

# Program Evaluation of a Nursing Workforce Intervention: The Maryland Nurse Support Program II

## EXECUTIVE SUMMARY

- ▶ A nursing workforce initiative in Maryland sought to graduate additional nursing students to become registered nurses and to increase the number and preparation levels of nursing faculty.
- ▶ Between FY 2006 and FY 2015, nearly \$100 million was awarded through 109 competitive institutional grants at 27 nursing programs across the state; 950 faculty received awards through fellowships, scholarships, and grants.
- ▶ Maryland's nursing workforce intervention increased the number of graduates by 27% through this decade-long program.
- ▶ Although Maryland outperformed the nation in the rate of increase of registered nurses, there is still a projected state shortfall of 12,100 nurses by 2025.
- ▶ It is imperative for nurse researchers and nurse leaders to address the future nursing and nurse faculty workforce shortage using effective strategies based on empirical evidence and evaluation of outcomes.
- ▶ This program evaluation informed the decision to continue investments in the nursing and faculty workforce (up to \$75 million) for an additional 5 years.

**A**MERICA'S HEALTH system relies on a large and diverse workforce, of whom 2.8 million, by far the largest segment, are registered nurses (RNs) (U.S. Department of Health and Human Services, Health Resources and Services Administration [HRSA], 2013). Repeatedly, over time and across the nation, this workforce has been insufficient. In Maryland, the shortage of nurses has been an active concern for hospitals, schools of higher education, professional organizations, and state agencies. Physicians, nurses, educators, and citizens have all collaborated with the Maryland Health Services Cost Review Commission (HSCRC) to provide direction and support to affected agencies. Originally, this support was evident through hospital-based funding of the Nurse Education Support Program (1986) and the Nurse Support Program I (2001).

Subsequently, it was determined a nursing faculty shortage was impeding the ability of schools of nursing to produce sufficient numbers of graduates to satisfy market demand. For this reason, the Nurse Support Program II (NSP II) was funded as an education-based intervention in which the HSCRC provided \$100 million to establish a competitive institutional grant program and statewide faculty initiatives. Competitive institutional grants funded efforts in individual schools to increase programs and capacity, while statewide initiatives funded individual faculty with scholarships, fellowships, and grants.

Between 2006 and 2015, 109 competitive institutional grants were funded at 27 nursing programs across the state; 950 faculty received awards through fellowships, scholarships, and grants. The two main goals were to graduate additional nursing students

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to become RNs and to increase the number and preparation levels of nursing faculty.

The process and findings of a comprehensive program evaluation conducted at the close of 10 years of NSP II funding are presented.

### **Nursing and Faculty Workforce Evidence**

The initial search covered the period 2008-2014, included five databases (PubMed, EMBASE, CINAHL, Psych-info, and Scopus) and used the following keywords: *nursing* and *faculty* and *shortage*. Inclusion criteria for review stipulated articles were written in English only; published in a peer-reviewed journal; and focused on strategies to address faculty shortages, educational capacity, and nursing workforce shortages. Clinical issues, patient care factors, or student-focused initiatives were excluded. Abstract reviews were conducted for all articles with nursing faculty shortage in the titles and all study designs that included outcome data beyond participant satisfaction to identify successful nursing faculty shortage mitigating strategies. Subsequently, hand searches of the reference lists were conducted and a sorting based on possible solutions to the faculty shortage resulted in 29 articles that met final inclusion and exclusion criteria.

Prosecution of the evidence, using the Johns Hopkins evidence-based practice tools (Dearholt & Dang, 2012), revealed no Level I (randomized control studies) or Level II (quasi-experimental studies) evidence. Level III evidence (descriptive qualitative and nonexperimental studies) addressed academic-clinical partnerships, faculty pipeline initiatives, surveys of faculty, and systematic reviews of moderate to high quality. Level IV and V evidence included quality improvement endeavors, program evaluations, financial evaluations, case study reports, and literature

reviews. Evidence-based solutions and robust evaluation of the most successful interventions were strongly recommended.

One systematic review presented 30 years of research on the clinical nursing faculty shortage, in which only 12 studies satisfied Level I or II criteria. The study team reported exemplars of innovative programs supported by legislated funding in five separate states (Allan & Aldebron, 2008), without evaluation of outcomes (Wyte-Lake, Tran, Bowman, Needleman, & Dobalian, 2013).

A set of state strategies for faculty recruitment and retention included navigating barriers, identifying and leveraging local resources, collaborating between organizations, matching stakeholder priorities, and refusing to give up (Proto & Dzurec, 2009). State funding has been correlated with RN replacement rates distributed geographically (Bargagliotti, 2009). A report on Maryland's NSP II progress (Allan, Crowley, Ports, & Aldebron, 2010) described the program and interim outcomes. State-specific models cited success with education redesign, centralizing accurate nursing supply, and demand data to inform funding and legislation (Reinhard & Hassmiller, 2011).

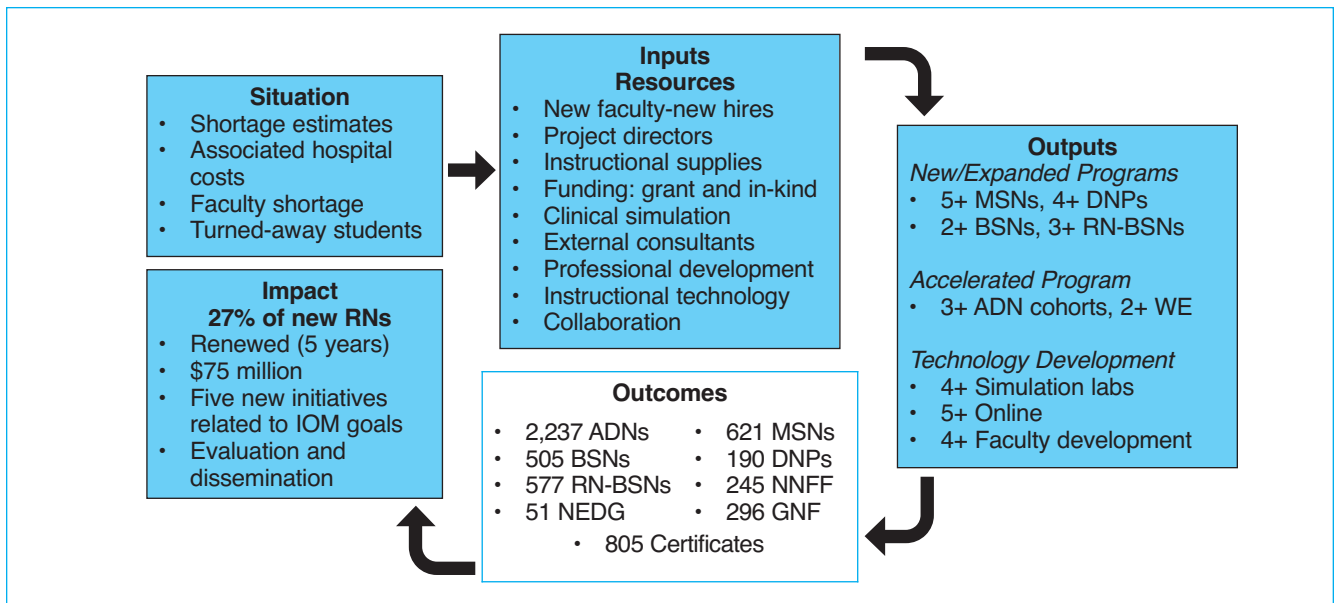
Several short-term strategies have been effective. These include recruiting staff nurses to complete master's degrees to serve as preceptors (Warren & Mills, 2009), clinical academic partnerships (Jeffries et al., 2013), hiring more adjunct faculty (McDermid, Peters, Jackson, & Daly, 2012), listening to existing faculty on effective low-cost recruitment and retention strategies (Evans, 2013), seeking aging faculty's insights (Falk, 2014), developing distance education to extend careers (Pearsall, Hodson-Carlton, & Flowers, 2012), examining leadership styles (Cummings et al., 2010), and considering faculty workload effects on intent to leave (Candela, Gutierrez, & Keating, 2013).

Additional strategies focused on the long term. The most critical issue impacting recruitment by schools of nursing is the limited pool of doctoral-prepared faculty (Fang & Li, 2012). Early indications of faculty interest through shadowing (Seldomridge, 2004) and tools to identify potential faculty at earlier stages (Samra, McGrath, & Esters, 2013) could allow for longer teaching career paths. Dual appointments for the doctor of nursing practice (DNP) across clinical and academic roles (Danzey et al., 2011; Minnick, Norman, & Donaghey, 2013) have the potential to increase the doctoral-prepared nurses available to serve as faculty. Recruiting and mentoring expert clinicians prepares a cadre of qualified teachers (Reid, Hinderer, Jarosinski, Mister, & Seldomridge, 2013; Roberts, Chrisman, & Flowers, 2013) for clinical practice sites.

Multipronged workforce interventions have been of particular interest to policymakers (Bargagliotti, 2009; Bowman et al., 2011; Gerolamo & Roemer, 2011; Kowalski & Kelley, 2013). Return on investment in solving the faculty shortage has only been addressed in one investigation (Kowalski & Kelley, 2013). This model identified eight methods for analysis utilizing a variety of surrogate variables. Return on investment ranged from 350% to 1,330% using these approaches. Regardless of the method chosen, a significant positive linkage was established between faculty investments and cost savings. There are few published studies on the faculty shortage (Duvall & Andrews, 2010); therefore, policy recommendations are made for funding and accepted without a strong evidence base (Green, Kishi, & Esperat, 2010).

In conclusion, the evidence is sparse. Evaluation of outcomes is lacking and the evidence does not provide clear direction with respect to effective faculty workforce solutions and policy. These

**Figure 1.**  
**NSP II Evaluation Logic Model**



GNF = Hal and Jo Cohen Graduate Nurse Scholarship  
 NEDG = Nurse educator doctoral grants  
 NNFF = New nurse faculty fellows  
 WE = Weekend

findings are congruent with the State of Maryland's decision to evaluate the workforce intervention funded as NSP II.

### Methods

A post hoc program evaluation was conducted to answer two questions:

1. Did the number of graduates from Maryland schools of nursing increase?
2. Did the number of nurses and nursing faculty in Maryland increase?

### Advisory Board

A seven-member advisory group was formed to include experienced project directors, representatives of community colleges, public and private universities, as well as hospital nurse researchers and nurse residency leaders. This group of nursing leaders recognized the importance of the NSP II evaluation and risk to resources for nursing education. As deans, directors, executives,

and educators, they provided perspective and input throughout the entire evaluation with Maryland Higher Education Commission and HSCRC staff. During weekly 30-minute conference calls, the group followed the brief agenda provided by the evaluator to accept assignments or define concerns. The evaluator provided emails with written minutes. Over a 6-month period, there were three meetings at the HSCRC and multiple conference calls.

### Evaluation Framework

The program evaluation was structured using Patton's Utilization Focused Evaluation (UFE) process (Patton, 2012) in combination with a logic model (University of Wisconsin-Extension, n.d.) (see Figure 1). Throughout the entire evaluation, end users (nurses, faculty, consumers, administrators, and physicians) were involved in and drivers of the UFE process. The evaluator served as collaborator, trainer, facilitator,

politician, analyst, colleague, diplomat, problem-solver, and expert. This inclusive participatory process was used across a wide variety of evaluation methods. The result was a high level of engagement by users through participation in discussions, open decision making, and ongoing deliberations about the meaning of the data and findings.

Any logic model emphasizes background situation, inputs, outputs, and outcomes; and concludes with an impact assessment. This approach was used to structure evaluation of each individual innovation as well as the program's success. The background situation that led to establishing the NSP II was complex. In 2003, the nursing shortage was acute and expected to worsen. *Maryland's Nursing Shortage: A Workforce Crisis* (Heller & Sweeney, 2003) was a call to action. Hospital costs were rising, public attention was increasing, and qualified students were being turned away from nurs-

ing schools due to a faculty shortage. National nursing workforce researchers were seeking answers to the nursing shortage. Concerned for the implications, Johnson & Johnson launched the *Campaign for Nursing's Future* in 2002 (Buerhaus, 2005). These conditions prompted the HSCRC to take action. Maryland's Higher Education Commission and Board of Nursing (2006) completed the Maryland Nursing Program Capacity Study to address workforce issues at the bedside and in the classroom. Inputs provided by NSP II included financial support, resources, new faculty members, consultants, professional development, and instructional and simulation technology. Outputs were the activities, programs, and innovations funded by the award. Outcomes to be achieved were increases in nursing faculty and graduates.

### Data Collection

Final reports were used as the primary source for data to be analyzed. The following data were gathered: numbers of additional faculty, additional students, and additional students from underrepresented groups (by sex, ethnicity, and race), student retention rates, nursing graduation rates, nursing licensure pass rates, new nurse graduates (in categories of associate degrees in nursing [ADN], bachelor degrees in nursing, master degrees [MSN], doctoral degrees [DNP], and post-graduate certificates). The annual and final reports for each of the NSP II projects across all years of activity were abstracted for these data.

A mixed methods approach was used. Quantitative data were obtained from post-hoc review of original proposal goals (see Table 1), annual and final outcome tables (see Table 2), and budgets for all closed projects. Data were entered into SPSS version 22 and descriptive statistics were run to generate a list of strategies. Narratives (see Table 3) and

**Table 1.**  
**Total Graduates from Closed Awards**

	Increase RN Pre-Licensure Graduates	Increase Graduate Degrees
Number of projects targeting initiative	18	11
Proportion of projects targeting initiative (%)	39	32
Targets	Pre-licensure RNs	MSNs & DNPs
Outcomes	2,742	632
Goals met (n)	6	4
Goals met (%)	33	36

SOURCE: HSCRC, 2015.

**Table 2.**  
**Annual and Final Measurable Outcomes Table**

Academic Year	AY	AY	AY	AY	AY
Total additional students admitted					
Total male					
Total Hispanic					
Total African American					
Total additional minority students					
Total information sessions					
New courses initiated					
Nursing students tutored					
Review sessions provided					
Retention rate (percent)					
Total nursing students graduated					
NCLEX pass rate					
Total new bedside RNs					
Total MSN graduates					
Total PhD graduates					
Total new faculty-prepared RNs					

SOURCE: HSCRC, 2015.

**Table 3.**  
**Narratives for Annual and Final Reports**

Narratives include goals, objectives, activities, and progress. Responses to the following questions are required:

- Please explain any discrepancies between the proposed and the actual numbers.
- Is the project progressing on target to meet the goals and objectives as outlined in the approved proposal? If not, please explain why.
- If the project is not on target, what adjustments will be made?
- What are the greatest challenges and/or major issues faced by the project? How will these be addressed?
- What aspects of the project have been the most successful?

SOURCE: HSCRC, 2015.



reports submitted at the close of each award were used to obtain qualitative data for thematic analysis.

Additional sources of data included publicly available reports from participating agencies.

- The Maryland Higher Education Commission provided data from all nursing programs on nursing enrollments and graduates from 2004 to 2014.
- The Maryland Hospital Association provided nursing workforce data and changes in the vacancy rates for this period.
- The Health Services Cost Review Commission provided agency nurse use comparisons and quality sensitive indicators.

### Program Evaluation Findings

A total of 41 closed projects were available for detailed analysis to determine the most successful strategies. Sixty-eight additional awards remain active, so only annual outcomes to date were included in this analysis. Nine rounds of institutional competitive grants were made to 27 nursing programs between July 1, 2005 and June 30, 2014, totaling \$63,374,650 in the form of 109 multi-year awards. Fifteen community colleges and 12 universities received funding. Schools of nursing at public universities including the state's four historically Black institutions, private universities, and community colleges across Maryland participated.

Statewide faculty-focused initiatives were available to all Maryland nursing programs. Combined with scholarship programs for nurses to complete entry-level graduate degrees, the fellowships and doctoral grants provided \$27,997,338 investment in the educational preparation and professional development of nursing faculty. These programs actively engaged nursing deans and directors through a nomination process

**Table 4.**  
**Strategy Incidence and Rate of Use by Successful Projects (n=14)**

Strategies Utilized by Successful Projects	Incidence	Rate of Use
Hiring faculty and personnel	13	93%
Instructional supplies	10	71%
Instructional technology	7	50%
External consultants	7	50%
Clinical simulation	5	36%

SOURCE: HSCRC, 2015.

and subsequently decreased open positions and increased educational capacity at schools across the state. Additional funds for FY 2015 were allocated but not released, which accounts for the difference in funded vs. awarded.

*Did the number of graduates from Maryland schools of nursing increase?* The number of graduates at every level from ADN to DNP increased. Analysis of the 41 closed awards revealed 2,742 new pre-licensure nurses graduated as a result of NSP II. Adding data from the 68 programs still in progress, 5,800 (27%) of all pre-licensure graduates reported between 2006 and 2014 were attributed to NSP II initiatives (see Table 1).

The number of graduates from MSN and DNP increased as well. A total 632 graduate degrees were awarded as a result of NSP II programs through 2010. Adding data from the 68 programs still in progress, 621 new master's degrees and 190 new doctoral degrees were directly attributed to the grant.

*Did the number of nurses and nursing faculty in Maryland increase?* NSP II has provided more than \$27 million to Maryland nursing faculty in the form of scholarships, fellowships, and grants. Since inception, 950 nurses participated in faculty-focused initiatives.

The Hal and Jo Cohen Graduate Nurse Scholarships were provided to 679 nurses between 2007 and 2014 to complete graduate degrees. Of these, 159 completed

the required graduate degrees and currently serve on faculty. An additional 156 recent graduates are available for teaching positions and the remainders are near degree completion.

New nurse faculty fellowships were provided to 245 new nurse faculty between 2007 and 2014. Of these fellows, 215 continue to teach in Maryland at 3 years for a retention rate of 87.76%. Maryland had 602 full-time nursing faculty in 2012. Of those, 127 faculty members received new nurse faculty fellowships (21%).

Nurse educator doctoral grants were provided to 51 existing nursing faculty members to help master's-prepared nurses complete terminal degrees (PhDs, DNPs, or EdDs).

*Additional findings.* Fourteen of the 41 successful projects implemented a set of five strategies. Strategy incidence and rate of use by successful projects are shown in Table 4.

*Summary of findings.* Aggregate findings from this evaluation of all NSP II programs are presented in the logic model in Figure 1. The demonstration of impact is denoted by 27% of all new pre-licensure nurses were attributed to NSP II funded projects at nursing programs across the state.

### Discussion

Maryland is the only state in the region including Delaware, Virginia, West Virginia, and Pennsylvania expected to see large declines in the RN workforce. Of 16 states expected to see

a shortfall, Maryland projects a deficiency of 12,100 RNs by 2025.

State investments have mitigated the shortage in the short-term. Nurse graduate data from Maryland's Higher Education Commission were compared to national data (HRSA, 2014) for 2008 through 2013. Maryland's increase (43%) outpaced the nation (20%).

Maryland has renewed the NSP II program, with a focus on more long-term strategies to mitigate the nursing workforce shortage projected into 2025 (HRSA, 2014).

*Effectiveness of commonly used strategies.* More individual projects were funded with larger grant awards at the state's public universities. Universities created state-wide resources through faculty development, provided online opportunities for teaching certificates, and developed modules for clinical preceptors. Smaller institutions reported higher goal attainment. These schools invested in hiring new faculty.

Each program submitted an evaluation suited to the objectives of that award and relied on internal definitions and sources of data. Using these data impeded evaluation. Absent clear reliable data at either the start or the closure of an award, rigorous evaluation was impossible.

*Recommendations.* In the future, an *a priori* evaluation plan would provide for a collection of proper data elements to allow reliable analysis.

Since no program-wide evaluation plan was instituted, this evaluation did not begin with a formal evaluation plan. Additional data collection is necessary to determine statewide impact.

*Limitations.* There is insufficient information on employment, effectiveness of workforce interventions, and return on investment in education. Different schools used different operational definitions which prevented rigorous evaluation. Sophistication with data management and analy-

sis varied across the 109 grant projects at 27 schools.

Organizational changes prove challenging. There were many changes to faculty responsibilities and availability to husband projects through to completion. Handoffs resulted in fragmentation and lack of fidelity with the original project plan. There were multiple physical relocations, leadership changes, and transitions in staff, and ongoing adjustments in project plans and budgets that could confound outcomes.

Since there is no research to provide a direct or indirect relationship to a state's investment in nurses or nurse faculty with patient care outcomes, answers to these questions elude us. In addition, higher-level data are available across seven state agencies, but data elements are not centralized and remain difficult to gather for analysis. Data infrastructure and interagency tools for measuring nursing supply and demand are not readily available.

The NSPII program evaluation was conducted by program staff evaluators and faculty volunteers familiar with the program. An external evaluator might have added different approaches or perspectives; however, time and budget constraints limited the opportunity to engage an external evaluation professional.

*Impact.* This program evaluation informed the Health Services Cost Review Commission's (2015) decision to renew the NSP II funding for approximately \$75 million for an additional 5 years. The goals and metrics selected by the NSP II for FY 2016-FY 2020 follow the blueprint established for nursing in the Institute of Medicine's (2010) *Future of Nursing* recommendations: (#4) Increase the proportion of nurses with BSNs to 80% by 2020, (#5) Double the number of nurses with a doctorate by 2020, (#6) Engage nurses in lifelong learning, and (#7) Prepare and enable nurses to lead change to advance health. Collectively,

these goals provide the foundation for developing new NSP II initiatives with associated deliverables. NSP II could be a model replicated by other states for investing in nursing faculty and building educational capacity for a stable nurse and nurse faculty workforce.

### Implications for Nurse Leaders and Faculty

Nurse-led research is needed to answer the following questions:

1. How can we establish a stronger base of evidence to support nursing and nurse faculty workforce strategies and interventions?
2. How can we measure the return on investment for the nursing and faculty workforce?
3. How can we measure the impact on patient outcomes of a more highly educated workforce?
4. How can we incentivize and interest nurse researchers in conducting and publishing research on the vital importance of a robust and highly educated nursing workforce?
5. How could we demonstrate the cost/benefit ratio for practicing clinical RNs to be provided full tuition by their employer to complete RN-BSN or higher degrees?
6. If time and money are the two greatest barriers to nurses completing the requirements for entry to practice, or baccalaureate degrees for professional nursing or the graduate education to become faculty, what can we do to reduce those barriers?

### Conclusions

The current state of health reform requires reliable workforce data to ensure adequate preparation of nurses with the right skill mix (Auerbach, Staiger, Muench, & Buehras, 2013). Nursing workforce interventions are complex, highly sensitive to a variety of factors, and deeply mingled with

availability of qualified and experienced nursing faculty. Maryland's significant financial investment created a proving ground in which to develop evidence-based, forward-thinking programming precisely suited to needs of the state, schools, faculty, and health care. At the renewal of the NSP II, the HSCRC requested an NSP II Workgroup to develop guidelines for the next awarding cycle. The Evaluation Advisory Group became the core members of a 15-member NSP II Workgroup. With their cohesiveness and experience, they successfully guided the process of embedding evaluation into the next phase of the NSP II programs.

As a direct output of this work, a set of data assessment tools, data dictionary, definition of terms, and consistent sources of metrics were developed. The data elements have been defined according to existing accreditation and program requirements. The next phase of the NSP II funding has been informed by this evaluation, fueled by the distressing projections and the promising results.

The next set of NSP II awards will be structured in a way that assures more consistent and reliable data gathering and analysis. Grantees will be required to present these standard data in the initial proposals, subsequent reports, and final reports to strengthen the ongoing program evaluation process. In addition, the nursesupport.org website is being upfitted to allow submission of data electronically to increase efficiency and better outcomes reporting tools. The next program evaluations for NSP I are due in 2017 and NSP II are due in 2020. \$

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