Uptake and impact of licensed pharmacy technicians in Ontario community pharmacies

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Introduction

Over the last decade, the provincial Colleges of Pharmacists, with the exception of Quebec, have created a new category of regulated pharmacy personnel, the pharmacy technician. Licensed technicians receive the training and education required to perform certain tasks that previously could only be performed by pharmacists. For instance, pharmacy technicians licensed in Ontario can verify that prescriptions are filled correctly, accept physicians' verbal prescriptions for most drugs, and can approve prescription transfers. The Ontario College of Pharmacists' (the OCP) rationale for licensing pharmacy technicians was to free up pharmacist time that instead could be spent providing "expanded scope" patient care. This care includes providing immunizations, reviewing patient medication use regimens, and recommending changes to these regimens. The OCP has encouraged pharmacists to provide these services. Moreover, the Ontario Ministry of Health remunerates pharmacies that provide these services.

There is little evidence in the literature on the uptake and impact of pharmacy technicians. This paper, therefore, addresses the following questions, focusing on pharmacy technicians licensed in Ontario. First, what are the characteristics of technicians employed in Ontario as of September 2016? Second, what fraction of pharmacies employ technicians and what are the characteristics of pharmacies that do so? And, finally, do pharmacies that hire technicians provide more expanded scope patient care services?

Methods

The OCP has licensed pharmacy technicians since December 2010. We obtained information on the pharmacy technicians and pharmacists licensed in September 2016 from the OCP website. In particular, we obtained information on individuals' gender, year of licensure and places of employment. The latter variable was used to determine pharmacy staffing levels. If an individual declared two places of employment, we assigned each place of employment 0.5 full time equivalent (FTE). (More generally, if an individual declared x places of employment, we assigned each place of employment $1/x$ FTE.)

We also obtained pharmacy claims data from the Ontario Public Drug Programs (OPDP) branch of the Ontario Ministry of Health. The OPDP provides drug coverage to seniors, those in receipt of social assistance, those residing in long term care facilities, and various other groups. We obtained, for each community pharmacy, information on the number of MedsChecks performed, by type of Medscheck, and the number of prescriptions dispensed to OPDP beneficiaries in the 12-month period ending March 31, 2016. The MedsCheck program remunerates pharmacies that counsel Ontario residents on their medication use. The most commonly provided type of MedsCheck is the MedsCheck Annual (for patients taking 3 or more chronic prescription medications); this was provided to 621,655 different patients over the 12-month period. We focused on the MedsCheck Annual, the MedsCheck Hospital (for those planning to be hospitalized, or those recently discharged from hospital), MedsCheck Follow up (a follow up consultation in cases where the pharmacist or physician recommended a change in medication), MedsCheck for Diabetes (for patients diagnosed with type 1 or type 2 diabetes and taking a medication for their condition), the MedsCheck LTC (for residents of a licensed Long-Term

Care Home), and the MedsCheck at Home (for those who are unable to visit a community pharmacy). The MedsCheck for Diabetes and MedsCheck LTC categories include both an initial assessment and also a possible follow-up. Merging these data sources yielded pharmacy-level data on the number of pharmacy technician FTEs, the number of pharmacist FTEs, the number of MedsChecks performed, by type of MedsCheck, and OPDP prescription volume. Information on the pharmacy's characteristics, including location and name, were also collected.

We estimated a probit regression model to determine if pharmacies that hire technicians are more likely to provide MedsChecks than those that do not. This model can be thought of as a model of the pharmacy's program participation. We also estimated a model of the volume of MedsChecks provided. This was accomplished by way of a linear regression model of the logarithm of the number of MedsChecks provided among the subsample of pharmacies that provided at least one MedsCheck. The logarithm was used to dampen the influence of any outlier MedsCheck values that might otherwise skew our estimates. Separate models were estimated for each of the six types of MedsCheck defined above.

The outcome variable in each case was the number of MedsChecks provided per pharmacist FTE. The same set of explanatory variables were used in each model. The first set of variables were used to control for volume of prescriptions the pharmacy dispenses to OPDP beneficiaries. This control variable was included in the model because pharmacies that serve more OPDP beneficiaries will naturally have more opportunities to provide MedsChecks. Controls for prescription volume consisted of four indicator variables representing the quintiles (across all pharmacies in our estimation sample) of OPDP prescription volume; the bottom quintile was the reference category.

In addition, the model included indicator variables for the number of licensed pharmacy personnel. Four indicators of the number of licensed technician FTEs (*techfte*) were included: $0<techfte\leq 1$, $1<techfte\leq 2$, $2<techfte\leq 3$, and $techfte>3$; $techfte=0$ was the reference category. Three indicators of the number of licensed pharmacist FTEs (*pharmfte*) were included: $1<pharmfte\leq 2$, $2<pharmfte\leq 3$, and $pharmfte>3$; $pharmfte\leq 1$ was the reference category.

This model was estimated using data on community pharmacies. We thus removed data on pharmacies with no store front, such as mail order pharmacies, central fill pharmacies and pharmacies that primarily focused on serving long-term care facilities. We also removed hospital outpatient pharmacies, and pharmacies that focus on specialty drugs.

Results

There were 4,143 pharmacy technicians employed in September 2016. Most (92%) were female and most (87%) worked in just one pharmacy; 11% worked in two. Most technicians had been licensed in the previous two years. Twenty four percent of the pharmacies in our sample employ technicians. Table 1, below, displays statistics on the fraction of pharmacies that employ pharmacy technicians, by pharmacy type. Pharmacies that process large prescription volumes that are eventually delivered to patients outside of the pharmacy, such as Central Fill pharmacies

and those serving LTC facilities, tend to use pharmacy technicians. Over one quarter of general outpatient hospital pharmacies employ more technicians than pharmacists. Almost all Costco pharmacies, two thirds of Jean Coutu pharmacies and one third of Shoppers Drug Mart pharmacies used technicians. Only 13% of independent pharmacies used technicians.

Table 2 presents estimates of the fraction of pharmacies using pharmacy technicians, by quintile of total OPDP prescriptions dispensed over the 12 month period. Only 7% of the pharmacies that dispensed relatively low volumes of prescriptions to OPDP beneficiaries (i.e. in the bottom quintile) used pharmacy technicians. This proportion increased to 46% of pharmacies in the top quintile.

Table 3 gives estimates of the impact of the different explanatory variables on the probability that a pharmacy will provide at least one MedsCheck. There is no evidence that the use of pharmacy technicians (*techfte*) materially increases the probability that the pharmacy provides at least one MedsCheck Annual. Indeed, pharmacies that employ more than 2 technician FTEs are at least 10% percentage points *less* likely to provide a MedsCheck Annual than pharmacies that do not employ any pharmacy technicians. The estimated model also indicates that pharmacies that employ more than one pharmacist FTE are slightly more likely to provide a MedsCheck Annual relative to those employing 1 or fewer pharmacist FTEs. Holding *techfte* and *pharmfte* constant, pharmacies dispensing in the 2nd to 5th quintiles of prescriptions to the OPDP beneficiaries are about 2 to 3 percentage points more likely to provide a MedsCheck Annual than pharmacies dispensing in the bottom quintile.

The models for Medscheck Follow up, Diabetes, Home and Hospital all reveal similar patterns re the impact of technician employment on the likelihood that the pharmacy provides a MedsCheck. Pharmacies that employ up to one technician FTE are more likely than pharmacies that do not employ any technicians to provide a MedsCheck. Conversely, pharmacies that hire more than 3 technicians are markedly less likely to provide MedsChecks. The MedsCheck LTC estimates are different. This model indicates that the likelihood of providing a MedsCheck LTC is higher, the greater the number of technicians that are employed.

Table 4 reports on the estimates of the linear regression of the log of the number of MedsChecks provided per pharmacist FTE, by type of MedsCheck, among the subsample of pharmacies that provide at least one MedsCheck. The estimates of such a model indicate the proportional – not the absolute – increase in the number of MedsChecks relative to the reference group. Consider first the estimate of the proportional difference in the number of MedsChecks provided per pharmacist between pharmacies that employ one or fewer technician FTEs vs those that employ none. The MedsCheck Annual model yielded an estimate of 14% and the LTC model an estimate of 220%. The remaining models' estimates were generally positive but not statistically significant. Consider next the estimate of the proportional difference in the number of MedsChecks provided per pharmacist between pharmacies that employ more than 3 technician FTEs vs those that employ none. The Annual and Diabetes models indicate that pharmacies employing 3 or more technicians employ 60% fewer MedsChecks per pharmacist FTE.

Discussion

We find that about one quarter of pharmacies in our sample employ licensed technicians. There is, however, considerable variation across pharmacies. Most pharmacies that process large volumes of prescriptions that are eventually delivered to patients outside of the pharmacy, such as Central Fill pharmacies, use pharmacy technicians. Among conventional community pharmacies, pharmacies with multiple locations all sharing the same name and appearance, such as Costco, Shoppers Drug Mart, Loblaws and Pharmasave, are more likely to use technicians than independent pharmacies. Pharmacies that fill more prescriptions are more likely to use technicians.

We estimated regression models of the impact of technician employment on the provision of MedsChecks by conventional community pharmacies. The models predict that pharmacies that hire up to one pharmacy technician FTE are more likely to provide MedsChecks and provide slightly more MedsChecks per pharmacist compared to pharmacies that employ no technicians. The magnitude of this effect varies by type of MedsCheck. The probability of a MedsCheck Follow-up increased by 10 percentage points. The probability of a MedsCheck Annual increased by only 1 percentage point. Also, the mean number of Medscheck Annuals per pharmacist increased by about 14%, whereas the estimates for the remaining models were smaller and statistically insignificant. The MedsCheck LTC was the notable exception. The presence of up to one technician FTE increased the number of MedsChecks by 220% and additional technicians resulted in further increases in the number of MedsChecks. For the other types of MedsChecks, pharmacies that employ three or more technician FTEs are both less likely to provide a MedsCheck and provide fewer MedsChecks per pharmacist.

Our methods have several caveats. First, the timing of the data obtained from the OCP and MOH websites differ by 6 months and it is possible that this causes some measurement error in our model. Second, the models are capable of assessing associations between the likelihood or number of MedsChecks provided and employment of pharmacy technicians, holding constant the number of pharmacist FTEs and prescription volumes. Note, however, that the models do not necessarily render causal effects. It is possible that there are pharmacy characteristics that are at once associated with the hiring of technicians and the likelihood of providing a MedsCheck. It is also possible that there is reverse causality. For instance, it is possible that pharmacies that do not intend to conduct any MedsChecks – perhaps because their focus is on dispensing – are the ones that hire technicians.

To obtain causal effects, one would need a source of quasi-experimental variation in the use technicians. This variation would be caused by factors that are independent of the pharmacy's decision making around the provision of MedsChecks. However, it is unclear whether such quasi-experimental variation exists. Even if there is reverse causality, however, the models are still informative. In particular, they indicate that pharmacies that perform MedsChecks tend to hire only one technician.

Table 1 Fraction of pharmacies using pharmacy technicians, by pharmacy type or name

Pharmacy type / name	Fraction using techs	Fraction using more techs than pharmacists
Central Fill	1.00	0.00
Hospital outpatient specialized	1.00	0.00
Costco	0.97	0.07
Medical Pharmacy LTC	0.90	0.00
LTC/institutional	0.88	0.00
Hospital outpatient general	0.73	0.27
Jean Coutu	0.67	0.00
Specialty rx	0.59	0.05
Medical Pharmacy	0.49	0.00
Shoppers Drug Mart	0.35	0.00
Homecare	0.33	0.00
Lovell Drugs	0.33	0.00
Mail Order	0.33	0.00
Loblaws	0.33	0.01
Pharmasave	0.32	0.04
Pharmachoice	0.30	0.04
Total Health Pharmacy	0.29	0.03
Remedy's Rx	0.23	0.02
IDA	0.21	0.02
Guardian	0.21	0.01
Rexall	0.20	0.01
IDA Independent	0.18	0.06
Medicine Shoppe	0.16	0.00
Prince Theodore Group	0.16	0.00
Metro	0.15	0.01
Walmart	0.15	0.00
Independent	0.13	0.02
Main Drug Mart	0.09	0.02
Morelli's	0.09	0.00
FreshCo	0.07	0.00
Sobeys	0.05	0.00
Ben’s	0.00	0.00
Janzen’s Pharmacy	0.00	0.00

Table 2 Fraction of pharmacies using pharmacy technicians, by quintile of total OPDP prescriptions dispensed

quintile of total OPDP prescriptions dispensed	Fraction using techs	Fraction using more techs than pharmacists
lowest 20%	0.07	0.01
second quintile	0.11	0.01
third quintile	0.22	0.02
fourth quintile	0.32	0.02
top 20%	0.46	0.03

Table 3 Probit regression estimates of the impact of pharmacy technician employment on the probability of providing one or more MedsChecks over the 12 month period ending March 31 2016, by type of MedsCheck

Variable	Annual	Follow-up	Diabetes	LTC	Home	Hospital
Techfte						
=1 if 0<*techfte*≤1	0.01	0.09***	0.04**	-0.00	0.07**	0.08***
=1 if 1<*techfte*≤2	-0.02	0.07	-0.02	0.02	0.02	0.05
=1 if 2<*techfte*≤3	-0.09*	0.05	-0.04	0.09**	0.06	0.10
=1 if *techfte*>3	-0.17***	-0.10	-0.21***	0.15***	-0.14	-0.22**
Pharmfte						
=1 if 1<*pharmfte*≤2	0.01*	0.07***	0.05***	-0.00	-0.03	0.06*
=1 if 2<*pharmfte*≤3	0.02***	0.16***	0.07***	-0.00	-0.05	0.12***
=1 if *pharmfte*>3	0.03***	0.22***	0.09***	-0.01	0.01	0.20***
OPDP rx volume						
=1 if 2nd quintile	0.02***	0.04*	0.04**	0.02	0.05	0.13***
=1 if 3rd quintile	0.03***	0.04	0.04***	0.03	0.11***	0.17***
=1 if 4th quintile	0.03***	0.04	0.05***	0.04*	0.15***	0.21***
=1 if top quintile	0.02***	0.07**	0.04**	0.14***	0.30***	0.20***
N	3,648	3,648	3,648	3,648	3,648	3,648
Pseudo R squared	0.11	0.07	0.06	0.10	0.04	0.08

legend: * p<0.05; ** p<0.01; *** p<0.001

Table 4 Linear regression estimates of the impact of pharmacy technician employment on the number of MedsChecks provided per pharmacist FTE over the 12 month period ending March 31 2016, among pharmacies providing at least one MedsCheck, by type of MedsCheck

Variable	Annual	Follow-up	Diabetes	LTC	Home	Hospital
techfte						
=1 if 0<*techfte*≤1	0.14*	0.16	0.06	2.20*	-0.03	0.08
=1 if 1<*techfte*≤2	-0.18	0.09	-0.20	14.31***	0.08	0.02
=1 if 2<*techfte*≤3	0.19	0.20	0.41	30.90***	1.16*	0.10
=1 if *techfte*>3	-0.64**	-0.36	-0.61*	65.64***	1.21	0.20
pharmfte						
=1 if 1<*pharmfte*≤2	-0.33***	-0.44***	-0.40***	-0.44	-0.49***	-0.51***
=1 if 2<*pharmfte*≤3	-0.44***	-0.61***	-0.50***	-0.52	-0.71***	-0.62***
=1 if *pharmfte*>3	-0.49***	-0.65***	-0.65***	-0.62	-0.85***	-0.77***
OPDP rx volume						
=1 if 2nd quintile	1.21***	0.16	0.89***	0.35	0.25*	0.70***
=1 if 3rd quintile	1.78***	0.48***	1.25***	0.21	0.63***	1.10***
=1 if 4th quintile	2.52***	0.83***	2.00***	1.95	1.07***	1.42***
=1 if top quintile	2.90***	1.20***	1.81***	6.38***	2.19***	1.66***
N	3530	2724	3302	176	1654	2483
Adjusted R squared	0.12	0.06	0.09	0.40	0.18	0.13

legend:* p<0.05; ** p<0.01; *** p<0.001
the estimates reported are not the OLS estimates b but the transformed estimates (exp(b)-1)