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# 2023 Scientific Evidence for Elsevier HESI PN Exams



# SCIENTIFIC EVIDENCE FOR ELSEVIER HESI PN EXAMS

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## INTRODUCTION

Elsevier is committed to providing the best evidence-based learning resources for nursing faculty and students. HESI® Review and Testing Solutions offer standardized HESI Specialty and Exit Exams for Practical Nursing or Vocational Nursing (PN/VN) programs to support student success (<https://evolve.elsevier.com/education/hesi/nursing-lpn-lvn/>).

This white paper:

1. Provides an overview of HESI PN Exams, including exam standards and recent updates to support Next Generation NCLEX readiness.
2. Examines recent scholarly evidence of HESI PN Exam scores and HESI-related program policies.
3. Summarizes results from previous research studies generalizable for PN/VN programs.

## HESI PN EXAMS

### *What standardized HESI PN exams are available?*

#### HESI PN Specialty Exams

HESI Specialty Exams assess student knowledge of nursing concepts within a specific nursing care context (Morrison et al., 2004). Several specialty exams are available, and these can be used as standardized end-of-course exams. Parallel versions of each exam are available to ensure independent assessment should repeat testing be indicated. Each HESI PN Specialty Exam contains scored items and unscored pilot items. HESI Specialty Exams were updated in 2023. See Table 1 for HESI PN Specialty Integrated Exam names, item types and numbers, and recommended testing time allocation.

#### HESI PN Exit Exam (E2)

The E2 is a comprehensive, computer-based exam that helps determine students' readiness for the NCLEX-PN. It contains 100 scored items with questions formatted and matched to the NCLEX-PN test plan (NCSBN, 2020). Performance scores identify student strengths and areas where additional skill-building is recommended. Parallel versions are available for repeat testing. In 2023, the E2 was updated and aligned with the current Next Generation NCLEX-PN test plan (NCSBN, 2023). See Table 1 for HESI PN Exit Integrated Exam item types and recommended testing time allocation.

**Table 1. HESI PN Integrated Exams\***

Exam Type	Exam Name	Total # of Items	Traditional Item Count	NGN** Unfolding Items	NGN** Standalone Items	Recommended Testing Time Allocation
Specialty	<ul style="list-style-type: none"> <li>• Geriatrics</li> <li>• Maternity</li> <li>• Maternity-Pediatrics</li> <li>• Medical-Surgical</li> <li>• Pediatrics</li> <li>• Pharmacology</li> <li>• Psychiatric/Mental Health</li> </ul>	60	42 scored 2 unscored	12	4	130 minutes
Specialty	<ul style="list-style-type: none"> <li>• Community</li> <li>• Fundamentals</li> <li>• Data Collection</li> <li>• Management</li> <li>• Nutrition</li> </ul>	60	46 scored 8 unscored		6	130 minutes
Specialty	<ul style="list-style-type: none"> <li>• Anatomy &amp; Physiology</li> <li>• Dosage Calculations</li> </ul>	55	50 scored 5 unscored			80 minutes
Exit	Exit (E2)	130	100 scored 2 unscored	24	4	214 minutes

\*HESI PN Integrated Exams released in 2023; \*\*NGN = Next Generation NCLEX Exam

**What are the quality standards underlying the HESI PN Exams?**

**HESI Exam Standards**

**Test Security:** Exam security is a principal attribute in HESI exam administration. The exams are to be administered solely in proctored environments with strict adherence to all legal obligations of test-takers, exam administrators, and the institution. Proctoring best practice guidelines are encouraged to optimize valid testing outcomes <https://evolve.elsevier.com/education/expertise/remote-learning/tips-for-promoting-test-security-when-remote-proctoring/>.

**Item Development:** HESI exam items are developed by subject matter experts who have completed extensive item-writing training. Exams include scored and unscored items. All scored items have undergone psychometric testing to evaluate validity and reliability (item difficulty and discrimination indices, including the Kuder-Richardson Formula 20 [KR-20]). Unscored items are dispersed throughout the exam and not identified to test takers as pilot items.

In preparation for the NCLEX changes in 2023, HESI subject matter experts developed pilot items to incorporate additional focus on clinical judgment. These pilot items incorporated multiple formats such as those to be used in the Next Generation NCLEX. Extensive pre-testing has provided more than 100,000 responses for the new pilot items.

Pilot items that align with acceptable psychometric standards are used as scored items in future tests. This continuous quality approach ensures that students use their best judgment on each pilot item allowing for unbiased performance evaluation.

**Exam Scoring:** HESI Exams yield a HESI Score based on a proprietary HESI Predictability Model (Brunnert et al., n.d.). This model considers several factors, such as the difficulty of each exam item and the test taker's performance on that item. HESI exam scores typically range from 0 to 1500. While scores of 850 or higher are considered acceptable, scores of 900 or more suggest optimal student readiness for first-time success on the NCLEX-PN. New HESI Scores to be released in 2024 will include NGN items in the interpretation of HESI Integrated Exam performance outcomes.

**Reporting:** Performance reports are provided to each student to identify individual strengths and weaknesses. Performance reports are also provided to faculty – identifying performance outcomes for individual students and the student cohort. The former provides insight for individual assessment, and the latter provides insight for course evaluation.

**Remediation:** Student performance drives individual HESI remediation and it is available for each exam completed. Remediation for an exam prioritizes materials based on areas of greatest need. Thus, initial materials focus first on the greatest knowledge deficits. Students receive links to textbook readings, videos, and case studies. Students who take a second version of the exam will receive updated remediation materials, allowing them to see knowledge gains and remaining knowledge gaps. Both faculty and students can track remediation completion progress.

## LITERATURE REVIEW

### *What evidence demonstrates the predictive validity of the E2?*

Several scholarly resources were examined to determine material relevant for this review. Scientific research databases (e.g., CINAHL, Medline, and Science Direct) were examined first, followed by repositories of scientific materials (e.g., ProQuest, Sigma). The literature search included HESI PN Exam validity studies that were published or disseminated between 1999 and 2023.

### HESI PN E2

The predictive validity of the E2 in PN/VN samples was examined in nine scholarly resources. Data were provided by 155 programs and included NCLEX-PN outcomes for 5,846 graduates. As noted in Table 2, students scoring at the acceptable level of 850 or more were highly likely (95.90-99.25%) to pass the NCLEX-PN exam on their first attempt. Students scoring at the recommended level of 900 or greater were even more likely (97.85-99.99%) to pass the exam on their first attempt.

**Table 2. Comprehensive Summary of E2 Validity Research<sup>a</sup>**

Author(s)	Data Years	Participating PN/VN Programs	N=PN/VN Student Sample Size	True Positive Rate <sup>b</sup>	% NCLEX-PN First-Time Pass Rates Scores > 900 n=sub-sample	% NCLEX-PN First-Time Pass Rates Scores > 850 n=sub-sample	% NCLEX-PN First-Time Pass Rates Scores 850-899 n=sub-sample
Lauchner et al., 1999	1996-1997	8	N=170	100 n=65			
Newman et al., 2000	1997-1998	17	N=456	97.87 n=141			
Nibert & Young, 2001	1998-1999	24	N=689	99.12 n=228			
Nibert et al., 2002	1999-2000	31	N=897		99.41 n=341		94.79 n=192
Young & Willson, 2010	2006-2007	31	N=1149		99.48 n=190		100 n=201
Young & Langford, 2013	2007-2008	26	N=962		98.40 n=246	98.20 n=395	98.00 n=149
Abston-Coleman & Levy, 2010	2008-2010	2	N=152			99.25 n=134	
Throckmorton, 2018	2014-2016				99.99		100
Riley et al., 2023	2018-2021	16	N=1371		97.85 n=561	95.90 n=782	90.99 n=221

<sup>a</sup>Presented according to data collection period; Table modified from Riley et al., 2023.

<sup>b</sup>True Positive Rate is the proportion of students who passed the NCLEX-PN on their first attempt, among those predicted to pass.

## ***What evidence-based testing policies support student success?***

### **Program Policies Related to Success**

The HESI-related policy findings presented below focus on those published in the last five years. The literature provided insights into preparatory strategies implemented to support student success on the E2 and remediation strategies to increase student knowledge as measured by the E2. The findings for PN/VN students were limited; thus, some insight from samples of RN programs is included to indicate support for a policy as needed.

### **Preparation Policies**

A primary policy finding was to establish an expected E2 minimum performance benchmark. PN/VN students expected to achieve a minimal score obtained significantly higher E2 scores than students not expected to meet a performance benchmark (Riley et al., 2023). This policy also led to significantly higher NCLEX-PN first-time pass rates (Riley et al., 2023). The most common minimal benchmark score was 850 (Riley et al., 2023; Throckmorton, 2018). The most common preparatory strategy was to use specialty exam reports from previous PN/VN courses (Riley et al., 2023). This may be especially important in addressing knowledge gaps noted in specialty exam performance reports. Furthermore, standardized exam practice may contribute to success on the E2. Evidence in RN student samples suggests that students gain significant computerized testing experience when specialty exams are part of the curriculum (Gouveia et al., 2021; Shah et al., 2022; Sportsman, 2020). Programs have additional preparatory resources to support student success. Those most required for PN/VN students included HESI Case Studies, Elsevier Adaptive Quizzing (EAQ), and HESI Practice Tests (Riley et al., 2023). These same strategies also supported higher E2 scores in RN student samples (Shah et al., 2022).

### **Remediation Policies**

Data from programs requiring PN/VN students to retake the E2 to achieve a minimum score demonstrated that this strategy was related to significantly higher NCLEX-PN pass rates (Riley et al., 2023). The opportunity to remediate and retake the E2 provided additional student engagement in quality learning resources. Evidence suggests that strategies based on PN/VN students' areas of needed improvement provided the focus of required remediation. Furthermore, required remediation activities led to higher E2 scores (Riley et al., 2023). This finding was also noted in RN student samples (Shah et al., 2022). The most common E2 remediation strategy noted was to focus on the remediation materials provided within individualized student reports (Riley et al., 2023; Throckmorton, 2018). Additional assigned requirements included EAQ and NCLEX-PN review manuals (Riley et al., 2023; Throckmorton, 2018).

## **CONCLUSION**

HESI Review and Testing Solutions are generated by subject matter experts and are validated by internal and external research studies. HESI PN Specialty Exams are content-specific and can be used as standardized course final exams. Additionally, they provide computerized test practice opportunities for PN/VN students with individualized performance reports of knowledge strengths and weaknesses. PN/VN programs that set expected exam standards and require students to actively prepare for the E2 demonstrate the positive outcomes of those practices. The E2 generates an objective performance score indicative of student readiness for NCLEX-PN success. Focused remediation can support student preparation for the NCLEX-PN. Research demonstrates that the E2 is highly predictive of NCLEX-PN success. Furthermore, the new HESI Integrated PN Exams incorporate psychometrically sound items to prepare students for the 2023-2026 Next Generation NCLEX-PN Exam.

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