Addressing Nursing Workforce Issues in the Commonwealth of Virginia

Goal: Effective infrastructure to support workforce planning and policy making require better data collection and an improved information infrastructure

Objectives:
- Continue participation on the Department of Health Professions Healthcare Workforce Data Center
- Conduct APRN's survey (in progress)
- Participation and dissemination of information from the Virginia Workforce Development Authority to inform RAC workgroups
- Attend the National Nursing Workforce "Longview" Conference in order to ensure minimum data sets are established across states
- Support the National Council of State Board of Nursing's (NCSBN) efforts to standardize data collection
- Identify private and public funds to increase capacity in baccalaureate programs

Long term: Improve data collection and information infrastructure

Objectives:
- Achieve consensus around the minimum data sets
- Develop and implement specific geographical demand models for nursing and other health professions

Background

Virginia like so many other states will be challenged to maintain an adequate health care provider workforce that will meet the needs of the state's population in the coming decades. Faced with the need to reduce costs, provide safe, quality, and accessible health care, health professionals, legislators and other stakeholders have come together to engage in more thought provoking strategic planning. A shortage of nurses, the largest of the health care provider groups, has the potential to significantly impact numerous aspects of the health care system leading to detrimental outcomes to the economy and to residents of the Commonwealth. Multiple factors are converging that will increase pressure to establish a long term plan to produce, recruit, and retain nurses in the Commonwealth:

- The current RN workforce is aging and many will soon retire.

- Virginia's population is growing, with the most rapid growth among the elderly.

- The federal Patient Protection and Affordable Care Act (PPACA) will provide more previously uninsured Virginia residents access to health insurance.

- Chronic disease rates are increasing.

To help plan for these trends, this white paper is based on a search of the literature, discussions with nursing workforce center executive directors, and other health care executives in the state. The need to collect reliable state-level data is critical in guiding workforce planners in the use of scarce state funding. The purpose of this paper is twofold: 1) describe factors associated with maintaining adequate supply and demand data in order to document limitations to the existing process and structure that may interfere with timely responses to health care needs; 2) develop policy recommendations which assume a proactive approach to meeting the health care needs of the residents of Virginia. For purposes of this paper nursing workforce includes the following health care providers: Certified Nurse Aides (CNAs), Licensed Practical Nurses (LPNs), Registered Nurses (RNs), and Clinical Nurse Specialists (CNSs), Nurse Practitioners (NPs), Nurse Midwives (CNMWs), and Registered Nurse Anesthetists (CRNAs).

Findings

Virginia was one of the early planners of the movement to build systems of nursing workforce development and planning to meet the changing needs of the health care system. In 1995, the Robert Wood Johnson Foundation funded a national program called Colleagues in Caring (CIC) marking the beginning of the first nursing workforce centers (Cleary and Rice, 2005). Many states went on to obtain state or other funding to establish state centers for nursing (Nooney et al, 2011). The Department of Health Professions Healthcare Workforce Data Center (HWDC) was established in the spring of 2008 following recommendation of the Governor's Health Reform Commission of 2007. The Center's mission is to:

> *"improve the healthcare system in the Commonwealth by improving data collection and measurement of the Commonwealth's healthcare workforce through regular assessment of workforce supply and demand."*

Nursing is just one of the health professions groups included under this legislation. Other groups include physicians, dentists, physician assistants, clinical psychologists and more. Ultimately the over 80 professions regulated within the Department will be surveyed as resources permit. As reported HWDC's *Forecasting Nurse Supply and Demand 2008-2028* published in January 2010, Virginia's nursing supply and demand was projected by applying the Nurse Supply Model (NSM) and Nurse Demand Model (NDM) respectively developed by the U.S. Health and

Resources Services Administration (HRSA). The NSM is based on information collected from the National Sample Survey of Registered Nurses (NSSRN). [1]

<u>Supply</u>
Currently information about nursing supply is available based on primary data collected through licensure renewal. The DHP Statistics page (http://www.dhp.virginia.gov/about/quarterly_states.htm) indicates there were 88,846 RNs licensed in the Commonwealth in 2008[2] compared to the forecast estimates for 2008[3] of 91,239 licensed RNs, which is a three percent difference between actual and projected estimates of RN supply. The number of licensed RNs may be different than the actual number actively practicing in the workforce. The forecast estimates of RNs active in the workforce for that same time period are 78,830.

Virginia uses licensure renewal as the primary source of data collection which occurs once every two years for LPNs, RNs, and NPs. There is no other mechanism in place that accounts for other health care provider groups listed in Appendix A.   In 2008, the Department of Health Professions Healthcare Workforce Data Center (HWDC) Advisory Council directed that work begin to retool the Board of Nursing's existing survey to better inform on specific workforce-related issues. The new CNA Workforce Survey was similarly developed in early 2010 with help from the Committee and a CNA Workforce Workgroup. This survey was launched in July 2010. Finally, the HWDC Nurse Practitioner Workgroup developed the HWDC Nurse Practitioner Workforce Survey in 2010 which was launched in February 2011.

The ability to perform comparisons across groups such as other states and municipalities is important to informing workforce-related policy within and across states. This process was facilitated by the development of the National Minimum Nurse Dataset (MDS) by the National Forum of State Nursing Workforce Centers (Forum). The Minimum Nurse Dataset Workgroup

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[1] For further details on the methods used by HWDC to obtain the supply and demand projections, see the full report at http://www.dhp.virginia.gov/hwdc/docs/ForecastingNurseSandD2008-2028.pdf

[2] http://www.dhp.virginia.gov/hwdc/docs/RNFactSheet_08.pdf
[3] http://www.dhp.virginia.gov/hwdc/docs/ForescastingNurseSandD2008-2028.pdf

identified the most critical items for the minimum dataset. Their work determined that to develop a national database the data must be available, complete, and usable in addition to having sufficient quality that their content can be specified. Consequently, the following criteria must be met:

- Hospital staffing data are collected by a statewide organization
- The organization is willing to make data available
- The data are relatively complete (80% or more of the hospitals report the data)
- Hospital identifiers exist
- Staffing categories separate the types of nurses and include at least RNs and LPNs or LVNs
- Staffing categories are in FTEs, or hours, or are capable of being converted to those categories
- Areas of work are delineated
- The unit measurement is defined
- The data collection time frame is clear
- Some caution should be exercised when drawing conclusions from sample survey results.

Using the National Minimum Data Set (MDS) would facilitate cross-state comparisons and the potential of a national repository of data. Although most Forum subscribers have adopted the MDS, coding variations will prevent the cross-state comparisons previously expected (Nooney, et al, 2011). The National Sample Survey of Registered Nurses (NSSRN) conducted every four years by the U.S. Department of Health and Human Services Bureau of Health Professions Health Resources and Services Administration (HRSA) the national survey that sampled registered nurses from each state, allows for cross state comparisons[4].

While sample surveys allow for between state comparisons, Reiner, et al (2005) raises concern about using national sample data to report projections for small states.   HRSA, during its survey reported that the state of Vermont was not projected to have a nursing shortage in either 2000 or 2020 but results were not consistent with state level reports. This raises concern about using national data to report projections for small states. Spetz and Kovner (2011) describe the benefits and drawbacks of sample surveys. The benefits of a sample survey include: the survey can be extensive and address many issues of interest, can be conducted when funds are available and there is less variation in the response rates. On

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[4] For information on the efforts of HRSA related to health professional workforce, including nursing professions, see http://bhpr.hrsa.gov/

the other hand, the drawbacks are: lower response rates than re-licensure surveys; can be expensive due to the length and complexity of the survey; if the sample is not large enough it may not represent each jurisdiction's RN's workforce (pg. 99). Supply of nurses can be measured using state license databases as long as RNs who have licenses in multiple states are identified, i.e. members of a Compact. Virginia is a Compact state.   Virginia no longer needs to rely on licensure data alone, since HWDC now has LPN, NP (which include CNMWs), and CNA surveys that collect workforce-specific data on an ongoing basis. A CRNA survey is planned for the future, as well.

Funding.   A secure funding source is essential to maintaining a consistent process and structure for collecting supply and demand data which can be costly. Workforce data collection in Virginia is supported by licensure renewal fees. Also, the HRSA workforce implementation grant funding in partnership with the Virginia Health Workforce Development Authority, primarily supports the data collection with limited analyses and the HRSA workforce implementation grant funding also supports a new system in Virginia to assist localities in reporting.   The IOM report recommends making data available to researchers to promote evidence based planning (IOM, 2010). Basic to this discussion is to learn the current number of practicing nurses in Virginia.

Using full-time equivalents (FTEs) to represent the number of practicing nurses is expressed so as to focus on nurse service rather than a mere body count which would include a wide variety of functioning healthcare service hours. The use of FTEs also enables comparison with national and other state data.

According to 2010 Virginia Health Information data (VHI, 2010), the existing number of RN FTEs in Virginia is:

- RN FTEs on Hospital Payroll   27,706.5
- RN FTEs under Contract   392.6
- RN FTEs in Patient Care   25,162.9
- RN FTEs in Administration/Management   2,877.9

                  Total   56,139.9

However, VHI information when compared to HWDC projections raises issues when reporting information from different sources that rely on different data collection methodologies. First, VHI data represent nursing workforce employed in hospital settings and secondly HWDC information is based on projections. We know that we there is no single source that will allow reporting of nurse workforce supply and demand for all practice settings which would represent a major financial expenditure.

Demand. Over the next two decades, Virginia's population is expected to grow by a million (Virginia Health Workforce Development Initiative, 2009). It will also be aging; current and new residents will increasingly be members of the Baby Boomer generation. The increasing need for healthcare services by this population has a direct impact on the number of nurses needed to meet impending demand. Collecting demand data is more difficult to acquire since there is no single source for this data. VHI report nurse FTEs for participating hospitals and does not reflect current hires from other settings such as long term care and public health. "Demand in terms of nursing workforce is the number of positions for which employers would hire, both filled and unfilled. Budgeted demand is the number of positions for which employers wish to pay; "actual demand" is the number of positions the health care system needs in order to care for its citizens" (pg. 2, Charting Nursing's Future, 2005). In such a situation, vacancy rates have been assumed to be synonymous with demand. There is no standardized method for calculation of vacancy and turnover rates which poses problems when comparing across states. National turnover rates are averaging approximately 11% for fulltime nurse employees (NSI, 2011). Vacancy rates as described by ICONS have been used as a measure of demand (Reiner, et al, 2005). Approximately 50% of nursing workforce data centers collects demand data.

The Commonwealth uses demand predictions based on HRSA's demand model (NDM). The prediction model includes current health care use, and other factors that affect health care use such as population age, gender, and rural/urban characteristics, health care operating environment, economic conditions and population health. According to HWDC's baseline estimates, there is an expected shortfall of approximately 7,100 RN FTEs in 2020. The likelihood of meeting the expected demand is based on a number of factors, foremost is an adequate pipeline. Staiger et al (2012) report that while the national economy lost 7.5 million jobs, the health care industry gained (428,000) and hospital employment of registered nurses

increased suggesting that the national shortage of RNs appears to have ended.   According to model projections by Staiger et al, the effect on the size of the RN workforce is not expected to be felt until the latter part of 2020. Therefore, policymakers are urged to plan for the anticipated changes in the economy that will result in changes in the nursing workforce.

Nursing Education Programs. According to new data released by the American Association of Colleges of Nursing (AACN, 2012), approximately 75,587 qualified applications to professional nursing programs were turned away last year, including more than 14,354 applications to graduate programs. The top reasons reported by nursing schools for not accepting all qualified students into entry-level baccalaureate programs, include insufficient clinical teaching sites (65.2%), a lack of faculty (62.5%), limited classroom space (46.1%), insufficient preceptors (29.4%), and budget cuts (24.8%). In the 2012 issue of *The New England Journal of Medicine*, Staiger, et al (2012) found that despite the current easing of the nursing shortage due to the recession, the U.S. nursing shortage is projected to grow to 260,000 registered nurses by 2015.

Data of nursing education programs is collected by DHP at the state level and nationally by other proprietary organizations such as American Association of Colleges of Nursing (2012) and National League for Nursing (2011). The number of applicants, number of students admitted and the number that enrolls in a nursing program is more difficult to track than would appear. Students often apply to multiple programs to assure admission to a program therefore inflating the number of applicants. Then once a student is enrolled, the average time to completion of a baccalaureate prepared nurse is three years. Another year should be added to produce the nurse who has completed an internship or residency program since increasing evidence shows that new graduate retention is higher for individuals who receive the additional support upon hire. A number of factors pose barriers to nursing program expansion and production. Among them are; shortage of nursing faculty, limited classroom and clinical space. Since the recession has increased the time and choice of jobs for new graduates, care should be taken to prevent students from becoming discouraged when seeking admission to nursing programs. This is an opportunity for developing new models of nursing education to decrease the length of preparation.

Summary. The Virginia Department of Health Professions Workforce Data Center collects workforce data of all health professionals licensed in the Commonwealth. This represents a reasonable structure, but the process of data collection, analysis and reporting is limited due to limited resources. The Virginia Health Workforce Development Authority (VHWDA) was established to "facilitate the development of a statewide health profession pipeline that identifies, educates, recruits, and retains a diverse appropriately geographically distributed and culturally competent quality workforce for all Virginians"(Virginia Health Workforce Development Initiative, 2010). Yet again, too few resources have been allocated.   Resource limitations are expected to be an ongoing issue for states like Virginia and for that reason public/private partnerships might be the approach to take.

Recommendations

1. Allocate funding to include private and public sector support to educate more nursing faculty with priority given to nurses willing to enroll in a course of study fulltime
2. Provide incentives to promote partnerships to collect demand data
3. Promote collaboration between public/private agencies to develop new models of care that are cost effective, accessible, and safe

<div align="center">References</div>

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Annotated Notes

1. **Auerbach, D.I., Buerhaus, P.I., & Staiger, D.O. (2011) Registered nurse supply grows faster than projected amid surge in new entrants ages 23-26. *Health Affairs*, 30 (12), 2283-2292.** A study was conducted using the Current Population Survey and the American Community Survey as the data sources. The Current Population Survey was used to estimate employment trends for registered nurses and to project the ages and supply of RNs and physicians. The American Community Survey, is modeled after the long form of the decennial census it contains fewer questions that the Current Populations Survey and it has a much larger sample size. The increase in the new entrants ages 23-26 has resulted in influx of nurses into the workforce and faster growth in the workforce over the next two decades. The projected rate of growth to be the same as the rate of growth as the population through 2030. Due to increase in demand due to aging of US population and implementation of Affordable Care Act there remain future nurse shortages especially in the area of geriatric care and ambulatory care settings to meet the need for primary care physicians and need for a nursing workforce with diversity to match that of the population . The projections of the nursing workforce presented by Auerbach et al for 2030 will be 15% below projections by HRSA of 3.6 million.

2. **Black, L., Spetz, J, & Harrington, C. (2010), Nurses who do not nurse: Factors that predict non-nursing work in the U.S. registered nursing labor market. *Nursing Economics*, 28 (4), 245-254.** The study compared nurses who are employed outside of nursing to those who work in nursing jobs according to socio-demographic, market, and political variables to determine if the two groups are different. The sample was drawn from the NSSRN sample survey. There were differences between married and unmarried nurses. Unmarried, higher education and males were more likely to work in non-nursing jobs. Concern that non-nursing jobs contributing to gaps in nursing workforce.

3. **Buerhaus, P. Auerbach, D. & Staiger, D. (2009). The recent surge in nurse employment: Causes and implications. *Health Affairs*, 28, w657-w668.** The authors discuss the causes of the recent surge in nurse employment is due primarily to the extended length of the recession which resulted in increases in unemployment of nurse spouses leading to return to work or delays in retirement of baby boomers; increased interest in nursing by younger women due to initiatives to encourage nursing as a career. Prior to recession, the majority of increases to the nursing workforce were due to foreign-born nurses and older women. As unemployment rates increased there was decrease in hospital vacancy rates. This decrease was not observed in non-hospital settings. Appeal of hospital settings include; pay, flexibility of work schedules (3-12 hour shifts is full-time), and benefits (health). Policy implications should focus on strengthening the current workforce by improving ergonomic environment (prevent injury prone older nurses) and addressing the potential safety related implications of relying on increasing numbers of internationally educated RNs. Support

analysis of structural barriers to long-term supply such as limited capacity of nursing education programs that includes shortage of faculty, clinical sites, and classroom space. Continued emphasis in long-term opportunities in nursing once recession ends to avoid the tendency to decrease funding to nursing education programs. Particular attention should be directed to increasing diversity of workforce to mirror that found in total workforce for men and Hispanics.

4. **Buerhaus, P.I. & Auerbach, D.I. (2011). The recession's effect on hospital registered nurse employment growth.** *Nursing Economics*, **29 (4) 163-167**. The severity of the recession has lead to an extended period of unemployment among the general population, but high participation of RN employment in hospitals especially of nurses in the 50 year age range. It is thought that nurses who retired, had spouses that were laid off or experienced other financial hardships remained in the workforce or returned to the workforce thus decreasing the demand for nurses in hospitals. This trend may be directly linked to the recession with caution that an increase in retirements will follow decrease in employment rates in the general population.

5. **Douglas, K & Kerfoot, K.M. 2011). A provocative conversation with Peter I. Buerhaus, PhD, RN, FAAN.** *Nursing Economics*, **29(4), 169-182**. Discusses the issue of staffing and its impact on overall health care system. Buerhaus report that hospitals are unwilling to make major changes in staffing patterns because of the expense. COOs not convince entirely that improved staffing will result in changes in patient outcomes. Buerhaus also describes the lack of intent by nurses to assume a major role in making changes to the overall system. Nurses were found not assuming an active role toward making changes.

6. **The Florida Nursing Shortage (2011). The Florida Center for Nursing, March 2011, 1-12.** Describe demand as employed nurses (demand that has been satisfied) as well as unmet demand in the form of vacancies, pg. 5. Future demand depends on population growth, nurse retirement and healthcare reform. Highest vacancy rates were for RNs and LPNs in home health agencies (8.6 and 8.8% respectively) and lowest for RNs in hospitals and public health departments. Lowest for LPNs in psychiatric hospitals and skilled nursing facilities. The Florida center does not survey physician's offices or ambulatory care centers. Vacancies in the workforce resulted in loses to state and local tax revenues due to unfilled positions.

7. **Gardner, D. (2011). Demonstrating the value of the nursing workforce: An interview with Kathleen M. White.** *Nursing Economics*, **29 (5), 276-277**. Kathleen White in her role as senior advisor with the National Center for Workforce Analysis has identified four priorities: (1) a minimum dataset for the health professions including nursing; (2) a National Sample Survey of Nurse Practitioners; (3) a Nursing Fact Book, and (4) a forecasting model of nursing supply and demand. The NMD allows for comparisons; the NP survey is intended to improve estimates of NP services as well as develop an accurate NP supply and demand projections. The nursing fact book to be produced annually to inform the nursing community, policy makers and public about major trends in nurse demand, and a new supply and demand model is needed in order to meet the news of changing healthcare landscape.

8. **IOM (Institute of Medicine). 2011. The Future of Nursing: Leading Change, Advancing Health. Washington, DC: The National Academies Press.** The committee believes that workforce initiatives will be most successful if they analyze workforce needs across the professions rather than focusing on one profession at a time. Also, the committee identified that national data are not granular enough to permit accurate projection of regional needs. Gaps in current workforce data do not provide the number of primary care providers

required to deliver accessible, quality health care. There isn't knowledge of the proportion of each; physicians, nurses, physician assistants and other providers needed and how quickly they can be prepared. Current projection models focus on single professions. Need information that describe how health outcomes are associated with various health professions; need to know whether inter professional team-based care is more efficient, lowers costs, and leads to safer care and improved patient outcomes. RWJ Nursing Research Network made the following recommendations to the committee: develop and update core data sets that facilitate analysis of supply, demand and distribution of health care workforce across health professions; develop a workforce surveillance system that provides regular and frequent updates (every 6-12 months) on key workforce indicators: develop data and support research to evaluate the impact of new models of care delivery on health care workforce and the impact of workforce configurations on health care costs, quality, and access.

9. **Kovner, C.T., Brewer, C.S., Fairchild, S, Poornima, S., Hongsoo, K. and Djukic, M. (2007). Newly licensed RN's characteristics, work attitudes, and intentions to work,** *American Journal of Nursing***, 107(9) 58-70.** This is a study of individuals newly licensed between August 1, 2004 and July 31, 2005 after passing NCLEX exam in 51 selected MSAs in and nine rural areas in 35 states and the District of Columbia. These data represent Wave 1 of a panel survey. Wave 1 is cross-sectional and subsequent follow-up will be over time. Mailed 14,512 surveys and used 3,266 for these analyses. Follow-up will occur in two years. The study collected data in the following four areas: individual characteristics, work setting, attitudes toward and personal life, perceptions of job opportunities in other organizations locally and in other geographic areas. Findings: most worked in hospitals; most had an associates degree, 13% had changed principle job after one year and 37% felt ready to change jobs (associate degree graduates more than baccalaureate graduates; reasons for leaving were poor management and stressful work environment; 62% reported experiencing verbal abuse; most were pleased with work groups but felt they had only moderate support from supervisors.

10. **Naylor, M.D. and Kurtzman, E.T. (2010). The role of nurse practitioners in reinventing primary care. Health Affairs, 29, 893-899.** The authors recommend support of the "Consensus Model for Advanced Practice Registered Nurse Regulation which is based on a single advanced-practice RN license, enabling independent practice with no regulatory requirements for collaboration, direction or supervision." The role of nurse practitioners in primary care was analyzed in terms of the quality, cost savings, and accessibility related to meeting the charge to improving the health care system. Although a number of studies document comparable types of care provided by nurse practitioners compared to primary care physicians, disparity remains in terms of reimbursement when the NP is an independent provider. Barriers to NPs practicing to the full extent of their education and scope of practice are the variation in licensing regulation. Policymakers are urged to support removal of barriers and advocate for new models of practice and reimbursement consistent with the level of care provided by the health care practitioner.

11. **Nooney, J.G, Cleary, B.L., Moulton, P., Wiebusch, P.L., Murray, J.L., Yore, M. & Brunell, M.L. (2010). Toward standardization (Part I): Assessment of state and national workforce data sources.** *Policy, Politics, & Nursing Practice,* **11 (3), 173-183**. In describing the sources of data and how they can be used to document the supply, education and demand of the nursing workforce, the authors the pros and cons. The primary source of national data for nurse supply is the National Sample Survey of Registered Nurses (NSSRN)-

sample size 30,000 which has been conducted every 4 years since 1977 by HRSA. Two other sources include Census Bureau's Current Population Survey (CPS) administered monthly to 100,000 households and the National Survey of RNs (NSRN) conducted every 2 years since 2002, sample size 3,000 RNs. The above sources of data produce cross-sectional information and do not permit trend analysis of work histories, retirement or career change. A single source to report national demand does not exist. A critical issue is how demand is defined. Most often demand is defined in terms of vacancy rates. Sources of demand or vacancy information is produced by the American Hospital Association, the Center for Medicare and Medicaid Services, the Occupational Employment Statistics (OES) managed by the Bureau of Labor Statistics, and the American Nurses Association although these data sources are usually limited to a single setting most often hospitals that cannot be used to estimate state or national employment of nurses. Reports of other settings that rely on nurse intensive personnel is collected sporadically and cannot be combined to produce national or state-level estimates of these settings. There is no source of information that incorporates an employer's short or long-term growth projections. National data on nursing education programs in the US is the most accurate of the three. AACN and NLN are the primary sources of this information although proprietary and are not available for state level researchers and planners. State level verses national data collection; source of population-level data, smaller scale of data collection and existence of regulatory authority (board of nursing) or state workforce centers. A problem with state workforce centers has been variation in the data collected which is problematic for building a national nurse workforce database from state-level contributions. Advantages of adopting uniform methods and data definitions for nurse workforce data include: accurate state- to-state, state-to-region, and state-to-nation comparisons; access to population-level data to allow for studying smaller nursing specialties, data aggregated more frequently to allow more accurate workforce planning and the possibility to create longitudinal data set tracking nurses, nurse employment and nursing education programs. An assessment of states (26) revealed that collection of supply and nursing education program data are dominated by boards of nursing through license renewal and the workforce center analyzes and reports on the workforce portion of the renewal information. About half of the states participating collected demand data and of those 64% of this data was collected by the workforce center; 21% of states the workforce center worked with another entity such as hospital associations or departments of health. Discussion includes methodology to establish the National Nursing Workforce Minimum Dataset for supply, demand and nursing education programs which revealed an ongoing issue for all types of data was the variation in method of measurement or differences in response categories. There was less agreement among states regarding the concepts that should be included on surveys of nursing programs. Conclusions; current national data sources are inadequate for understanding nurse supply, demand and the size of the gap between supply and demand; states are a rich source of population-level data on supply and education programs (pipeline) but variations in survey methods prevent state-to-state comparisons; although there is some agreement of concepts to understand supply, demand, and education the details have yet been resolved.

12. **Reiner, K., Palumbo, M.V, McIntosh, B., Rambur, B., Kolodinsky, J., Hurowitz, L., & Ashikaga, T(2005) Measuring the nursing workforce: Clarifying the definitions.** *Medical Care Research and Review*, **62 (6), 741-755**. HRSA reported that the state of Vermont was not projected to have a nursing shortage in neither 2000 nor 2020 but results

were not consistent with state level reports. This raises concern about the using national data to report projections for small states. Predicting national or regional need for nurse is difficult because there is no consensus on the optimal number of health professional necessary to meet the population's health care needs. HRSA's demand predictions based on a model that include current health care use, and other factors that affect health care use such as population age, gender, and rural/urban characteristics, health care operating environment, economic conditions and population health. These complex models do not account for There is no standardized method for calculation of vacancy and turnover rates which poses problems when comparing across states. Authors used vacancy rates as described by Interagency Conference on Nursing Statistics (ICONS) as a measure of demand which use the number of vacant positions under recruitment (FTEs) and reports of turnover are best reported as number and type worker in the numerator and denominator for calculations.

13. **Spetz, J & Kovner, C.T. (2011). How should we collect data on the nursing workforce?** *Nursing Economics*, **29 (2), 97-100.** The Patient Protection and Affordable Care Act established the National Health Care Workforce Commission to serve as a resource for federal and state policymakers to ensure an adequate health workforce in the US. The commission is charged with developing evaluation of federal education and training programs, identifying health workforce needs and barriers to meeting those needs, and making policy recommendations to encourage innovations. The National Sample Survey of Registered Nurses (NSSRN) is conducted under the mandate of the Nurse Training Act of 1975. Samples surveys tend to be long and provide estimates of state and national levels of registered nurse supply. The pros of sample surveys can be extensive and address many issues, less variation in response rates. The drawbacks include; lower response rates than re-licensure survey, expensive due to length, may not represent each jurisdiction if sample isn't large enough. The National Minimum Dataset developed by the Forum of State Nursing Workforce Centers which is a standard set of questions asked in re-licensure surveys and would facilitate cross-state comparisons and the potential of a national repository of data.

14. **Staiger, D.O., Auerbach, D.I, Buerhaus, P.I. (2011). Health care reform and the health care workforce – The Massachusetts experience.** *The New England Journal of Medicine*, electronic download. Massachusetts used U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages. Data related to health care employment within major occupations came from the American Community Survey which is a survey developed by the U. S. Census Bureau. This is a report of the affect implementation of the Massachusetts health reform plan had on health care cost and workforce. The plan implemented in 2006 lead to employment increases by 9.5% compared to 5.5% increase for the rest of the country. Most of the difference n health care employment growth occurred in administrative occupations (18.4%) The administrative occupations include management, business and financial operations, and office and administrative support (including medical records and health information technicians). Non-administrative increases were 9.3% which includes physicians and nurses although the amount of the increase for this group is lower than for the administrative occupations. Administrative support resulted from the need to enroll the new enrollees and process applications.