinary teaming offers challenges and opportunities for all medical professionals. The ability to cooperatively focus the expertise of diverse disciplines on the desired outcome for the patient, client, or project is critical. This trend offers opportunities to demonstrate expertise, effectiveness, and leadership. Rigorous scientific training positions RDs to be highly valued members of a medical interdisciplinary team. With additional leadership and business skills, RDs could lead these teams in many settings.

Advanced Practice

The percent of RDs who hold specialist credentials (15%) is higher than practitioners in other allied health and nursing professions, but differentiating specialist practice and advanced practice activities from general practice activities has been difficult. RDs who hold specialist credentials report personal benefits, but employers have yet to value and demand practitioners with specialist credentials in large numbers. There is currently no advanced practice credential (a different designation than specialist) available from the Academy, but this issue is being studied. Although recognition of both specialist and advanced practice skills will be important in the future, the future scan published in this Supplement also indicates that skilled generalists will have important roles to play in a fast-changing environment.

Increased Competition

Competition for dietetics roles and jobs comes from several sources. Included in these ranks are practitioners academically prepared in other health-related professions whose scopes of practice blur into the dietetics practitioner's role. In addition, graduates of Didactic Programs in Dietetics who do not complete dietetic internships to become credentialed professionals often want to work in the dietetics profession. Another source of competition is individuals without academic preparation or credentials but who identify themselves as nutrition and health experts.

Demand that Exceeds Supply

The current projection is that by 2020, only 75% of the demand for dietetics practitioners will be met, unless the supply increases dramatically. This is both sobering

Sidebar: Dietetics Workforce Demand Study Summary

Themes

- Strategically manage the projected gap between supply and demand
- Position the profession to meet anticipated priority changes:
  - Aging within the population and the profession
  - Diversity within the population and the profession
  - Population risk factors and the prevalence of obesity and chronic diseases
  - Health care financing
- Align dietetics workforce with the trend of health care professions to bifurcate between 2-year degrees and advanced practice degrees and marketplace factors that promote multiple levels of practice
- Strategically plan for increased competition resulting from supply/demand gap
- Enhance RD/DTR competency related to roles as leaders, change agents, and influencers
- Resolve issues related to definition of, recognition of, and support for advanced practitioners
- Prepare practitioners to effectively lead or serve on multidisciplinary teams

Research Needed to Inform Future Practice

- Continually monitor/update workforce demand projections and periodically review assumptions and projections
- Determine RD/DTR interest/competency in practicing in growth areas, such as aging
- Assess geographic distribution of RD/DTR
- Conduct cohort study to assess RD/DTR career paths and levels of practice
- Explore telemedicine opportunities and impact on supply/demand
- Delineate roles and emerging opportunities for RD, DTR, and Didactic Program in Dietetics (DPD) graduates
- Determine impact on RD/DTR of projected bifurcation of health care workforce and related market factors
- Assess market/employer/practitioner interest in advanced and specialty dietetic practitioners
- Identify competencies needed to effectively lead/serve on interdisciplinary teams
- Quantify value of dietetics services through outcomes research
- Identify staffing ratios and practice efficiencies
- Project number and practice settings of RDs and DTRs in different levels of care
- Workforce outlook assessment of dietetics educators
- Determine support needed for RDs re-entering practice
- Identify factors influencing market demand and individual practice preferences for full-time and part-time RD employment
- Assess RD/DTR working conditions/environment
- Describe consumer and health care consumer trends
- Develop research guidelines to ensure comparability among studies examining dietetics workforce supply and demand, assessments of practice, and RD and DTR surveys
- Evaluate effectiveness of the Professional Development Portfolio (PDP) process

Professional Development/Credentialing Considerations

- Provide opportunities and education to explore emerging dietetics practice sectors
- Consider market importance of business skills for all practitioners and offer supporting education
- Ensure technological competence of dietetics practitioners
- Develop measures, models, and strategies to assure effective and efficient practice
- Seek and embrace opportunities to acquire executive level vision and skills
- Align professional development guidelines with future practice challenges
- Explore advisability of establishing continuing education priorities/mandates
- Continue support of career development at different levels of practice

Possible Strategy and Advocacy Actions

- Advocate for training support for RDs working with underserved population segments
- Take a global perspective on workforce recruitment and opportunities
- Establish a systematic way to identify and adapt to scientific developments, technology

(continued)

and exciting news. The supply/demand gap might provide already credentialed dietetics practitioners with economic advantages in the short-term. However, this also provides competitors with opportunities for market positions. If RDs and dietetic technicians, registered, do not meet employment demand, competitors will fill the nonregulated positions and economic advantages for dietetics practitioners will quickly erode.

NEXT STEPS

Strategically managing the supply of dietetics practitioners to meet the demand is critical. Identification of factors affecting supply and demand prepares both the profession and individuals to thrive in a changing environment.

Demographic Changes

Although cultural diversity is rising, the profession remains overwhelmingly white. Recruiting students from other racial and ethnic groups is increasingly important to meet the needs of all individuals who may require or seek out dietetics services.

Population Risk Factors and Legislation

Research on the outcomes of dietetics services in a variety of settings will provide evidence needed to influence legislation that protects the public and ensures the role of the RD/DTR in disease prevention and treatment. Developing even better counseling skills will enable dietetics practitioners to effectively affect health outcomes.

Bifurcation of Labor Force and Practice Levels

Defining, credentialing, and supporting advanced practice levels will be essential in meeting the demands for dietetics services created by bifurcation between technical and advanced practitioners in the health care labor force. The profession must expedite efforts to accomplish this while also attending to the small supply of DTRs.

Change Agents

Dietetics practitioners should regain the management and foodservice practice sectors by enhancing business skills. "Business" is the language of employers, and all RDs and DTRs must acquire business skills to remain viable in the future work environment. From its inception as a profession, dietetics practitioners have been educated to improve the nutrition status of institution-bound people through the food prepared and served. Improving nutrition status and food safety by managing food and nutrition services is an important role for which dietetics practitioners are uniquely prepared.

Sidebar: Dietetics Workforce Demand Study Summary

(continued)

- Promote the appeal of work/family balance and flexibility to employers, prospective RDs
- Pursue full employment of existing RDs to meet demand
- Offer avenues for successful retooling for career re-entry
- Recognize the importance of culture change in strategically managing workforce supply and demand

Next Steps

- Strategically manage supply to meet demand
  - Maintain/expand practice sectors where RDs and DTRs serve
  - Retain and fully employ active RDs and support career re-entry of inactive RDs
  - Recruit prospective students with an interest in food and nutrition
  - Be proactive about competition and collaboration with other professionals
  - Remain relevant and advance practice to meet future challenges
  - Cultivate multiple levels of practice to meet marketplace demands
- Acquire business skills to effectively interface with and/or lead decision makers
- Recognize the shared responsibility between the individual practitioner, organization, and profession for research, culture, and identity to ensure future practice relevance
- Regularly project manpower demand and supply (using the Lewin model developed for this project)
- Promote use of this information among leadership of organized Academy units in strategic planning and developing annual program of work

Because leaders and managers make decisions that influence the employment environment of others, dietetics practitioners need to be included in their ranks. In addition, compensation is linked to the management of risk, resources, and revenues. Failure to qualify for or accept management/leadership roles will negatively affect the profession. Without dietetics practitioners in the board room, advocacy for their competencies and services is decreased.

Interdisciplinary Teams

With the trend toward an interdisciplinary team approach to the provision of medical services, RDs and DTRs must be competent to work effectively in this environment. Respect for the expertise of others and the ability to communicate clearly and negotiate rationally are among the critical skills needed to ensure success.

Competition Increases

If the model for demand is accurate, the projected supply of RDs and DTRs will not meet the projected demand in 2020. Therefore, it is imperative that strategies be devised to manage supply and demand, influence legislation, and interface with competitors to ensure the safety of the public.

The dietetics education structure creates some competition in the form of the Didactic Program in Dietetics (DPD) graduate who does not have the opportunity to complete supervised practice requirements. Many efforts have been made to resolve this issue, including the Commission on Dietetic Registration's DTR Pathway 3, which allows DPD graduates to take the DTR examination. In addition, in September 2011, the Commission on Accreditation of Dietetics Education introduced Individual Supervised Practice Programs, with the goal of adding 200 new supervised practice positions by Fall 2012. Academy leadership continues to focus on ameliorating this issue.

Professional Career Development

The education and training of dietetics practitioners sets the foundation for the career, but it is only the foundation. Individual practitioners must take responsibility for their own progression and development. The Professional Development Portfolio should include plans that stretch, grow, and increase value for the RD or DTR.

Shared Responsibility

Thriving in the future requires participation of the Academy, the profession, and the individual. Professionals can ignore the changing environment at their peril—or, they can respond to and influence that environment to position RDs and DTRs as the unequivocal food and nutrition experts who substantially affect the health and wellness of individuals and populations in a variety of settings. The Academy of Nutrition and Dietetics leadership will move the profession toward its preferred future. However, each practitioner has an individual responsibility to seek, create, and seize opportunities to advance his or her career, demonstrate value, and deliver excellent service.

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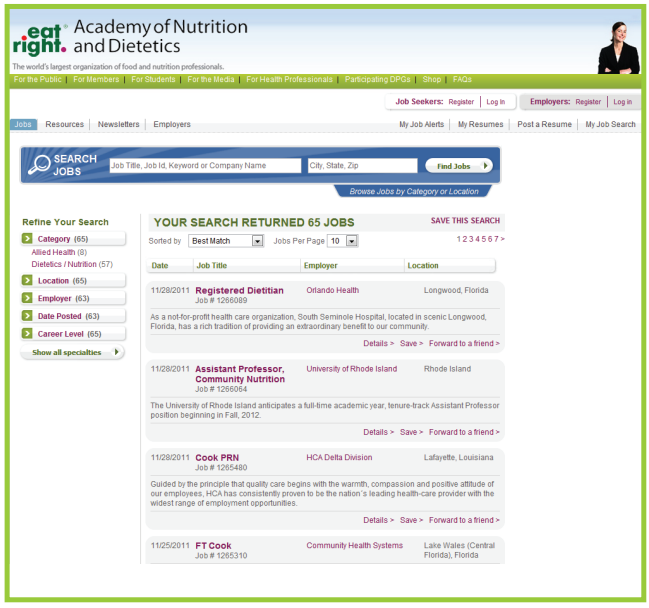

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