

5-1-2019

A Screening Tool to Identify Qualified Pharmacy Residency Candidates.

Daniel Hu

Providence St. Peter Hospital.

Danny Veenhouwer

Providence St. Peter Hospital, Olympia, Washington

Julie McCoy

Providence St. Peter Hospital, Olympia, Washington

Dominick A Caselnova

Providence St. Peter Hospital, Olympia, Washington

Follow this and additional works at: <https://digitalcommons.psjhealth.org/publications>



Part of the [Pharmacy and Pharmaceutical Sciences Commons](#)

Recommended Citation

Hu, Daniel; Veenhouwer, Danny; McCoy, Julie; and Caselnova, Dominick A, "A Screening Tool to Identify Qualified Pharmacy Residency Candidates." (2019). *Articles, Abstracts, and Reports*. 1695.

<https://digitalcommons.psjhealth.org/publications/1695>

This Article is brought to you for free and open access by Providence St. Joseph Health Digital Commons. It has been accepted for inclusion in Articles, Abstracts, and Reports by an authorized administrator of Providence St. Joseph Health Digital Commons. For more information, please contact digitalcommons@providence.org.

RESEARCH

A Screening Tool to Identify Qualified Pharmacy Residency Candidates

Daniel Hu, PharmD, Danny Veenhouwer, PharmD, Julie McCoy, PharmD, Dominick A. Caselnova III, MHA, BS Pharm

Providence St. Peter Hospital, Olympia, Washington

Submitted August 10, 2017; accepted January 11, 2018; published May 2019.

Objective. To develop and evaluate the utility of a prescreening tool to assess candidates for PGY1 pharmacy residency programs.

Methods. A scoring tool was developed to prescreen candidates who applied to two PGY1 pharmacy residency programs. The tool scored applicants based on six domains: community service, leadership experience, letters of intent, letters of recommendation, presentations/publication, and work experience.

Results. Applicants who were chosen to interview based on results from the screening tool were those who had significantly higher scores for all domains except work experience, as compared to applicants who were not interviewed. Total scores were also significantly higher. The average overall scores for applicants increased each year.

Conclusion. Each year, the competition for first-year pharmacy residency positions continues to increase. A tool that can assess and differentiate between candidates' strengths by screening their applications can be a valuable asset for program administrators when used correctly.

Keywords: PGY-1, pharmacy residency, screening tools, interview, letters of recommendation

INTRODUCTION

As the number of candidates applying for pharmacy postgraduate year one (PGY-1) residencies has increased, programs are increasingly faced with the challenge of streamlining the application and interview process.¹⁻³ Although pre-interview screening tools have existed since the 1970s, they are becoming more prevalent as programs attempt to standardize their process for assessing candidates.^{4,5} These screening tools are used to score candidates based on various domains such as work experience, grade point average, and leadership roles. Theoretically, they can be used to assess which candidates are the best fit for a program.^{5,6} Ensor and colleagues assessed the screening tool used at their institution and found that their screening tool analyses revealed certain characteristics that were significantly associated with invitation to interview (professional association involvement, presentations, rotation experiences, publications, pharmacy work experience, grade point average, and skills and certifications).⁶ Our own study was conducted for the purpose of adding to the sparse amount of published literature on this subject by performing similar analyses to those of Ensor and colleagues in order to provide additional insights into the screening process and a point of comparison to their results.

METHODS

Providence St. Peter Hospital (PSPH) and Providence Centralia Hospital (PCH) are sister hospitals in southwest Washington. Beginning with the 2014-2015 PGY-1 residency cycle, a scoring tool was developed for the purpose of prescreening candidates who applied to our programs. The tool was created by a pharmacist who was involved with the residency program and was based on recommendations by an accreditation team from the American Society of Health-System Pharmacists (ASHP). Because of the growing number of applications that the programs were receiving, the tool was needed to streamline the process for selecting residents. For the 2014-2015 and 2015-2016 residency cycles, PSPH had eight PGY-1 positions available and PCH had two PGY-1 positions available. Multiple reviewers participated in the scoring of candidates, which was based on the information the candidates had submitted to the Pharmacy Online Residency Centralized Application Service (PhORCAS). The pool of reviewers included the residency program director, preceptors, and pharmacy PGY-1 residents.

Candidates' scores were calculated based on six domains: community service, leadership experience, letters of intent, letters of recommendation, presentations/publications, and work experience (Table 1). These domains were selected to reflect the team values at PSPH and PCH and the desired qualities and experiences for residents in the PGY-1 programs. Points were determined according

Corresponding Author: Daniel Hu, Providence St. Peter Hospital, 413 Lilly Rd., NE, Olympia, WA 98506. Tel: 360-493-7411. E-mail: daniel.hu@providence.org

to pre-specified evaluative criteria per the scoring rubric to ensure consistency between all reviewers. In addition to their quantitative score for each applicant, reviewers could add qualitative comments based on their impressions from reviewing the candidate’s application. They also had an opportunity to enter a “strongly suggest to interview” or “strongly suggest no interview” comment regardless of the candidate’s score. The “strongly suggest to interview” option was included in the screening tool to serve as a “wild card” in cases where an applicant with a lower score was thought to be deserving of an interview. Conversely, “strongly suggest no interview” was included as an option for a candidate who scored high but was believed to otherwise not be a good fit for the program. Because candidates could submit more than three letters of reference in PhORCAS, only the three letters that the reviewers scored the highest were used to maintain consistency.

For this study, the candidates’ scores (as assessed by the application reviewers) were entered into PhORCAS and then exported to Excel spreadsheets using a report functionality built into the PhORCAS website tool. The de-identified data were then sent to a biostatistician for statistical analyses. Three academic years of candidate scoring data were analyzed (2014-2015, 2015-2016, and 2016-2017 PGY-1 residency cycles). The data were evaluated to determine whether individual scores for each domain as well as the total score were associated with an invitation to interview. The data were also evaluated to assess for trends in candidate characteristics over the three years. T-tests or one-way ANOVA tests were used to compare individual domains for candidates who were interviewed against candidates who were not interviewed, and for candidates in different years. Chi-square tests were used to compare rates of interview across the two hospitals and by year. The a priori level of significance was set at $p < .05$. R, 3.3.2 software (R Foundation for Statistical Computing, Vienna, Austria) was used to

conduct the analysis and generate the figures. Institutional review board approval was granted by Providence Health Care IRB for this study, with a waiver for consent authorization as the study was deemed to be of minimal risk.

RESULTS

All candidates who applied to PSPH and PCH programs during the three years for which data were reviewed were included in the final analyses. The average total score for all 279 candidates who applied to the residency programs during the three years for which data were reviewed was 9.6 (SD=2.5). Candidates who were subsequently invited to interview had significantly higher scores on their applications across all domains (except for work experience) than candidates who were not interviewed: 11.6 (SD=1.3) vs. 8.1 (SD=2.1), $p < .001$ (Table 2). A visual comparison of the differences in candidates’ scores between those who were invited to interview and those who were not is presented in Figure 1.

The data revealed several outliers including three candidates with relatively low scores who were offered interviews, and five candidates with relatively high scores who were not offered interviews (Figure 2).

Logistic regression demonstrated that total score was significantly associated with the likelihood of a candidate being interviewed, with an odds ratio of 4.2 ($p < .05$). This final model had a C-index of 0.93 (0.88, 0.99) and a Hosmer and Lemeshow goodness-of-fit test result of $p = .68$, indicating that the final model demonstrates “outstanding discrimination” and well-calibrated for correlation with likelihood of interview. These two tests are used to assess goodness of fit for logistic regression models.

Rates of interview were not significantly different across hospitals or by year. When assessed by year of application, the total scores for all candidates regardless of interview status increased over all three years (Table 3). However, no increase was seen for the domain of references and presentations and publications. When only the candidates invited to interview were evaluated, only the domains of community service and presentations/publications showed differences across application years (Table 4).

DISCUSSION

Candidates who were invited to interview demonstrated significantly higher total scores and within five out of the six domains found on the screening tool. The average score of a candidate offered an interview was 11.6 (SD=1.3). Ninety-five percent of interviewed candidates had scores from 9.1 to 14.1. The likelihood of a candidate being interviewed increased dramatically with every point the

Table 1. Domains Included in an Electronic Scoring Tool Used to Screen Applicants to Two Hospital-based Pharmacy Residency Programs (PSPH and PCH)

| Domain | Scoring Range |
|--------------------------------|---------------|
| Community service | 0-1 |
| Leadership experience | 0-4 |
| Letter of intent | 0-3 |
| Letters of recommendation | 0-3 |
| Presentations and publications | 0-3 |
| Work experience | 0-1 |

Abbreviations: PSPH=Providence St. Peter Hospital, PCH=Providence Centralia Hospital

Table 2. Pharmacy Residency Program Applicants' Scores Using Southwest Washington Region Pharmacy Department PGY-1 Residency Program Scoring Tool

| Variable | Scoring Range | Overall, Mean (SD) | Interview = No, Mean (SD) | Interview = Yes, Mean (SD) | p Value |
|--------------------------------|---------------|--------------------|---------------------------|----------------------------|---------|
| No. of candidates | - | 279 | 153 | 126 | - |
| Community service | 0-1 | 0.6 (0.5) | 0.5 (0.5) | 0.7 (0.4) | <.001 |
| Leadership | 0-4 | 2.4 (1.3) | 1.8 (1.1) | 3.3 (0.8) | <.001 |
| Letters of intent | 0-3 | 2.3 (0.7) | 2.1 (0.7) | 2.6 (0.5) | <.001 |
| Letters of recommendation | 0-3 | 2.5 (0.6) | 2.3 (0.7) | 2.8 (0.3) | <.001 |
| Presentations and publications | 0-3 | 1 (0.9) | 0.6 (0.8) | 1.4 (0.9) | <.001 |
| Work experience | 0-1 | 0.8 (0.4) | 0.8 (0.4) | 0.9 (0.3) | .07 |
| Total | 0-15 | 9.6 (2.5) | 8.1 (2.1) | 11.6 (1.3) | <.001 |

candidate received on the screening tool, suggesting that the range of scores could be widened to permit further differentiation between candidates. With every point increase, candidates were 4.2 times more likely to be offered an interview. Thus, a candidate scoring a mere three points higher on the screening tool was more than 10 times more likely to be offered an interview than his or her peers.

The domains had different scales, which meant that they could not be compared against each other to see which domain was the most impactful on a candidate's overall likelihood of being offered an interview based solely on odds ratios. For example, the domain of leadership had a maximum score of four points, whereas the domains of community service and work experience were awarded only one point at most.

Grade point average (GPA) was not used in the scoring tool, which was in contrast to other reported scoring tools. Our reason for omitting GPA from consideration was because we feel that GPAs do not necessarily reflect

similar performance at similar levels of difficulty, and do not permit accurate assessment of performance between different programs' curriculums. Additionally, a large number of applicants came from students who attended nearby pharmacy schools that used a pass/fail system. Therefore, we did not believe that GPA was a useful tool for comparison between our applicants. A trend seen over the three-year study period was that applicants had increasingly higher overall qualifications, regardless of interview status, which is likely a reflection of the increasingly competitive nature of PGY-1 residency programs.

Our data revealed several outliers where candidates with relatively low or high scores were offered interviews or not offered interviews, respectively. The explanation for these outliers is likely the "wild card" flexibility built into our screening process, ie, the candidate's score was not in and of itself the sole determinant of whether he or she would be offered an interview. The program reserved the option of offering interviews to candidates who were

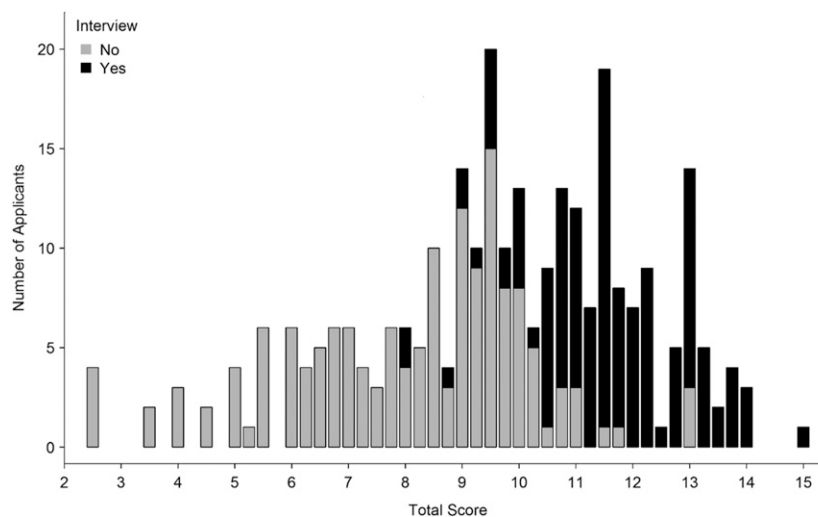


Figure 1. Visual Depiction of the Distribution of Applicant Scores and Interview Status

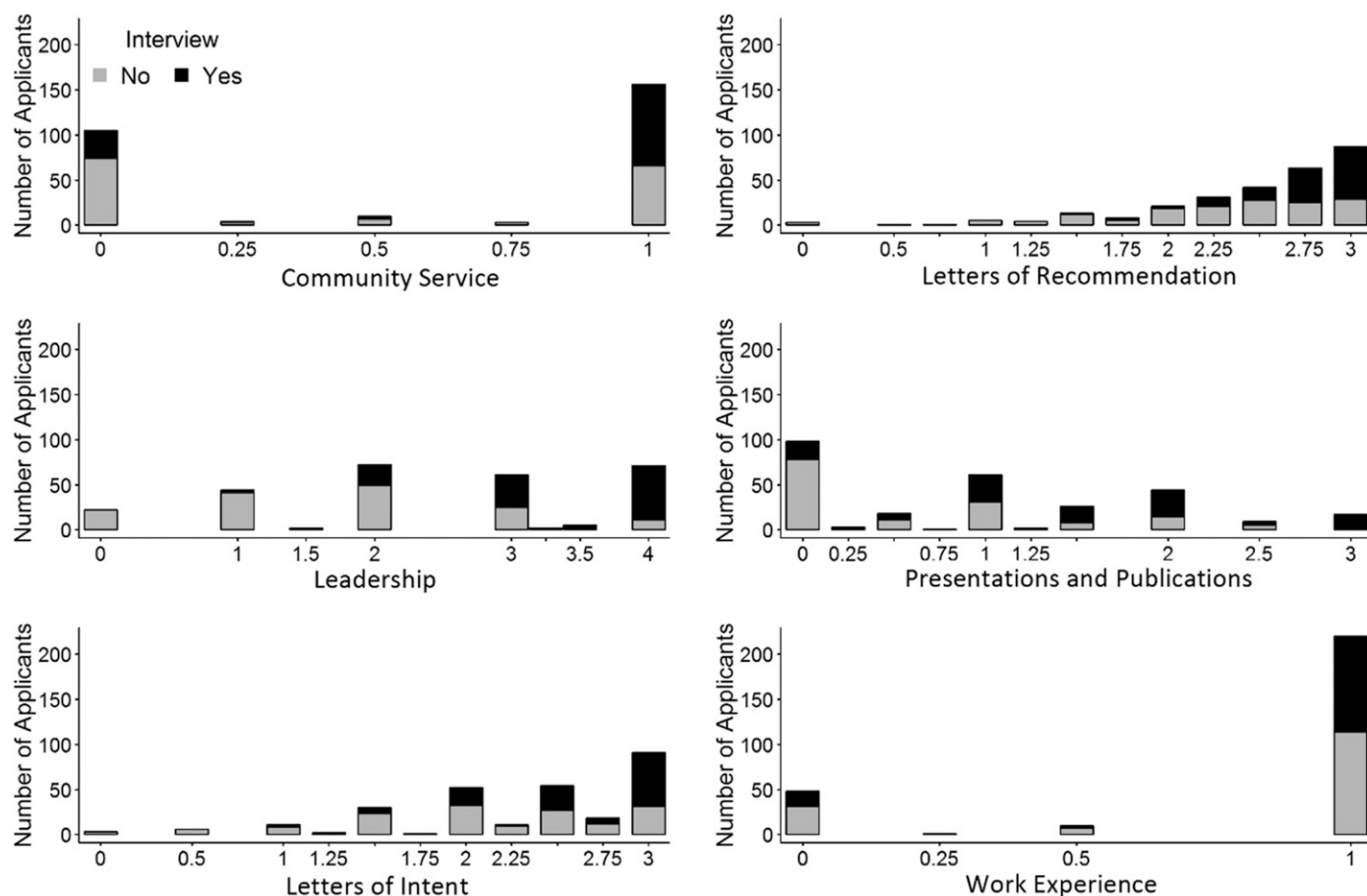


Figure 2. Visual Depiction of the Distribution of Applicant Scores and Interview Status Across Domains

anticipated to be good fits despite relatively low scores, and declining to interview candidates who were felt to be a poor fit for the program despite relatively high scores (typically because of prior knowledge of the candidate through rotations or personal knowledge by pharmacy personnel). Decisions to interview or not interview despite a relatively high or low score were made through discussions between the reviewers who screened the ap-

plicants, the residency interview team, pharmacist preceptors, pharmacy management, and the residency program director. This discretion demonstrates the high value our program places on noncognitive attributes of candidates as these decisions were largely made based on knowledge of a candidate’s character, work ethic, personality, or career goals. Because our program receives a high number of applications from candidates who complete

Table 3. Comparison of Pooled Scores Generated by an Electronic Screening Tool for All Candidates Who Applied to Pharmacy Residency Programs Over Three Academic Years

| Variable | Scoring Range | 2014-2015, Mean (SD) | 2015-2016, Mean (SD) | 2016-2017, Mean (SD) | p Value |
|--------------------------------|---------------|----------------------|----------------------|----------------------|---------|
| No. of candidates | - | 82 | 104 | 93 | - |
| Interviewed N (%) | - | 35 (43%) | 52 (50%) | 39 (42%) | .46 |
| Community service | 0-1 | 0.52 (0.50) | 0.50 (0.50) | 0.76 (0.38) | <.001 |
| Leadership | 0-4 | 2.14 (1.41) | 2.46 (1.28) | 2.70 (1.01) | .01 |
| Letters of intent | 0-3 | 2.13 (0.76) | 2.41 (0.67) | 2.41 (0.60) | .009 |
| Letters of recommendation | 0-3 | 2.43 (0.72) | 2.56 (0.49) | 2.47 (0.54) | .29 |
| Presentations and publications | 0-3 | 0.66 (0.85) | 1.25 (0.91) | 0.97 (0.95) | <.001 |
| Work experience | 0-1 | 0.74 (0.43) | 0.77 (0.41) | 0.90 (0.26) | .01 |
| Total | 0-15 | 8.63 (2.76) | 9.95 (2.44) | 10.21 (2.05) | <.001 |

Table 4. Comparison of Scores Generated Over Three Academic Years for Candidates Who Were Subsequently Invited to Interview for a Pharmacy Residency Position

| Variable | Scoring Range | 2014-2015, Mean (SD) | 2015-2016, Mean (SD) | 2016-2017, Mean (SD) | p Value |
|--------------------------------|---------------|----------------------|----------------------|----------------------|---------|
| No. of candidates | - | 35 | 52 | 39 | - |
| Community service | 0-1 | 0.74 (0.44) | 0.59 (0.50) | 0.92 (0.23) | .001 |
| Leadership | 0-4 | 3.26 (0.84) | 3.25 (0.85) | 3.28 (0.83) | .98 |
| Letters of intent | 0-3 | 2.51 (0.62) | 2.56 (0.54) | 2.62 (0.42) | .72 |
| Letters of recommendation | 0-3 | 2.79 (0.32) | 2.77 (0.32) | 2.69 (0.32) | .35 |
| Presentations and publications | 0-3 | 0.99 (0.91) | 1.69 (0.77) | 1.35 (0.99) | .002 |
| Work experience | 0-1 | 0.83 (0.38) | 0.80 (0.40) | 0.95 (0.17) | .11 |
| Total | - | 11.12 (0.97) | 11.69 (1.52) | 11.81 (1.26) | .06 |

advanced pharmacy practice experiences (APPEs) at our sites, our team often has a working and personal knowledge of many of the candidates.

In comparison with Ensor and colleagues, our scoring tool evaluated fewer domains and had a much smaller range of scores. Ensor and colleagues describe a tool which evaluated 13 domains with a maximum total score of 132. In contrast, our tool evaluated six domains and had a maximum score of 15. Interestingly, Ensor and colleagues' mean score for applicants invited to interview was 104.8 or 79% of the total points possible, and the mean score for applicants to our programs was 11.6 or 77% of the total points possible. Similarly to their findings, our results showed that applicants who were interviewed had significantly higher screening scores. Whereas their analyses showed that six of their domains (grade point average, letters of recommendation, community service, professional awards and scholarships, letters of interest, and general leadership experience) were not associated with the candidate's likelihood of interview, only one of ours (work experience) had no association. This contrasts with our model, where letters of recommendation, community service, letters of intent, and leadership experience were shown to be significantly associated with likelihood of interview.⁶ Explanations for these discrepancies could be a difference in the criteria used for scoring, different candidate populations applying to the programs, and difference in scale between our screening tools.

Our screening tool has limitations that are similar to those described by Ensor and colleagues. This was a retrospective review of data collected during the first three years of use. Our data are limited to only three years, and the trend and trajectory of applicant characteristics may change over time. Our screening tool was developed for use at our own institution; thus, the domains investigated and their relative weight in scoring reflect the values of

our program. For example, the domain of leadership represented up to four of 15 total points, while work experience could only score one of the 15 total points. Therefore, the tool we created may not be applicable to other institutions. Adjusting the scoring tool so that the domains have equal weight could permit future analyses into whether some domains are more impactful than others.

Because our screening tool scores were only assessed for correlations between screening tool domains and likelihood of interview, they cannot be used to predict rank position or likelihood of matching. Future assessments could be made to assess for correlations with these outcomes; however, the application of these data remains to be seen. Our candidates' scores are also limited in applicability for correlation with success. Qualitative research into the meaning of "success" for a pharmacy resident and program would be necessary to make these assessments, and at this time the literature is lacking in descriptions of perspectives on pharmacy residency success.

Lastly, there are other ways to screen applicants prior to the interview stage. For example, the University of Washington Medicine Pharmacy Services conducted a study on the use of phone screening interviews for the purpose of evaluating candidate fitness prior to the onsite interview. A survey of the candidates who were screened via phone interview showed that 85% of candidates felt that the phone interview was a useful experience.⁷

CONCLUSION

Analyses of our program's PGY-1 pharmacy residency screening tool demonstrates a strong correlation between a candidate's high scores and the likelihood that they would be offered an interview. We recommend that programs wishing to adopt a scoring tool should perform analyses to ensure that the tools are performing well to

their intended goals. Additional studies are necessary to determine correlations with other measures such as rank position, likelihood of match, and success. Additionally, we recommend qualitative research to be applied alongside quantitative investigations to ensure a balanced approach to screening residency applicants.

ACKNOWLEDGMENTS

The authors gratefully acknowledge Ruyun Jin, MD, MCR, for her contributions in conducting the statistical analyses for this project.

REFERENCES

1. Murphy JE, Nappi JM, Bosso JA, et al. ACCP position statement. ACCP vision of the future: postgraduate pharmacy residency training as a prerequisite for direct patient care. *Pharmacotherapy*. 2006; 26:722-733.
2. American Society of Health-System Pharmacists. ASHP long-range vision for the pharmacy work force in hospitals and health systems. *Am J Heal Syst Pharm*. 2007;64:1320-1330.
3. ASHP resident matching program statistics. <https://natmatch.com/ashprmp/stats.html>. Accessed My 16, 2019.
4. Kubica AJ, Dugas JE. Screening and selecting candidates for a hospital pharmacy residency program. *Am J Heal Pharm*. 1979; 36(2):194-198.
5. Hillebrand K, Leinum CJ, Desai S, Pettit NN, Fuller PD. Residency application screening tools: a survey of academic medical centers. *Am J Heal Pharm*. 2015;72(11 Supplement 1):S16-S19. doi:10.2146/ajhp150093.
6. Ensor CR, Walker CL, Rider SK, Clemente EU, Ashby DM, Shermock KM. Streamlining the process for initial review of pharmacy residency applications: an analytic approach. *Am J Health Syst Pharm*. 2013;70(19):1670-1675. doi:10.2146/ajhp120769.
7. Sipols I. Evaluation of the UW Medicine Pharmacy Residency Interview Process. 2017. Oral presentation at: Western States Conference; 2016; San Diego, CA.