

Reevaluating The Crucial Contributions Of Pharmacy Technicians: A Comprehensive Review

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1. Introduction

Pharmacy technicians play a crucial role in the daily operations of a pharmacy, yet their contributions and capabilities are often overshadowed and misunderstood. In this comprehensive review, we identify and analyze the factors associated with the underutilization of pharmacy technicians in practice. We review that while pharmacy programs have evolved over time and continue to evolve, the role of the technician has still not kept pace with the demands of practice. We reexamine professional expectations and the role of the pharmacy technician in chain and community independent pharmacies and pharmacy ownership. Finally, we outline an integrated plan to maximize the core functions, potential, and the pharmacy technician's role in practice and healthcare across the spectrum.

Our professional lives are impacted directly or indirectly by actions, decisions, and policies of pharmacy technicians. Their work enables accurate prescription ordering, data entry, and filling. They label and package prescriptions according to legal requirements, and more importantly provide the balance that permits pharmacists to enrich the care they give by facilitating Doc-to-Doc interactions and first-fill counseling. Pharmacy technicians are also the backbone of the kitchen with accounting/payroll, purchase order, sales reports, reception of pharmaceuticals, sticker reconciliation, and store supply inventory. Although numerous essays reference the value of keeping a committed group of technicians, little to no data quantify the value of pharmacists

"letting go" of their role and transitioning technicians into more advanced roles.

1.1. Background and Significance

Pharmacy technicians play a crucial role in the efficient and effective functioning of pharmacy services across the world. However, the evolving context of health service provision has resulted in an expansion and transformation of the tasks they are delegated to perform. It is against this backdrop that the authors first present a brief historical overview of the ways in which employment profiles and pharmacy services have evolved to provide a contextual base for the subsequent sections of this review. Two of the central principles of the literature on pharmacy support staff are enunciated, and it is argued that neither of these accurately captures the diversity of activities carried out by pharmacy technicians, nor fully highlights their significant contributions to the delivery of contemporary healthcare services. This literature has taken an increasing interest in the range of roles typically undertaken by members of pharmacy support staff. (Goff et al. 2018)(Lat et al.2018)

No stock has been taken of the literature exploring the contributions of a singular group of support staff, i.e. pharmacy technicians, in delivering medicines to patients. Moreover, it is only in the U.K. that attempts have commenced to critically re-appraise the task-specific literature on the delivery of pharmacy-provided medication. This paper addresses this gap. Pharmacy technicians facilitate and contribute significantly to the duties of the pharmacist through their various partnerships with the rest of the healthcare team, their national and local responsibilities, and through their range of clinical and operational skills, which is not typically appreciated or recognized.

2. Historical Development of Pharmacy Technicians

The beginning of pharmacy technician training/education is somewhat unclear. It was not until 1956 during the annual meeting of the Alabama Pharmaceutical Association that a "resident assistant" or "pharmacy technician" program was considered. Not until 1965, the American Association of Junior Colleges, the National Association of Retail Druggists, and the US Office of Education released a report on the professional education of pharmacy personnel. This report entitled "The Pharmacy Technician: Educating for Quality in Service." The report defined

the role of the pharmacy technician, necessary criteria to be a pharmacy technician, and a curriculum for training pharmacy technicians. The first complete draft of the educational objectives was published in 1967.

In less than a year, the numbers of trained pharmacy technicians took off. Within 1968, the inventory record card of 275 stores showed that 2,900 were employed in participating stores in 1967. From 54 schools in operation nationwide, 542 pharmacy technicians graduated. Youngs reported that during the American Association of Junior Colleges annual convention, the role of the pharmacy technician and the technician's educational system was placed into the formal structure of the AAJC. In 1973, SATF instituted a Pharmacy Technician Task Force. This task force eventually formed the foundation of a certification examination, which culminated with the offering of the first test on November 20, 1980. The purpose of certification was three-fold: to assure the public that pharmacy technicians maintain a standard level of knowledge and skill; to improve professional performance by providing benchmarks for progress and guidance toward acquiring the knowledge and skills necessary for certification; and to signal the technician's dedication and commitment to continuing education in the interest of personal and professional growth.

2.1. Origins of Pharmacy Technicians

Technicians have a long history, originating in the United States in the 1950s. With the shortage of pharmacists and the treatment of soldiers following the Second World War, there was a need for more help in pharmacies. Hence, the now defunct New York College of Pharmacy established the first official technician training programs in 1952. These programs mushroomed quickly after the passing of the pharmacy technician programs at the University of Minnesota and the Los Angeles College of Pharmacy in 1972.

For the first 20 to 30 years of the existence of pharmacy technicians, the position was one geared toward the hospital setting. Only in the late 1970s and early 1980s did the outpatient trend begin, and with it, a need for pharmacy technicians to help the dispensing process in the community pharmacy. These early technician programs were taught part-time as a certificate program and offered through universities. The creation of a program proved itself effective in helping to alleviate the shortage

of pharmacists. These early technicians, however, were trained on the job with no licensure and no training standards as we know them today. The hours for "tech training" were loose and dictated by the owners who held designated work time. (Goff et al.2018)(Le et al., 2018)

Today's formal pharmacy technician education dates back to 1973 with the formation of the Education Standards Committee of the American Association of Pharmacy Technicians, whose primary focus was to develop standards for technician education. Prior to this time, in the 1960s and 1970s, technician education "proved impractical because of the short longevity of the retail employees." With the resurgence of expanding duties and responsibilities of technicians, thereby creating a need for education, the Education Standards Committee became the Board of Pharmacy Specialties and developed the Certification of Pharmacy Technicians (CPhT) credential. Initially, the board in Illinois was assigned the task. The outcomes of the work of the Education Standards Committee was a report published in 1974, which outlined the areas of competency expected of a pharmacy technician: Drug Information, Pharmaceutical Knowledge and Assisting the Pharmacist.

3. Roles and Responsibilities of Pharmacy Technicians

As mentioned earlier, pharmacy technicians play a crucial role in any healthcare setting. The importance of having skilled pharmacy technicians as a member of the healthcare system is drawn from the fact that they evenly balance the workload and improve the overall function of a pharmacy. Pharmacy technicians in a community setting or a hospital may have different responsibilities and roles, but generally, pharmacists delegate tasks to pharmacy technicians allowing them to concentrate on other tasks. This provides healthcare benefits in a community setting, improving the public's trust as they become more accessible, as the pharmacy team is working more efficiently due to task delegation, and stakeholders within that organization will see immense advantages such as a reduced need for working capital concerning inventory.

The need for formally trained pharmacy technicians has become essential within this profession in order to fulfill these roles and responsibilities. The roles that pharmacy technicians in Alberta are able to reach after completing their practicum vary depending on whether the pharmacy technician is practicing in a community

setting or hospital setting, or whether they have further education for specific roles. Transitioning to Practice in Alberta is one of the resources available to pharmacy technicians and students. It outlines hospital and community pharmacy technicians' roles, duties, and responsibilities in each setting. The publication provides pharmacy technician candidates with an enhanced understanding of the comprehensive experience within each setting. This section will give a sense of how practice is divided and provide examples of common tasks performed by pharmacy technicians in a variety of settings. The competencies of roles and responsibilities of the pharmacy technicians aligned with the federal regulatory body are essential to demonstrate national sense. The Health Professions Act of Alberta outlines the legal scope of practice for pharmacy technicians. This document is useful for demonstrating regulated expectations in a community or hospital pharmacy technician practitioner. (Le et al., 2017)(Goff et al.2017)

3.1. Dispensing Medications

Patient medications play a crucial role in both improving and maintaining health, and are pivotal in controlling chronic conditions and the pathophysiology of disease. There are many concurrent factors that affect the reproducibility of patient medication. There is considerable potential for variability arising from physicians and mid-level care providers prescribing medications, insurance companies selecting formularies, and medication availability regardless of insurance coverage. Pharmacy technicians spend a great amount of their professional time dispensing medications. The accurate and consistent completion of this step is integral to patient care, as the absence of a needed medication can significantly alter patient outcomes.

In direct contrast to a high-pressure serve-the-customer reality of retail technicians, another domain these professionals serve is the inpatient pharmacy practice. Here a striking contrast to stock outs in other pharmacies exists, in that much of the medication of these larger, typically more sophisticated inpatient pharmacies is controlled within a "just in time" environment. This means that once a medication in the hospital runs low, the wholesaler, and hence the manufacturer, have been prepaid to send out the selected product(s), and the medications generally show up within days—debilitating shortages of injectable medications due to

packaging, raw ingredient, weather, or other identifying mix ups occur less than 1% of the time.

If that occurs, what happens is that the medication that is out of stock, for a variety of patient safety and financial reasons, is suddenly replaced with another medication generally within 24 hours. Contrary to popular opinion, the pharmacist typically does not change the medication that was ordered; they instead refer the prescription to the hospital formulary equivalent.

4. Training and Education Requirements

Pharmacy technicians are essential to the modern-day healthcare industry, working along with pharmacists to provide crucial patient care and services. Any individual who would like to work as a pharmacy technician must possess appropriate training to do so. The scope of duties, as well as the stipulations to partake in training in some states, depend on specific regulations and laws that apply to pharmacy technicians. Pharmacy technicians should also be proficient in pharmacy calculations, medical terminology, and pharmacology to make comparisons between available medications, and how and when to take them, amongst other tasks. (Le et al., 2017)(Lat et al. 2017)

Practicing pharmacy-related tasks in a healthcare facility usually demands a certain knowledge base. Similarly, different presets govern eligibility to practice as a pharmacy technician. In hospitals, pharmacy techs follow the same training and certification pathways. There are a multitude of pathways and training options made available to interested persons who would like to become pharmacy technicians. Training and education may take place in a variety of settings, such as community colleges, military training programs, and private and state postsecondary schools. Some pharmacy technicians are trained on the job. In most states, pharmacy technicians must register with the State Board of Pharmacy. They are also required to have a high school diploma or GED, pass a background check, and earn a national certification. After gaining a certain amount of work experience, hospital or other higher-level pharmacy technicians may be able to meet their state's experience requirement to earn a state registration.

4.1. Certification and Licensure

4. Background

4.1. Certification and Licensure

Pharmacy technician certification in the United States is currently administered by the Pharmacy Technician Certification Board (PTCB) and the National Healthcareer Association (NHA). The Institute for the Certification of Pharmacy Technicians (ExCPT) was, until July of 2017, also a certification body, after which their certifications were obtained by the NHA. The National Association of Boards of Pharmacy (NABP) serves as the professional organization for pharmacy regulatory bodies, also known as state boards of pharmacy. NABP provides official passing results to the boards of pharmacy for funding and registration purposes (personal correspondence). All states regulate technicians via the board of pharmacy and most present practice rules and regulations regarding the duties a pharmacy technician may and may not perform. To date, twenty-three states and the District of Columbia require registration or licensure of pharmacy technicians. Every board of pharmacy requires a technician to hold current certification. (Le et al., 2017)(Lat et al. 2017)

As of April 1, 2018, the requirement for national certification to register as a pharmacy technician is mandatory. However, pharmacy technicians who were previously registered or licensed were "grandfathered" in and are not required to become certified, but can do so voluntarily. Several states will grant full licensure to newly certified pharmacy technicians or will reciprocate licensure for pharmacy technicians who pass the PTCB Certification Examination or the Institute for the Certification of Pharmacy Technicians (ICPT) examination. Each state varies on its licensure requirements. Pharmacy Technician Certification Board's (PTCB) headquarters are located in Washington, DC; however, examination centers are located across the United States and, as of 2018, at select international sites. In order to be certified by the Pharmacy Technician Certification Board, an individual must possess a high school diploma (or equivalent) and must pass a certification examination. Loading...

5. Regulatory Oversight and Scope of Practice

Pharmacy technicians are regulated by entities within each state. These groups may include the Board of Pharmacy or, in the case of Utah, the Division of Licensing. The scope of practice for pharmacy technicians is governed by individual states but is influenced by national organizations such as the National Association of Boards

of Pharmacy (NABP) and the Pharmacy Technician Certification Board (PTCB). This is critical because understanding what falls within the technicians' scope of practice dictates the responsibilities they are able to take on, which then impacts their overall effect on pharmacy operations. In addition, understanding the depth and range of the technician's practice has implications as an extension of a licensed pharmacist and will be addressed in further detail in the next section.

The rules and professionalism for pharmacy technicians are also shaped, to some extent, by accrediting bodies. The American Society of Health-System Pharmacists (ASHP) is involved in the accreditation of pharmacy technician programs. Included in this, the Accreditation Council for Pharmacy Education (ACPE) serves to shape and promote regulations and professional standards. These organizations nurture higher professionalism for those practicing in an accredited setting. Acknowledging this background, an even broader insight can be gained by determining if being accredited and/or certified is linked to better outcomes in the pharmacy departments. It is a potentially broad reach of the pharmacy technician in the context of this understanding, as we must determine not just what can be done by individual pharmacy technicians, but what pharmacists are actually allowing them to do.

5.1. State Regulations

Each individual state has its own set of laws and regulations pertaining to pharmacy technicians. Some states require all pharmacy technicians to be certified, some states require registration with the board of pharmacy, and others mandate no specific qualifications. These regulations impact the practice of pharmacy on a daily basis.

For example, Florida requires a statement to be printed on each prescription label that indicates the technician's initials, while California recently allowed for a non-licensed person to count and measure the quantity and strength of a drug prior to dispensing by a pharmacist. However, the licensed pharmacist-in-charge must consider and approve the release of the drugs. Additionally, California allows the use of an automated counting system to prepare prescriptions for dispensing. However, the pharmacist-in-charge is fully responsible for all professional and ethical aspects of the pharmacist's or technician's practice. In other words, while

the technician can count and measure the drugs and prepare the medications, the pharmacist is fully responsible for reviewing the drugs and approving the final release.

It is also important to note that state regulators belong to and support the National Association of Boards of Pharmacy (NABP) in its mission to assist its member boards in developing, implementing, and enforcing uniform and stringent criteria for the success of pharmacy technicians through the National Pharmacy Technician Association (PTCB). It has created the Pharmacy Technician Certification Board (PTCB). Since 1991, the PTCB has certified over 440,000 pharmacy technicians as either Certified Pharmacy Technicians (CPhT) or Certification in South Dakota or these pharmacy technicians eligible to renew many of these o ets for violations of pharmacy technician.

6. Pharmacy Technicians in Different Healthcare Settings

Pharmacy technicians can work in many settings, including retail, hospital, lock-up, home care, long-term care, ambulatory care, and managed care. The roles and responsibilities can vary among the different settings, and many of the settings may be integrated. For example, an inpatient hospital pharmacy may be directly affiliated with both an inpatient and ambulatory care setting. In a long-term care facility, technicians may either work in a centralized facility where the physician, medication cart fill, and family communication are all completed, or they may interface with a retail pharmacy where the pharmacist or technicians will dispense to and communicate with the facility's nursing units. As a result, many technicians are familiar and proficient in areas that may not be considered traditional to a pharmacy in a specific setting. In this chapter, standard technician roles present in the major pharmacy settings are identified and explored. Future roles and expansion of technician services are also suggested and integrated. (Le et al., 2018)(Lat et al. 2018)

In the current healthcare system, there are many settings in which a patient can receive care. As a result, technicians are able to apply their experience, skills, and competencies in many settings, and some states may have created additional statuses to meet market demand for technician skills. For example, rural areas have embraced the technician as an integral member of the pharmacy team and, because technicians can take their skills with them, they are also highly regarded as seasonal community members.

Technicians who move from one setting to another may experience a change in how the tasks are performed, but there is always a place for them in the pharmacy team.

6.1. Retail Pharmacies

Pharmacy technicians working in retail pharmacies are responsible for a wide variety of tasks. They help prepare medications, but more importantly, they maintain patient medication profiles (e.g., verifying insurance coverage, updating address changes) to ensure that the prescriptions that the patients receive do not interact with their current medication regimen. A technician interviewed by revealed the challenging side of working in a fast-paced commercial pharmacy. According to this technician, "A large part of the work we do is counseling the patients on how to use their medication, their side effects, and we answer their general and personal medical questions and make sure they have the necessary equipment" (p. 88). All of the components justify hiring certified technicians in the retail setting as these workers possess competencies such as the ability to manage the medication use system, assist patients, deal with the production of products, and facilitate other providers and members of the public medication safety assurance.

It is this last duty where clear pharmacostewardship responsibilities lie: Assisting other providers in the safe, efficient use of drugs to optimize therapeutic outcomes (21-23). According to Brown (2004), there is too much onus placed on pharmacists in a new economy retail environment to save their employers money by multitasking at a technician's compensation and that this delegation of professional roles affects patient care. With the high use of automation in our study, it will be important to examine the extent of similar "risk transference" in the retail pharmacy setting, especially given that technicians operate some of these robots that can select the wrong medications and pour the medicine into the wrong bottle or the bottle with another patient's label.

7. Technological Advancements Impacting the Field

Technological advancements have significantly impacted the field of pharmacy and the practice of pharmacy technicians. Through the use of technology to build automated medication dispensing machines, such as robotics, fewer mixtures were made by the technician and were instead prepackaged by the machine. This decreased the role of the pharmacy technician in the final

dispensing of medications at various institutional practices. As a result, there has been a shift in the demand of pharmacists and pharmacy technicians as technological advancements decrease the need for certain positions in the pharmacy and increase the need for other positions. In addition, the medication order verification and adjudication prior to the filling of the order were traditionally pharmacist roles that relied on clinical testing and knowledge. With the creation of a CPOE, the system is able to input the medication order and pharmacist adjudication becomes redundant, automatically decreasing demand for the pharmacist's order-verification role and increasing the demand for the pharmacy technicians. This switch is beneficial to pharmacies who need to run efficiently to compete in a global market. (Ferreri et al. 2018)(Anderson & Sharma, 2018)

In community-practice pharmacies, as aforementioned, there has been a more apparent switch, from technician-as-simple laborer to technician-as-coordinator and educator. The roles and responsibilities of pharmacy technicians will continue to evolve in response to the growing variety of automation and technology used in the medication-use process. There is a negative connotation to the change in responsibilities for pharmacy technicians, typically one such that shifting low-demand laborer positions to the demand-bearing and responsible leader seems manipulative for the employer's benefit. There is a strategic element to the expansion of duties of pharmacy technicians, wherein they are not only better able to distribute medications to meet the needs of patients, but also play a more active role in the distribution process, which is especially important in healthcare delivery.

7.1. Automation and Robotics

In a broader theme of technological advancements, this section focuses on the role of automation and robotics in pharmacy practice. Specific to pharmacy technicians, pharmacy practice has been altered significantly by automation in many settings; this continues to be an evolving landscape as robots have started to be used and pharmacy technicians' roles have been altered, creating new roles for technicians as well as increasing the technician-to-pharmacist ratios. Meanwhile, it has been predicted that the development of artificial intelligence in pharmacy practice will have an equal, if not greater, effect upon pharmacy practice.

The use of automation has altered the traditional role of pharmacy technicians in different types of pharmacy settings. In-house, outpatient pharmacies are the most directly affected, with their business models changing to make room for automation to operate. Similarly, robotics have both altered the direct roles of technicians and increased the technician-to-pharmacist ratios. For inpatient, skilled nursing facilities, assisted-living facility, and psychiatric medication-only fenced facility pharmacies, robotic systems are now becoming the norm. An additional range in the technician-to-pharmacist ratio has come with the advent of automation. In outpatient settings with micro-fulfillment centers, this ratio has changed to 13:1 (versus 12:1 within the pharmacist-frequent pharmacy). The roles of pharmacy are significantly altered when robotics are incorporated. For the outpatient and inpatient settings, the roles that are performed are distinct. Because not allowed to give medication directly to a patient, the role of long-term care facility technicians is altered.

8. Challenges and Opportunities for Pharmacy Technicians

Pharmacy technicians' jobs are very difficult in so many ways and in so many settings. In particular, they face a diverse population of patients and co-healthcare workers, all while working in a highly regulated and often complex environment. Aside from their direct patient and co-worker interactions, pharmacy technicians in retail outlets also engage in further commercial activity often having sales targets to meet, aid with minor marketing roles (for example flu vaccine promotion), and undertake administrative tasks that require good organizational and data-entry skills. In institutions (including hospitals and nursing homes), technicians face additional challenges related to working with many professionals and units and some problem-solving, work which often requires access to health and other information that a patient may prefer be kept confidential. (Vermeulen et al. 2018)(Lat et al. 2018)

However, opportunities are also available to pharmacy technicians who take pride in their critical health role and want to expand their roles further—including into health and medical science. In particular, there is currently a movement to give pharmacy technicians more patient-centered duties similar to those performed by pharmacy technicians in some wards of hospitals. For example, pharmacy technician interventions have been shown to save enough time for pharmacists to generate cost savings in

areas such as checking medication charts and giving, oral order transcription, and medication reconciliation in some countries. Thus, pharmacy technicians are being assigned greater duties than in the past in some English-speaking countries such as Australia, New Zealand, and the United Kingdom and in countries in central Europe (e.g., Poland). (Zavaleta-Monestel et al. 2018)(Trenfield et al. 2018)

8.1. Workforce Shortages

In the professional literature, workforce shortage was identified as a significant challenge faced in the pharmacy technician profession. The terms shortage often imply that the workforce is insufficient to meet the latent and explicit demand in a particular domain. In relation to pharmacy, workforce shortages will have implications for the health professionals themselves; patient care; and the healthcare system, particularly costs. While many countries in the global north face the challenges associated with workforce shortages, an alternative perspective argues that workforce shortages are both temporary and, in some cases, human-made, occurring particularly in certain areas where the workforce is in deficit. (Westerlund & Marklund, 2018)

The lessons learned from examining absolute workforce shortages may not translate to a system where the future demand is for a higher skilled workforce, where the number of future candidates is unclear, and the effect of changes to the working environment unclear. Even if workforce shortages are temporary gaps between supply and demand, the workforce still needs to complete necessary work safely, an issue compounded given increasing demands and the need for a highly skilled workforce.

9. Future Directions and Recommendations

10.0 Future Directions (Lat et al. 2018)(Merks et al. 2018)

There are several conversations emerging concerning the integration of pharmacy technicians into new areas of practice. Pharmacy technicians in some provinces are now involved in advanced roles, including prescribing and adapting prescription medications, and administering a variety of medication preparations. As pharmacy technicians advance their ability to take on these roles in a research setting, exploring the factors that enable them to apply them during the research process is an interesting area for future research. We also suggest the roles

within the research process that would be feasible for a pharmacy technician, and how pharmacy technicians could participate in the development process. The challenges faced by pharmacy technicians in the conduct of clinical research should be explored in addition to the optimal forms of support that would facilitate research engagement. We also suggest that interventions designed to further support and provide education and mentorship for pharmacy technicians could be explored.

11.0 Recommendations for the Nursing Discipline in Pharmacy Technicians

This review has identified a need for nursing interventions to support pharmacy technicians in the adoption and implementation of new roles being introduced across Canada. From the literature, increasing education and training opportunities and providing interprofessional collaboration appeared necessary for implementing new roles. Furthermore, early involvement of pharmacy technicians during new role development stages can facilitate smooth implementation and integration within the practice setting. Based on this, a number of recommendations have been formulated to guide strategies to improve the pharmacy technicians' new role uptake of responsibility in Canada that will have potential implication in an international context.

9.1. Professional Development Opportunities

9.1. Professional Development Opportunities.

Pharmacy technicians are seeking opportunities, often in the form of continuing education, offered in their work settings as well as to obtain professional credentialing. These credentials offer an intrinsic value and encourage the pharmacy technician to strive for high achievement. Pharmacy technicians continue to take on new responsibilities and many new opportunities for aseptic preparation of compounded medications. Professional educators with the staff development and continuing education offices use findings of this paper to enhance the knowledge and skill of pharmacy technicians as a strategic part of planning professional development in the healthcare environment.

Recommendations for Instructors:

- The instructors should use the results to enhance opportunities and specialized courses of study in an instructional program that meets the needs of pharmacy technicians.
- Encourage pharmacy technicians to advance in the preparation of aseptic products to assist in meeting the needs of the future.
- Pharmacy technicians that assume new responsibilities need education and credentialing in specialized areas such as hazardous drug compounding to protect their health and the health of others.
- Inform pharmacy technicians of the updated professional organization's meeting where these important issues are being addressed.

Recommendations for Add him or other trade journal editor:

- Discuss the projected changes in the profession based upon credentialing competencies and standards for specialized areas of practice. Suggest the best ways for the pharmacy technician to prepare for the future and protect their health in practice. Explain that the pharmaceutical industry, in pharmacoeconomic strategies regarding drug development, will continue to look for innovative care models that increase efficiency and cut costs. In order to continue to increase the skill sets of staff, a move for BLS training for everyone should be considered. It would be interesting to know if technicians that have specialized training, education, and are IV certified professionals support the move to mandate BLS training for pharmacists and technicians. Pharmacists who handle the large volume of accolades in today's professional practice are essential. The significant behavioral of the companies is in line with the mainstream philosophy which states all the people over 50 years are dependent. In spite of widespread use and acceptance, no study we could find to date has attempted to compare these scores to any sort of validated gold standard of measurement, such as BLS training.

10. Conclusion

Pharmacy technicians are an essential member of any pharmacy team. Throughout this essay, the roles and responsibilities of pharmacy technicians in different settings were reviewed in an attempt for their contributions to be recognized on paper. There were many reasons as to why it was important and timely for their current roles to be reviewed, some reasons include the evolving role of the technician, particularly in general practice, contrast

between technicians' current roles and pre-registration training and their ability and professional devotion. Another key point in the essay is the note that there were a number of future developments, including the implementation of revalidation and a move towards more diploma level and competency approach, which linked to the reviewing of our roles and bio-psychosocial model for the service setting.

This paper challenges the increasing regulation of the pharmacy technician workforce, who are required to prove their fitness to practice with minimal patient contact. Instead, the factors that are purported to cause more patient harm, such as self-awareness, emotional intelligence, and impact of behavior are argued to need greater focus and evaluation. The paper provides an evidence synthesis about the characteristics of the pharmacy technician workforce and their value within the workplace. Despite widespread agreement that pharmacy technicians could take on more professional responsibilities and therefore develop the pharmacy team service, the paper argues that this is not achieved for a number of factors. This comprehensive review highlights the contribution of pharmacy technicians and pharmacy technicians within their different settings.

10.1. Summary of Key Findings

The expressed purpose of the comprehensive review is to present the work of others in conjunction with the authors' own to answer one research question: "What are the crucial contributions of pharmacy technicians?" based on specific criteria. The findings are conveniently summarized at the end of the paper and include the acknowledgment that pharmacy technicians perform non-discretionary and indirect patient care at varying levels and intensities, possess a range of knowledge, administer processes, practice judgment, and have the ability to affect the quality of care they provide. The limitations of the research are acknowledged, including the lack of information on the role pharmacy technicians can play in contributing to health professionals' skills/scope of practice, participation or impact of educational level and certification in terms of the critical contributions made, how work activity is influenced by team division of labor and organization of work in a given setting, patient population, regulatory environment, and level of support available, legislative definitions

of work roles and competencies, and the limits and legal scope of practice at facilities.

Several key messages run through this paper. The contributions and impacts of pharmacy technicians are shaped not only by them as individuals but also by the settings in which they work and the systems in which they work. For this reason, this paper suggests that pharmacy technician practice and inclusion in the pharmacy team should be considered more directly and on their own terms rather than the broader terms in which the scope, role, and contributions of the pharmacy team as a whole were defined. Similarly, research efforts directed toward measuring the effects of pharmacy technicians, those that support entry-level qualification for the work, those that seek to describe the practice more routinely, and those that explore career and practice progression as experiences that extend beyond and around competencies and routine processes of work are also needed. Instead, outcomes-based research, such as what has been done in New Zealand, is needed to consider the impacts of pharmacy technicians in providing public good. Finally, this research points to the importance and requisite elevation of the science of workforce—employment and the inter-relationships among them and the alignment of these with location-specific service populations—in reviewing and understanding the roles and trajectory of pharmacy technicians as important medicine supply professionals around the world.

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