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Assessing Student Readiness to Work with People Who Use Drugs: Development of a Multi-disciplinary Addiction Educational Survey

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Citation Details

Brown, Patrick C.M.; Button, Dana; Bethune, Danika; Kelly, Emily; Tierney, Hannah R.; Nerurkar, Rahee M.; Nicolaidis, Christina; Harrison, Rebecca; and Levander, Ximena, "Assessing Student Readiness to Work with People Who Use Drugs: Development of a Multi-disciplinary Addiction Educational Survey" (2022). *School of Social Work Faculty Publications and Presentations*. 588.

https://pdxscholar.library.pdx.edu/socwork_fac/588

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NOTICE: this is the author's final version of a work that was accepted for publication in the *Journal of General Internal Medicine*. Changes resulting from the publishing process, such as editing, corrections, formatting, and other quality control mechanisms may not be reflected in this document. The final, formatted version of this paper is available: <https://doi.org/10.1007/s11606-022-07494-5>

1 **Title:** Assessing Student Readiness to Work with People Who Use Drugs: Development of a
2 Multi-disciplinary Addiction Educational Survey

3 Running Title: Multi-disciplinary Student Survey for Addiction

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44 **Abstract word count: 296/300**

45 **Manuscript word count: 2811/3000**

46 **Tables and figures: 2 tables; 2 supplement tables and 1 supplement figure**

47 **References: 64**

48 **Key Words: interdisciplinary study, competency-based education, substance-related**
49 **disorders, surveys and questionnaires, survey methods, harm reduction, undergraduate**
50 **medical education**

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Abstract

Background: As health professions schools implement addiction curricula, they need survey instruments to evaluate the impact of the educational interventions. However, existing measures do not use current non-stigmatizing language and fail to capture core concepts.

Objective: To develop a brief measure of health professions student readiness to work with people who use drugs (PWUDs) and establish its content validity.

Methods: We conducted a literature review of existing instruments and desired clinical competencies related to providing care to PWUD and used results and expert feedback to create and revise a pool of 72 items. We conducted cognitive interviews with ten pre-clinical health professions students from various United States schools of nursing, pharmacy, and medicine to ensure the items were easy to understand. Finally, we used a modified Delphi process with twenty-four health professions educators and addiction experts (eight each from nursing, pharmacy, and medicine) to select items for inclusion in the final scale. We analyzed expert ratings of individual items and interdisciplinary agreement on ratings to decide how to prioritize items. We ultimately selected 12 attitudes and 12 confidence items to include in the REadiness to Discuss Use, Common Effects, and HArm Reduction Measure (REDUCE-HARM). Experts rated their overall assessment of the final scale.

80 **Results:** Twenty-two of twenty-four experts agreed or strongly agreed that the attitudes scale
81 measures student attitudes that impact readiness to work with PWUDs. Twenty-three of
82 twenty-four experts agreed or strongly agreed that the confidence scale measures student self-
83 efficacy in competencies that impact readiness to work with PWUDs. Seven of 72 initial items,
84 and none of the 24 selected items had statistically significant differences between disciplines.

85 **Conclusions:** The REDUCE-HARM instrument has strong content validity and may serve as a
86 useful tool in evaluating addiction education. Additional research is needed to establish its
87 reliability, construct validity, and responsiveness to change.

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89

90 **Introduction**

91 As the addiction and overdose epidemics worsen, experts and organizations have called for the
92 expansion of addiction and substance use education for all health professionals providing care
93 to people who use drugs (PWUDs).(1–6) Effective pharmacologic and behavioral treatments for
94 substance use disorders (SUDs) exist; despite increasing patient need, availability and utilization
95 of these evidence-based interventions remains low. Insufficient addiction training and stigma
96 among health professionals towards PWUDs contribute to this ongoing treatment gap.(1)

97 Formal teaching of core addiction concepts improves addiction-related knowledge and
98 increases trainee efficacy, while reducing addiction stigma among future health professionals in
99 nursing,(7–12) pharmacy, (13–16) and medicine.(17–21)(22) In particular, interprofessional
100 courses show improvements in addiction educational outcomes and students’ ability to work
101 collaboratively in the team-based delivery of SUD care.(23–27)

102 Both professionals and learners report that current educational programs offer inadequate
103 training on addiction topics.(3, 28–30) PWUDs are harmed by this lack of proficiency as
104 widespread stigma toward PWUDs in healthcare is a frequently cited reason PWUDs delay
105 seeking evaluation for serious conditions.(31–36) As clinical training progresses, stigma often
106 worsens, illustrating the need for early and focused pre-clinical and clinical educational
107 interventions.(37–39)

108 While knowledge and perceptions are often assessed in addiction courses, the measures used
109 are varied and often not validated. Commonly used validated measures include the Substance
110 Abuse Attitudes Scale (SAAS) and the Drug and Drug Problems Perceptions Questionnaire

111 (DDPPQ).(12,17,23,40–42) Both tools assess attitudes toward PWUDs, but employ outdated
112 and stigmatizing language (e.g. addict, drug user). They fail to assess attitudes toward
113 medications for opioid use disorder (MOUD) and harm reduction – paradigms central to
114 modern addiction practice. MOUD and harm reduction are themselves often stigmatized by
115 clinicians, a major barrier to patients receiving evidence-based care.(43–46) Neither the SAAS
116 nor the DDPPQ broadly measures confidence in core addiction competencies. The DDPPQ
117 evaluates confidence working with PWUDs generally, but frames items in the context of a
118 clinical “role” that is not relevant to pre-clinical students. Developed in 2003 (DDPPQ) and 1985
119 (SAAS), these measures may not capture recent and needed shifts in attitudes towards
120 substance use and addiction. The DDPPQ or SAAS may be supplemented by more institution
121 specific surveys assessing domains such as knowledge of opioid overdose response or attitudes
122 toward treatment modalities.(47–49) However, additional questions can result in a high survey
123 burden contributing to low response quality and low completion rates.(50,51)

124 With growing addiction education in health professions curricula, a new measure is needed to
125 assess students’ attitudes towards PWUDs and confidence in core SUD competencies. We
126 aimed to develop a self-assessment measure called the REadiness to Discuss Use, Common
127 Effects, and HARM Reduction Measure (REDUCE-HARM) and establish its content validity. The
128 REDUCE-HARM aims to capture the preparedness of health professions students including
129 medical, nursing, and pharmacy schools to work with PWUDs.

130 **Methods**

131 *Survey Development Process Overview*

132 We used a multi-step process to develop the REDUCE-HARM survey and establish its content
133 validity. We used a literature review and iterative team discussion to create an initial pool of
134 items and performed cognitive interviewing with target users (pre-clinical health science
135 students) to ensure items were easy to understand. We then used a modified Delphi process,
136 involving three rounds of feedback from a national multi-disciplinary group of experts to finalize
137 a 24-item instrument. The cognitive interviewees and multi-disciplinary experts involved in this
138 study provided feedback as advisors to the team, not as study participants, and the Institutional
139 Review Board of Oregon Health & Science University determined that study procedures were
140 not human subjects research.

141 *Initial Item Development*

142 We developed an initial pool of key ideas related to addiction attitudes or competencies
143 through a literature review including validated and unvalidated measures and published
144 competency guidelines.(52,53) Team members iteratively discussed these ideas, developed
145 items, refined phrasing, clarified wording, and ensured item relevance and non-redundancy.
146 Each attitude item described a belief about substance use, PWUDs, or SUD treatment, and was
147 intended to address a belief that was both prevalent among health professions students and
148 might negatively affect care of PWUDs. We grounded attitude items in evidence-based
149 practices in addiction treatment and public health in the U.S, and avoided potentially more
150 controversial topics without a “right” answer (e.g. “safe supply”). We formulated confidence
151 items for pre-clinical health professions students guided by the first two levels of Bloom’s
152 Taxonomy (“remember” and “understand”); while we use the term competencies in relation to
153 these items, they did not correspond directly to published competencies from an accrediting

154 body given the multi-disciplinary nature of the survey and lack of established interdisciplinary
155 competencies.(54)

156 *Cognitive Interviewing with Intended Audience*

157 We recruited a pre-determined convenience sample of 10 pre-clinical health professions
158 student participants from three West Coast institutions enrolled in schools of pharmacy,
159 nursing, and medicine to take part in reparative and descriptive cognitive interviews to ensure
160 that items reflected the intended constructs.(55) All pharmacy and nursing students were from
161 Oregon Health & Science University, while medical students were from Oregon Health &
162 Science University, University of California - San Francisco, and University of Washington. In
163 order to approximate the type of learner taking a general addiction medicine introductory
164 course, we selected students we knew from class cohorts and interdisciplinary volunteering
165 settings who reported little personal or professional experience working with PWUDs. We
166 conducted interviews in-person. Interviewers (DAB, DB, EK) asked student participants to
167 paraphrase the meaning of each item to ensure that items reflected the intended construct,
168 and field notes on participant feedback was later used to improve item clarity. No individual
169 student participant data was collected through cognitive interviews.

170 *Expert Review*

171 We used a modified Delphi approach (56) with a national group of addiction experts to create
172 the final instrument. In order to achieve representativeness and balance between experts'
173 professions, we pre-determined a recruitment goal of eight experts for each profession,
174 yielding an overall panel size of 24 previously shown to produce reliable results.(57) We defined

175 experts as faculty in schools of pharmacy, nursing, or medicine with expertise working with
176 PWUDs and in student education, as demonstrated by having published related research or by
177 holding key education positions related to this topic. We identified experts through university
178 listings, social media platforms, and peer recommendations. We recruited eight pharmacy,
179 eight nursing, and eight medical experts (N=24) from nine institutions across the United States
180 to participate.

181 The modified Delphi process included three rounds of surveys. In Round 1, experts rated items
182 on a three-point scale that assessed the importance of each individual survey item to the
183 overall survey design; few response options were used as we primarily intended to identify
184 attitudes and competencies deemed essential by experts. Experts commented on item wording,
185 and suggested ideas important to the intended constructs but missing from the initial items in
186 open-ended response fields. In Round 2, experts rated items that were developed or
187 substantively revised based on Round 1 feedback using the same three-point scale. In Round 3,
188 experts rated the final survey subscales on how well they measured the intended constructs
189 using a six-point scale of agreement.

190 Between Rounds 1 and 2, experts rated a total of 72 survey items, including 22 attitude (A) and
191 50 confidence (C) items. We provided each expert with a complete list of survey items and they
192 rated the importance of the readiness of students in their health profession to work with
193 PWUDs. Response options ranged from 1 (not at all important) to 3 (very important).

194 In Round 3, experts rated how well they thought the final survey subscales captured attitudes
195 and confidence in competencies important to the readiness of students in their respective

196 disciplines to care for PWUD. Response options ranged from strongly agree to strongly disagree
197 on a six-point scale. Additional open-ended items solicited feedback on reasons for responses
198 other than agree and strongly agree.

199 *Data Analysis*

200 We performed descriptive statistics for item ratings overall and by discipline. To assess the
201 appropriateness of applying uniform criteria across disciplines, we tested differences between
202 survey item rankings by health profession discipline using one-way ANOVA with a significance
203 threshold of $p < 0.01$ due to the large number of tests performed. Significant ANOVA tests were
204 evaluated with Tukey's post-hoc analyses to determine specific group differences.(58)

205 Any attitude item with a combined mean rating between the three health professions
206 disciplines of greater than 2.5 was included in the final survey design. Ratings for attitude items
207 were aggregated across disciplines as we hypothesized attitudes to be universal, and
208 competencies to be discipline specific. Any confidence item with a mean rating below 2.5 from
209 any discipline (pharmacy, nursing, or medicine) was removed from the final survey design. We
210 selected a cutoff of 2.5 so that the finalized sub-scales would contain only the most important
211 12 items to minimize final survey burden. All analyses were performed in RStudio.(59)

212 **Results**

213 The final list of survey items sent to each expert for an overall assessment in Round 3 and the
214 survey item rating is included in Table 1. All rated survey items and their overall and health
215 profession specific mean ratings are presented in Supplemental Table 1, and graphically

216 displayed in Supplemental Figure 1. Nearly all items were rated by all 24 experts with 2.7%
217 missingness.

218 Seven statistically significant ($p < 0.01$) differences in mean rankings between health
219 professions disciplines (Table 2), conducted as post-hoc analyses resulted. Only one attitude
220 item differed significantly among health professions. There were six confidence items that
221 differed significantly among health profession disciplines. Differences of all 72 survey items are
222 available as an online supplement table 2.

223 Twenty-two of twenty-four (92%) experts agreed or strongly agreed that “The attitudes scale
224 measures student attitudes that impact readiness to work with people who use drugs.” The two
225 experts that gave a rating lower than agree to the attitudes scale statement disagreed that
226 specific attitudes were necessary to work with PWUDs.

227 Twenty-three of twenty-four (96%) experts agreed or strongly agreed that “The confidence
228 scale measures student self-efficacy in competencies that impact readiness to work with people
229 who use drugs.” The expert that gave a rating lower than agree to the confidence scale
230 disagreed with the use of confidence as a descriptor, noting the difference between confidence
231 and self-efficacy, but did not disagree that the scale measured the intended construct.

232 **Discussion**

233 We developed the REDUCE-HARM as a tool to assess the readiness of multiple kinds of health
234 professions students to care for PWUD in a non-stigmatizing way informed by knowledge of
235 evidence-based treatments. Uses of this assessment tool include developing curricula,
236 performing educational assessment of the effectiveness of an educational intervention or for

237 assessing students' readiness to care for PWUD. We used cognitive interviews with pre-clinical
238 students to ensure items were straightforward to understand and we used a modified Delphi
239 approach with a nationally representative sample of addiction experts to rate items within a
240 pool of 72 items to decide which were most important to include. Ultimately, the 12 attitude
241 items and the 12 confidence items included in our final survey measure reflect shared
242 interprofessional values about what is most important for students of nursing, pharmacy, and
243 medicine preparing for future clinical work with PWUDs.

244 Experts identified learners' conception of addiction and addiction treatment as central to their
245 readiness to work with PWUDs. Experts valued the critical importance of students recognizing
246 addiction not as a personal weakness (A8), but as a disorder of reward neurocircuitry (A17) with
247 psychological and social contributors (A18) and a relapsing-remitting course (A13). Similarly,
248 perceptions of MOUD (A1, A2), opioid analgesia (A22), and access to sterile needles/supplies
249 (A4) as enabling of use disorder were seen as barriers to learner readiness to care for this
250 population.

251 Other important attitudes and competencies emphasized mitigating the role of stigma in
252 clinical encounters through examination of personal and clinical team behaviors (C17, C28,
253 C42), and perceiving the benefits of wide availability for SUD therapies (A2, A3, A19, A20).

254 Experts also rated as important having a non-stigmatizing perception of healthcare
255 professionals who developed a SUD (A16).

256 Experts rated self-efficacy in foundational addiction-related knowledge frequently relevant to
257 clinical encounters as important for students (C8, C30, C35, C40). Experts also highly rated

258 items related to self-efficacy in identifying patients at risk for life-threatening complications of
259 substance use (C11, C25) and strategies to reduce those risks (C10). They also recognized the
260 importance of health profession students to identify withdrawal symptoms which might cause
261 considerable discomfort and increased risk of mortality in an inpatient setting (C21, C25, C27).

262 Between the health professions disciplines, we found a statistically significant difference in
263 ratings for one attitude item and statistically significant differences in ratings for six confidence
264 items. Pharmacy experts gave statistically significant lower ratings to some survey items
265 relating to psychological factors (A7, C3), past trauma (C16), and social determinants of health
266 potentially contributing to development of and recovery from SUDs (C14). Medicine experts
267 gave higher ratings to self-efficacy in describing common quantities and frequencies of
268 substance use (C9). Interestingly, medicine experts gave significantly lower ratings to self-
269 efficacy regarding knowledge of adverse health outcomes of drug injection (C6) and alcohol use
270 (C2). These item rating differences provide valuable insight into the potential variation of health
271 professional responsibilities and focus areas when it comes to addiction care. These variations
272 reflect how SUD and addiction interdisciplinary educational programs could provide added
273 value for learners of all disciplines through development of complementary knowledge and skill
274 sets as well a knowledge gaps to target in curriculum.

275 Despite these differences, experts from the three disciplines agreed across the majority (n = 65)
276 of items, with no significant differences in the final measure. We believe the high level of
277 overall agreement reflects trans-disciplinary underpinnings and core values of caring for those
278 with addiction and supports the use of the REDUCE-HARM as a measure for interdisciplinary
279 addiction education, and curricula development in individual health professions schools.

280 *Limitations and Future Directions*

281 Our samples from all three disciplines may not have been fully representative of these
282 professions. Students recruited for cognitive interviewing were only enrolled at West Coast
283 universities; item interpretation may be subject to unidentified regional variation. Data on
284 characteristics of experts and students including race and gender were not collected. However,
285 our sample included experts at nine different universities across the West, Midwest, and
286 Northeast United States with a variety of official positions, time in clinical practice, and areas of
287 expertise within addictions care including addiction psychiatry and addiction medicine training.
288 On average, attitude items were rated lower than confidence items, and a couple experts
289 questioned the utility of attitudes in assessing student readiness. However, we believe that
290 attitudes are central to pre-clinical student readiness to work with PWUDs as stigma towards
291 this patient population remains one of the greatest barriers to high-quality patient-centered
292 addictions care.(31,60,61) In the current form, the confidence sub-scale of the REDUCE-HARM
293 is intended as a self-assessment. However, replacing “I...” with “The student can...”, for
294 example, makes this measure easily adaptable and a potential tool for educator assessment of
295 students after additional validation for use in this manner.

296 Ongoing research by the study team aims to assess this measure’s psychometric properties in a
297 large population of pharmacy, nursing, and medicine students from a variety of institutions and
298 geographic areas. This next step will further support the tool’s validity in measuring attitudes
299 and self-reported confidence in readiness to work with PWUD. Future work should evaluate the
300 responsiveness of this tool to addiction medicine educational interventions for pre-clinical
301 health professions students, such as didactics, reflective exercises and discussion, simulated

302 patient experiences, and multidisciplinary shadowing experiences. Another potential use of the
303 REDUCE-HARM self-assessment would be to review the student's survey with a trusted faculty
304 member or coach as part of strengths-based and lifelong learning skill development. While
305 existing curricula may not align completely with survey items, our assessment process identifies
306 these as attitudes and competencies central to student readiness which these curricula are
307 likely intended to promote, and this measure can further guide ongoing curriculum design or
308 revision. Additional research should also seek to evaluate the correlation between results of the
309 REDUCE-HARM and other forms of assessment in pre-clinical health professions students. There
310 are inherent limitations of self-assessment. It is a dynamic process influenced by knowledge,
311 experience, peers, and evaluators, and often does not follow a linear trajectory over time.(62)
312 Self-assessment in pre-clinical learners should be paired with early feedback from faculty in
313 order to identify areas of discordance and future goal-setting.(63) In addition to self-
314 assessment of attitudes and confidence, assessment of readiness should include demonstration
315 of knowledge and skills through simulated patient encounters, curriculum-specific question-
316 based exams, and short real-time assessments once students have moved from the pre-clinical
317 to clinical environment.(64)

318 **Conclusions**

319 As health professions schools develop and implement addiction-related curricula, educational
320 initiatives should focus on addressing stigmatizing attitudes and improving confidence in
321 evidence-based treatment modalities to prepare health professions students to provide non-
322 stigmatizing care for PWUDs with a multidisciplinary team based approach. The REDUCE-HARM

323 instrument is a step forward in the development and evaluation of these much-needed
324 educational interventions.

325 **Acknowledgements:** The authors would like to thank all of the experts who graciously reviewed
326 survey drafts and provided suggestions – Dan Arendt PharmD, Alëna A. Balasanova MD, Basilia
327 Basin RN, Christopher Blazes MD, Rebecca Cantone MD, Daniel Ciccarone MD, Jordan Covvey
328 PharmD, Kimberleigh Cox NP, Elona Dellabough-Gormley RN, Beth Doyle RN, Marian Fireman
329 MD, Amelia Goff RN, Daniel Hartung PharmD, Jared Klein MD, David Lawrence MD, Susannah
330 Lujan-Bear RN, Jessica Moreno PharmD, Kenneth Morford MD, Lilly Nickerson RN, Jackie Sharpe
331 PharmD, Emily Skogrand PharmD, Victoria Tutag-Lehr PharmD, April Vallerand RN, and Daniel
332 Ventricelli PharmD. **Prior presentation:** This work will be presented at the AMERSA Conference
333 November 2021 virtually as a poster presentation.

334 **Conflicts of Interest:**

335 Patrick C. M. Brown: No conflicts to disclose.

336 Dana A. Button: No conflicts to disclose.

337 Danika Bethune: No conflicts to disclose.

338 Emily Kelly: No conflicts to disclose.

339 Hannah R. Tierney: No conflicts to disclose.

340 Rahee M. Nerurkar: No conflicts to disclose.

341 Christina Nicolaidis: No conflicts to disclose.

342 Rebecca A. Harrison: No conflicts to disclose.

343 Ximena A. Levander: Dr. Levander was supported by the Samuel H. Wise Foundation during the
344 completion of this project.

345

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347

348

349 **References**

- 350 1. Madras BK, Ahmad NJ, Wen J, Sharfstein J, Prevention AT, Treatment, et al. Improving Access to
351 Evidence-Based Medical Treatment for Opioid Use Disorder: Strategies to Address Key Barriers
352 Within the Treatment System. *NAM Perspectives* [Internet]. 2020 Apr 27 [cited 2021 Jul 24];
353 Available from: [https://nam.edu/improving-access-to-evidence-based-medical-treatment-for-](https://nam.edu/improving-access-to-evidence-based-medical-treatment-for-opioid-use-disorder-strategies-to-address-key-barriers-within-the-treatment-system/)
354 [opioid-use-disorder-strategies-to-address-key-barriers-within-the-treatment-system/](https://nam.edu/improving-access-to-evidence-based-medical-treatment-for-opioid-use-disorder-strategies-to-address-key-barriers-within-the-treatment-system/)
- 355 2. Ratycz MC, Papadimos TJ, Vanderbilt AA. Addressing the growing opioid and heroin abuse
356 epidemic: a call for medical school curricula. *Med Educ Online*. 2018 Dec;23(1):1466574.
- 357 3. Ram A, Chisolm MS. The Time is Now: Improving Substance Abuse Training in Medical Schools.
358 *Acad Psychiatry*. 2016 Jun 1;40(3):454–60.
- 359 4. Shapiro A, Villarroel LR, George P. A call to maximize impact of the SUPPORT for Patients and
360 Communities Act through standard inclusion of opioid use disorder treatment curricula in medical
361 schools. *Adv Med Educ Pract*. 2019;10:581–3.
- 362 5. Lembke A, Humphreys K. The Opioid Epidemic as a Watershed Moment for Physician Training in
363 Addiction Medicine. *Acad Psychiatry*. 2018 Apr;42(2):269–72.
- 364 6. Cantone RE. Why medical students need addictions training. *Med Teach*. 2018;40(4):421–2.
- 365 7. Hines CB, Cody SL, Eyer JC, Coupe L. An Opioid Education Program for Baccalaureate Nursing
366 Students. *J Addict Nurs*. 2021 Jun 1;32(2):88–94.
- 367 8. McMorrow MC, Chang Y-P. Motivational Interviewing Training for Advanced Practice Nursing
368 Students to Address Prescription Opioid Use Disorder: A Mixed Methods Approach. *J Addict Nurs*.
369 2021 Jun 1;32(2):141–51.
- 370 9. Lanzillotta-Rangeley J, Leslie J, Little M, Stem J, Asselin E, Kurahovic M. Educational Program to
371 Increase Substance Use Disorder Knowledge and Decrease Stigma in First-Year Nursing Students.
372 *Pain Manag Nurs*. 2020 Oct;21(5):435–40.

- 373 10. Puskar K, Mitchell AM, Lee H, Kane I, Albrecht SA, Frank LR, et al. Nursing Students Learn Online
374 Interprofessional Education on Substance Use. *Can J Nurs Res*. 2020 Mar 1;52(1):8–14.
- 375 11. Mahmoud KF, Finnell D, Lindsay D, MacFarland C, Marze HD, Scolieri BB, et al. Can Screening, Brief
376 Intervention, and Referral to Treatment Education and Clinical Exposure Affect Nursing Students’
377 Stigma Perception Toward Alcohol and Opioid Use? *J Am Psychiatr Nurses Assoc*. 2019
378 Dec;25(6):467–75.
- 379 12. Smothers Z, Reynolds V, McEachern M, Derouin AL, Carter BM, Muzyk A. Substance Use Education
380 in Schools of Nursing: A Systematic Review of the Literature. *Nurse Educ*. 2018 Jun;43(3):136–9.
- 381 13. Kuryluk V, McAuley J, Maguire M. Naloxone counseling: Confidence and attitudes of student
382 pharmacists after a volunteer syringe exchange experience. *Curr Pharm Teach Learn*. 2020
383 Apr;12(4):429–33.
- 384 14. Silvia RJ. A Music Assignment to Develop Pharmacy Students’ Empathy Toward People with Opioid
385 Use Disorder. *Am J Pharm Educ*. 2020 Apr;84(4):7631.
- 386 15. Steinhardt SJ, Kelly WN, Clark JE, Hill AM. An Artistic Active-Learning Approach to Teaching a
387 Substance Use Disorder Elective Course. *Am J Pharm Educ* [Internet]. 2020 Apr [cited 2021 Jun
388 10];84(4). Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7223939/>
- 389 16. Muzyk AJ, Tew C, Thomas-Fannin A, Dayal S, Maeda R, Schramm-Sapyta N, et al. An
390 Interprofessional Course on Substance Use Disorders for Health Professions Students. *Acad Med*.
391 2017;92(12):1704–8.
- 392 17. Muzyk A, Smothers ZPW, Akrobetu D, Ruiz Veve J, MacEachern M, Tetrault JM, et al. Substance
393 Use Disorder Education in Medical Schools: A Scoping Review. *Academic Medicine*. 2019
394 Nov;94(11):1825–34.
- 395 18. Jawa R, Saravanan N, Burrowes SAB, Demers L. A call for training graduate medical students on
396 harm reduction for people who inject drugs. *Subst Abus*. 2021 Jun 4;1–3.
- 397 19. Kidd JD, Smith JL, Hu M-C, Turrigiano EM, Bisaga A, Nunes EV, et al. Medical Student Attitudes
398 Toward Substance Use Disorders Before and After a Skills-Based Screening, Brief Intervention, and
399 Referral to Treatment (SBIRT) Curriculum. *AMEP*. 2020 Jun 30;11:455–61.
- 400 20. Zerbo E, Traba C, Matthew P, Chen S, Holland BK, Levounis P, et al. DATA 2000 waiver training for
401 medical students: Lessons learned from a medical school experience. *Subst Abus*. 2020;41(4):463–
402 7.
- 403 21. Kothari D, Gourevitch MN, Lee JD, Grossman E, Truncali A, Ark TK, et al. Undergraduate Medical
404 Education in Substance Abuse: A Review of the Quality of the Literature. *Acad Med*. 2011
405 Jan;86(1):98–112.
- 406 22. Livingston J, Milne T, Fang ML, Amari E. The effectiveness of interventions for reducing stigma
407 related to substance use disorders: A systematic review. *Addiction* (Abingdon, England). 2011 Aug
408 4;107:39–50.

- 409 23. Muzyk A, Smothers ZPW, Andolsek KM, Bradner M, Bratberg JP, Clark SA, et al. Interprofessional
410 Substance Use Disorder Education in Health Professions Education Programs: A Scoping Review.
411 Acad Med. 2020 Mar;95(3):470–80.
- 412 24. Muzyk A, Mullan P, Andolsek K, Derouin A, Smothers Z, Sanders C, et al. A Pilot Interprofessional
413 Course on Substance Use Disorders to Improve Students’ Empathy and Counseling Skills. Am J
414 Pharm Educ. 2020 Apr;84(4):7415.
- 415 25. Wilson M, Bray BS, Remsberg CM, Kobayashi R, Richardson B. Interprofessional education on
416 opioid use and pain identifies team-based learning needs. Curr Pharm Teach Learn. 2021
417 Apr;13(4):429–37.
- 418 26. Dumenco L, Monteiro K, Collins S, Stewart C, Berkowitz L, Flanigan T, et al. A qualitative analysis of
419 interprofessional students’ perceptions toward patients with opioid use disorder after a patient
420 panel experience. Subst Abus. 2019;40(2):125–31.
- 421 27. Broyles LM, Conley JW, Harding JDJ, Gordon AJ. A scoping review of interdisciplinary collaboration
422 in addictions education and training. [Review]. Journal of Addictions Nursing. 2013 Mar;24(1):29–
423 36.
- 424 28. Finnell DS, Savage CL, Hansen BR, Sanchez M, White KM, Johnson JA, et al. Integrating Substance
425 Use Content in an “Overcrowded” Nursing Curriculum. Nurse Educ. 2018 Jun;43(3):128–31.
- 426 29. Thomas K, Muzyk AJ. Surveys of substance use disorders education in US pharmacy programs.
427 Ment Health Clin. 2018 Jan;8(1):14–7.
- 428 30. Raber I, Ball A, Papac J, Aggarwal A, Sussman R, Basaviah P, et al. Qualitative Assessment of
429 Clerkship Students’ Perspectives of the Topics of Pain and Addiction in their Preclinical Curriculum.
430 Acad Psychiatry. 2018 Oct;42(5):664–7.
- 431 31. van Boekel LC, Brouwers EPM, van Weeghel J, Garretsen HFL. Stigma among health professionals
432 towards patients with substance use disorders and its consequences for healthcare delivery:
433 systematic review. Drug Alcohol Depend. 2013 Jul 1;131(1–2):23–35.
- 434 32. Summers PJ, Hellman JL, MacLean MR, Rees VW, Wilkes MS. Negative experiences of pain and
435 withdrawal create barriers to abscess care for people who inject heroin. A mixed methods analysis.
436 Drug Alcohol Depend. 2018 Sep 1;190:200–8.
- 437 33. Cornford C, Fraser L, Wright N. Deep Vein Thromboses in Injecting Drug Users: Meanings, Bodily
438 Experiences, and Stigma. Qual Health Res. 2019 Sep;29(11):1641–50.
- 439 34. Bearnot B, Mitton JA, Hayden M, Park ER. Experiences of care among individuals with opioid use
440 disorder-associated endocarditis and their healthcare providers: Results from a qualitative study. J
441 Subst Abuse Treat. 2019 Jul;102:16–22.
- 442 35. McKnight C, Shumway M, Masson CL, Pouget ER, Jordan AE, Des Jarlais DC, et al. Perceived
443 discrimination among racial and ethnic minority drug users and the association with health care
444 utilization. J Ethn Subst Abuse. 2017 Dec;16(4):404–19.

- 445 36. Biancarelli DL, Biello KB, Childs E, Drainoni M, Salhaney P, Edeza A, et al. Strategies used by people
446 who inject drugs to avoid stigma in healthcare settings. *Drug Alcohol Depend*. 2019 May 1;198:80–
447 6.
- 448 37. Phillips SP, Clarke M. More than an education: the hidden curriculum, professional attitudes and
449 career choice. *Med Educ*. 2012 Sep;46(9):887–93.
- 450 38. Avery J, Zerbo E. Improving Psychiatry Residents’ Attitudes Toward Individuals Diagnosed with
451 Substance Use Disorders. *Harv Rev Psychiatry*. 2015 Aug;23(4):296–300.
- 452 39. Clancy C, Oyefeso A. Getting Addiction Into the Nursing Education “Water Supply”: A U.K. Case
453 Study. *J Addict Nurs*. 2019 Sep;30(3):149–58.
- 454 40. Muzyk AJ, Peedin E, Lipetzky J, Parker H, McEachern MP, Thomas K. Substance use education in US
455 schools of pharmacy: A systematic review of the literature. *Substance Abuse*. 2017 Oct
456 2;38(4):455–63.
- 457 41. Chappel JN, Veach TL, Krug RS. The substance abuse attitude survey: an instrument for measuring
458 attitudes. *J Stud Alcohol*. 1985 Jan 1;46(1):48–52.
- 459 42. Watson H, Maclaren W, Kerr S. Staff attitudes towards working with drug users: development of
460 the Drug Problems Perceptions Questionnaire. *Addiction*. 2007;102(2):206–15.
- 461 43. McGinty EE, Barry CL, Stone EM, Niederdeppe J, Kennedy-Hendricks A, Linden S, et al. Public
462 support for safe consumption sites and syringe services programs to combat the opioid epidemic.
463 *Prev Med*. 2018 Jun;111:73–7.
- 464 44. Lanzillotta-Rangeley J, Zeller TA, Beachler T, Litwin AH, Clark A, Stem J. The Impact of the Disease
465 Model of Substance Use Disorder on Evidence Based Practice Adoption and Stigmatizing Attitudes:
466 A Comparative Analysis. *Pain Manag Nurs*. 2021 Apr 24;
- 467 45. Salsitz E, Wiegand T. Pharmacotherapy of Opioid Addiction: “Putting a Real Face on a False
468 Demon.” *J Med Toxicol*. 2016 Mar;12(1):58–63.
- 469 46. Mahon LR, Hawthorne AN, Lee J, Blue H, Palombi L. Assessing pharmacy student experience with,
470 knowledge of and attitudes towards harm reduction: illuminating barriers to pharmacist-led harm
471 reduction. *Harm Reduct J*. 2018 Nov 16;15(1):57.
- 472 47. Williams AV, Strang J, Marsden J. Development of Opioid Overdose Knowledge (OOKS) and
473 Attitudes (OOAS) Scales for take-home naloxone training evaluation. *Drug and Alcohol
474 Dependence*. 2013 Sep 1;132(1):383–6.
- 475 48. Gjersing LR, Butler T, Caplehorn JRM, Belcher JM, Matthews R. Attitudes and beliefs towards
476 methadone maintenance treatment among Australian prison health staff. *Drug and Alcohol
477 Review*. 2007;26(5):501–8.
- 478 49. Goddard P. Changing attitudes towards harm reduction among treatment professionals: a report
479 from the American Midwest. *International Journal of Drug Policy*. 2003 Jun 1;14(3):257–60.

- 480 50. Porter SR, Whitcomb ME, Weitzer WH. Multiple Surveys of Students and Survey Fatigue. *New*
481 *Directions for Institutional Research*. 2004 Jan 1;(121):63–73.
- 482 51. Wise VL, Barham MA. Assessment Matters: Moving beyond Surveys. *About Campus*. 2012 Jan
483 1;17(2):26–9.
- 484 52. Core Competencies for Addiction Medicine [Internet]. American Board of Addiction Medicine.
485 [cited 2020 Aug 17]. Available from: <https://www.abam.net/become-certified/core-competencies/>
- 486 53. Servis M, Fishman SM, Wallace MS, Henry SG, Ziedonis D, Ciccarone D, et al. Responding to the
487 Opioid Epidemic: Educational Competencies for Pain and Substance Use Disorder from the Medical
488 Schools of the University of California. *Pain Med*. 2021 Feb 4;22(1):60–6.
- 489 54. Adams NE. Bloom’s taxonomy of cognitive learning objectives. *J Med Libr Assoc*. 2015
490 Jul;103(3):152–3.
- 491 55. Meadows K. Cognitive Interviewing Methodologies. *Clin Nurs Res*. 2021 May;30(4):375–9.
- 492 56. Khodyakov D, Grant S, Denger B, Kinnett K, Martin A, Peay H, et al. Practical Considerations in
493 Using Online Modified-Delphi Approaches to Engage Patients and Other Stakeholders in Clinical
494 Practice Guideline Development. *The Patient - Patient-Centered Outcomes Research*. 2019;
- 495 57. Akins RB, Tolson H, Cole BR. Stability of response characteristics of a Delphi panel: application of
496 bootstrap data expansion. *BMC Medical Research Methodology*. 2005 Dec 1;5(1):37.
- 497 58. Tukey JW. Comparing Individual Means in the Analysis of Variance. *Biometrics*. 1949;5(2):99–114.
- 498 59. R Core Team. R: A language and environment for statistical computing. [Internet]. Vienna, Austria:
499 R Foundation for Statistical Computing; 2019. Available from: <https://www.R-project.org/>
- 500 60. Priest KC, Englander H, McCarty D. “Now hospital leaders are paying attention”: A qualitative study
501 of internal and external factors influencing addiction consult services. *J Subst Abuse Treat*. 2020
502 Mar;110:59–65.
- 503 61. Yang LH, Wong LY, Grivel MM, Hasin DS. Stigma and substance use disorders: an international
504 phenomenon. *Curr Opin Psychiatry*. 2017 Sep;30(5):378–88.
- 505 62. Sargeant J, Armson H, Chesluk B, Dornan T, Eva K, Holmboe E, et al. The processes and dimensions
506 of informed self-assessment: a conceptual model. *Acad Med*. 2010 Jul;85(7):1212–20.
- 507 63. Holmboe ES. Work-based Assessment and Co-production in Postgraduate Medical Training. *GMS J*
508 *Med Educ*. 2017;34(5):Doc58.
- 509 64. Thampy H, Willert E, Ramani S. Assessing Clinical Reasoning: Targeting the Higher Levels of the
510 Pyramid. *J Gen Intern Med*. 2019 Aug;34(8):1631–6.

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Table 28 Attitude and confidence item rankings of content validated survey items among pharmacy, nursing, and medicine experts in addiction care and health profession student education.

| Survey Item ID | Survey Item | Content and education expert mean (SD) item ranking from 1 = not at all important to 3 = very important | | | |
|----------------|---|---|----------------|----------------|----------------|
| | | Overall | Pharmacy | Nursing | Medicine |
| A1 | Someone being prescribed buprenorphine or methadone for their opioid use disorder is replacing one addiction with another. | 2.83 (0.48) | 3.00 (0.00) | 2.71 (0.49) | 2.71 (0.76) |
| A2 | If somebody continues to use addictive substances without a prescription, they should not be prescribed methadone or buprenorphine. | 2.65 (0.57) | 2.83 (0.41) | 2.86 (0.38) | 2.14 (0.69) |
| A3 | People should not expect to be treated for opioid withdrawal when they are in the hospital for another reason. | 2.67 (0.64) | 2.57 (0.53) | 3.00 (0.00) | 2.43 (0.98) |
| A4 | Providing sterile needles and syringes without a prescription encourages people to continue injecting addictive drugs. | 2.83 (0.48) | 3.00 (0.00) | 3.00 (0.00) | 2.43 (0.79) |
| A8 | People with substance use disorders could stop using if they really wanted. | 2.75 (0.53) | 2.86 (0.38) | 3.00 (0.00) | 2.29 (0.76) |

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|-----|--|----------------|----------------|----------------|----------------|
| A13 | Recovering from a substance use disorder may include a return to using substances. | 2.68 (0.48) | 2.50 (0.55) | 3.00 (0.00) | 2.40 (0.55) |
| A16 | If a healthcare professional developed a substance use disorder, they should not be allowed to work in healthcare in the future. | 2.70 (0.56) | 2.67 (0.52) | 3.00 (0.00) | 2.43 (0.79) |
| A17 | Substance use disorders cause changes in the brain's reward pathways which affect behavior. | 2.75 (0.61) | 2.43 (0.98) | 3.00 (0.00) | 2.71 (0.49) |
| A18 | Multiple factors contribute to the development of substance use disorders, including a person's biology, environment and, experiences. | 2.75 (0.44) | 2.71 (0.49) | 3.00 (0.00) | 2.57 (0.53) |
| A19 | Naloxone, the opioid overdose antidote, should be available without a prescription. | 2.67 (0.56) | 3.00 (0.00) | 2.57 (0.53) | 2.29 (0.76) |
| A20 | More members of the public should learn how to respond to an opioid overdose with naloxone. | 2.64 (0.58) | 2.83 (0.41) | 3 (0.00) | 2.14 (0.69) |
| A21 | Someone who injects drugs will probably not take steps to improve their health. | 2.27 (0.63) | 2 (0.63) | 2.67 (0.52) | 2.00 (0.58) |
| A22 | People with active opioid use disorder should not receive opioid analgesics to treat pain in the hospital. | 2.86 (0.47) | 2.83 (0.41) | 3.00 (0.00) | 2.71 (0.76) |
| C8 | I can describe typical routes of administration for common substances. | 2.68 (0.48) | 2.50 (0.55) | 2.67 (0.52) | 2.71 (0.49) |
| C10 | I can describe ways that people who use opioids can reduce their risk of fatal overdose. | 2.92 (0.28) | 3.00 (0.00) | 3.00 (0.00) | 2.71 (0.49) |
| C11 | I can recognize risk factors for opioid overdose. | 2.96 (0.20) | 3.00 (0.00) | 3.00 (0.00) | 2.86 (0.38) |
| C17 | I can recognize ways in which people who use substances can be mistreated in medical settings. | 2.68 (0.48) | 2.67 (0.52) | 2.83 (0.41) | 2.57 (0.53) |
| C21 | I can describe the common signs and symptoms of alcohol withdrawal. | 2.79 (0.51) | 2.71 (0.49) | 3.00 (0.00) | 2.57 (0.79) |
| C25 | I can describe the common signs and symptoms of opioid withdrawal. | 2.79 (0.51) | 2.71 (0.49) | 3.00 (0.00) | 2.57 (0.79) |
| C27 | I can describe the common signs and symptoms of stimulant withdrawal. | 2.70 (0.56) | 2.50 (0.55) | 3.00 (0.00) | 2.57 (0.79) |
| C28 | I can distinguish between stigmatizing and non-stigmatizing terms used to talk about drug use. | 2.96 (0.20) | 3.00 (0.00) | 3.00 (0.00) | 2.86 (0.38) |
| C30 | I can describe harm reduction. | 2.88 (0.45) | 3.00 (0.00) | 3.00 (0.00) | 2.57 (0.79) |
| C35 | I can distinguish a substance use disorder from substance use. | 2.83 (0.39) | 2.67 (0.52) | 3.00 (0.00) | 2.71 (0.49) |
| C42 | I can list pharmacologic treatments for opioid use disorder. | 2.88 (0.34) | 3.00 (0.00) | 3.00 (0.00) | 2.57 (0.53) |
| C44 | I can recognize my own biases towards people with substance use disorders. | 3.00 (0.00) | 3.00 (0.00) | 3.00 (0.00) | 3.00 (0.00) |

A, Attitude survey items; C, Confidence survey items.

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Table 33 Survey items with differences in rating importance among health professions experts relating to preparedness to work with people who use drugs.

| Survey Item ID | Survey Item | One-way ANOVA | | Tukey's post-hoc | |
|----------------|--|---------------|---------|--------------------------|-----------------|
| | | F | p-value | Group rating differences | p-value |
| A7 | Community support from other people in recovery is an important part of recovery from substance use disorders. | 7.3 | 0.0039 | NUR > PHRM | 0.0039 |
| C2 | I can describe chronic adverse health outcomes associated with alcohol. | 6.82 | 0.0052 | NUR > MED | 0.004 |
| C3 | I can recognize benefits that people get from using substances. | 10.36 | 0.0009 | MED > PHRM NUR > PHRM | 0.008 0.0009 |
| C6 | I can describe adverse health outcomes associated with injecting drugs. | 6.68 | 0.0057 | NUR > MED PHRM > MED | 0.006 0.03 |
| C9 | I can describe typical patterns of substance use in terms of quantity and frequency. | 8.4 | 0.0029 | MED > NUR MED > PHRM | 0.058 0.002 |
| C14 | I can recognize the contribution of the social determinants of health to the development of substance use disorders. | 8.17 | 0.0024 | MED > PHRM NUR > PHRM | 0.04 0.002 |
| C16 | I can recognize the role of trauma in the development and continuation of substance use disorders. | 11.42 | 0.0004 | MED > PHRM NUR > PHRM | 0.004 0.0006 |

A, Attitude survey item; C, Confidence survey item; NUR, nursing experts; PHRM; pharmacy experts; MED, medicine experts

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Supplement table 1. Perception and confidence item rankings among pharmacy, nursing, and medicine experts in addition care and health profession student education.

| Survey Item ID | Survey Item | Content and education expert mean (SD) item ranking from 1 = not at all important to 3 = very important | | | |
|----------------|--|---|----------------|----------------|----------------|
| | | Overall | Pharmacy | Nursing | Medicine |
| A1* | Someone being prescribed buprenorphine or methadone for their opioid use disorder is replacing one addiction with another. | 2.83 (0.48) | 3.00 (0.00) | 2.71 (0.49) | 2.71 (0.76) |
| A2* | If somebody continues to use addictive substances without a prescription, they should not be prescribed methadone or buprenorphine. | 2.65 (0.57) | 2.83 (0.41) | 2.86 (0.38) | 2.14 (0.69) |
| A3* | People should not expect to be treated for opioid withdrawal when they are in the hospital for another reason. | 2.67 (0.64) | 2.57 (0.53) | 3.00 (0.00) | 2.43 (0.98) |
| A4* | Providing sterile needles and syringes without a prescription encourages people to continue injecting addictive drugs. | 2.83 (0.48) | 3.00 (0.00) | 3.00 (0.00) | 2.43 (0.79) |
| A5 | People with substance use disorders are choosing substances over their personal relationships. | 2.33 (0.70) | 2.71 (0.49) | 2.29 (0.76) | 2.00 (0.82) |
| A6 | Health systems should consult people who use substances when designing substance use services. | 2.46 (0.66) | 2.57 (0.53) | 2.71 (0.49) | 2.00 (0.82) |
| A7 | Community support from other people in recovery is an important part of recovery from substance use disorders. | 2.46 (0.66) | 2.00 (0.58) | 3.00 (0.00) | 2.29 (0.76) |
| A8* | People with substance use disorders could stop using if they really wanted. | 2.75 (0.53) | 2.86 (0.38) | 3.00 (0.00) | 2.29 (0.76) |
| A9 | Hitting 'rock bottom' helps people recover from substance use disorders. | 2.33 (0.70) | 2.00 (0.82) | 2.43 (0.53) | 2.29 (0.76) |
| A10 | People who use heroin more than once will develop an opioid use disorder. | 2.33 (0.56) | 2.43 (0.53) | 2.29 (0.76) | 2.14 (0.38) |
| A11 | A person's appearance is a good indicator of the severity of their substance use disorder. | 2.33 (0.76) | 2.57 (0.53) | 2.71 (0.76) | 2.00 (0.82) |
| A12 | Substance use disorders inevitably get worse over time. | 2.25 (0.68) | 2.43 (0.79) | 2.43 (0.53) | 2.00 (0.58) |
| A13* | Recovering from a substance use disorder may include a return to using substances. | 2.68 (0.48) | 2.50 (0.55) | 3.00 (0.00) | 2.40 (0.55) |
| A14 | Patients with opioid use disorder should not receive stimulant medications for ADHD. | 2.30 (0.66) | 2.50 (0.55) | 2.33 (0.52) | 2.17 (0.75) |
| A15 | If a healthcare professional developed a substance use disorder, they should try to stop on their own without telling anyone. | 2.50 (0.59) | 2.43 (0.53) | 2.71 (0.49) | 2.29 (0.76) |
| A16* | If a healthcare professional developed a substance use disorder, they should not be allowed to work in healthcare in the future. | 2.70 (0.56) | 2.67 (0.52) | 3.00 (0.00) | 2.43 (0.79) |
| A17* | Substance use disorders cause changes in the brain's reward pathways which affect behavior. | 2.75 (0.61) | 2.43 (0.98) | 3.00 (0.00) | 2.71 (0.49) |
| A18* | Multiple factors contribute to the development of substance use disorders, including a person's biology, environment and, experiences. | 2.75 (0.44) | 2.71 (0.49) | 3.00 (0.00) | 2.57 (0.53) |

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|------|--|----------------|----------------|----------------|----------------|
| A19* | Naloxone, the opioid overdose antidote, should be available without a prescription. | 2.67 (0.56) | 3.00 (0.00) | 2.57 (0.53) | 2.29 (0.76) |
| A20* | More members of the public should learn how to respond to an opioid overdose with naloxone. | 2.64 (0.58) | 2.83 (0.41) | 3.00 (0.00) | 2.14 (0.69) |
| A21 | Someone who injects drugs will probably not take steps to improve their health. | 2.27 (0.63) | 2.00 (0.63) | 2.67 (0.52) | 2.00 (0.58) |
| A22* | People with active opioid use disorder should not receive opioid analgesics to treat pain in the hospital. | 2.86 (0.47) | 2.83 (0.41) | 3.00 (0.00) | 2.71 (0.76) |
| C1 | I can recognize informal terms used to describe types, quantities, and ways of using substances. | 2.00 (0.72) | 1.86 (0.90) | 2.14 (0.69) | 2.14 (0.69) |
| C2 | I can describe chronic adverse health outcomes associated with alcohol. | 2.58 (0.58) | 2.57 (0.53) | 3.00 (0.00) | 2.00 (0.58) |
| C3 | I can recognize benefits that people get from using substances. | 2.59 (0.59) | 2.00 (0.63) | 3.00 (0.00) | 2.71 (0.49) |
| C4 | I can describe chronic adverse health outcomes associated with stimulant use disorder (e.g., methamphetamine, amphetamine, cocaine). | 2.75 (0.44) | 2.86 (0.38) | 3.00 (0.00) | 2.43 (0.53) |
| C5 | I can describe chronic adverse health outcomes associated with long term use of opioids (e.g., heroin, oxycodone, fentanyl). | 2.79 (0.41) | 2.86 (0.38) | 3.00 (0.00) | 2.43 (0.53) |
| C6 | I can describe adverse health outcomes associated with injecting drugs. | 2.75 (0.44) | 2.86 (0.38) | 3.00 (0.00) | 2.29 (0.49) |
| C7 | I can describe safe injection practices for people who inject drugs. | 2.67 (0.64) | 3.00 (0.00) | 2.86 (0.38) | 2.29 (0.76) |
| C8* | I can describe typical routes of administration for common substances. | 2.68 (0.48) | 2.50 (0.55) | 2.67 (0.52) | 2.71 (0.49) |
| C9 | I can describe typical patterns of substance use in terms of quantity and frequency. | 2.10 (0.72) | 1.50 (0.55) | 2.00 (0.63) | 2.67 (0.52) |
| C10* | I can describe ways that people who use opioids can reduce their risk of fatal overdose. | 2.92 (0.28) | 3.00 (0.00) | 3.00 (0.00) | 2.71 (0.49) |
| C11* | I can recognize risk factors for opioid overdose. | 2.96 (0.20) | 3.00 (0.00) | 3.00 (0.00) | 2.86 (0.38) |
| C12 | I can identify patients who should be offered a naloxone prescription. | 2.68 (0.57) | 2.83 (0.41) | 2.83 (0.41) | 2.29 (0.76) |
| C13 | I can demonstrate the steps of responding to an opioid overdose in the community. | 2.71 (0.55) | 3.00 (0.00) | 2.71 (0.49) | 2.29 (0.76) |
| C14 | I can recognize the contribution of the social determinants of health to the development of substance use disorders. | 2.67 (0.48) | 2.29 (0.49) | 3.00 (0.00) | 2.71 (0.49) |
| C15 | I can recognize the contribution of the social determinants of health to substance use disorder treatment access. | 2.62 (0.58) | 2.57 (0.53) | 2.86 (0.38) | 2.43 (0.79) |
| C16 | I can recognize the role of trauma in the development and continuation of substance use disorders. | 2.71 (0.46) | 2.29 (0.49) | 3.00 (0.00) | 2.86 (0.38) |
| C17* | I can recognize ways in which people who use substances can be mistreated in medical settings. | 2.68 (0.48) | 2.67 (0.52) | 2.83 (0.41) | 2.57 (0.53) |
| C18 | I can recognize the role of chronic pain in the development and continuation of substance use disorders. | 2.54 (0.78) | 2.14 (1.07) | 2.71 (0.76) | 2.57 (0.53) |
| C19 | I can describe opioid induced hyperalgesia. | 2.41 (0.67) | 2.50 (0.55) | 2.33 (0.82) | 2.29 (0.76) |

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|------|--|----------------|----------------|----------------|----------------|
| C20 | I can describe the common signs and symptoms of alcohol intoxication. | 2.62 (0.65) | 2.43 (0.79) | 3.00 (0.00) | 2.29 (0.76) |
| C21* | I can describe the common signs and symptoms of alcohol withdrawal. | 2.79 (0.51) | 2.71 (0.49) | 3.00 (0.00) | 2.57 (0.79) |
| C22 | I can describe the common signs and symptoms of benzodiazepine intoxication. | 2.56 (0.59) | 2.67 (0.52) | 2.57 (0.53) | 2.43 (0.79) |
| C23 | I can describe the common signs and symptoms of benzodiazepine withdrawal. | 2.64 (0.66) | 2.67 (0.52) | 3.00 (0.00) | 2.29 (0.95) |
| C24 | I can describe the common signs and symptoms of opioid intoxication. | 2.83 (0.48) | 3.00 (0.00) | 3.00 (0.00) | 2.43 (0.79) |
| C25* | I can describe the common signs and symptoms of opioid withdrawal. | 2.79 (0.51) | 2.71 (0.49) | 3.00 (0.00) | 2.57 (0.79) |
| C26 | I can describe the common signs and symptoms of stimulant intoxication. | 2.67 (0.64) | 2.43 (0.79) | 3.00 (0.00) | 2.57 (0.79) |
| C27* | I can describe the common signs and symptoms of stimulant withdrawal. | 2.70 (0.56) | 2.50 (0.55) | 3.00 (0.00) | 2.57 (0.79) |
| C28* | I can distinguish between stigmatizing and non-stigmatizing terms used to talk about drug use. | 2.96 (0.20) | 3.00 (0.00) | 3.00 (0.00) | 2.86 (0.38) |
| C29 | I can describe contingency management. | 2.04 (0.77) | 1.83 (0.75) | 2.29 (0.76) | 1.86 (0.69) |
| C30* | I can describe harm reduction. | 2.88 (0.45) | 3.00 (0.00) | 3.00 (0.00) | 2.57 (0.79) |
| C31 | I can recognize examples of harm reduction strategies. | 2.75 (0.53) | 2.86 (0.38) | 2.86 (0.38) | 2.43 (0.79) |
| C32 | I can describe the purpose of trauma informed care. | 2.62 (0.65) | 2.29 (0.76) | 3.00 (0.00) | 2.71 (0.49) |
| C33 | I can distinguish between trauma informed care and actions that may be re-traumatizing. | 2.54 (0.66) | 2.43 (0.79) | 2.86 (0.38) | 2.43 (0.53) |
| C34 | I can describe the approach of motivational interviewing. | 2.71 (0.55) | 2.43 (0.53) | 2.86 (0.38) | 2.71 (0.76) |
| C35* | I can distinguish a substance use disorder from substance use. | 2.83 (0.39) | 2.67 (0.52) | 3.00 (0.00) | 2.71 (0.49) |
| C36 | I can identify the classes of medications that are misused (i.e., stimulant, opioid, depressant). | 2.50 (0.78) | 2.43 (0.79) | 2.71 (0.76) | 2.14 (0.90) |
| C37 | I can describe the role of community and peer support in helping people with their substance use disorder. | 2.54 (0.66) | 2.14 (0.69) | 3.00 (0.00) | 2.43 (0.79) |
| C38 | I can describe the principles of 12-step recovery support programs. | 2.17 (0.70) | 1.86 (0.69) | 2.57 (0.53) | 2.14 (0.69) |
| C39 | I can list common behavioral therapies for substance use disorders. | 2.35 (0.71) | 2.17 (0.75) | 2.71 (0.49) | 2.14 (0.90) |
| C40 | I can list pharmacologic treatments for tobacco use disorder. | 2.37 (0.68) | 2.50 (0.55) | 2.17 (0.75) | 2.40 (0.89) |
| C41 | I can list pharmacologic treatments for alcohol use disorder. | 2.71 (0.46) | 2.86 (0.38) | 2.86 (0.38) | 2.43 (0.53) |
| C42* | I can list pharmacologic treatments for opioid use disorder. | 2.88 (0.34) | 3.00 (0.00) | 3.00 (0.00) | 2.57 (0.53) |

| | | | | | |
|------|---|----------------|----------------|----------------|----------------|
| C43 | I can describe the mechanism of action for various medications prescribed for opioid use disorder. | 2.77 (0.43) | 3.00 (0.00) | 2.83 (0.41) | 2.43 (0.53) |
| C44* | I can recognize my own biases towards people with substance use disorders. | 3.00 (0.00) | 3.00 (0.00) | 3.00 (0.00) | 3.00 (0.00) |
| C45 | I can recognize risk factors for return to use (or starting to use again) for a person abstaining from substance use. | 2.62 (0.49) | 2.57 (0.53) | 2.71 (0.49) | 2.43 (0.53) |
| C46 | I can identify high risk or hazardous features of drug and alcohol use. | 2.50 (0.78) | 2.57 (0.53) | 2.71 (0.76) | 2.00 (1.00) |
| C47 | I can find services that support patients with different goals regarding their substance use. | 2.39 (0.66) | 2.67 (0.52) | 2.57 (0.79) | 2.00 (0.58) |
| C48 | I can identify health care and drug policies that affect people with substance use disorders. | 2.29 (0.69) | 2.43 (0.53) | 2.71 (0.49) | 1.71 (0.76) |
| C49 | I can find addiction and recovery support services that are tailored to specific identities (including cultural, racial, and gender). | 2.38 (0.71) | 2.71 (0.49) | 2.57 (0.79) | 1.86 (0.69) |
| C50 | I can distinguish between physiologic dependence on a substance and substance use disorder. | 2.58 (0.58) | 2.71 (0.49) | 2.57 (0.79) | 2.43 (0.53) |

*Selected for final survey design; A, Attitude survey item; C, Confidence survey item.

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Supplement table 2. Differences among health professions experts ratings of items relating to preparedness to work with people who use drugs.

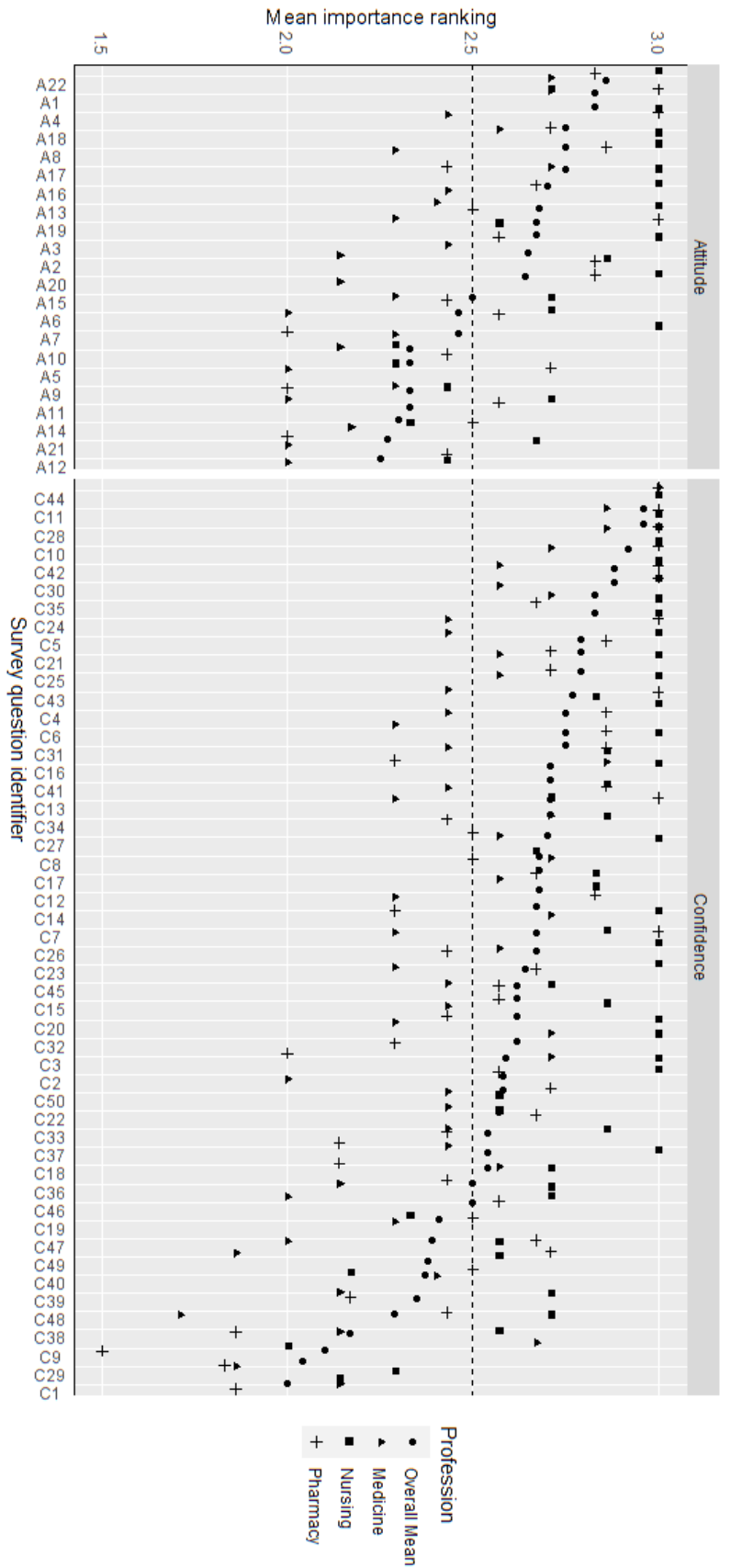
| Survey Item ID | Survey Item | One-way ANOVA | | Tukey's post-hoc | |
|----------------|---|---------------|---------|--------------------------|---------|
| | | F | p-value | Group rating differences | p-value |
| A1* | Someone being prescribed buprenorphine or methadone for their opioid use disorder is replacing one addiction with another. | 0.7 | 0.51 | | |
| A2* | If somebody continues to use addictive substances without a prescription, they should not be prescribed methadone or buprenorphine. | 3.79 | 0.04 | | |
| A3* | People should not expect to be treated for opioid withdrawal when they are in the hospital for another reason. | 2.15 | 0.14 | | |
| A4* | Providing sterile needles and syringes without a prescription encourages people to continue injecting addictive drugs. | 3.5 | 0.049 | | |
| A5 | People with substance use disorders are choosing substances over their personal relationships. | 1.11 | 0.35 | | |
| A6 | Health systems should consult people who use substances when designing substance use services. | 1.99 | 0.16 | | |
| A7 | Community support from other people in recovery is an important part of recovery from substance use disorders. | 7.3 | 0.0039 | NUR > PHRM | 0.0039 |
| A8* | People with substance use disorders could stop using if they really wanted. | 3.87 | 0.037 | | |
| A9 | Hitting 'rock bottom' helps people recover from substance use disorders. | 0.57 | 0.57 | | |
| A10 | People who use heroin more than once will develop an opioid use disorder. | 0.12 | 0.89 | | |
| A11 | A person's appearance is a good indicator of the severity of their substance use disorder. | 1.17 | 0.33 | | |
| A12 | Substance use disorders inevitably get worse over time. | 0.26 | 0.78 | | |
| A13* | Recovering from a substance use disorder may include a return to using substances. | 2.95 | 0.08 | | |
| A14 | Patients with opioid use disorder should not receive stimulant medications for ADHD. | 0.45 | 0.64 | | |
| A15 | If a healthcare professional developed a substance use disorder, they should try to stop on their own without telling anyone. | 0.34 | 0.72 | | |
| A16* | If a healthcare professional developed a substance use disorder, they should not be allowed to work in healthcare in the future. | 0.9 | 0.42 | | |
| A17* | Substance use disorders cause changes in the brain's reward pathways which affect behavior. | 1.4 | 0.27 | | |

| | | | | | |
|------|--|-------|--------|--------------------------|-----------------|
| A18* | Multiple factors contribute to the development of substance use disorders, including a person's biology, environment and, experiences. | 3 | 0.071 | | |
| A19* | Naloxone, the opioid overdose antidote, should be available without a prescription. | 2.89 | 0.078 | | |
| A20* | More members of the public should learn how to respond to an opioid overdose with naloxone. | 4.17 | 0.032 | | |
| A21 | Someone who injects drugs will probably not take steps to improve their health. | 3.1 | 0.068 | | |
| A22* | People with active opioid use disorder should not receive opioid analgesics to treat pain in the hospital. | 0.51 | 0.61 | | |
| C1 | I can recognize informal terms used to describe types, quantities, and ways of using substances. | 0.7 | 0.51 | | |
| C2 | I can describe chronic adverse health outcomes associated with alcohol. | 6.82 | 0.0052 | NUR > MED | 0.004 |
| C3 | I can recognize benefits that people get from using substances. | 10.36 | 0.0009 | MED > PHRM NUR > PHRM | 0.008 0.0009 |
| C4 | I can describe chronic adverse health outcomes associated with stimulant use disorder (e.g., methamphetamine, amphetamine, cocaine). | 3 | 0.07 | | |
| C5 | I can describe chronic adverse health outcomes associated with long term use of opioids (e.g., heroin, oxycodone, fentanyl). | 3.96 | 0.035 | | |
| C6 | I can describe adverse health outcomes associated with injecting drugs. | 6.68 | 0.0057 | NUR > MED PMD > MED | 0.006 0.03 |
| C7 | I can describe safe injection practices for people who inject drugs. | 1.38 | 0.27 | | |
| C8* | I can describe typical routes of administration for common substances. | 0.27 | 0.77 | | |
| C9 | I can describe typical patterns of substance use in terms of quantity and frequency. | 8.4 | 0.0029 | MED > NUR MED > PHRM | 0.058 0.002 |
| C10* | I can describe ways that people who use opioids can reduce their risk of fatal overdose. | 2.33 | 0.12 | | |
| C11* | I can recognize risk factors for opioid overdose. | 1 | 0.38 | | |
| C12 | I can identify patients who should be offered a naloxone prescription. | 2.01 | 0.16 | | |
| C13 | I can demonstrate the steps of responding to an opioid overdose in the community. | 3.09 | 0.067 | | |
| C14 | I can recognize the contribution of the social determinants of health to the development of substance use disorders. | 8.17 | 0.0024 | MED > PHRM NUR > PHRM | 0.04 0.002 |
| C15 | I can recognize the contribution of the social determinants of health to substance use disorder treatment access. | 1.15 | 0.34 | | |
| C16 | I can recognize the role of trauma in the development and continuation of substance use disorders. | 11.42 | 0.0004 | MED > PHRM NUR > PHRM | 0.004 0.0006 |

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|------|--|------|-------|--|--|
| C17* | I can recognize ways in which people who use substances can be mistreated in medical settings. | 0.7 | 0.51 | | |
| C18 | I can recognize the role of chronic pain in the development and continuation of substance use disorders. | 0.88 | 0.43 | | |
| C19 | I can describe opioid induced hyperalgesia. | 0.32 | 0.73 | | |
| C20 | I can describe the common signs and symptoms of alcohol intoxication. | 2.33 | 0.12 | | |
| C21* | I can describe the common signs and symptoms of alcohol withdrawal. | 1.14 | 0.34 | | |
| C22 | I can describe the common signs and symptoms of benzodiazepine intoxication. | 0.08 | 0.92 | | |
| C23 | I can describe the common signs and symptoms of benzodiazepine withdrawal. | 1.88 | 0.18 | | |
| C24 | I can describe the common signs and symptoms of opioid intoxication. | 3.5 | 0.049 | | |
| C25* | I can describe the common signs and symptoms of opioid withdrawal. | 1.14 | 0.34 | | |
| C26 | I can describe the common signs and symptoms of stimulant intoxication. | 2.15 | 0.14 | | |
| C27* | I can describe the common signs and symptoms of stimulant withdrawal. | 2.29 | 0.13 | | |
| C28* | I can distinguish between stigmatizing and non-stigmatizing terms used to talk about drug use. | 1 | 0.38 | | |
| C29 | I can describe contingency management. | 1.46 | 0.26 | | |
| C30* | I can describe harm reduction. | 2.03 | 0.16 | | |
| C31 | I can recognize examples of harm reduction strategies. | 1.37 | 0.28 | | |
| C32 | I can describe the purpose of trauma informed care. | 5.35 | 0.013 | | |
| C33 | I can distinguish between trauma informed care and actions that may be re-traumatizing. | 1.99 | 0.16 | | |
| C34 | I can describe the approach of motivational interviewing. | 0.96 | 0.40 | | |
| C35* | I can distinguish a substance use disorder from substance use. | 1.28 | 0.30 | | |
| C36 | I can identify the classes of medications that are misused (i.e., stimulant, opioid, depressant). | 0.81 | 0.46 | | |
| C37 | I can describe the role of community and peer support in helping people with their substance use disorder. | 4.71 | 0.020 | | |
| C38 | I can describe the principles of 12-step recovery support programs. | 2.72 | 0.089 | | |
| C39 | I can list common behavioral therapies for substance use disorders. | 0.96 | 0.40 | | |
| C40 | I can list pharmacologic treatments for tobacco use disorder. | 0.57 | 0.57 | | |
| C41 | I can list pharmacologic treatments for alcohol use disorder. | 1.4 | 0.27 | | |
| C42* | I can list pharmacologic treatments for opioid use disorder. | 4.2 | 0.029 | | |

| | | | | | |
|------|---|------|-------|--|--|
| C43 | I can describe the mechanism of action for various medications prescribed for opioid use disorder. | 3.35 | 0.057 | | |
| C44* | I can recognize my own biases towards people with substance use disorders. | 1 | 0.38 | | |
| C45 | I can recognize risk factors for return to use (or starting to use again) for a person abstaining from substance use. | 0.49 | 0.62 | | |
| C46 | I can identify high risk or hazardous features of drug and alcohol use. | 1.5 | 0.25 | | |
| C47 | I can find services that support patients with different goals regarding their substance use. | 1.03 | 0.37 | | |
| C48 | I can identify health care and drug policies that affect people with substance use disorders. | 2.84 | 0.081 | | |
| C49 | I can find addiction and recovery support services that are tailored to specific identities (including cultural, racial, and gender). | 1.86 | 0.18 | | |
| C50 | I can distinguish between physiologic dependence on a substance and substance use disorder. | 0.47 | 0.63 | | |

*Selected for final survey design; A, Attitude survey item; C, Confidence survey item; NUR, nursing experts; PHRM; pharmacy experts; MED, medicine experts.



Supplement figure 1. Mean overall and health professions' experts survey item rankings.