
# A RESEARCH PAPER OF
# THE EXTENT AND NATURE OF DEMAND AND SUPPLY OF PHARMACY HUMAN RESOURCES: A CASE OF THE EDUCATION AND TRAINING LANDSCAPE

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## 1. INTRODUCTION

The goal of this study is to provide an understanding of the context of supply and demand of Pharmacy human resources in South Africa.

The main aim is therefore to investigate the extent and nature of the supply and demand of Pharmacists and Pharmacist Assistants in South Africa; the challenges that exist pertaining to maintaining the supply of these human resources and skills; and thereof come up with possible solutions.

This will be achieved through the following objectives:

1. Conducting an investigation of the trends in the supply looking at articulation from Matric to post-school education and training, and ultimately into employment
2. Conducting an investigation of the ratio for Pharmacist-to-pharmacist Assistants.
3. Conducting an investigation of global and national ratios densities.
4. Establishing the challenges of the pharmacy profession.

The research questions pertinent to this study therefore include the following:

a) What are the trends of outputs produced by the Basic Education System in Matric subjects including Mathematics, Physical Sciences and Life Sciences?
b) What are the trends in enrolments and outputs produced by the Higher Education System through the Bachelor of Pharmacy (BPharm) and Post-Graduate Qualifications?
c) What are the trends in enrolments and outputs of Pharmacist Assistants produced through the (National Certificate) NC: Pharmacist Assistant (Basic) and (Further Education and Training Certificate) FETC: Pharmacist Assistant (Post-Basic) Qualifications?
d) What are the trends in registration of Pharmacist Interns?
e) What are the trends in registration of Community Service Pharmacists?
f) What are the trends in the registration of Pharmacists and Pharmacist Specialists?
g) What are the trends in the registration of Pharmacist Assistants: Basic and Pharmacists Assistants Post-Basic?
h) What are the ratios of Pharmacist-to-Pharmacist Assistants?
i) What are the Global and National ratios densities of Pharmacists?
j) What challenges does the Pharmacy Professions experience?

## 1.1 Contextualising the Pharmacy Human Resources in South Africa

The health care system comprises all organisations, human resources and activities that relate to the promotion, restoration and maintenance of health. The World Health Organisation (WHO) recognised Pharmacists as an essential part of the health care team. The role Pharmacists fulfil has evolved historically from a focus on medication compounding and dispensing to pharmaceutical care services and therefore encompass health- services, information, products and technologies, financing, and leadership and governance. During Covid-19 pandemic the scope of Pharmacists expanded as they found themselves being the key first point of contact in the health care system; and during the period of National Disaster Restrictions Pharmacies were among the health care services that remained open to the public. Pharmacist Assistants (which are Pharmacist Support Personnel) play a key role in the health care system, assisting Pharmacists in their daily duties. Their supportive role is very important given the shortage of Pharmacist in South Africa measured against the WHOs global densities for the number of pharmacists needed per 100 000 population.

In 2011 the South African Pharmacy Council reported that, at the time, the average vacancy rates for pharmacists ranged from 36% to 76% in certain regions in South Africa, and that there was only one pharmacist per 3 849 population (1:3 849), which is 26 per 100 000 (26:100 000). This was considerably below the World Health Organisation's recommendation of one per 2 300 population (1:2 300) which is 43 per 100 000 (43:100 000) at the time. The Council calculated, that for South Africa to meet the recommended target by 2030, it needed to register an average of 1 200 pharmacists per year, and at the time 450 (37,5%) Pharmacists were registering per year on average. This meant that an additional 750 Pharmacists per year were required to be registered per annum making it necessary to mobilise resources adequate to produce an additional 62,5% Pharmacists to meet the minimum Pharmacist-to-population ratios.

Therefore, it is significant for this study to understand the context of the supply and demand of the Pharmacy Occupations and the factors at play in this regard. Currently (March 2023) there are 18 301 Pharmacists (including community service pharmacists and specialists), and 26 091 Pharmacist Assistants: Basic and Post-Basic (including learners) registered at the South African Pharmacy Council (SAPC). ***The problem addressed by this study is whether these numbers are in the right trajectory towards the projected Pharmacy Occupation Human Resources.***

## 2. LITERATURE REVIEW

### Education and training process of becoming a Pharmacist

The literature review first unpacks the process of education and training required from Basic education to Higher education towards becoming a Pharmacist to identify existing bottlenecks in each stage. Becoming a Pharmacist in South Africa is obtained through undergoing a four-year course which leads to a Bachelor of Pharmacy (BPharm) qualification which is an NQF Level 8 qualification. The following is a tabulated summary of the process involved to becoming a Pharmacist:

Table 1: Qualification pathway for becoming a Pharmacist in South Africa through the University sub-system

| | | | |
|---|---|---|---|
| **Pharmacy undergraduate studies** | **Qualification Title** | **Bachelor of Pharmacy (BPharm)** | |
| | NQF level | 8 | |
| | Duration | 4 years | |
| | Year Levels | Year 1 - 4 | |
| | Entry Requirements | ***Either:***<br>National Senior Certificate (UMALUSI) NQF level 4, with each of the following subjects at a minimum of 60%:<br>• Mathematics<br>• Life Sciences<br>• Physical Sciences | ***OR:***<br>FETC: Pharmacist Assistant – Post-Basic |
| | Professional Registration Category | Student Pharmacist | |
| | Exit | Graduate and obtain a Bachelor of Pharmacy (BPharm) Degree. | |
| **Graduate Intern in Pharmacy** | **Professional Registration Category** | **Pharmacy Intern** | |
| | Year level | Year 5 | |
| | Duration | 1 Year | |
| | Requirements | Placement at a healthcare facility<br>(Public or Private) | |
| **Professional Registration as a Community Service Pharmacist** | **Professional Registration Category** | **Community Service Pharmacist** | |
| | Year level | Year 6 | |
| | Duration | 1 year | |
| | Requirements | Placement at a public healthcare facility only. | |
| **Professional Registration as a Pharmacist** | **Professional Registration Category** | **Pharmacist** | |
| | Year level | Year 7 | |
| | Requirements | Completion of Community Service training | |
| | | | |
| **Specialisation on Pharmacy** | **Qualification Title** | **Master's in Pharmacy:** | |
| | NQF level | 9 | |
| | Duration | 2 years (minimum) to 3 years | |
| | Entry Requirements | Bachelor of Pharmacy Degree, (Minimum pass grade 60%) | |
| | Professional Registration Category | Specialist Pharmacist | |
| | Year Level | Year 8 | |
| | Exit | Graduate and obtain a Master's Degree in Pharmacy | |

Pharmacist Assistants form an important part of the Pharmacy support personnel and currently, in South Africa there are two cadres with different scopes of operation, namely the Pharmacist Assistant: Basic and the Pharmacist Assistant: Post Basic. The latter has a broader scope of work

than the latter although learners under both can perform functions of a qualified support personnel under direct supervision of a Pharmacist. However, the advantage of the Pharmacist Assistant: Basic is its ability to increase volumes within the supply system given its low entry level. The following is a tabulated summary of the process involved to becoming a Pharmacist Assistant: Basic and Pharmacist Assistant: Post-Basic:

Table 2: Qualification pathway for becoming a Pharmacy personnel in South Africa through the occupation qualifications system

| | | | |
|---|---|---|---|
| **Pharmacist Assistant: Basic Studies** | **Qualification Title** | **National Certificate: Pharmacist Assistant** | |
| | NQF level | 3 | |
| | Duration | 6 to 12 months of training plus 2 months of work-based training | |
| | Year Levels | Year 1 | |
| | Entry Requirements | NQF Level 2 or Grade 10, with the required pass in the following subjects:<br>• Mathematics<br>• Life Sciences<br>• Physical Sciences | |
| | Professional Registration Category | Student Basic Pharmacist Assistant | |
| | Exit | Graduate and obtain a Certificate in Pharmacist Assistance: Basic | |
| | | | |
| **Professional Registration as a Pharmacist Assistant: Basic** | **Professional Registration Category** | **Pharmacist Assistant: Basic** | |
| | Year level | Year 2 | |
| | Requirements | 12 months in service training under supervision of a tutor in a Pharmacy approved training | |
| | | | |
| **Pharmacist Assistant: Post-Basic Studies** | **Qualification Title** | **FETC: Pharmacist Assistant** | |
| | NQF level | 4 | |
| | Duration | 12 to 24 months | |
| | Year Levels | Year 2-3 | |
| | Entry Requirements | NQF Level 4 or Grade 12 plus required pass in the following subjects:<br>• Mathematics<br>• Life Sciences<br>• Physical Sciences | National Certificate: Pharmacist Assistance |
| | Professional Registration Category | Student Post-Basic Pharmacist Assistant | |
| | Exit | Graduate and obtain a Certificate in Pharmacist Assistance: Post-Basic | |
| | | | |
| **Professional Registration as a Pharmacist Assistant: Basic** | **Professional Registration Category** | **Pharmacist Assistant: Post-Basic** | |
| | Year level | Year 4 | |
| | Requirements | 12 months in service training under supervision of a tutor in a Pharmacy approved training | |

Nonetheless, both qualifications are currently under revision as the SACP is in the process of phasing out these qualifications and replacing them with the National Certificate in Pharmacy Technical assistants (NC: Pharmacy Technician; NQF 5) and a Further Education and Training Certificate in Pharmacy Technicians (FETC: Pharmacy Technician; NQF 6). This new cadre of

technicians is aimed at improving career paths for pharmacists, as such the revised qualifications are meant to be trained at Higher Education and Training Institutions.

**Context of Human Resources for Health: Pharmacist**

Globally there are numerous challenges faced by the Pharmacy fraternity. These challenges relate to the following: Migration; the production of Pharmacy staff; quality assurance; competency development; and linking Pharmacy workforce development to human resources planning. In terms of migration the following trends are noticed: Migration from low socioeconomic areas to more developed environments; from rural to urban areas, between the public and the private sector; and from developing countries to more developed countries. In the Southern African region, it is specifically noticed that pharmacists migrate from other countries in the region to South Africa and to developed countries. There are several reasons for these trends (push factors): Low levels of remuneration; unsatisfactory working conditions; high levels of crime; lack of recognition of the role of healthcare professionals; and deteriorating standards of care. In addition, it is found that developed countries have intensive recruitment strategies, they offer improved quality of life, and further study opportunities.

The production of pharmacy staff is not as good in certain regions of the globe as in others, particularly in developing countries. The challenges in this regard refer to the following: retainment of pharmacy academics; the lack of funding; the lack of quality and needs-based education and training; and insufficient physical institutional infrastructure. Another challenge relates to quality and assurance of education and training programmes; it is found that some countries do not have such a framework in place for pharmacy training specifically. Competency development is another issue; not all the countries have implemented CPD programmes. South Africa was one of the first countries in Africa to establish a CPD framework that is overseen by the SAPC. One of the most pressing challenges globally that is mentioned, is linking pharmacy workforce development to human resources planning.

Nationally, as far back as 2011, the SAPC listed numerous challenges that existed at the time in South Africa. These are related to the following: HR policy planning and governance; sustainable production of pharmacists and pharmacist assistants; recruitment, retention, and development of pharmacists and pharmacist assistants; HR information system – infrastructure and technology; HR research; and HR monitoring and evaluation.

In summary, the literature indicates that challenges in supplying more Pharmacists are quite stretched, this includes the lack of academics and infrastructure in higher education institutions to accommodate more enrollments towards obtaining the BPharm qualification. Some of the

challenges include the placement of internships and community service due to lack of funds which eventually delays the process of supply and leads to bottlenecks. Low salaries and burn out because of long working hours also contribute to the migration of workers either nationally or internationally.

## 3. RESEARCH METHODOLOGY

The study adopted a mixed method approach through the following methods: (i) literature review; (ii) quantitative analysis of several secondary databases: and (iii) qualitative analysis of primary data collected through personal interviews with key experts and stakeholders who have in-depth knowledge of the health sector and the issues relevant to this study.

The analysis of secondary data included the following data sources:

- Education Management Information System (EMIS) (data on Grade 12 learners who passed Mathematics, Physical Sciences and Life Sciences).
- Higher Education Management Information System (HEMIS) (data on enrolment and completion of first four-year degree and post-graduate diplomas and degrees).
- South African Pharmacy Council registration data on students, interns, community service pharmacists, qualified pharmacists and specialists, statutory deductions per province, continued professional development (CPD) declarations, pharmacist assistant learners, and qualified pharmacist assistants.
- Statistics South Africa mid-year population estimates.
- World Health Organisation (WHO), Organisation for Economic Co-operation and Development (OECD) and Institute for Health Metrics and Evaluation (IHME) statistics and indicators.

Qualitative data was collected through interviews with the key stakeholders based on the following target population:

| TARGETED POPULATION | SAMPLE SIZE | RESPONSES |
|---|---|---|
| Pharmacy schools | 9 | 9 |
| Public training hospitals | 10 | 5 |
| Statutory council and Voluntary associations | 6 | 5 |
| Private employers | 5 | 5 |
| **Total** | **30** | **24** |

Purposive sampling was applied in the case of public training hospitals and private employers; this sampling technique refers to non-probability sampling in which units are selected because they have characteristics that one needs in a sample. The interviews were conducted on a digital platform such as Microsoft Teams as well as face-to-face when requested. The questions were semi-structured, allowing participants to speak freely on any of the topics raised. After all interviews

had been completed, a process of coding began where similar responses were grouped and analysed, revealing key themes which have answered the research questions and informed the conclusions and recommendations. For quantitative data, the population consisted of a total number of **44, 392** Pharmacy personnel which is made up of a total of **18 301 registered Pharmacists** (including community service Pharmacists and specialists), and **26 091 pharmacist assistants** (including learners) as reported by the council in March 2023.

Limitations of the study can be summarised as follows:

a. Difficulty getting the training hospitals participation due to the NEHAWU strike and protests.
b. Difficulty getting raw datasets from the training Universities due to issues of POPI and long ethical clearance processes.
c. Data discrepancies (SAPC data)

Nonetheless, the mentioned limitations do not affect the conclusions reached in the study since the different datasets obtained were able to allow a triangulation and comparison of datasets and was representative.

## 4. DISCUSSION OF FINDINGS

Findings are discussed in line with the objectives of the study as follows:

### Objective 1: Conducting an investigation of the trends in the supply looking at articulation from Matric to post-school education and training, and ultimately into employment

The supply pipeline at Basic Education contributes to the first stage of the value chain of transitioning into Higher Education and eventually producing Pharmacists. This section therefore specifically outlines the supply or output trends from Basic- and Higher Education institutions. For example, a good Grade 12 pass, with Mathematics, Physical Sciences, and Life Sciences as subjects is a basic entry requirement into most of the health-related tertiary-level study programmes, of which Pharmacy is one. In broadening the STEM field (Sciences, Technology, and Mathematics as subjects), South Africa seeks *"to increase participation rates in mathematics and science"* (Human Resource Development Strategy 2009, p.37). The study shows in Figure 1 and 2 below that participation has a positive annual average growth rate over the four-year period (2018 - 2021) of 3.5% and 4.6% for those writing Mathematics and Physical Sciences towards obtaining the National Senior Certificate respectively. However, the share of distribution has been on the decline by 7% (from 46% to 37%) and 6% (34% to 28%) for those writing Mathematics and Physical Sciences for the NSC respectively. This indicates that more and more students are not choosing the STEM fields within the Basic Education sub-system irrespective of the overall increasing annual average growth rate of 7.1% between 2017 and 2021 of those writing the NSC.

***Figure 1 Proportion of learners writing Mathematics of the NSC, 2018-2021***

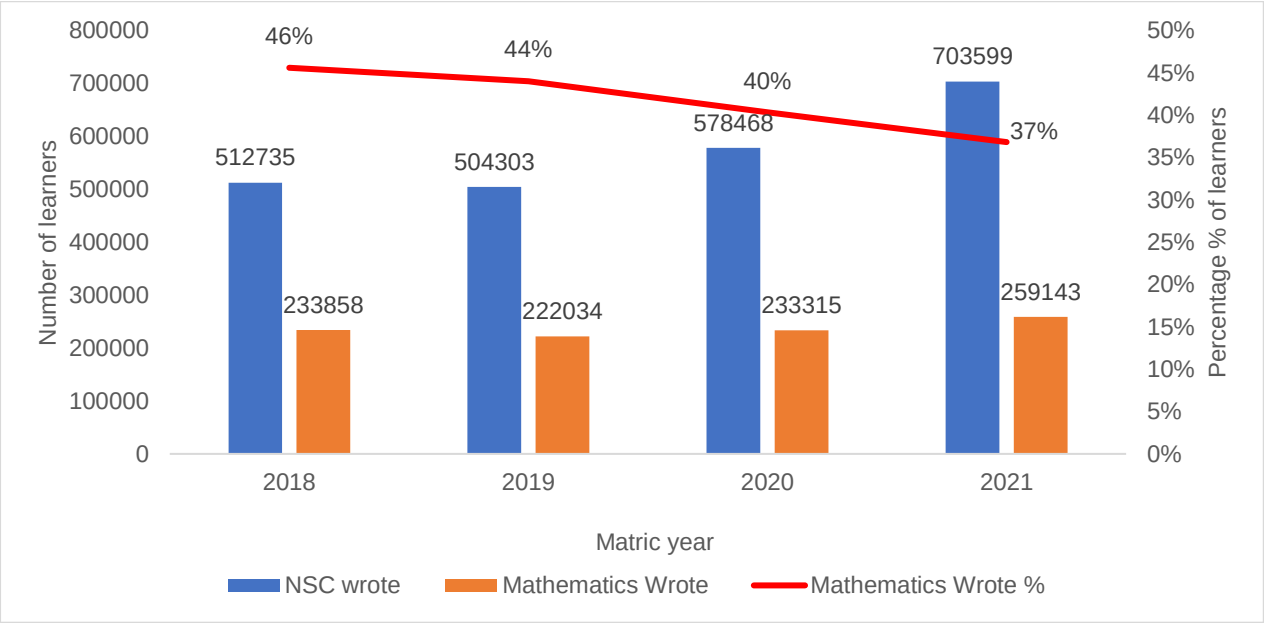
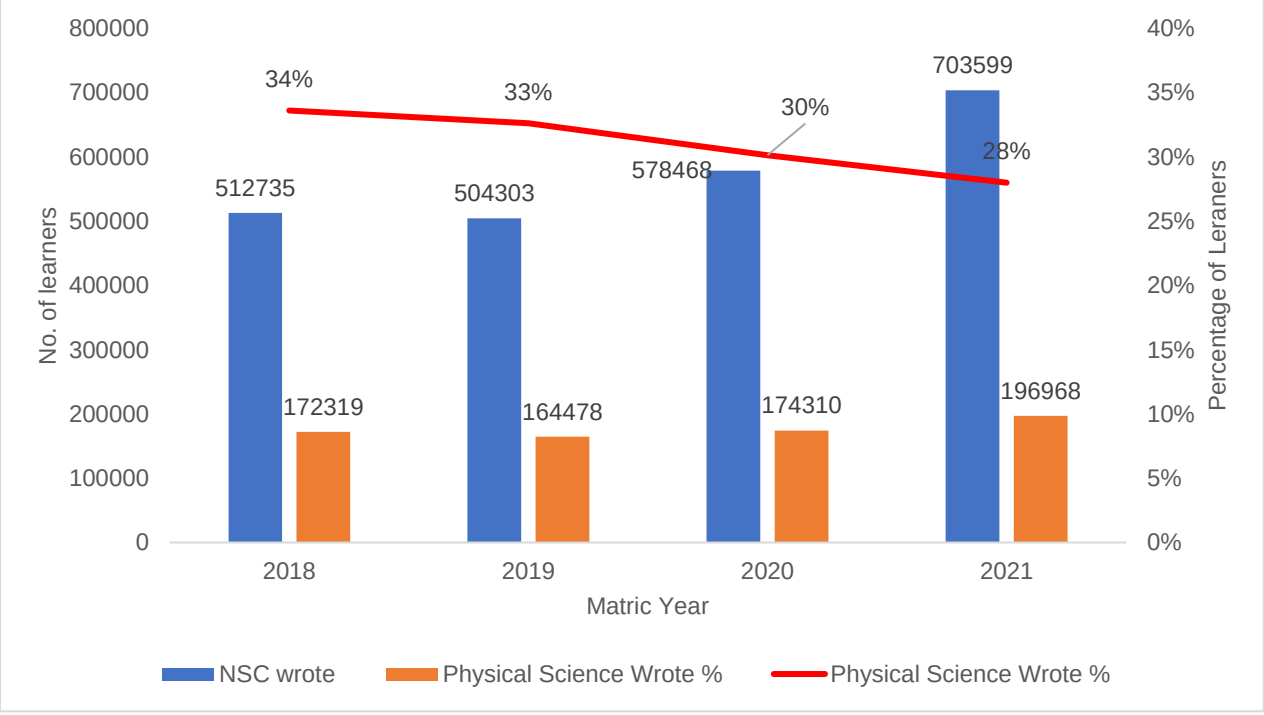


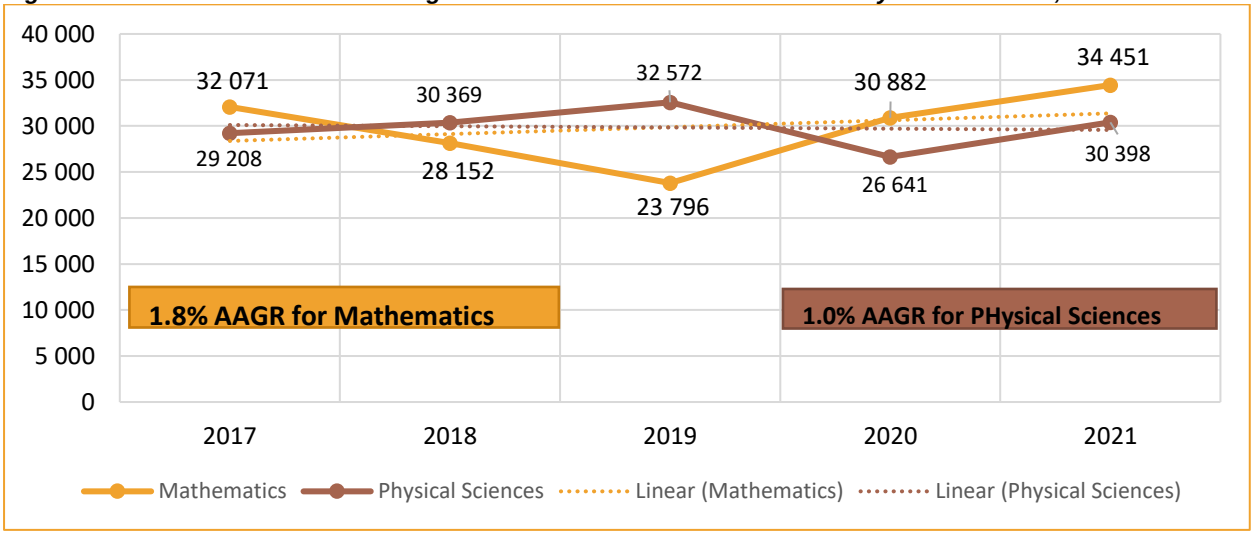

***Figure 2 Proportion of learners writing Physical Sciences of the NSC, 2018-2021***




South Africa seeks *"to increase the number of passes in grade 12 final examination with a 60% mark and above in Mathematics…[and] physical sciences"* (Human Resource Development Strategy 2009, p.36). Of the higher education institutions offering the Bachelor of Pharmacy in South Africa, both mathematics and physical science is a requirement at a minimum of 70%

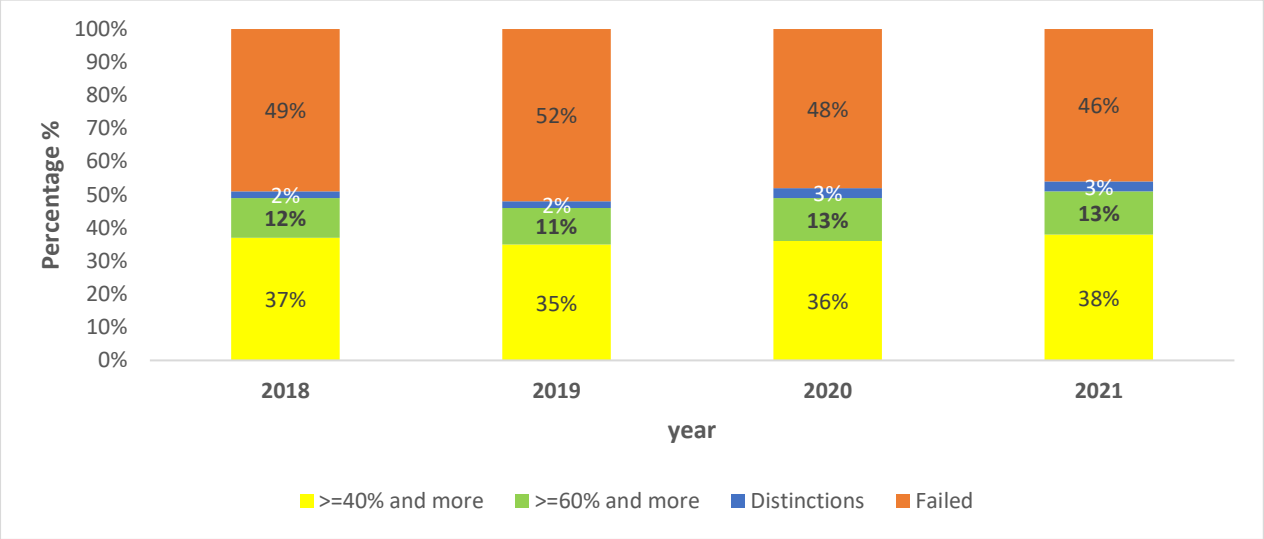
National Senior Certificate (NSC). In instances where the minimum requirement is 60% for mathematics, an aggregate of at least 70% for the National Senior Certificate (NSC) is still a requirement. Figure 3 below indicates an increase in the annual average growth rate of 1.8% and 1.0% in learner passes at and above 60% for mathematics and physical sciences NSC respectively. Importantly, these annual average growth rates are far below the annual average growth rates of learners writing mathematics (3.5%) and physical sciences (4.6%) NSC.

***Figure 3 Number of learners achieving 60% and more in Mathematics and Physical Sciences, 2017-2021***




The average annual growth in terms of output over this period was low, only 1.8% for Mathematics and 1.0% for Physical Sciences over 2010-2022. while the growth rates over this period are low, the positive trajectory provides an indication of growth of supply pipeline towards the entry level of Pharm qualification in most schools. Nonetheless, the pharmacy programmes are not the only ones that have to source potential students from this pool; they must share it with other health-related programmes such as medicine and nursing, as well as programmes related to engineering, business and economics, computer science, life sciences, physical sciences, and mathematics and statistics to mention a few. Figure 4 graphically illustrates how small the pool is of students that legitimately fall in the category of the health sector and other competing sectors. Between 2018 and 2021, on average, about 12% of the total number of learners who wrote Mathematics passed with 60% and more.

*Figure 4* ***Distribution of learners' achievement in mathematics by achievement categories, 2018-2021***



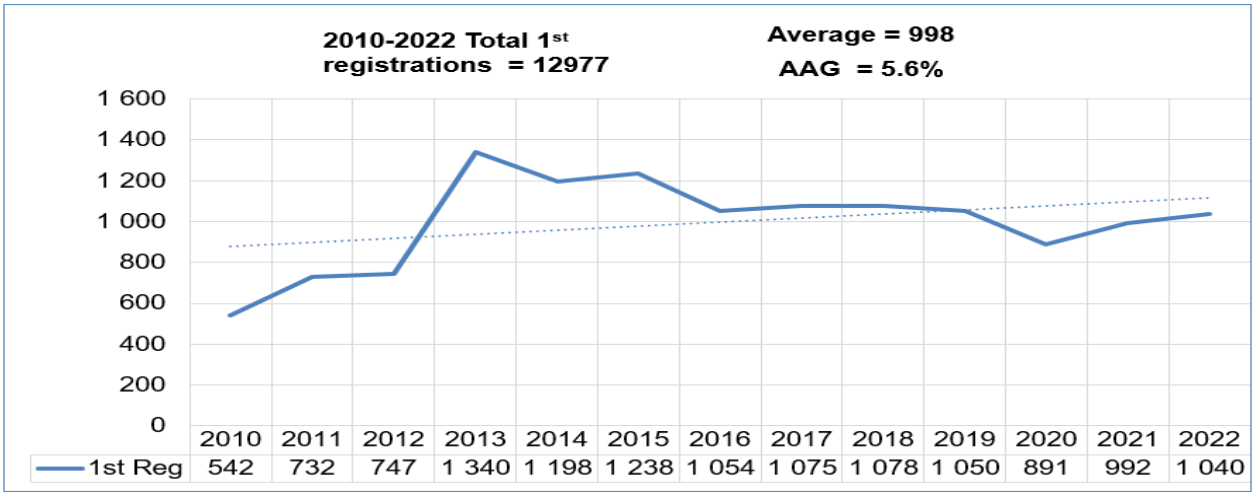

**Output from Higher Education**

Output from higher education forms the second layer of the pipeline toward producing a pharmacist. There are currently nine pharmacy schools in South Africa: two in the Eastern Cape (EC), three in Gauteng (GP), and one in KwaZulu-Natal (KZN), Limpopo (LP), North West (NW) and the Western Cape (WC) respectively.

| EC | GP | KZN | LP | NW | WC |
|---|---|---|---|---|---|
| NMU; RU | Wits; TUT; SMU | UKZN | UL | NWU | UWC |

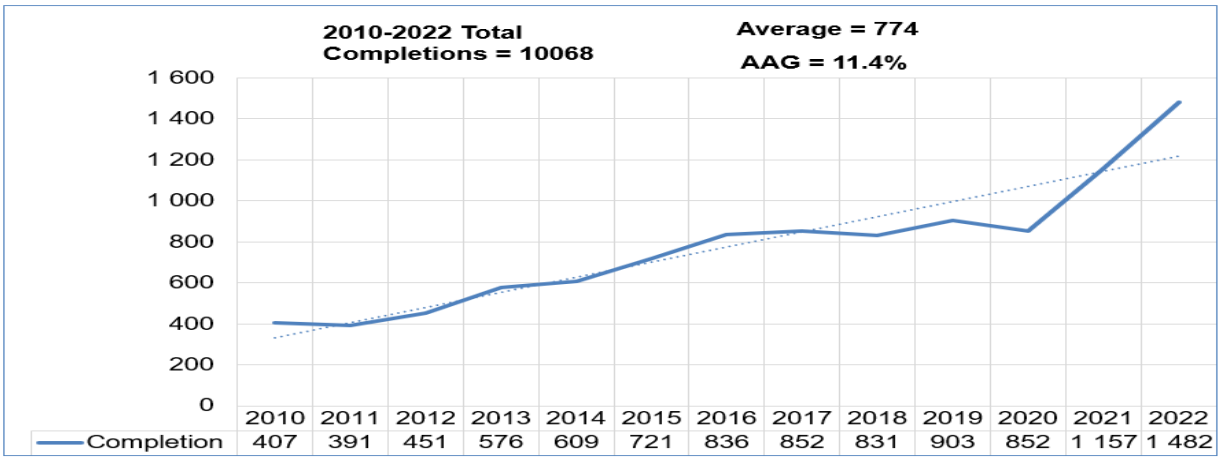
The next figure shows the number of 1st registrations as a student of the BPharm degree over the 2010-2022 period. This number does not refer to the number of 1st year intakes or enrolments given that learners can only register with the council from the 2nd year of study, in which in some instances registration takes place from the 3rd year of study onwards. The WHO recommendation in 2011 for South Africa to meet the target of 1 pharmacist per 2300 population by 2030 required SA to produce an average of 1200 pharmacists. While the 1st entries are just a representation of access into the pipeline, they also provide an indication of probabilities towards completion of the qualification. The total number of the 1st registrations as a student increased from 542 in 2010 to 1 040 in 2022 which provides an indication of increased access to the profession. The average annual number of 1st registrations as a student at 998 per annum (pipeline) is however below the recommended target. The drop in 2021 in 1st registration as students is noticeable, probably due to the disruption in contact education and training during the Covid-19 pandemic. The increase from 2012 was confirmed by the pharmacy council as a directive for training institutions to increase supply.

*Figure 5 Number of 1st registration as students of Bachelor of pharmacy, 2010-2022 (not 1st year intakes)*




The total number of BPharm completions from 2010-2022 is 10068 with an average of 774 completions reported each year. The completions pipeline is still below the threshold of an average of 1200 Pharmacists per year suggested by WHO. The average annual growth for output/BPharm graduates on the other hand was 11.4% over the period (from 407 in 2010 to 1 482 in 2022) which shows that the supply of graduates has increased.

*Figure 6 Number of completions of BPharm students, 2010-2022*

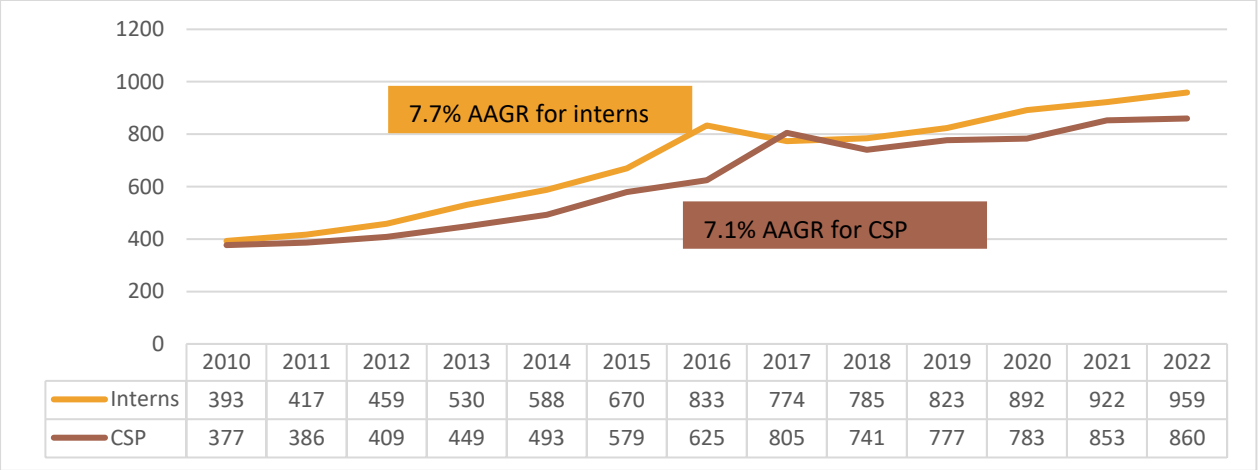



**Supply of Interns and Community Service Pharmacists**

The supply of interns and community service pharmacists (CSP) is very important in the production pipeline of pharmacists as this is their final period of training. The next figure shows that the number of interns and community service pharmacists (CSP) at 1st registration over 2010-2022.There was a total of 1st registrations of interns and CSP at 9045 and 8137 respectively. On average, this brings the registration of interns and CSP to 695 and 625 respectively. During this period, the average annual growth for interns was 7.7% while for the 1st registrations as CSP the average annual growth

rate was 7.1%. Although the average growth rate of pharmacist registering for the 1st time between 2001-2010 under CSP is less than that of interns, placements of both categories share similar challenges according to stakeholders and this will be further discussed in the recurring themes and challenges. The 2017 spike in interns and CSP placements in 2017 can be the results on increased intakes which took place in 2012. Lastly, these placements of interns and CSP seem to be moving in the same direction, one increases/decreases the other follows.

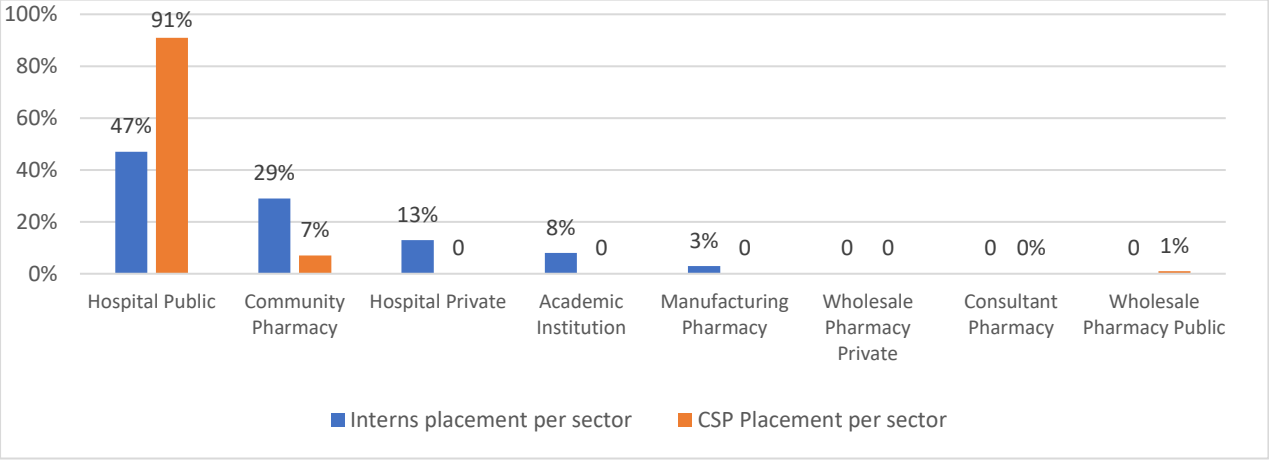
***Figure 7 Number of interns and CSP at 1st registration over 2010-2022 period***




| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Interns | 393 | 417 | 459 | 530 | 588 | 670 | 833 | 774 | 785 | 823 | 892 | 922 | 959 |
| CSP | 377 | 386 | 409 | 449 | 493 | 579 | 625 | 805 | 741 | 777 | 783 | 853 | 860 |

The next figure provides the distribution of placements of both interns and CSP over 2010-2022. The placement of interns is almost evenly distributed amongst the public (47%) and the private sector (42%) when combining the community pharmacies and private hospitals under the private sector. Coming to the placements of CSP, this must ideally take place in the public sector. Nonetheless, the figure below shows that there was a phase where the government allowed qualified pharmacists to do their community service in the private sector due to the lack of opportunities in the public sector.

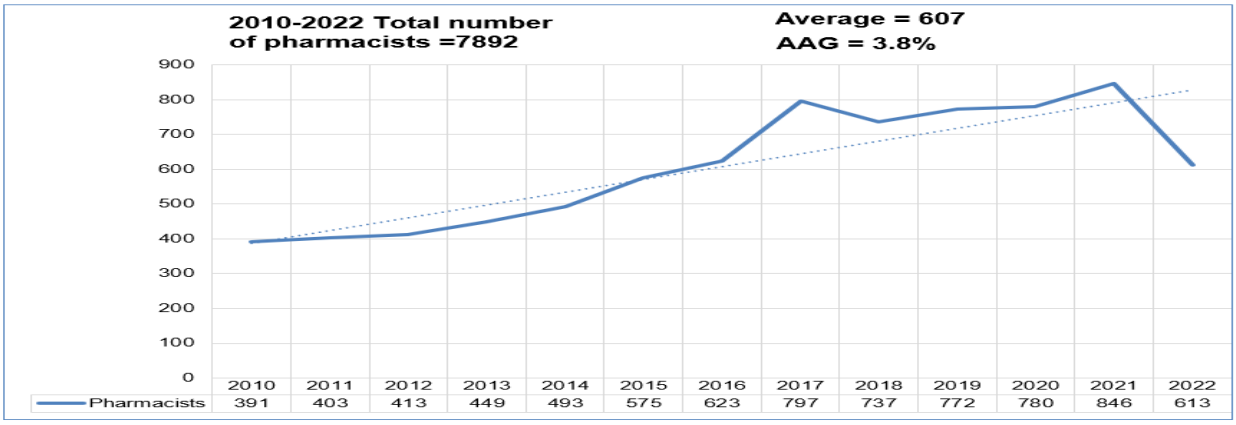
***Figure 8 Distribution of placements of Interns and CSP per sector, 2010-2022***



**Supply of registered pharmacists, 2010-2022**

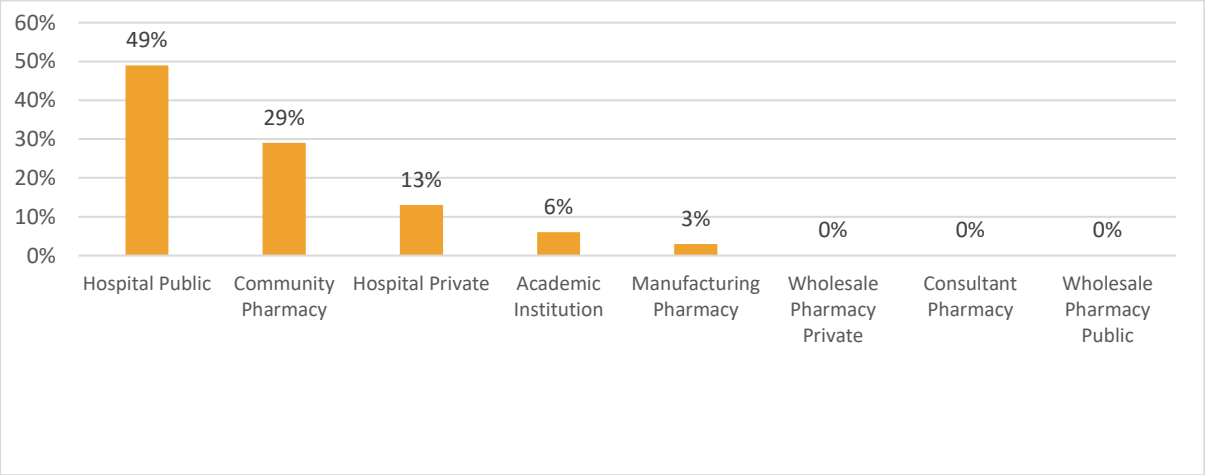
The supply of pharmacists consists of the last stage where one can be regarded as a professional prior to specialization. In terms of pharmacists registered at 1st registration over the 2010-2022 period, there was a total of 7 892 1st registrations with 391 in 2010 compared to 613 in 2022 which is equivalent to the average annual growth rate of only 3.8%. This growth rate is low relative to the 7.1 (CSP) placements growth rate over the same period. On average, about 607 pharmacists registered per year for the first time over the 2010-2022 period, which is still below the recommended estimate of 1 200 per year according to the WHO. This output was meant to meet a recommended target of 1 pharmacist serving 2300 population by 2030. The 2017 spike follows the increasing trend in interns and CSP, meaning that the pipeline leading to registration as a qualified pharmacist was sustained in this regard.

***Figure 9 Registered pharmacists at 1st registration (post-CSP), 2010-2022***




The distribution of pharmacists at 1st registration is also presented per sector. This distribution is almost evenly distributed across the public and private sector.

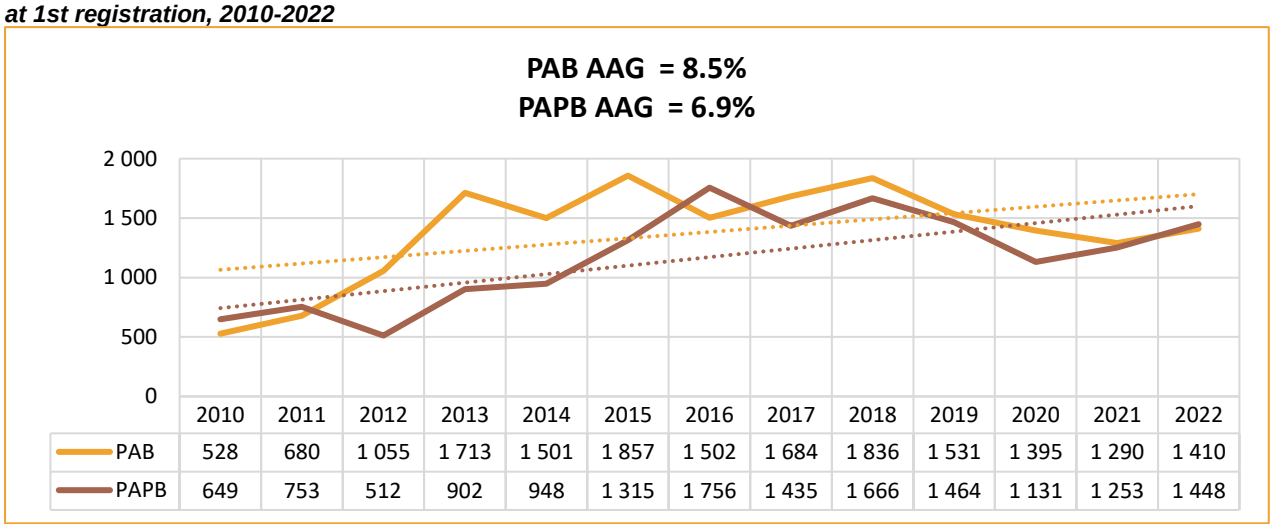
***Figure 10 Distribution of Pharmacists per sector, 2010-2022***



**Supply of pharmacy support personnel**

Pharmacist assistants also referred to as the pharmacy support personnel can practice in any sector of pharmacy such as manufacturing, wholesale, community, or institutional pharmacy in either the public or the private sector. Their main function is to assist with functions relating to medicine supply and they may only work under the personal supervision of a pharmacist who is physically present in a pharmacy. All functions must be performed in accordance with the relevant legislation and standard operating procedures approved by the responsible pharmacist of the pharmacy. In the labour market they are categorised as mid-level workers and they must comply with their scope of practice in delivering the services. The next figure shows the number of registrations for this group.

***Figure 11 Number of qualified Pharmacist Assistant Basic (PAB) and Pharmacist Assistant Post-Basic (PAPB) at 1st registration, 2010-2022***




| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PAB | 528 | 680 | 1 055 | 1 713 | 1 501 | 1 857 | 1 502 | 1 684 | 1 836 | 1 531 | 1 395 | 1 290 | 1 410 |
| PAPB | 649 | 753 | 512 | 902 | 948 | 1 315 | 1 756 | 1 435 | 1 666 | 1 464 | 1 131 | 1 253 | 1 448 |

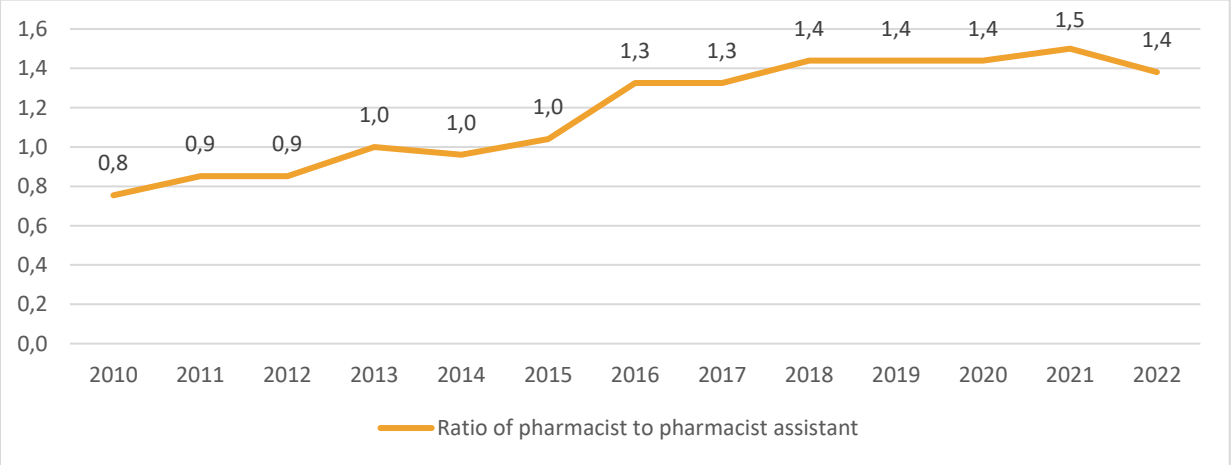
From the above figure there was in total 33 214 1st registered qualified pharmacists (PAB and PAPB) over the 2010-2022 period, with 1 177 in 2010 compared to 2 858 in 2022. The average annual growth (AAG) of 1st registrations as qualified pharmacist assistants (PAB and PAPB) over the period was 7.7%. This growth rate for the combined assistants is slightly higher than the growth rate of pharmacists which was recorded at 3.8%. The recommendation according to the pharmacy council is that 1 pharmacist may supervise 3 pharmacists assistants and whether this currently holds will be unpacked in the subsequent objective. The total of 1st registrations for qualified PABs was 17 982, with an average of 1 383 per annum, and an average annual growth of 8.5%. The total for qualified PAPBs was 15 232, with an average of 1 172 per annum, and an average annual growth of 6.9%.

**Objective 2: Investigating the ratio of pharmacists-to-pharmacists assistants.**

This section reports on the ratio of pharmacist-to-pharmacist assistants in South Africa. The next graph shows the proportions for pharmacists and pharmacist assistants from 2010 to 2022 in terms of all registrations (learners included). This figure shows a gradual increase in ratios from 2010

until 2021, while 2022 ratios declined. In 2010, the ratio of 0.8 means that there were 0.8 assistants per pharmacists. Coming to 2022, there were 1.4 assistants per pharmacist. While the ratio in 2022 is higher than 12 years ago, the current ratio is still lower that the current set ratio by the council of 3 pharmacists assistants per pharmacist (1 pharmacists may supervise 3 Pharmacist assistants). It is important to note that this ratio differs provincially with the highest ratios of 1:2 in KZN followed by the FS and NC with 1:1.9 followed by GP and MP with 1: 1.8 and the least ratios in LP, NW and WC with 1:1.6. The provincial density estimates were applied using the national ratio according to the council of medical schemes, which indicated that in 2020 the private sector population accounted for 85% while the public accounted for 15%. Although the sector distributions may differ provincially, these ratios together with the national ratio do not meet the ratio as directed by the pharmacy council, consequently this means that the growth in pharmacists assistants is not sufficient.

***Figure 12 Ratio of pharmacists -to-pharmacists assistants***




## Objective 3: Investigation of the global and national ratios and densities.

The following section provides a summary of global densities and the South African densities for comparison. The United Nations sustainable development goals found in 2019 that to reach 80 out of 100 on the UHC effective coverage index, at least 9.4 (94 per 100 000) pharmaceutical personnel would be needed. However, the WHO indicated that the global density of pharmacist per 10 000 populations was only 4.7 (47 per 100 000) in 2020, which is half of the minimum SDG density threshold of 94. The African continent estimates from WHO at that time had the lowest density of 8 pharmacists per 100 000 populations relative to other regions. The OECD countries had very high densities of 86 pharmacists per 100 000 population while Nigeria only had 12.

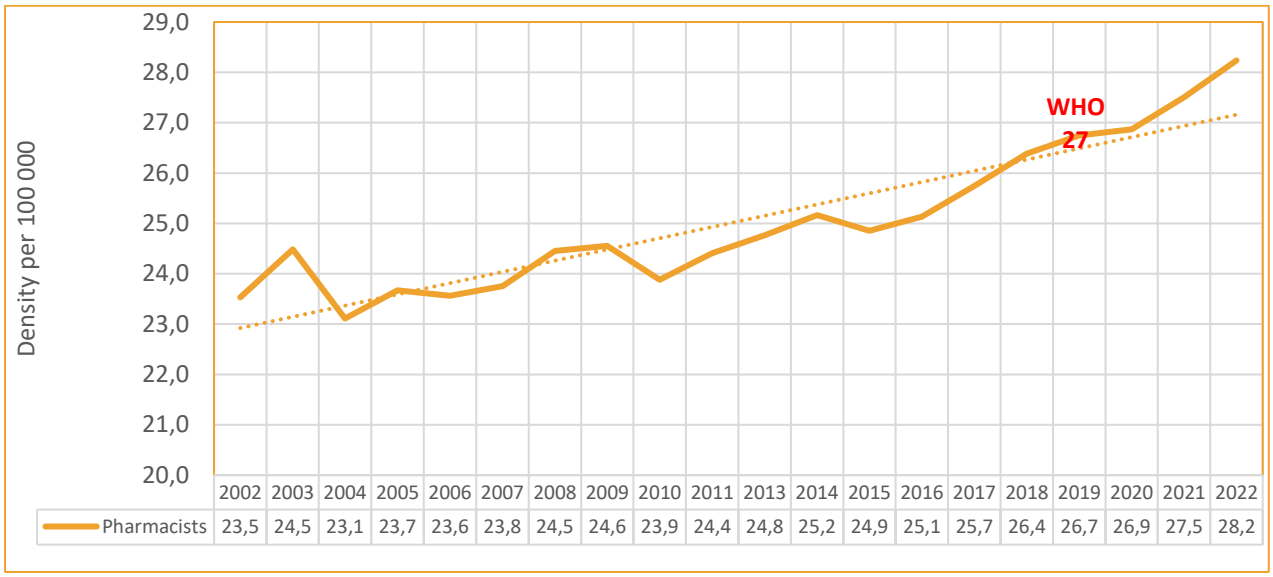
| Global Densities | UN SDGs | WHO | African Continent (WHO) | OECD | Nigeria |
|---|---|---|---|---|---|
| **Year** | 2019 | 2020 | 2020 | 2021 | 2019 |
| **Density Threshold (pharmacists per 100 000 population)** | 94 | 47 | 8 | 86 | 12 |

The South African densities were reported in 2011 by the pharmacy council as 26 pharmacists per 100 000 population. At that time the WHO made a recommendation of one per 2 300 population (43 per 100 000) globally. In 2019, WHO estimated a density of 27 pharmacists per 100 000 populations for South Africa. If the total register of pharmacists is taken into account, the national density as estimated in 2022 in the study, is 28.2 pharmacists per 100 000 population.

| **WHO recommendation for SA in 2011** | **one pharmacist per 2 300 population (43 per 100 000) at the time.** | | |
|---|---|---|---|
| **National Densities** | **SACP** | **WHO** | **SACP (total register)** |
| **Year** | 2011 | 2019 | 2022 |
| **Densities (pharmacists per 100 000 population)** | 26 | 27 | 28.2 |

This density for pharmacists were also calculated on the 2020-2022 register based on CPD declarations. Pharmacists must declare their CPD compliance every year, indicating in which sector they are practising. This data reports that in 2020 to 2022 about a third of the pharmacists worked either full-time or part-time in the public sector (non-practising pharmacists were excluded). The density per 100 000 public population was 9, and for the private sector ranging from 98.6 to 103.3. The trends in national densities are also presented in the figure below.

**Figure 13 National density of pharmacists per 100 000 population, 2010-2022 (total registrations)**




The study further made a triangulation of different data sources for comparison, and verifications where possible for the public sector. The next table therefore shows the comparison of the public sector data of the SAPC, the NDoH (Persal data) and the PSETA WSP data for pharmacists. The 2019 densities based on the Persal data of the NDoH and the WSP data of the PSETA were close to each other (11 and 12). Both datasets, however, have limitations of accuracy. The 2022 public

sector densities based on the SAPC CPD declarations and the statutory deductions, were 9 and 8 respectively. Similarly, these densities are also not far from each other.

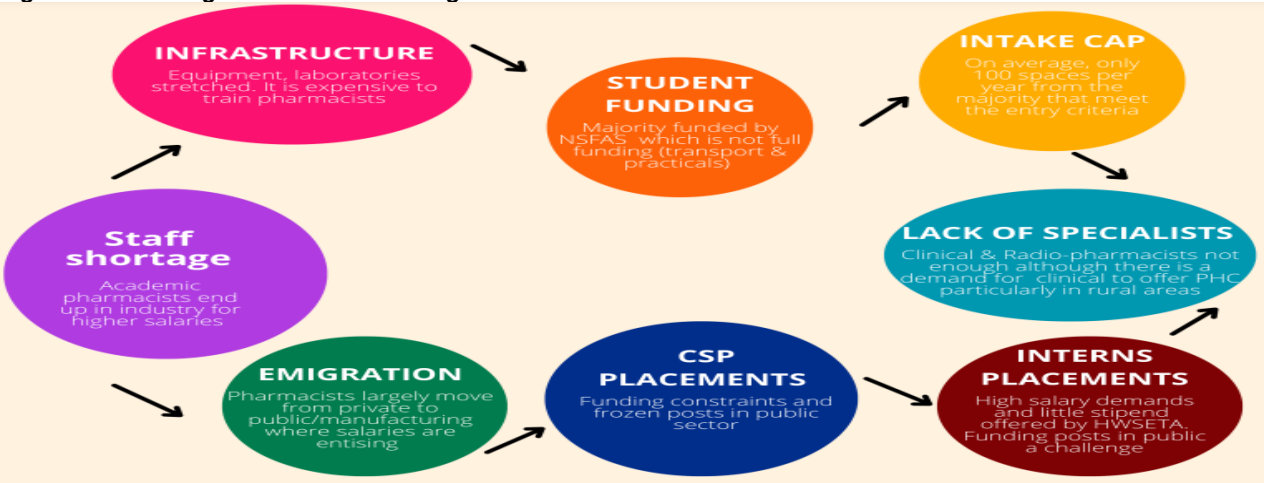
***Table 3 Comparison of public sector densities for pharmacists [SAPC, NDoH (Persal), PSETA (WSP)]***

| Organisation | Pharmacists | Density per 100 000 public population |
|---|---|---|
| NDoH (2019) | 5 762 | 11.9 |
| PSETA WSP (2019) | 5 165 | 10.6 |
| SAPC statutory deduction (2022) | 3 892 | 7.6 |
| SAPC CPD declarations (2022) | 4 731 | 9.2 |
| PSETA WSP (2022) | 5414 | 10.5 |

## Objective 4: Establishing the challenges of the pharmacy profession.

The recurring themes and challenges that came out from stakeholder interviews include the following:

***Figure 14 Recuring themes and challenges***




## Conclusions and recommendations

The conclusions of the study are summarised in table below:

| Pipeline Stage | Period | Total output | Average | AAG (%) | Identified gaps |
|---|---|---|---|---|---|
| **Basic Education Maths** | 2017-2021 | 158,352 | 31,6704 | 1.8 | Quality concerns around the subjects and not all make it |
| **Basic Education Physics** | | 149,188 | 29,8376 | 1.0 | |
| **BPharm completions** | 2010-2022 | 10068 | 774 | 11.4 | Lack of staff, infrastructure, student funding |
| **Internship** | | 9045 | 695 | 7.7 | Lack of budget and posts plus high salaries |
| **Community Service** | | 8137 | 625 | 7.1 | Lack of budget and posts |
| **Pharmacists (post CSP)** | | 7892 | 607 | 3.8 | Lack of job opportunities, emigration from private to public, issues of licensing and prising regulations |
| **Specialists** | | N/A | N/A | N/A | Not sufficient |

| Pipeline Stage | Period | Total output | Average | AAG (%) | Identified gaps |
|---|---|---|---|---|---|
| **Pharmacy assistants (PAB & PAPB)** | | 19505 | 1277 | 7.7 | The growth not sufficient |

Of the 1st enrolments in BPharm, 61% were ultimately registered as pharmacists after having completed Bpharm and placed as an intern and CSP between 2010 and 2022. Of the 39% lost within the post-school supply chain, 22% (more than half) were those that enrolled but could not complete their BPharm. This represents the phase with significant inefficiencies in the production supply chain. The other inefficiencies were, in their order of sequence, identified in intern placement (8%), community service pharmacists (7%), and registered pharmacists (2%).

The recommendations for HWSETA are as follows:

- Consider funding community service posts in areas where the shortages of pharmacists are felt by communities the most.
- Provide funding for post-graduate studies in academia, as well as post-graduates across the board.
- Boost the salaries for academic pharmacists, to encourage more post-graduates to consider academia as a career choice.
- Consider raising the stipend paid by the SETA for interns at private hospitals.
- Start discussions with the pharmacy schools regarding the different ways that support could be offered.
- SETA could facilitate these discussions to foster partnerships between the pharmacy schools and industry so that graduates can be absorbed by both public and private.
- Continue to provide the short courses for pharmacists on business, people and leadership skills. The SETA could even consider a new qualification in management and sales, particularly for pharmacists.
- Consider introducing conferences or forums to update members with sector news as well as provide a platform for pharmacists professionals to share challenges and how to solve them.
- Introduce a platform with information on pharmacists who are looking for employment.