

Increasing Diversity in Admissions to Postgraduate Study

Cite This: *J. Med. Chem.* 2022, 65, 5867–5869

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If we are to increase the diversity of scientists engaged in medicinal chemistry,¹ then it stands to reason that we must increase the diversity of scientists who are appropriately trained to practice our science. In 2019, the authors were fortunate enough to be awarded funding to establish one of 23 Ph.D. Programs in basic science supported by the Wellcome Trust in the UK. Our program, Chemistry in Cells, includes a significant component of medicinal chemistry training and research. In addition to providing a scientifically excellent training, these programs were asked to contribute to a positive research culture and develop initiatives to promote equality, diversity, and inclusion. In response to the Editor-in-Chief's call for diversity stories in the *Journal of Medicinal Chemistry*,² we detail the approaches that we have taken to increase the fairness of postgraduate admissions in the Chemistry in Cells program at the University of Oxford. Aspects of these approaches are now being implemented by >65 programs and departments at Oxford, and some could become standard in postgraduate admissions across the whole University. As will become evident, some of the approaches require some effort on the part of the program directors and administrators, the students who apply to the program, and their supporting referees. Therefore, it is necessary to assess whether the measures we have put in place are effective in increasing diversity, or removing bias, in the admissions process. We are currently undertaking such a study, and its results will be published in a suitable peer-reviewed forum in due course. Therefore, in this Editorial, we outline the measures that we have put in place and our reasons for trialing them, but we have not attempted to assess their effectiveness. We view the measures as a pilot scheme, and we accept that we will not get everything right the first time. We are, however, scientists, and so we wish to base our approach going forward on experimental evidence—it has become somewhat of a mantra that it is better to do something rather than doing nothing, even if everything is not perfect the first time. We hope that the information provided might prove useful to others considering how to increase fairness in undergraduate and postgraduate admissions at their institutions. We also think that these measures might be of interest to those seeking to minimize bias in recruitment more generally. We note, however, that some practices are more applicable than others in certain situations.

What Is Diversity, and Why Is It Important? The philosophy of our Ph.D. program is that by providing a diverse and supportive environment, we can create a culture where science and scientists can thrive. It stands to reason that bringing to bear a diversity of ideas and approaches to a scientific problem will likely result in a creative and original solution. There is also no reason to suppose that one particular

group of human beings is any better or worse equipped to become successful scientists, and therefore it is illogical that any group should be excluded from this profession, either deliberately or accidentally. It is important to consider what is meant by diversity and how this is affected by the local context. For example, the different histories of the UK and the USA mean that some diversity considerations are different, although some are the same. When thinking about diversity, we have put in place measures that attempt to remove implicit or explicit bias against a given gender and against race or ethnicity. We have also considered the challenges faced by those who come from socioeconomically disadvantaged backgrounds. There is good evidence of intersectionality here; i.e., applicants who, for example, come from an under-represented ethnic background often also come from a socioeconomically disadvantaged situation. Therefore, our work has focused on removing bias related to gender or ethnicity and attempting to mitigate for socioeconomic disadvantage.

Anonymization of Applications. Studies have shown that when the same *curriculum vitae* (CV) was assigned either a male or a female name, the CV with the male name was rated as significantly more competent and hireable, despite the information it contains being identical to that with the female name.³ The gender of the people rating the CVs did not affect the outcome; both female and male assessors were equally likely to show bias against the CV with the female name. A similar study, in which names were used to modulate implied ethnic background (Asian, Black, Latinx, and White), showed that perceived Asian and White candidates were rated as more competent and hireable than perceived Black and Latinx candidates.⁴ These studies are consistent with the idea that everyone has some form of unconscious or implicit bias, and so processes that help to recognize and mitigate this can help to remove bias from an application process. To help counter implicit and explicit bias in our application process, we have trialed the anonymization of the application forms. Anonymization refers to the removal of names, gender pronouns, and other information that might give information on the gender of the applicant, e.g., membership of a sorority or fraternity. This means that the assessors do not know the applicant's gender or ethnicity during the shortlisting process. There is an argument

Published: April 19, 2022



that more information could be removed, e.g., the undergraduate university attended by the applicant, but this kind of information tends to be a proxy for socioeconomic status, which we have taken a different approach to addressing (see [below](#)). Often a judgment based on undergraduate university involves an imperfect assumption that does not include all of the relevant information; e.g., was the student in receipt of a needs-based scholarship? Conversely, it has also been argued that removing information from an application form makes it harder to place the application in context. This implies that some form of *ad hoc* positive action is being used; otherwise, it is hard to understand why names and gender pronouns are relevant in the assessment process. While we are not against the use of positive action when a clear case is made (see [below](#)), we feel that this approach should be used transparently and applied uniformly so as to be as fair as possible.

There are currently few effective automated methods to remove names and gender pronouns from applications, and so this process has to be completed manually and, consequently, can be labor intensive for a program with a large number of applicants. However, in our experience, the time taken to anonymize applications can be significantly reduced by streamlining the information used for shortlisting. For example, we have employed a standardized CV format (see [below](#)), asked referees to anonymize their reference letters and the candidates to anonymize their application forms, and used a standard set of questions for the initial references (see [below](#)). Even when using these approaches, the applications still have to be manually checked, but this is less time-consuming than manually anonymizing every application.

Use of a Standardized CV Format. Our initial reasons for using a standard CV format were to help with the anonymization process (see [above](#)) and to remove unconscious bias when comparing CVs of applicants who have been fortunate enough to receive training on how to format a CV and those who have not had this support. As assessors, we additionally find it very helpful to have uniform information provided for each candidate in the same format, as this makes comparison easier and fairer. This approach is easy to implement using an online form and is a simple step to help make an admissions process fairer. The use of standard CVs has been adopted by all of the departments and programs in our pilot study.

Use of a Standard Set of Questions for Referees. One of the most time-consuming aspects of the anonymization process was the redaction of reference letters. While we greatly value the information provided by reviewers, we also wanted to explore whether we could obtain similar information in a more concise way. We also realized that the variability in the quality and style of references provided for candidates can affect their chances of success but is largely beyond their control. Here we do not mean whether the referee is supportive, but whether they have taken the time to write a reference that is truly reflective of the candidate's strengths, weaknesses, and potential. To help with anonymization, we asked referees to write references that did not use gendered pronouns and did not mention the candidate's name. This, however, places a substantial burden on the referee, who is already likely writing a number of references. To circumvent these issues, we have trialed the use of a set of standard "tick-box" questions that can be answered rapidly (<1 min) by the referee. These questions seek answers to the questions that we feel are key for the initial shortlisting process. If more detailed references are required to

judge borderline cases, this information can be anonymized and provided to assessors as needed. We ask the following questions:

1. *In what context do you know the applicant?* (Answers: Lecturer - taught classes; Personal tutor - undergraduate/Masters course; Supervisor - university research project; Supervisor - industrial placement; Other - please specify)
2. *How long have you known the applicant?* (Answers: <6 months; <1 year; >1 year)
3. *Do you think the applicant is suitable for postgraduate research/study?* (Answers: yes/no).
4. *Hypothetically, if the applicant was interested in studying in your research area, would you supervise/accept them within your research group as a Ph.D. student?* (Answers: yes/no)
5. *With regards to the remit for the Wellcome Trust Chemistry in Cells DPhil program, would this applicant be suitable for the course?* (Answers: yes/no)
6. *Are there any exceptional circumstances (not COVID-19 related) that the candidate has had to overcome during their undergraduate studies, or any other factors, which you think we should be aware of? Please keep your answers anonymous and do not use gendered pronouns.* (Answer: free text)

Having used these questions in one cycle of admissions, the feeling of the authors is that they provided sufficient information for the shortlisting process, and we expect to use a similar approach next year.

The Use of Socioeconomic Data in Postgraduate Admission Processes. UK universities have collected socioeconomic data for applications for admission to undergraduate study for many years. This information is provided to assessors as part of the application form and provides a context for the academic achievements of the applicant. The received wisdom is that those who have significantly achieved without the benefits of a privileged education are likely to be on an upward academic trajectory and will, therefore, perform well in their studies. The use of similar socioeconomic data when considering postgraduate admissions is much less widespread in the UK, and we only considered it for the first time at Oxford in 2021 (except for some postgraduate scholarships where these data were used in 2020). This is partly because the consideration of which socioeconomic data should be included is not straightforward; for example, how should one consider a student who was socioeconomically disadvantaged before going to university but has had the privilege of attending an elite undergraduate institution? There is also a discrepancy between the data available for UK and non-UK students, meaning that how the data are interpreted and applied needs to be given careful consideration. Despite these challenges, we think it is desirable to move toward a consistent method for assessing and mitigating against socioeconomic disadvantage.

The information collected provides insight on challenges that the candidates have faced in their career and life to date. This includes details such as the socioeconomic background from which the applicant comes, whether they have caring responsibilities, whether they have been in care, or whether they have been a refugee. Based on this information, a socioeconomic data score is assigned to each candidate, and we then must consider how to use this information. We have trialed a number of approaches and have settled for a qualitative "banding" approach. Shortlisting proceeds based

on other academic criteria focused on excellence, and once the initial ranking is established, the socioeconomic banding is revealed to the assessors. At this point, the assessor can see borderline cases who have been socioeconomically disadvantaged and consider whether they should be interviewed. We also consider these data after interviews when making offers. This allows us to account for disadvantages that only become evident at the interview stage, for example, less training in presentation skills.

Positive Action Cases. In some cases, students from certain communities are so under-represented that a different approach is required. For example, Black British students are heavily under-represented at UK universities. In 2021 a positive action case was made (by others) to enable the University to establish the Black Academic Futures initiative. Under this initiative, Black British and Mixed British students who meet the academic requirements for entry to certain programs at Oxford are guaranteed an interview for that program. This approach is clearly counter to anonymization, as the candidate's ethnicity is used in the shortlisting process. We have incorporated this approach into the Chemistry in Cells application process by still ranking candidates anonymously and then revealing ethnicity once the initial ranking is established. It remains to be seen how effective this approach is at supporting the applications of a very under-represented group.

The Applicant Pool. While we do not intend to draw conclusions about the effectiveness of the above approaches, one thing has become clear during our pilot study: it does not matter how many initiatives are in place if the initial pool of applicants is not diverse. There is some anecdotal evidence from our experience that by stating clearly that diversity is something that is valued and taken seriously, and by signposting the measures we are taking to address bias, a more diverse collection of applicants is likely to apply to the program. This idea is consistent with suggestions made by Hatley et al.¹ for increasing diversity among authors of medicinal chemistry journals. However, there is also much work to be done in actively attracting a more diverse pool of students to undertake postgraduate study. We note that once a more diverse pool of students is appointed, it is important to put in place provisions to support them throughout the course of their studies.

Conclusion. Above we have summarized the approaches that we are taking in an attempt to make the postgraduate application process fairer at the University of Oxford. We have explained the thinking behind these approaches and tried to acknowledge their shortcomings. We have not evaluated the effectiveness of each approach, but we aim to publish a peer-reviewed analysis in due course. We hope that this information promotes discussion about which are effective methods of increasing diversity in applications for postgraduate study. We also think that these approaches might be useful in other recruitment exercises. However, we note that a context-dependent consideration must be given to the approaches taken in each case. For example, in recruitment exercises where the publication list of the applicants is important, anonymization becomes difficult and is easy to circumvent if an assessor so chooses. Nonetheless, careful consideration how to make a recruitment exercise as fair as possible is likely to lead to a more diverse pool of applicants, and ultimately more diversity in those studying and practicing medicinal chemistry. And that

can only be a good thing in building a strong future for our fascinating science.

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Notes

Views expressed in this editorial are those of the authors and not necessarily the views of the ACS.

The authors declare no competing financial interest.

ACKNOWLEDGMENTS

The work described here has required the support and hard work of a large number of people. These include Dr. Nadia Pollini, Charles Greenhill, Prof. David Gavaghan, Prof. Gail Preston, Victoria Forth, Jennifer Massey, Prof. Esther Becker, Prof. David Pyle, Prof. Martin Williams, Prof. Robert Gilbert, Kate Ogilvy, Prof. Garrett Morris, and Kate Davy; we are very grateful for their support. The Chemistry in Cells 4-Year Ph.D. program is funded by the Wellcome Trust (218514/Z/19/Z) with support from Merck Sharp & Dohme, and Janssen.

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