FIP Board of Pharmaceutical Practice

Trend analysis report amid the COVID-19 pandemic

2021–2022

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International
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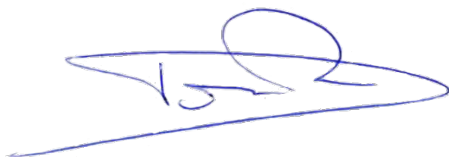# Message from the FIP President

We live in a fast-paced world where change and the capacity to respond to it determine the evolution of everything we do. Health and healthcare, including pharmacy, are no exceptions. The world is now beginning to emerge from a pandemic that required urgent responses from healthcare systems and healthcare professionals, new technologies and new ways of working. Pharmacy rose to the challenge and became part of the solution.

Other pandemics and health emergencies may come in the future, and preparedness is essential for our profession to remain an indispensable part of the healthcare ecosystem. Likewise, new technologies and trends will emerge that will greatly impact what we do and challenge our comfort zone — everything we know, how we have practised pharmacy and how we serve our patients and communities. But I have no doubt that pharmacy will respond again and again, adapting and transforming itself to meet the needs of every moment.

FIP brings together a network of pharmacy leaders and experts from around the world, who make up our most critical and valuable asset. The combined knowledge and visionary thinking that they bring to the federation empowers us as the global organisation representing pharmacy to navigate wisely through the challenges of the present and to set the course that will shape the future of our profession.

This report does exactly that: it offers insight into the main trends that will impact the future of pharmacy in all its practice settings. In doing so, it provides a roadmap to the leaders of FIP member organisations and a valuable strategic tool to drive change at local level.

We thank all those who were involved in developing this important resource for their visionary spirit and guidance. FIP will continue not only to monitor and share emerging trends, but also to set our own trends and to navigate together any challenges that may come our way — based, as always, on the principles of trust, solidarity and action.

Dominique Jordan
FIP President

Foreword

It is my pleasure as chair of the Board of Pharmaceutical Practice (BPP) at FIP to write this foreword to the 2021–2022 Trends Analysis Report.

This is an important report for the BPP as it involves contributions from each of the sections and allows an analysis of trends and changes in each of the disciplines within pharmaceutical practice. With a worldwide COVID-19 pandemic affecting everything we do for the past 18 months, much change has been forced upon both our workplaces and our workforces. The ability to collect and analyse these influences and trends allows us to better plan for changes that will inevitably impact on how we work.

Key trends, such as transformation in pharmaceutical education with the adaption to online learning platforms and the increase in scope of practice for many pharmacists being permitted to administer an ever-increasing range of vaccines, will influence both practice and health policy going forward.

My thanks to all the sections for their commitment to this project and for the very valuable data set we have been able to create. This report will form an important foundation for the updated versions to follow in coming years.

My thanks also to Ema Paulino, our previous BPP professional secretary, who has overseen a group of very keen volunteers in assisting the development of this report and to our current professional secretary, Luís Lourenço, who has overseen its completion.

I recommend this document to all member organisations and pharmacists looking to better understand some of the dynamics of change happening in our pharmaceutical work environments.

Again, my thanks to all involved.

Paul Sinclair
Chair of the FIP Board of Pharmaceutical Practice

1 Trend analysis reports

Every year, FIP sections are invited to submit a trend analysis report to the Board of Pharmaceutical Practice.

The term "trend analysis" means collecting information and identifying patterns based on this information. FIP BPP sections are asked to recognise and describe those trends which they consider are the drivers for the changes occurring in pharmacy at a global level. Sections are also invited to consider the most probable impact on section activities driven by these trends.

The analysis of trends affecting pharmacists is important for the following reasons:

- Through the identification of trends, sections can more easily determine potential projects and session topics to be addressed within their programmes of work or FIP events related to major trends in their fields;
- Through sharing these trend analyses with other sections and structures within FIP, connections can be established based on similar trends, facilitating joint sessions within the congress, as well as collaborative projects;
- With this information, FIP officers can be more aware of trends affecting their fields and consider them when formulating FIP global policies and actions.

To develop these reports, sections undergo the following procedure:

1. The first step is to list all the trends which are affecting (or will affect) the practice of their section members;
2. Next, for each of these trends, sections explain the corresponding rationale;
3. Finally, sections endeavour to determine the possible consequences of each trend on their field of practice. These consequences may be presented in two parts: first, the consequences which are already observed in some countries; second, the consequences which have not yet been seen but are expected to occur.

Part 1 of this BPP publication presents the trend analysis reports submitted by FIP sections in March 2020, updated in July 2020 to consider the experience throughout the first wave of the COVID-19 pandemic. In this update, sections were asked to consider how the pandemic affected each of the trends, and whether new patterns were observed that would drive the transformation of pharmacy practice worldwide in the coming months and years.

Our intention in publishing this report is to provide an opportunity for FIP member organisations and individual pharmacists to reflect on what we can learn from this global pandemic, as a means to better prepare for future health challenges.

1.1 Trend analysis reports per FIP section

This part of the report contains the trends for each of the FIP sections that are part of the Board of Pharmaceutical Practice. Direct access to a Table for each section is facilitated by clicking the titles below:

- Table 1. Main trends in academic pharmacy, according to the FIP Academic Pharmacy Section
- Table 2. Main trends in clinical biology, according to the FIP Clinical Biology Section
- Table 3. Main trends in community pharmacy, according to the FIP Community Pharmacy Section
- Table 4. Main trends in health and medicines information, according to the FIP Health and Medicines Information Section
- Table 5. Main trends in hospital pharmacy, according to the FIP Hospital Pharmacy Section
- Table 6. Main trends in industrial pharmacy, according to the FIP Industrial Pharmacy Section
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1.1.1 Academic Pharmacy Section

Table 1. Main trends in academic pharmacy

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
International movement to online education and global virtual pharmaceutical education	Global coronavirus pandemic.	Consequences already observed: Most pharmacy programmes in the world have moved to mixed asynchronous and synchronous models of internet-based education[1]. Consequences not yet observed: Positive and negative consequences are anticipated. Positive consequences include the required movement to distance learning, which could improve access to pharmaceutical education in the future. Negative implications include the limit to one mode of teaching, potential incomplete competency acquisition and difficulty in teaching laboratory competencies.	The trend has been driven by the pandemic and, as the pandemic continues, there is an ongoing development and refinement of online delivery of courses and examinations. Furthermore, as the COVID-19 vaccination programme is rolled out, pharmacy degrees are being delivered through a hybrid model of face-to-face and online teaching modes.
	Health concerns for faculty members, staff members and learners.	Remote/online teaching and teaching-related activities.	Development of symptom tracking strategies, testing, isolating, contact tracing. Developing quarantining strategies for infected individuals. These approaches support and promote safe return to face-to-face teaching.
Expansion of the number of pharmaceutical education institutions globally	Increasing demand for pharmacists and pharmaceutical scientists to expand availability and optimal medicines use.	Consequences already observed: Reduced student applications to pharmacy schools in high-income countries and poor distribution of pharmacists globally. Consequences not yet observed: Potential for increased number of pharmaceutical practitioners and scientists globally.	
	Differences in learning technologies and environments due to variable infrastructure.		Institutions from high-income countries are better positioned for virtual education, which will further widen the gap in competencies in high- and low-income countries.

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[1] Synchronous learning is online or distance education that happens in real time, often with a set class schedule and required login times. Asynchronous learning does not require real-time interaction; content is available online for participants to access when it best suits their schedules, and assignments are completed to deadlines.

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
			Learners with limited access to internet, computers and other technology will have limited ability to receive instruction and feedback. Relying on online learning technologies could provide less than optimal learning opportunities. Students may potentially not be able to learn optimally as only "one style" of learning, i.e., online, is available.
Movement towards integration of science and practice in pharmaceutical education	Enhanced integration of pharmaceutical concepts to improve competency acquisition of learners.	Consequences already observed: Increased integration of science and practice pharmaceutical education globally. Consequences not yet observed: Improved competencies of pharmaceutical practitioners globally.	
Governmental funding for pharmaceutical research	Countries shifting research funds to pandemic-related research.	Negative consequences include reduced funding for the chronic diseases that impact the global population.	
Increased importance of pharmaceutical support personnel	Poor distribution of pharmacists globally and high salary costs for pharmacists.	Positive consequence is the increased opportunity and competency levels of support personnel.	Pandemic may lead to increased demand for pharmaceutical support personnel as well as pharmacists

1.1.2 Clinical Biology Section

Table 2. Main trends in clinical biology

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Wide development of point-of-care testing or auto-testing devices, outside clinical laboratories	Search for the immediacy of results to relieve congestion in hospitals, clinics and medical practices, and speed up diagnosis and therapeutic decisions. Global coronavirus pandemic.	Consequences already observed: Break in the chain of care with the results not being made available to all healthcare professionals. Breaking the continuity of results by using different methods. Inappropriate diagnostic or therapeutic decisions due to lack of knowledge of the analytical limits of these tests. Non-validated and insufficiently efficient devices available on the market. Increased competition with community pharmacies, general practitioners, nurses and other healthcare facilities and professionals providing the service.	Accelerated development linked to political and media pressure for rapid access to results.
Talented clinical biology pharmacists are willing to give up practising	No time for other activities besides analytical management. Economic concentration of labs by large corporations. Global coronavirus pandemic.	Consequences already observed: Reduced student applications to clinical biology specialization. Decrease in the number of active clinical biology pharmacists. Change in the pharmacist-patient relationship.	Accelerated.

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Big data and e-health systems	Fast technological developments. Economic interest of governments and GAFA (Google Amazon Facebook Apple) for health data. Health data regulation laws. Global coronavirus pandemic.	Safer, better designed e-health systems can lead to improved patient and medication safety. Violation of medical confidentiality, namely through cyber-attacks.	Greater recognition of the role of clinical biology pharmacists as patient and medication safety data stewards within healthcare systems.

1.1.3 Community Pharmacy Section

Table 3. Main trends in community pharmacy

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Talented pharmacists are leaving, and going to other pharmacy sectors	Payment models need to reward clinical input, current system rewards volume of output not value of outcome.	Part-time job (hard to get a closer connection with patients).	Halted.
	No opportunities to use full scope of skills.	Need to train technicians to assist on more functions.	Halted.
Digitalisation of community pharmacies	Community pharmacies need to use more integrated and complex tools for daily practice.	Other players (disruptors, industry, etc) might want to replace community pharmacies (direct to patient).	Accelerated.
	Patients ask for digitalisation.	Pharmacists will need to deliver more blended care to near and distant people.	Accelerated.
	Patients and pharmacists want to be able to consult using modern technology. Legal and contractual frameworks must adapt to modern work practices.	Need to advocate greater recognition of more efficient practices from our regulators and payers.	Accelerated.
Pharmacists in general practice	Some health systems are duplicating roles through adding an extra layer of bureaucracy at general practice level.	People should have access and choice to receive the services provided by general practice pharmacists from their community pharmacist.	Halted.
Increased use of tele-medicine, tele-pharmacy and home deliveries (including online services)	During the COVID-19 confinement new ways to access pharmaceutical care and medicines had to be developed.	Incorporation of these new services within the community pharmacy practice. Pharmacies are adapting and investing in new technologies and allocate dedicated staff to attend to these new services (including training).	Accelerated.
Increased role and recognition of community pharmacy as a resource and information centre	During the COVID-19 confinement community pharmacies were acknowledged as reliable sources of information.	Expanding role for pharmacies due to greater awareness and requests by the public and other healthcare professionals with regard to the medicines information role of the pharmacist.	Community pharmacies will adopt new ways of conveying reliable information about health issues. Increased workload for the pharmacist.
Medicines shortages	Multifactorial, including low supply of raw products, issues with supply, and economic pressure on supply chains.	Time (20%?) allocated to substituting missing medicines.	Exacerbated by the various lockdowns, impacting development and supply.
Consolidation of the pharmacy sector (vertical integration)	Perceived economic gains.	Vertical integration lessens opportunity for pharmacist autonomous practice.	Halted.

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Integration of the community pharmacy sector within large healthcare corporations	Perceived economic gains.	Integration may withdraw services from community pharmacies to others structures, limiting pharmacists' autonomous practice.	Halted.
Automation in the dispensing process	Automation is a natural progression but no new model has surpassed what is readily available in terms of choice, range and access currently on offer to people through their community pharmacy.	Any move to greater automation must fully recognise and utilise the existing network of community pharmacies. This is particularly true in deprived and remote areas.	Halted.
Big corporations becoming healthcare providers	Perceived economic gains. Greater control over the entire healthcare/health services patient journey. This also applies to health insurance companies, and the US model being adopted outside the US.	Possible change in the pharmacist-patient relationship. Possible change to the existing community pharmacy structure. Reduced patient choice and access, as well as healthcare professional autonomy.	Halted.
Hospital pharmacists providing services outside the hospital	Need to follow-up discharged patients.	Competition with community pharmacies. Potential for improved transition of care, improved patient outcomes and reduced readmissions, when services provided in collaboration.	Accelerated.
High-tech medicines cannot be copyrighted (e.g., blood therapy)	Development of new types of therapeutics.	Direct to patient delivery. Improved patient access to novel therapies.	Halted.

1.1.4 Health and Medicines Information Section

Table 4. Main trends in health and medicines information

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Increased awareness globally of the importance of health literacy as an asset and risk in healthcare. This also includes e-health literacy	There is increased recognition that a key factor in influencing people's understanding of health information, and therefore ability to seek preventive therapy, adhere to therapy, self-manage and achieve optimum health outcomes, is their health literacy.	Recognition of the skills and the unique positioning of the pharmacist in the midst of the community they serve, which might enable them to: • Assess the impact of health literacy on medication therapy and identify risks for patient health and well-being associated with low health literacy; • Design interventions that improve efficacy and ensure safe and equitable access to therapy at an individual level; • Identify systemic risks to the healthcare system resulting from the varying levels of health literacy in the population and contribute to national goals and healthcare system improvements; • Increase awareness of the impact of health literacy and work with communities and other healthcare professionals to improve access to health education and health information aiming to decrease disparities in health literacy; and • Measure the impact of pharmacists' interventions on health literacy and build a rationale for the importance of pharmacists as accessible healthcare professionals to raise awareness on public health topics and increase health literacy, especially in remote and rural areas, and isolated communities where that need is the highest. See references :[1-5]	Disparities in health outcomes may be exacerbated by poor quality resources, resources not appropriate for low health literacy levels, lack of multilingual COVID-19 resources, lack of access to digital resources, and differences in public health messaging as well as misinformation.[6]
Increased (and global) standardisation in product labelling and written medicines information of non-prescription medicines	There is a recognition for a need to ensure standardisation in the information provided on non-prescription product labels and packaging; as well as written information (found inside the product).	This will improve and ensure consistency in the information that people receive about their non-prescription medicines, will assist pharmacists in provision of advice to consumers. will increase health literacy and result in better patient outcomes.	

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Global access to quality and credible healthcare information for healthcare professionals (online)	Online resources have been made more readily available as government and non-profit organisations have developed credible resources to meet the needs of healthcare professionals.	The reliance on text resources (journals, books, etc) is more limited and further decreasing. Most healthcare professionals are seeking information online through many of the well-established internet health resources. Many resources are free and credible (e.g., PubMed, Cochrane, Medscape, eMedicine, GlobalRPh, & Epocrates). Some are at a cost (e.g., Micromedex Databases, Lexi-Comp, eFacts and Comparisions, Access Medicine online books, and many online journals). This has resulted in less reliance on drug information pharmacists to answer questions, since the resources are at the fingertips of the healthcare professional. However, having access to so much information can also be confusing for many, so reliance on medicines information pharmacists with expertise in internet resource searching has become even more critical. The more complex questions often still require the assistance of a pharmacist trained in medicines information.	The lack of effective therapy for COVID-19 has resulted in a wide off-label use of various classes of medicines, necessitating better access to reliable medicines information. The request for information on off-label and emergency authorisations for use of medicines has been on the rise as healthcare professionals are trying various approaches to manage the disease. The retraction of several high-profile studies on the use of hydroxychloroquine as treatment for COVID-19 has exposed serious weaknesses in the peer review system currently used for international validation.[7]
Global access to quality healthcare information: Increased credible and free health information available online for consumers	Online resources have been made more readily available as government and non-profit organisations have developed credible resources to meet the needs of consumers. As patients are going online more often and have better computer access, their needs have grown and can be met with online material.	Consumers are seeking self-care information online more often, and more and more are sharing information on social networking sites. Patients are seeking information more readily and this provides pharmacists with a wonderful opportunity to teach patients about safe internet search practices, about credible resources and about the privacy of information on social networking sites.	Pharmacists are combating the infodemic. They play an important role in helping to contain the spread of false claims and misinformation circulating in their communities. This has supported the way the health systems respond better to the COVID-19 infodemic.[8] Different and potentially conflicting information on symptoms and potential treatments is being shared widely by a plethora of official and ever-increasing fake sources. The public is ill-equipped to critically analyse health information (see trend on health literacy) leading to a surge of myths and misinformation shared by people with a potentially dangerous impact on their health. Lack of understanding of the drug development process has the potential to

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
			affect the trust in novel as well as existing therapies and especially vaccines, with potentially disastrous outcomes for public health. On the positive side, the crisis has enabled wider collaboration between healthcare professionals to ensure access to accurate and reliable information is available for patients and the public.
Development of health information technology and delivery: Development of commercially owned personal health records	A range of commercial personal health record websites are available internationally due to the perceived failures in large-scale public initiatives.	There are opportunities for pharmacists to use the records as an additional source of information about patients. The information may be used as part of interprofessional and collaborative care of patients and delivery of patient-centred services. There are concerns about the motivation of commercial providers, for example, the use of data for advertising etc. There are also concerns about possible fragmentation of the health records if the various solutions do not communicate readily between each other, decreasing their power. Electronic records also could be an attractor or detractor for patients visiting certain pharmacies., for example, providers of personal health records that are also health insurance agents advising the patient about which pharmacy to visit.	Use of health records in observational research will be an important pillar in the post-marketing surveillance of COVID-19 treatments and vaccines. Pharmacoepidemiological studies will be very important to guide decision-making about vaccine indications, vaccination policies and treatment options for COVID-19 in special populations (e.g. pregnant women).
Development of health information technology and delivery: Increased emphasis on patient information governance	As pharmacists take on a greater clinical role, there has been a significant increase in emphasis on protecting patient data, including consent arrangements and protecting digital information.	Greater constraints around how data can be used and shared. Workload implications.	
Development of health information technology and delivery:	More and more commercial, government as well as non-government apps are being developed, ranging from weight loss and smoking cessation to monitoring of disease conditions such	Apps can be beneficial in increasing people's awareness about public health and preventive health initiatives. They can increase involvement by people who are busy or are not able to consult health professionals or who, because of stigma, feel that they cannot consult health professionals. They can also be used as	In some countries (e.g., US), the pandemic has facilitated an expanded scope of practice to allow for telehealth visits

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Increased availability of apps for health and well-being	as diabetes and self-diagnosis, e.g., in depression. They are also being increasingly developed and evaluated by researchers. However, one of the emerging trends and issues is that the majority of apps are in English, which can limit their use and application to many patients.	interventions to promote adherence to therapy and better patient self-management. Most benefit is likely to be obtained if apps are used as part of overall healthcare in collaboration with a health professional (for patients with chronic disease conditions, for example). There is a need to objectively assess the effectiveness of apps for health intervention. There are apps that have been classified as health devices and which are subject to additional regulations as well as apps that are not currently subject to the same levels of scrutiny. There is a clear pathway how apps are approved, whether they are managing patient level data compliantly and whether the information is complete, accurate and accessible. As apps and wearables can be regarded as medical technology/devices, there will be a further need for pharmacists to ensure their correct use and to support the interpretation of results and their relevance to people's health. Resources are required to "translate" or develop apps in languages other than English to ensure greater applicability and use of apps as part of disease prevention and the health and well-being of people.	
Writing and publishing health information resources: **Publicly available websites rating health services**	There have, for a number of years, been websites in the UK that allow patients to rate the care they receive. They have covered GPs and hospitals and have included both private sites and a publicly funded site. The first privately owned site has started rating pharmacies. The reason for trend is to encourage competition and choice amongst care providers.	Could have a role in promoting high standards in areas such as customer service and presentation. However, it could lead to patients rating the people and environment rather than quality of care itself and health outcomes etc. This can lead to libel concerns. In the case of an external website, the reliability of the ratings can depend upon the pharmacist increasing the awareness of his/her patients/clients to the possibility of such evaluations. For example, most evaluations on the Dutch patient federation website are about an online pharmacy.	

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
		However, in the Netherlands, for example, pharmacies have a national quality profile and one of the items is asking patients about the pharmacy services so the pharmacist can improve on them. This can be done by a questionnaire or a focus group meeting with patients. The quality profile can be found on apotheek.nl, the patient website of all pharmacists.	
Writing and publishing health information resources: **Use of social networking sites to promote public health and pharmacy**	A range of health organisations and patient groups are using social networking — both large commercial sites such as Facebook and Twitter, and bespoke networking sites — to engage with patients and the public.	Social networking sites provide alternative methods pharmacists can use to raise awareness of pharmacy and public health services. Also, they are a means of providing information services. New options refer patients for peer support. They support the concept of the expert patient.	Social media has proven to be a fertile ground for conspiracy theories and the distribution of "cures" to vulnerable populations, especially affecting those with lower health literacy. There has been a proliferation of governmental and public sources of pandemic-related information trying to combat the "fake news" often circulating widely in the (social) media.
Drug and poisons information services: **Medicines information services servicing both patients and health professionals with the establishment of walk-in centres for patients and healthcare professionals**	There is an increasing need for in-depth knowledge by consumers, informal and formal carers; health literacy needs to be improved for all these groups.	More awareness, increased health literacy and improved healthcare outcomes; more responsibility on healthcare providers to be updated; more realisation by consumers of healthcare that information is vital to care.	During the COVID-19 pandemic, the need for information services was emphasised since there were reports of herbal products being used with no proven efficacy or established side effects.
Drug and poisons information services: **Reduction in financial resources for drug information and poison centres**	Economic downturn. Perception that electronic information resources are adequate and more cost-effective for clinical decision support.	This has already resulted in a reduction in the number of drug information services and poison control services available to healthcare professionals and patients. For example, the Kaiser Healthcare drug information centre in Downey, California, has closed due to funding issues. The California Poison Centre lost its state funding and was at risk of closing. However, it was able to secure alternative funding from a non-government source. It is unclear what funding will be obtained at the beginning of the new fiscal year. In the near future, funding for drug and poison information centres is at risk due to funding	Infrastructure of poison centres like Maryland USA, have expanded to aid Office of Emergency Management in operationalizing COVID information call centre.

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
		resources (government and other) cutting funds to support these services in order to make limited budgets. In Australia, the National Prescribing Service ceased funding its national advisory service for health professionals. However, this can also open up avenues for identifying and generating new resources. For example, the pharmaceutical industry can outsource development of medicines and disease information resource to independent drug/medicines information centres. In the Netherlands, the Medicines Information Centre has been incorporated as a department of the Royal Dutch Pharmacists Association. In the Middle East and Africa, drug and poison information centres are not widely available. They can be available as independent centres or attached to hospitals or teaching universities. One example is the Loghman-Hakim drug and poison information centre in Iran, which was founded in 2006. Updates in information are paramount and for this reason, continuous education of working pharmacists in these centres is essential and access to international reliable electronic database could be one of the potential cheapest solutions. Improving telephone-based information service as well as electronic poison information database is an alternative for remote areas. The presence of pharmacists responding to online inquiries highlights their role as medicines expert.[9-11]	
Drug use experience data collection: **Increased use of computerised prescribing, dispensing and clinical alerts**	Expansion of systems to replace paper-based orders, supply and administration of drugs in hospitals.	These systems offer potential for increased efficiency and safety, but decision support requires careful design and testing for local conditions. This is an area where pharmacists can help to influence the quality of medicines used and be a part of future decision-making rather than just be end-users. For a good functioning decision support system, patient data are also required. Some patient data can be collected in pharmacies, for	Digital prescribing direct to the patient, without the need for the patient to visit their GP, e.g. in Australia.

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
		example, from point-of-care testing. Another development is wearables, which generate substantial data, but patients may or may not wish to share the data. There is a need to consider whether processes in decision support systems can be improved by big data, and how we can integrate big data into the systems. Decision support systems can also be used in community pharmacy and in general practice systems, (e.g., for checking dosages in co-morbidities, in children, in renal insufficiency or kidney failure, morbid obesity or patients who have had a coronary bypass), as well as information from pharmacogenetic testing to support clinical decision making. Most Middle Eastern and African countries have, or have started, pharmacovigilance programmes; others have some activities, and some have none. In Africa, there are huge differences between countries.	
Adverse drug event reporting: **Awareness strategies and use of computerised systems to enable healthcare professionals and consumers to report adverse drug events (ADEs)**	Increased recognition that there is an under reporting of ADEs by consumers and healthcare professionals.	Pharmacists have potential for involvement at a number of levels: educating consumers about ADEs and reporting mechanisms; being aware of reporting processes and mechanisms themselves and being actively involved in reporting ADEs; educating and assisting other healthcare professionals in reporting ADEs. More awareness programmes need to be conducted by pharmacists and national and international pharmacy organisations among patients and other healthcare professionals, including increased awareness of pharmacovigilance programmes, especially in developing countries.	

1.1.5 Hospital Pharmacy Section

Table 5. Main trends in hospital pharmacy

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Transitions of care services, such as medication reconciliation	Medication errors have been shown to be higher at transition points (admission and discharge) and can lead to drug related problems (DRPs) and readmission.	Hospital and community pharmacists need to work together to link patient care at these transition points. There is blurring of lines between the sectors.	This is still an important focus, however, it has been less of a focus since the pandemic.
New stewardship roles for pharmacists in pain and infection	Antimicrobial and opioid stewardship pharmacist positions have been created to try to improve the rational prescribing and use of antimicrobials and opioids.	This creates new roles for pharmacists and requires new skill sets to be developed. This has education and training consequences for both organisations and individuals.	New roles in stewardship are important, but the COVID-19 pandemic has seen a creation of new or increased roles for hospital pharmacists in procurement and logistics and infection control. This has been particularly apparent in hospitals in countries severely affected by the pandemic.
Expanding roles of technicians	Pharmacy support staff can take over some roles traditionally held by pharmacists to free pharmacist time for more patient-focused, clinical services.	Technicians may require more training and support, and may need to have membership in pharmacy organisations.	Pharmacy support staff continue to be a vital part of the workforce; however, this trend has probably had less focus since the pandemic began.
Advancing technologies and data management	The use of technology to assist in providing services and capturing data is expanding.	Pharmacy roles may change, with pharmacists needing to become more digitally literate.	This trend is also still apparent, although there has been less focus of late.
Pharmacist and pharmacy staff well-being	Due to the stresses caused by the pandemic (both work and social), pharmacists and pharmacy staff have been under immense pressure.	This has negative impacts on pharmacy staff health and well-being.	It is essential that pharmacists and their staff are safe. They must have adequate personal protective equipment to minimise infection risk. Interval staffing, where staff have more off shifts to decrease exposure risk, is valued, as are tips and resources to cope with and decrease the stress of taking care of patients with COVID-19. Staff should be able to take time off if they are unwell. They need to be given opportunities to interact with peers and friends to maintain their wellness and resilience. Consequently, there has also been an increased use of telehealth technologies for clinical ambulatory pharmacy services.

1.1.6 Industrial Pharmacy Section

Table 6. Main trends in industrial pharmacy

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Increase in mail order of medicines	General trend in society to order online rather than visit stores.	The volumes for pharmacies will decrease and as a result some pharmacies may reach a critical point where business is no longer possible. The pharmaceutical industry today relies on pharmacies to provide information on prescription medicines and to be a source for over-the-counter medicines.	Stronger. During the pandemic mail ordering has increased and, in many countries. The pharmaceutical industry must consider how to secure adequate information for patients going forward.
Increased interest in patient-reported outcomes	Increased understanding that medical parameters generated in healthcare do not provide full answers.	When patient-reported outcomes become increasingly important this will change requirements from healthcare and reimbursement authorities. This is an important area for the pharmaceutical industry to follow and to take into consideration when developing new medicines.	Remains the same.
Increase in harm-aversion in the general public	Harm is communicated much more frequently than benefits, particularly in media.	When citizens are increasingly afraid of medicines and consequently more reluctant to use them, then the pharmaceutical industry must improve documentation on safety and find new ways to explain the balance between benefits and harm from medicines for patients.	Stronger. COVID-19 and discussions on harm fill the media.
Increase in orphan drugs, and with that higher medication costs per patient	With increased scientific knowledge it is possible, today, to develop novel medicines, including for some rare diseases, and to differentiate existing diagnoses into more precise indications.	Developing medicines for a small number of patients is associated with similar costs as for a large number of patients. The risk the pharmaceutical industry takes is that the price becomes so high that the new product is not used, or the price too low for the company to recover the investments made.	Remains the same.
Healthy lifestyle	A general trend is to try to stay young forever (but, of course, not everyone chooses to follow the trend).	Lifestyle is a major factor in health, and consequently in healthcare costs. Smoking, alcohol, narcotics, diet and exercise are important factors that are possible to alter by oneself. Therefore, to develop products that support a healthy lifestyle is an interesting opportunity for the pharmaceutical industry.	Stronger. Science tells us that the risk of a severe COVID-19 infection increases with age. This has been widely communicated in the media and, with that, the importance of a healthy lifestyle to lower the risk.
Increase in shortage of active pharmaceutical ingredients (APIs) and finished dosage forms (FDFs)	About 80% of APIs used globally are sourced from China. About 40% of FDFs used globally are sourced from	For the past 20 years, there has been a concerted effort to reduce drug costs by off-shoring API and FDF manufacture away from high-income countries. While such offshoring lowered costs for pharmaceutical companies (although rarely	Stronger. COVID-19 has resulted in a significant cancellation of transportation (particularly air freight). This has exacerbated the limitations of supply chains, shown by

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
	India. Global supply chains for APIs and FDFs are being challenged economically and impacting the availability and quality of supply	have these been shared with patients), it exposes high-income country patients to availability and quality issues. There is growing concern about API/FDF availability, with many governments establishing requirements for pharmaceutical companies to advise regulators of impending drug shortages. Contributes to medicines shortages.	increasing air freight costs, less availability of space on aircraft, and lower frequency of flights between countries.

1.1.7 Military and Emergency Pharmacy Section

Table 7. Main trends in military and emergency pharmacy

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
Significantly increasing number and severity of natural disasters and disease outbreaks	Climate change and global warming are leading to an increased number of disasters, and the disasters are more severe.	The effect of this is increased pressure to respond to the emergencies, highlighting the need for more resources.	
Increased focus on the controlled management of medical devices	Incidents resulting from surgical devices' adverse effects have led to increased legislative controls.	Increased compliance costs and requirements.	
Increasing effect of drug shortages, compounded by restricted number and location of active pharmaceutical ingredient (API) manufacturers	More of the section members are reporting shortages.	Reduced treatment options and increasing costs, leading to possible increased disease burden.	This was highlighted in the COVID-19 outbreak where China closing its borders had a significant effect on the availability of APIs.
Increasing focus on oxygen delivery and management	COVID-19 has highlighted the lack of oxygen in many areas and placed an increased demand on pharmacy staff to manage oxygen (as considered a medicine in many places).		Pharmacist may be involved more with the management of oxygen which they may not be familiar with. Numerous risks from patient death to staff injury to increased fire risk.
Increasing focus on personal protective equipment (PPE)	PPE quality assurance is becoming an area in which pharmacists are required to intervene more. Pharmacists also are asked to help advise on the type of PPE to be worn, when, and how to extend the use of PPE. They are also expected to work wearing PPE.		Staff infection and deaths.
Increasing focus on epidemic preparedness	Renewed focus on stockpiles — how to maintain items so they do not deteriorate, what items should be stockpiled as well as workplace and staff preparedness.		Loss of stockpiled items can have large financial costs; poor workplace preparedness can lead to stress among staff and poor patient outcomes.
Plasma shortages	COVID-19 pandemic		Due to COVID-19, plasma collection in the US, which provides to the global market of immune globulin (Ig) has dropped by 15–20%. As Ig global

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
			supply was already tight before the pandemic, it is expected that a global shortage of Ig is imminent. As it takes 6 to 9 months to produce Ig from raw plasma, this shortage was expected near the end of 2020, going into 2021. Many countries have shortage plans for Ig, while others do not. One key component in such a shortage plan is optimising use and ensuring equitable access, where pharmacists can play a key role as healthcare providers.
Increasing recognition of the effect of extreme (high and low) temperatures	With more extreme high and low temperatures being recorded, it is evident that the storage and transportation of medicines requires better temperature management.	Temperature extremes are highly likely to have an adverse effect on medication outcomes. There is very little information available to enable informed decisions to be made on medicines safety following exposure to temperatures outside of the manufacturer designated range. This is a safety issue that requires more information from manufacturers and active management.	
Increasing development of technological advances for pharmacologistics management in austere environments.	There are more developments in areas such as use of drones for vaccine delivery, and transportation systems for temperature-controlled delivery.	With the increasing need for medical responses in austere areas, more effective solutions are required for efficient, secure and managed medicines delivery.	
Increasing awareness of need for environmentally responsible destruction of pharmaceutical waste	Methods used in the past contribute to adverse environmental effects, especially water quality, and can lead to the development of antimicrobial resistance.	The need for better destruction methods is particularly necessary in field environments to alleviate the hazards involved in currently used destruction methods.	
Increasing recognition of the importance of pharmacovigilance-style activities to collect, detect, assess, monitor and prevent adverse effect of products	With an increasing recognition of substandard and falsified medicines entering medicines supply chains there is a need for providers to be able to identify adverse effects of pharmaceutical products, including treatment failure.	There is a need for pharmacists to increase their knowledge on pharmacovigilance to be able to set up pharmacovigilance programmes and interpret data. This also adds a necessity for pharmacists to be able to collaborate with their ministry of health counterparts to support pharmacovigilance reporting and system strengthening (where required).	
Requirement for adoption of good distribution practice	Increasingly, pharmacists are aware that being in an austere environment does not	Everyone, regardless of location or situation, should receive their medicines in as good a condition as is	

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID-19 pandemic
(GDP) as a basis for pharmacologistics in austere environments	negate the need for GDP principles to apply.	possible. Applying GDP in the distribution phase of delivery helps to ensure this principle applies.	
Recognition that pharmacists in the humanitarian sector need to be able to undertake medicine recalls.	There is a lack of systems in use that currently enable pharmacists in the field to recall medicines if required.	Systems will need to be developed to enable effective recall methods.	
Increasing requirement for pharmacists in emergency management to collaborate	The increased number of disasters and need for emergency response leads to complex problems	The problems rarely need unique solutions. Emergency pharmacists being able to collaborate enables effective sharing of solutions and ideas for problem resolution. This communication involves both organisation-to-organisation as well as individual-to-individual interaction.	
Increasing recognition of need for all pharmacists to prepare for coping in an emergency	The increasing number of emergencies is affecting larger numbers of people.	As more people are affected and media highlight the issues, more pharmacists across all areas of practice are becoming aware of the need to prepare for emergencies, regardless of their environment.	
Increasing recognition that pharmacists are part of a national/local emergency response team	Many civil emergency organisations do not realise that pharmacy has a role to play in emergency management.	Some pharmacists are recognising that they have an important role in large disasters and are trying to raise awareness of this role within their organisations, professional organisations and in civil defence management.	
More pharmacists are wanting to help in emergency situations	The need for emergency responses is increasing, resulting in increased awareness.	More pharmacists are asking about volunteering to help in emergency situations.	
Increasing requirement for pharmacists skilled in emergency management	Climate change, terrorist activity, civil unrest and conflict are leading to increased numbers of disasters.	There is a need for identification of the defined skills and competence required for this role. Then there is a need to identify training solutions.	
Increasing recognition of the need for cultural considerations in the provision of care	The recent migrant crisis has identified the need for better understanding of cultural considerations.	Better education of pharmacists in the importance of this aspect of care is required and more tools (such as a compendium of Halal medicine) need to be developed to aid pharmacists in their practice.	

1.1.8 Social and Administrative Pharmacy Section

Table 8 - Main trends in social and administrative pharmacy

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID19 pandemic
Big data and e-health systems	In 2017, WHO launched its third global Patient Safety Challenge – Medication without Harm. As key medication safety data stewards, pharmacists should play a central role. For example, medication safety is dependent on timely access to relevant health data including use of medicines, adverse effects of medicines, test results including genotype and phenotype data, medical history etc. These are areas in which the expertise of pharmacists is essential.	Safer, better designed e-health systems can lead to improved medication safety.	Greater recognition of the role of pharmacists as medication safety data stewards within health care systems.
Expanded scope of practice, Specialisation and credentialing of pharmacists	To enhance patient access to professional services such as independent prescribing; health promotion and prevention via social media and other non-traditional platforms; to deliver care to complex and specific patient populations requires specialized knowledge and credentialing (micro credentialing) to demonstrate competence in these areas.	Increased access and equity of care to all patients, regardless of age, race and nationality. Increased recognition of professional skills of pharmacists. Increased collaborative practice in health care teams. Provision of services beyond the traditional supply role and allow complex patients, and those with specific conditions to have easier access to specialist care and to have that care both more accessible and equitable to more members of the community.	Greater proportion of pharmacists providing services beyond the traditional supply role. Due to the high accessibility of pharmacists, this may allow complex patients and those with specific conditions, to have better access to specialist pharmaceutical care in a more equitable way.

Trends	Reasons for these trends	Possible consequences of these trends on practice	How the trends have changed since the COVID19 pandemic
Tele-pharmacy	Delivery of care to patients in rural and regional areas, or for patients unable to access specialised services due to distance, infirmity or other conditions precluding travel to specialist centres.	Allow complex patients, and those with specific conditions to have easier access to specialist care and to have that care both more accessible and equitable to more members of the community. Also allow patients who have inability, either physically, socially or medically, to gain face-to-face access to have the same healthcare and access as all other patients.	This service and demand have increased during the pandemic.
Planning for pandemics and natural disasters – the role of pharmacists as essential health hubs	The current worldwide pandemic, and associated risks to frontline healthcare workers, points to the need for up to date, trusted information sources, standard operating procedures, implementation and evaluation processes. The dynamic nature of current pandemic points to the need for better emergence preparedness, and education.		To minimise the risks of frontline healthcare workers (e.g. due to inadequate access to essential resources such as PPE, burn out, stress and mental burden). To reduce the spread of disease via endorsed public health promotion and prevention information and services. To allow access and provisions for protection for all frontline workers. To provide guidelines and protocols for assessing, assisting and supplying patients during a pandemic lockdown (e.g. during periods of hard lockdown).

1.2 Major trends identified by FIP sections

Based on the trend analyses undertaken by the FIP sections, we have categorised trends into groups that represent the major challenges and opportunities recognised in pharmacy practice and academia.

1.2.1 Transformation in pharmaceutical education

Ways in which pharmaceutical education was transformed on account of the COVID-19 pandemic are outlined in Figure 1.

Figure 1. Transformation in pharmaceutical education

Trend	Before COVID-19	After COVID-19
On-line education/global virtual pharmaceutical education	↑	↑
Expansion of the number of pharmaceutical education institutions globally	↑	↑
Integration of science and practice in pharmaceutical education	↑	↑

As the global coronavirus pandemic continues, there has been an increased awareness of the need to address concerns with remote and virtual learning techniques, which were already being considered and implemented in various countries. Primary concerns include limitations in teaching strategies, overall student competency development and lack of laboratory/clinical skills. While most educational systems have moved to mixed asynchronous and synchronous models of internet-based education, this rapid transfer has demonstrated some positive consequences. To name a few, faculty members and staff used this time as an opportunity to enhance their skills in the delivery of pharmaceutical education, and the institutions as a whole made improvements in distance learning infrastructures and e-learning capabilities. This transition of learning was implemented to protect the health of students, and faculty and staff members, but since the start of the pandemic, further safety protocols that allow for in-person classes have been developed that include symptom tracking strategies, testing, isolating, contact tracing and quarantining strategies for infected students and faculty members. This allowed for a mixed approach, with some classes held online and others in person, depending on the purpose and capacity-building strategy.

While pharmacy schools worldwide faced unprecedented challenges in ensuring sustainable education during the COVID-19 pandemic, some insight was presented in an article by Monash University's Faculty of Pharmacy and Pharmaceutical Sciences in Victoria, Australia.[12] Authors expressed many of the same primary concerns addressed in the trend analysis. While this perspective was generated from one organisation, it appears to be most fitting throughout the pharmaceutical education system globally. The authors outlined how they used sustainability principles to deliver emergency remote teaching, ensure purposeful experiential placements, support displaced or isolated students, and communicate with faculty and staff members and students in the Asia-Pacific region. They also discussed how the pandemic accelerated opportunities for new models of pharmacy education across the world.

In a subsequent article published by the *American Journal of Pharmaceutical Education*, authors highlighted different challenges presented in various countries with the shift to e-learning.[13] One of the biggest concerns was found in Nigeria, where many students do not have access to the internet. Educators tried utilising open resources, social media, and phone apps for the teacher-student interface but, ultimately, the lack of technology poses a huge limitation in academia worldwide. From a student perspective, some challenges recognised with distance learning included external factors, such as unstable internet connection and extra financial burden for the internet quota, and internal factors, such as time management and difficulty to focus while learning online for long periods. As also noted in this trend analysis report, one

of the most limiting aspects of pharmaceutical programmes is around the development of laboratory and clinical skills. This is a mutual concern of educators and students alike.

In addition to concerns with challenges in educating students, there is also a concern about high quality future education of patients in the age of digitalisation. The pandemic has increased the demand for digital education and pharmaceutical institutions must ready their students to meet this demand as future pharmacists.

Recently, FIP has published a report on digital health in pharmacy education which investigates the changes in pharmaceutical education following COVID-19 and provides recommendations for training the future generation of pharmacists in digital health.[14] Digital technology has greatly changed the healthcare field and will likely continue to change in upcoming years. Training future pharmacists in technological and digital skills is crucial in ensuring that they are prepared to utilise their knowledge and skills across all career levels in pharmacy and pharmaceutical sciences. After assessing digital health in pharmacy education through a survey conducted across the globe, FIP found that many pharmacy schools and faculties do not offer any digital health education to their students. The biggest challenges that such schools and faculties face includes a lack of enabling policies, lack of access to digital health tools and data, and technical limitations. A key gap identified in digital health education was the skillset and knowledge required to apply technology within the healthcare field to solve clinical problems and improve patient care. FIP suggests that to develop a digitally enabled pharmaceutical workforce it would be crucial to develop courses and training materials in educating students to prepare them as a digitally literate workforce, to develop multidisciplinary learning of digital health literacy that includes other professions, and to provide opportunities for continuing education to ensure the workforce remains current in digital health changes and innovations.

As pressure on healthcare systems continues to grow, there is a high demand for pharmacists and pharmaceutical scientists worldwide. The expansion of the number of pharmaceutical education institutions globally would expand the availability of professionals, which would ultimately further contribute to optimal medicines use. However, there are some concerns with this expansion, which include differences in learning technologies globally, and gaps in competencies in high- and low-income countries. This expansion should also aim to include full integration of science and practice in the pharmaceutical education curriculum. Ultimately, there would be improved competencies of pharmaceutical practitioners globally.

Although there is an increasing demand for pharmacists and pharmaceutical scientists, we are also seeing reduced student applications to pharmacy schools in high-income countries. An article published by the *American Journal of Pharmacy Education* further investigates the challenges pharmacy schools are facing in recruiting pharmacy students.[15] Many recruitment strategies by pharmacy institutions involve direct human interaction, such as touring campuses and dorm rooms and meeting current students. Instead, during the COVID-19 pandemic, recruiters have utilised technology to recruit students. With these changes in recruitment strategies and changes to the campus experience, including social and cultural events, students may be discouraged from applying. Also, the financial strain placed on families throughout the pandemic may discourage potential students from placing themselves or their families under further financial strain to pursue higher education. Additionally, the article states that, due to the COVID-19 pandemic, there will likely be decreased international student populations in US colleges and universities. This prediction can be applied across the globe because international travel is prohibited in many countries, forcing students to apply to local pharmacy schools.

1.2.2 Expanding pharmaceutical workforce scope of practice

Changes in pharmaceutical workforce on account of the COVID-19 pandemic are outlined in Figure 2.

Figure 2. Expanding pharmaceutical workforce scope of practice

Trend	Before COVID-19	After COVID-19
Expanded scope of practice, specialisation and credentialing of pharmacists	↑	↑↑
Interprofessional collaboration	↑	↑↑
Expanding roles of technicians	↑	↑
New stewardship roles for pharmacists	↑	↑↑

There is a growing trend for the expansion of pharmacist and technician roles as the global pandemic continues. While other healthcare professionals are under pressure, there is a need to enhance patient access to professional services that ensure continuity of care and, specifically, medication adherence. These may include, depending on context, independent prescribing, medication renewal services, health promotion and prevention (including via social media and other non-traditional platforms), treatment of minor ailments, and provision of information. In order to expand the scope of services that are provided, specialised training must be implemented.

With a greater proportion of pharmacists providing services beyond the traditional supply role, this can allow complex patients and those with specific conditions to have better access to specialised pharmaceutical care in a more equitable way. It is proposed that the traditional pharmacist and technician roles are expanded to provide such services. These new roles will require more interprofessional collaboration with other healthcare professionals and medical scientists.

New stewardship roles would be included in this expansion, focusing on antimicrobial and opioid management. New roles in stewardship are important, and the pandemic has seen a creation of new or increased roles for hospital pharmacists in procurement, logistics and infection control. This has been particularly apparent in hospitals in countries severely affected by the pandemic.

In agreement with FIP sections' most up-to-date trend analysis, "The role of hospital and community pharmacists in the management of COVID-19: Towards an expanded definition of the roles, responsibilities, and duties of the pharmacist" addressed the expansion of pharmacy roles during the COVID-19 pandemic.[16] As stated in the article, "roles, duties and responsibilities of pharmacists have paralleled such historical changes and have known a gradual expansion, incorporating new skills and reflecting new societal demands and challenges. The COVID-19 outbreak has unearthed new opportunities for pharmacists: community and hospital pharmacists have, indeed, played a key role during the COVID-19 pandemic, suggesting that a fully integrated, inter-sectoral and inter-professional collaboration is necessary to face crises and public health emergencies." On a global scale, pharmacists and pharmacy technicians are becoming important participants on the healthcare front, most notably with the release of the COVID-19 vaccine. Pharmacy staff participation is being recognised as a vital part of vaccine distribution and administration, demonstrating that expanded roles are essential. Many articles in public health have recognised the pivotal role pharmacy teams have played during the pandemic. In situations where healthcare systems are collapsing amid the unprecedented number of COVID-19 cases, pharmacists and pharmacy technicians have expanded roles in disease prevention, management and containment that are greater than ever before.

According to an article published by the *Journal of American College of Clinical Pharmacy*, pharmacists and pharmacy societies and organisations across the globe have contributed greatly to the needs of the public during the pandemic.[17] The article looked specifically at China, Australia, Malaysia, Saudi Arabia and the United States. In these countries, both community and hospital pharmacists have contributed by supporting antibiotic stewardship, developing pharmacist training for critical care, producing high quality hand sanitiser and disinfectants, developing post-discharge ambulatory

care clinics for patients with COVID-19, participated in the COVID-19 patient rounds team, expanded intensive care units and general pharmacy services to round-the-clock availability, created guidelines for prevention and management of COVID-19, and promoted social safety through medicines delivery, drive-throughs and tele-pharmacy services.

FIP recognises that pharmaceutical services have changed and will continue to change to deliver extended clinical services to optimise patient health outcomes. Pharmacy support staff have also transformed in response to this extension of clinical services. FIP established this in its 2017 report, "Technicians and pharmacy support workforce cadres working with pharmacists".[18] It is clear that the need to utilise the pharmacy support workforce is integral to high quality patient care. However, certain issues and concerns around the pharmacy support workforce have developed. In order for the pharmacist to retreat from the more administrative and supply roles and focus on clinical services, the pharmacy support workforce will require further development in education and leadership skills as well as requiring new regulations and registrations.

1.2.3 Pandemic and natural disaster preparation

Ways in which pandemic and natural disaster preparation was transformed on account of the COVID-19 pandemic are outlined in Figure 3.

Figure 3. Pandemic and natural disaster preparation

Trend	Before COVID-19	After COVID-19
Need for better preparation and planning for pandemics and natural disasters	↑	↑ ↑
Shortages of medicines and other health products	↑	↑ ↑
Increased focus on epidemic preparedness	↓	↑
Concerns over pharmacist and pharmacy staff well-being	↓	↑
Concerns over retention of talented pharmacists	↓	↑

The dynamic nature of the current pandemic highlights the need for better emergency preparedness and education in the healthcare realm. The effects of COVID-19 on frontline workers raises concern for staff well-being and the retention of talented pharmacists. The lack of up-to-date, trusted information sources, standard operating procedures, and implementation and evaluation processes has left pharmacists in disarray while trying to provide the best patient care. Increasing the focus on epidemic and natural disaster preparedness will minimise the risks to frontline healthcare workers (e.g., due to inadequate access to essential resources such as personal protective equipment, burn out, stress and mental burden), reduce the spread of disease through endorsed public health promotion and prevention information and services, allow access and provisions for protection for all frontline workers, and provide guidelines and protocols for assessing, assisting and supplying patients during a pandemic lockdown..

Throughout events such as the COVID-19 pandemic, it is also important that pharmacies maintain adequate medicines stock and supplies for patients. Further preparation strategies should include renewed focus on stockpiles. Protocols should include how to maintain items so they do not deteriorate, which items should be stockpiled as well as workplace and staff preparedness.

The concern for increased pandemic and natural disaster preparedness in pharmacy is a global issue to be addressed. Recent articles support the need for proposed action plans to be developed for current and future events. In a collaborative attempt to support this need, multiple universities across the United States have created a public health emergency COVID-19 initiative.[19] This initiative supports the trends analysis with a proposed framework for expanding the roles of pharmacy and contributions to emergency preparedness and response to the current pandemic and beyond. Pharmacists have long been involved in public health and emergency preparedness and response (EP&R), including through preventive measures such as screening, vaccinations, testing, medical and pharmaceutical countermeasures, as well as ensuring medication safety and access during natural disasters and pandemics. The suggested framework can be utilised to develop, implement, evaluate and disseminate results in order to strengthen existing efforts and to establish new initiatives in EP&R.

Disasters are unpredictable and therefore are difficult to prepare for. Pharmacy departments should be involved in hospital-wide emergency planning efforts; during a disaster, pharmacy departments are responsible for handling medicines procurement and storage. The American Society of Health-System Pharmacists and The Joint Commission have published guidelines and accreditation standards that guide the pharmacists' role in disaster planning.[20]

An article published in the *American Journal of Health-System Pharmacy* highlighted the key areas of response needed to help pharmacists navigate a pandemic and the possibility of a coinciding natural disaster (e.g., a tornado).[21] It focused on four key elements, including communication, staff flexibility, teamwork and collaboration. The article suggested creating a singular point of contact to streamline all communication and limit confusion. It determined that preparing pharmacists and pharmacy technicians to easily adapt to differing roles would allow staff members to be redeployed to the areas of greatest need. In order to preserve mental stability and energy, the article suggested creating a systematic schedule for alternating days off, maintaining access to pharmacy leadership at all times, and demonstrating staff appreciation through providing lunches. It also examined collaboration and suggested idea sharing across the country and across the globe would provide the greatest benefit in facilitating a more informed and centralised response. These key elements were successfully utilised in response to a tornado and the start of the COVID-19 pandemic in March 2020 when a pharmacy was affected by the destruction of a health system's warehouse that housed clinical supplies, including personal protective equipment and fluids.

FIP recognises the need for guidance on the role of the pharmacist in response to natural disasters which can be extrapolated to include a pandemic. While protocols often exist on the global and local levels, FIP aims to provide comprehensive guidelines and instructions to support those efforts. In 2016, FIP published "Responding to disasters: Guidelines for pharmacy".[22] These guidelines highlight four phases of an emergency including prevention (risk mitigation), preparation (readiness), response and recovery. The overall goal is to assist pharmacists in providing the most safe and effective care for patients during the unexpected. There is much data to be analysed after the advent of COVID-19 that will invariably require modification of these guidelines.

1.2.4 Cultural and environmental concerns

Ways in which cultural and environmental concerns were transformed on account of the COVID-19 pandemic are outlined in Figure 4.

Figure 4. Cultural and environmental concerns

Trend	Before COVID-19	After COVID-19
Increased recognition of the need for cultural considerations in the provision of care	↑	↑↑
Increased patient/people needs and expectations on health and medicines information	↑	↑↑
Greater focus on prevention and healthy lifestyle services	↑	↑↑
Increased environmental concerns	↑	N/A

Although the risk of having complications from COVID-19 increases with age, there are many modifiable risk factors that may help patients avoid contracting COVID-19. Smoking, alcohol, narcotics, diet and exercise are possible to alter by oneself. By maintaining a healthy lifestyle, patients not only lower their risk of COVID-19-related complications, but also lower healthcare costs.

There is an increased awareness globally of the importance of health literacy as both an asset and risk in healthcare. Health literacy helps patients seek preventive therapy, as well as self-manage and achieve optimal health outcomes. However, disparities in health outcomes may be exacerbated by a lack of multilingual COVID-19 resources, lack of access to digital resources, and differences in public health messaging.

An article in the *Journal of General Internal Medicine* found that "this novel coronavirus which results in increased rates of respiratory failure and death among infected individuals is found to disproportionally affect those with comorbidities such as diabetes, heart disease, and asthma. These conditions are known to disproportionately affect minorities who are already impacted by health disparities." The article then goes on to describe obstacles that minorities may experience. For example, racial/ethnic minorities are less likely to have access to a primary care provider, making it more difficult to obtain COVID-19 testing when needed. Furthermore, some facilities created drive-through testing sites. However, these testing sites required that patients to be tested have access to a vehicle. Many patients in underserved communities do not have access to transportation. Due to the lack of testing resources available, many patients end up attempting to get tested in hospital emergency departments or do not get tested at all. This creates a problem because, without proper testing, patients are unsure as to whether they should quarantine or not. Access to masks, decreased transportation options due to social distancing and the financial implications of unemployment will likely widen the disparity gap, particularly in underserved communities.[23]

In order to prevent health disparities, culturally and linguistically appropriate resources are necessary for the provision of care. This is evident by the recent migrant crisis. Pharmacists require better education and tools (such as a compendium of Halal medicine) in order to better care for patients with different cultural backgrounds.

COVID-19 has not only caused concern for health disparities, but also concern for the environment. In the early stages of the pandemic, the WHO and health agencies around the world recommended that people should clean and disinfect surfaces, especially those that were frequently touched. As evidence has accumulated over the course of the pandemic, it was found that the majority of transmissions occur as a result of infected people dispersing large droplets and aerosols when they cough, talk or breathe. Surface transmission, although possible, is not a significant risk. Despite this evolving evidence, the public has grown to expect extra levels of sanitisation.

An article published in *Preventing Chronic Disease* addresses the need for cultural competency when communicating information about the COVID-19 pandemic.[24] It highlights the nature of speaking about the pandemic from an individualist perspective while not addressing the nature of a collectivist mindset in the disproportionally affected black and brown communities in the United States and globally. It references using a model developed in 1989 called the PEN-3 Model, which consists of three primary domains including cultural identity, relationships and expectations, and cultural empowerment. In each domain there are three factors that make up PEN (person, extended family, and neighbourhood). This model provides a basis for working on developing public health rhetoric with these ideals in mind. Pharmacists play a key role in cultivating cultural competency as the most easily accessible healthcare professional. As the vaccine rollout continues in the United States and globally, there is increasing hesitation among many populations to receive the vaccine. Pharmacists can be the source of dispelling myths and educating the public on the importance of immunisation and overall changing health behaviours. Health behaviours include proper mask disposal, medicines disposal, and proper use of PPE and social distancing guidelines.

FIP recognises the impact of the COVID-19 pandemic on health disparities. The FIP EquityRx programme[15] established in 2018 and expanded in 2019 aims to highlight the contribution of pharmacy towards a more inclusive civil society for all.

1.2.5 Increased investment in data systems and automation

Changes in investment in data systems and automation on account of the COVID-19 pandemic are outlined in Figure 5.

Figure 5. Increased investment in data systems and automation

Trend	Before COVID-19	After COVID-19
Increased importance of patient-reported outcomes	↑	Remains the same
Increased investment in big data and e-health systems	↑	↑ ↑
Increased investment in the development and availability of (shared) personal health records	↑	↑ ↑
Increased healthcare professional need for health and medicines information	↑	↑ ↑
Increased importance of pharmacovigilance activities and computerised adverse drug event reporting	↑	↑ ↑
Automation/digitalisation/e-health	↑	↑ ↑

e-Health is a new healthcare practice that promotes communication of healthcare information electronically via computers, mobile phones, satellite communications and other information systems. According to the Pharmaceutical Group of the European Union (PGEU), "many pharmacists use eHealth tools on a daily basis, whether it is dispensing electronic prescriptions, checking for medication interactions when accessing electronic medication records, providing support for adherence via a mobile app or telephone call, or acting as the patient's entry point into the health system". At present, all pharmacies in Europe are computerised. Additionally, most European countries utilise e-prescribing systems. In some countries, such as Switzerland, telemedicine services provide patients with limited accessibility to healthcare services with a means to consult with pharmacists and physicians. On the other hand, Denmark has an app that reminds patients to take their medicines. Additionally, patients may enter health data into the app such as blood glucose, blood

pressure, weight, etc. The PGEU also states that "evidence shows that shared computerised [electronic health records] are effective in reducing a range of medication errors in primary care". All in all, e-health is improving patient care in many different ways.[25]

COVID-19 has solidified the need for increased investment in data systems and automation. This includes investment in big data and e-health systems and the development and availability of (shared) personal health records, which will not only improve patient safety, but will also serve as a further source of information for pharmacists. Health and medicines information for pharmacists and other healthcare professionals is now widely available online. The reliance on text resources (journals, books, etc) is more limited and further decreasing. Most healthcare professionals are seeking information online through many of the well-established internet health resources. The request for information on off-label use and emergency authorisations for use of medicines have been on the rise as healthcare professionals try various approaches to manage COVID-19.

Not only can pharmacists use technology to improve patient safety and find more information, but they can also use it to report adverse drug events (ADEs). There is an under-reporting of ADEs by both consumers and healthcare professionals, and pharmacists may improve the situation by educating patients about ADEs and how to report them, understanding how to report ADEs themselves and assisting other healthcare professionals in reporting ADEs.

According to an article published in the *Journal of the American Medical Informatics Association*, the COVID-19 pandemic accelerated the utilisation of e-health systems. They provide a way to screen patients efficiently, provide continued care for chronic diseases while social distancing, and allow for patients to be monitored and tracked with a single electronic health record. Pharmacy can now utilise this information in practice by tracking the diagnosis of patients and monitoring medication appropriately, even in the community setting. There is still much improvement needed to have this accessible by all community pharmacists, but the COVID-19 pandemic highlighted its necessity and effectiveness.[26]

FIP recognises the increased utilisation of digital health in pharmacy education and the workforce. In 2021, FIP published "FIP digital heath in pharmacy education: Developing a digitally enabled pharmaceutical workforce".[27] This report provides a global overview of how well prepared and ready pharmacy education is to adapt to a digital platform and it also assesses the knowledge and abilities of the pharmaceutical workforce with regard to the digitalisation of health care.

1.2.6 Health security, economic and distribution concerns

Changes in health security, economic and distribution concerns on account of the COVID-19 pandemic are outlined in Figure 6.

Figure 6. Health security, economic and distribution concerns

Trend	Before COVID-19	After COVID-19
Need to strengthen supply chains to ensure quality and accessibility of medicines and medicinal products	↑	↑↑
New supply and distribution mechanisms	↑	↑↑
Increased price of medicines with an impact on accessibility	↑	Remains the same
Consumer-driven transparency on the availability of pharmaceutical services	↑	↑↑
New stakeholders and business consolidation in the pharmacy sector	↑	Remains the same

Currently, there are many health security, economic and distribution concerns regarding pharmaceuticals across the world. For the past 20 years, there has been a concerted effort to reduce drug costs by off-shoring active pharmaceutical ingredient (API) and final dosage form (FDF) manufacture away from high-income countries. About 80% of APIs used globally are sourced from China. About 40% of FDFs used globally are sourced from India. Global supply chains for APIs and FDFs are being challenged economically and impacting the availability of supply. Drug shortages have been a major focus for FIP. It organised an International Summit on Medicines Shortages in 2013, which produced a number of recommendations and solutions to the global issue of medicine shortages through a multi-stakeholder approach involving representatives from governments, healthcare practitioners and professional bodies, industry and patients.[28] Drug shortages are not a consequence of COVID-19, but this context has resulted in a significant cancellation of transportation (particularly air freight), which exacerbated the limitations of supply chains, shown by increasing air freight costs, decreased availability of space on aircraft, and lower frequency of flights between countries. Drug shortages lead to a reduced number of treatment options, increasing costs and leading to possible increased disease burden.

"A critical analysis of the impacts of COVID-19 on the global economy and ecosystems and opportunities for circular economy strategies" described the economic implications of the COVID-19 pandemic.[29] The pandemic has cost trillions of dollars and created a global economic recession. Significant economic impact from COVID-19 has occurred due to measures such as mandatory national lockdowns and border closures. The virus has disrupted supply chains, which in turn has upset financial markets.

The COVID-19 pandemic also created a shortage of healthcare products such as certain drugs, personal protective equipment (PPE) and even testing kits. Shortages of drugs, such as hydroxychloroquine, chloroquine, midazolam and propofol, made it very difficult for healthcare practitioners to treat COVID-19 patients. However, they also created obstacles for patients who did not have COVID-19, but required these medicines for other purposes. "Medication shortages during the COVID-19 crisis: What we must go" states: "The active pharmaceutical ingredients for many commonly used medications come from China, and many of our generics are manufactured and imported from other countries, including India. Since the pandemic has affected manufacturing and exports worldwide, the shortages exemplified by antimicrobials and sedatives will soon impact numerous medications unrelated to the treatment of COVID-19."[30]

Additionally, the shortage of PPE puts healthcare professionals at risk of contracting the virus themselves, particularly those undertaking direct patient care, such as doctors and nurses. The stress caused by healthcare shortages, as well as the repercussions of these shortages, are a great stressor on healthcare workers. Due to COVID-19 stressors, healthcare

professionals are at an increased risk of high levels of stress, anxiety, depression, burnout, addiction and post-traumatic stress disorder, which could have long-term psychological implications.[31]

In this context, FIP's 2017 report on models and tactical options to report medicines shortages provides a useful resource for countries and regions to implement or strengthen reporting systems that address this topic, through the sharing of best practices.[32]

In addition, we have seen an increase in the number of orphan drugs, which are often associated with a higher medication cost per patient. Developing medicines for a small number of patients has much the same costs as for a large number of patients. The risk the pharmaceutical industry takes is that the price becomes so high that the new product is not used, or the price too low for the company to recover the investments made.

2 Mapping trends against the FIP Development Goals

Following the categorisation of the trends identified by the FIP sections, we mapped these to the FIP Development Goals (FIP DGs), as shown in Table 9.

The FIP DGs are a key resource for transforming the pharmacy profession over the next decade globally, regionally and nationally. They align with FIP's mission to support global health by enabling the advancement of pharmaceutical practice, sciences and education and are set to transform pharmacy in alignment with wider global imperatives underpinning the UN Sustainable Development Goals.

Taking into account that the various FIP structures, including the Board of Pharmaceutical Practice, are mapping ongoing projects and initiatives to the FIP DGs, also mapping BPP trends will allow us to identify the need for the development of further activities that prepare pharmacists, pharmaceutical scientists and pharmacy educators globally to drive these trends.

The COVID-19 global pandemic not only changed the world, but greatly influenced the pharmacy profession. The pandemic has presented challenges to pharmacies around the world and has forced many aspects of the profession to evolve, both positively and negatively. These changes are illustrated by the trends mentioned above. The FIP DGs correlate well to the current trends of the pharmacy profession. All DGs were targeted by at least one of the identified trends. The profession of pharmacy is seeing many changes during this time, but FIP's goals are very much in line with these changes as they occur.

Table 9. Identified trends mapped according to the FIP Development Goals

Trends	Primary development goal	Secondary development goal
Transformation in pharmaceutical education	Goal 1 (Academic capacity) Goal 2 (Early career training strategy)	Goal 5 (Competency development)
Expanding pharmaceutical workforce scope of practice	Goal 4 (Advanced and specialist development)	Goal 3 (Quality assurance) Goal 5 (Competency development) Goal 6 (Leadership development) Goal 7 (Advancing integrated services) Goal 8 (Working with others) Goal 9 (Continuing professional development strategies) Goal 15 (People-centred care) Goal 17 (Antimicrobial stewardship) Goal 18 (Access to medicines, devices & services)
Pandemic and natural disaster preparation	Goal 16 (Communicable diseases)	Goal 4 (Advanced and specialist development) Goal 5 (Competency development) Goal 6 (Leadership development) Goal 8 (Working with others) Goal 9 (Continuing professional development strategies) Goal 13 (Policy development) Goal 15 (People-centred care) Goal 18 (Access to medicines, devices & services) Goal 19 (Patient safety)

Trends	Primary development goal	Secondary development goal
Cultural and environmental concerns	Goal 11 (Impact and outcomes)	Goal 15 (People-centred care) Goal 19 (Patient safety) Goal 21 (Sustainability in pharmacy)
Increased investment in data systems and automation	Goal 12 (Primary intelligence)	Goal 7 (Advancing integrated services) Goal 11 (Impact and outcomes) Goal 12 (Primary intelligence) Goal 14 (Medicines expertise) Goal 18 (Access to medicines, devices & services) Goal 19 (Patient safety) Goal 20: Digital health
Health security, economic and distribution concerns	Goal 21 (Sustainability in pharmacy)	Goal 14 (Medicines expertise) Goal 15 (People-centred care) Goal 19 (Patient safety)

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