



DOCTOR OF NURSING PRACTICE (DNP) PROGRAM

A DNP PROJECT

EFFECTIVENESS OF NURSE RESIDENCY PROGRAMS FOR NEW GRADUATE NURSES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Abstract

Background: As many as 35% of new nurses change positions within their first year of work. The costs of turnover incurred by institutions is costly and new graduate nurses feel ill prepared to practice nursing after graduation. Nurse residency programs were developed to address these issues.

Objective: To examine the best available evidence on retention rates and perceived competency among new graduate nurses with less than 12 months of acute care clinical experience who completed a nurse residency program in a Magnet designated versus non-Magnet institution.

Method: This is a systematic review of quantitative studies involving new graduate nurses who completed a nurse residency program in an acute care setting. The standard 3-step search strategy of the Joanna Briggs Institute was used to find eligible studies. These were independently screened by title, abstract and full review for relevance by 2 reviewers. Critical appraisal was performed by two reviewers working independently using the JBI MASTARI critical appraisal tools. Data were extracted by two reviewers using the JBI MASTARI data extraction form based on the selected study's design.

Findings: Of the 14,882 articles identified, 347 full text articles were retrieved that met inclusion criteria based on abstract or title. The majority (N=338) were excluded as they did not meet criteria. This review, therefore, comprises nine quantitative studies representing 14 U.S. hospitals and 1585 new graduate nurses. A meta-analysis was conducted for retention overall and for Magnet institutions versus non-Magnet institutions. The overall retention rate of 93% [95% CI: 87-99%] indicated effectiveness of nurse residency programs for new graduate nurses in the first meta-analysis. The second meta-analysis revealed no significant difference in effectiveness of nurse residency programs comparing Magnet designated institutions versus non-Magnet institutions. Three studies revealed positive outcomes regarding perceived competency. These are discussed narratively as there was insufficient data to conduct a meta-analysis.

Conclusions: Nurse residency programs improved retention rates in this meta-analysis. An increase in retention was found at 93% [95% CI: 87-99%]. Utilization of competency assessment tools revealed improvement in self perceived competency among the new graduate nurses enrolled in a nurse residency program. While Magnet status incorporates multiple elements which impact retention, costs, and perceived competency, it is not conclusive if Magnet status is more effective than non-Magnet institutions that utilize nurse residency programs based on the findings of this systematic review. Further research would be beneficial to understand effectiveness of specific program types or tools to measure retention rates and perceived competency.

Keywords: nursing preparedness; nursing retention; nurse residency; systematic review

Table of Contents

Cover Page	1
Abstract	2
Review Question.....	4
Introduction	4
Method	7
Inclusion Criteria	7
Interventions	8
Comparators.....	8
Outcomes	8
Types of Studies	8
Search Strategy	9
Sources of Evidence.....	9
Study Selection	9
Assessment of Methodological Quality	9
Data Extraction	10
Data Synthesis	10
Assessing Certainty in the Findings.....	10
Findings	11
Data Appraisal and Extraction	12
Study Characteristics	13
Meta-Analysis.....	14
Narrative Summary.....	16
Discussion	17
Evidence Transfer	19
Part I	19
Part II.....	20
Conclusion.....	22
Limitations.....	23
Acknowledgements	23
References	24
Appendices	28
Appendix A: Search Strategy.....	28
Appendix B: Critical Appraisal From	29
Appendix C: Data Extraction Form	30
Appendix D: Table of Evidence.....	31
Appendix E: IRB Approval	34
Appendix F: IRB Closure	35
Appendix G: CITI Certifications	36

Effectiveness of Nurse Residency Programs for New Graduate Nurses: A Systematic Review and Meta-Analysis

Review Question

What is the effectiveness of nurse residency programs on retention rates and perceived competency among new graduate nurses with less than 12 months of acute care clinical experience who completed a nurse residency program in a Magnet designated as compared to a non-Magnet institution?

Introduction

Upon graduation from nursing school, graduate nurses complete a licensure examination to demonstrate the minimal knowledge necessary to practice nursing safely. Even with the successful completion of this examination, many new graduate nurses who choose to work in hospital settings may feel challenged by the experience, overwhelmed, and ill equipped for practice. This discrepancy between demonstrated knowledge and competent practice, termed a transition-to-practice gap, is not only a safety issue for hospitalized persons, but has been reported as a reason for up to 35% of new nurses changing jobs within their first year of work.¹ A 2017 survey of 136 organizations in the U.S. found that bedside registered nurse turnover averaged 14.9% among these hospitals with an annual hospital financial loss of 5.13 million dollars to 7.86 million dollars.³ Li and Jones (2013) indicated that nurse turnover results in costs ranging from \$10,000 to \$88,000 per nurse.² Further compounding the retention issue is the reported nursing shortage across the country,⁴ projecting the need for 1.1 million new registered nurses to replace retirees to avoid a nursing shortage by 2022.⁵ The shortage is expected to reach greater than a half million nurses by 2025, particularly in some specialty areas.⁶ The shortage is thought to be caused by the convergence of several factors, ranging from hospital efforts to reduce costs in the 1990s,⁶ to increased need resulting from Baby Boomer's higher utilization of healthcare to longer life spans and more sophisticated treatment options.⁷ In conjunction with high turnover rates and the overall shortage, lack of job satisfaction has been proposed as a major problem the field must confront. Prior research found that hospital nurses are four times more likely to be dissatisfied with their jobs than the average U.S. employee.⁸ Moreover, a 23% rise in nurse burnout and dissatisfaction has been reported with the addition of a single patient to a nurse's caseload.⁹

Taken together, these issues can compromise patient care and safety. For instance, increased nurse staffing is associated with fewer deaths, shorter lengths of hospital stay, lower rates of infection, and more infrequent incidents of failure-to-rescue.¹⁰ Alternately, insufficient nurse staffing has been found to be associated with greater rates of patient mortality. Notably, a 6% increase in mortality rates in understaffed units compared to sufficiently staffed ones was reported in 43 large academic health centers.¹¹ Furthermore, researchers have found an association between greater patient caseloads and higher readmission rates to the hospital.¹² Therefore, solutions are needed to address these real threats to the quality of care being provided.

Several organizations have supported changing the education and training pipeline as a means to address these issues.^{5, 13, 14} For example, a report by The Joint Commission (TJC)¹³ recommended placing greater emphasis on the transition from a nursing school to a

professional practice. This is particularly salient given findings indicating that both nurses and their supervisors perceive the transition as challenging.¹⁵ Four recommendations were provided: a) remove scope-of-practice barriers; b) expand opportunities for nurses to lead and diffuse collaborative improvement efforts; c) implement nurse residency programs (NRP); and d) increase the proportion of nurses with a baccalaureate degree to 80 percent by 2020.¹³ Similarly, the Institute of Medicine (IOM; now the National Academy of Medicine) maintains that utilizing NRPs would improve transition from a classroom to a clinical practice setting for new graduate nurses and contribute to increased retention rates and greater feelings of competence in this population.¹⁴

In the years since TJC and the IOM published their reports, a good deal of attention has been paid to the implementation of NRPs.⁴ NRPs are comprehensive, transition-to-practice programs that allow graduates to continue practicing and acquiring skills either after the completion of a pre-licensure or advanced practice degree program, or during the transition into new areas of clinical practice for more experienced nurses. NRPs are typically housed in hospitals and larger health systems and most often in acute care settings.¹³

As presented in Table 1, there are several types of nurse residency programs created by different accrediting agencies and vendors in the US. The accrediting agencies include the American Nurses Credentialing Center (ANCC), the Practice Transition Accreditation Program (PTAP), the Commission for Collegiate Nursing Education (CCNE) Entry to Practice Residency Standards, and the National Council of State Boards of Nursing (NCSBN) Transition to Practice. Commercial programs include the Versant New Graduate Nurse Residency, and there is one combined program: the Vizient/American Association of Colleges of Nursing (AACN) Nurse Residency Program.¹⁶ Some states have also developed collaborative programs. For instance, the Wisconsin Nurse Residency Program (WNRN) was developed in 2004 and launched in 2005. The program represents a collaborative effort between 50 urban and rural hospitals in Wisconsin to implement a year-long NRP that offers educational and psychosocial support to newly graduated nurses.²² Since then, NRPs have become more commonplace and the Commission on Collegiate Nursing Education created a process by which NRPs can become accredited.

Despite the increasing push for NRPs, at the time of TJC's recommendation to implement NRPs, there was little empirical evidence about the extent to which NRPs resulted in improvements in the specific challenges plaguing the field. Since then, several studies have examined the effectiveness of NRPs and reported positive outcomes, both for nurses and hospitals at large.²³⁻²⁹ For hospitals, residency programs have been found to increase retention²¹ and organizational commitment²² and are also thought to be cost-effective.²⁸ For nurses, research demonstrates that NRPs result in outcomes such as increased job satisfaction, reduced job stress, improved clinical decision-making, and increased confidence and competency.^{22, 29}

The American Association of Colleges of Nursing (AACN) strongly endorsed the implementation of NRPs in the United States (US). Their belief that these programs will ease the transition through a variety of mechanisms, including increasing confidence and competence and improved retention.⁴ Efforts to improve new nurse confidence and competence and essential components of preparedness, may be an importance piece of

tackling some of the crises in the field. Confidence has been defined as "a sense of security which is soundly-based on the nurses' awareness of her own capability, values, and rights" (p. 9),³¹ whereas competence is "the effective application of knowledge, skill, and clinical judgment in the performance of nursing care activities" (p. 11).³⁰ Previous researchers have found that new nurse graduates who rate their self-confidence about their skills as well as their competency as lower are more likely to have higher turnover intent.³² Retention, on the other hand, has been defined in various ways. For example, researchers have measured turnover by calculating everything from *stayer to leaver* ratio to the proportion of terminations in a one-year period relative to the total number of staff.³³ However, retention is distinct from turnover in that it demonstrates a given facility's ability to yield a longer average duration of employment among its staff. Reflective of worker stability, retention is sometimes defined as proportion of nurses with long periods of continuous service.³³

Table 1
Examples of Nurse Residency Programs

Program	Accreditation Model or Program	Description and Specialized Focus	URL link
American Nurses Credentialing Center (ANCC), Practice Transition Accreditation Program (PTAP)¹⁷	Hospital-based Accreditation	Six core criteria domains: -Program leadership -Organizational enculturation -Development and design -Practice-based learning -Nursing professional development -Quality outcomes	https://www.nursingworld.org/organizational-programs/accreditation/ptap/
	Accrediting agency		
Commission of Collegiate Nursing Education (CCNE), Entry to Practice Residency Standards¹⁸	Hospital-based Accreditation	Four quality standards: -Institutional commitment and resources -Curriculum -Assessment -Achievement of program outcomes	http://www.aacnursing.org/Portals/42/CCNE/PDF/CCNE-Entry-to-Practice-Residency-Standards-2015.pdf
	Accrediting agency		
National Council of State Boards of Nursing (NCSBN), Transition to Practice¹⁹	Self-learning Program	Five fee-based modules: -Communication and teamwork -Patient and family-centred care -Evidence-based practice -Quality improvement -Informatics	https://d1vy0qa05cdjr5.cloudfront.net/23be6d16-e87e-4096-9b70-5a41647dc335/Other_Documents/NewNurses/TTPCourseBookletWeb.pdf
	Accrediting agency		
Versant New Graduate Nurse Residency²⁰	Hospital-based Program	Core curriculum focussing on confidence and competence -Leadership -Patient safety and outcomes -Professional role	https://www.versant.org/new-graduate-residency/
	Vendor		
Vizient/American Association of College Program of Nursing (AACN) Nurse Residency Program²¹	Hospital-based Program	Six Curricular Threads: -Critical thinking and clinical reasoning -Patient safety leadership -Interprofessional communication -Evidence-based practice -Patient and family centered care -Professional progression	https://www.scha.org/files/jwillingham_vizient_nurse_residency.pdf
	Vendor		

A 2019 systematic review by Brooke and colleagues found that 27-52 week internship/residency or orientation/transition to practice programs that involve teaching, preceptorship and mentorship are among the most promising interventions with respect to improvements in nurse retention.³ Additionally, a systematic review conducted by Edwards and colleagues from 2015 found that internship/residency programs and graduate nurse orientation programs both led to increased competency among participants. This remained consistent, despite differences in program duration or type and regardless of who rated competency level (self or supervisor). Ultimately, the results of the review indicated that it is not a matter of which transitional support strategy but rather the focus and investment in a strategy, in general, that eases the transition of nurses from education to practice and leads to successful outcomes. Being implemented at all leads to successful outcomes, such as increased retention and improved overall experience.³⁴

From 2010 to present, 13 other systematic reviews examined factors contributing to job satisfaction among NRP participants,^{27, 35-44} well as the relationship between new NRPs and potential outcomes such as retention rates,^{16, 27, 35-42, 44, 45} perceived satisfaction,^{27, 35-44} clinical decision making,^{27, 35, 36, 38-43, 45} and clinical leadership skills,^{27, 35, 36, 38-45} confidence and competence,^{27, 35-37, 40-45} and reduced anxiety.^{27, 38, 41-43, 45} However, despite the field's growing commitment to the implementation of NRPs to improve both nurse-specific and hospital-wide outcomes, to date, there have been no comprehensive evaluation of the literature regarding specific effects of NRPs on both retention (i.e., mean employment duration) and nursing preparedness (i.e., competence). This review filled that gap.

With these considerations in mind, the objective of this review was to examine the effectiveness of NRPs on retention rates and perceived competency among new graduate nurses with less than 12 months of acute care clinical experience who completed a NRP in a Magnet designated as compared to a non-Magnet institution.

Method

This systematic review was conducted in accordance with the Joanna Briggs Institute methodology for systematic reviews of effectiveness and the PRISMA statement.⁴⁶ A systematic review is the most reliable source of evidence to guide clinical practice. Its purpose is to summarize all the available primary research in response to a clinically focused question.⁵³ The key characteristics of a systematic review are a clearly stated set of objectives with pre-established eligibility criteria; a transparent and reproducible methodology; a systematic search to identify all relevant studies using the eligibility criteria; and an assessment of the quality of selected studies and a synthesis of the findings.⁵⁴

Inclusion Criteria

Participants

The review considered published, peer-reviewed primary studies that included new graduate nurses working in acute care settings with less than one year of clinical experience who had completed a nurse residency in the United States. Studies of nurses in hospital orientation programs and experienced nurses who were enrolled in an NRP when transposing to a new area of clinical practice were excluded. For the purposes of this review, participant definitions are found in Table 2.

Table 2
Participant Definitions

Program	Duration	Population	Institution Type	Location	Outcomes
New Graduate Nurse in a Residency Program ^{22-24, 29}	12 months	New graduate nurses	Acute settings/hospitals	Various states	Increased job satisfaction, reduced job stress, organizational commitment, retention, improved clinical decision-making, and increased confidence and competency
New Graduate Nurse in a Hospital Orientation Program ^{48, 49}	Varies	Any new hire nurses	Acute settings/hospitals	Various states	Limited Sufficient Self Efficacy Identified issues using tools

Interventions

This review considered studies that evaluated the effectiveness of NRPs for new graduate nurses who began the program with less than 12 months of acute care clinical experience. NRPs were defined as hospital-based educational programs designed to ease the transition of newly graduated nurses into professional practice. The review considered studies of NRPs with duration of 12 months. NRPs of more than one year of duration were excluded from this review as NRPs at the two-year mark did not sustain significant retention and limited literature is available assessing effectiveness of residencies greater than one year.^{3,16}

Comparators

This review considered studies that compared new nurses' retention rates and perceived competence after completing an NRP in a Magnet designated facility compared to non-Magnet facility.

Outcomes

This review considered studies that reported the following data, as either primary or secondary outcomes:

- Nurse attrition/retention/turnover rates
- Self-reported nurse competence.

Studies that did not include retention or competence as outcome measures, either as primary or secondary outcomes, were excluded as were studies taking place in other than acute care settings and those that are longer than 12 months following graduation from nursing school.

Types of Studies

This review considered both experimental and quasi-experimental study designs including randomized controlled trials, non-randomized controlled trials, before and after studies, analytical observational studies including prospective and retrospective cohort studies, case-control studies, and analytical cross-sectional studies. Only studies published in English were included. The search did not include any limitations on date of publication to increase sensitivity of results. Expert opinion, including literature reviews and editorials as well as qualitative studies were excluded. Studies with a sample size of <10 were excluded to decrease inclusion of studies with the possibility of a Type 1 error and to increase validity of

results.

Search Strategy

The search strategy aimed to locate both published studies and was conducted with the assistance of a research librarian. First, an initial limited search of PubMed was undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles and the index terms used to describe the articles were then used to develop a full search strategy across included databases. Finally, the reference list of all studies considered for appraisal were reviewed to identify any additional studies (see Appendix A for an example of the search strategy).

Initial keywords to be used included:

Nurs* residency OR
effect* OR
competenc* OR
outcome* OR
confiden* OR
retention*

Sources of Evidence

The databases searched included MEDLINE/PubMed, CINAHL, ScienceDirect, and ProQuest. Sources of unpublished studies and grey literature searched Google Scholar/MEDNar.

Study Selection

Following the search, all identified citations were collated and uploaded into EndNote X9 and duplicates removed. Titles and abstracts were then screened by two independent reviewers for assessment against the inclusion criteria for the review. Potentially relevant studies were retrieved in full and their citation details imported into the Joanna Briggs Institute (JBI) System for the Unified Management, Assessment and Review of Information (JBI SUMARI).⁴⁹ The full text of selected citations were assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of full text studies that did not meet the inclusion criteria were recorded (see Table 3). Any disagreements that arose between the reviewers at any stage of the study selection process were resolved through discussion. The results of the search are presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram (see Figure 1).⁵⁰

Assessment of Methodological Quality

Eligible studies were critically appraised by two independent reviewers at the study level for methodological quality in the review using standardized critical appraisal instruments from the Joanna Briggs Institute based on the study design. Following critical appraisal, studies that did not meet a certain quality threshold were excluded. Papers must have met any five out of eight criteria on the Joanna Briggs Institute - Meta Analysis of Statistics Assessment and Review Instrument (JBI-MASARI) to be included in the review. In addition, to be included, papers must have scored a YES answer regarding the reliability of measurement and appropriateness of statistical tests used for analysis. This decision was based on the two reviewers independently reaching consensus that the article was of reasonable

methodological quality after completing the critical appraisal.

Data Extraction

Data were extracted from studies included in the review by two independent reviewers using the standardized data extraction tool, JBI-MASARI (see Appendix B).⁴⁶ The data extracted included specific details about the populations, study methods, interventions, and outcomes of significance to the review objective (i.e., retention rates, self-reported ratings of competence) and placed in a Table of Evidence (see Table 6).

Data Synthesis

Where possible, data were pooled in a statistical meta-analysis using R (version 3.6.1) with the metafor package.⁶⁵ Effect sizes were expressed as either odds ratios (for dichotomous data) and weighted (or standardized) final post-intervention mean differences (for continuous data) and their 95% confidence intervals. Heterogeneity was assessed statistically using the standard chi-square (Q) and I square tests. Statistical analysis was performed using a random effects model.⁵¹ Since NRPs reviewed in this systematic review are not the same regarding setting, sample size, geographical location, etc., using this model would allow distribution of variance between studies. Where statistical pooling was not possible, the findings were presented in narrative form including tables and figures to aid in data presentation where appropriate. A funnel plot can be generated using Microsoft Excel to assess publication bias if there are 10 or more studies included. Statistical tests for funnel plot asymmetry (Egger test, Begg test, Harbord test) can be performed where appropriate.

Assessing Certainty in the Findings

The Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach for grading the certainty of evidence were followed⁵² and a Summary of Findings (SoF) created using GRADEPro (GDT 2018) if possible. The SoF would present the following information where appropriate: absolute risks for the treatment and control, estimates of relative risk, and a ranking of the quality of the evidence based on the risk of bias, directness, heterogeneity, precision and risk of publication bias of the review results. The outcomes reported in the SoF were to include self-reported competence.

Table 3

Exclusion Categories

Exclusion Categories	# of Articles
Systematic Reviews	41
International Studies	40
Recommendations	42
Missing Outcomes of Interest	58
Program Type	72
Program > 1 Year	0
Samples Size < 10	3
Full Text Unavailable	7
Qualitative Study	25
Unable to Verify Magnet Status	30
Unpublished Dissertations	20
Total Excluded	338
Articles that met criteria	9
Total Full Text Reviewed	347

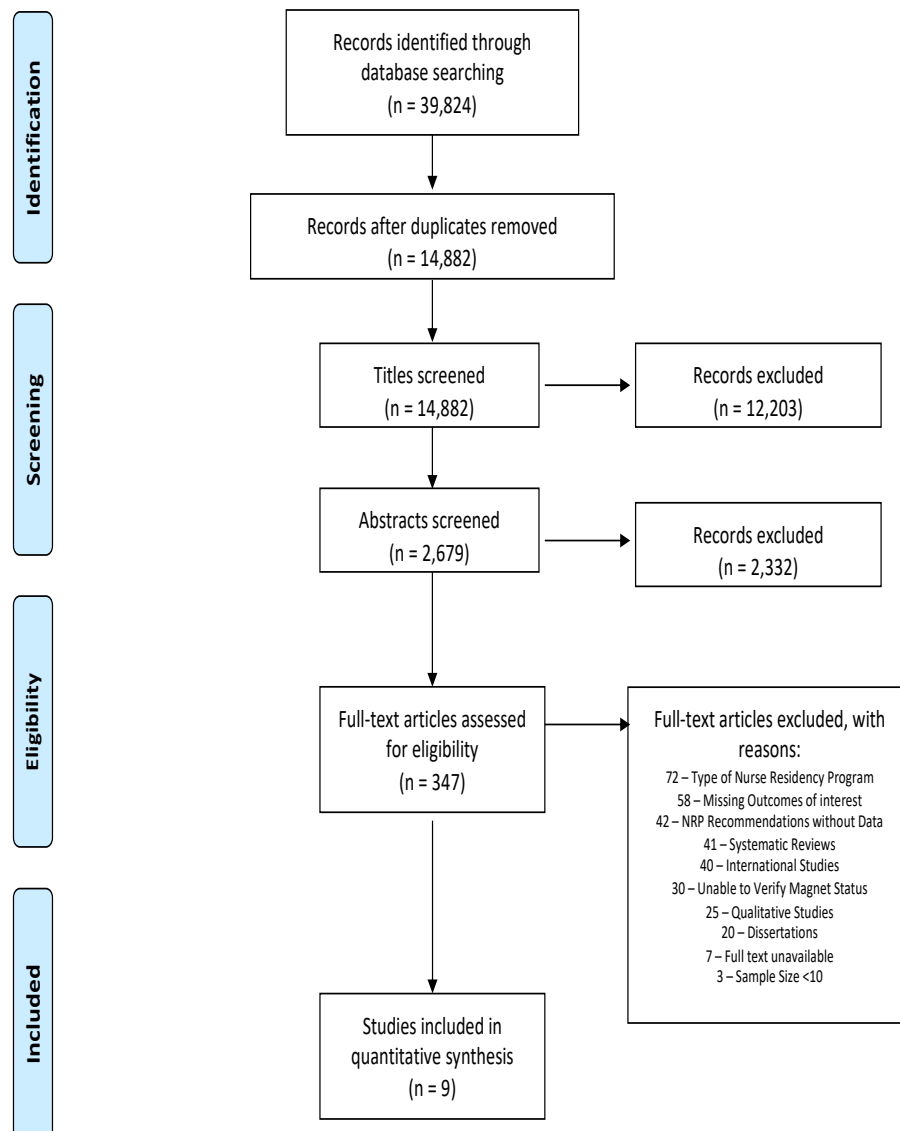


Figure 1
Prisma Diagram

Findings

The search yielded 39,824 articles (see Figure 1) and 14,882 articles remained after the removal of duplicates; 12,203 of these articles were eliminated as they did not satisfy the inclusion criteria for this review. Of the remaining 2,679 articles, their abstracts were screened resulting in the removal of 2,332 additional articles that did not meet inclusion criteria. The remaining 347 articles were reviewed of which 338 were eliminated (72 did not specify type of NRP, 58 were missing outcomes of interest, 42 did not provide data, 41 were systematic reviews, 40 were international studies, 30 were unable to be designated for magnet status, 25 were qualitative studies, 20 were unpublished dissertations, seven of which full text was unavailable). As a result, nine articles were selected for this study.⁵⁶⁻⁶⁴ One of the

included articles⁵⁶ investigated three sites. Consequently, this review contains nine articles with 11 distinct sites. A statistical meta-analysis was able to be performed on retention for all nine studies⁵⁶⁻⁶⁴; however, a statistical meta-analysis could not be done on competence due to limited comparable data. In the Narrative Summary section, details were provided for the three articles that provided limited data regarding competence.^{57, 61-62} The PRISMA diagram is presented in Figure 1, exclusion categories for the retrieved and screened articles are presented in Table 3, and codes with definitions are described in Table 4.

Table 4
Code and Definitions

Code	Definition
Previous Search	Articles that were previously in SUMARI project before official systematic review
Duplicate	More than one article presents with the same title and author
Systematic Reviews	Literature Review, Meta-Analysis, Integrative Reviews, or Systematic Reviews
International Studies	Studies carried out outside of the United States
Recommendations/Advising Statements	Non-primary research focused on advice surrounding evidence/outcomes from nurse residency research or announcements regarding research development
Missing Outcome of Interest	Primary or Secondary Outcomes do not include self-reported nurse competence/confidence or nurse attrition/retention/turnover rates
Program Type	Residency Programs that were not conducted in an acute setting, or do not fit the standard guidelines of an orientation/residency program
Programs >1 Year	Residency Programs that exceed one year in length

Data Appraisal and Extraction

The appraisals and the data extraction information of the nine included articles are presented below in Table 5 (Critical Appraisal, JBI Analytical Cross-Sectional Studies) and Table 6 (Data Extraction for Retention Post NRP). Overall, the quality of the included studies was moderate.⁵⁶⁻⁶⁴ The average post one-year retention rate was 93% [0.90%-0.96%] for non-Magnet institutions⁵⁶⁻⁵⁹ and 94% [0.91%-0.96%] for Magnet designated institutions.⁵⁹⁻⁶⁴

Table 5
Critical Appraisal, JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies

Author(s)/Year	1	2	3	4	5	6	7	8
Beyea et al. (2010) ⁵⁶	Y	Y	Y	Y	N	n/a	Y	Y
Setter et al. (2011) ⁵⁷	Y	Y	Y	n/a	N	n/a	Y	Y
Varner & Leeds (2012) ⁵⁸	Y	Y	Y	n/a	N	n/a	Y	Y
Harrison & Ledbetter (2014) ⁵⁹	Y	Y	Y	Y	N	n/a	Y	Y
Friedman et al. (2013) ⁶⁰	Y	Y	Y	Y	N	n/a	Y	Y
Medas et al. (2015) ⁶¹	Y	Y	Y	n/a	N	n/a	Y	n/a
Olson-Sitki et al. (2012) ⁶²	Y	Y	Y	n/a	N	n/a	Y	Y
Pillai et al. (2018) ⁶³	Y	Y	Y	n/a	Y	n/a	Y	Y
Rosenfeld et al. (2015) ⁶⁴	Y	Y	Y	Y	N	n/a	Y	Y

See Appendix D for questions

Table 6
Data Extraction for Retention Post NRP

Author(s)/Year	Years Monitored	One Year Retention Post NRP	Lower CI	Upper CI	Sample Numbers
NON-Magnet N=5					
Beyea et al. (2010) ⁵⁶	2005-2008	0.91	0.84	0.96	260
Setter et al. (2011) ⁵⁷	2003-2007	0.94	0.87	0.98	202
Varner & Leeds (2012) ⁵⁸	2009-2011	0.88	0.80	0.94	68
Harrison & Ledbetter (2014) ⁵⁹ -Site A	2010-2011	0.98	0.93	1.00	30
Harrison & Ledbetter (2014) ⁵⁹ -Site B	2010-2011	0.95	0.89	0.98	25
Sub-Total	-----	0.93	0.90	0.96	585
Magnet designated N=6					
Harrison & Ledbetter (2014) ⁵⁹ -Site C	2010-2011	0.96	0.90	0.99	147
Friedman et al. (2013) ⁶⁰	2007-2010	0.94	0.87	0.98	77
Medas et al. (2015) ⁶¹	2010-2011	0.92	0.85	0.96	79
Olson-Sitki et al. (2012) ⁶²	2006-2007	0.93	0.86	0.97	31
Pillai et al. (2018) ⁶³	2009-2016	0.88	0.80	0.94	241
Rosenfeld et al. (2015) ⁶⁴	2005-2013	0.96	0.90	0.99	425
Sub-Total	-----	0.94	0.91	0.96	1000
Total	-----	0.93	0.87	0.99	1585

NON-Magnet sites n=585, Magnet site n=1000, Total n=1585

Study Characteristics

Nine studies,⁵⁶⁻⁶⁴ consisting of 1585 nurse participants met the inclusion criteria for this review. The characteristics of each study are presented in Appendix D as a Table of Evidence. Levels of Evidence (LOE) were determined using Melnyk and Fineout-Overholt's seven levels of evidence.⁵⁵ Three of the studies were level three,^{54, 56, 60} three were four,^{57, 58, 62} and two were level six.^{59, 63} One study was level five in the hierarchy level of evidence.⁶¹ All nine studies were conducted in the United States.⁵⁵⁻⁶⁴ The nine articles included demographic data such as age, gender of the participant, and nurse degree type (one study did not include race, age, and gender⁵⁸).⁵⁶⁻⁶⁴ All NRPs took place in acute care hospitals and lasted 12 months.⁵⁶⁻⁶⁴ The studies followed their respective cohort using a pre and post design.^{56, 58, 60, 62} Sample size ranged from 31 to 425.⁵⁶⁻⁶⁴ All nine studies were cross sectional analytical yet,⁵⁶⁻⁶⁴ varied by three types of design; five were descriptive^{57-59, 62, 63} two were retrospective,^{60, 64} one was prospective,⁶¹ and one was quantitative.⁵⁶ Six out of the nine studies were Magnet designated institutions⁵⁹⁻⁶⁴ and four were not (one of the studies included three sites of which one was a magnet designated institution and the other two were non-Magnet⁵⁹).⁵⁶⁻⁵⁹ In the study with three sites,⁵⁹ Magnet status did not appear to influence the scores when compared to the two non-Magnet institutions. In fact, as seen in Table 6,

Magnet status did not influence retention rates differently than non-Magnet status, meaning the presence of an NRP had a greater influence on retention than Magnet status.

All nine studies provided retention rates for the one-year post implementation of the NRP; the lowest retention rate one-year post implementation of NRP was at 83% and the highest retention rate at 100% at one of the institutions (see Appendix D).⁵⁶⁻⁶⁴ Four of the studies also included retention data two years after implementation of the NRP.^{56, 58, 63, 64} Five studies looked at the rate of retention one year prior to implementation of the NRP.^{56, 58-60, 62} One study looked at retention two years prior to the intervention.⁵⁸ Four studies included retention rate two years after intervention.^{56, 58, 63, 64} In one study, demographics was compared between two groups of new graduate nurses (NGNs) to assess if age and degree type influenced their intent to stay,⁶³ one looking at satisfaction (looking at including salary, hours worked, and options for advancement which seem to impact retention),⁶² and the other looking at satisfaction of the program itself.⁵⁷ Three studies utilized use of the Casey-Fink Graduate Nurse Experience Survey, CFGNES (one provided actual scores,⁵⁹ and two with specific questions with the most impact in scores^{61, 62}) to assess elements of the NGN including stress, support, ability to organize and prioritize, communication and leadership, and professional satisfaction.^{59, 61, 62} One of the studies used the Global Rating of Confidence and Competence scale which measured competence, confidence, and readiness for practice.⁵⁶ These three studies looked at satisfaction of NGNs regarding intent to leave, satisfaction of their job who participated in an NRP.^{57, 61, 62} Two of the studies incorporated a measurement of costs to also assess the financial implications associated with implementation of an NRP.^{60, 63}

Meta-Analysis

Nine articles reviewed in this systematic review provided retention rates one-year post implementation of an NRP to power this meta-analysis,⁵⁶⁻⁶⁴ which was conducted using R (version 3.6.1) with the metafor package.⁶⁵ Given the number of articles that met criteria for inclusion, assessing the certainty of the findings was not applicable. There was low risk bias as all nine articles had more than five Yes' than No's out of eight questions in critical appraisal tool (see Table 5 and Appendix D). There were not enough outcomes to satisfy an evidence profile using GRADEPro GDT 2018 as a minimal number of 10 studies is required for valid recommendations.⁶⁵ Should this review had included randomized controlled trials, it may have been able to power a high-quality meta-analysis. NRP's revealed a high nursing retention in the program by 93% [95% CI: 87-99%] (see Figure 2).⁵⁶⁻⁶⁴ Statistical significance was unable to be performed for retention given that there was no comparison group in this systematic review because only retention rates were provided at least one-year post implementation of an NRP. All nine studies appear to be observational studies, therefore, immediately dropping down the grading criteria to a low grade. However, for the five articles that provided retention rates one year prior to intervention that was a magnitude of effect seen.^{58-58, 60, 62} For example, retention rate increased from 79% to 95%.⁶⁴ The magnitude bumps the level of grading to moderate quality. Five out of the nine studies provided a retention rate prior to the intervention.^{56, 58, 60, 62, 64} Without knowing the baseline measurement of the outcome, this review reveals what the retention rate was *after* the intervention. However, it appears that those five articles have a high retention rate after implementation.^{56, 58, 60, 62, 64} In Figure 2, the validity of this meta-analysis among all nine studies indicated it was appropriate to pool findings for a meta-analysis as the heterogeneity using I^2 was 36%.

The second meta-analysis was completed to compare the difference in effectiveness of NRP's regarding Magnet status.⁵⁶⁻⁶⁴ All nine studies reviewed were able to be designated for their status of Magnet designation.⁵⁶⁻⁶⁴ Out of the nine articles,⁵⁶⁻⁶⁴ six of the institutions that utilized an NRP were Magnet status facilities at inception⁵⁹⁻⁶⁴ and five of the study sites were non-Magnet (One study had three sites-one of which was Magnet designated and two that were not-Magnet⁵⁹).⁵⁶⁻⁵⁹ Of the nine analytical cross-sectional studies involving NRPs appraised with data extraction, meta-analysis using the forest plot (see Figure 3) separating Magnet designated institutions versus non-Magnet institutions. The heterogeneity of Magnet designated institutions was $I^2 = 58\%$ and non-Magnet institutions was $I^2 = 36\%$. Although these heterogeneities indicated the validity of this meta-analysis, the heterogeneity among Magnet designated institutions was rather lower due to the nature of the Magnet accreditation.

Of the included nine articles in this systematic review,⁵⁶⁻⁶⁴ three of the records reported using the Casey-Fink Graduate Nurse Experience Survey tool (CFGNES)⁵⁸⁻⁶⁰ regarding perceived competency. However, they reported their information in different manners. One of the articles provided a breakdown of p values,⁵⁸ one provided a summary of significant quantitative results⁶⁰ and the other reported mean nurse experience scores for individual questions and not the whole.⁵⁹ Since there were no common outcomes, results are discussed in the narrative summary section.

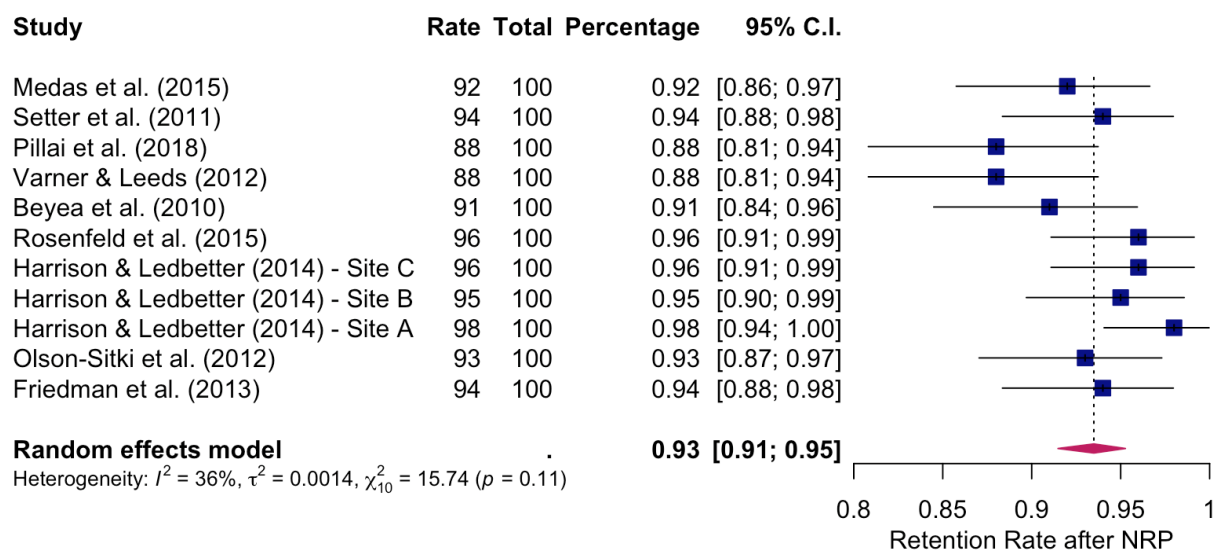


Figure 2
Forest Plot; all sites

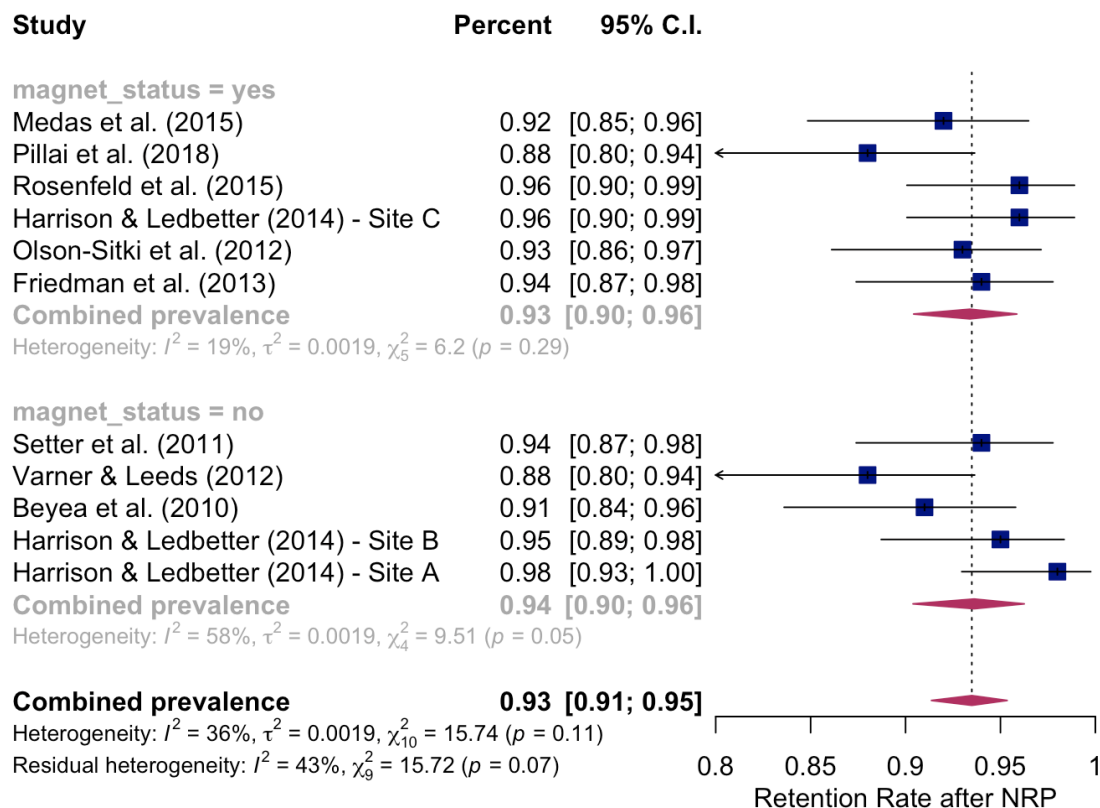


Figure 3
Forest Plot; Magnet designated sites vs non-Magnet sites

Narrative Summary on Competence

Three studies used the CFGNES to study the effect of an NRP on competence of participants.^{59, 61-62} Due to the differences in reporting of findings and insufficient data to perform the necessary calculations, the studies were not able to be included in a meta-analysis. Results are reported here, narratively.

Harrison and Ledbetter⁵⁹ conducted a study measuring retention rates and scores on the CFGNES to determine if an NRP versus a standard orientation program increased retention. Data were collected from three sites; one was Magnet designated and the other two were not. Site A (N=30; 83% Female; 87% White; 67% BSN) was the only site that had an NRP. The NRP focus was on leadership, patient safety, and professional role for NGNs. Every nurse was paired with a mentor for the fiscal year. Site B (N=25; 88% Female; 100% White; 68% BSN) had two cohorts in a one-year transitional program that focused on safe patient handling, system reviews, and communication. The Magnet designated site, Site C, (N=147; 88% Female; 95% White; 78% BSN) conducted a general orientation that lasted between 12 to 36 weeks depending on the specialty. There was no significant difference among the three sites in terms of scores using the CFGNES or the survey score or any of its subscale scores. The similarity in scores from a system perspective is positive as it implies that all participants reported achieving comparable support and orientation, although competence was not specifically delineated, yet one of the study-aims.

A study by Medas, Amato, Grimm and McNett (N=79; 87% Female; 87% White; 55% BSN) evaluated the effectiveness of a one-year NRP.⁶¹ There was a perceived improvement in preparedness after completion of the NRP. There was a mean score increase in feeling prepared (confidence) from 1.8 to 2.4. Mean nurse experience scores from baseline to 18 months had the most impact on physician communication with a jump from 1.6 to 2.8, CFGNES individual questions reported, scores not available.

In study by Olson-Sitki, Wendler and Forbes the experiences of 31 new graduate nurses (87% Female; 96% White; 58% BSN) at a Magnet designated institution were evaluated.⁶² Using CFGNES, nine out of the 24 quantitative questions reviewed significant differences. The focus was monitoring the new graduate experience, satisfaction among the new graduate nurses, and impact on retention. The findings supported protecting new graduate nurses and allowing them to develop professionally at their own pace. There was a significant increase in ability to engage with staff, patients, and their families. It did not report the scales, but rather reported the responses to individual questions, specifically the questions that were significantly different between the two time points of data collection.

In summary, the findings on competence using the CFGNES were equivocal and reporting highly variable. Although, there was some agreement among the studies that the confidence and competence of graduates of an NRP was a positive outcome, overall conclusions could not be made on what has been reported in these studies.

Discussion

The purpose of this systematic review was to determine the effectiveness of NRPs on retention rates and perceived competency among new graduate nurses with less than 12 months of acute care clinical experience who completed an NRP in a Magnet designated facility as compared to a non-Magnet institution. Nine studies representing 11 distinct groups met the inclusion criteria for the review. Statistical meta-analysis was able to be performed on retention for all nine studies for the variable of retention rate⁵⁶⁻⁶⁴; however, a statistical meta-analysis could not be done on competence due to limited and highly variable comparable data.

As NRPs are strongly encouraged by accrediting bodies such as the ANCC to address the knowledge gap of the new graduate nurses (NGN), their perceived competency, and retention,⁴ this systematic review (SR) indicated that NGNs with less than 12 months of acute care clinical experience who completed an NRP was effective on retention rates. There are some data to suggest that these programs were also successful in increasing competency, but the data are weak. Notably, Magnet status did not directly influence these outcomes, meaning that the NRP itself was the modifying factor.

The high overall retention rate of 93% [95% CI: 87-99%] indicated effectiveness of NRPs for NGNs in the first meta-analysis (see Figure 2). The second meta-analysis revealed no significant difference in effectiveness of NRPs comparing Magnet designated institutions versus non-Magnet institutions (see Figure 3). Perceived competency was discovered; however, data were limited to create a meta-analysis. Ranges of change and improvement in retention rates varied among the nine studies.⁵⁶⁻⁶⁴ The lowest retention rate prior to implementation of the NRP was reported as low as 50% to a high of 83%.^{58, 60} Retention rates increased to 88% to as high as 100% one year after inception of the NRP in at least site

in one of the studies reviewed.^{58, 59, 63} Mentorship, which was seen in two studies may have contributed to increased retention rates.^{59, 60} One site both not Magnet or having a formalized NRP that provided a support group for NGNs resulted in 100% retention rate in one of the cohort sites within the study.⁵⁹

A beginning trend was noted toward an association between perceived competency and confidence in the included studies, however, the small sample of three studies and lack of comparable data for analysis among the studies did not support a statistical analysis. . There was no consensus to measure perceived competency among NGNs participating in an NRP, as several scales or tools were used to measure these elements across the nine reviewed studies.⁵⁶⁻⁶⁴ Some of the factors that weigh into this observation include nurse satisfaction, organization commitment, support from their mentors and unit staff.^{57, 61, 62} Other strategies were also used to improve competency of the new graduate nurse included utilization of human patient simulators.⁵⁶ Nurse satisfaction was frequently mentioned and discussed in the results of the reviews. There may be an element in satisfaction that may influences perceived competency as well as retention rates; however, this needs further investigation, although this determination was not within the scope of this review.⁶¹ There are also financial incentives for institutions to attain Magnet status which may influence implementation of a NRP at a budget level in addition to improved retention of NGNs.^{60,63}

In addition, although costs were not included in the search criteria, implementation of NRPs demonstrated a financial impact at two study sites.^{60,63} A cost analysis revealed a financial loss when NGNs left before one year and it took one year to recoup financial loss in one study.⁶³ Yearly net cost savings of \$597,778 was seen in another study in this SR.⁶⁰ Two of the study sites that made note of financial impact of the NRP were at Magnet institutions.^{60,63} While multiple factors were found that influence retention rates and perceived competency of NGNs, positive outcomes were seen in all nine studies.

As costs of replacing nurses are high² and retention rates are low,¹ this SR indicated that NRPs were effective for NGNs whether institutions were Magnet designated or not. Besides, perceived competency that was seen in four studies^{56, 59, 61, 62} influenced increasing retention rates. While Magnet status did not directly impact retention rates, there was a trend noted in an increase in perceived competency in these facilities. The findings provided to offer recommendations of NRPs that may affect the retention rates and perceived competency of NGNs whether institutions are Magnet designated or not.

While there were several systematic reviews that discussed the effectiveness of NRPs and various factors that impacted NGNs, none of the SRs reviewed competency and retention specifically. It appeared that the authors of the SRs had a general purpose of looking at global outcomes of NRPs.^{27, 35-45} The thrust for NRPs by accrediting bodies led to focus of Magnet status as a comparator for these systematic reviews. There were no systematic reviews assessing the impact or influence of Magnet recognized institutions. While more evidence is needed to help bridge the gap if Magnet status or competency has a direct or significant favorable impact, it is without question that NRPs are beneficial to the NGN, likely patient care, and institutional financial stability. In efforts to align institutional goals with goals of the NGN, more research and identification of needs for the NGN is needed to reduce turnover and improve competency.

Evidence Transfer

Part I

Ken Hanamura

Policy Brief

Executive Summary

The mission of the American Nurses Association is the general welfare of nurses, including workplace environment.⁵ As such, recent attention has turned to institutional turnover rates, perceived competency, and nurse satisfaction of the new graduate nurse. Yet, despite this attention from the leading nursing organization, 21.2% - 35% of all new registered nurses left their organization within one year, resulting in low rates of retention⁶⁶ The average cost of turnover for each registered nurse is \$10,000 to \$88,000 per nurse.² Based on recommendation from such prestigious health organizations such as The Joint Commission (TJC)¹³ and the Institute of Medicine (IOM),⁴ a number of national nursing accrediting bodies and reliable vendors have devised programs to address turnover and retention among nurses, known as Nurse Residency Programs. Each program is unique, there is no standardization; however, an overall retention rate of 93% was found for the nurse residency programs reviewed in this current study.

Policy Recommendations

Based on the current study, there are several key factors that made nurse residency programs effective for new graduate nurses. These factors are recommended as policy when healthcare facilities seek to implement nurse residency programs.

1. *All nurse residency programs duration shall require at least 12-month periods of time for transition.* Programs of shorter duration have a lower retention rate.
2. *Designated preceptors should be assigned to each participant throughout the program.* Programs reviewed as a part of this study revealed higher retention rates in the presence of a preceptor, and preceptors should be BSN prepared experienced nurses. Providing mentorship which would also contribute to increased retention rates.^{59, 60}
3. *Participants should be BSN prepared registered nurses.* In this study, baccalaureate prepared nurses showed higher scores of job and professional satisfaction,⁵⁹ which might translate into higher retention rates. The Institute of Medicine's Future of Nursing Report calls for 80% of registered nurses to hold bachelor's degrees by 2020,¹³ noting the need for higher education in registered nurses to take care of the higher complexity patients in our healthcare system, which makes both retention and education important issues in this population.

Policy Action Steps

1. Determine the need for a nurse residency program and select an individual program based on facility resources and needs.
2. Implement recommended policies.

3. Use Clinical Audit Statements to evaluate the effectiveness of the nurse residency program.
4. Monitor and communicate with healthcare organizations that have nurse residency programs for any constructive feedback and suggestions.
5. Consult with national accrediting bodies and reliable vendors for further recommendations.

Part II

Peter Panayi

Clinical Audit Statements

A clinical audit is a quality improvement initiative meant to identify deficits in current practice, administer excellent service, and uphold evidence-based standards. It is a cycle with stages of establishing best practice; measuring against criteria; taking action to improve care; and monitoring to sustain improvement.⁶⁷ Many factors contribute to the success of an audit in any organization. These include effective communication, staff engagement, empowerment and a sense of ownership. They also include the presence of adequate resources and support for training with a strong, dedicated team. Clinical audit statements are devised to guide and evaluate the team's work. Here, we suggest clinical audit statements to determine the effectiveness of nurse residency programs (NRPs). While there are specific tools and other activities to determine the outcomes related to participants, audit criteria to assess the effectiveness of the program are missing. A clinical audit consists of measuring an outcome or a process, against well-defined standards set on the principles of evidence-based practice to identify the changes needed to improve the quality of care. Consequently, clinical audit is a part of the continuous quality improvement process. As there is little evidence on audit criteria for NRP, the recommendations that emerged from this systematic review will be used as a foundation. Those recommendations were that regardless of Magnet status, an NRP should:

- Be at least 12 months in duration
- Have preceptors or mentors made available to each new graduate nurse for the 12 months of the program, and perhaps, 6 months following to ensure retention rates remain stable
- Have the BSN required for participating new graduate nurses

In addition, as the purpose of an NRP is to increase retention and competency of its participants, these also should be part of the audit.

When developing audit criteria, it is necessary to determine (1) An indicator: a variable that describes decisions aiming at obtaining or maintaining the changes. It can be expressed as absolute number, percentage, rate, or average; (2) A criterion: a definable and measurable aspect of health care that describes its quality; and (3) A standard: the standard of care to be achieved for each specific criterion, usually expressed as a percentage. It represents the threshold of acceptability, that is, the value that defines the upper or lower limit, so that the quality of care is appropriate. Some indicators are so important that the standards must be achieved in 100% (e.g., use of masks during the dressing of central venous catheters), but in

general it is sufficient to meet the standard in a lower percentage (for example, in 80% of patients).

To develop the recommendations that emerged from this systematic review, the SMART framework was used.⁶⁸ SMART is an acronym for the five elements of specific, measurable, achievable, relevant, and time-based goals. In efforts to improve competency and retention of new graduate nurses, development of a plan to help achieve these goals may be used (see Table 7 and 8).

Table 7
Clinical Audit Protocol

Criterion	Benchmark	When will data be collected	Where are data located	Who will collect data	Assessment	Comments
Retention Rate is increased	100%	1 year after completion of NRP	Employee file	Human Resources	Yes/No	Consider exit interview for those who leave prior to one year to determine reasons for exit. Compare results ongoing after each program.
Competency is increased in each participant	100%	Pre-and post NRP, periodic assessment during the program (at least every 6 months) and then yearly for 2 years	Employee file	Nurse Manager	Yes/No	Periodic assessment during the program by the designated individual and then by annual performance evaluation. Less than 90% competency will require a remediation plan in conjunction with Staff Education Department
All NGNs with a BSN degree will be enrolled in the NRP	100%	Upon hire	Employee file	Staff Development	Yes/No	Those with less than a BSN can be enrolled in the program upon advice from Nursing Administration. Those with previous clinical experience can be enrolled on advice of Nursing Administration.
Each participant is assigned a mentor	100%	Upon start of the program	Employee file	Nurse Manager	Yes/No	Nurse manager will assist in determining the mentor-mentee fit. NGNs and mentors will devise a schedule for meeting and discussion and submitted to Nurse Manager and Staff Development. Objectives and goals can be tracked using the mentee's agenda.
Each participant is enrolled in the program for 12 months	100%	Ongoing	Employee file	Staff Development	Yes/No	Reasons for extending or not completing the program length will be evaluated by Staff Development via interview with the nurse and nurse manager.

Table 8
Guidelines for Use of Audit Criteria

Specific	Measurable	Achievable	Relevant	Time-Bound
Educators will develop and implement a curriculum and resource guide that encompasses teaching strategies that are evidence based for NGNs enrolled in an NRP to increase competency and retention of the institution or healthcare organization.	With minimum of one-year employment contract after initiating NRP, NGNs are motivated by mentors and educators to improve NGN confidence and competency levels.	This will be measured with completion of continuing education, unit-based projects including utilization of evidence-based practice projects approved by nursing education and/or department managers. Interim feedback will be provided as needed by the NGN.	There will be a value of retention of the NGN as they meet personal and professional goals including confidence and competence. Healthcare organizations will support in efforts to reduce costs of recruiting nurses.	It is anticipated that by one year of inception of the NRP, evaluation of confidence and competence will be improved and assessed at 3-month intervals. By the end of year one, 100% nurses will be able to practice safely after demonstrating improvement in competency in a confident manner. Cost savings of the organization will be returned in one year per NGN.
Of the NGNs recruited, 100% will possess a minimum of a bachelor's degree in nursing.	Competency needs will be assessed by mentors and educators evaluating the NGN performance at baseline in a practice-based learning area, critical thinking of patient care scenarios.	May be completed via workshops and mandatory education modules for each individual NGN every 3-4 months. Remediation will be determined by the mentor/educator.	There will be a decrease in negative feedback from NGNs, increase in reported confidence, and positive feedback by mentors/educators using assessment tools.	Retention rates will surpass national standards and achieve a 100% benchmark retention rate. Organizations will ensure retention by addressing the confidence and competence deficits of the NGN.

Conclusion

Given the 95% confidence interval, it can be interpreted that there was a 95% confidence that retention rates of nurses after NRPs fell between 87% and 99% for studies that fit this meta-analysis criteria. While the utilization of the Casey-Fink Graduate Nurse Experience Survey tool (CFGNES) supports assessing and addressing areas of nurse preparedness particularly for new graduate nurses, other tools that may have been used may be effective, but not conclusive in this systematic review. It is clear that NRPs influence retention and

competence, which were crucial in determining how the curriculum of NRPs can continue to improve nurse preparedness among new graduates, reduce turnover, reduce institutional costs and ultimately improve patient care. Studies in this review included factors that may have hindered or impacted nurse turnover which should be encouraged to evaluate effectiveness of NRPs. While Magnet status encompasses criteria including but not limited to retention, competence, confidence, it is not conclusive if Magnet status would fare better in terms of reducing turnover rate and improving nurse preparedness of the new graduate nurse given positive outcomes seen in non-Magnet institutions. Further investigation is needed in this area.

Limitations

It was a challenge to compare studies as NRPs are not standardized. In addition, limited consensus of evaluating tools and lack of specific findings to power conclusive data were limitations. There were not enough data to generate meta-analysis for perceived competency. Other limitations include information that was omitted from studies that can be interpreted as negative findings as well as issues reported by the new graduate nurses that may have impacted turnover rates and impacted scores related to perceived competency.

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Appendices

Appendix A: Search Strategy

PubMed: (("nurse residency"[Title/Abstract]) AND effect*[Title/Abstract]) OR (("nurse residency"[Title/Abstract]) AND confidence[Title/Abstract])) OR (("nurse residency"[Title/Abstract]) AND competenc*[Title/Abstract])) OR (("nurse residency"[Title/Abstract]) AND outcome OR ("nurse residency"[Title/Abstract]) AND retention*[Title/Abstract]) OR ("nurse residency"[Title/Abstract]) AND preparedness[Title/Abstract]) OR ("nursing residency"[Title/Abstract]) AND effect*[Title/Abstract]) OR (("nursing residency"[Title/Abstract]) AND confidence[Title/Abstract])) OR (("nursing residency"[Title/Abstract]) AND competenc*[Title/Abstract])) OR (("nursing residency"[Title/Abstract]) AND outcome*[Title/Abstract]) OR (("nursing residency"[Title/Abstract]) AND preparedness[Title/Abstract])

There are no planned time limits for the initial search.

Appendix B: Critical Appraisal Form**MAStARI Appraisal Instruments****JBIC Critical Appraisal Checklist for Analytical Cross-Sectional Studies**

Reviewer _____ Date _____

Author _____ Year _____ Record Number _____

	Yes	No	Unclear	Not applicable
1. Were the criteria for inclusion in the sample clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the study subjects and the setting described in detail?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was the exposure measured in a valid and reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were objective, standard criteria used for measurement of the condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were confounding factors identified?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were strategies to deal with confounding factors stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes measured in a valid and reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overall appraisal:	Include <input type="checkbox"/>	Exclude <input type="checkbox"/>	Seek further info <input type="checkbox"/>	
Comments (Including reason for exclusion)				

Appendix C: Data Extraction Form**JBI Data Extraction Form for Experimental/Observational Studies**

Reviewer_____Date_____Author_____

_____Year

_____Journal_____

Record number_____

Study method

RCT Quasi-RCT Longitudinal

Retrospective Observational Other_____

Participants

Setting_____

Population_____

Sample size

Intervention 1_____

Intervention 2_____

Intervention 3_____

Interventions

Intervention 1

Intervention 2

Intervention 3

Outcome		Mean	Standard Deviation	
Outcome		Mean	Standard Deviation	

Appendix D: Table of Evidence, Study Characteristics

non-Magnet N=5						
Study	LOE	Purpose	Design	Setting/Sample	Findings	Comments
Beyea, S., Slattery, M. von Reyn, L. (2010) ⁵⁶	3	Evaluate the clinical competency of new graduate nurses	Cross-sectional study/Quantitative Design using clinical simulation. 17 cohorts. Retention, competence and confidence was measured pre-and post-nurse residency program (NRP) on a 10-point Likert scale. Paired T-Test was used.	Large academic medical center in the Northeast. n=260 88% female 92% White 53.5% BSN Average age: 30 years	<u>Retention Rate</u> <i>Pre:</i> Year One: 83% Year Two: 53% <i>Post:</i> Year One: 91% Year Two: 66%	Findings were significant for all 3 variables: <u>Confidence</u> Baseline 3.4 10-week 7.1 <u>Competence</u> Baseline 3.7 10-week 7.1 Readiness for Practice was also measure and found to be significant: Baseline 3.6 10-week 7.2 Tool Used: Global Rating of Confidence and Competence (on a 10-point scale).
Setter R, Walker M, Connelly LM, Peterman T. (2011) ⁵⁷	4	Examine the relationships among job satisfaction, reasons for staying at a specific job, and satisfaction with the NRP	Cross-sectional/ Descriptive Design One cohort of new graduate nurses (NGNs) who completed the NRP between 2003 and 2007	Large academic medical center in the mid-West. n=202 84% Female 84% White Average age: 27 years	<u>Retention</u> <i>Post:</i> 94%	No pre-retention rates provided. Retention was measured using several different methods. Reasons for retention were related to “staying in a job” rather than “job satisfaction”
Varner K, Leeds R. (2012) ⁵⁸	4	Examine the outcomes of NRP for new graduates	Cross-sectional/ Descriptive Design 3 cohorts of NGNs who started the NRP in 2009, 2010, and 2011	Two hospitals in the mid-West: one suburban and one rural. n=68 48% critical care nurses 38% med-surg nurses 60% ADN	<u>Retention rate</u> <i>Pre:</i> 50% <i>Post:</i> 2009 Year One: 95% Year Two: 91% 2010 Year One: 95% Year Two: 95% 2011 Year One: 95%	Retention rates were averaged across the cohorts and across sites. After the first year across two sites, the average turnover rate was 5% . After completion of the two-year contract (Year Three), this increased to 24%.
Harrison C., Ledbetter (2014) ⁵⁹ Site A	6	Examine the outcomes of an NRP vs traditional orientation	Cross-sectional/ Descriptive design A convenience sample consisting of 3 cohorts across 3 sites was completed between November 2010 and September 2011 Site A (included here) and B (detailed below) were non-Magnet designated.	Southeast n=30 83% Female, 87% White 67% BSN Average age: 28 years.	<u>Retention Rate</u> <i>Post:</i> 98% (2% increase)	The curriculum was focused on patient safety, leadership, and professional role. Additional material was covered at the 2-month, 6-month, and 1-year marks. Mentorship (this site had) may have an impact on scores.

			Site C (detailed below) was Magnet designated.			
Harrison C., Ledbetter (2014) ⁵⁹ Site B	6	Examine the outcomes of an NRP vs traditional orientation	Cross-sectional at 3 sites. Site B (included here) and Site A (detailed above) were not Magnet designated. Site C (detailed below) was Magnet designated.	Southwest n=25 88% Female 100% White 68% BSN. Average age: 28 years.	<u>Retention Rate</u> This site had 2 cohorts. <i>Post:</i> Cohort 1: 100% turnover Cohort 2: 90%	The curriculum was safe patient handling, system reviews, and communication.
Magnet designated N=6						
Study	LOE	Purpose	Design	Setting/Sample	Findings	Comments
Harrison & Ledbetter (2014) ⁵⁹ Site C	6	Examine the outcomes of NRP vs traditional orientation	Cross-sectional at 3 sites. Site C (included here) was Magnet designated. Sites A and B (detailed above) were not.	Midwest n=147 88% Female 95% White 78% BSN Average age: 26 years	<u>Retention Rate</u> <i>Post:</i> 96%	Magnet status did not appear to influence the scores when compared to the two non-Magnet sites. CFGNES was used
Friedman M, Delaney M, Schmidt K, Quinn C. (2013) ⁶⁰	3	Compare the outcomes of a specialized pediatric orientation to a traditional orientation	Cross-sectional / Retrospective descriptive evaluative design Two cohorts. Retention and cost were measured	Large Children's Medical Center in suburban NY. n=77 Critical Care and ED nurses. Traditional: 96.4% Female 68% White 75% BSN New: 94% female 88% White 84% BSN	<u>Retention Rates</u> <i>Pre:</i> 82% <i>Post:</i> 84% PICU <i>Pre:</i> 69% <i>Post:</i> 87% ED <i>Pre:</i> 87% <i>Post:</i> 97%	Yearly net cost savings of \$597,778 was realized. The length of employment/retention for those who completed the NRP was higher than those completing the standard orientation
Medas JC, Amato S, Grimm D, Radziewicz R, Rhodes C, VanHorn C, et al. (2015) ⁶¹	5	Evaluate the influence of NRP on satisfaction, role transition, confidence and intent to leave.	Cross-sectional/Prospectus cohort study One cohort	Mid-west region n=79 87% Female 87% White 31% Medical surgical 29% ICU 55% BSN Average age: 28 years	<u>Retention Rates:</u> <i>Post:</i> 92%	Mean nurse experience scores from baseline to 18 months had the most impact on physician communication with a jump from 1.6 to 2.8 A mean score increase in feeling prepared (confidence) from 1.8 to 2.4 CFGNES-Individual questions reported, scores not available

Olson-Sitki K, Wendler M, Forbes G. (2012) ⁶²	4	Evaluate outcomes of an NRP. Two cohorts	Cross-sectional/ Descriptive Study. Mixed method Two cohorts who started an NRP after graduation upon employment	Regional Medical Center n=31 87% Female 96% White 58% BSN 68% Non-Intensive Care	Retention Rates: <i>Pre:</i> <i>Cohort1</i> 85%: <i>Cohort 2</i> 88% <i>Post:</i> <i>Cohort 1:</i> 93% <i>Cohort 2:</i> 89%	Nine questions were illustrated in the study report which showed P values less than 0.05 which reflected most impacted areas in the CFGNES Individual items including salary, hours worked, and options for advancement had satisfaction rates of 73%, 78%, and 68
Pillai S., Manister N., Coppolo, M., Ducey, M., McManus-Penzero J. (2018) ⁶³	6	Examine one-year retention rate of NRP participants	Cross-sectional/ Descriptive Study. Data on 20 cohorts of NGNs and best practices for residency programs and costs were examined	Large urban medical center in the Northeast. n=241 88% Female 74% White 61% BSN Average age = 29	<u>Retention Rates:</u> <i>Post:</i> 88%	Participants who stayed beyond one year were younger (28 vs 33 years) and included more BSN graduates (64% vs 53%). Cost analysis revealed a financial loss when new graduates leave before one year. It takes one year to recoup losses. NGNs reported NRPs improved confidence levels
Rosenfeld P., Glassman K., Capobianco, E. (2015) ⁶⁴	3	Evaluate outcomes of post BSN NRP	Cross-sectional/ Retrospective study.	Large urban medical center in the Northeast. n=425 92% Female 60% White 12% Latino	<u>Retention Rates</u> <i>Pre:</i> 79% <i>Post:</i> 96%	95% of new graduates remained employed after one year in these two cohorts as compared with 49% in 2005. Qualtrics survey was created and assessed four domains of the enrolled participants: employment characteristics, current assessment, demographic information characteristics, and educational and professional accomplishment Retention may be impacted by the experience of the NGN during employment period.

Reference: Melnyk and Fineout-Overholt's (2015) seven levels of evidence.⁵⁵

Appendix G: CITI Certifications




Completion Date 15-Mar-2019
 Expiration Date 14-Mar-2022
 Record ID XXXXXXXXXX

This is to certify that:

Ken Hanamura

Has completed the following CITI Program course:

Human Research
 Social / Behavioral / Epidemiologic Research Investigators
 1 - Basic Course

(Curriculum Group)
 (Course Learner Group)
 (Stage)

Under requirements set by:

Rutgers- The State University of New Jersey (All Campuses)



Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w0dff649b-a72c-4655-b02c-fa705fba55bd-30147114




Completion Date 07-Jan-2018
 Expiration Date 06-Jan-2021
 Record ID XXXXXXXXXX

This is to certify that:

Peter Panayi

Has completed the following CITI Program course:

Human Research
 Social / Behavioral / Epidemiologic Research Investigators
 1 - Basic Course

(Curriculum Group)
 (Course Learner Group)
 (Stage)

Under requirements set by:

Rutgers- The State University of New Jersey (All Campuses)



Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w8e7ca8e8-81b2-42f8-8e0b-1fb728f34ef3-25664625