

# 2013 FIP*Ed* Global Education Report

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FIP *Education Initiative*

Developing the health care workforce of the future:  
better science, better practice, better health care.



# Colophon

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This report together with the questionnaire and data from the 2013 FIPeD Global Education Survey are available for electronic download from: [www.fip.org/educationreports](http://www.fip.org/educationreports)

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# Foreword

The World Health Organization (WHO) recently adopted a policy that advocates universal health coverage for all. A key challenge facing the ability to provide such universal health coverage and ensure best health for patients is to ensure a sufficient and appropriately educated health workforce. An integral part of this health workforce, are those who provide pharmaceutical and/or medicines expertise. The challenges our global pharmacy community faces as a result of serving more patients are to prepare:

- pharmaceutical graduates that are relevant and competent to bring value to a nation's health care system and its populations;
- people with medicines expertise to be leading members of society and the Health care team;
- sufficient numbers of medicines experts in every country, developed in the context of national and regional policies and needs.

As the global educational and professional leadership body, the purpose of the FIP Education Initiative (FIP*Ed*) is to assure a competent and sufficient pharmacy workforce that can encourage responsible medicines use to achieve improved health. To be able to effectively improve health we need responsible medicines use, from the starting point of development of new medicines to the endpoint of responsible use of medicines in patients. Comprehensive medicines expertise (e.g. basic and applied sciences and clinical) is needed in order to provide appropriate care to patients using medicines.

Advancement of our profession, of pharmacists, pharmaceutical scientists and educators, is strongly dependent on robust, and contemporary education programs for initial and lifetime education. We need universities to provide quality education and engage in a socially accountable manner to serve the needs of individual patients and the society as a whole. Moreover, there needs to be a strong alignment between the outcomes of pharmacy and pharmaceutical education and the overall health needs of nations.

This 2013 FIP*Ed* Global Education Report is the first publication of its kind to provide a baseline on the current status, transformation and scaling up of pharmaceutical education worldwide. We share this knowledge from our Members, to our Members and beyond, to trigger dialogue and action towards stronger policies and education for health. We hope that this will stimulate collaboration between all stakeholders, including professional organisations and universities taking up the important role of advocating education reform at the national level.



Henri R. Manasse Jr, PhD, ScD (Hon), FFIP  
FIP Education Initiative (FIP*Ed*) Steering Committee Chair

# PART 1

## KEY MESSAGES

The practice of pharmacy, pharmaceutical science, and education are undergoing unprecedented global changes. Extended and new roles for pharmacists, as providers of health care services and as scientists, are increasingly being recognised and valued. Pharmacists worldwide are providing essential medicines expertise for collaborative health care teams, for medicines prescribing and the provision of critical medicines information to other health providers about the benefits, risks, and potential adverse interactions of medicines. The complexity of therapeutic agents available for communicable diseases such as malaria, tuberculosis (TB), HIV/AIDS and non-communicable diseases such as diabetes, hypertension and cancer, has never been greater.

### *A Needs-based Approach to Education for Better Health Outcomes*

FIP advocates for the consistent use of a needs-based approach to education with an emphasis on linking pharmacy education with the health needs of populations and national priorities. FIP Education Initiative (FIPeD) urges all countries to examine this issue through thoughtful and objective dialogue among all stakeholders.

The FIPeD Development Team 'needs-based education' model describes that pharmacy education should be locally determined, socially accountable, globally connected, and quality assured in order to meet the given health needs of communities.

An adaptable quality assurance framework ([http://www.fip.org/files/fip/PharmacyEducation/QA Booklet.pdf](http://www.fip.org/files/fip/PharmacyEducation/QA%20Booklet.pdf)) has been developed and adopted by FIP to support this approach. In addition, the FIP Global Competency Framework ([http://www.fip.org/files/fip/PharmacyEducation/GbCF\\_v1.pdf](http://www.fip.org/files/fip/PharmacyEducation/GbCF_v1.pdf)) has been adapted and adopted by several countries for mapping country-specific needs for early career professional development and the initial education of the pharmaceutical workforce.

### *Accountability and Education*

Increased attention to the challenge of social accountability for the professional health care workforce is no exception in pharmacy. High quality pharmaceutical education systems and provision underpins all national population and national health priorities. Civil society should expect that Higher Education Institutions (HEIs) are socially accountable, and that pharmacy education provision has effective quality-assured systems based on a clear description of professional competencies, linked with health care needs.

Opinion leaders and governments in developed countries are calling for pharmacy education to take the lead in medicines optimisation and pharmaceutical public health.

This means assuming accountability for medication therapy outcomes, and the development of professional curricula to prepare pharmacy students for future innovations in personalised medicines, information systems, and team-based patient care. In the meantime, developing countries are seeking support in developing patient-centred curricula and public health focussed pharmacy practice to meet their changing health environments, and to achieve universal access to essential medicines.

### *Challenges in Capacity and Infrastructure*

The capacity to provide pharmaceutical services in each country is dependent upon having a competent, adaptable and capable workforce, and a similarly integrated academic workforce to train and support sufficient numbers of new registrant pharmacists and other support staff at both entry-to-practice and advanced levels.

However this report suggests that pharmacy education, in both capacity and infrastructure, varies considerably between countries and territories and WHO regions, and generally correlates with country level economic development indicators. Those countries and territories with lower economic indicators tend to have relatively lower educational capacity and pharmacist production. There needs to be an on-going effort to ensure capacity building is linked with initial education and training in order to meet the pharmaceutical health needs of communities and populations.

Pharmacy students and young pharmacists also have an important role in developing and transforming pharmacy education – as their experience of education is, increasingly, a significant influence in the delivery of quality improvement. There remains, however, a global shortage of pharmacist academics and of practice-based supervisors. Universities and policy makers need to think of new ways to attract practitioners into these roles; there is a need to create clear career pathways and training schemes to address the academic workforce in general, and a practitioner-academic workforce in particular.

A focus is also required on developing better approaches to continuing education and practitioner development models for the existing pharmaceutical healthcare workforce. Better training will lead to better care and this must include the training and supervision of support workers, and care assistants, as this still remains an unacceptable policy oversight.

The understanding of pharmacy education and the significant influencing factors, are essential for planning human resources for health and for achieving universal access to medicines and medicines expertise. Collaboration with key partners, including governments and national and international pharmacy organisations, is crucial to achieving sustainable solutions to the challenges surrounding pharmacy education.

# PART 2

## INTRODUCTION

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### Summary

- The roles and responsibility of pharmacists have been evolving to encompass patient-oriented services, and therefore pharmacy and pharmaceutical education should be designed and transformed accordingly. Higher education institutions (HEIs) in health care professions play an important role in preparing students with specific skills and knowledge as well as instilling into them the value of self-directed lifelong learning (LLL), leading to system-based and competency-driven education reforms. Students must be provided with suitable conditions to practice and develop their skills so they are able to face a new competitive and demanding market.
- Educational quality must be assured in order to meet given health needs to prepare graduates to meet social expectations and to appropriately train them for the wide range of future pharmacy careers.
- In an era when decisions are taken on a global scale, it becomes even more important for pharmacy students to engage in international opportunities that will contribute to social and institutional cooperation. It is highly recommended to promote collaborations between professional representing bodies in order to enhance students' leadership skills.

### Global Pharmacy Education

The roles and responsibilities of pharmacists have been evolving from product-oriented to patient-oriented service provision in the last two decades<sup>[3-3]</sup>. A foundation of professional education and training is a key factor in order for health care professionals to develop the capability to improve therapeutic outcomes, enhance patients' quality of life and help people to stay healthy, as well as advance science and practice<sup>[4]</sup>. For pharmacy, too, contemporary forms of initial education and training are vital for the profession to meet the increasingly complex health care demands of populations in any country<sup>[5, 6]</sup>.

The complex and varied health care demands are pointed out in the collaboration between the Harvard School of Public Health, the World Health Organisation (WHO) and World Bank<sup>[7]</sup>.

The main concerns relating to health care by 2020 will centre on ischemic heart disease, depression directly associated with an ageing population, the rise of the HIV/AIDS pandemic, and tobacco-related mortality and morbidity<sup>[7]</sup>.

Pharmacists are often seen as the most accessible health care provider to the population and one of the most trusted when it comes to advice about medicines, yet the pharmacy profession faces many challenges, especially in community pharmacy<sup>[8]</sup>.

Pharmacy and pharmaceutical education has to be designed so it can deliver the skills needed by students to work in different pharmaceutical settings once qualified, e.g. community pharmacy, hospital, research and development, regulatory affairs, industry and academia<sup>[5]</sup>. There are many gaps to be filled in pharmacy and pharmaceutical education worldwide and in order to mitigate these issues, a joint collaboration between the International Pharmaceutical Federation (FIP), WHO and United Nations Educational, Scientific and Cultural Organization (UNESCO) was established and the Pharmacy Education Taskforce created (see Part 5 of this report).

Pharmacists are confronted with a diverse range of situations on a daily basis that require a combination of scientific knowledge, communication and problem-solving skills, caring attitudes and ethical values. Hence, undergraduate students must be taught with new methodologies to help them adapt to real life problems in a comprehensive and multi-disciplinary way<sup>[9]</sup>.

Pharmacy and pharmaceutical education globally continues to face many issues - including rapid expansion in the number of schools of pharmacy and pharmaceutical sciences in some countries - that challenge the quality of teaching and learning at a time when there are limited resources to meet these challenges<sup>[5]</sup>. The paradigm in education has shifted accordingly. This challenge and shift will be explored by considering the role of higher education, curricula trends and quality assurance.

## Higher education

Higher education in modern societies should provide learners with the skills to work in a competitive and global market and must empower them in a pluralistic way to enhance the exchange of knowledge. Furthermore, they must be given access to an education that can be applied daily based on good conduct and ethics, and that also contributes to improving their scientific expertise and professional and technical competence<sup>[10]</sup>.

According to a paper written in partnership between the World Bank and the United Nations (UN), universities or more broadly, HEIs should be the link between expertise and competence, as countries need to educate young people to higher standards so they can increase national competitiveness<sup>[11]</sup>. There has been a drive for graduates to be 'lifelong learners' from policy-makers in national agencies, and HEIs globally<sup>[13, 14]</sup>. Regardless of the diversity of cultural contexts, it is generally agreed that organisations and HEIs have a responsibility to instil within undergraduates the value and skills of LLL in order to prepare them for on-going professional development<sup>[13, 14]</sup>. The responsibility for LLL belongs not only to educational systems and society but also to individuals. The individual is placed at the centre of the LLL framework, and the awareness relies to a large extent on *"the capacity and motivation of individuals to take care of their own learning"*<sup>[15]</sup>. LLL can be considered as being a *"triadic concept"*, consisting of *"economic progress and development"*, *"personal development and fulfilment"*, and *"social inclusiveness, democratic understanding and activity"*<sup>[16]</sup>.

A recurring problem in developing countries is the need to fund higher education - central governments cannot allocate adequate resources from their small education budgets and public universities are almost entirely dependent on this budget. Compared to developed countries, the developing world is spending less per student on education<sup>[17]</sup>. This report also reveals a similar correlation between the tuition fee per student and the country's economic condition (see Part 3 of this report).

Alongside challenges in funding there are also infrastructure limitations. For example, libraries and laboratory equipment within universities are often neglected, being left unfinished for several years or without appropriate maintenance.

In health care professions, higher education now has to incorporate a multitude of learning to achieve competencies in the health systems that employ graduates. Thus, system-based and competency-driven educational reform is recommended, adjusting core professional competencies in particular contexts, while drawing on global knowledge and perspectives<sup>[4, 18]</sup>.

## Curricula trends

In global pharmacy and pharmaceutical education, the call for curricular reform has been raised. However, the requests for educational reform vary within different settings worldwide. In developed countries, academic staff pursue curricula to prepare students for future specialised fields in pharmacy. On the other hand, in developing countries, patient-centred curricula and public health pharmacy are focused on tackling ever-changing health environments<sup>[6]</sup>.

In addition, in specific settings where pharmacy and pharmaceutical higher education has not been previously established, there may be a unique need for specific educational models<sup>[19]</sup>. Furthermore, the status of pharmacists varies all over the world and is influenced by the number of pharmacists, or lack of awareness of pharmacists as health care team members; the perceived status of pharmacists could be well below that of their medical colleagues<sup>[20]</sup>.

As the wide range of global needs and demands for pharmacy services increases, curricula need to better reflect the variety of pharmacy career directions that future graduates will face, and the varied and challenging global health needs<sup>[21]</sup>. It is highly recommended that in addition to formal curricula, pharmacy students take part in extra-curricular activities such as conferences, symposia, competitions, publications and internships to develop specific areas of expertise<sup>[22]</sup>.

To prepare the students for the wide range of areas of activity in pharmacy and pharmaceutical sciences, several approaches have been introduced, such as work-place education in collaboration with practitioners, inter-professional education for developing the skills to work as a health care team member, and student-centred learning to achieve the problem-solving skills and application of knowledge to real life problems.

By encouraging students to be directly involved in the learning process in a responsible and dynamic way, schools of pharmacy have afforded them the responsibility to lead the pharmacy profession to a better future in all fields. Also, student involvement with pharmacy's professional bodies will help them understand the values, vision and purpose of the profession. This concept is reflected in Guideline 17.3 of The Accreditation Council for Pharmacy Education in the USA<sup>[23]</sup>, which recommends that leadership skills be assessed at the time of admission. As not all incoming pharmacy students possess these abilities, attitudes and behaviours, they must be developed during their educational experience and beyond graduation<sup>[24]</sup>.



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The appropriate link between the pharmacy curriculum and its outcomes to population and national health needs has been “a visible global agenda” with the growing “emphasis of governments to provide greater access to and improved responsible medication use”<sup>[25]</sup>. In order to bridge the gap between pharmacy curricula and given health needs, competency-based education has been gaining attention as an alternative approach for optimising the preparation of health professional graduates<sup>[26]</sup>.

## Quality Assurance

Many countries have established quality assurance (QA) systems for HEIs, including internal and external processes and self-assessment<sup>[27, 28]</sup>. QA systems’ prevalence is not specific for pharmacy or pharmaceutical education and therefore does not consider desired learning outcomes. FIP, WHO, and UNESCO have recognised a world-wide need for building capacity and expertise towards higher and equitable quality of pharmacy education. Aiming for QA systems that are nationally or regionally adaptable - ensuring that curricula are competency-based and reflect a vision for needs-based pharmacy practice - will deliver high quality and appropriate education. Thus FIP developed the Global Framework for Quality Assurance of Pharmacy Education in 2008, to identify the core principles and elements that are deemed as fundamental for an effective approach to the QA of pharmacy education<sup>[27, 28]</sup>. The FIP framework can be adapted to accommodate national and population needs, and local health systems<sup>[27]</sup>.

Quality in pharmacy and pharmaceutical education is recognised as the foundation of our profession. The initial professional education must be reflective of a vision for pharmacy practice, which is national and population health needs-based, socially accountable, competency-based, and quality assured. The global consensus recognises that quality-assured education based on well-structured standards will prepare graduates for the wide range of future pharmacy careers and also to meet social expectations<sup>[25]</sup>.

Multiple stakeholders have become interested in the quality of, and the standards for, pharmacy and pharmaceutical education. Combined with the increasing recognition of the extended roles of pharmacists, growing awareness of pharmacists as health care providers, and the need for pharmaceutical scientists<sup>[25, 27]</sup>.

Global leadership and the commitment of international policy-makers accountable for prioritised health and education programmes are key to supporting country-led strategies for reform and helping to facilitate the engagement of multiple stakeholders<sup>[18]</sup>. Evidence-based global pharmacy and pharmaceutical education policy can therefore support the achievement of higher and equitable quality world-wide.

The outcomes of professional pharmacy and pharmaceutical education depend on two main factors: effective quality-assurance of pharmacy and pharmaceutical education, and the production of competent pharmacy graduates. In turn, identifying pharmacy and pharmaceutical education provision globally is an essential step towards delivering acceptable evidence-based practices and policies for professional pharmacy and pharmaceutical education.

## Conclusions

FIP advocates the use of a needs-based approach to education to further the global agenda<sup>[6, 29]</sup>. The emphasis is on the link between pharmacy/pharmaceutical education and the health needs of the population<sup>[18]</sup>.

In all health professions, there is increased attention to social accountability. Underlining population needs and national health priorities to ensure that HEIs are socially accountable, professional pharmacy and pharmaceutical education needs to be quality-assured with effective systems that are developed through a clear presentation of professional competencies.

The FIP Education Initiative Development Team ‘needs-based education’ cycle describes that pharmacy and pharmaceutical education has to be needs assessed, socially accountable, competency-based, and quality assured (see Part 5 of this report).

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# PART 3

## GLOBAL EDUCATION DESCRIPTION

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### Summary

- The 2013 FIP Global Pharmacy Education Survey was conducted using English, French, Portuguese, Arabic, Japanese, Chinese and Spanish forms; this resulted in education and workforce data for 109 countries and territories representing around 175,000 pharmacy students and 2,500 education institutions worldwide (Report available at: [www.fip.org/educationreports](http://www.fip.org/educationreports)).
- Pharmacy education, in both capacity and infrastructure varies considerably between countries and WHO regions and generally correlates with population numbers and country level economic development indicators. Those countries and territories with lower economic indicators tend to have relatively lower educational capacity and pharmacist production.
- African countries tend to have lower educational capacity and supply pipelines for pharmacists. This has implications for future parity for access to medicines and medicines expertise. There needs to be an on-going effort to ensure capacity building linked with initial education and training to meet the pharmaceutical health needs of populations.
- The proportion of the female undergraduate population is a majority globally, with some regions having an average female pharmacy student enrolment of more than 70%.
- The relative costs of pharmacy and pharmaceutical education also varies across countries and territories. There is an associated variation in the relative contributions of direct and public contributions for initial undergraduate education in the higher education sectors.

### 3.1 Introduction and Methods

The 2013 FIP global pharmacy education survey was conducted between January 2012 and April 2013.

FIP member organisations, country and territory level contacts in education, individual universities, and associations were approached to provide country and

territory level data regarding the initial education and training of pharmacy students prior to registration as licensed pharmacists. Demographic and economic data was also collected.

The questionnaire was developed in collaboration with the FIP Collaborating Centre (University College London), the School of Pharmacy University of Nottingham, FIPeD and WHO Human Resources for Health staff. The questionnaire sought data relating to pharmacy and pharmaceutical education, workforce and relevant regulations and was available in English, French, Portuguese, Arabic, Japanese, Chinese and Spanish. The dataset was cleaned and checked with respondents before being prepared for analysis. The questionnaire tool, data tables and the report are available for download from [www.fip.org/educationreports](http://www.fip.org/educationreports).

A total of 109 countries and territories responded to the questionnaire (full list of respondents available in Annex I). The total case load represents around three-quarters of the current world population. The data collection was conducted using multiple languages and this has assisted with country level engagement for this 2013 Report. The analysis presented here should be interpreted within the confines of generalisation and based on best available validated data collated by the FIPeD team. A listing of contributing countries and territories is supplied in Appendix 2.

Table 3.1 shows the respondent countries and territories categorised by WHO region, compared with the formal listing of all WHO member states, showing good proportionality between the FIP country and territory level responses and the global WHO member states.

**Table 3.1: Sample Response and WHO Regional comparison.**

	Sample response	Sample %	WHO member states	WHO member states %
Africa	20	18.3	46	23.7
Americas	10	9.2	35	18.0
Eastern Mediterranean	11	10.1	22	11.3
Western Pacific	23	21.1	27	13.9
South East Asia	5	4.6	11	5.7
Europe	40	36.7	53	27.3
<b>Total</b>	<b>109</b>	<b>100</b>	<b>194</b>	<b>100</b>

Note: China Taiwan is included in Western Pacific Region in all the analyses.

### 3.2 Global overview: the pharmacy supply side descriptions and global comparisons

The total case load for this report (N=109 countries and territories) comprises descriptive data covering around 175,000 graduating students per annum and 2,589 pharmacy and pharmaceutical educational institutions (higher education institutions, HEIs). There are strong correlations with total pharmacists per country and the annual graduating cohort (Figure 3.1,  $R^2 = 0.57$ ,  $p < 0.0001$ ). The WHO African region countries tend to exhibit a tendency for fewer pharmacists and a corresponding proportionally smaller graduate production, a human resource for health situation that was also identified in the 2012 FIP Global Workforce Survey. Figure 3.1 shows the relative graduate production capacity per country in this sample adjusted for country population size.

Figure 3.1: Number of pharmacists and graduating students (per 10,000 population) | n= 95.

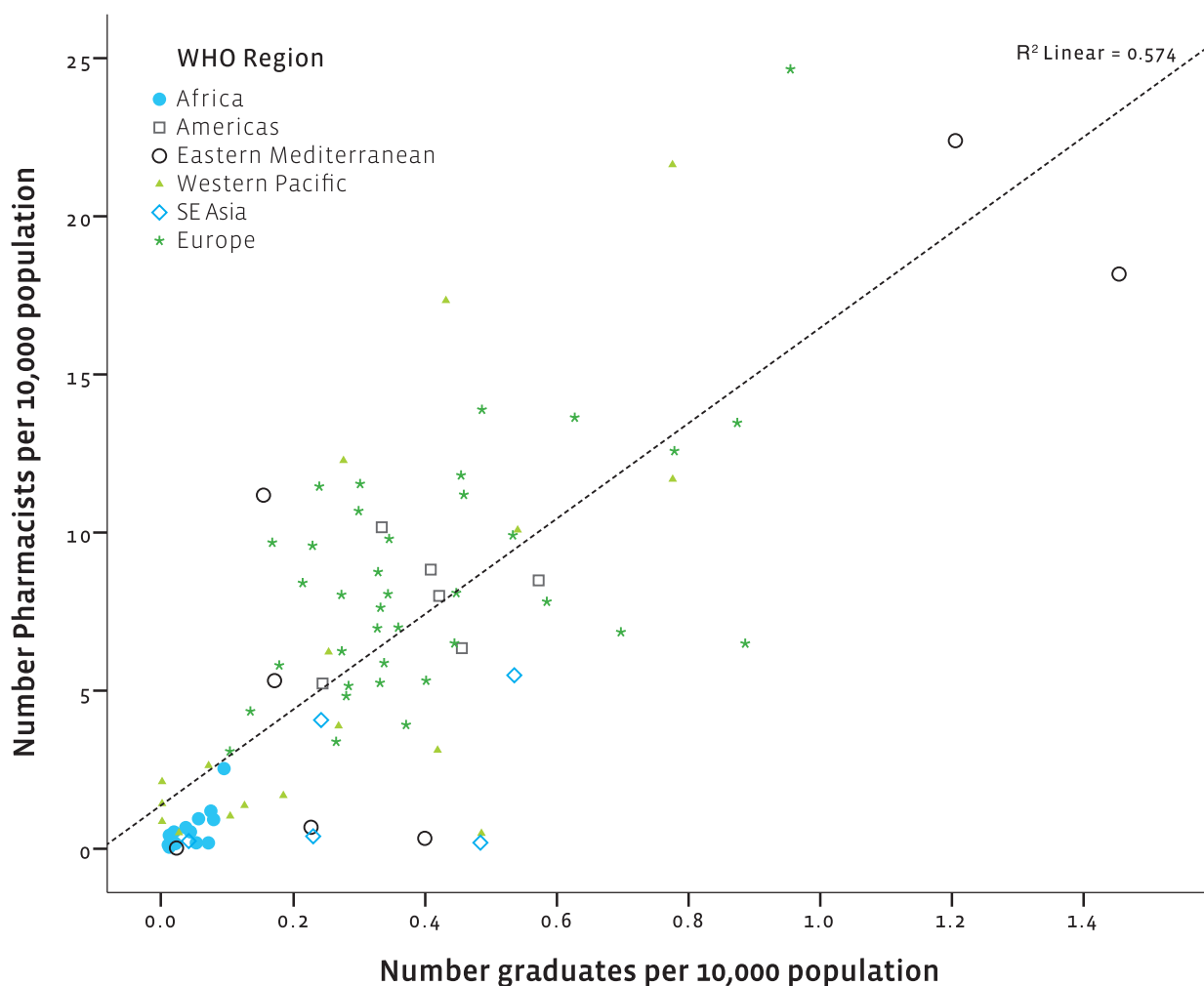


Figure 3.2: Number of pharmacy graduates per capita per country | n= 95.

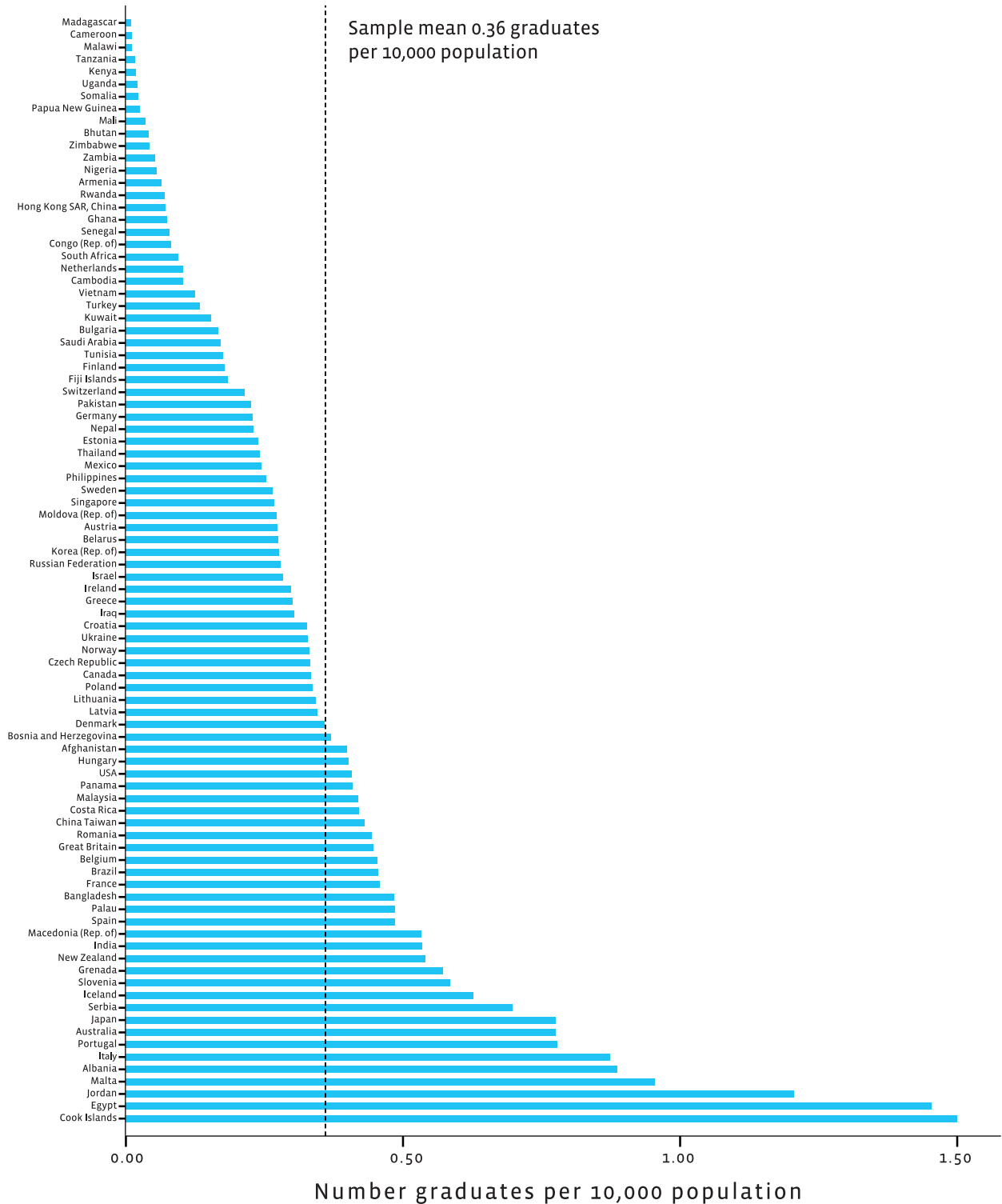
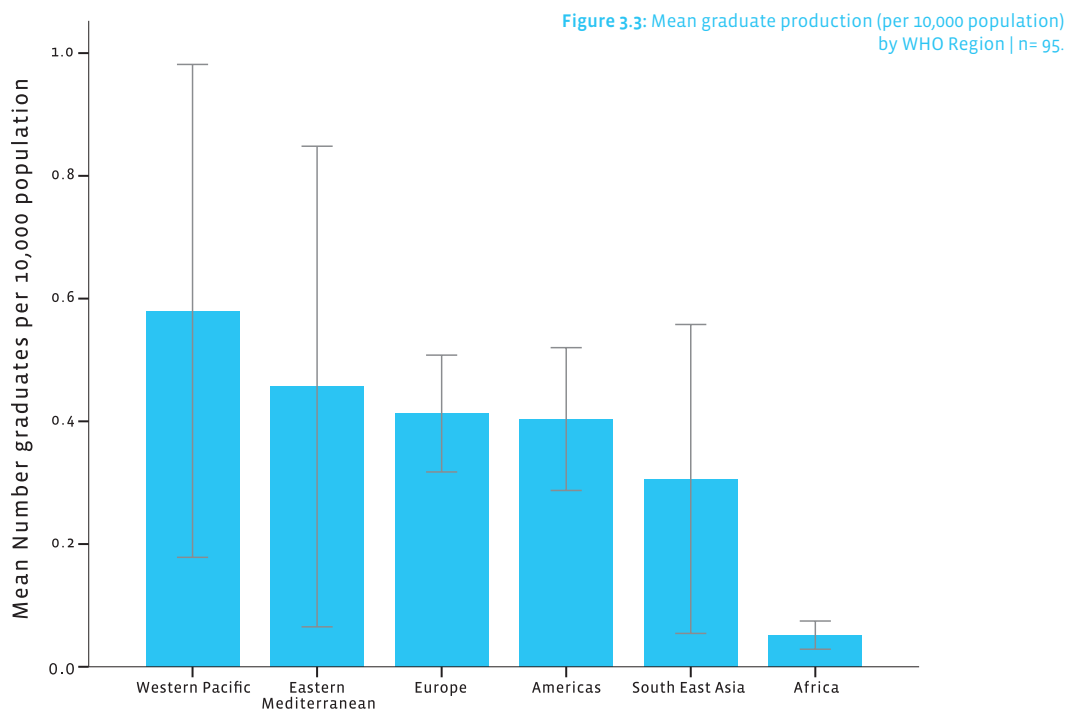


Figure 3.2 also displays some anomalies, such as the lower populated nations having relatively larger graduate production capacity (for example Cook Islands, New Zealand, Grenada). However, absolute graduation numbers indicate a wider range. Table 3.2 shows the highest and lowest nationally graduating numbers per year (for those countries with at least one School/Faculty).

Table 3.2: Highest and lowest pharmacy graduating cohorts in the report sample.

Country/Territory	Highest numbers of graduating pharmacy students (national)	Country/Territory	Lowest numbers of graduating pharmacy students (national)
India	66,423	Grenada	6
USA	12,719	Fiji Islands	16
Egypt	12,000 (estimated)	Malawi	17
Japan	9,912	Papua New Guinea	18
Brazil	8,956	Madagascar	20
		Armenia	20
		Iceland	20

The disparities with education capacity and pharmacist production can be more clearly seen by aggregating within WHO regions. Figure 3.3 shows the global graduate production capacity by WHO region, once again indicating that the lowest educational capacity, is also linked with most severe shortages of licensed pharmacists, occur in the sub-Saharan African nations.



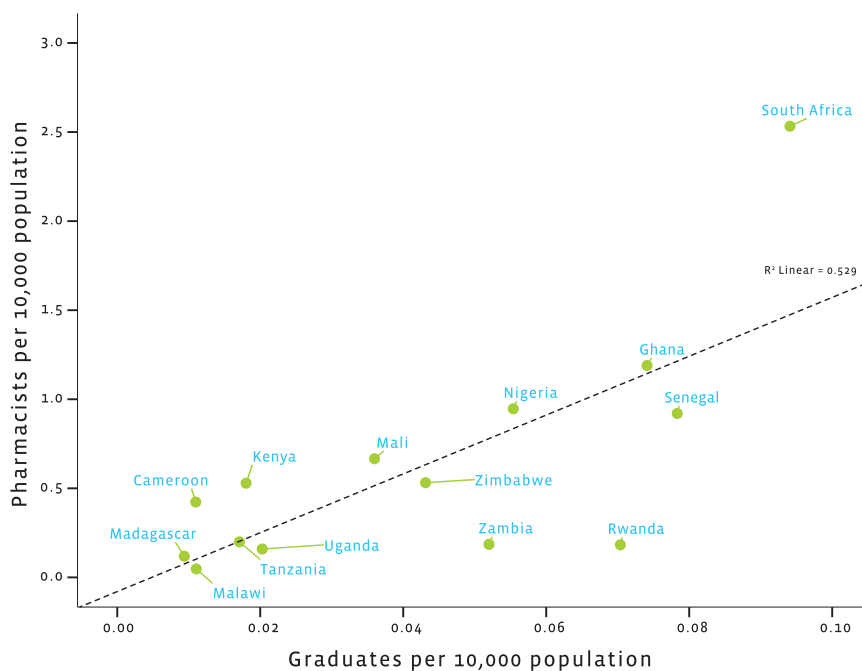
The wide confidence intervals for some WHO regions indicate the presence of statistical outliers, as illustrated in Figure 3.3. These outlier nations are listed in Table 3.3 and indicate that some countries and territories have a significantly higher capacity production (standardised to population) relative to other countries and territories in the same region.

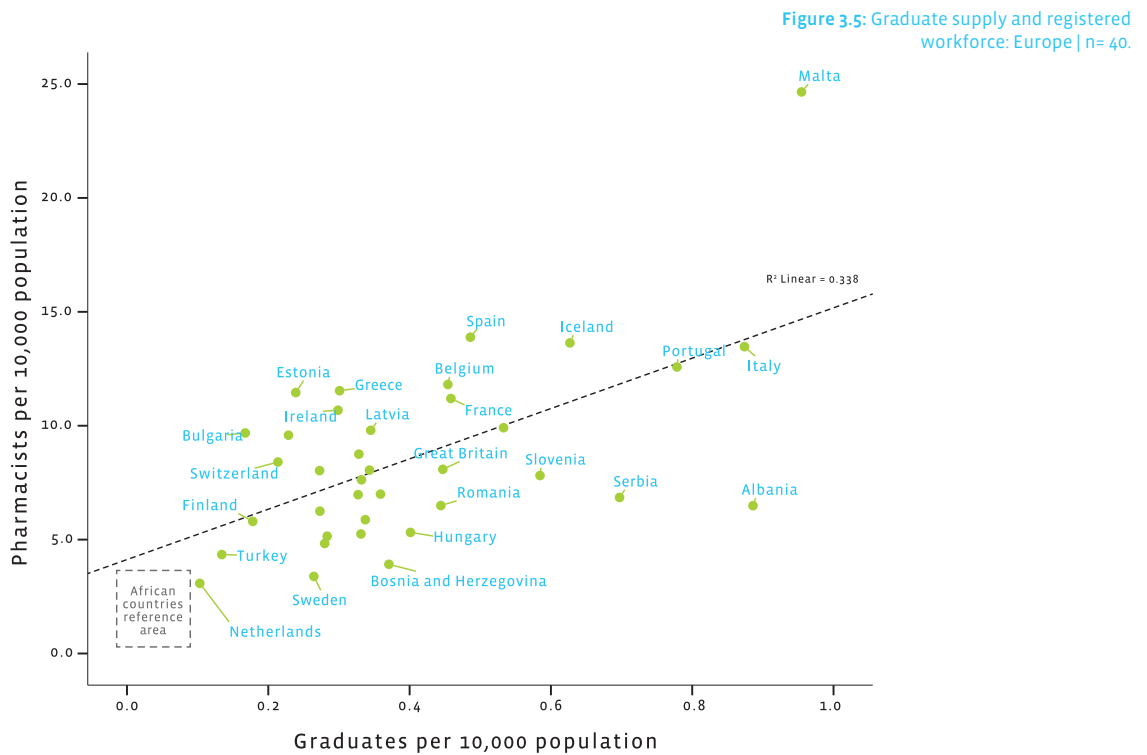
**Table 3.3:** Countries with graduate production more than 1.5 times the interquartile range for their WHO Region (statistical outliers).

Country/Territory	WHO Region	WHO Regional mean number of graduates per 10,000 population	Actual number graduates per 10,000 population
Egypt	Eastern Mediterranean	0.46	1.46
Jordan	Eastern Mediterranean		1.20
Cook Islands	Western Pacific	0.46	1.50
Tuvalu	Western Pacific		3.05
Italy	Europe	0.41	0.87
Portugal	Europe		0.78
Malta	Europe		0.95
Albania	Europe		1.73

Africa, as a region, shows a relative shortfall in both supply side and workforce capacity. Looking at this region in more detail, together with Europe as a comparative example, Figures 3.4 and 3.5 show close correlations with supply side and workforce (with some labelled exceptions). However, the absolute regional differences in graduates and workforce remain a key concern.

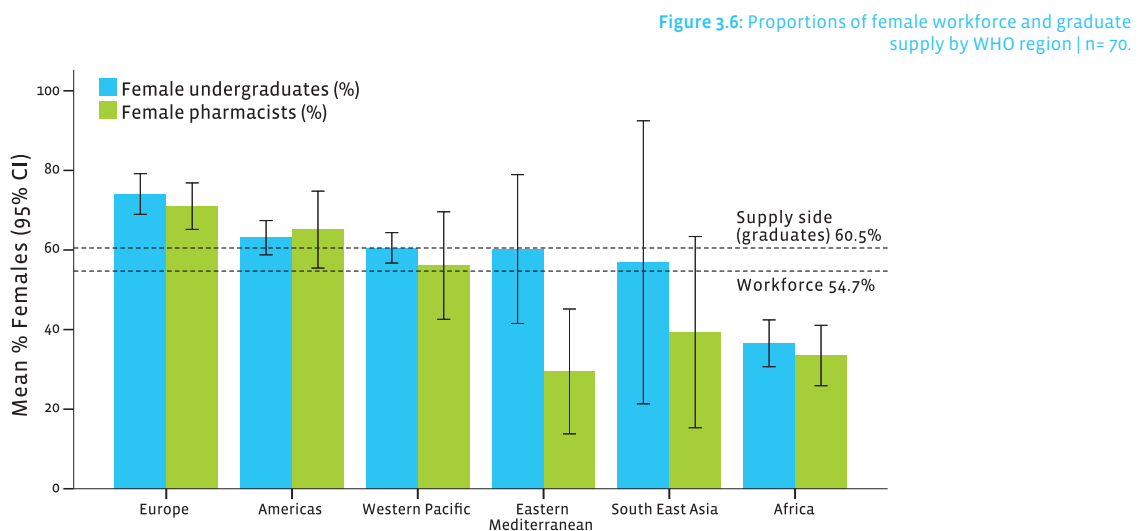
**Figure 3.4:** Graduate supply and registered workforce: Africa | n = 14.





## Gender

The mean global female pharmacist registered workforce in this sample comprises 54.7%, which is less than the graduate supply mean of 60.5%. In some regions, the supply side female undergraduate proportion has an even greater difference, indicating that the proportion of the registered female workforce will continue to increase, and in some regions (for example Eastern Mediterranean and Western Pacific) this increase will be marked. Figure 3.6 shows the proportional differences between current female registered workforce and supply side female undergraduates.





### 3.3 A Global Institutional analysis

This report gathered data on country and territory level descriptions of institutions, by which we mean Schools, Faculties or Departments that provide initial education leading to a regulated pharmacy qualification. Figure 3.7 shows a country and territory level profile of the distribution of Schools and Faculties in this sample. Excluding the highest reported figures (see Table 3.4) the global average is around 11 Schools/Faculties per country or territory. However, this should not draw attention away from a sizeable proportion of countries and territories that have only a single national School or Faculty (n=26 or 27% of those countries that reported having a School or Faculty) and 12 countries and territories reporting not having any institution providing pharmacy/pharmaceutical education.

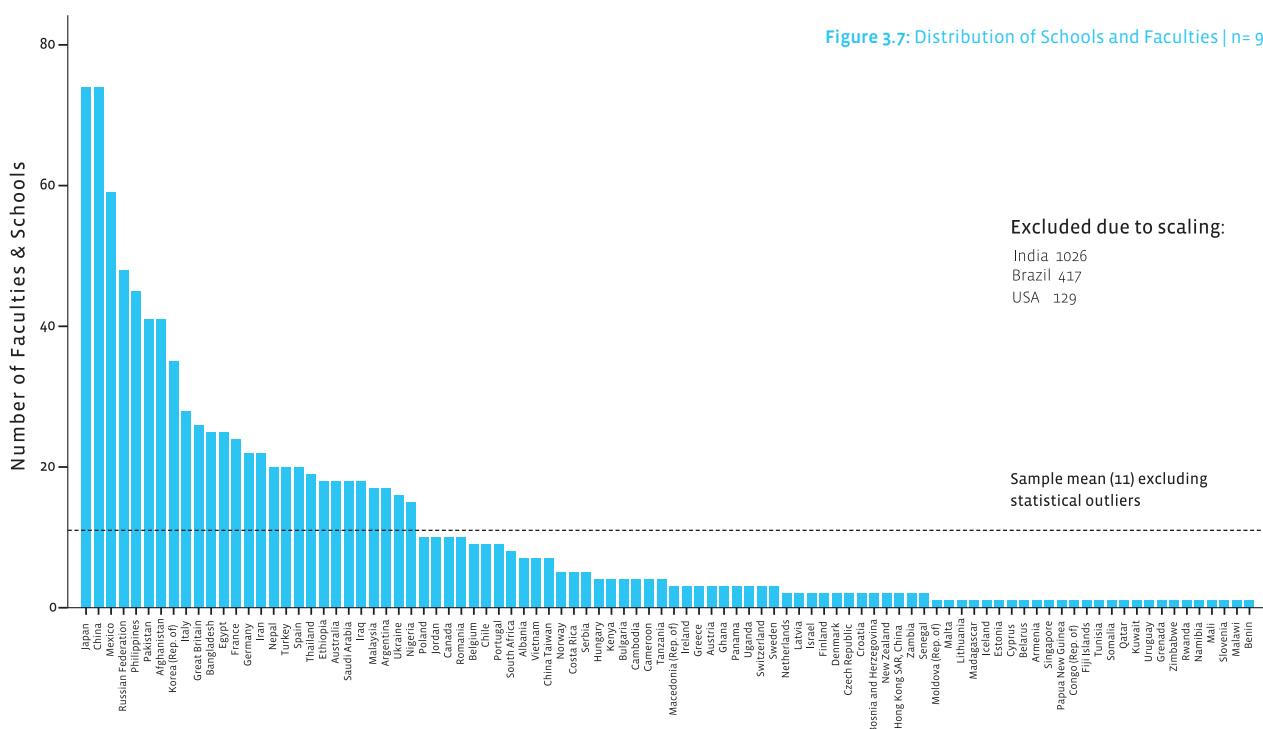


Table 3.4 shows those countries with the highest number of Schools/faculties and similarly those countries with no established Schools or Faculties reported.

**Table 3.4: Distribution of highest and zero Schools/Faculties.**

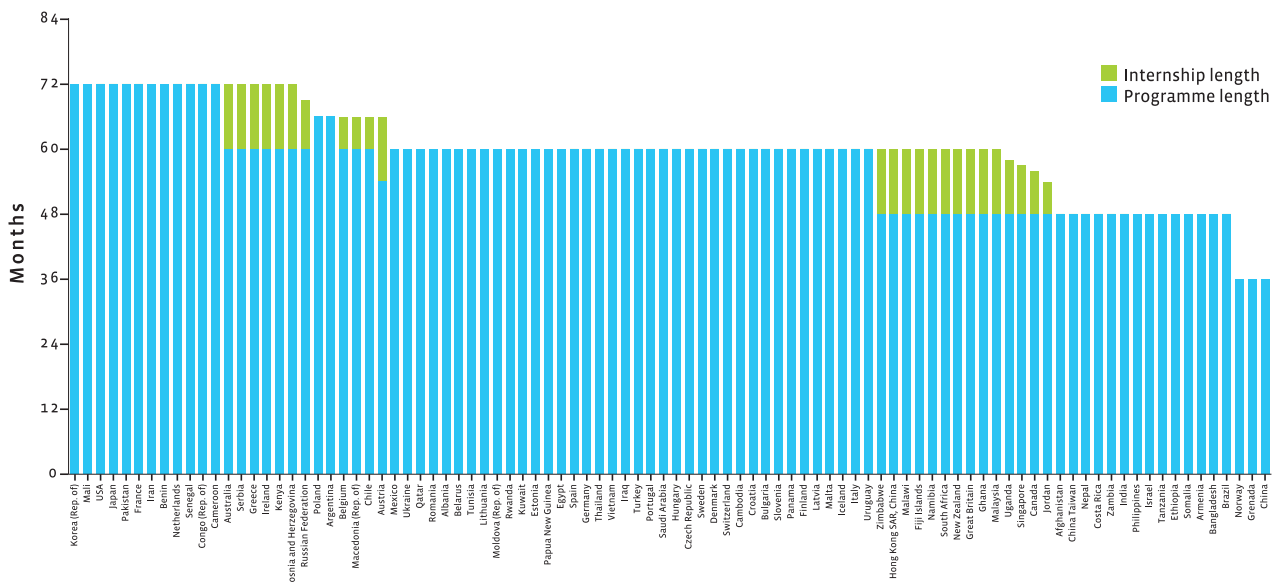
Country	Number of Schools/Faculties	Countries with no declared Schools/Faculties in this sample	
India	1026	Burundi	Palau
Brazil	417	Congo (Rep. Dem. of)	Samoa
USA	129	Cook Islands	Tonga (Kingdom of)
China	74	Marshall Islands (Rep. of)	Tuvalu
Japan	74	Nauru	Vanuatu
Mexico	59	Niue	Bhutan

The sample respondents reported several undergraduate degree titles that were, generally, associated with programme length. Table 3.5 maps programme title with mode (in years). On a wider scale, Figure 3.8 shows the degree and internships reported by countries.

Table 3.5: Distributions of programme type | n= 74.

Academic programme by degree title	Frequency	Responses (%)	Responses grouped (%)	Length (years)
Bachelor	30	40.6	40.6	4 (mode)
Master	17	23.0	33.8	5 (mode)
Bachelor & Master	8	10.8		
PharmD	9	12.2	25.8	6 (mode)
Bachelor & PharmD	8	10.8		
Diploma & PharmD	1	1.4		
Diploma & Bachelor & PharmD	1	1.4		
Totals	74	100.0	100	
No School of Pharmacy	4			
Missing data	35			

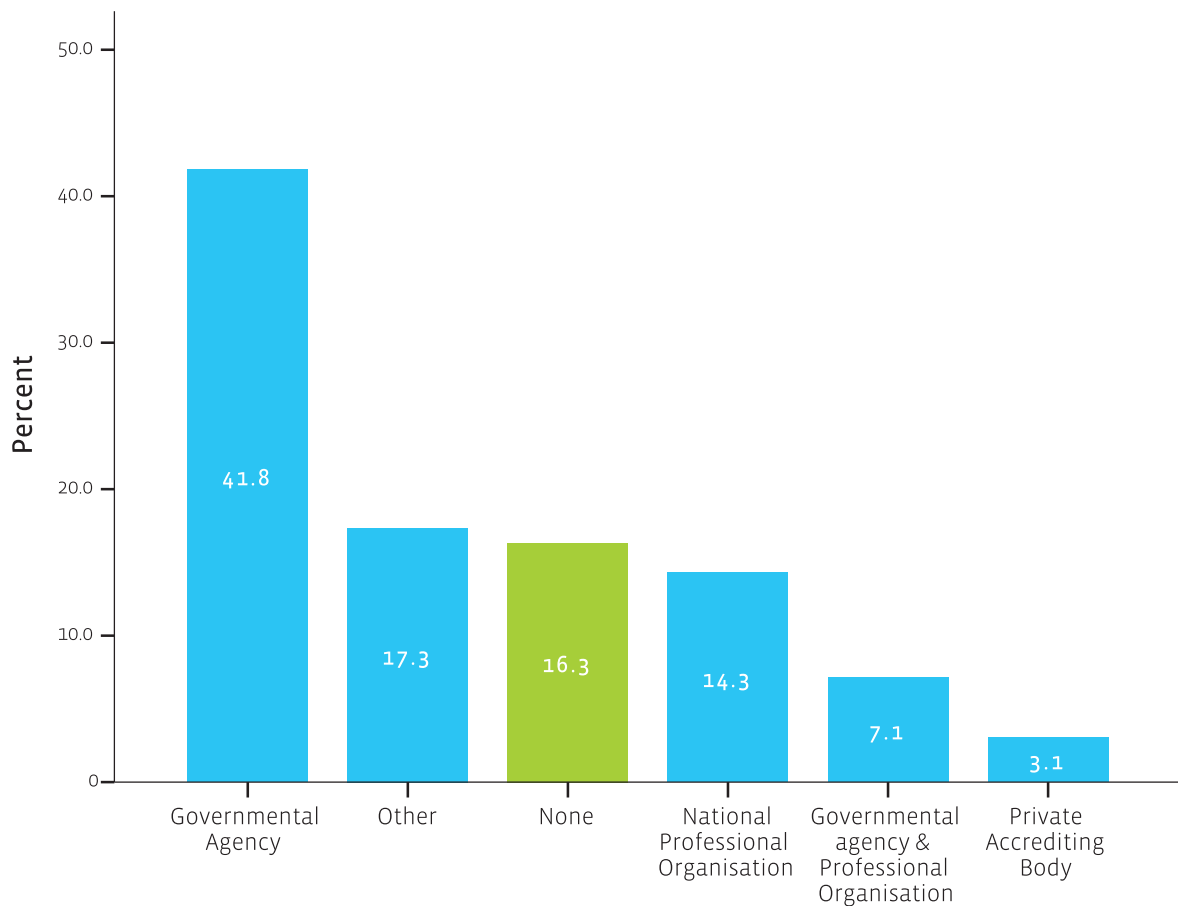
Figure 3.8: Distribution of degree and internships | n= 94.



## Quality assurance and accreditation mechanisms

Respondents provided high level information on quality assurance. Information was sought to characterise whether quality assurance and accreditation was in place within the country and the accrediting body responsible. From the data, it seems that up to 16% (valid n=20) of the respondents claimed no accreditation mechanisms. Figure 3.9 shows the relative proportions of accrediting agencies reported by the sample.

Figure 3.9: Accrediting agencies | n= 98.

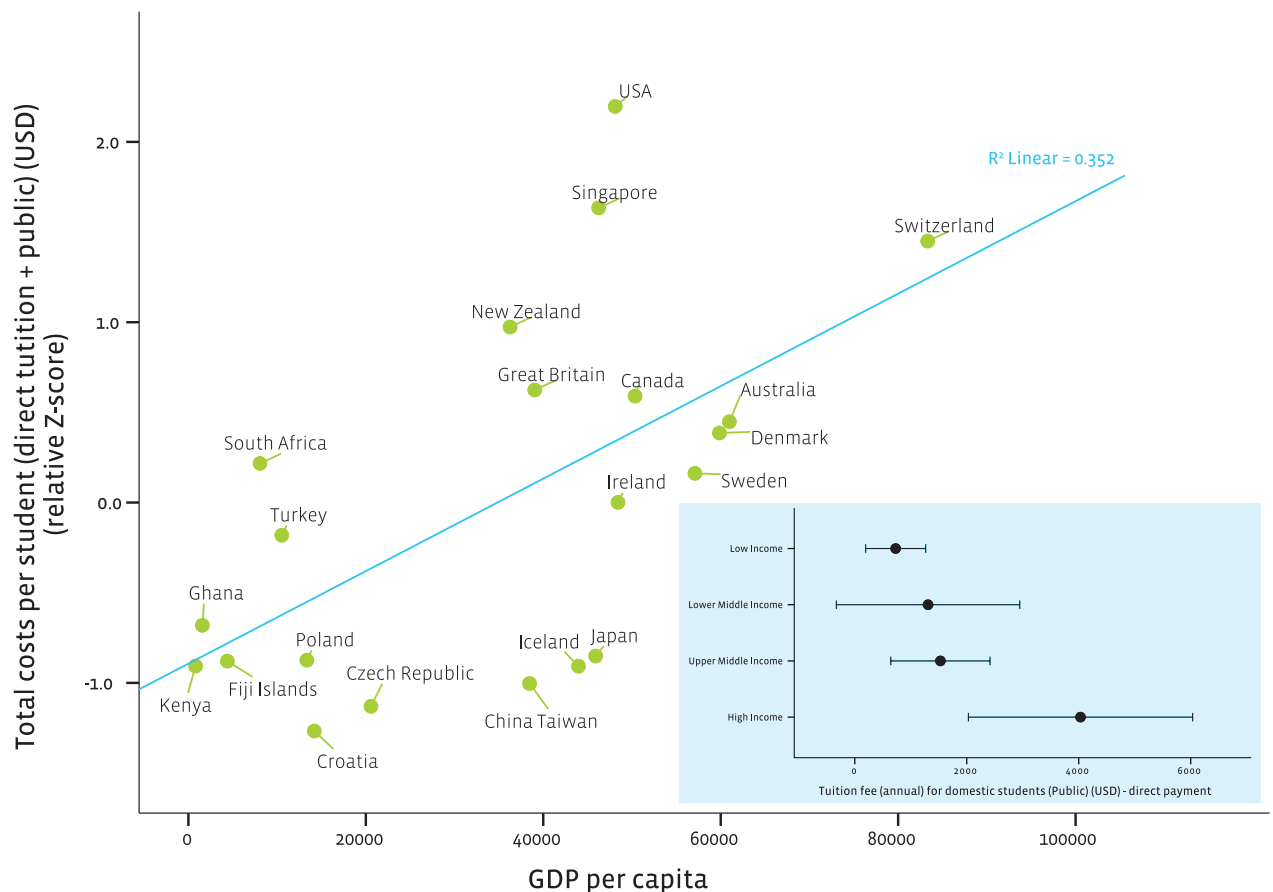


Those agencies classified within the category “others” included examples where regional professional agencies were accrediting, quasi-university and government agencies and out-sourced bodies.

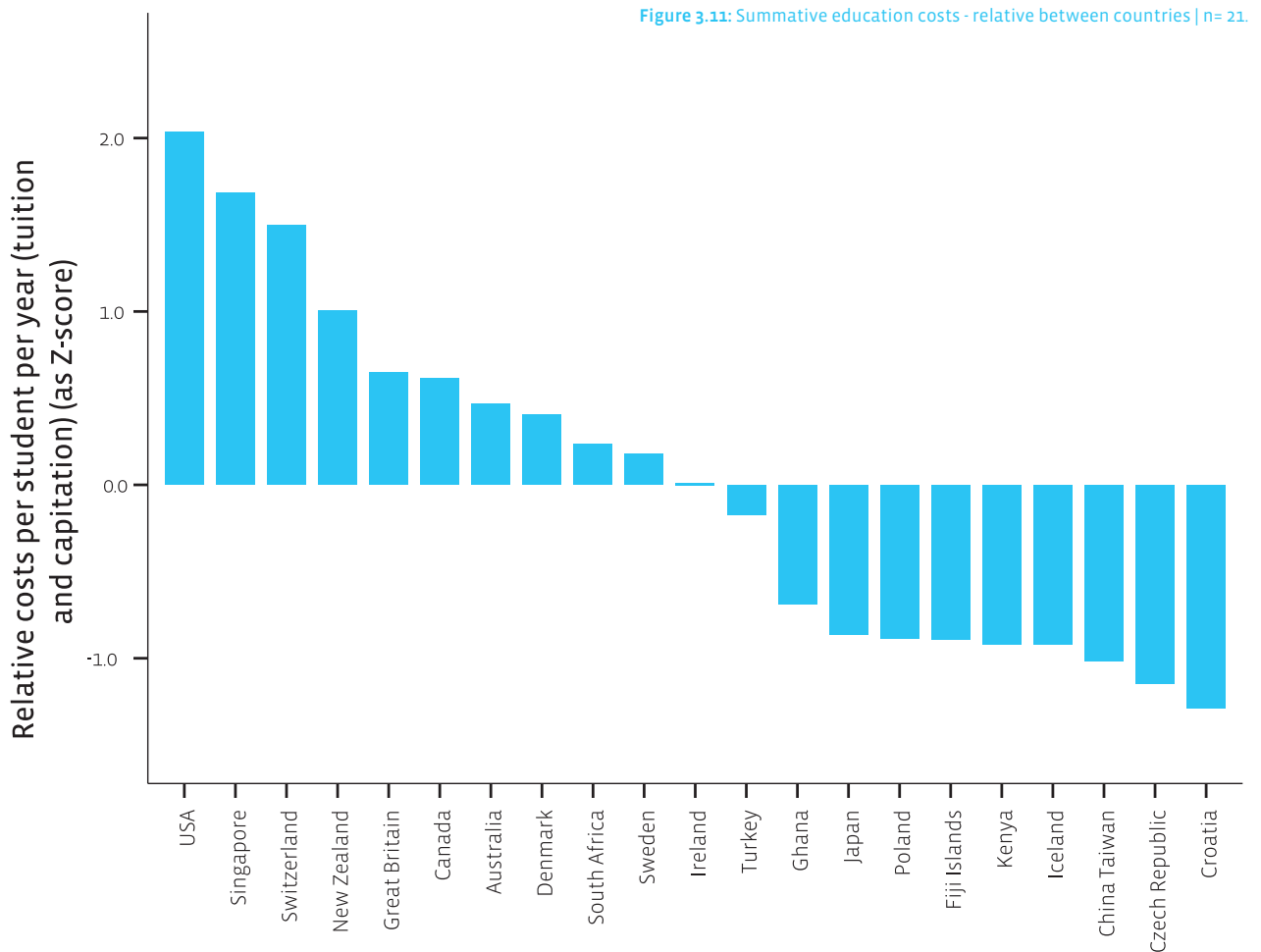
## Economics

Fourteen countries in this sample reported no direct student tuition fees (including Afghanistan, Austria, Czech Republic, Denmark, Estonia, Greece, Hungary, Malta, Poland, Serbia, Slovenia, Sweden, Turkey and Uruguay). For those countries in the sample that do charge a direct tuition fee (for domestic students in public universities) the correlation of direct tuition fee payments with GNI (per capita, PPP) is significant ( $r = 0.512$ ,  $p=0.001$ ). Similarly with the total student costs (i.e. direct tuition fee plus public capitation contribution) there are strong positive correlations with GNI (PPP) ( $r = 0.715$ ,  $p=0.001$ ). Figure 3.10 visualises these correlations of GNI with total education costs, together with banding by World Bank income level classification.

Figures 3.10: Pharmacy education costs and GNI (PPP) per capita | n= 42.

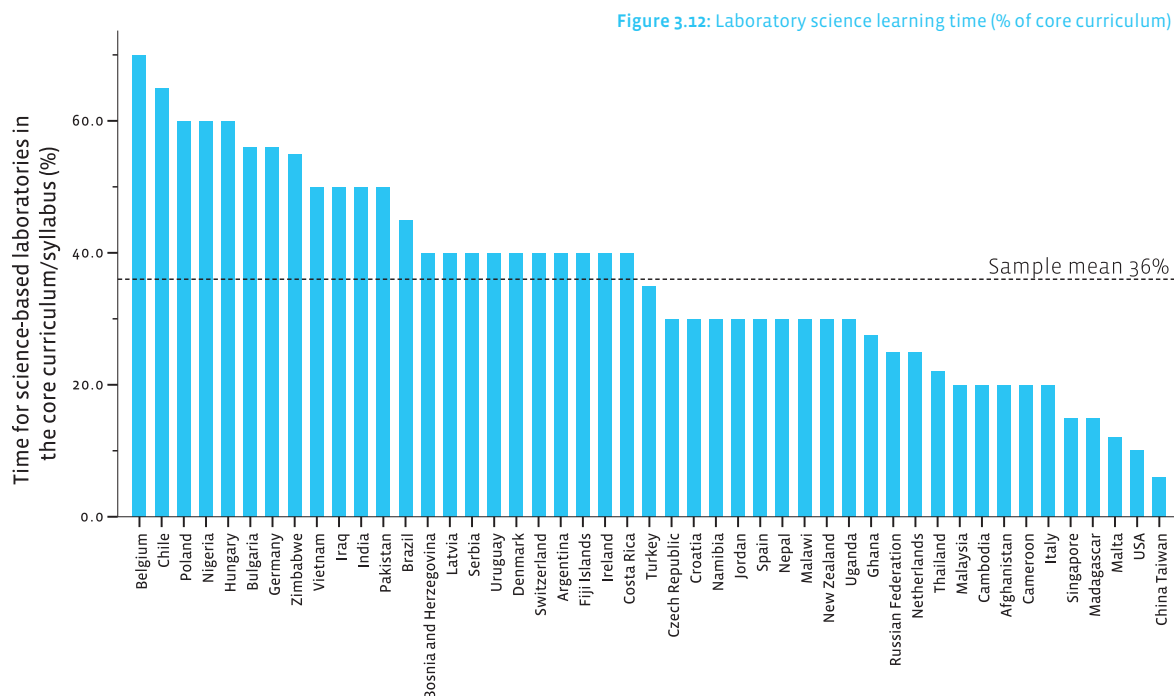


For those *public universities* charging a direct student tuition fee, the global sample mean is USD 3128 (n=42). However, relative costs can be more easily assimilated in Figure 3.11, which uses Z-scores (standard deviation units) to display the relative total tuition costs (direct to student plus any capitation fee from government sources) for data where available in this response set.



## Curriculum

Of the 64 countries and territories who supplied data in this section, 38 (59%) indicated the existence of a national core curriculum or syllabus for initial education. Allied to this, 47 countries and territories provided data on the proportion of time spent on science-based laboratory learning in the core curriculum, which ranged from 6% to 70%, with a sample mean of around 36% - one third - of curriculum time spent on laboratory-based learning. Figure 3.12 provides a description of the distribution of core curriculum time spent on laboratory science.



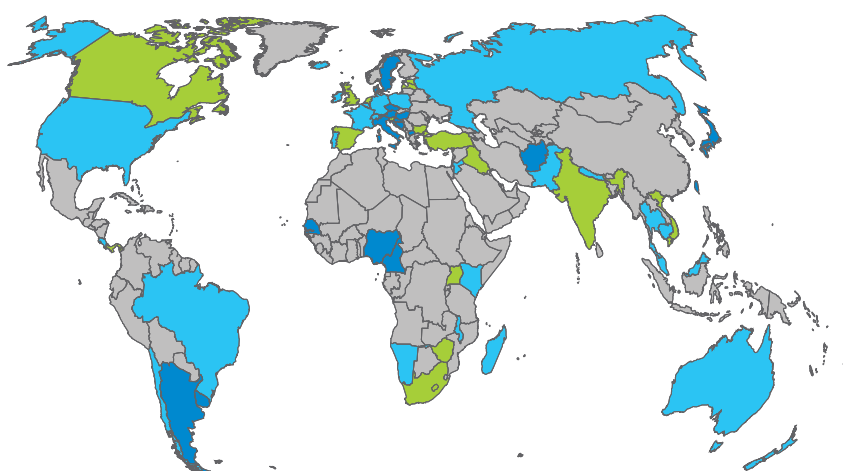
Respondents provided a description of the curriculum, according to pre-set categories, as shown in Table 3.6. There were no associations with these self-declared categories and geographical region. The geographic distribution is shown in Figure 3.13.

Table 3.6: Early years curriculum general description.

	Frequency	(%)
Wholly general science, with very little pharmacy practice component	17	25.7
Mostly general science orientation, with small/moderate pharmacy practice components	28	42.9
A mix of general science and pharmacy practice	18	27.2
<b>Total</b>	<b>63</b>	<b>100</b>

Figure 3.13: Mix of science and practice in early curriculum | n=47.

- Wholly general science, with very little pharmacy practice component
- Mostly general science orientation, with small/moderate pharmacy practice components
- A mix of general science and pharmacy practice



## Summary

The data collected in this sample covers 109 countries and territories worldwide, but with some data gaps remaining. The responding countries and territories report, in total, around 175,000 graduating students per annum, this being an estimate of the capacity production of students who, for the most part, go onto registration or become licensed. Taking the nationally reported degree length, from 89 countries and territories who supplied full data, this represents a pharmacy student cohort size of 680,000 worldwide. However, the data set can be said to be characterised by wide variation in capacity across nations, with sub-Saharan Africa having the lowest proportional educational capacity.

The economics and cost of higher education for entry into the profession also vary. Costs tend to correspond with national incomes and wealth and reflect national systems for higher education.

There is additional variance in the degree title and lengths (with these characteristics being related) which, would suggest differences in content and education provision models between countries and regions. This variance alone suggests that additional investigations should be made with the aim of seeking similarities and differences in the educational outcomes associated with differing degree titles and lengths.

There were no direct measures of quality or learning experiences made in this survey. FIP and IPSF are conducting a significant work in this area that can, in the future, be mapped to the demographic data presented here. Future work should look closely at the quality issues and how these link with learning experiences and country level demography, including a correlated economic evaluation of the total costs of education for entry into the profession.

Overall, this data set provides interesting and impactful comparisons, although more data should be obtained from countries who could not provide data for this report.

# PART 4

## EDUCATION TRENDS, INNOVATIONS AND TRANSFORMATIONS – CASE STUDIES

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### 4.1 Introduction

Opinion leaders and governments in developed countries are calling for pharmacy education to take the lead in medicines optimisation and public health, to build accountability for medication therapy outcomes, and to develop curricula to prepare pharmacy students for specialised areas such as personalised medicine, independent prescribing, and team-based patient care<sup>[1-7]</sup>. In the meantime, developing countries seek patient-centred curricula and public health pharmacy to meet their changing health environments, and to achieve universal access to essential medicines<sup>[8]</sup>. In addition, there may be specific needs, especially in settings where tertiary pharmacy education has not been in place previously<sup>[9]</sup>. It is critical that pharmacy degree courses accurately reflect the wide range of career directions that future pharmacists will take to better meet health system needs. Many countries are moving from curricula that focus on knowledge and skills to curricula that will develop pharmacists who will, “*think, act, and do things in a way that shows they are truly patient-centred pharmacists.*”<sup>[10, 11]</sup> There is an increasing focus on values and behaviours in the UK following the findings of the Francis Inquiry into serious failings of care at the Mid Staffordshire hospital where many patients died unnecessarily. The failure of the healthcare system in this example has led to many national recommendations including enhancing education, training and support<sup>[12]</sup>. There is also a desire to prepare flexible graduates for a varied and unknown future, but pharmacy educators may not be moving quickly enough toward these goals<sup>[13, 14]</sup>.

The transition to integrated patient-orientated pharmacy services in the developed world has been a factor of health-system planning and investment in academic and practice orientation and quality assurance over many years. Developed countries have led competency-based pharmacy curricula, which have been a product of these tertiary healthcare environments. In contrast, within developing countries the population's access to health services is reduced and health care provision is the primary aim of the health-care system.



The role of pharmacists in these environments is still evolving, but trends toward a focus on access to medicines, including availability, affordability, and acceptability are emerging. In a number of countries, for example, India, South Africa and Mexico pharmacists are also widely employed in the pharmaceutical industry and students are prepared for careers in the industry.

Globally, pharmacy practice, science, and education are undergoing unprecedented changes. Expanded roles for pharmacists, as providers of health-care services and as scientists, are increasingly recognised and valued. Pharmacists worldwide are serving as the medicines experts in the collaborative health care team and providing critical information to other health providers on the benefits, risks, and potential adverse interactions between therapeutic agents for communicable diseases such as malaria, TB, HIV/AIDS and non-communicable diseases such as diabetes, hypertension and cancer. Countering these achievements, many countries still face critical shortages of pharmacists, pharmaceutical scientists, and pharmaceutical support personnel. Although there have been calls for changes in pre-service education, better approaches to continuing education for the existing health workforce, and training pharmacists to supervise a lower cadre of assistants<sup>[15]</sup>.

## 4.2 Method

Sixteen countries were purposively sampled based on existing knowledge and asked a series of questions about pharmacy education, relating to

- Current drivers
- Trends
- Innovations and transformation
- Links with national strategy for health care services/delivery

After two reminders 14 responses were received [Chile, Great Britain, Japan, Jordan, Malaysia, Namibia, Philippines, Portugal, Saudi Arabia, Switzerland, Thailand, United Arab Emirates (UAE) – Abu Dhabi, USA and Zimbabwe], which were analysed using NVivo computer programme. Themes were identified from the case studies submitted and a narrative account was produced, drawing from the country case studies. The final narrative was sent back to all the authors for comments and approval.

## 4.3 Results and Discussion

### 4.3.1 Current drivers

The current global health system and pharmacy profession drivers that are transforming pharmacy education are summarised in Figure 4.1.

Figure 4.1: Current drives for change.

### Global

- Increasing population
- Longer life expectancy
- Increasing chronic disease burden on top of infectious diseases
- Increase in life style related diseases
- Progress in medical technology
- Demand for new pharmaceuticals
- Increasing tourism

### Health system

- National policy
- Healthcare transformation
- Moving towards patient centred, team based care
- Moving towards personalised medicine
- Society's demand for medicines safety
- Demand for caring professionalism
- Demand to train local health professionals rather than rely on expatriates
- Medical tourism
- Improved salaries and conditions

### Pharmacy

- Professional policy
- University policy
- Increasing status
- Increasing demand for clinical and medicines optimisation roles
- Increasing demand for public health roles
- Flourishing pharmaceutical industry

Many countries have or are in the process of completely changing their entry-level pharmacy courses. Japan started a new six-year undergraduate pharmacy education programme in 2006 to address the rapid progress of medical technology, development of new pharmaceuticals and meet social demands for medication safety. The increasing demand for pharmacists to practice in both public and private sectors is the main driver for change of the pharmacy education in Malaysia. The status of pharmacists in the public and private sector has improved with new clinical roles, attractive salaries and increased opportunities for promotion.

Global and local drivers are shaping the pharmacy profession in Jordan. For instance, the world-wide shift in pharmacy practice from being product-oriented to being patient-oriented, and the subsequent rise of the “pharmaceutical care” concept, has exercised pressure on Jordanian pharmacy education to shift in tandem with these changes. Additionally, the evolution of new concepts, such as pharmacogenomics

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and health economics have forced the academic sector to rethink new ways of preparing up-to-date, highly employable graduates. Locally, a number of market-driven forces have shaped pharmacy education, such as the thriving pharmaceutical industry which accounts for around 20% of Jordan's manufacturing GDP and the growth of the health services market. Jordan has been transformed into a regional medical hub, with medical tourism as a primary industry.

The increase in the population and the increase in tourism have placed demands on the health system in the UAE. To meet health care needs personnel has been recruited from a range of other countries in the Middle East and Asia. To ensure sustainability, and to decrease reliance on foreign trained workers, it is critical that the local, Emirati population be trained to enable them to take a leading role in health care delivery. Aggressive growth in demand is expected for services relating to lifestyle related diseases, e.g. diabetes and cardiovascular disease, and cancer with larger volume increases in outpatient settings. By 2021, it is estimated that up to 3,200 additional doctors and 5,900 nurses will be required but no figures for pharmacy are available<sup>[16]</sup>.

Namibia is one of the most inequitable countries in the world, and health and pharmaceutical needs are typical of the sub-Saharan region (prevalence of HIV/TB/malaria). There is also a serious emergence of non-communicable diseases with almost no pharmaceutical industry and pharmacists in short supply both in the public and private sectors. The new BPharm (Hon) degree in Pharmacy was based on the needs of Namibia and competencies defined by stakeholders in a rigorous curriculum development exercise<sup>[10, 17]</sup>. Simultaneously, the Ministry of Health and Social Services (MOHSS) was also developing their pharmaceutical policy which enabled the curriculum to be broadly aligned to this. A seamless continuum on inter-professional education and multi-disciplinary team based care is planned for future pharmacists, working in teams as students with their medical and nursing counterparts, and transferring this working team into the practice environment as healthcare professionals.

Pharmacy education development in Switzerland has been driven by pharmaSuisse, the Swiss pharmacists' association. The association started influencing national pharmacy education by financing the implementation of two new Departments of Pharmaceutical Care at the universities of Geneva and Basel. pharmaSuisse is collaborating with the universities in order to coordinate undergraduate and postgraduate education, and to influence the pharmacy curricula (including post-qualification) to prepare future pharmacists for new roles.

The demographic profile in the UK is changing due to a combination of increased life expectancy and low birth rates, older people are more reliant on medicines and it is expected that medicines use will become increasingly personalised making patients more reliant on pharmacists. A recommendation has been made to the UK's government

to transform pharmacy education from a four-year undergraduate year (plus a pre-registration training year) to a five-year integrated course (with two six-month placements). The proposed change to pharmacy education is based on the vision that pharmacists can make a significant contribution to patients and public health by ensuring that patients get the optimum benefit from their medicines and that the public is supported to stay healthy. The current drivers are from the Modernising Pharmacy Careers (MPC) Programme Board, which is part of Health Education England<sup>[18]</sup>, a new body responsible for education, training and personal development of every member of staff in the healthcare workforce.

The Professional Regulatory Board of Pharmacy in the Philippines is leading on a development of a prototype outcomes-based curriculum, which will be used or improved on, by individual university users. As a major project following the Philippine Qualifications Framework, it allows changes in the curriculum so that advanced competencies not present in the current curriculum may be incorporated. This includes outcomes-based, technical skills certification for each year level. The technical skills programmes are based on the needs of stakeholders. The change in curriculum will be geared towards more business, marketing and entrepreneurship, and pharmaceutical care in a community pharmacy setting. This is because 80% of all Philippines' pharmacy graduates eventually work in community pharmacy.

While a slow economic recovery from the deep recession in the USA continues to affect the supply and demand for pharmacists, new practice opportunities are increasing in patient care. Health care in the USA is moving toward a patient-centred, team-based care model and medication use management is now recognised as an essential component of the model by progressive delivery systems.

Current drivers in Chile for pharmacy and pharmaceutical education include quality assurance of pharmacy education, education based on outcomes results and competencies (general and specific).

## 4.3.2 Workforce issues

### Capacity building

In many countries pharmacists have been in short supply and education has played a large part in building workforce capacity. In Namibia the new BPharm degree, with its first graduates in 2014, will produce a generalist pharmacist who can practice in the many fields available for pharmacists including regulatory affairs, community pharmacy, hospital, supply chain management, quality assurance, and pharmaceutical production. The needs and competency-based curriculum against which students are educated means that for the first time ever, Namibia has not only defined what it wants in its future pharmacists but also will receive that product.

Over the last 20 years, pharmacy practice in Malaysia has undergone radical change due to health care transformation and changes in the population's expectation of the pharmacist's role in society. The latest statistics published by the Ministry of Health (MoH) in December 2012 reveals that there are a total of 8,632 registered pharmacists in Malaysia serving an approximate population of 29 million<sup>[19]</sup>. This can be translated as one pharmacist catering for 3,355 persons. The MoH, as the major employer of pharmacists, expects to attain the World Health Organization (WHO) recommendation of 1:2000 by 2016, this translates into a need for approximately 18,000 registered pharmacists<sup>[20]</sup>. Pharmacists in the public sector are remunerated with good salaries and compulsory service has led to a workforce shortage in community pharmacy and industry. To overcome these shortages, service liberalisation in selected parts of the private sector is currently being allowed.

In the USA, pharmacy education addressed the national shortage of pharmacists and other health professionals with robust expansion of capacity in the last decade. The USA experienced a nationwide shortage of pharmacists (and other health professionals) in the 2000-2008 timeframe. Educational institutions responded by increasing the size of classes and by initiating new pharmacy programmes at universities that had not offered PharmD education previously.

Thai pharmacy workforce is still critically insufficient, lower than the Thai government's strategic plan and also lower than WHO's criteria<sup>[21]</sup>. The limited success in human resource for health planning might be due to lack of accurate information, lack of inappropriate planning, limited support to long term strategic planning and lack of participation of relevant stakeholders. Moreover, the new pharmacy workforce maybe more attracted to the private sector offering higher salaries and compensation<sup>[22]</sup>.

Due to harsh socio-economic challenges that Zimbabwe has faced, many pharmacists left to pursue their careers in other regional countries as well as abroad. The resulting demand for pharmacists has forced an increase in the intake of students from an enrolment of 25 students to 60 in the past decade.

Low levels of Emirati health professionals within the UAE means that the health care system continues to rely on expatriates. While this meets the immediate needs of the community, it is not sustainable. Increasing the number of appropriately qualified Emirati nationals in the health care system has the potential to stabilise the health workforce and decrease the reliance on an expatriate workforce.

Since Saudi Arabia's independence, the government succeeded to provide health and pharmaceutical services to its people free of cost. Private hospitals providing paid services to ensure the rapid health care access to the community has increased the need for pharmacists and resulted in hiring qualified professionals from neighbouring countries and abroad. However, due to the current developments in the education

system, it can be assumed that in future Saudi pharmacy institutions will be in a position to meet the future demand of pharmacists in industry and clinical sector.

Once pharmacy students graduate from Chilean universities, they are immediately hired with good wages. The number of graduates in Chile has been kept at equilibrium regarding the needs of the country and the number of graduates emerging from each of the nine schools of pharmacy. Ninety per cent of graduates go into community pharmacy (largely chain pharmacies). A number of graduates are working at the level of regulatory affairs, mainly at the Ministry of Health and its organisms, i.e., National Institute of Public Health. The remainder go into hospital pharmacy and there is now very little pharmaceutical industry in Chile, as it has moved to Brazil and Mexico.

### Clinical capacity building

Alignment of curricula with actual practice activities is important for a number of reasons including job satisfaction and to provide the best health care for patients. As pharmacists' roles in health systems become more patient-focussed there is a need to develop both clinical faculty and clinical training sites where pharmacy students can contextualise their learning. The development of the courses and the clinical training sites does not always however develop in tandem.

In UK, pharmacists will need to draw on their scientific training and their clinical communication skills so an integrated undergraduate and pre-registration programme will ensure that professionals are able to contextualise their learning and apply their knowledge and learning in practice settings.

In Malaysia it is becoming increasingly difficult to accommodate pharmacy students from both public and private institutions for clinical pharmacy and industrial placements.

Thailand has accommodated the challenge of clinical capacity with an agreement in 1984-85 to train their academic staff in schools of pharmacy in USA, to be able to gain site exposure and experience in patient care<sup>[23-25]</sup>.

The profession in Jordan is witnessing several trends such as the cross-country expansion of faculties and the introduction of more clinically-oriented degrees, as well as the development of academic pharmacy through the development of teaching methods and continued investment in staff education.

### Academic workforce

One response to the global shortage of pharmacists has been to increase the size and number of pharmacy schools in both developed and developing countries. Expansion however presents many concerns including the quality of teaching, the number of available pharmacy-trained academic faculty members, and the academic standard of applicants. Higher education funding policies have encouraged higher enrolments, which have not always been matched by similar increases in resources including staffing levels.

In order to invest in the future, pharmaSuisse financed two chairs (50% positions in community and hospital pharmacy, respectively) each at the universities of Basel and Geneva. To consolidate these two new departments in pharmaceutical care and clinical pharmacy, pharmaSuisse is currently supporting financially their research.

In the UK, the lack of pharmacy graduates continuing to PhD level is a concern as the pool of academic pharmacists for teaching pharmacy undergraduates diminishes, a situation not helped by the market-led growth in the number of schools of pharmacy.

In Malaysia there has also been an increase in the number of private universities/colleges that offer pharmacy degree programmes. Due to the rapid expansion, clinical pharmacy, pharmaceuticals, pharmacology, bio-pharmacy and social pharmacy are fields that have shortages of academics leading to a recruitment of foreign pharmacists<sup>[26]</sup>. International collaboration is increasing the production of pharmacists for the Malaysian market. The Ministry of Higher Education is also providing postgraduate scholarships to encourage pharmacists to move towards specialisation and academia.

Thailand developed partnerships, such as, the US-Thai consortium to expand the academic clinical workforce and the Thai-UK Collaborative Research Network<sup>[27,28]</sup>. These partnerships focus on needs-based training allowing students, practitioners and scientists to undertake government-subsidised advanced pharmacy and pharmaceutical studies (e.g. clinical and doctoral level) to build capacity for the academic workforce. Since the initiation of the programmes (1993 in USA and 2003 in the UK), about 200 Thai pharmacy practitioners and researchers have completed studies, returning to Thailand as clinicians, educators and researchers. These collaborations have helped with the transition to an all PharmD programme in Thailand.

Like in Thailand many Jordanian graduates are sponsored by universities to pursue postgraduate studies abroad and, subsequently, return as distinguished staff members to relay their experiences, skills and ways of thinking from regions such as North America, Europe and Australia.

### Expansion of courses

In December 2012, the UK government announced that university intake numbers of pharmacy students would be planned for the future (as it is for medicine and dentistry), and to include all sectors of practice (including community and hospital pharmacy, academia and industry). Universities in the UK are currently free to open new schools of pharmacy and to increase pharmacy student numbers in established schools as the market determines. As a result the number of schools of pharmacy in England has increased from 12 in 1999 to 23 in 2013. Pharmacy student numbers have increased from 42,001 in 1999/2000 to 109,513 in 2011/2012. Currently around 16% of pharmacy undergraduates are from overseas (i.e. outside the European Union).

The number of graduates in Portugal has also increased significantly in the past decade, due to the growth in number of the Faculties of Pharmacy, from 3 in 1998 to 9 in 2013.

The number of both pharmacy graduates and faculties in Jordan has increased significantly since the late 1990's. Jordan's pharmacist-per-population density was the 3rd highest in the world according to the latest FIP Global Pharmacy Workforce Report<sup>[29]</sup>. The driving forces behind faculty expansion are multi-dimensional and include, for instance, the privatisation of higher education and the increased influx of international students.

Japan experienced fluctuations in application numbers when the entry-level pharmacy education programme changed to 6 years and due to school fees.

### 4.3.3 National strategies

Many of the changes in pharmacy education around the world have been driven by national governmental and/or professional strategies.

Portugal is reflecting upon ways to develop the services offered by community and hospital pharmacies in order to strengthen the roles and responsibilities of community and hospital pharmacists in the national health care system<sup>[30]</sup>. Some of the areas in which community and hospital pharmacists can play a greater role include the provision of new pharmaceutical services. This provides a means to increase the quality of care that is delivered, whilst ensuring sustainability of the health care system; and participation in cost-containment efforts to decrease the medicines' budget through the selection, procurement, delivery and administration of the most cost-effective medicines.

In the Japan the health care delivery system is shifting to care at home, and pharmacists are expected to contribute

to homecare. In order to promote homecare a plan was developed in 2012 named “action plan of home care promotion”. It has been implemented and has shifted into seeking cooperation with various professionals and other organisations.

The new BPharm (Hon) degree programme in Namibia has been informed by stakeholders and the MOHSS, ensuring its relevance to national strategy. Where no pharmacy education has existed to date, the focus is naturally to create a locally trained and sustainable workforce that will meet the country's demands. The outcome will be a generalist pharmacist that will catalyse the difference fields of expertise required in future post-graduate education.

In the Philippines the Technical Committee on Pharmacy Education under the Commission on Higher Education makes sure that the minimum standards are met and complied with by pharmacy schools. While the number of graduates has increased significantly over the past three years, it is still not sufficient to meet domestic industry demands. A national career advocacy plan had been drafted by the Board of Pharmacy and will be disseminated to career advocates to attract high school graduates to take up pharmacy.

The strategy of pharmaSuisse is based on competency, quality and services. Pharmacists engage in national disease prevention programmes (e.g. vaccination, colon cancer screening) acquire new competencies with a federally acknowledged specialisation title and can then triage and treat patients with identified diseases as a primary care point using standardised guidelines.

The changes in pharmacy education are aligned with health reform priorities in the USA (both public and private health sectors). The US has embraced the triple aim of: a) better care of individuals; b) improved health of populations; and c) lower overall health care costs as the mantra for health reform. Pharmacy and medication management fits with these priorities due to the centrality of medication use and ensuring it is safe, effective and efficient care is delivered, as well as prevention.

Thai pharmacy education transitioned to a six year PharmD, which has required cooperation between faculties of pharmacy, the Pharmacy Council and the Ministry of Public Health in order to prepare policy for pharmacy professional administration in the health care system, for example, career structure for progression and advancement, and salary revision.

The pharmacists' role in Chile was included in the national policy on medicines implemented in April 2004, the reason why it has been important that the pharmacy curriculum is based on both professional and general competencies.

#### 4.3.4 Accreditation and quality assurance

There has been a global drive for improving quality assurance and accreditation systems in pharmacy education. The strategy of pharmaSuisse is based on the following three pillars: Competency, Quality and Services. Competency is assured by providing the necessary basic education in the university and the possibility of acquiring new competencies by postgraduate (titles, certificates and continuing education accredited courses, blended learning, distance learning, e-learning, etc).

In the UK, current education arrangements are: a 4-year undergraduate degree [MPharm – accredited by the profession's regulator, the General Pharmaceutical Council (GPhC)] followed by a separate year of pre-registration practice-based training leading to registration as a pharmacist with the GPhC. The process of becoming a pharmacist is thus divided into two parts and completely separate in terms of curriculum, quality assurance and outcomes. This creates a gap in how the concept of professionalism is managed, and the MPC's proposal to change to a five year integrated course (with two six-month placements) and concomitant graduation and registration, would bridge this gap.

All the pharmacy programmes, in Malaysia, are subjected to accreditation by the Malaysian Qualification Agency (MQA) and the Pharmacy Board of Malaysia (PBM). MQA is a statutory body under the Ministry of Higher Education and works very closely with PBM on quality standards assessment of pharmacy programmes in the country.

Almost every institution in Saudi Arabia is planning to design their curriculum as per the standards set down by Accreditation Council for Pharmacy Education (ACPE). Moreover, extensive training programmes like Introductory Pharmacy Practice Experience (IPPE) and Advance Pharmacy Practice Experience (APPE) have also been introduced to ensure the clinical competency-based education to meet the national and global needs of the profession. In addition, some institutions are also benchmarking their PharmD programme with the Canadian Pharmacy Accreditation Council with an aim to seek certification in Canada.

Jordan has implemented a national accreditation system for the newly formed faculties of pharmacy; the two older public schools are exempt from this. The accreditation system is designed to control and provide a basis for positive competition among the schools in order to refine the quality of education/service they provide to students.

As the BPharm degree has now been accredited both by the professional and educational regulator, Namibia considers their future pharmacists to be the gold-standard of practice, research and innovation in dealing with the health and social needs of the country.

### 4.3.5 Curriculum development

While many countries for example, UK, Switzerland, Malaysia, and Namibia, retain a BPharm or MPharm/MSc as the entry-level university qualification, a number of countries (for example Japan, Saudi Arabia and Thailand), have adopted the PharmD as their entry-level degree. Regardless of the chosen degree title, there is a global trend towards more integrated clinical curricula with more patient focussed, experiential learning in practice or virtual environments. This had been accompanied by a move away from an emphasis on pharmaceutical science and the development of separate pharmaceutical science degrees.

Active learning in the forms of case-based learning and experiential education has been part of the pharmacy curricula of US schools for years. This is beginning to be even more prominent as evidence grows that active learning and student engagement are critical to the professional development of lifelong learners. Simulation and gaming, especially as part of interprofessional education, will be increasingly important in the PharmD curriculum.

#### Needs based Curriculum

To combat the many issues faced by the pharmacy workforce, mechanisms based on local needs are essential for scaling up, assuring and improving the quality of pharmaceutical education. Educational development is a key strategy that is often limited by resources and capacity within academic and training institutions. Being both aware and sceptical of the impracticality of the “one size fits all” educational model, FIP has been actively supporting, and calling for, a “needs-based education” approach where pharmacy education provision is socially accountable, practice and science are evidence-based and practitioners have the required competencies to provide the services needed by their communities<sup>[28, 31]</sup>.

Namibia is focussing on needs and competency-based education, emphasis on practical exposure, research and pharmaceutical industry. Another significant area of need is in the technical support that is otherwise missing from the practice environment. Namibia is developing a diploma for Pharmaceutical Technicians to fill this gap and provide career development opportunities for the pharmacy support workforce.

In Zimbabwe the curriculum has been crafted to suit the specific needs of a developing nation and specific competencies have been identified which practitioners need for their service delivery in this environment. The pharmacy curriculum has been updated to cater for some key competencies required to specifically developing country pharmacy practitioners. These include such issues as: “the essential medicines concept”, the policies concerning affordable, accessible, equitable, and sustainable provision

of generic medicinal products, as well as the importance of pharmacovigilance with respect to substandard and counterfeit medicines. Other topics of importance to the Zimbabwean pharmacy practitioner involve the emphasis on HIV/AIDS, TB, malaria and other tropical diseases. Zimbabwe and other regional settings have a focus on such subjects as primary health care, nutritional disorders, and paediatric pharmaceutical dosage formulations.

The proposed transformation of the UK curriculum includes the following recommendations<sup>[8]</sup>: dispersed practice placements within the 5-year integrated degree, a single application process for major practice placements, local systems of quality management within the practice placements, the creation of local pharmacy deaneries responsible for signing off the students practice placements, and a view of the academic workforce.

Pharmacy education and training in Portugal faces the main challenge of maintaining a comprehensive pharmacy diploma based on a 5-year curriculum. Due to the fact that around 60% of pharmacists in Portugal work in community pharmacy, faculties have been developing courses relevant to community pharmacy such as non-prescription medicines, communication, pharmaceutical care, pharmacotherapy follow-up, information technology, and management. However, some of these courses remain elective, with fewer vacancies than the number of students who would like to attend.

#### Outcome based curriculum

In 2012, the Pharmacy Council of Thailand produced guidelines about the core competencies and course structures for all pharmacy curricula. These core competencies are not only important for the knowledge, skills, abilities and characteristics of pharmacy graduates to meet societal needs but also will be used as guidelines for the first registration examination which is in the process of professional licensure. The faculties of pharmacy have revised their curricula with the intention to produce highly educated pharmacists to meet the health care requirements of patients and society. Thai pharmacists have to get involved in every aspect from pharmaceutical supply chain or manufacturing industry through to pharmaceutical care. Therefore, preparation of pharmacy students for diversities of roles and responsibilities among different practice settings is the most important aspect in pharmacy curriculum. In 2013, the Pharmacy Council also developed a core competency in industrial pharmacy consisting of research and development (R&D) and regulatory affairs (RA), quality assurance and quality control, and manufacturing.

The Malaysian pharmacy curriculum has gone through gradual review and improvement in line with pharmacy practice globally. The early days of pharmacy education

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which was more didactic and subject oriented, has evolved into a more integrated approach. It incorporates teaching from different disciplines such as physiology, pharmacology, medicinal chemistry and clinical pharmacy. In order to strengthen problem-solving skills among the students, the implementation of problem-based learning, computer-aided learning, hospital clerkship, community and industrial attachments and self-directed learning has raised the competency and self-confidence among the pharmacy undergraduate students. At present, the pharmacy courses in Malaysia are aligned with the outcome-based education approach, which emphasises knowledgeable, competent, ethical and internationally accepted pharmacy graduates.

In Japan a new curriculum will be finalised in 2013 and begin in 2015. These revisions were needed as the curriculum was overcrowded and was too focussed on basic science. Clinical education will be emphasised, a separate introductory programme developed and the curriculum will be more integrated.

In Zimbabwe, due to the shortage of senior academic researchers and funding, the pharmacy curriculum has not been extensively reviewed for the past 12 years. The past two consecutive inspection reports by the regulatory Pharmacists Council of Zimbabwe has strongly recommended the review of the pharmacy curriculum in order to modernise pharmacy training in line with global trends and to prepare pharmacy graduates for practice in the 21st century. Work is under way in the country to introduce an undergraduate degree in pharmaceutical sciences majoring in emerging technologies.

Jordan has introduced the “Virtual Pharmacy” concept where students can practice patient education, dispensing prescriptions, as well as ‘meet and learn’ from real-life cases, and role playing in a community pharmacy environment. The large chain pharmacies in Jordan have sponsored the virtual pharmacies in universities and also provide student placements.

In Chile all universities are looking to develop curricula based on competencies taking into account international experiences (e.g. FIP, Pan-American Conference on Pharmaceutical Education and Tuning Educational Structures).

### 4.3.6 Inter-professional education

#### Developing Countries

In Namibia a number of areas besides the didactic educational modalities are being planned in concert with broader health professions. The rural placements that pharmacy students undertake as part of their studies are based in the public sector, linking students with a hospital from which they move out into the rural community in hard-to-reach parts of the country. They are also part of a multi-disciplinary team including fellow medical students and pharmacists assistants.

#### Developed Countries

In the US significant efforts to make inter-professional education part of the curriculum are being advanced. Health care in the US is moving towards a patient-centred, team-based care model and medication use management is now recognised as an essential component of the model by progressive health delivery systems. Pharmacists are the medicines specialists and those educated clinically are especially in demand. Accreditation of US pharmacy education strongly encourages inter-professional education across the PharmD curriculum and many colleges and schools of pharmacy are the primary champions on their campus for inter-professional education.

### 4.3.7 Unique challenges

Currently, Namibia has approximately 200 pharmacists registered and the intention is to double that number within 10 years of the new BPharm programme. With such a small population (circa 2 million) it is possible to educate enough pharmacists in a relatively short period of time without flooding the market to resolve the current shortage. However, in a country where there has been no previous pharmacist education, the attrition rate has been predictably high (2011 – 2013: 42%) as students may also repeat years or transfer to other professional programmes such as medicine. The concern for the practicing sector is that the pharmacists who graduate will not be sufficient to meet the nation’s needs and has resulted in an increased intake of approximately 27% year on year.

### 4.3.8 Postgraduate courses and certification for specialist roles

Many countries have developed postgraduate courses like Masters courses in clinical or community pharmacy or more specialist qualifications for certain roles, for example, the board certification in therapeutics, certificates in independent prescribing, vaccination, management of TB and business management.

Switzerland has implemented a number of postgraduate certificates beside 3 comprehensive postgraduate specialisation titles. This allows a certain necessary flexibility in the curricula in Switzerland. There are postgraduate (specialisation) titles in community pharmacy, hospital pharmacy and six postgraduate certificates with structured curricula over two-six years depending on the specialisation. A postgraduate certificate is a method to provide a high quality education in a new and specific area. The objective is to integrate the contents of this new certificate into the postgraduate specialisation curriculum of the FPH title.

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Further along the road, the contents should be implemented into the university curriculum in order to prepare the new generation for new professional challenges. As early as 1994, pharmaSuisse provided the “specialisation for community pharmacists”, a structured two year postgraduate course for experienced pharmacists. In 2001, the postgraduate FPH title was created making postgraduate education accessible to all pharmacists and initiating compulsory continuing education as required by law and by the statutes of pharmaSuisse.

Recognising that the five years required for the pre-graduate course are not sufficient to cover all competencies required for pharmacists who will work in various fields of activity, the Portuguese Pharmaceutical Society has established a compulsory continuing education system, with the need to attain a certain number of credits every five years in order to renew the professional license. Nowadays, several faculties of pharmacy and other organisations such as the National Association of Pharmacies and the Pharmaceutical Society offer a wide variety of post-graduate courses and short- and medium-length courses on an array of topics, which range from scientific refresher courses to the acquisition of competencies such as immunisation.

In Jordan, a pharmacy chain and the Jordan University of Science and Technology (JUST) have recently collaborated to develop a “Retail Pharmacy Management Diploma”.

The University of Namibia are planning a Master of Pharmacy work-based programme that will be adaptable to both public and private sectors to ensure continuing education and training, and workforce development. This will give post-graduate students exposure to specific areas of practice including therapeutics information, technical services and clinical pharmacy. Finally, a comprehensive post-graduate programme is being created in conjunction with schools of medicine and nursing to clinically train pharmacists in multidisciplinary teams. This programme will continually evaluate the evidence for this approach to ensure that it is appropriate in meeting patient needs in Namibia.

In Zimbabwe, work to introduce a taught Master’s course in key areas as law relating to pharmacy, toxicology, and African traditional medicine is highly prioritised in the national strategy for pharmaceutical education. There is a requirement for all pharmacists to gain a specified number of Continuing Professional Development (CPD) training credits as criterion for continued registration and licensing. CPD programmes for pharmacists in the private sector are not well established.

Some schools in the Philippines have continuing options for an additional year or two for clinical pharmacy orientation and residency.

Thailand has developed clinical pharmacy/pharmaceutical care workshops and modules for hospital pharmacists. There will be eight workshops per year and these workshops can form part of the Masters degree in clinical pharmacy at four

faculties. Thailand has also developed a four-year board certification pharmacotherapy training programme for pharmacy residents.

All the institutions of higher learning in Malaysia, which offer pharmacy courses, also offer their own postgraduate programmes. The postgraduate education for Masters and PhD can be divided into three categories, which consist of full time research, coursework, or a mixed mode, which combines research and coursework.

In Saudi Arabia and in the whole Middle East region there are limited opportunities for postgraduate clinical practice qualifications. To meet this need some of the Saudi public universities have established collaborative programmes with some universities in the US to provide training slots to Saudi pharmacy graduates.

The Japan Pharmaceutical Association (JPA) launched a new continuing education system: the JPA Lifelong Learning Support System (JPALS) in April 2012. The JPALS is an e-learning system for lifelong learning for pharmacists with a CPD cycle: reflection, planning, action and evaluation. As of the end of March 2013, approximately 20,000 pharmacists used JPALS. To become a fully qualified pharmacist, pharmacists have to obtain at least 40 units within four years of initial training. For revalidation, they have to acquire at least another 30 units over the next three years. There are other specialist fields such as traditional Kanpo medicine and paediatric medication. Other organisations offer qualifications in cancer, infection control and psychiatry.

Most pharmacy schools in the UK offer postgraduate diploma and Masters courses in pharmacy practice, and/or clinical pharmacy as well as PhD programmes, with some also offering professional doctorates (DPharm). It has been common practice to need at least a postgraduate diploma to progress in a hospital pharmacy career. Universities have also provided certified courses for accrediting pharmacists to provide medicines use review services. Pharmacists who have been qualified for two years can take a university certificate in independent prescribing which is accredited by the GPhC. Many other courses have been developed regionally and locally to qualify community pharmacists to provide National Health Service funded services, for example minor ailments services, smoking cessation, sexual health and health promotion.

## 4.4 Conclusion

These 14 case studies give a flavour of some of the transformation that is occurring in pharmacy education globally. There is a shift to patient centred, team based practice and to clinically focussed, integrated curricula with plenty of opportunities for patient and practice centred learning. There remains a shortage of pharmacist academics and of clinical preceptors. Universities and policy makers



will need to think of new and imaginative ways to attract young people into these roles. The understanding of pharmacy education and the factors that influence it, are essential for human resource planning and for achieving universal access to medicines. Collaboration with key partners including governments and national and international pharmacy organisations is crucial to achieving sustainable solutions to the issues surrounding pharmacy education.

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# PART 5

## USING FIP EDUCATION INITIATIVE RESOURCES AND NETWORKS TO IMPLEMENT EDUCATIONAL DEVELOPMENT CHANGE

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### Summary

• The FIP Education initiative (FIPed) was established by FIP in 2011, with the mission to bring together organisations and leaders who are working to improve health through advancing pharmacy and pharmaceutical sciences education. FIPed works to stimulate transformational change in professional pharmacy, pharmaceutical sciences and pharmaceutical education to advance and develop our diverse profession towards meeting present and future health care needs around the world ([www.fip.org/education](http://www.fip.org/education)).

• The capacity to provide pharmaceutical services in each country is dependent upon having an assured competent and capable workforce and a similarly integrated academic workforce to train and support sufficient numbers of new pharmacists and other support staff at both entry-level and advanced levels.

• An adaptable quality assurance framework has been developed and adopted by FIP. Advocacy continues to encourage systems to improve quality assurance and accreditation of pre-service education. One such example is India, where the Pharmacy Council of India (PCI) has proposed to establish the National Task Force for Quality Assurance in Pharmacy Education.

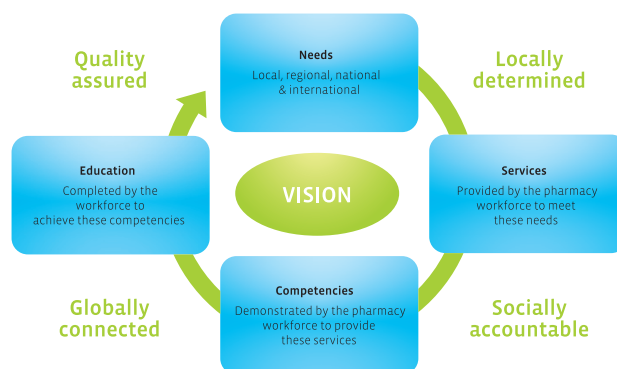
• The Global Competency Framework (GbCF v1) a mapping tool, for the creation of country specific needs for the development of practice and professional development of the pharmaceutical workforce has been adapted and revised in several countries.

### 5.1 Advancing Pharmacy Education Globally

FIP Education Initiative, known as FIPed, is the umbrella directorate bringing together all of FIP's education actions; strengthening our projects and our partnerships with the World Health Organization (WHO) and with United Nations Educational, Scientific and Cultural Organization (UNESCO).

FIPed comprises the Academic Institutional Membership (AIM), the Academic Pharmacy Section (AcPS) and the Education Development Team (EDT), a reformulation of the former FIP-WHO-UNESCO Global Pharmacy Education Taskforce (PET). Advocating for the use of needs-based education and training strategies (Figure 5.1) where pharmacy education provision is socially accountable, where practice and science are evidence-based and practitioners have the required competencies to provide the services needed by their communities.

Figure 5.1: Needs-Based Professional Educational Model (PET 2008-Present).



WHO-UNESCO-FIP Education Initiative Development Team

It also provides a global platform for exchange, mentoring and learning for leaders and academics, focusing on the development of skills in the areas of leadership, academic management and pedagogy. FIPed builds, advocates for, and

disseminates evidence-based guidance, consensus-based standards, tools and resources for educational development and quality assurance, as well as developing and facilitating education-related policy that supports advancement of the profession. This is aided by working closely with stakeholders at global, regional and local levels.

Building on the success of the 2008-2010 Action Plan<sup>[1]</sup> implemented by the PET, the current domains of activity will continue to develop and grow in a sustainable way.

The current Work Plan is oriented towards identifying locally determined needs and services and using those to facilitate comprehensive education development and achievement of competencies, which are required to deliver the services (Figure 5.1). The domains for action prioritised in the current Work Plan relate specifically to developing a pharmacy education vision and framework, preparing the pharmacy workforce, quality assurance of education, and developing educational leadership. From these domains, nine project teams have been created to support the areas of:

- Academic Capacity
- Competency
- Continuing Professional Development/Continuing Education
- Interprofessiona Education
- Leadership
- Pharmacy Support Workforce
- Quality Assurance
- Social Accountability
- Workforce

The leadership for these project teams comes from the EDT, which serves as the coordination, analysis and dissemination hub. It includes both a core of key stakeholders and a dynamic shell of collaborators most attuned to the needs of their regions.

The global workforce needs to be competent, capable and flexible with a clear orientation to a medicines-centred, patient-focused approach towards education, development and professional practice, centred on the tenets of needs-based education. FIPeD and EDT advocate for professional needs-based education, working in partnership with UNESCO and WHO<sup>[2-7]</sup>.

For healthcare professionals, the capability to improve therapeutic outcomes, patients' quality of life, scientific advancement and public health imperatives is dependent on a foundation of education and training. Likewise, a capable practitioner workforce is an essential pre-requisite for all healthcare professions and pharmacy is no exception. Evolving roles towards more patient-facing service provision has been a steady trend in the last two decades and modern, contemporary forms of initial education and training are vital for professions to be able to meet the increasingly complex healthcare demands of populations<sup>[3-7]</sup>.

Pharmacy education worldwide continues to have many issues that challenge the quality of teaching and learning at a time when there are limited resources to meet these challenges. The data from the 2012 FIP Global Pharmacy Workforce report makes clear that there is a global scarcity of qualified pharmacists to provide patient care, even though there are more opportunities for pharmacists to expand their roles and responsibilities<sup>[8]</sup>.

FIPeD and its groups have been highly active with projects and publications across the domains of human resources, quality assurance, social accountability, competency, leadership and the pharmacy support workforce, such as:

• **2012 Global Pharmacy Workforce Report** ([www.fip.org/humanresources](http://www.fip.org/humanresources)) – Published and launched at the FIP Centennial Congress, the report includes data from 90 countries and territories and nine country case studies, as well as an important chapter developed with their partner WHO, on transforming and scaling up education.

• **Global Competency Framework Recognition** ([www.fip.org/pe\\_resources](http://www.fip.org/pe_resources)) – Version 1 of the GbCF developed by the FIP Pharmacy Education Taskforce, to support the educational development of pharmacy practitioners, has been recognised and utilised by national associations in several countries and in regional initiatives to date.

• **FIP-UNESCO UNITWIN: Global Pharmacy Education Development network (GPhED) – Two Platform Projects Launched** ([www.fip.org/pe\\_resources](http://www.fip.org/pe_resources)) – **SABER** and **Pharmapedia**. SABER is an open access platform designed for provider institutions to share and develop learning and simulation tools, being hosted by Monash University in cooperation with UNITWIN partners. Pharmapedia is directed towards individuals (students and practitioners) and is a content-driven wiki® platform intended for long-term growth as a knowledge resource for pharmacy and pharmaceutical sciences.

• **Academic Institutional Membership (AIM)** (<http://aim.fip.org>) – Over 100 AIM members in 2012 and growing. AIM continues to grow as a distinctive FIP membership category that allows faculties and schools of pharmacy to become inter-connected on a global platform of discussion, leadership and shared challenges and successes. AIM focuses on the advancement of Faculties and Schools of Pharmacy – fostered by faculty Deans and decision makers – alongside the on-going changes in pharmacy practice, science, research and their respective funding. The Academic Institutions are represented by their Deans, Vice Deans, and other decision makers within the membership activities such as an online discussion/exchange/news platform and the annual Global Deans Forum at the FIP Congress.

• **2012 AIM Global Deans Forum** (<http://aim.fip.org>) - Over 70 AIM members participated in the Global Dean's Forum in Amsterdam. Expert speakers and facilitators from around the

world as well as innovative interactive opportunities were featured over the two-day event that took place in Amsterdam in October 2012.

• **1st Pharmacy Support Workforce Symposium** – This symposium took place at the 2012 FIP Congress and brought together members of the pharmacy workforce from across the globe to discuss the changing roles of pharmacists and pharmacy support staff and how they help or hinder one another in the workplace.

The outcomes of the projects developed by the FIPEd Development Team have impact across different countries, cultures and educational systems. Examples of how the tools - Global Framework for Quality Assurance and the GbCF, both version 1 - have been used are portrayed below.

## 5.2 Global Framework for Quality Assurance

Almost all countries have established systems for oversight and quality assurance (QA) of education in general, fewer countries have QA systems specific to pharmacy education that are well-developed. In some countries, such systems are emerging; in others, they are non-existent or, at best, rely on internal (institutional) QA processes.

To support national efforts to improve systems and standards for QA of pharmacy education, FIP developed and adopted the *Global Framework for Quality Assurance of Pharmacy Education*<sup>[121]</sup>. The framework (available at [www.fip.org/pe\\_resources](http://www.fip.org/pe_resources)) provides the context for QA of pharmacy education, presents a framework for a national QA system, and offers quality criteria for pharmacy education.

The framework is intended to serve as a foundation that can be adapted and built upon to suit national needs, systems, and conditions. It focuses on the elements that need to be included and how these elements are applied in principle, rather than being specific or prescriptive. The framework does not advocate for any one overall model or QA system but comments on different approaches that exist and outlines trends that are emerging globally<sup>[122]</sup>.

### Quality Assurance in Pharmacy Education in India

Suresh Bhojraj, President, Pharmacy Council of India

“Pharmacy education in India is being delivered in diverse settings and backgrounds, including: government and private pharmacy colleges including deemed universities and departments of pharmacy at state/central universities; urban vs. rural settings; institutes with strong industry collaboration vs. practise based training; and integrated postgraduate research institutions vs. diploma institutions. There are

approximately 1030 schools of pharmacy offering degree and diploma programs and there is significant variation in the outcomes of these institutions with respect to the quality of education and training provided to the students.

There is need for QA in pharmacy education, in order for the service providers and the prospective employers of pharmacy graduates and pharmacy professionals, such as, hospitals, industry, pharmacy educational institutions, to be satisfied with the competencies acquired by the pharmacists who graduate from these pharmacy institutions. Pharmacy institutions in India are encouraged to undergo accreditation by the National Board of Accreditation of All India Council of Technical Education, New Delhi or the National Accreditation and Assessment Council (NAAC). The former is an accreditation agency for technical institutions (engineering and technology) and the latter an accreditation agency for higher educational institutions (universities, arts and science colleges). Both these agencies do not address the role or policy on good pharmacy education and practice that would incorporate core principles and elements considered essential for advancing the Pharmacy Profession.

Drawing inspiration from the initiative of the *International Forum for Quality Assurance of Pharmacy Education* which operates under the auspices of the FIPEd Development Team, and the *Global Framework for Quality Assurance of Pharmacy Education* document published by FIP, and also realising the need for quality assurance in pharmacy education, the Pharmacy Council of India (PCI), the statutory body regulating pharmacy education and profession in India has proposed to establish the National Taskforce for Quality Assurance in Pharmacy Education (NTF QAPE). The purpose of the Taskforce is to oversee the implementation of PCI's initiative for QA in pharmacy education. The initiative aims to enable the sustainability of a pharmacy workforce that is relevant to local needs and also aligned with global expectations. The initiative is dedicated to three domains of action: QA, academic and institutional capacity, and competency and vision for pharmacy education and profession.

The Objectives of the National Taskforce include the following:

- 1• to promote excellence in education for the profession of pharmacy;
- 2• to provide a national forum for exchange of information, collaboration and co-operation in the area of QA with other organisations involved in the QA of education in the country or abroad;
- 3• to accredit and/or grade pharmacy educational institutions;
- 4• to provide guidelines for continuing education (CE) and continuing professional development (CPD).

PCI has drafted regulations for the establishment of the NTF QAPE and has sent them to stakeholders for their comments before the regulation becomes binding on the institutions. The PCI is also organising workshops regionally and nationally to obtain feedback on the proposed initiative. It is envisaged

that the QAPE initiative will initially get implemented as a voluntary exercise and become mandatory over a period of time.

The Taskforce will then be given the mandate to frame the tools (norms) for QA for pharmacy education in the country (undergraduate, postgraduate, CPD, practitioner development, LLL, as well as participating in an appropriate global platform and having on-going dialogue on sharing of evidence, practice, lessons learned, resources and tools for pharmacy education and workforce planning, and mutual recognition of pharmacy qualifications.

The PCI envisages that by the year 2020, NTF QAPE will help overcome weaknesses in the education system and help produce appropriately trained pharmacists with the competencies to not only meet the demands of the country, but also be a part of a global competent health care workforce.”

### 5.3 Global Competency Framework v1 (GbCF)

Competency frameworks in healthcare have become increasingly popular due to the need for transparency in the training, development and accreditation of health care professionals. Continuing Professional Development (CPD) is advocated as a means of ensuring the competence of health care professionals and is now mandatory for many of the health care professions. In order for CPD to be meaningful, health care professionals need to know the areas of competence for their role, what it is they need to be able to do, to enable them to accurately identify their learning needs. Competency frameworks are based on real life roles and experience and so can provide a starting point, while experiential or applied learning is essential for the development of competence<sup>[13, 14]</sup>.

The Competency project team has developed an initial construct towards an “educational roadmap” to guide efforts in and mechanisms for pharmacy education<sup>[15, 16]</sup>. The GbCF Version 1 contains a core set of behavioural competencies ([www.fip.org/pe\\_resources](http://www.fip.org/pe_resources)). It can be a starting point to provide guidance for foundation level practice, at an individual level and also for further development of advanced practice. It can also be an aid in providing an overview of how practice at a foundation level can be translated into the ‘what’ and ‘how’ for students, always with country specifications in mind. The GbCF does not imply that there should be a ‘single’ global curriculum that would fit all.

Acting as a mapping tool for the creation of country specific needs for the development of practice and practitioner professional development, the GbCF can be attached to an assessment grid and, together with appropriate assessment tools, aid countries that do not currently have a competency

framework but wish to develop one. By creating a portfolio, in synergy with other assessment tools, countries can implement the tool into practice, developing education and training infrastructures for their practitioners<sup>[17 - 23]</sup>.

The GbCF is a living document and more studies are encouraged to effectively refine the core competencies for a foundation level framework across all pharmacy sectors that will improve the competence of practitioners. Nonetheless, the findings from its development provide evidence that at its core a practitioner is the same globally, there are the same expectations of competence, and the practice is similar as practitioners are the medicines experts.

#### Examples of how countries and individual schools have used the GbCF:

##### Ireland

*Cora Nestor, Practice Development Pharmacist, Pharmaceutical Society of Ireland*

“In Ireland, the Pharmaceutical Society of Ireland (PSI, the pharmacy regulatory body), is currently implementing a new system of mandatory CPD for pharmacists informed by the recommendations of an international review of CPD models. In this new CPD system, all pharmacists are encouraged to adopt a more reflective approach to learning and to identify their own learning and development needs based on the skills and competencies required for their particular professional practice. A core competency framework was identified as a key requirement for the implementation of this new system to provide guidance and structure for CPD over the changing demands of a pharmacist’s career. The competency framework for pharmacists in Ireland was developed based on the GbCF for pharmacists drafted by the former FIP Pharmacy Education Taskforce, now FIPeD Development Team.

The GbCF was used as a mapping tool to review the competencies and behaviours identified to reflect Irish pharmacists’ practice. An expert group of pharmacy practitioners from all practice settings in Ireland was formed to review the framework. Participants used their knowledge and practical experience to review and update the competencies as identified in the GbCF, to those that would be required of pharmacists newly-registered to practice pharmacy in Ireland. Following the development process, the Council of the PSI, adopted the core competency framework for pharmacists in Ireland and this framework will now be used as a tool to guide the continuing professional development of pharmacists over the changing demands of their careers.”

## University of Wyoming School of Pharmacy

*Linda Gore Martin, Dean, University of Wyoming School of Pharmacy*

“The University of Wyoming School of Pharmacy (United States) used the GbCF as the basis for the redesign of our student learning outcomes. Other statements were used to fill in any perceived gaps. The various guidelines and lists were relatively consistent with GbCF. The school is now in the process of developing measurements for assessing all of these competencies.”

## Croatia, Bosnia and Herzegovina, Monte Negro and Macedonia

*Arijana Meštrović, Competency Development Manager, PharmaExpert*

“**Croatia:** A day symposium about competency development, self-assessment and CPD approaches was held in Zagreb (Society) with 90 participants. There were representatives from community pharmacy, managers, universities, and industry. From the evaluation form it was found that pharmacists are highly motivated to implement a competency based education plan on an individual and organisational level. Progress will be followed through implementing small projects in the organisations.

Educational plans and CPD based on a competency assessment, is currently used and planned across six pharmacy chains in Croatia representing more than 200 pharmacies (>20%) in the country.

**Bosnia and Herzegovina:** A two day conference was held in Sarajevo with international participation about assessing competency and applying a CPD approach for competency development. It was attended by 320 participants – from different settings including: community and hospital setting, university, and government agencies. Representatives from Croatia (University), Serbia (community pharmacy), Montenegro (Chamber), Macedonia (Chamber, community pharmacy) presented their progress in competency based education implementation. The Pharmaceutical Society of Bosnia and Herzegovina took a lead role in the implementation of the GbCF at a national level. A three-day training programme for assessors in community setting who will serve on the national evaluation project in community pharmacies, will be held in September in Sarajevo. Many pharmacy chains or individual pharmacies are participating in the implementation of this project.

Similar conferences are scheduled for Serbia (Belgrade) and Montenegro (Podgorica) in October 2013 and Macedonia in 2014.

**Montenegro:** The GbCF was validated at the national level in

2012 to encourage CPD to be based on competency evaluation. It is in use in private pharmacy chains.

**Macedonia:** The Pharmaceutical chamber is taking a lead in implementation of the GbCF at the national level, validated in 2012, in use in more than 20% of pharmacies. Initial results of this project (joint with Serbia and Croatia) were presented during the FIP Congress in Amsterdam and published in a poster at the APhA meeting in LA in 2013.

The GbCF is mainly used to detect educational needs, plan CPD on an individual basis, and at the organisational and national levels, as well as to raise motivation, as colleagues are motivated to start development according to international standards. Hence, the GbCF is in use for identifying variances and circumstances, as well as gaps in pharmaceutical care delivery.”

## Serbia

*Dusanka Krajnovic, Belgrade University Faculty of Pharmacy*

“The GbCF document is well adapted to the Serbian pharmaceutical workforce and the implementation process of the GbCF document in some part of Serbia started in June 2012. A working group of the Pharmaceutical Chamber of Serbia is developing a national competency framework for the primary level of pharmaceutical care based on the GbCF. It is expected that the implementation process of the GbCF-based national framework into the regulation system will be in process in the near future. Currently, community pharmacists from the Subotica Pharmacy and several others healthcare institutions from the north part of the country have been using the culturally adopted version of the GbCF document for the evaluation and self-evaluation, and the assessment results will be analysed and published. One PhD thesis at the Belgrade University Faculty of Pharmacy is focused on the GbCF as an evaluation instrument.”

## Pacific Island Countries

*Andrew Brown, Assistant Professor, Discipline of Pharmacy, Faculty of Health, University of Canberra*

A lack of health personnel with the appropriate on-going competence is recognised as an impediment to achieving the health-related Millennium Development Goals (MDGs) in many Pacific Island Countries<sup>[8, 14, 24, 25]</sup>. There is a need in low-income environments to focus on medical supply chain education to be able to achieve the health related MDGs. A systematic approach to improving essential medicines supply management and workforce competence has begun in the region, with the aim to develop a Pharmacy Competency Framework identified as a priority<sup>[18, 19]</sup>.

To meet this need a process of participatory action research involving academics, Ministry of Health officials and health

personnel was used, informed by aspects of the GbCF. A draft framework was revised through a process of workplace interviews in Vanuatu and Papua New Guinea with wider validation using an online survey tool.

As a result of this research a validated, service based, pharmacy competency framework was generated, containing 113 competencies, organised into four clusters: Organisation and Management Competencies 91.8% relevance (n=24), Professional/Personal Competencies 99% relevance (n=24), Pharmaceutical Public Health Competencies 97.2% relevance (n=24) and Pharmaceutical Care Competencies 90.4% relevance (n=24).

The Pharmacy Competency Framework generated from this research is service based rather than cadre specific, which allows wider application to the diverse pharmacy practice environments of the Pacific. The framework can assist health personnel responsible for the delivery of pharmacy services when considering education requirements for pharmacy service providers, and when monitoring staff effectiveness in their local context. This framework could be adapted to develop similar frameworks for use in other international environments.

#### PAHO/WHO Initiative

The Pharmaceutical Services initiative based on Primary Health Care began in late 2008 as part of the activities promoted by the Pan American Health Organization/World Health Organization (PAHO/WHO) to strengthen health systems in the Americas<sup>[26,27]</sup>. The strategy for strengthening pharmaceutical services based on primary health care is patient-centred, and is part of the technical cooperation framework of PAHO/WHO in the region of the Americas. In order to join efforts to strengthen the role of the pharmacist for the development of pharmaceutical services based on primary health care, the Pharmaceutical Forum of the Americas (FFA) together with PAHO/WHO, FIP and the Pan American Conference on Pharmaceutical Education (CPEF), created the Technical Group for the development of competencies for pharmaceutical services. The Technical Group has been created to develop a proposal for pharmaceutical services based in primary health care and good pharmacy practices.

Several main references were used when developing the competencies<sup>[28-32]</sup>. The document will be published online and will be used as part of the didactic material for regional virtual courses. The GbCF was one of the references used to develop the final set of competencies contributing to a global map in the Competencies of the Pharmacist for the Development of Pharmaceutical Services Based on Primary Health Care and Good Pharmacy Practice document.

## 5.4 Pharmacy Education Journal | Overarching Resource

*Pharmacy Education* is an online free-access international journal hosted and published by FIP and endorsed by WHO. It publishes articles with a focus on issues in pharmacy education. The journal is now engaging to a greater extent with the international audience by encouraging research submissions and inviting reviewers specifically from the global context.

The pharmacy academic and education sector is growing to meet the human resource demands in settings where pharmacy education is developed but also notably in regions such as sub-Saharan Africa where there is the greatest dearth of pharmacy personnel<sup>[8,34]</sup>. Pharmacy education is perhaps the only way to provide a sustainable approach to workforce solutions in ensuring quality medicines supply and pharmaceutical care.

An essential part of this demand is to ensure that these activities in the academic and education setting are well reported in the literature including journals such as *Pharmacy Education*. An editorial decision was also made in 2012 to focus particularly on the main areas of publishing including original research, programme and assessment description and short reports, and will continue to support conferences and symposia through the publishing of abstracts.

There will be continued efforts to ensure quality of published works and support especially for new authors and researchers and those from the practice settings where formal education increasingly takes place.



## 5.5 Future steps

- The Development Team aims to advocate and facilitate support tools for pharmacy education that are needs-based in their approach. This will include post-registration education in addition to pre-service.
- Future FIPeD Development Team activities include the launch of the first African Centre of Excellence within the *UNITWIN Network in Global Pharmacy Education Development* (GPhED) network; the launch of the FIP Global Pharmacy Workforce Observatory (GPWO) in partnership with the Royal Pharmaceutical Society; the publication of an updated version of the FIP Global Framework for Quality Assurance of Pharmacy Education; further validation and development of GbCF v1; and the compilation of leadership development resources.

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# PART 6

## PHARMACY STUDENTS AND YOUNG PRACTITIONERS

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### Summary

- The International Pharmaceutical Students' Federation (IPSF), established in 1949, currently represents more than 350,000 pharmacy students and recent graduates in 84 countries worldwide. The IPSF is the leading international advocacy organisation of pharmacy students promoting improved public health through provision of information, education, networking, and a range of publications and professional activities. The IPSF initiatives focus mainly on public health, pharmacy education and professional development. Initiatives include public health campaigns, research regarding pharmacy education and workforce development, the Student Exchange Programme (SEP), organising international and regional congresses and symposia, and publication of the IPSF News Bulletin, Newsletter and educational supplement *Phuture*. More information at: [www.ipsf.org](http://www.ipsf.org).

- The Young Pharmacists' Group (YPG) was officially established as a network of the International Pharmaceutical Federation (FIP) in 2001 although young pharmacists have always been part of FIP. The aim of the YPG is to encourage young pharmacists to get actively involved in international pharmacy and within FIP. There are a number of young pharmacists who are actively part of FIP boards and sections, representing over 1000 young pharmacists in 80 countries worldwide. Members of the YPG meet formally at a business meeting once a year at the FIP Congress. At the business meeting the educational topics and the theme for Congress Programming are selected, new initiatives and projects are discussed, and the success of the previous year is shared. More information is available at: [http://www.fip.org/young\\_pharmacists\\_group](http://www.fip.org/young_pharmacists_group).

- The YPG offers its members an opportunity for support projects in their area of practice. The YPG grant for professional innovation aims to support young members from around the globe who have limited resources for professional organisational involvement or their own research, and providing funds for the implementation of a project. Projects can stem from any field of pharmacy (pharmacy practice, pharmaceutical science and/or pharmacy education), aimed to directly or indirectly benefit or improve community health and demonstrate the added value of pharmacy on health.

### 6. 1 Current Policies and Projects

Education is a priority for the IPSF development plans. The pharmacy education team along with the professional development team is committed to provide primary and continuous education to pharmacy students and recent graduates. Primary education falls under the pharmacy education portfolio through several initiatives to provide quality education to pharmacy students.

Most of the activities are centralised in the IPSF events – regional congresses and World Congress, which take place usually in July/August each year. Scientific and educational symposia days are important events in the World Congress. The IPSF invites well-known specialists in the field of pharmaceutical sciences and practice to share their expertise. The theme is decided prior to the Congress, to meet the needs of students in terms of education concerning a particular topic. Usually the IPSF seeks themes that are related to the latest news and discovery in both fields, with an emphasis on global topics. Similar symposia take place in the regional events (Africa, America, East-Mediterranean and Asia), and the themes are centred on a regional issue that students would like to know more about. Also, along with the symposia, poster exhibitions aim at give opportunity for students to show their findings or share their current projects. This is particular interest for them, since it is usually their first scientific communication at a regional or global level.

During the year, students are also encouraged to write articles for the *Phuture magazine*, which is good training for scientific writing and publications. The essay competition has been running for three years and aims to further develop and improve writing skills as well as critical thinking and appraisal. The students are required to write in article format and the winner has the opportunity to be published in the *Pharmacy Education* journal (a collaboration with FIP Education Initiative Development Team)<sup>[3]</sup>.

The IPSF is also involved in initiatives with United Nations Educational, Scientific and Cultural Organization (UNESCO), by taking part in the Education For All (EFA) initiative and constantly submitting suggestions and reports to the UNESCO e-groups.

The IPSF has also collaborated with FIP on several occasions, and one worth mentioning is the Patient Counselling Event (PCE) booklet, an initiative started by the IPSF. The need for international cooperation in developing new innovations in training concordance-based communications that support adherence is evident. The IPSF has done important pioneering work by promoting PCE since the 1980s. To promote education, the patient counselling booklet "*Counselling, Concordance and Communication – Innovative Education for Pharmacists*" was published as a joint project by FIP and the IPSF in 2012. The booklet has been a useful educational tool to enhance

communication skills and learning techniques based on dialogue, respect for patient autonomy, and mutual agreement<sup>[2]</sup>.

The FIP YPG currently has two projects relating to education. However, as YPG supports young practitioners, the majority of their members are interns or registered pharmacists.

The YPG's first project, which has already been run at pilot stage, is the "YPG Barometer". Its aim is to investigate the link between young pharmacists' job satisfaction, motivation to practice and pre- and post-graduation education. The objective is to provide data to improve pharmacy education and practice so that pharmacists can have greater job satisfaction. By identifying the factors that affect the motivation of young pharmacists to practice, the YPG is providing valuable data for FIP to promote change in the profession. In this way, young pharmacists are shaping the future of the profession. The "YPG Barometer" is the first component in identifying job satisfaction issues, and possibly helping to gain inclusion for these subjects within established educational programmes. The initial phase is a questionnaire, which assesses the demographics of the young pharmacist population (current practice, length of career, school of pharmacy), then evaluates young pharmacists' perceptions regarding their education and their job. Factors affecting job satisfaction and motivation to practice will also be identified as well as a component of the questionnaire focusing on continuing professional development (CPD). This project will be rolled out further after the FIP World Congress, Dublin 2013, in September.

The second project is the "Leadership Project" and will focus on providing additional leadership skills to young practitioners. It has been in response to requests from students and young pharmacists who feel that their initial education programmes do not provide the adequate skills needed to practice pharmacy from a managerial role. Elements included will be management skills (including team, time and project management skills) and communication skills.

## 6.2 Strategic Priorities

The IPSF aims to develop more educational activities. It was decided that all strategic decisions would be made in response to students' feedback. To achieve this, it has launched two surveys inquiring about the educational needs of students. Several project proposals were submitted to the General Assembly and the students decided which were more appealing to them. *Pharmacy Education Newsletter* has provided a platform for students to write and communicate their experiences, ideas and research findings. The IPSF has been involved in organising national educational events, by providing our international expertise in the field, suggesting themes, and a network of contacts. Along with decentralising educational events from annual events, the IPSF has also

further developed existing events and created new ones focused on education. The Young Researchers' Forum was created at the World Congress and aims to provide a sharing space for students to expose their views on education, science and practice.

The IPSF conferences are also events in which students are encouraged to present innovative ideas through informal talks, lectures and workshops. Most importantly, the Pharmacy Education Extracurricular Training was implemented with the objective of providing students with training in topics that are not usually tackled at university. The quality of the IPSF events is certainly an important issue and the IPSF extends invitations to world-renowned speakers to provide high calibre talks and advice to students. The IPSF is keen to collaborate with other professional organisations and universities to increase the quality of events.

The YPG is currently focused on identifying elements missing from the initial education received by recently graduated pharmacists. Primarily this has been found to be day-to-day skills for practice, which relate to human relations: customer service, staff management, and communication and conflict resolution. Once these shortfalls have been identified from a wider range of young practitioners, the YPG will then shift focus onto implementing more programmes directed at those missing elements. The YPG will also assess whether having these additional skills will result in greater workplace satisfaction. This is designed as a long term project, and can be run at regular intervals to ensure that the changing needs of young pharmacists can be met. As the study will identify issues resulting from educational programmes, the YPG will also then focus on providing feedback and information to the boards and selected sections, with regard to the identified areas of deficit and need. It is hoped this information would then provide a basis for including these components within the pharmacy courses provided.

## 6.3 Future Steps

This year, the IPSF has started collaboration with UNESCO, in order to set up joint events. UNESCO experts can bring a new dimension to the IPSF education initiative. The IPSF works to develop further collaboration with FIP Education Initiative (FIPEd). The IPSF will implement an e-group where students, during the year can talk to each other and share their ideas regarding education as students getting to know each other better will help to reduce barriers between different educational systems, the IPSF plan to further develop their advocacy system in order to know more clearly what students are looking to gain from the IPSF, and what the IPSF can offer them outside of university.

At the beginning of the year the IPSF, in collaboration with FIPEd Development Team, launched the "FIPEd - IPSF Student

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Learning Experience Questionnaire”, a continuation of the IPSF Moving On II, which focused on the pharmacy students’ perceptions of their education (data being collected since 2004). The questionnaire has now been revised to include students’ ways of studying their degrees and will allow world-wide comparisons to be made and mapping of the learning experiences and the quality of learning in pharmacy programmes. It is available online ([http://www.codegnet.org.uk/molli\\_2013/](http://www.codegnet.org.uk/molli_2013/)) in six different languages (Arabic, French, Japanese, Mandarin-Chinese, Portuguese, and Spanish).

The “YPG Barometer” project’s pilot study was with the Portuguese Young Pharmacist group. YPG is working towards recruiting other national groups to help roll out and collect data over the next year. National groups are being used as often they are affiliated with other member groups of FIP and may be able to access better resources. The YPG aims to recruit at least five other national groups from the different regions of the world (Asia, Africa, Europe, North America and South America plus Australia). This information will hopefully be collated to provide a global picture of the workplace issues for young pharmacists by the FIP Annual Congress 2014 Bangkok.

The “Leadership Project” is currently working in collaboration with the FIPeD Development Team. One of the components of the project will be to provide a leadership skills session at future FIP World Congresses, occurring annually. This year the session will focus on leadership for young pharmacists, which will inform the initial focus of the “Leadership Project”.

## References

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# PART 7

## SUMMARY

The roles and responsibility of pharmacists have been evolving from product-oriented to patient-oriented service provision in the last two decades. A foundation of professional education and training is a key factor for health care professionals to develop the capability to improve therapeutic outcomes, enhance patients' quality of life and help people to stay healthy, as well as advance science and practice. For pharmacy contemporary forms of initial education and training are vital for professions to meet the increasingly complex health care demands of populations in any country.

This 2013 *FIPeD* Global Education Report has presented the current pharmacy and pharmaceutical sciences education and workforce situation across 109 countries and territories around the world, representing around 175,000 pharmacy students and 2,500 education institutions worldwide.

Data from the 2013 *FIPeD* Global Pharmacy Education Survey indicates that pharmacy education, in both capacity and infrastructure varies considerably between countries and WHO regions and generally correlates with population numbers and country level economic development indicators. Those countries and territories with lower economic indicators tend to have relatively lower educational capacity and pharmacist production. Furthermore, African countries tend to have lower educational capacity and supply pipelines for pharmacists. This has implications for future parity for access to medicines expertise. There needs to be an ongoing effort to ensure capacity building linked with initial education and training to meet the pharmaceutical health needs of populations.

The FIP Education Initiative (*FIPeD*) was established by FIP in 2011, with the mission to bring together organisations and leaders who are working to improve health through advancing pharmacy and pharmaceutical sciences education. *FIPeD* works to stimulate transformational change in professional pharmacy, pharmaceutical sciences and pharmaceutical education to advance and develop our diverse profession towards meeting present and future health care needs around the world.

As part of its initiative to advancing pharmacy and pharmaceutical sciences education *FIPeD* has developed the Global Competency Framework (GbCF Version 1), which contains a core set of behavioural competencies. It can be a starting point to provide guidance for foundation practice, not only at an individual level but also for further development into advanced practice, but it does not imply that there should be a 'single' global curriculum that would fit all.

The 14 case studies (see Part 4 of this report) provided an overview of the transformation that is occurring in pharmacy and pharmaceutical science education globally. Notably

there is a shift to patient centred, team based practice and to clinically focussed, integrated curricula with several opportunities for patient and practice centred learning.

Nonetheless there is still a shortage of pharmacist academics and of clinical preceptors. Universities and policy makers will need to think of new and imaginative ways to attract young people into these roles. The understanding of pharmacy education and the factors that influence it, are essential for human resource planning and for achieving universal access to medicines. Collaboration with key partners including governments and national and international pharmacy organisations is crucial to achieving sustainable solutions to the issues surrounding pharmacy education.

*FIPeD* is committed to further progress the global understanding of education and invites all readers not just to read this report, but to actively participate, share experiences and strategies in addressing education challenges through the global *FIPeD* platform and communities of practice. The *FIPeD* Development Team aims to advocate and facilitate design and support tools for pharmacy education that are needs-based in their approach.

# Annex 1 | Data Table

	Pharmacy graduates per year		Declared number of Pharmacy Faculties/Schools	Academic programme		Practical training			
	Total	Female		Degree Type	Length (years)	Integrated		Separated	
						Practice	Total length (months)		Practice
Afghanistan	1410	430	41	B, P	4, 5	C, H, I, O	4	-	-
Albania	285	-	5	-	5	-	-	-	-
Argentina	-	-	17	B	5.5	C, H	3	-	-
Armenia	20	17	1	B	4	-	-	-	-
Australia	1755	1131	18	B, M	4, 2	-	-	C, H	12
Austria	230	-	3	M	4.5	-	-	C, H	12
Bangladesh	7277	-	25	-	4	-	-	-	-
Belarus (Rep. of)	260	147	1	M	5	-	-	-	5
Belgium	500	-	9	B, M	3, 2	C	6	-	-
Benin	-	-	1	P	6	-	-	-	-
Bhutan	3	1	0	-	-	-	-	-	-
Bosnia and Herzegovina	53	50	2	M	5	-	-	C, H, O	12
Brazil	8956	-	417	B	4	C, H, I, O	7	-	-
Bulgaria	123	75	4	M	5	C, H	6	-	-
Burundi	-	-	0	-	-	-	-	-	-
Cambodia	148	-	4	B	5	C, H, I	9	-	-
Cameroon	22	8	4	P	6	C, H, I	8.5	C, O	12
Canada	1151	748*	10	B, P	4, 5	C, H, O	8	-	2.5
Chile	-	-	9	B	5	-	-	C, H, I, O	6
China	-	-	74	-	3	-	-	-	-
ChinaTaiwan	995	597	7	B, P	4, 6	H	4	-	-
Congo (Rep. Dem. of)	-	-	0	-	-	-	-	-	-
Congo (Rep. of)	34	13	1	P	6	-	12	-	-
Cook Islands	3	-	0	-	-	-	-	-	-
Costa Rica	199	145	5	B	4	C, H, I	12	-	-

	Pharmacy graduates per year		Declared number of Pharmacy Faculties/Schools	Academic programme		Practical training			
	Total	Female		Degree Type	Length (years)	Integrated		Separated	
						Practice	Total length (months)	Practice	Total length (months)
Croatia	144	129	2	M	5	C	6	-	-
Cyprus (Rep. of)	-	-	1	-	-	-	-	-	-
Czech Republic	350	300	2	M	5	C, H	7	-	-
Denmark	200	135	2	B	5	C	6	-	-
Egypt	12000	-	25	-	5	-	-	-	-
Estonia	32	-	1	M	5	-	-	-	-
Ethiopia	-	-	18	-	4	-	-	-	-
Fiji Islands	16	11	1	B	4	-	-	C, H	12
Finland	96	69	3	B, M	3, 5	C, H	6	-	-
France	3000*	-	24	D, P	9, 6	C, H, I	12	-	-
Germany	1,868	1401*	22	B	5	C, H, I	12	-	-
Ghana	185	84	3	B, P	4, 6	C, H, I	9	C, H	12
Great Britain	2800*	1708*	26	M	4	-	-	C, H, I	12
Greece	340	-	3	M	5	-	-	C, H	12
Grenada	6	-	1	-	3	-	-	-	-
Hong Kong SAR, China	50	-	2	B	4	-	-	C, H, I	12
Hungary	400*	-	4	P	5	C, H	5	-	-
Iceland	20*	15*	1	B, M	3, 2	C, H	9	-	-
India	66,423	39853*	1026	D, B, P	2, 3, 4, 6	C, H, I	19	C, H	3
Iran	-	-	22	-	6	-	-	-	-
Iraq	1000	800*	18	B	5	C, H, I, O	28	-	-
Ireland	134	102	3	B, M	4, 1	-	-	C, H, I, O	12
Israel	220	-	2	-	4	-	-	-	-
Italy	5311	3705	28	P	5	C, H	12	-	-
Japan	9912	5660	74	B	6	C, H	5	-	-
Jordan	745	425	10	B, P	4, 5, 5	-	-	C	6
Kenya	75	29	4	B	5	-	-	C, H, I	12

	Pharmacy graduates per year			Declared number of Pharmacy Faculties/Schools	Academic programme		Practical training			
	Total	Female	Length (years)		Degree Type	Integrated		Separated		
						Practice	Total length (months)	Practice	Total length (months)	
Korea (Rep of)	1372	-	6	-	-	-	-	-	-	-
Kuwait	46	-	5	B	-	-	-	-	-	-
Latvia	71	61	3,5	B, M	C	6	-	-	-	-
Lithuania	104	-	5	M	-	-	-	-	-	-
Macedonia (Rep. of)	110	-	5	M	-	-	-	C, H, O	6	6
Madagascar	20	9	-	-	-	-	-	-	-	-
Malawi	17	2	4	B	-	-	-	C, H, I	12	12
Malaysia	1208	676	3,4	D, B	-	-	-	C, H, I, O	12	12
Mali	57	-	6	-	-	-	-	-	-	-
Malta	40	32	4,1	B, M	C, H, I	9	-	-	-	-
Marshall Islands (Repof)	-	-	-	-	-	-	-	-	-	-
Mexico	2800	-	5	-	-	-	-	-	-	-
Moldova (Rep of)	97	-	5	-	-	-	-	-	-	-
Namibia	0	-	4	B	-	-	-	-	-	12
Nauru	0	0	-	-	-	-	-	-	-	-
Nepal	700*	-	4	B	H, I	2	-	-	-	-
Netherlands	172	115	3,3	B, M	C, H	6	-	-	-	-
New Zealand	238	157	4	B	-	-	C, H	12	12	12
Nigeria	900*	400*	-	-	C, H, I	4	-	-	-	-
Niue	0	-	-	-	-	-	-	-	-	-
Norway	164	-	3	-	-	-	-	-	-	-
Pakistan	4000*	2500*	6	P	C, H, I	12	-	-	-	-
Palau	1	-	-	-	-	-	-	-	-	-
Panama	95	-	5	B	-	-	-	-	-	-
Papua New Guinea	18	-	5	-	-	-	-	-	-	-
Philippines	2400*	-	4	-	-	-	-	-	-	-
Poland	1300	910	5.5	M	C, H	7	-	-	-	-



	Pharmacy graduates per year		Declared number of Pharmacy Faculties/Schools	Academic programme		Practical training			
	Total	Female		Degree Type	Length (years)	Integrated		Separated	
						Practice	Total length (months)	Practice	Total length (months)
Portugal	828	621*	9	M	5	C, H	6	-	-
Qatar	-	-	1	B, P	5, 6	-	-	-	-
Romania	950	-	10	-	5	-	-	-	-
Russian Federation	4000	-	48	M	5	-	-	O	9
Rwanda	77	26	1	B	5	-	-	-	-
Samoa	-	-	0	-	-	-	-	-	-
Saudi Arabia	480	-	18	B, P	5, 6	H	4	-	-
Senegal	100	40	2	P	6/8	-	-	H	-
Serbia	506	397	5	M	5	-	-	C, H, O	12
Singapore	139	80	1	B	4	C, H	3	C, H, O	9
Slovenia	120	-	1	M	5	C, H	6	-	-
Somalia	21*	-	1	-	4	-	-	-	-
South Africa	476	-	8	B	4	-	-	C, H, I	12
Spain	2247	-	20	B	5	C, H	6	-	-
Sweden	250	-	3	M	5	C	6	-	-
Switzerland	169	131	3	B, M	3, 2	C, H	10, 5	-	-
Tanzania	79	-	4	-	4	-	-	-	-
Thailand	1680*	1300*	19	B, P	5, 6	C, H, I, O	13	-	-
Tonga (Kingdom of)	0	0	0	-	-	-	-	-	-
Tunisia	187	133	1	P	5	-	-	-	-
Turkey	988	505	20	B	5	C, H, I	6	-	-
Tuvalu	3	-	0	-	-	-	-	-	-
Uganda	70	25	3	B	4	-	-	C, H, I, O	10
Ukraine	1500	-	16	-	5	-	-	-	-
Uruguay	-	-	1	B	5	C, H, I	9	-	-
USA	12719	7782	129	P	6	C, H, O	-	-	2.5
Vanuatu	0	-	0	-	-	-	-	-	-

	Pharmacy graduates per year		Declared number of Pharmacy Faculties/Schools	Academic programme		Practical training			
	Total	Female		Degree Type	Length (years)	Integrated		Separated	
						Practice	Total length (months)	Practice	Total length (months)
Vietnam	1100	600	7	B	5	C, H	-	-	-
Zambia	70*	-	2	B	4	-	12	-	-
Zimbabwe	55	18	1	B	4	C, H, I	3	-	12

#### Notes

(hyphen): Data not available

\*: Estimated data

◇ : Data only reported by the Republic of Srpska, one of the two entities forming Bosnia and Herzegovina

D: Diploma

B: Bachelor

M: Master

P: Vocational Doctorate (Pharm.D.)

C: Community Pharmacy

H: Hospital Pharmacy

I: Industry

O: Other

Data source and year of data vary.

#### Definitions

Pharmacy Faculties/Schools: Faculties or Schools or Departments of Pharmacy that currently provide a pharmacy degree which leads to registration as a pharmacist in the country.

Academic programme: A combination of courses or learning modules that give access to a degree, diploma, certificate or other credential, which is recognised in society outside the educational institution such as a Diploma, Baccalaureate Degree, Master Degree, Professional Doctorate, and PhD.

Integrated practical training: A workplace based training integrated in the main academic programme leading to registration/licensure as a pharmacist in the country.

Separated practical training: A workplace based training separated from the main academic programme and conducted between graduation and registration as a pharmacist in the country

## Annex 2 | Acknowledgements

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**Israel** – Pharmaceutical Association of Israel\*

**Italy** – Mauro Lanzilotto, Federfarma

**Japan** – Japan Pharmaceutical Association; Kiyoshi Tomioka, Pharmaceutical Society of Japan; Yoshio Kusakabe, Ministry of Education, Culture, Sports, Science and Technology

**Jordan** – Lina Bader, School of Pharmacy, University of Nottingham

**Kenya** – Stephen Kimatu, Kenya Pharmacy and Poisons Board

**Korea (Rep. of)** – Korean Pharmaceutical Association\*

**Kuwait** – Ladislav Novotny, Faculty of Pharmacy, Kuwait University

**Latvia** – Ruta Muceniece, Faculty of Medicine of University of Latvia

**Lithuania** – Lithuanian University of Health Sciences\*\*

**Macedonia (Rep. of)** – Jasminka Patcheva, Pharmaceutical Chamber of Macedonia

**Madagascar** – Nantenaina Soa Randrianjafisamindrakotroka, Faculté de Médecine, Université d'Antananarivo

**Malawi** – Nettie Dzabala, College of Medicine

**Malaysia** – Azman Yahya, Pharmacy Board Malaysia; Nurul Afifah Osman, Pharmacy Board Malaysia

**Mali** – Ordre des Pharmaciens/Chu Gabriel Touré\*

**Malta** – Lilian M Azzopardi, University of Malta

**Marshall Islands** – Majuro Hospital, Ministry of Health\*

**Moldova (Rep. of)** – State University of Medicine and Pharmacy “Nicolae Testemitanu” \*

**Namibia** – Timothy Rennie, University of Namibia, School of Pharmacy

**Nauru** – Leweni Mocevakaca, Ministry of Health Nauru

**Nepal** – Panna Thapa, KU School of Science, Department of Pharmacy, Kathmandu University; Mohan Shrestha, Tribhuvan University, Institute of Medicine, Maharajgunj Medical Campus, Department of Pharmacy

**Netherlands** – Ton De Boer, Utrecht University, Faculty of Sciences

**New Zealand** – William Allan, Hawke’s Bay District Health Board

**Nigeria** – Veronica Obasi, National Orthopaedic Hospital, Enugu, Nigeria

**Niue** – Niue Health Department\*

**Norway** – Norwegian Pharmacy Association/Norwegian Association of Pharmacist\*

**Pakistan** – Naziruddin Ahsan, Pharmacy Council of Pakistan

**Palau** – Ministry of Health\*

**Panama** – Leida Barrios, School of Pharmacy-University of Panama

**Papua New Guinea** – School of Medicine and Health Sciences, University of Papua New Guinea\*

**Philippines** – Philippine Pharmacists Association, Inc.\*

**Poland** – Krystyna Olczyk, Polish Pharmaceutical Society

**Portugal** – Luis Rhodes Baião, Ordem dos Farmacêuticos

**Qatar** – Peter Jewesson, College of Pharmacy

**Romania** – Romanian Federation of Pharmaceutical Owners’ Associations\*

**Russian Federation** – Olga Kudritskaya, State Saint-Petersburg Chemical and Pharmaceutical Academy

**Samoa** – Rozanna Meredith, National Health Services

**Saudi Arabia** – Dalia Almaghaslah, UCL School of Pharmacy

**Senegal** – Cheikhou Oumar Dia, Ordre Des Pharmaciens Du Senegal

**Serbia** – Dragana Vasiljevic, University of Belgrade/Faculty of Pharmacy; Jelena Parojčić, University of Belgrade/Faculty of Pharmacy

**Singapore** – Wai-Keung Chui, Department of Pharmacy, National University of Singapore

**Slovenia** – University of Ljubljana, Faculty of Pharmacy\*\*

**Somalia** – WHO-Somalia\*

**South Africa** – Anri Hornsveld, Pharmaceutical Society of South Africa

**Spain** – Carmen Peña Lopez, Consejo General de Colegios Oficiales de Farmacéuticos

**Sweden** – Clary Holtendal, Swedish Pharmaceutical Association

**Switzerland** – Astrid Czock, PharmaSuisse

**Tanzania** – Pharmacy Council, Ministry of Health and Social Welfare\*

**Thailand** – Payom Wongpoowarak, Faculty of Pharmaceutical Sciences, Prince of Songkla University; Teeraporn Chanakit, Faculty of Pharmaceutical Sciences, Ubon Ratchathani University

**Tonga (Kingdom of)** – Melenaita Mahe, Ministry of Health

**Tunisia** – Souad Lajmi épouse Sfar Gandoura, Faculté de Pharmacie, Université de Monastir

**Turkey** – Ceren Uyar, Turkish Pharmacist Association

**Tuvalu** – Ministry of Health\*

**Uganda** – Richard Adome, Makerere University

**Ukraine** – National University of Pharmacy\*

**Uruguay** – María José Martínez, Asociación de Química y Farmacia

**USA** – Lucinda Maine, American Association of College of Pharmacy; Mike Rouse, Accreditation Council for Pharmacy Education

**Vanuatu** – Ministry of Health\*

**Vietnam** – Nguyen Xuan Hung, Vietnam Pharmaceutical Association

**Zambia** – Lungwani Tyson Muungo, University of Zambia, School of Medicine

**Zimbabwe** – Charles Maponga, University of Zimbabwe School of Pharmacy

**FIP** – Luc Besançon, Diane Gal, Gonçalo Sousa Pinto, FIP Staff; Xuanhao Chan, former FIP staff; Henri Manasse, Jennifer Marriott, Ross McKinnon, FIP Education Initiative Steering Committee

**FIP Collaborating Centre** – Dalia Almaghaslah, Naoko Arakawa, Ian Bates, Andreia Bruno, Joana Carrasqueira, University College London, School of Pharmacy.

**WHO** – Teena Kunjumen, and former WHO staff members Rebecca Bailey and Mario Dal Poz.

#### Notes

\*: Previous data from 2012 Workforce Report

\*\* : Data from PHARMINE [Available at: [www.pharmine.org](http://www.pharmine.org)]



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