**SCOPE AND FUTURE IN PHARMACY & NURSING**

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**Abstract:**

The chapter opens with an overview of the present and projected state of nursing and pharmacy practise research. After that, this chapter sets the stage by talking about issues that are important for practise research. These problems include shifting demographics of the population, advancements in technology, adjustments to consumer behaviour and the institution's role as a pharmacy, as well as adjustments to the nursing and pharmacy profession. Additionally, it describes the significant changes in nursing and pharmacy practise research, such as cooperation and interprofessional collaboration with patients, documenting and quantifying the results of interventions, and taking into account the cultural variety of patients. It ends by highlighting the approaches that would be most frequently applied in upcoming research on nursing and pharmacy practise. The rise of large and complicated data sets, dealing with electronic health records, and researchers' adoption of a variety of mixed techniques in nursing and pharmacy practise research could be some of the methodological problems of the future.

1. **The Future of Pharmacy**

**S**cience is growing; without limits. The world is changing; getting smarter. And new technologies are taking birth; doing wonders. Like a genie, who turns things real when asked, science makes things real that existed only in the imagination. The origin of AI, AR and Robotics has opened up new technologies with infinite possibilities **[1].** Also, the spread of COVID-19 and other influenza has encouraged new and secure lifestyles. The time is not far away when a smart brush diagnoses the early symptoms of a mouth infection and the report would be sent to the nearby medical lab. No need to wonder about such a smart toothbrush. Because, there are smartwatches available today in the market that can detect pressure, sugar and even oxygen saturation levels. In this article, we go through how the future of pharmacy is predicted and also the current trends & the precise technological advancements that have affected the pharmaceutical industry **[2]**.

* 1. **Current Trends and Innovations in Life Science**

The COVID-19 pandemic has spurred the idea of self-service pharmacies. The pharmaceutical industry has already switched to online. People can buy medicine at home by comparing the brand and price with a few simple clicks. The self-service pharmacy would be technologically more advanced in the future. Building on the strengths of artificial intelligence (AI), robotics, and insights obtained from interoperable data, clinical and technological advancements are occurring at an all-time high **[3].**.

* 1. **The innovations and studies that happening in life science are:**
* Studies are ongoing on the possibilities of using the gut microbiome to generate food as a medicinal approach to bring glucose levels under control and enhance general health.
* Research is happening in developing smart mirrors that monitor health variations by making use of advanced cameras & human breath.
* Smartphones are evolving as a type of home health diagnostic tool to detect urinary tract infections or diabetic eye disease.
* A large number of robotics companies and startups are developing and trying out home healthcare bots that can fulfil basic needs.
* Ingestible origami robots have been produced by labs in order to heal wound **[4]**.

The future of pharmacy will be drastically different when these advancements are coupled with the expanding influence of customers who are concerned with their well-being. pharmacy companies and pharmacists are tense as a result of these dynamics even though they are planning and investing for the future.

* 1. **The Future of Pharmacy**

Self-serve pharmacies are more likely to develop even more cutting-edge technology in the future. A QR code might easily be created from the prescription. When it goes to the associated pharmacy, it might experience fully automated processes like reading the QR code and dispensing medication using cutting-edge machinery **[5]**. As a result, the packaging of the drug will be finished considerably more quickly. Today’s retail pharmacists are highly skilled, well-respected health care providers who spend an excessive amount of time counting pills and handling clinical edits. AI robots can perform all of these activities, allowing pharmacists to better utilize their time while keeping the patient’s needs first. Many patients are not aware that pharmacists are able to consult just as well as a doctor would for uncomplicated medical ailments and chronic conditions. Pharmacists can spend more time developing connections with their patients and providing tailored medical advice by automating a lot of the administrative labour and other tedious duties.

Looking into the future, we can see how drastically different the pharmacy sector will be from what it is today **[6]**:

* Enormous amounts of data sets can be linked through devices connected to the Internet of Things (IoT), quantum computing and algorithms stored in the cloud, which may lead to instant diagnosis and understanding that become a part of our everyday lives and can be shared among health care providers.
* Clinical research-accelerated digital medicines, nutraceuticals, implants, gene editing, and programmable microorganisms would take the place of treatments that are centered on chemical and biological remedies.
* Retail pharmacies might be transformed into integrated healthcare destinations with product dispensation altered by 3D printing, telemedicine, kiosks and same-day delivery by driverless automobiles, drones and automated robots **[7]**.
	1. **Explore an immersive glimpse into the future of pharmacy**

The role of pharmacy and the pharmacist in the health care ecosystem is evolving as technologies—like artificial intelligence and virtual health—drive exponential change. But as pharmacy capabilities and clinical breakthroughs advance, how will the role of the pharmacy and the pharmacist evolve within the broader care team?

* 1. **Innovations in technology and life sciences transform pharmacy**

Exponential change is accelerating disruption across the health care value chain and transforming the future of pharmacy. Clinical and technology breakthroughs are occurring at a record pace, building on the power of artificial intelligence (AI), robotics, and insights derived from radically interoperable data. As “imprecision medicine”1 shifts to precision treatments, the role of the pharmacist and the delivery channels we know today are likely to change. This combination may bring about a move from a fee-for-service reimbursement model to a value-based model, aligning pharmacy with the broader payer shifts underway **[8]**.

* 1. **Innovation is happening across the life sciences:**
* Researchers are developing**smart mirrors** that use advanced cameras and your breath to detect health variations.
* Multiple companies are testing and working on **home health care bots**that can perform basic services, while elderly workers in Japan are using **exoskeletons** to extend their ability to perform manual labor.
* Smartphones are evolving to allow them to act as point-of-care and **home health diagnostic tools** for conditions such as urinary tract infections4 or diabetic eye disease **[9].**
* Labs have produced an **ingestible origami robot** that can be swallowed and controlledto patch a wound.
* Companies are using the gut microbiome to create a **food-as-medicine approach**to manage glucose levels and improve overall health.

When these innovations are combined with the growing influence of consumers focused on their well-being, the future of pharmacy will be radically different **[10]**. These dynamics create exciting tension for pharmacy companies and pharmacists as they debate how to win in today’s market while planning, adapting, and investing for the future.

* 1. **Technology-driven disruption happens fast**

Many pharmacies operate on a legacy business model that is only just beginning to embrace the technologies and customer service innovation. Today’s retail pharmacists are highly trained, trusted medical professionals who spend a disproportionate amount of time counting pills and addressing clinical edits rather than operating at the top of their license (such as providing point-of-care testing and counseling) **[11]**. Not only does this tend to minimize their ability to affect patient outcomes, but is also causing safety8and profitability9issues. To complicate matters, regulators and nontraditional players are challenging the legacy profit pools across the entire supply chain, affecting pharmaceutical manufacturers, distributors, pharmacy benefit managers (PBMs), and pharmacies.

The dynamic pace of today’s innovation cycles is likely to create disruption, not a gentle evolution. Looking ahead, we can begin to imagine a pharmacy industry that looks much different than it does today **[12]**:

* Treatments would no longer be focused on chemical and biologic solutions, but instead focus on digital therapeutics, nutraceuticals, implants, gene editing,10 and programmable bacteria accelerated by clinical research.
* Retail pharmacies could become consolidated health destinations with product distribution altered by 3D printing, kiosks, telehealth, and same-day delivery by driverless cars, autonomous bots, and drones.
* Automation and AI algorithms would enhance pharmacists’ responsibilities, allowing them to become recognized as care providers, ultimately prescribing acute medications and managing chronic diseases **[13]**.
* Massive data sets connected by Internet of Things (IoT) connected devices, cloud-based algorithms, and quantum computing could enable real-time diagnosis and insights that are integrated into our daily lives and shared across care providers.

While many of these changes seem inevitable, the key question is: How quickly will they occur? The time horizon depends upon the regulatory environment, consumer adoption of technology, where and how competitors invest, and the economic viability of the innovations that are brought to market **[14]**.

* 1. **The future consumer experience**

To really understand our vision of the future of pharmacy, it is important to begin with the consumer and think about how their health care journey changes. As technology becomes ubiquitous and integrated, the role of the pharmacy and pharmacist evolves into one that may not even be recognized by today’s standards. We see a convergence of health and wellness, along with an expanded role of telehealth and virtual health care **[15]**.

And while the traditional retail pharmacy experience may no longer exist, there still is likely to be a role for coordinated and high-touch care delivered locally—we see competition between health care professionals for these roles (RPhs, RNs, NPs, PAs, and MDs). There will also likely be people that are not compliant or not willing or able to take advantage of digital health technology (even as costs drop dramatically) and need in-person care.

* 1. **The Future of Pharmacists**

The future of pharmacy might be involved in the competition between human expertise and technological advancements. Pharmacists might simply get everything through messages over a related computer system or app, where the patient’s medical history is already noted, rather than obtaining a prescription and then calling the doctor to check in with them. This shortens the procedure considerably and makes it more efficient. By delivering high-quality service in a short amount of time, robotic automation can help the healthcare system. Instead of standing and counting each and every tablet, the pharmacist can spend their time better advising medical professionals or talking to patients **[16]**. Robots will assist pharmacists in monitoring which drugs are running low and require reordering. Whether a patient chooses to use a telehealth pharmacy service or visits a physical drugstore, pharmacists will be accessible to counsel, consult, and listen to the patient. Digital therapeutics are anticipated to be used in conjunction with more conventional pharmaceutical treatments as medicine becomes increasingly digital. Digital treatments are sometimes divided into three categories: physiological, drug-specific, and behaviour-changing. They may replace more traditional forms of care as patients’ first choice while also serving as a valuable complement to them. Pharmacists will be capable of advising patients on which digital product is suitable for their condition **[17]**.

Technology advancements can significantly assist pharmacists in order to extend their capabilities to health consultants or health experts instead of counting pills and distributing them. New technologies will continue to influence our lives, and when it comes to healthcare, they can have a significant positive impact on doctors, pharmacists as well as patients turning the sector more efficient overall. It will be fascinating to observe how the new AI-powered robots and software will upend the established order and gradually make it better, one robot at a time.As innovations in life sciences and new technology disrupt the health care value chain, consumers are increasingly focused on well-being, demanding greater health care access, convenience, and customized products. In this environment, exciting opportunities emerge for pharmacists to evolve and expand their role **[18]**.

In today’s health care ecosystem, the pharmacist is a trusted, critical, and—often—underutilized resource. As the pharmacy industry increases its use of enabling technologies, pharmacists may find themselves at a professional crossroads: either grow their role’s scope and value or face potential disintermediation.

After all, in a not-so-distant future, robots will likely dispense medications to patients, 3D printers may print combination therapies, and algorithms may address most clinical edits. When combined with technology like smart contact lenses that use augmented reality (AR), it’s possible that lower-skilled staff, such as pharmacy technicians, may be able to conduct basic tasks like visual verification **[19]**.

Fortunately, an increasing demand for physicians, combined with projections about people living longer, should create opportunities for pharmacists to evolve and expand their role—perhaps even to become the next generation of primary care providers (PCPs) who treat patients with acute illnesses and manage chronic conditions like diabetes, hypertension, and asthma. That will require regulatory changes, but pharmacists are increasingly being recognized as providers in the United States,building on global discussions about pharmacist prescribing **[20]**.

*We see three specialized paths going forward: digital, medical, and behavioural.*



* 1. **Moving forward**

To move confidently into the future of pharmacy, companies should begin by acknowledging and being realistic about their core competencies and how those are sustainable and/or transferable. While there are clearly opportunities to continue to make money today, forward-thinking organizations are asking questions such as **[21]**:

* Who inside or outside of our ecosystem will be a competitor or disruptor? Who could be an ally?
* How quickly will our sector innovate relative to the ecosystem’s rate of change?
* How will risk shift to or away from us, and what will be the impact?
* Should we innovate now to be in control of our future or wait until the disruptors gain market share and prove the model, in which case it’s much more expensive to get into the market?
* How will our talent strategy and organizational structure support our future business?
* Do our existing systems and technology support expectations for omnichannel and digital or virtual engagement?

Ultimately, the challenge for most companies is not generating sufficient ideas on how to move forward. Rather, it is aligning and prioritizing those ideas to determine where and how much to invest to secure their place in the future of pharmacy **[22]**.

* 1. **Trends dominating the pharma industry: A 2023 outlook**

Over the past year, the pharma industry has witnessed greater collaboration, adapted quickly, and adopted innovative approach to deliver high quality medicines continuously during the pandemic and beyond. The industry has shown unwavering commitment to support the country’s healthcare needs as well as enhance its footprint across the world.

According to a recent EY FICCI analysis, with a rising consensus on offering new breakthrough cures to patients, the Indian pharmaceutical market is expected to reach $130 billion in value by the end of 2030 **[23]**.

A bright future stands ahead for India’s pharmaceutical business in 2023, with a greater emphasis on quality manufacturing, medicine affordability, and the use of innovation and technology. However, to combat certain challenges like low R&D spending, scarcity of skilled labor, intellectual property (IP) regulations and rights, and potential export contraction, a high level of agility and resilience is required. Following are some of the key trends that the industry is likely to experience in the coming year.

* + 1. **Proactive Quality Management System**

The medicine manufacturing and distribution supply chain is a long and complex one. But in the coming years, the Indian pharmaceutical industry should look more closely at advanced tracking systems and introduce better tracing-related technologies. This is nothing new for Indian pharmaceutical manufacturers and exporters **[24]**. The government previously had implemented a comprehensive traceability system known as Drug Authentication & Verification Application (DAVA) for both export and domestic markets in 2015. The program provided consumers and regulatory authorities with easier ways to prove drug authenticity and safeguard India’s brand image in international markets. However now the Pharma companies will progressively focus on strengthening their self-monitoring systems recognizing their moral need to do more.

* + 1. **Digital Technologies**

India, known as the ‘Pharmacy to the World’, already has expertise in low-cost generic patented medications as well as end-to-end production **[25]**. As the country’s footprint grows, pharmaceutical companies are progressively adopting technology to upgrade their manufacturing capacities while also harmonizing regulatory requirements to meet global standards. The International Society for Pharmaceutical Engineering (ISPE) Pharma 4.0 framework also recommends the use of digitalization, cloud technologies, and process automation to enable efficiency, consistent quality, and right-the-first-time manufacturing while being sensitive to the environment.

Pharma businesses in India are going beyond overall operations of pharmaceutical manufacturing and leveraging digital technologies to communicate with key stakeholders including the healthcare professionals and patients in addition to drug research. Through data analysis, companies can now have entire visibility into a patient’s path, from diagnosis to disease care, thanks to clever automation. This data-driven knowledge, in turn, aids in drug development and, as a result, has the potential to improve patient outcomes in future **[26]**.

* + 1. **Precision Medicine**

Precision medicine is increasingly becoming an area of focus in the Indian pharmaceutical industry, which arose from the concept of personalization and customization of medical care. The most important component of this is to diagnose and treat each patient as an individual. Precision medicine is all about offering real-time insights into how a specific patient’s body is responding to pharmaceuticals by combining data management, data privacy, and data analysis through Machine Learning. This knowledge is proposed to improve advanced clinical manufacturing procedures, such as establishing drug exposure models to predict pharmacokinetic and pharmacodynamic features to prepare the needed dosage depending on age, comorbidities, and other clinical parameters **[27]**.

* + 1. **Emerging Markets – Drive Innovation**

With the flattening of growth in pharma sales in developed countries, drug makers are increasingly looking to emerging markets for new sources of growth and revenue. This means pharmaceutical companies will focus on global competencies with strategies tailored for local markets to stay competitive. Market research firm IMARC projects that the global “pharmerging” market — which includes countries that presently have a low position in the market but are rapidly growing — will experience a compound annual growth rate of 10.4% from 2021 to 2026. IMARC cites the following reasons for growth in the pharmerging market **[28]**:

* The prevalence of chronic diseases and an increase in consumer awareness about treatment
* Government actions aimed at lowering the cost of treating chronic diseases
* Aging populations that face issues such as cardiac failure and hypertension
* Growth in health insurance in pharmerging countries

In addition to these trends, the sector this year was marked by a greater degree of collaboration between the government and industry, with both playing a pivotal role in helping the sector further strengthen its position in the global market. Because of the pandemic, the pharmaceutical sector’s entire landscape has shifted, with collaboration between the government and the industry increasingly viewed in a positive light. In 2023, these partnerships are most likely to grow as we see an increase in government schemes and initiatives for manufacturing, skill development and other crucial areas of growth for the industry **[29]**. All of this can tremendously help the industry’s growth rate in coming years, while enhancing India’s potential to become the world’s preferred pharmaceutical investment destination.

* 1. **Next in Pharma: How can pharmaceutical companies drive value growth?**

The pharmaceutical industry has plenty to celebrate. In the last decade, major therapeutic advances, such as immunotherapy and cell and gene therapy, have given new hope to patients. COVID-19 vaccines were developed in record time to help save the world during a historic pandemic.But during that same period of groundbreaking innovation, pharmaceutical companies failed to keep pace with the capital markets. In fact, returns from pharmaceutical companies lagged the S&P 500 by about one-third, and biotech fared even worse **[30]**.

Looking at the stock performance of the top 50 pharmaceutical companies, the divide between the leaders and laggards has been widening. In 2021, the five-year total shareholder return (TSR) for drugmakers in the top quintile was up by 29%, compared with a decline of 11% in the bottom quintile, according to a PwC analysis (figure 2). As performance pressures mount, investors are taking a closer look at which pharma companies are positioned to win and allocating their investments accordingly **[31]**.

* 1. **Overcoming the performance challenge**

Market headwinds are well documented. Drugmakers are grappling with extended drug development timelines, pricing scrutiny, high costs of regulation and litigation, and increasing competition in nearly every category. Another wave of patent expirations is just around the corner, meaning more therapeutic areas will have generic or biosimilar alternatives. Gross margins for some novel treatments, such as chimeric antigen receptor T-cell (CAR-T) therapy, are well below historical averages and the increasing personalization of medicine means manufacturers need to generate returns on smaller populations of patients. All of these forces need to be overcome in pursuit of higher shareholder returns.

First, as leaders set the path ahead, they should incorporate a sharper lens on shareholder value creation into everyday decision-making. Connecting product-market decisions (e.g., portfolio choices, launch investments, production expansions) to shareholder value creation across the enterprise is essential to help translate great science into great returns.

* 1. **Build differentiated capabilities to outperform competition:**

Key industry capabilities (e.g., decentralized trials, machine learning at scale) will help drive the business forward in a differentiated manner. Companies that execute flawlessly on these capabilities will have a competitive advantage **[32]**.

* 1. **Retain talent, prioritize culture:**

 In the age of “The Great Resignation” and the ”war for talent,” having a differentiated culture to attract and retain the right staff will be critical. Employees want to find purpose and know that what they are doing can drive change in the world. For employees at pharmaceutical companies, work means saving lives. Doubling down on this mission, while building a unique culture that matches your strategic imperatives is critical. Communicating and executing on those values daily will help drive the most sustained loyalty from your personnel.

* 1. **Protect the enterprise:**

Given the aforementioned challenges in the industry, it will be critical to minimize any downside risk around cybersecurity, regulatory challenges and legal matters in order to preserve value **[33]**.

* 1. **Drive more returns from large IT and cloud investments:**

Companies have made massive investments in enterprise resource planning (ERP) systems, artificial intelligence (AI), automation and cloud. Now is the time to capitalize on these investments, driving them to the front-end patient experience to improve customer satisfaction, while also improving the efficiency of operations **[34]**.

* 1. **Think broadly about portfolio and transactions:**

The industry spends a lot of effort and focus on determining where best to drive the business strategically (e.g., geography, therapeutic categories, scientific modalities). There is no doubt that making the right strategic choices can provide a lot of headroom, however, we see returns accelerated by better execution of divestitures as well as in building out the best-in-class.

* 1. **Retain talent, prioritize culture**

Over the past decade, [**PwC’s annual global culture survey**](https://www.pwc.com/gx/en/issues/upskilling/global-culture-survey-2021.html) has consistently shown that organizations with a distinct culture deliver higher growth and profitability than their industry peers. [**Culture can either accelerate or hinder the types of transformational changes**](https://www.strategy-business.com/article/Culture-Transformations-invisible-enabler) that will define the drugmaker of the future. So there’s no getting around the role of culture in driving an uplift to pharmaceutical sector performance **[35]**.

While every company will make its own choices on the behaviors to emphasize in their unique culture, two themes will be important in the cultural underpinnings of tomorrow’s pharma company:

* 1. **Trust comes first, owning ESG**

The first is trust. Trust is a precious commodity, especially for a sector that asks individuals to participate in scientific experiments, share personal data and pay significant amounts of money for the promise of improved health. Organizational behaviors aligned to building trust with external stakeholders such as customers, partners and regulators are critical to living the industry’s purpose, and also to realizing the value that can be created in areas such as digital engagement, real-world evidence and decentralized trials. In particular, behaviors to build trust in underserved and underrepresented populations will be increasingly important to both improving societal outcomes and accessing new patients **[36]**.

* 1. **Take risks to innovate**

The second key cultural theme is innovation. Of course pharma is innovative, right? Concerns about taking risks and going outside of traditional comfort zones can put a damper on new ideas, especially in large-scale, established companies. Next-generation transformation at scale means every part of the enterprise will need to innovate.

* 1. **Think broadly about portfolio and transactions**

Transactions have always been the fabric of the pharma industry, and deal activity will accelerate as companies look to inorganic activities to achieve their growth plans. Transactions for products as well as capabilities are on the agenda for all CEOs. With the continued scrutiny of the US Federal Trade Commission (FTC) on larger deals in pharma, most companies will need to drive a higher number of transactions to get the same outcomes **[37]**.

* 1. **Revisit and rethink your overall buy/build/partner strategy and decision trees.**

In this dynamic and unstable business climate, having a clear yet agile approach to evaluating all of your options will be key. Companies should continue to push harder on asking themselves whether products and services need to be made in-house. Focusing on differentiated capabilities that will really be the critical value drivers for the business can provide the strategic path towards helping to clarify what is often muddied **[38]**.

* 1. **Protect the enterprise**

While creating capabilities to enhance competitive advantage and value for your business is critical, you must also ensure the business is protected from factors that can destroy value, such as cyberattacks, quality and compliance problems, legal matters and other ethical challenges. Driving technology-enabled digital change can be the most efficient path forward. Companies that have appropriately focused on the people and process side of the equation and are now addressing technology will be better equipped to manage threats **[39]**.

* 1. **Tax strategy paves way for long-term success**

Given the global nature of the industry and the impact of tax on many aspects of the business, we see taxes continuing to be an area of value retention and creation. With potentially changing supply chains from geopolitical instability, tax structuring and planning will be critical to prevent leakage.

1. **Future Trends in Nursing**

Health care is a constantly evolving industry. This is arguably most evident in the field of nursing, where medical advances, government-mandated regulations, and technological innovation combine to change the look and feel of patient care.For advanced practice nurses, such as those equipped with a [Master of Science in Nursing (MSN)](https://online.regiscollege.edu/online-masters-degrees/online-master-science-nursing/), the ability to guide others through these evolutionary processes is critical, especially as the health care industry braces for an impending shortage of qualified nursing leaders. The first step in keeping up with this changing field is understanding the future trends in nursing and how they may shape patient care **[40]**.

* 1. **What the Nursing Shortage Means for Nurses**

A projected shortage of nurses is poised to impact the industry. The U.S. Bureau of Labor Statistics (BLS) projects 9% job growth for registered nurses (RNs) and 45% job growth for nurse practitioners, nurse midwives, and nurse anesthetists between 2020 and 2030. Both percentages are significantly higher than the 8% average growth projected for all professions for the same period **[41]**.

The nursing shortage has a number of causes:

* **Aging population**: The U.S. Census reports that adults age 65 or older numbered 54 million in 2021, or about 16.5% of the population. The elderly require more medical care — and this demographic is only expected to grow in the coming years.
* **Nurse retirements**: Nurses are part of the aging population, and many plan to retire in the next several years. A report in the American Journal of Nursing says nearly 5 million nurses around the globe are expected to retire by 2030.
* **Shortage of nursing faculty**: The number of nursing instructors and professors isn’t high enough to meet the demand for training **[42]**.
* **Burnout**: The COVID-19 pandemic has caused many nurses to suffer burnout because of understaffing. Many nurses have chosen to retire early or leave the profession altogether.

With an [advanced degree in nursing](https://online.regiscollege.edu/online-masters-degrees/online-master-science-nursing/resources/msn-degree-definition/), nurses can leverage their skills to become leaders in their field as it evolves to meet these challenges. Effective leaders are those who will embrace current and future nursing trends, guiding the direction of care delivery for patients of all ages.

* 1. **Trends Affecting the Future of Nursing**

While the aging patient population and staffing shortages are important trends directly affecting the nursing industry, other trends are likewise shaping its future. These trends require nurses to have strong skills in areas beyond traditional nursing competencies, such as tech-driven knowledge **[43]**.

* 1. **Telehealth and Remote Nursing**

Remote patient care via telephone has been around for decades. Yet the concept of telehealth has moved beyond the phone to incorporate a host of multimedia channels, including email, the internet, smartphone apps, and interactive videos. For instance, an email exchange between a patient and a nurse can concern the former’s symptoms and the latter’s recommendation based on patient history.Telehealth gained even greater prominence during the onset of the COVID-19 pandemic in 2020. The spread of infection made many people reluctant to go to hospitals for fear of contracting the virus. Telehealth allowed nurses and other providers to deliver virtual care, avoiding the risk of infection for themselves and their patients **[44]**.

The advantages of telehealth — during and beyond the pandemic — make it attractive to patients and nurses alike. Nurses have the flexibility of working preferred hours. For example, they may work in a call center or in private practice, or they may work in a disease management program. Patients may also find telehealth to be more convenient because it allows them to confer with clinical staff without having to drive to an office or hospital.

* 1. **Patient Data and Nursing Informatics**

The prevalence of technology has changed the way nurses gather and share data. The use of electronic health records (EHRs), coupled with standardized nursing terminology, allows nurses to share patient data efficiently, not only with patients but also with collaborating professionals such as physicians **[45]**.

The advent of EHRs has also given rise to health informatics, a branch of nursing devoted to managing care-related data as it’s gathered and stored. Health informatics calls for nursing students to develop fundamental technological skills, which can include understanding how to incorporate tech-driven innovations into care strategies. Because technology is constantly advancing, optimal care delivery requires that nurses keep abreast of industry innovations that could affect future nursing trends.

* 1. **Artificial Intelligence and Automated Tasks in Nursing**

The use of artificial intelligence (AI) is streamlining patient care delivery. AI and machine learning allow providers to collect and analyze vast amounts of health data to guide decision-making. Some examples of AI in nursing include **[46]**:

* **Clinical decision support**: Clinical decision support tools include alerts in EHRs. They can be used to predict risk and provide data to support diagnosis or treatment. Guided decision trees can improve care and prevent errors.
* **Sensor-based technology**: Nursing has begun leveraging remote sensor technology to improve patient care. AI can help gather data and facilitate patient monitoring, as well as recommend treatments based on the data. This is especially helpful in managing chronic illness.
* **Mobile technology**: Consumer fitness apps and mobile heart monitors are part of the growing demand for mobile health care. This technology generates a great deal of data for providers, which AI can help interpret **[47]**.
* **Voice assistants and robotics**: A voice assistant can remind patients to take medication or monitor their blood pressure. Robotics can be used to augment patient care and patients’ movements.
	1. **The Future of Nursing Is Here — Are You Ready?**

Are you ready to respond to the trends in nursing that are changing patient care? With coursework in clinical, theoretical, and practical concepts in nursing, the Regis College [online Master of Science in Nursing](https://online.regiscollege.edu/online-masters-degrees/online-master-science-nursing/) program can prepare you for a satisfying career as a future-directed nursing professional.

Learn how you can make a positive impact on care delivery and become a leader in shaping nursing for generations to come.

The vision of the Committee on the Future of Nursing 2020–2030, which informs this report, is the achievement of health equity in the United States built on strengthened nursing capacity and expertise. By leveraging these attributes, nursing will help to create and contribute comprehensively to equitable public health and health care systems that are designed to work for everyone **[48]**. To achieve health equity, the committee also envisions a major role for the nursing profession in engaging in the complex work of aligning public health, health care, social services, and public policies to eliminate health disparities and achieve health equity. Specifically, with implementation of this report’s recommendations, the committee envisions 10 outcomes that position the nursing profession to contribute meaningfully to achieving health equity.

* 1. **Health and Health Inequities**

Health inequities, defined as “systematic differences in the opportunities that groups have to achieve optimal health, leading to unfair and avoidable differences in health outcomes,” disproportionately impact people of color; the lesbian, gay, bisexual, transgender, and queer (LGBTQ) community; people with disabilities; those with low income; and those living in rural areas. Indeed, growing evidence reveals a clear association between inequities in both health and access to health care and SDOH—the conditions in the environments in which people live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks. SDOH include both the positive and negative aspects of these conditions. Examples of SDOH include education, employment, health systems and services, housing, income and wealth, the physical environment, public safety, the social environment (including structures, institutions, and policies), and transportation **[49]**. Everyone is affected by SDOH. Some people who have more education or higher incomes will fare better healthwise as they may be able to make more informed choices, have better opportunities to access health care, and have the means to pay for health care. Others, without the benefit of these positive social determinants, are unlikely to fare as well.

* 1. **The Role of Nurses in Advancing Health Equity**

A nation cannot fully thrive until everyone—no matter who they are, where they live, or how much money they make—can live the healthiest possible life, and helping people live their healthiest life is and has always been the essential role of nurses. Whether in a school, a hospital, or a community health clinic, they have worked to address the root causes of poor health. The history of nursing is grounded in social justice and community health advocacy. The Code of Ethics for Nurses with Interpretive Statements from the American Nurses Association (ANA), for example, obligates nurses to “integrate principles of social justice into nursing and health policy.” **[50]**

Nurses work in a wide array of settings and practice at a range of professional levels. They often act as the first and most frequent line of contact with people of all backgrounds and experiences seeking care. The nursing workforce also represents the largest of the health care professions—nearly four times the size of the physician workforce. In their various capacities and given their numbers, nurses are uniquely positioned to manage teams and link clinical care, public health, and social services **[51]**.

* 1. **Study Purpose and Approach**

Nurses, then, have a critical role to play in achieving the goal of health equity. But to take on the pursuit of that goal, they need robust education, supportive work environments, and autonomy. Accordingly, the Robert Wood Johnson Foundation asked the National Academies of Sciences, Engineering, and Medicine to conduct a study aimed at charting a path forward for the nursing profession to help create a culture of health and reduce disparities in people’s ability to achieve their full health potential. To carry out this study, the National Academies convened an ad hoc committee of 15 experts in the fields of nursing leadership, education, practice, and workforce, as well as health policy, economics and health care finance, informatics, population health and health disparities, health care quality and delivery, and health care research and interventions **[52]**.

* 1. **Acting Now to Improve the Health and Well-Being of the Nation**

The health and well-being of the nation are at an inflection point. In the decade ahead, in addition to growth in the overall size of the U.S. population, other sociodemographic factors and health workforce imbalances will increase the demand for nurses, particularly in areas in which the current registered nurse (RN) and advanced practice registered nurse (APRN) workforce is inadequate to meet the nation’s health care needs. For instance, a 2020 report prepared for the American Association of Medical Colleges estimated that by 2033, current physician shortages, seen particularly in the areas of primary care, mental health, and gerontology and in rural areas, could increase—for primary care physicians, ranging between 21,400 and 55,200, and for non–primary care specialty physicians, between 33,700 and 86,700 **[53]**.

The strengths of the nursing workforce are many, yet they will be tested by formidable challenges that are already beginning to affect nurses and the health systems and organizations in which they work. These challenges will arise not only from the above changes occurring throughout the broader society but also from changes within the health care system itself and within the nursing and larger health care workforce. Further challenges for nursing will arise from health-related public policies and other factors that affect the scope of practice, size, distribution, diversity, and educational preparation of the nursing workforce. These many challenges include the need to **[54]**

* increase the number of nurses available to meet the nation’s growing health care needs;
* rightsize the clinical specialty distribution of nurses;
* increase the distribution of nurses to where they are needed most;
* ensure a nursing workforce that is diverse and prepared with the knowledge and skills to address SDOH;
* overcome current and future barriers affecting workforce capacity; and
* anticipate long-term impacts of the COVID-19 pandemic on the nursing workforce.
	1. **Lifting Barriers to Expand the Contributions of Nursing**

Nurses can address SDOH and help improve health equity by providing care management and team-based care; expanding the capacity of primary care, including maternal and pediatric care, mental health care, and telehealth; and providing care in school, home, work, and public health settings. Yet, their ability to fulfill this potential is limited by state-level regulations restricting nurse practitioners’ (NPs’) scope of practice. While considerable progress has been made over the past two decades in lifting such regulations, 27 states still do not allow full practice authority for NPs. As of January 2021, 23 states and the District of Columbia allowed full practice authority for NPs, permitting them to prescribe medication, diagnose patients, and provide treatment without the presence of a physician. In 16 states, NPs need a physician’s authority to prescribe medication, and in 11 states, they require physician oversight for all practice **[55]**.

* 1. **Designing Better Payment Models**

How care is paid for can directly influence access to care. The design of payment systems influences what health care is provided to individuals and communities, where care is provided, and by whom. Positioning health systems to work in partnership with other sectors to meet the complex health and social needs of individuals can help reduce health inequities. However, current payment systems are not designed to pay for services—including those provided by nurses, such as supporting team-based care and advancing proven interventions and strategies for reducing health disparities—that address social needs and SDOH. Going forward, payment systems need to be redesigned to recognize the value of those services **[56]**.

Nurses are essential to whole-person care through their vital roles in coordinating and managing care, helping people navigate the health care system, and providing health education, as well as addressing SDOH and advancing health equity. By supporting team-based care, improved communication, and proven interventions and strategies that can reduce health disparities, payment systems can enable nurses to make these essential contributions to improving care and outcomes for all patients.

* 1. **Strengthening Nursing Education**

Nursing education needs to be markedly strengthened to prepare nurses to identify and act on the complex social, economic, and environmental factors that influence health and well-being. In particular, their education needs to provide nursing students with substantive, diverse, and sustained community-based experiences, as well as to substantially reorient curricula and reevaluate hiring and admission practices so as to achieve a diverse faculty and student population **[57]**.

Nursing organizations have developed guidelines for how nursing education should prepare nurses to address health equity issues and SDOH in a meaningful way. The American Association of Colleges of Nursing’s (AACN’s) *Essentials* provides an outline for the necessary curriculum content and expected competencies for graduates of baccalaureate, master’s, and doctor of nursing practice (DNP) programs. Yet, despite this guidance and the numerous calls to incorporate equity, population health, and SDOH into undergraduate and graduate nursing education, these and related concepts are currently not well integrated into nursing curricula **[58]**.

* 1. **Valuing Community Nursing**

School and public health nurses play a vital role in advancing health equity. Adequate funding for these nurses is essential if they are to take on that role. School nurses are front-line health care providers, serving as a bridge between the health care and education systems and other sectors. Whether they are hired by school districts, health departments, or hospitals, school nurses focus on the physical and mental health of students in the context of educational environments. They serve as both essential care providers for individuals and links to broader community health issues through the student populations they serve **[59]**.

* 1. **Fostering Nurses’ Roles as Leaders and Advocates**

Creating a future in which opportunities to optimize health are more equitable will require disrupting the deeply entrenched prevailing paradigms of health care, which in turn will require enlightened, diverse, courageous, and competent leadership. Nurses have always been key to the health and well-being of patients and communities, but a new generation of nurse leaders is now needed—one that recognizes the importance of diversity and is able to use and build on the increasing evidence base supporting the link between SDOH and health status. Today’s nurses are called on to lead in the development of effective strategies for improving the nation’s health with due attention to the needs of the most underserved individuals, neighborhoods, and communities and the crucial importance of advancing health equity. Implementing change to address SDOH and advance health equity will require the contributions of nurses in all roles and all settings; although no one nurse can successfully implement change without the collaboration of others. In addition to collaboration among members of the nursing profession, the creation of enduring change will require the involvement of patients and community members. Rather than a more hierarchal system of leadership, moreover, collaborative leadership assumes that everyone involved has unique contributions to make and that constructive dialogue and joint resources are needed to achieve ongoing goals **[60]**.

* 1. **Preparing Nurses to Respond to Disasters**

The increasing frequency of natural and environmental disasters and public health emergencies, such as the COVID-19 pandemic, reveals in stark detail the critical importance of having a national nursing workforce prepared with the knowledge, skills, and abilities to respond to these events **[61]**. COVID-19 has revealed deep chasms within an already fragmented U.S. health care system, resulting in significant excess mortality and morbidity, glaring health inequities, and the inability to contain a rapidly escalating pandemic **[62]**. Most severely—and unfairly—affected are individuals and communities of color, who suffer from the compound disadvantages of racism, poverty, workplace hazards, limited health care access, and preexisting health conditions resulting from the foregoing factors **[63]**. As other disasters and public health emergencies threaten population health in the decades ahead, articulation of the roles and responsibilities of nurses in disaster response and public health emergency management will be critical to the nation’s capacity to plan for and respond to these types of events **[64]**.

* 1. **Supporting the Health and Well-Being of Nurses**

Nurses’ health and well-being are affected by the demands of their workplace, and in turn affect the quality and safety of the care they provide. Thus, it is essential to address the systems, structures, and policies that create workplace hazards and stresses that lead to burnout, fatigue, and poor physical and mental health among the nursing workforce. With the emergence of COVID-19, the day-to-day demands of nursing have been both illuminated and exacerbated **[65]**. Nurses are coping with unrealistic workloads; insufficient resources and protective equipment; risk of infection; stigma directed at health care workers; and the mental, emotional, and moral burdens of caring for patients with a new and unpredictable disease and helping with contact tracing and testing. Moreover, if nurses are to contribute to addressing the many social determinants that influence health, they must first feel healthy, well, and supported themselves. Policy makers, employers of nurses, nursing schools, nurse leaders, and nursing associations all have a role to play to this end **[66]**.

**References**

1. Jpt, H. (2008). Cochrane handbook for systematic reviews of interventions. *http://www. cochrane-handbook. org*.
2. Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group\*. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of internal medicine*, *151*(4), 264-269.
3. Cochrane Effective, P. (2017). Organisation of C. *EPOC Resources for review authors*, *2017*.
4. Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., ... & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018 for information professionals and researchers. *Education for information*, *34*(4), 285-291.
5. Adams, B. (2015). NHS Alliance: the evolution of primary care. *Prescriber*, *26*(3), 32-34.
6. Wärdig, R. E., Hultsjö, S., Lind, M., & Klavebäck, I. (2022). Nurses’ Experiences of Suicide Prevention in Primary Health Care (PHC)–A Qualitative Interview Study. *Issues in mental health nursing*, *43*(10), 903-912.
7. Al-Alawi, K., Al Mandhari, A., & Johansson, H. (2019). Care providers’ perceptions towards challenges and opportunities for service improvement at diabetes management clinics in public primary health care in Muscat, Oman: a qualitative study. *BMC health services research*, *19*(1), 1-17.
8. Alhabib, S., Aldraimly, M., & Alfarhan, A. (2016). An evolving role of clinical pharmacists in managing diabetes: evidence from the literature. *Saudi Pharmaceutical Journal*, *24*(4), 441-446.
9. Ali, S., Smith, T. L., Mican, L., & Brown, C. (2015). Psychiatric providers’ willingness to participate in shared decision making when prescribing psychotropics. *Journal of Pharmacy Technology*, *31*(5), 212-218.
10. Aljumah, K., & Hassali, M. A. (2015). Impact of pharmacist intervention on adherence and measurable patient outcomes among depressed patients: a randomised controlled study. *BMC psychiatry*, *15*, 1-9.
11. Almunef, M., Mason, J., Curtis, C., & Jalal, Z. (2019). P034 Management of chronic illness in young people aged 10-24 years: a systematic review to explore the role of primary care pharmacists.
12. Alshehri, A. A., Cheema, E., Yahyouche, A., Haque, M. S., & Jalal, Z. (2021). Evaluating the role and integration of general practice pharmacists in England: a cross-sectional study. *International Journal of Clinical Pharmacy*, *43*(6), 1609-1618.
13. Anderson, K., Freeman, C., Rowett, D., Burrows, J., Scott, I., & Rigby, D. (2015). Polypharmacy, deprescribing and shared decision‐making in primary care: the role of the accredited pharmacist. *Journal of Pharmacy Practice and Research*, *45*(4), 446-449.
14. Ashcroft, D. M., Clark, C. M., & Gorman, S. P. (1998). Shared care: a study of patients' experiences with erythropoietin. *International Journal of Pharmacy Practice*, *6*(3), 145-149.
15. Bains, S., Naqvi, M., & West, A. (2021). S126 The pharmacist-led accelerated transfer of patients to shared care for the monitoring and prescribing of immunomodulatory therapy during covid-19.
16. Bajramovic, J., Emmerton, L., & Tett, S. E. (2004). Perceptions around concordance–focus groups and semi‐structured interviews conducted with consumers, pharmacists and general practitioners. *Health Expectations*, *7*(3), 221-234.
17. Iqbal, N., Huynh, C., & Maidment, I. (2022). Systematic literature review of pharmacists in general practice in supporting the implementation of shared care agreements in primary care. *Systematic Reviews*, *11*(1), 88.
18. Bellingham, C. (2004). News feature-How to improve medicines management at the primary/secondary care interface. *Pharmaceutical Journal*, *272*(7287), 210-211.
19. Berendsen, A. J., de Jong, G. M., Meyboom-de Jong, B., Dekker, J. H., & Schuling, J. (2009). Transition of care: experiences and preferences of patients across the primary/secondary interface–a qualitative study. *BMC Health Services Research*, *9*(1), 1-8.
20. Bojke, C., Philips, Z., Sculpher, M., Campion, P., Chrystyn, H., Coulton, S., ... & RESPECT Trial Team. (2010). Cost-effectiveness of shared pharmaceutical care for older patients: RESPECT trial findings. *British Journal of General Practice*, *60*(570), e20-e27.
21. Iqbal, N., Huynh, C., & Maidment, I. (2022). Systematic literature review of pharmacists in general practice in supporting the implementation of shared care agreements in primary care. *Systematic Reviews*, *11*(1), 88.
22. Cain, R. M. (1970). The physician-pharmacist interface in the clinical practice of pharmacy. *Drug Intelligence & Clinical Pharmacy*, *4*(2), 38-40.
23. Carrington, I. M., & McAloon, J. (2018). Why shared-care arrangements for prescribing in attention deficit hyperactivity disorder may not be accepted. *European Journal of Hospital Pharmacy*, *25*(4), 222-224.
24. Chana, N., Porat, T., Whittlesea, C., & Delaney, B. (2017). Improving specialist drug prescribing in primary care using task and error analysis: an observational study. *British Journal of General Practice*, *67*(656), e157-e167.
25. Maheu, A., Vanier, M. C., Rouleau, L., Dugré, N., & Guénette, L. (2019). The creation of a practice-based network of pharmacists working in family medicine groups (FMG). *Pharmacy*, *7*(3), 108.
26. Cox, W. M. (2002). Evaluation of a shared-care program for methadone treatment of drug abuse: An international perspective. *Journal of Drug Issues*, *32*(4), 1115-1124.
27. Schork, N. J. (2015). Personalized medicine: time for one-person trials. *Nature*, *520*(7549), 609-611.
28. Gabler, E. (2020). How chaos at chain pharmacies is putting patients at risk. *The New York Times*, *31*.
29. Terlep, S., & Kang, J. (2020). The Pharmacist Is Out: Supermarkets Close Pharmacy Counters. *Wall Street Journal, January*, *27*.
30. Pashkov, V. M., & Harkusha, A. О. (2019). Enforceability of non-Compete agreements in medical practice: Between law and ethics. *Wiadomości Lekarskie*, *72*(12), 2421-2426.
31. Jebara, T., Cunningham, S., MacLure, K., Awaisu, A., Pallivalapila, A., & Stewart, D. (2018). Stakeholders' views and experiences of pharmacist prescribing: a systematic review. *British journal of clinical pharmacology*, *84*(9), 1883-1905.
32. Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, *8*(1), 19-32.
33. Azhar, S., Hassali, M. A., Mohamed Ibrahim, M. I., Saleem, F., & Siow Yen, L. (2012). A survey evaluating nurses’ perception and expectations towards the role of pharmacist in Pakistan’s healthcare system. *Journal of advanced nursing*, *68*(1), 199-205.
34. Borrott, N., Kinney, S., Newall, F., Williams, A., Cranswick, N., Wong, I., & Manias, E. (2017). Medication communication between nurses and doctors for paediatric acute care: An ethnographic study. *Journal of clinical nursing*, *26*(13-14), 1978-1992.
35. Choo, J., Hutchinson, A., & Bucknall, T. (2010). Nurses' role in medication safety. *Journal of nursing management*, *18*(7), 853-861.
36. Colquhoun, H. L., Levac, D., O'Brien, K. K., Straus, S., Tricco, A. C., Perrier, L., ... & Moher, D. (2014). Scoping reviews: time for clarity in definition, methods, and reporting. *Journal of clinical epidemiology*, *67*(12), 1291-1294.
37. Daudt, H. M., van Mossel, C., & Scott, S. J. (2013). Enhancing the scoping study methodology: a large, inter-professional team’s experience with Arksey and O’Malley’s framework. *BMC medical research methodology*, *13*, 1-9.
38. De Baetselier, E., Dilles, T., Batalha, L. M., Dijkstra, N. E., Fernandes, M. I., Filov, I., ... & Van Rompaey, B. (2021). Perspectives of nurses’ role in interprofessional pharmaceutical care across 14 European countries: A qualitative study in pharmacists, physicians and nurses. *PloS one*, *16*(5), e0251982.
39. De Baetselier, E., Van Rompaey, B., Batalha, L. M., Bergqvist, M., Czarkowska-Paczek, B., De Santis, A., ... & Dilles, T. (2020). EUPRON: nurses’ practice in interprofessional pharmaceutical care in Europe. A cross-sectional survey in 17 countries. *BMJ open*, *10*(6), e036269.
40. Dilles, T., Vander Stichele, R. H., Van Bortel, L. M., & Elseviers, M. M. (2013). The development and test of an intervention to improve ADR screening in nursing homes. *Journal of the American Medical Directors Association*, *14*(5), 379-e1.
41. Dossey, B. M. (1998). Florence Nightingale: A 19th-century mystic. *Journal of Holistic Nursing*, *16*(2), 111-164.
42. Dürr, P., Schlichtig, K., Kelz, C., Deutsch, B., Maas, R., Eckart, M. J., ... & Fromm, M. F. (2021). The randomized AMBORA trial: Impact of pharmacological/pharmaceutical care on medication safety and patient-reported outcomes during treatment with new oral anticancer agents. *Journal of Clinical Oncology*, *39*(18), 1983-1994.
43. Dykes, P. C., Rothschild, J. M., & Hurley, A. C. (2010). Medical errors recovered by critical care nurses. *JONA: The Journal of Nursing Administration*, *40*(5), 241-246.
44. Ensing, H. T., Stuijt, C. C., Van Den Bemt, B. J., Van Dooren, A. A., Karapinar-Carkit, F., Koster, E. S., & Bouvy, M. L. (2015). Identifying the optimal role for pharmacists in care transitions: a systematic review. *Journal of managed care & specialty pharmacy*, *21*(8), 614-636.
45. Gabe, M. E., Davies, G. A., Murphy, F., Davies, M., Johnstone, L., & Jordan, S. U. E. (2011). Adverse drug reactions: treatment burdens and nurse‐led medication monitoring. *Journal of Nursing Management*, *19*(3), 377-392.
46. Henneman, E. A., Gawlinski, A., Blank, F. S., Henneman, P. L., Jordan, D., & McKenzie, J. B. (2010). Strategies used by critical care nurses to identify, interrupt, and correct medical errors. *American Journal of Critical Care*, *19*(6), 500-509.
47. Hepler, C. D., & Strand, L. M. (1990). Opportunities and responsibilities in pharmaceutical care. *American journal of hospital pharmacy*, *47*(3), 533-543.
48. Jordan, S., Gabe-Walters, M. E., Watkins, A., Humphreys, I., Newson, L., Snelgrove, S., & Dennis, M. S. (2015). Nurse-led medicines' monitoring for patients with dementia in care homes: a pragmatic cohort stepped wedge cluster randomised trial. *PLoS One*, *10*(10), e0140203.
49. Krautscheid, L. C. (2014). Defining professional nursing accountability: a literature review. *Journal of Professional Nursing*, *30*(1), 43-47.
50. Levac, D., Colquhoun, H., & O'Brien, K. K. (2010). Scoping studies: advancing the methodology. *Implementation science*, *5*, 1-9.
51. Lopez-Gonzalez, E., Herdeiro, M. T., Piñeiro-Lamas, M., Figueiras, A., & Grephepi Group. (2015). Effect of an educational intervention to improve adverse drug reaction reporting in physicians: a cluster randomized controlled trial. *Drug safety*, *38*, 189-196.
52. Maier, C. B. (2019). Nurse prescribing of medicines in 13 European countries. *Human Resources for Health*, *17*(1), 1-10.
53. Maier, C. B., & Aiken, L. H. (2016). Task shifting from physicians to nurses in primary care in 39 countries: a cross-country comparative study. *The European Journal of Public Health*, *26*(6), 927-934.
54. Maier, C. B., Budde, H., & Buchan, J. (2018). Nurses in expanded roles to strengthen community-based health promotion and chronic care: policy implications from an international perspective; A commentary. *Israel Journal of Health Policy Research*, *7*, 1-4.
55. Makowsky, M. J., Schindel, T. J., Rosenthal, M., Campbell, K., Tsuyuki, R. T., & Madill, H. M. (2009). Collaboration between pharmacists, physicians and nurse practitioners: a qualitative investigation of working relationships in the inpatient medical setting. *Journal of interprofessional care*, *23*(2), 169-184.
56. Manias, E. (2018). Effects of interdisciplinary collaboration in hospitals on medication errors: an integrative review. *Expert Opinion on Drug Safety*, *17*(3), 259-275.
57. Parretta, E., Rafaniello, C., Magro, L., Coggiola Pittoni, A., Sportiello, L., Ferrajolo, C., ... & Capuano, A. (2014). Improvement of patient adverse drug reaction reporting through a community pharmacist-based intervention in the Campania region of Italy. *Expert opinion on drug safety*, *13*(sup1), 21-29.
58. Peters, M. D., Godfrey, C. M., Khalil, H., McInerney, P., Parker, D., & Soares, C. B. (2015). Guidance for conducting systematic scoping reviews. *JBI Evidence Implementation*, *13*(3), 141-146.
59. Richards, D. A., Hanssen, T. A., & Borglin, G. (2018). The second triennial systematic literature review of European nursing research: Impact on patient outcomes and implications for evidence‐based practice. *Worldviews on Evidence‐Based Nursing*, *15*(5), 333-343.
60. Rinchuse, D. J., & Greene, C. S. (2018). Scoping review of systematic review abstracts about temporomandibular disorders: Comparison of search years 2004 and 2017. *American Journal of Orthodontics and Dentofacial Orthopedics*, *154*(1), 35-46.
61. Rogers, A. E., Dean, G. E., Hwang, W. T., & Scott, L. D. (2008). Role of registered nurses in error prevention, discovery and correction. *BMJ Quality & Safety*, *17*(2), 117-121.
62. Thoma, J. E., & Waite, M. A. (2018). Experiences of nurse case managers within a central discharge planning role of collaboration between physicians, patients and other healthcare professionals: A sociocultural qualitative study. *Journal of clinical nursing*, *27*(5-6), 1198-1208.
63. Tricco, A. C., Lillie, E., Zarin, W., O'Brien, K. K., Colquhoun, H., Levac, D., ... & Straus, S. E. (2018). PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Annals of internal medicine*, *169*(7), 467-473.
64. Ulfvarson, J., Mejyr, S., & Bergman, U. (2007). Nurses are increasingly involved in pharmacovigilance in Sweden. *Pharmacoepidemiology and drug safety*, *16*(5), 532-537.
65. Van Bogaert, P., Kowalski, C., Weeks, S. M., & Clarke, S. P. (2013). The relationship between nurse practice environment, nurse work characteristics, burnout and job outcome and quality of nursing care: a cross-sectional survey. *International journal of nursing studies*, *50*(12), 1667-1677.
66. Wilson, A. J., Palmer, L., Levett-Jones, T., Gilligan, C., & Outram, S. (2016). Interprofessional collaborative practice for medication safety: Nursing, pharmacy, and medical graduates’ experiences and perspectives. *Journal of interprofessional care*, *30*(5), 649-654.