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Opportunities for Mitigating Bias in the Process and Priorities for Pediatric Chief Resident Selection

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Peer reviewed

1 Opportunities for mitigating bias in the process and priorities for pediatric chief resident
2 selection

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47 Abstract

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49 Objective

50 To describe the current processes and priorities for pediatric CR selection, to characterize
51 pediatric CR demographics in the past five years nationally, and to identify opportunities for
52 addressing bias in the process of pediatric CR selection.

53

54 Methods

55 We used a cross-sectional study design with an anonymous national survey of pediatric program
56 directors (PDs) through a web-based platform in January 2020.

57

58 Results

59 92 of 200 (46%) of PDs responded. 16% of CR are underrepresented in medicine (UIM) by
60 race/ethnicity. The influential factors most commonly cited in selection were nominations from
61 faculty (84%) and peers (77%), followed by fit with other co-chiefs (68%). Only 17% reported
62 having a specific method to mitigate bias in CR selection, most commonly involving multiple
63 stakeholders in the process.

64

65 Conclusions

66 Current CR selection relies on processes with the potential to introduce bias. Programs have
67 opportunities to address bias in the CR selection process by reevaluating methods vulnerable to
68 bias, including peer/faculty nominations, fit with peers, ITE scores, and assessments through the
69 use of more objective selection tools.

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88 Abbreviations: PD (program director), APD (associate program director), CR (chief resident),
89 APPD (Association of Pediatric Program Directors), UIM (underrepresented in medicine),
90 AAMC (Association of American Medical Colleges), LOR (letter of recommendation)

91

92 **Introduction**

93 It is known that multiple forms of bias affect both the selection of residents and faculty¹, but little
94 data exists on chief resident (CR) selection. There is limited information on the priorities of
95 pediatric PDs or other stakeholders in the selection process. Strategies used to select CRs are also
96 unknown, including whether processes or priorities in CR selection examine the potential
97 introduction of bias.

98

99 The lack of diversity in the physician workforce is an injustice for both patients and physicians-
100 in-training. Physician diversity is important as it has been associated with improved patient care
101 outcomes, increased likelihood to serve the medically underserved, and enhanced educational
102 experiences²⁻⁴. Despite valuing diversity, there remains a low level of underrepresented in
103 medicine (UIM) representation at advanced levels of training or academic appointments, with
104 only 8.6% of academic pediatric faculty identifying as UIM⁵.

105

106 Chief residency can be an entrée into academic medicine due to the intense mentorship and
107 sponsorship of chief residents. Chief residents in pediatrics are most commonly selected to serve
108 an additional year beyond the completion of their training, in an administrative and educational
109 leadership capacity with the training program. Due to the importance of their role, the selection
110 process can be competitive, and the position is often a springboard for future involvement in
111 academic medicine and medical education. Yet little is known about the demographics of CR
112 and the processes that are used in CR selection. Understanding these processes better could lead
113 to diversifying the CR workforce and ultimately the academic workforce.

114

115 In the pursuit of representation that better matches the diversity of the communities that we
116 serve, there have been efforts within medical school and residency recruitment to identify
117 potential sources of bias in the selection process. The AAMC recommends holistic review of
118 applicants as a method to remedy the systemic factors that lead to discrimination⁶. Consistent
119 evaluation methods with holistic review can help deemphasize or remove items that may
120 introduce more bias, such as Alpha Omega Alpha (AOA) status⁷ or USMLE scores.
121 Standardized test scores are known to introduce bias, and it has been shown that they do not
122 predict clinical performance during residency⁸. It is unknown whether efforts to remove bias
123 have been utilized in the process of CR selection.

124

125 The aims of this study are to explore pediatric PD priorities for and process of CR selection, to
126 assess the current diversity of the pediatric CR workforce, and to identify opportunities for
127 addressing bias in the process of pediatric CR selection.

128

129 **Methods**

130 A survey was developed by the authors, including current pediatric PDs and APDs with expertise
131 and collectively over 40 years of experience in residency recruitment and leadership. It was
132 initially developed through an iterative process, utilizing prior studies and experience to inform
133 the questions. For demographics questions, PDs were asked to report demographics for chief
134 residents and residents over the last five years to provide a longer lookback period and account
135 for the possibility that any single year might not be representative of general demographics. We
136 defined underrepresented in medicine by the AAMC definition: racial and ethnic populations that
137 are underrepresented in the medical profession relative to their numbers in the general

138 population. The survey was then pilot tested with cognitive think-aloud at 3 institutions and
139 questions were refined with expert consensus of APDs and PDs. The APPD Research and
140 Scholarship Learning Community reviewed and approved the survey for dissemination to the
141 APPD listserv of pediatric program directors. The survey was built on LimeSurvey Professional⁹
142 and was distributed to 200 pediatric US PDs in January 2020 via email with 3 subsequent
143 reminder emails.

144 Additional demographic data were obtained through APPD survey administrators and were fully
145 deidentified prior to the team's review. Non-responder demographic data, including program size
146 and region, were obtained in order to compare the sample of responders to non-responders using
147 Fisher's exact tests for analysis.

148 Descriptive statistics were used to describe demographic items. Content analysis of free
149 responses was performed to identify common methods for mitigating bias in chief resident
150 selection. Data analysis was performed in MS Excel version 16.37 and R version 3.6.3.

151 Our study received an exempt determination through the University of Chicago IRB.

152

153 **Results**

154 Nearly half of all PDs responded, 92 of 200 (46.0%). Table 1 shows a comparison of those
155 residency programs in our sample with all residency programs, which we found to be similar in
156 region and program type compared to the population.

157 Based on a lookback period of five years, chief resident demographic information showed that
158 CRs are largely female and not from underrepresented groups in terms of race/ethnicity. Data

159 was not available for resident and CR representation for 3 programs and program leadership
160 representation for 4 programs. It was found that 16.2% of residents, 16.1% of CRs, and 15.5% of
161 program leadership (as defined by PDs and APDs at each program) were UIM in terms of
162 race/ethnicity (Table 2). Few CRs were identified as part of other underrepresented groups, such
163 as LGBTQIA (4.2%), transgender or nonbinary (0.1%), or with disability (0.5%). Some of the 89
164 programs who responded with their UIM representation responded “I don’t know” for other
165 representation: nine with respect to LGBTQIA, eight with respect to transgender or nonbinary,
166 and six with respect disability representation.

167 Questions about the logistical considerations for the CR year revealed that recruitment season
168 mirrors resident recruitment with 83.1% of programs completing CR recruitment between
169 October and February. 90.2% of programs complete selection during the second year (or third
170 year for medicine-pediatrics residents), and 84.3% of CR years are after completion of residency
171 rather than embedded in the third year. 68.5% of CR continue in academic medicine, with
172 fellowship being the most frequent destination for graduating CRs (48.5%), while 20.0% go on
173 directly to university-based jobs.

174 For CR selection, responding programs reported that the people who were influential in CR
175 selection include PDs (98.9%), APDs (87.0%), current chiefs (66.3%), coordinators (63.0%), and
176 the chair (38.0%), with other faculty, resident, and nursing representatives less commonly having
177 influence (Table 3). Nominations from faculty (83.7%), nominations from peers (77.2%), and fit
178 with other co-chiefs (68.5%) were the most commonly cited influential factors in CR selection.
179 25.0% of PDs reported that in-service training exams (ITEs) played a role in CR selection.
180 However, Step 1 and Step 2 scores were not considered, and only one program named Step 3

181 scores as influential. When asked what word would best describe a chief resident, leader or
182 leadership (36.8%) were most common, followed by organized (11.5%).

183 Only 17.4% of PDs reported having a specific method to mitigate bias in CR selection, with the
184 most common method being involvement of multiple stakeholders in the process. Tied for
185 second most common were having an interview or a standardized process. Responses varied
186 widely, including one program with a formal bias checklist and one program citing that the PD
187 being the sole decider was their method to mitigate bias.

188

189 **Discussion**

190 This study is the first to our knowledge that identifies the diversity of pediatric CR, processes for
191 CR selection, and potential sources of bias in selection. The finding that less than 1 in 5
192 residency programs in this representative sample have a method to mitigate bias in CR selection
193 suggests that there is an opportunity to implement a more equitable and inclusive selection
194 process. There are multiple findings from our study that could be considered in the development
195 of a standardized process such as to consider exclusion of standardized testing, address the issue
196 of in-group bias, and address use of any behavioral descriptors vulnerable to bias. PDs who are
197 not already including others in the process of CR selection could consider the development of a
198 selection committee to minimize the magnitude of any individual's in-group bias.

199 The three most common influential selection factors of faculty nominations, peer nominations,
200 and "fit" with other co-chiefs expose the selection process to potential vulnerability to the issue
201 of in-group bias. Those with power to select candidates for a position may have pleasant feelings

202 when they encounter candidates who mirror their own traits, including ethnicity and gender¹⁰,
203 and unconsciously choose candidates in ways that unfairly disadvantages UIM candidates. With
204 only 15.5% of our responding program leadership identifying as UIM, an individual's in-group
205 bias will rarely favor UIM nominees. Without a standardized rubric to identify competency-
206 based criteria for a position, leaders in the selection process may discriminate against applicants
207 who are most qualified, instead choosing what is comfortable or familiar.

208 Though the majority of residency programs reported that standardized testing was not an
209 influential factor in their selection process, 25.0% of PDs still report in-training exams (ITEs) as
210 influential. It is important to note that the first-year or second-year ITE results available at the
211 time of CR selection would not be as predictive of performance on the Pediatric Board Exams¹¹.
212 Given the bias introduced by including standardized testing, excluding it as a selection factor
213 entirely would be beneficial.

214 For programs who use written comments or letters of recommendation (LOR) in their selection
215 process, it would be important to evaluate for sources of bias in the text. The most common
216 words to describe the defining characteristic of a chief resident were competency-based terms:
217 "leader," "leadership," and "organized." Studies have found racial and gender bias in the use of
218 competency-based descriptors within LOR for residency^{12,13}. If other assessment criteria such as
219 ITE scores are removed from the decision-making process, it is possible that LOR or written
220 assessments may become more influential in the process and therefore need to be critically
221 appraised for bias.

222 Since multiple methods of selection can be flawed, PDs may consider using a holistic review
223 process for chief resident selection, which has been successfully used in residency recruitment¹⁴.

224 One of the programs in our study mentioned using a bias checklist, which could be incorporated
225 into a holistic review process. Other frameworks¹⁵ that have been used for addressing bias in
226 medical school and residency recruitment may also be useful.

227 The representation of UIM residents, CRs, and residency program leadership (PDs and APDs)
228 was very similar across the three levels of training, without the decrease between residents and
229 program leadership that was previously reported by Mendoza et al¹⁶. The representation for UIM
230 pediatric residents matches the cross-sectional study by Montez et al, which found 16.5% to be
231 UIM in 2019¹⁷. This indicates that the UIM representation in pediatric PD and APDs is better
232 relative to the population of academic pediatric faculty¹⁸, although it still falls short of being
233 representative of the general population of the United States. Based on our study, it is
234 encouraging that there is a retention of UIM residents as CR. Further study of UIM CR
235 recruitment and retention may provide valuable insight into the promising practices of these
236 programs. In addition, in our study, LGBTQIA and those with disabilities were also poorly
237 represented in CRs, indicating a need for further studies on these groups and additional reflection
238 on what sources of bias may contribute to this decreased representation. Since some programs
239 reported that they were not sure about the representation at their program, gathering data
240 consistently at a program level would be a good first step.

241 Our results suggest that CRs are important in the pipeline of academic pediatric leadership, with
242 more than half of CRs remaining in academic pediatrics after their chief year. This reaffirms the
243 necessity for addressing bias in CR selection, to do further work to implement the processes to
244 mitigate bias, and to study the selection process of CRs in other specialties.

245 Our study finds that the timing of the selection process for CR mirrors that of the residency
246 selection cycle. Given that PDs are also devoting time to prioritizing a thoughtful, holistic
247 recruitment process, it could be a consideration to move the timing of CR recruitment to before
248 or after the residency recruitment season to avoiding competing priorities.

249 Our study has several limitations. The response rate was slightly less than half, although the
250 responders and non-responders were not significantly different in terms of program type and
251 geographic location. In addition, the response rate is comparable to other APPD surveys.

252 Although we addressed validity through expert review, the survey instrument was not validated
253 through other methods, and respondents may have interpreted questions in a different manner
254 than intended. Another important limitation is that we relied on the PD's report of resident and
255 CR demographics. It is possible that PDs overestimated their UIM representation, given that the
256 representation was higher than expected. Due to selection bias, it is possible that PDs who
257 responded to the survey could be more likely to have methods of addressing bias in chief resident
258 selection. Although PDs will know their CRs well and are familiar with their initial ERAS
259 application with demographic characteristics, it is possible that they would not know some CR
260 characteristics, including sexual orientation and abilities.

261 **Conclusions**

262 The selection of chief residents relies on processes with the potential to introduce bias. Programs
263 have opportunities to address bias in the CR selection process by using holistic review, having
264 multiple diverse representatives in the process, open discussions of potential sources of bias, and
265 review for evidence of bias in prior selection. Future studies should measure the effect of

266 implementation of these bias mitigation strategies on the percentage of UIM residents selected
267 for chief residency.

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Table 1. Demographic characteristics of pediatric residency programs.

Characteristic	Our sample	Population of pediatric programs	P
<i>N (%)</i>	92 (46.0%)	200 (100.0%)	
<i>Program type N (%)</i>			
University-based	43 (46.7%)	84 (42.0%)	
Community-based, university-affiliated	39 (42.4%)	89 (44.5%)	
Community-based	6 (6.5%)	16 (8.0%)	
Military	2 (2.2%)	6 (3.0%)	
Non-profit	0 (0%)	1 (0.5%)	
Hospital-based	1 (1.1%)	2 (1.0%)	
Teaching hospital	1 (1.1%)	1 (0.5%)	
			0.94
<i>Program location N (%)</i>			
Western	16 (17.4%)	29 (15%)	
Mid-Atlantic	15 (16.3%)	31 (16%)	
Southeast	15 (16.3%)	39 (20%)	
Midwest	14 (15.2%)	28 (14%)	
New York	12 (13.0%)	29 (15%)	
Mid-America	12 (13.0%)	24 (12%)	
New England	6 (6.5%)	9 (5%)	
Southwest	2 (2.2%)	11 (6%)	
			0.89
<i>Program size, mean</i>			
Total residents	50.8	45.7	
Categorical residents	47.3	42.9	

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Table 2. Resident, Chief Resident and Program Leadership Diversity. The proportion of residents and chief residents UIM was reported from 2016-2020. Current demographics for program leadership was reported.

<i>UIM representation</i>	
Residents (%)	(16.2%)
Chief residents N (%)*	176 (16.1%)
Program leadership N (%)*	51 (15.5%)
<i>Chief residents over the last 5 years N (%)</i>	
Female	740 (69.2%)
UIM (race/ethnicity)	176 (16.1%)
LGBTQIA	45 (4.2%)
Disability	5 (0.5%)
Transgender or non-binary	1 (0.1%)

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Table 3. Influential factors in CR selection.

<i>Program report of people who have the most influence on CR selection N (%)</i>	
PD	91 (98.9%)
APD	80 (87.0%)
Current chiefs	61 (66.3%)
Coordinators	58 (63.0%)
Chair	35 (38.0%)
Core faculty	18 (19.6%)
Other	10 (10.9%)
Resident representatives	5 (5.4%)
Nursing	1 (1.1%)
<i>Influential factors in CR selection N (%)</i>	
Nomination from faculty	77 (83.7%)
Nomination of peers	71 (77.2%)
Fit with other co-chiefs	63 (68.5%)
Progress in CCC/milestones	59 (64.1%)
Strength of interview for position	56 (60.9%)
Activities such as councils	56 (60.9%)
Strength of essay for position	38 (41.3%)
Life experiences	35 (38.0%)
Career goal of entering into academic medicine	27 (29.3%)
Involvement with efforts to promote recruitment	24 (26.1%)
ITE scores	23 (25%)
Step 3	1 (1.1%)
Step 1 or 2	0 (0.0%)

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356 Supplemental File (Survey)

357 Dear APPD community,

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359 We are conducting a research study to understand the process and priorities for chief
360 resident selection in Pediatrics. We know that chief residents can play a large role in residency
361 programs and would like to understand better how they are selected. The survey has been
362 approved by the University of Chicago IRB and the APPD Research and Scholarship Learning
363 Community and will take approximately 5-8 minutes. We have a few questions that will request
364 demographic information about your program and chiefs. Please ask your program coordinators
365 for help to verify information if needed.

366

367 Thank you,

368 Sarah Gustafson, Barrett Fromme, Rhonda Acholonu, Patricia Poitevien, and Becky

369 Blankenburg

370

371 Your participation is completely voluntary, and you will not receive any direct benefit from the
372 study, though the knowledge obtained could positively impact your program's practice in the
373 future. By completing the survey, you are consenting to participate, and you can stop
374 participating at any time by stopping the survey. All responses will be anonymous.

375

376 1. How many chief residents do you have each year? (Choose one of the following answers)

377 a. 1

378 b. 2

379 c. 3

380 d. 4

381 e. 5

382 2. Is your chief position embedded in the 3rd year, or is it an additional year? (Choose one of
383 the following answers)

384 a. Embedded in the 3rd year

385 b. Additional year

386 3. Is your chief resident ever recruited from another institution? (Choose one of the
387 following answers)

388 a. Yes

389 b. No

390 4. How are chief residents paid? (Choose one of the following answers)

391 a. Full junior faculty salary

392 b. More than PGY-4 salary, but less than a full junior faculty salary

393 c. PGY-4

394 d. PGY-3

395 e. Other:

396 5. In their first position post-chief residency, please estimate the PERCENT of chief
397 residents over the last 5 years have gone on to: (Only numbers may be entered in these
398 fields. The sum must equal 100.)

399 a. university-based job (%)

- 400 b. community-based practice (%)
401 c. fellowship (%)
402 d. other (%)
- 403 6. Use one word to describe the defining characteristic for a chief resident. [free response]
404 7. Briefly explain how you assess the defining characteristic of a chief resident. [free
405 response]
406 8. What time of year do you recruit and select chief residents? (Choose one of the following
407 answers)
408 a. July through September
409 b. October through December
410 c. December through February
411 d. March through June
- 412 9. In which year of residency do you recruit and select chief residents? (Choose one of the
413 following answers)
414 a. During intern year (or second year for Med-Peds)
415 b. During second year (or third year for Med-Peds)
416 c. During third year (or for fourth year for Med-Peds)
- 417 10. What factors are influential in evaluating and selecting candidates for chief residency?
418 (check all that apply)
419 a. Nominations from peers (interns and other residents)
- 420 b. Nominations from faculty members
- 421 c. Step 1 or Step 2 USMLE board scores
- 422 d. Step 3 scores
- 423 e. ITE scores
- 424 f. Participation in extracurricular activities during residency, such as councils
- 425 g. Progress in milestones or CCC discussions
- 426 h. Involvement with efforts to promote recruitment and retention of
427 underrepresented groups
- 428 i. Life experiences and background, including identification of the resident as a
429 protected group
- 430 j. Strength of interview for chief residency position
- 431 k. Strength of application essay for chief residency position
- 432 l. Candidate career goal of entering into academic medicine
- 433 m. Fit with the other co-chiefs selected
- 434 n. Other: [free response]

- 435 11. Of the factors you have selected [in question 10], please list the top three most influential
436 factors in evaluating and selecting candidates for chief residency in order of importance.
437 (ranking)
- 438 12. Who is involved in the final decision about which resident(s) will be offered the chief
439 resident position? (Check all that apply)
- 440 a. PD
- 441 b. APDs
- 442 c. Coordinators
- 443 d. Current Chiefs
- 444 e. Resident representatives
- 445 f. Core faculty
- 446 g. Chair
- 447 h. Nursing
- 448 i. Other: [free response]
- 449 13. Do you have specific methods or approaches you use to mitigate bias in chief resident
450 selection? (Choose one of the following answers)
- 451 a. Yes
- 452 b. No
- 453 14. If you do have methods to mitigate bias in chief resident selection, what are the specific
454 methods? [free response]
- 455 15. Over the last 5 years, what NUMBER of chief residents have identified as
456 female? (Choose one of the following answers) [drop-down]
- 457 a. 0
- 458 b. 1
- 459 c. 2
- 460 d. 3
- 461 e. 4
- 462 f. 5
- 463 g. 6
- 464 h. 7
- 465 i. 8

- 466 j. 9
 - 467 k. 10
 - 468 l. 11
 - 469 m. 12
 - 470 n. 13
 - 471 o. 14
 - 472 p. 15
 - 473 q. 16
 - 474 r. I don't know
16. Over the last 5 years, what NUMBER of chief residents have identified as underrepresented in medicine (by the AAMC definition*)? *Underrepresented in Medicine by AAMC definition: Underrepresented in medicine means those racial and ethnic populations that are underrepresented in the medical profession relative to their numbers in the general population. (Choose one of the following answers)
- 480 a. 0
 - 481 b. 1
 - 482 c. 2
 - 483 d. 3
 - 484 e. 4
 - 485 f. 5
 - 486 g. 6
 - 487 h. 7
 - 488 i. 8
 - 489 j. 9
 - 490 k. 10
 - 491 l. 11
 - 492 m. 12
 - 493 n. 13
 - 494 o. 14
 - 495 p. 15
 - 496 q. 16
 - 497 r. I don't know

498 17. Over the past 5 years, what NUMBER of chief residents have identified as LGBTQIA?
499 (Choose one of the following answers)

500 a. 0

501 b. 1

502 c. 2

503 d. 3

504 e. 4

505 f. 5

506 g. 6

507 h. 7

508 i. 8

509 j. 9

510 k. 10

511 l. 11

512 m. 12

513 n. 13

514 o. 14

515 p. 15

516 q. 16

517 r. I don't know

518 18. Over the last 5 years, what NUMBER of chief residents have identified as third gender or
519 non-binary? (Choose one of the following answers)

520 a. 0

521 b. 1

522 c. 2

523 d. 3

524 e. 4

525 f. 5

526 g. 6

527 h. 7

528 i. 8

- 529 j. 9
- 530 k. 10
- 531 l. 11
- 532 m. 12
- 533 n. 13
- 534 o. 14
- 535 p. 15
- 536 q. 16
- 537 r. I don't know

538 19. Over the last 5 years, what NUMBER of chief residents were first generation in their
539 family to attend college? (Choose one of the following answers)

- 540 a. 0
- 541 b. 1
- 542 c. 2
- 543 d. 3
- 544 e. 4
- 545 f. 5
- 546 g. 6
- 547 h. 7
- 548 i. 8
- 549 j. 9
- 550 k. 10
- 551 l. 11
- 552 m. 12
- 553 n. 13
- 554 o. 14
- 555 p. 15
- 556 q. 16
- 557 r. I don't know

558 20. Over the last 5 years, what NUMBER of chief residents were disabled? (Choose one of
559 the following answers)

- 560 a. 0

- 561 b. 1
- 562 c. 2
- 563 d. 3
- 564 e. 4
- 565 f. 5
- 566 g. 6
- 567 h. 7
- 568 i. 8
- 569 j. 9
- 570 k. 10
- 571 l. 11
- 572 m. 12
- 573 n. 13
- 574 o. 14
- 575 p. 15
- 576 q. 16
- 577 r. I don't know

578 21. How many total residents per year are in your categorical pediatric and categorical
579 medicine-pediatrics (if applicable) residency programs at your institution? (Only numbers
580 may be entered in this field.)

581 22. What PERCENT of residents in your program identify as underrepresented in medicine*?
582 (Only numbers may be entered in this field.)

583 23. How many leadership members are there in your program? (include only PD and APDs)
584 (Only numbers may be entered in this field.)

585 24. How many in this group of program leadership identify as underrepresented in
586 medicine*? (Only numbers may be entered in this field.)

587