

Association between Pharmacists' Country of Qualifying Education and Practising in a Hospital Setting: A Cross-Sectional Ontario Study

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ABSTRACT

Background: It is hypothesized that international pharmacy graduates (IPGs) are underrepresented in more clinically challenging work.

Objective: To examine the association between country of qualifying education for pharmacists in Ontario and the likelihood of practising in a hospital setting.

Methods: This study was based on publicly available data from the Ontario College of Pharmacists website, specifically records for all Ontario pharmacists with authorization to provide patient care and for whom country of qualifying education and an accredited pharmacy as a place of practice were reported. Pharmacists who met the inclusion criteria were categorized as Canadian graduates or IPGs. The odds ratio (OR) and 95% confidence interval (CI) for reporting hospital pharmacy as a place of practice were estimated by fitting a logistic regression, with adjustment for gender and years since graduation.

Results: A total of 14 689 pharmacists were included in the study: 7403 (50.4%) Canadian graduates and 7286 (49.6%) IPGs. These pharmacists worked in a total of 5028 accredited pharmacies (243 hospital pharmacies [4.8%] and 4785 community pharmacies [95.2%]). Among Canadian graduates, 2458 (33.2%) reported at least 1 hospital pharmacy practice site, whereas the proportion was much smaller among IPGs (427, 5.9%). Canadian graduates represented 85.2% (2458/2885) of all pharmacists who reported hospital practice. The estimated crude OR for practice in a hospital pharmacy was 7.98 (95% CI 7.16–8.91), and the adjusted OR was 7.12 (95% CI 6.39–7.98).

Conclusions: IPGs may face barriers impeding their ability to practise in a hospital setting. Providing opportunities such as structured clinical training and experiential placements may facilitate integration of IPGs in institutional settings.

Keywords: international pharmacy graduates, hospital practice, institutional setting, integration, experiential training, bridging, equity, diversity, inclusion

RÉSUMÉ

Contexte : On émet l'hypothèse que les diplômés internationaux en pharmacie (DIP) sont sous-représentés dans des tâches plus cliniquement exigeantes.

Objectif : Étudier l'association entre le pays de formation qualifiante des pharmaciens en Ontario et la probabilité de pratiquer dans un environnement hospitalier.

Méthodes : Cette étude se fondait sur des données accessibles au public sur le site Web de l'Ordre des pharmaciens de l'Ontario, plus précisément les dossiers de tous les pharmaciens de l'Ontario autorisés à prodiguer des soins aux patients et pour lesquels le pays de formation qualifiante ainsi qu'une pharmacie accréditée en tant que lieu de pratique étaient signalés. Les pharmaciens répondant aux critères d'inclusion ont été catégorisés en tant que diplômés canadiens ou DIP. Le rapport de cotes (RC) et l'intervalle de confiance (IC) à 95 % pour le signalement de la pharmacie pratiquée en milieu hospitalier ont été estimés en utilisant une régression logistique, tenant compte du sexe et du nombre d'années depuis l'obtention du diplôme.

Résultats : Un total de 14 689 pharmaciens ont été inclus dans l'étude : 7403 (50,4 %) diplômés canadiens et 7286 (49,6 %) DIP. Ces pharmaciens travaillaient dans 5028 pharmacies accréditées au total (243 pharmacies en milieu hospitalier [4,8 %] et 4785 pharmacies communautaires [95,2 %]). Parmi les diplômés canadiens, 2458 (33,2 %) ont signalé au moins un site de pratique en pharmacie hospitalière, tandis que la proportion était beaucoup plus faible parmi les DIP (427, 5,9 %). Les diplômés canadiens représentaient 85,2 % (2458/2885) de tous les pharmaciens ayant signalé une pratique de la pharmacie en milieu hospitalier. Le rapport de cotes (RC) brut estimé pour la pratique en pharmacie en milieu hospitalier était de 7,98 (IC à 95 % 7,16-8,91), et le RC ajusté était de 7,12 (IC à 95 % 6,39-7,98).

Conclusions : Les DIP peuvent être confrontés à des obstacles qui entravent leur capacité à exercer dans un environnement hospitalier. Offrir des occasions, comme des formations cliniques structurées et des stages expérimentiels, pourrait faciliter leur intégration dans des milieux institutionnels.

Mots-clés : diplômés internationaux en pharmacie, pratique hospitalière, milieu institutionnel, intégration, formation expérientielle, transition, équité, diversité, inclusion

INTRODUCTION

Future planning of Canada's health care labour force relies on initiatives to increase its diversity to mirror the nation's changing demographics, as well as to achieve health equity and improve patients' access to quality care.¹⁻⁶ One such initiative includes the recruitment of internationally educated health care professionals as a pathway to diversify professions and meet the needs of underserved minority populations.^{1,7,8} The 2016 census of Canada reported that approximately one-third of the health care labour force was internationally trained⁹; however, this level of diversity has not resulted in equity and inclusion for those trained outside of Canada. Reports from nursing and medical professions suggest that international nursing and medical graduates face structural disadvantages that limit their career options.¹⁰⁻¹⁴ This situation points to a hierarchical or "pyramidal" structure within the health care labour force, with domestic graduates occupying higher-status clinical positions, while internationally educated workers are over-represented in lower-status front-line work.¹⁰⁻¹⁵

Although there are no data regarding the ethno-racial make-up of pharmacists in Canada, available information indicates that international pharmacy graduates (IPGs) contribute greatly to the diversity of the Canadian pharmacy labour force. For example, approximately 50% of newly registered pharmacists in Ontario are IPGs,¹⁶ most of whom have immigrated from the Middle East, Africa, and Asia.¹⁷ Additionally, in 2020, in Ontario, there were equal numbers of international and domestically (i.e., Ontario) educated pharmacists, at 42% for each cohort, with the remaining being from other Canadian provinces or the United States.^{18,19} IPGs represent a significant proportion of the pharmacist labour force in Canada; however, their level of integration into all areas of practice is unknown, nor is it known if there exists a pyramidal structure within the pharmacy labour force whereby IPGs are overrepresented in community practice. Conversely, for domestically educated pharmacists, access to entry-level hospital pharmacist positions is facilitated through their participation in residency programs. Institutional pharmacists require greater involvement in clinical decision-making and medication-therapy management for a more vulnerable and complex patient population, and residency programs address this need.²⁰ The response of IPGs to these structural barriers is not known, and few studies have examined their workplace satisfaction.²¹ However, in a recent study on IPG identity,²² it was noted that while many IPGs enjoy community pharmacy, with its greater scope of practice, some preferred careers as hospital pharmacists but faced structural barriers to gaining access to these positions, despite having hospital experience similar to that of Canadian graduates.

Pharmacy is striving to support equity, diversity, and inclusion (EDI) in the profession,²³⁻²⁵ but there is very

limited information available to assess the success of these efforts.²⁶ Understanding how IPGs are integrated within the pharmacy profession is essential to optimizing patient care for underserved populations and the populations of Ontario and Canada in general, and to realize the profession's efforts to remove structural barriers at all levels,²⁴ including in institutional settings such as hospitals. As such, the objective of this study was to examine the association between a pharmacist's country of qualifying education and practise in a hospital setting.

METHODS

Study Design and Data Source

This was a cross-sectional quantitative observational study based on data from a single province.

We used publicly available data from the Ontario College of Pharmacists (OCP) website to identify all pharmacy professionals and accredited pharmacies in Ontario (as of January 20, 2022).²⁷ We obtained data pertaining to all practising pharmacists in Ontario with regard to their educational background and declared workplaces, with a focus on the community and hospital settings. Data from other institutional and clinical practice settings (e.g., long-term care, family health teams, or community health centres) were not included in the study because such practice settings are not accredited by the OCP.

We collected the following data on all OCP registrants: licence number, member type (pharmacist, pharmacist emeritus, intern, student, or pharmacy technician), institution and country of qualifying education, year and month of graduation, gender, and member status (can provide patient care, can provide patient care – with conditions, does not provide patient care, not entitled to practice [specifically, cancelled due to non-payment, expired, interim suspension, rescinded, resigned, revoked, suspended for discipline, or deceased]). We collected the following data for all accredited pharmacies: accreditation number, status (active, closed, relocated, sold), type (community pharmacy, hospital pharmacy, drug preparation premises, remote dispensing location), address, and licence numbers of pharmacists who declared this pharmacy as their place of practice.

This research was conducted using publicly available data; therefore, ethics board approval was not required.²⁸

Study Sample

From among all OCP registrants, members were included in our analysis if they were pharmacists, had member status "can provide patient care", and reported both a country of qualifying education and at least 1 place of practice. From among all accredited pharmacies, those included in our study were active pharmacies with unique accreditation numbers and a reported pharmacy type.

Data Analysis

We used Python 2.7.8 (Python Software Foundation) and Beautiful Soup library software to extract the data from the OCP website and SAS version 9.4 (SAS Institute Inc) to perform the analysis. After extracting the data, we changed the format from Unicode to text base and then transferred the data to the statistical software for analysis.

Pharmacists were categorized according to their declared site of practice either as hospital pharmacists (if they reported at least 1 hospital practice site) or as community pharmacists (if they reported other sites of practice, but not hospitals).

Drug preparation premises and remote dispensing locations²⁹ are sites where pharmacists engage in drug compounding activities, including the compounding of sterile medications, such as chemotherapy drugs for hospitals and clinics. As such, because pharmacists who work in these settings are expected to have hospital product-related knowledge and compounding skills, these settings were grouped with hospital pharmacies. The mean, median, and range of the number of pharmacists declaring these pharmacies as their place of practice were calculated. Depending on the reported country of qualifying education, pharmacists were categorized as Canadian graduates or IPGs. The frequency of each country of qualifying education was determined, and the most frequent country of qualifying education was identified.

The following characteristics of Canadian graduates and IPGs were compared: reporting of at least 1 hospital practice site, years since graduation, gender, and number of declared sites of practice. In addition, the frequency of location of qualifying education (Canadian graduates versus IPGs) in each practice setting (hospital versus community) was identified. Statistical significance was tested by the χ^2 test (for categorical variables) and the *t* test (for continuous variables).

Thereafter, we fitted a logistic regression with the outcome of reporting at least 1 hospital pharmacy as a place

of practice; the independent variable was the location of qualifying education (Canadian graduates versus IPGs). Data were analyzed with both a crude model (where only the independent variable was included in the model) and an adjusted model (where variables for gender and years since graduation were included in the model). Odds ratios (ORs) and 95% Wald confidence intervals (CIs) were calculated for both crude and adjusted models.

We conducted a sensitivity analysis in which pharmacists were categorized, on the basis of country of qualifying education, as North American graduates or IPGs. In this sensitivity analysis, pharmacy graduates from the United States were combined with Canadian graduates to create a North American pool for comparison with other IPGs. The United States was chosen not only for its close geographic location but also because of similarities with Canada in terms of educational curriculums, experiential rotations, clinical guidelines, and residency programs. In a second sensitivity analysis, we tested if our assumption of drug preparation premises and remote dispensing locations as hospital practice sites was reasonable by removing them from the hospital pharmacy category and adding them to the community pharmacy category of practice setting.

RESULTS

Study Sample

From a total of 5946 extracted pharmacy records, we included 5028 accredited pharmacy sites in our analysis (Figure 1). Of these, 4785 (95.2%) were community pharmacies, and 243 (4.8%) were hospital pharmacies. Most of the pharmacies ($n = 5018$, 99.8%) had at least 1 pharmacist (range 0 to 248) who reported the pharmacy as their place of practice. Of the 10 pharmacies without any associated pharmacists, 9 were hospital pharmacies and 1 was a community pharmacy. The mean number of pharmacists per accredited pharmacy was 6.2 (median 4.0).

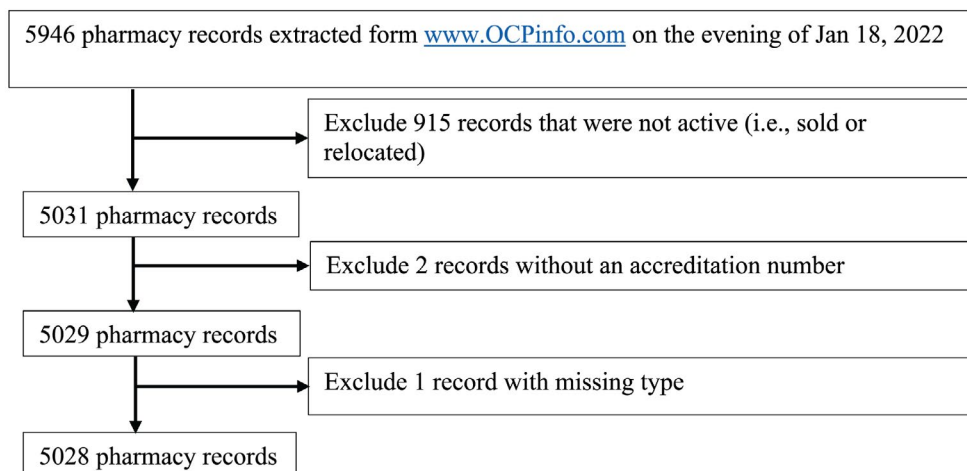


FIGURE 1. Selection of accredited pharmacies (sites).

From a total of 26 614 extracted OCP member records, we included 14 689 pharmacists in our analysis (Figure 2). When categorized by country of qualifying pharmacy education, 7403 (50.4%) were Canadian graduates, and 7286 (49.6%) were IPGs. Egypt, India, the United States, and England were the most frequent countries of qualifying education, and these countries accounted for 66.4% of all IPGs (or 32.9% of the entire sample). The frequencies for all qualifying

countries are listed in Appendix 1 (available from <https://www.cjhp-online.ca/index.php/cjhp/issue/view/216>).

Table 1 shows the characteristics of pharmacists in our sample by location of qualifying education. Overall, more of the Canadian graduates than IPGs were women (63.2% versus 52.3%, $p < 0.01$), and graduation had occurred more recently (17.4 versus 22.1 years since graduation, $p < 0.01$). The mean number of practice sites was only slightly higher

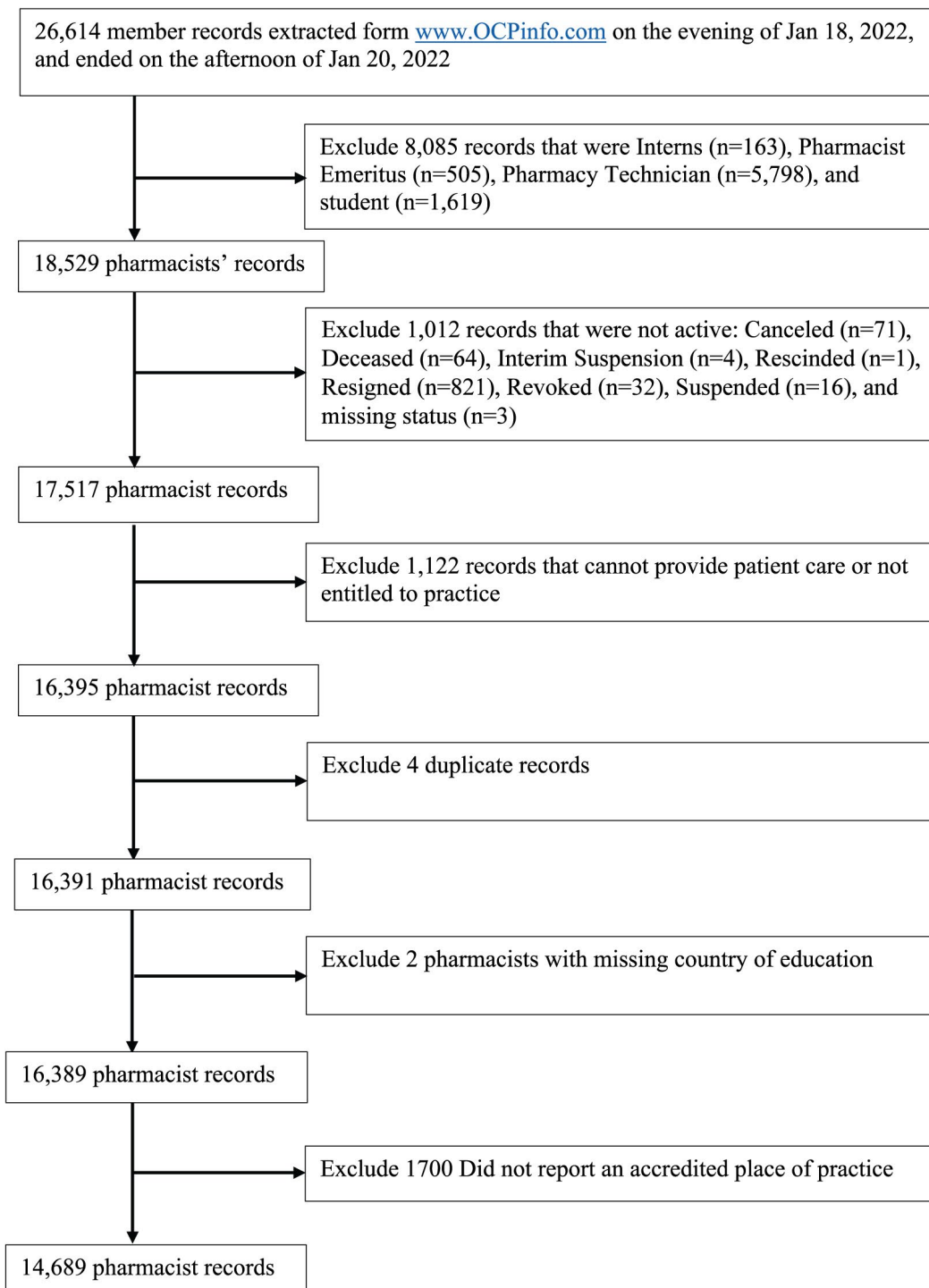


FIGURE 2. Selection of Ontario College of Pharmacist members.

in numeric terms (1.6 versus 1.5), but this difference was statistically significant ($p = 0.02$).

Canadian versus IPGs in hospital practice

Among all pharmacists in our sample, 2885 (19.6%) reported at least 1 hospital pharmacy as a place of practice. Most of these ($n = 2458$, 85.2%) were Canadian graduates. Furthermore, the proportion of pharmacists in each group who reported practising in at least 1 hospital pharmacy differed significantly between Canadian graduates ($n = 2458/7403$, 33.2%) and IPGs ($n = 427/7286$, 5.9%) ($p < 0.01$).

Graduating from Canada was associated with higher odds of practising in a hospital pharmacy. In the crude model, the OR for Canadian graduates reporting at least 1 hospital pharmacy as a place of practice was 7.98 (95% CI 7.16–8.91). This association between location of qualifying education and hospital practice was similar in the adjusted model (OR 7.12, 95% CI 6.39–7.98). Men had lower odds of practising in a hospital pharmacy (OR 0.40, 95% CI 0.36–0.44). Similarly, every additional year since graduation was associated with lower odds of practising in a hospital pharmacy (OR 0.98, 95% CI 0.98–0.99).

Sensitivity Analyses

In the first sensitivity analysis, pharmacists graduating from institutions in the United States were combined with

Canadian graduates to create a category of North American graduates, which totalled 8279 pharmacists (56.4%), leaving 6410 (43.6%) in the IPG category. With this configuration, North American graduates formed 91.3% ($n = 2634$) of the hospital pharmacist workforce, relative to only 8.7% ($n = 251$) who were IPGs (Table 2). The association between location of qualifying education and hospital practice was more pronounced: crude OR 11.45 (95% CI 10.01–13.09) and adjusted OR 10.32 (95% CI 9.00–11.82). Gender and years since graduation had a similar association with hospital practice in the comparison of North American graduates and IPGs.

In the second sensitivity analysis, drug preparation premises were combined with community pharmacies (instead of being classified as hospital pharmacies). With this change, there was a total of 237 hospital pharmacies, but the overall distribution of pharmacists in the hospital practice setting was similar to what was observed in the main analysis (see Appendix 2, available from <https://www.cjhp-online.ca/index.php/cjhp/issue/view/216>), with a crude OR of 8.19 (95% CI 7.33–9.14) and adjusted OR of 7.33 (95% CI 6.55–8.20).

DISCUSSION

Using publicly available data from the OCP website, we examined whether the location of qualifying education of pharmacists in Ontario was associated with practice in a

TABLE 1. Characteristics of Pharmacists by Location of Qualifying Education: Canadian versus IPG

Characteristic	Location of Qualifying Education			p Value ^a
	Canadian Graduates (n = 7403)	IPGs (n = 7286)	All (n = 14 689)	
No. (%) with at least 1 hospital practice site	2458 (33.2)	427 (5.9)	2885 (19.6)	< 0.01
No. (%) females	4679 (63.2)	3807 (52.3)	8486 (57.8)	< 0.01
Time since graduation (years) (mean ± SD)	17.4 ± 13.2	22.1 ± 11.0	19.7 ± 12.4	< 0.01
No. of declared sites of practice (mean ± SD)	1.6 ± 2.4	1.5 ± 1.5	1.6 ± 2.0	0.02

IPG = international pharmacy graduate, SD = standard deviation.

^aBased on χ^2 or *t* test.

TABLE 2. Characteristics of Pharmacists by Location of Qualifying Education: North American versus IPG

Characteristic	Location of Qualifying Education			p Value ^a
	North American Graduates (n = 8279)	IPGs (n = 6410)	All (n = 14 689)	
No. (%) with at least 1 hospital practice site	2634 (31.8)	251 (3.9)	2885 (19.6)	< 0.01
No. (%) females	5152 (62.2)	3334 (52.0)	8486 (57.8)	< 0.01
Time since graduation (years) (mean ± SD)	17.6 ± 13.0	22.4 ± 11.0	19.7 ± 12.4	< 0.01
No. of declared sites of practice (mean ± SD)	1.6 ± 2.3	1.5 ± 1.6	1.6 ± 2.0	< 0.01

IPG = international pharmacy graduate, SD = standard deviation.

^aBased on χ^2 or *t* test.

hospital setting. We found that among Canadian graduates, approximately 1 in 3 pharmacists (33.2%) reported practising at 1 or more hospital sites. In contrast, among the IPGs, just over 1 in every 20 pharmacists (5.9%) reported practising at a hospital site. Based on adjusted ORs, Canadian pharmacy graduates had 7.12 times higher odds of working in a hospital setting relative to IPGs. When North American pharmacy graduates were analyzed collectively, the effect was even larger, with US and Canadian graduates having 10.32 times higher odds of working in a hospital setting relative to IPGs.

This research provides empirical data regarding the distribution of IPGs and domestic graduates at pharmacy practice sites in Ontario and fills a significant gap in the literature regarding the integration of IPGs at all levels of the profession. Our data revealed that IPGs are underrepresented in higher-status clinical work within hospital settings, which mirrors the pyramidal structure existing in other health care professions.¹⁰⁻¹⁵ Principles of EDI have been widely adopted as institutional practice by the pharmacy profession.²³⁻²⁵ However, our data suggest that although the pharmacy labour force may be diverse in terms of its members' ethno-racial profile, there is a lack of equity and inclusion in some of its institutions, as indicated by pharmacists' country of graduation.

The lack of integration of IPGs into hospital settings may stem from structural barriers that exist within the licensing process. Compared with Canadian graduates, IPGs do not have the same access to structured practical and clinical training and co-op placements, which are favoured by employers when filling hospital residency positions.³⁰ Pharmacy programs in Canada have transitioned to the Doctor of Pharmacy (PharmD) degree, which has become the standard for entry to practice. In the PharmD curriculum, there is an added emphasis on experiential clinical placements, relative to the previous baccalaureate degree programs. For example, the PharmD program at the University of Toronto provides all students in their final year with 44 weeks of hands-on clinical training.³¹ Beyond these initial clinical placements, graduates who are interested in hospital-based practice seek out hospital residency training,³²⁻³⁴ which is the expectation for most entry-level institutional positions across Canada.²⁰ Conversely, IPGs' pathway to licensure lacks such opportunities.³⁵ For example, the bridging program for IPGs at the University of Toronto does not offer students structured clinical placements, which arguably deprives IPGs of key networking opportunities that would improve their chances of matching in a pharmacy residency program.³⁶ A similar situation exists for IPGs in the United States, who lack the exposure to advanced clinical training opportunities that their domestic counterparts enjoy.³⁰ IPGs' participation in the Canadian residency matching process is not known, and the OCP database does not provide information on additional training/education. As such, future research could

seek empirical evidence to show the extent to which IPGs are underrepresented in this process, to examine potential facilitators and barriers that could affect IPGs' ability to secure advanced training opportunities, and to gauge the impact of these barriers on IPGs' workplace satisfaction.

Although the methods and data in our study do not support the claim that IPGs face implicit or unconscious bias in the hiring process, the data demonstrate that US graduates have a greater chance of getting hired in Ontario hospitals, possibly because of similarities in education and training to the Canadian graduates, making them a better institutional "fit". Future research could investigate how employers can better assess and value the unique contributions of IPGs, particularly at a time when institutions are interested in promoting equitable and inclusive workplaces. However, this may require changes to an institutional culture that views Canadian education and training as the norm against which other knowledge and experience are compared.³⁷ Integration of IPGs into hospital pharmacy practice may require initiatives similar to those used for international nurses, including a longer orientation period, a mentorship program, and the creation of networks through formal education such as bridging programs embedded with experiential training.³⁸⁻⁴⁰ Initiatives could also include diversity training for managers and staff, with the goal of creating supportive and inclusive work environments⁴⁰ and a greater range of networking opportunities supported by national and provincial pharmacy organizations.

It has been suggested that a more diverse health care workforce, one that mirrors Canada's evolving demographics, could improve health disparities for underrepresented and vulnerable patient populations.¹⁻⁵ In keeping with initiatives from other health care professions,^{1,7,8} the integration of more IPGs into hospital pharmacy practice may improve patients' access to culturally competent care; however, the extent to which IPGs can fulfill this mandate in Ontario hospitals or how it is being addressed currently by domestic graduates is unknown and would be an area for future study.⁴¹ Culturally competent care is promoted within the profession of pharmacy,^{42,43} and IPGs arguably possess knowledge that can facilitate this agenda. However, it must be stressed that serving a diverse population is the responsibility of all pharmacists; the burden of expectation should not rest solely on IPGs, as doing so could potentially limit their practice to a smaller segment of the patient population.⁴⁴ In addition, evidence has shown that some IPGs prefer to serve patients beyond their own diaspora.²² The main impetus for IPG integration into hospital practice should be in keeping with the principles of EDI, whereby the profession advocates for breaking down barriers at all levels of the profession,²⁴ including structural barriers for those trained outside of Canada.

For our study, we used a comprehensive database from the most populous province in Canada, where a significant

proportion of new immigrants settle. However, several limitations should be noted. First, we used self-declared place of practice as the outcome, but the information in the database may be outdated, and some pharmacists may not have declared all their current places of practice. Nonetheless, it is expected that all Ontario pharmacists accurately declare their place of practice upon annual license renewal. In addition, when pharmacists change their place of practice, they are required to report the new site to the OCP within 30 days.⁴⁵ We also considered that reporting at least 1 hospital practice site was a proxy for practising in a hospital; however, it is not known if pharmacists are practising at these sites on a full-time or casual basis. Nevertheless, reporting at least 1 hospital practice site is a valid indicator of practice in such a setting. Lastly, given the lack of data regarding the ethno-racial profile of pharmacists in Ontario, we considered the country of qualifying education as a proxy for diversity, keeping in mind that some Canadian students who are not visible minorities attend pharmacy schools abroad and are considered IPGs and also that many domestic graduates are from diverse backgrounds.

CONCLUSION

We found that the pharmacy profession in Ontario, despite being diverse, is “missing [its] other half”.¹⁹ In particular, IPGs have significantly lower odds of realizing their professional ambitions. We hypothesize that this is due to structural barriers impeding their ability to enter institutional practice and have thus identified a need for the pharmacy labour force to diversify into hospital settings. Indeed, our goal should be to enhance the integration of IPGs in all arenas of the profession, including hospitals, academia, advocacy, and regulatory organizations, to meet the needs of a changing Canadian population. Integrating minority professionals, including those with international training, can contribute greatly to the reduction of health disparities when they are represented in all areas of professional life. Future research should examine facilitators and interventions to enhance the integration of internationally educated health care professionals as a pathway to diversifying professions.

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