BRIEF REPORT

Development of a novel hospitalist advanced practice provider assessment instrument: A pilot study

Amteshwar Singh MD, MEHP, FACP1 | David Klimpl MD2 | Flora Kisuule MD, MPH, SFHM1 | Tracy Cardin ACNP, SFHM3 | Sean Tackett MD, MPH4,5 | Ishaan Gupta MD1 | Kimberly Blum PA-C1 | Kinsey Wimmer PA2 | Scott Wright MD4 | Jorie Colbert-Getz PhD6

1Department of Medicine, Johns Hopkins Bayview Medical Center, Division of Hospital Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA
2Division of Hospital Medicine, University of Colorado School of Medicine, Denver, Colorado, USA
3Sound Physicians, Tacoma, Washington, USA
4Department of Medicine, Johns Hopkins Bayview Medical Center, Division of General Internal Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA
5Biostatistics, Epidemiology, and Data Management Core, Johns Hopkins School of Medicine, Baltimore, Maryland, USA
6Department of Internal Medicine, Division of General Internal Medicine, University of Utah School of Medicine, Salt Lake City, Utah, USA

Correspondence
Amteshwar Singh, MD, MEHP, FACP, Department of Medicine, Johns Hopkins Bayview Medical Center, Division of Hospital Medicine, Johns Hopkins University School of Medicine, 5200 Eastern Ave., MFL East 2nd Floor, Baltimore, MD 21224, USA.
Email: asingh42@jhmi.edu;
Twitter: @amteshwar

Abstract
Advanced practice providers (APPs) graduate from school with variable hospitalist experience. While hospitalist-specific onboarding is recommended for hospitalist APPs, no standard method currently exists to assess their readiness for practice. We created a 17-item instrument called the Cardin Hospitalist Advanced Practice Provider-Readiness Assessment (CHAPP-RA) to assess APPs’ readiness for practice using a milestones-based scale. We piloted CHAPP-RA at a single site where 11 APPs with varied experience were rated by 30 supervising physicians. Supervisors also provided global ratings for overall performance. We investigated the feasibility of CHAPP-RA and collected validity evidence for the interpretation of scores. The mean time to complete one CHAPP-RA was 10.5 min. Supervisors rated novice APPs lower than more experienced APPs, \( p \leq .001 \). CHAPP-RA ratings also correlated strongly with global ratings. CHAPP-RA is feasible to implement and has initial validity evidence.

INTRODUCTION

Advanced practice providers (APPs), defined as nurse practitioners (NPs) and physician assistants (PAs), form an integral part of the hospitalist workforce. The percent of hospital medicine groups (HMGs) that employ APPs has increased from 66% in 2014 to 83% in 2020. Experienced hospitalist APPs have achieved similar patient outcomes as hospitalist physicians. APPs undergo variable training in hospital medicine prior to entering the workforce. NP and PA schools are not required to include education in hospital medicine, though...
some do provide this option\(^4\). Postgraduate training in hospital medicine is likewise only optional, facilitated through programs such as hospital medicine fellowships.\(^5\) Once hired, and after variable onboarding, most hospitalist APPs work with considerable autonomy.\(^6\) This transition from student to clinical provider can be jarring for newly graduated APPs,\(^7\) and an instrument that enables HMGs to efficiently assess an APP’s readiness for practice could help with their development.

To date, no standardized method exists to assess an APP’s readiness for hospitalist practice. To this end, we developed a milestone-based assessment instrument (Cardin Hospitalist Advanced Practice Provider- Readiness Assessment instrument, or CHAPP-RA). In this report, we describe the CHAPP-RA, results from a test of its feasibility in practice settings, and validity evidence\(^8\) for interpretation of scores.

**METHODS**

**Participants and setting**

A total of 11 APPs and 30 physicians participated in this study from August to September 2020 at Johns Hopkins Bayview Medical Center, Baltimore, a 420-bed Level 2 trauma center.

**Instrument development: Content validity evidence**

One author (T. C.) drafted a list of 44 clinical practice items pertinent to hospitalist APPs based on existing instruments for assessing nurses\(^7\) and NPs.\(^9\) These original items were refined by a drafting team utilizing NP/PA core competencies,\(^10\) Society of Hospital Medicine’s (SHM’s) core competencies,\(^11\) ACGME internal medicine milestones,\(^12\) and APP assessment instruments used in our HMGs. The drafting team included APPs, HMG leaders, and hospitalist educators who practice with APPs. To avoid bias, the drafting team was excluded from piloting the tool. During the iterative process, nonessential items like “APP is comfortable with their professional identity” and “function as a resource to other healthcare professionals” were eliminated. Common concepts such as “know the limits of their knowledge and when to seek consultation” and “able to identify the appropriate need for specialty consultation” were consolidated. These efforts contributed to content validity evidence.

Iterative revisions refined the initial 44 items to a 17-item instrument, which was then aligned with the ACGME milestones format to create five-levels of ability.\(^13\) These levels, (1) novice, (2) advanced beginner, (3) competent, (4) proficient, and (5) expert/coach, were expanded to a nine-point scale to permit rating of intermediate performance. Five labels were not included on CHAPP-RA to avoid bias.

Before administering CHAPP-RA, we conducted think aloud with five physicians who routinely supervise APPs. Small edits to wording were made to improve clarity.

**Data collection**

Physician raters received a Qualtrics link to complete the CHAPP-RA via email after working three consecutive shifts directly supervising an APP. Because some raters worked with APPs for multiple stretches of consecutive shifts (range: 3–5), only the longest stretch was evaluated.

**Data analysis**

**Response process validity evidence**

Response process validity evidence was collected by investigating the time to complete each instrument (using Qualtrics timer), the range of rating options selected for each item, and how ratings compared based on APP level of experience. The frequency and percentages of ratings for each item was computed to ensure raters used the full milestones scale. To determine if ratings varied with clinical experience, we grouped APPs by years of hospitalist practice (Novice APPs had 1–5 years of experience, and senior APPs had >5 years of experience). Means for each item for these groups were compared using t-tests for pairwise comparisons.

**Relationship to other variable validity evidence**

To gather relationships to other variables validity evidence, we asked raters their level of agreement with two global statements: APP is ready to practice independently, and I would feel comfortable having this APP care for my loved ones on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). CHAPP-RA ratings were correlated with the two global ratings using Spearman’s \(\rho\), with a \(\rho\) of \(\geq 0.50\) indicating a strong correlation between global ratings and average CHAPP-RA ratings.

We analyzed data using Stata version 15. This study was exempted by a Johns Hopkins Medicine IRB (IRB002768110).

**RESULTS**

The study included 11 APPs (9 PAs, 2 NPs; 8 females, and 3 males). Four were novice, four were mid-career, and three were senior. The 30 raters had an average of 7.1 years of clinical experience (SD: 5.7). Raters completed 42 out of 52 assigned CHAPP-RAs. The number of CHAPP-RAs completed by raters ranged from 1 to 7 (mean: 2.3, SD: 1.3).

**Response process validity evidence**

The average time to complete a CHAPP-RA was 10.5 min (range: 2.0–28.0 min). Table 1 shows the percentage of CHAPP-RA items able to be observed with descriptive statistics. Raters used a broad range of the 9-point milestones scale. Four items observed by all
raters were “assessment/plan of care,” “documentation/written communication,” “time management/reliability,” and “collaboration with a multidisciplinary team.” 13 items were “not observed” by at least one rater. Of these, the two items observed least often were “identification and management of the acutely ill” (37% not observed) and “history taking” (27%). Table 2 shows average ratings for novice, mid-career, and senior APPs. Novice APPs were rated statistically significantly lower than all other APPs, \( p < .001 \) for all comparisons. No statistically significant differences were found in items scores between mid-career and senior APPs.

**Relationship to other variables validity evidence**

Supplement A provides correlation values between the two global item ratings and CHAPP-RA items ratings. All correlations were positive (>.50) suggesting a strong relationship between CHAPP-RA items ratings and global assessment of an APP (range: 0.82–0.96 for both correlations).

**DISCUSSION**

This study provides content, response process, and relationship to other variables validity evidence for the interpretation of scores for a new instrument, the CHAPP-RA, to assess hospitalist APPs’ readiness for practice. The CHAPP-RA was used to assess trainees and more established providers. The SHM statement paper, “Hospital Medicine NPPA Practice Integration and Optimization,” recommends onboarding hospitalist APPs using a standardized assessment instrument.\(^{14}\) We designed the CHAPP-RA with this recommendation in mind. We intended for it to be easy to implement, requiring minimal instruction prior to use, using a milestone format already familiar to medical providers. Checklists for APP onboarding processes have been created in the past, however, they have not reported substantial validity evidence.\(^{15}\) In this pilot study, we report initial validity evidence for an instrument which could facilitate standardized clinical assessment during onboarding and subsequently into APPs’ practice.

APPs with less than 1 year of hospitalist experience scored lower compared to more experienced colleagues. Hence, we believe the CHAPP-RA could be most useful in assessing less experienced APPs.

We expected that all CHAPP-RA items could be assessed across 36 h of supervision. However, two items, “identification, and management of the acutely ill” and “history taking” were listed as “unable to rate” in over a quarter of occurrences. We realized that observing an initial history would only occur if the dyad was admitting new patients—which was not guaranteed in our study. Similarly, observing the management of

**TABLE 1** Descriptive statistics for each APP’s item rating on the CHAPP-RA by 30 physicians

| CHAPP-RA item                                      | Percentage of raters able to observe the items for CHAPP-RAs | Mean rating (SD) | Range of ratings |
|---------------------------------------------------|-------------------------------------------------------------|------------------|------------------|
| History-taking                                    | 80%                                                         | 6.3 (2.0)        | 2–9              |
| Physical exam                                     | 87%                                                         | 6.3 (1.7)        | 2–9              |
| Medication reconciliation                         | 93%                                                         | 6.5 (1.8)        | 1–9              |
| Clinical reasoning                                | 97%                                                         | 6.0 (1.8)        | 3–9              |
| Assessment/plan of care                           | 100%                                                        | 6.0 (1.9)        | 2–9              |
| Documentation/written communication               | 100%                                                        | 6.7 (1.6)        | 3–9              |
| Presentation/oral communication                   | 97%                                                         | 6.5 (1.7)        | 2–9              |
| Identification and management of the acutely ill  | 73%                                                         | 6.2 (2.1)        | 3–9              |
| Subspecialty and multidisciplinary consultation    | 90%                                                         | 6.6 (1.8)        | 3–9              |
| Knowledge of labs, images, and procedures         | 97%                                                         | 6.3 (1.9)        | 3–9              |
| Time management/reliability                       | 100%                                                        | 6.5 (1.9)        | 1–9              |
| Socioeconomic barriers to care                    | 87%                                                         | 6.9 (1.8)        | 3–9              |
| Patient interview                                 | 90%                                                         | 6.8 (1.6)        | 3–9              |
| Patient and family discussions                    | 87%                                                         | 6.7 (1.7)        | 3–9              |
| Unique patient characteristics                    | 87%                                                         | 6.9 (1.6)        | 2–9              |
| Collaborating with a multidisciplinary team        | 100%                                                        | 7.0 (1.6)        | 3–9              |
| Self-improvement                                  | 93%                                                         | 6.7 (1.7)        | 3–9              |

Abbreviations: APP, advanced practice provider; CHAPP-RA, Cardin Hospitalist Advanced Practice Provider-Readiness Assessment.
Table 2: Average CHAPP-RA item ratings for novice, mid-career, and senior APPs with standard deviations in parenthesis

| CHAPP-RA item                          | Novice APP (n = 4) | Mid-career APP (n = 4) | Senior career APP (n = 3) |
|----------------------------------------|--------------------|------------------------|--------------------------|
| History-taking                         | 5.3 (1.4)          | 7.6 (1.0)              | 7.9 (1.1)                |
| Physical exam                          | 5.4 (1.4)          | 7.9 (0.9)              | 8.3 (0.8)                |
| Medication reconciliation              | 4.8 (1.3)          | 7.7 (1.2)              | 8.0 (1.1)                |
| Clinical reasoning                     | 4.9 (1.4)          | 7.6 (1.2)              | 7.9 (1.4)                |
| Assessment/plan of care                | 5.8 (1.5)          | 7.7 (1.2)              | 8.1 (1.1)                |
| Documentation/written communication    | 5.6 (1.4)          | 7.7 (1.2)              | 8.0 (1.3)                |
| Identification and management of the acutely ill | 4.7 (1.4) | 7.8 (1.1) | 8.1 (1.3) |
| Subspecialty and multidisciplinary consultation | 5.5 (1.6) | 7.9 (1.2) | 8.0 (1.1) |
| Knowledge of labs, images, and procedures | 5.1 (1.5) | 7.7 (1.2) | 8.0 (1.2) |
| Time management/reliability            | 5.6 (1.7)          | 8.2 (0.6)              | 8.2 (0.9)                |
| Socioeconomic barriers to care         | 5.7 (1.6)          | 8.1 (0.9)              | 8.3 (0.8)                |
| Patient interview                      | 5.9 (1.4)          | 8.0 (0.8)              | 8.0 (1.1)                |
| Patient and family discussions         | 5.7 (1.3)          | 8.0 (0.7)              | 8.2 (1.0)                |
| Unique patient characteristics         | 5.8 (1.5)          | 8.1 (0.8)              | 8.1 (0.9)                |
| Collaborating with a multidisciplinary team | 6.1 (1.5) | 8.4 (0.7) | 8.3 (0.8) |
| Self-improvement                       | 6.0 (1.6)          | 8.0 (0.7)              | 8.1 (0.9)                |

Abbreviations: APP, advanced practice provider; CHAPP-RA, Cardin Hospitalist Advanced Practice Provider-Readiness Assessment.

*a* p < .001 for all row-wise comparisons for novice versus mid-career and novice versus senior.

*b* p > .05 for all row-wide comparisons for mid-career versus senior.

CONCLUSION

Assessing readiness for practice is a crucial step in the onboarding and continued education of hospitalist APPs. This study presents a readiness for practice assessment instrument that was feasible to implement and has established initial validity evidence for the interpretation of scores. Further study is needed to validate the CHAPP-RA on a larger scale.

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CONFLICT OF INTEREST

The authors report no relevant conflicts of interest.
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SUPPORTING INFORMATION
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