

Express Scripts®
Pharmacy

The prescription of trust

Pharmacists
transforming
patient care

Express Scripts® Pharmacy

Dear Reader,

Express Scripts® Pharmacy led the way with the first home delivery of prescriptions 35 years ago. Since then, we have been innovating and adapting to meet the needs of our patients. We've grown to serve millions of patients each year, thanks to the commitment and clinical expertise of our 1,000+ pharmacists, in partnership with prescribing physicians and health care providers across the country.

To stay on the cutting edge of pharmacy practice, we engaged Columbia University Mailman School of Public Health to conduct a research study, bringing together the views of providers, pharmacists, and patients to explore the future impact of pharmacists on the health care ecosystem. This effort yielded new insights to help us shape our pharmacy care, products, and services going forward.

As we publish this report, the health care system is evolving rapidly, with the COVID-19 pandemic driving increased workloads in traditional health care settings. In addition, an aging population, challenges with primary care access, an increase in chronic conditions, and complex medication therapies are contributing to gaps in patient care. Pharmacists will play a key role in filling these gaps.

Express Scripts® Pharmacy's singular focus on pharmacy has allowed us to create a unique model of care in which our pharmacists concentrate in specific roles, honing their skills to deliver a higher level of patient care. The research also uncovered other ways in which Express Scripts® Pharmacy is ready to meet patient needs.

- **Disease specialization among pharmacists.** “The Prescription of Trust” report tells us pharmacists are trusted to fill more direct patient care gaps, with 77.3% of patient respondents agreeing that the pharmacist is an integral member of the care team.

Pharmacists with condition-specific experience and training staff our Therapeutic Resource Centers (TRC) built around six disease areas. Patients with these conditions receive care from a TRC pharmacist, who provides support for safe and effective use of medication and counsels the patient on ways to manage their condition.

- **Supportive technologies to help enable patient care.** 70.8% of pharmacists agree that automation will lead to reductions in human error and 86.1% agree that technology advances will make the practice of pharmacy safer for patients.

At Express Scripts® Pharmacy our proprietary automation frees up time for our pharmacists to work directly with patients. Our pharmacists and technology work together to dispense medications with a 99.99% accuracy rate.

- **Pharmacist inclusion in value-based care.** 83.7% of providers whose practice was part of a value-based payment model agreed that pharmacists should be regularly included in multidisciplinary teams that collaborate on patient care.

A recent study showed that home delivery drives higher medication adherence as compared with retail pharmacy, with a 26%-39% increase across specific disease states.¹ Home delivery patients in the studied disease states have up to 23% fewer ER visits and up to 20% fewer inpatient hospitalizations.

Patient care is our top priority at Express Scripts® Pharmacy. We are committed to learning and evolving to meet the needs of patients, ensuring our pharmacists are ready to provide the highest quality patient care — now and in the future!



Matt Perlberg
President, Accredo and Express Scripts® Pharmacy

¹ Evernorth Health Service Research, Impact on Adherence and Medical Utilization Longitudinal Study July 2017-December 2019.

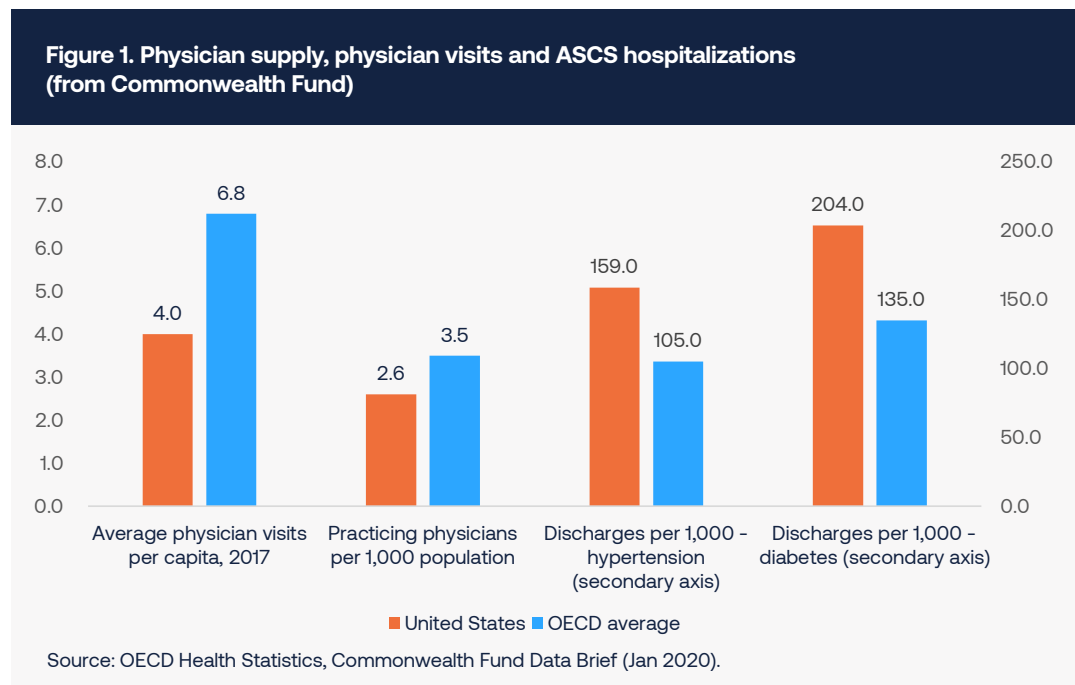
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Pharmacists of the future: demand and innovation transforming patient care

The U.S. health care system is complicated, with varying delivery and reimbursement models, access to care challenges, as well as the complexity of diagnostic and treatment options, including some of the most technologically advanced procedures, devices, and medication therapies available. According to a 2020 Commonwealth Fund data brief, in comparison with the Organisation for Economic Co-operation and Development (OECD) countries, the United States has some of the highest hospitalization rates for ambulatory sensitive conditions such as hypertension and diabetes, has fewer doctor visits per capita, and has the lowest physicians per 1,000 population.² (Figure 1) In fact, the nation's shortage of doctors is expected to rise to between 54,000 and 139,000 by 2033 as the U.S. population grows and ages, and is even more of a critical issue in rural areas. In addition, the country is experiencing a critical nursing shortage that is expected to continue through 2030 and was exacerbated by the COVID-19 pandemic.³



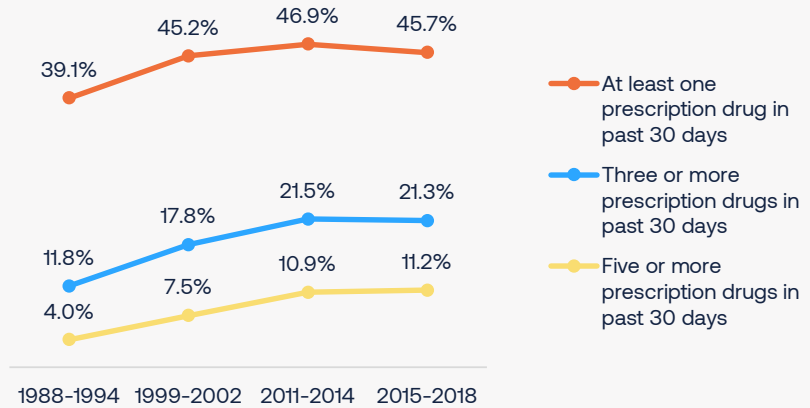
² https://www.commonwealthfund.org/sites/default/files/2020-01/Tikkanen_US_hlt_care_global_perspective_2019_OECD_db_v2.pdf
³ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8251049/pdf/INR-68-12.pdf>



With more than half of the U.S. population experiencing at least one chronic condition, **prescription drugs are often the first line of defense.**

With more than half (51.8%) of the U.S. population experiencing at least one chronic condition,⁴ and one-quarter suffering from multiple chronic conditions, prescription medications are often the first line of defense to help patients manage these conditions. In the period 2015–2018, nearly one-half of the U.S. population was using at least one prescription drug, nearly one-quarter (21.4%) were using three or more, and over 10% (11.2) were using five or more prescription drugs.⁵ (Figure 2)

Figure 2. Prescription drug use in the past 30 years



Source: Centers for Disease Control and Prevention.

The rise of chronic disease and increased medication use, shifts to value-based payment models and persistent primary care access challenges are changing how care is being implemented in many local and regional markets. The need for change has revealed an underutilized resource that could bridge the access gap, help attain cost and quality goals, and assist with chronic disease management – pharmacists.

⁴ Prevalence of Multiple Chronic Conditions Among US Adults, 2018. Research Brief – Volume 17 – 9/17/20. https://www.cdc.gov/pcd/issues/2020/20_0130.htm

⁵ Centers for Disease Control and Prevention. Therapeutic Drug Use – FastStats – 2019

To explore the role of pharmacists in the U.S. health care system, Express Scripts® Pharmacy, in partnership with Columbia University Mailman School of Public Health, analyzed the largest, most comprehensive data sources related to the topic, incorporating patients' voices for the first time. Survey data were collected from 1,000 pharmacists, 500 medical providers (physicians and nurse practitioners), and 3,000 patients. Emerging from this data were six driving themes.

Exploring the role of pharmacists: Six driving themes

1. Value-based models	2. Primary care gaps	3. Patient care activities
Pharmacists can help achieve cost and quality goals on the journey to value-based payment models	Primary care supply shortages and gaps can be filled with pharmacists	The expanded role of the pharmacist will include more patient care activities
4. Training and education	5. Trust	6. Supportive technology
To meet growing demand and fill gaps in care, pharmacist training will be a key focus	There is a high level of trust in pharmacists to expand their role	Growth in use of technology will help free up pharmacist time to focus on patient care

Pharmacists can help achieve cost and quality goals on the journey to value-based payment models



40.9%

of health care payments were made as part of a value-based payment arrangement or an alternative payment model (APM).

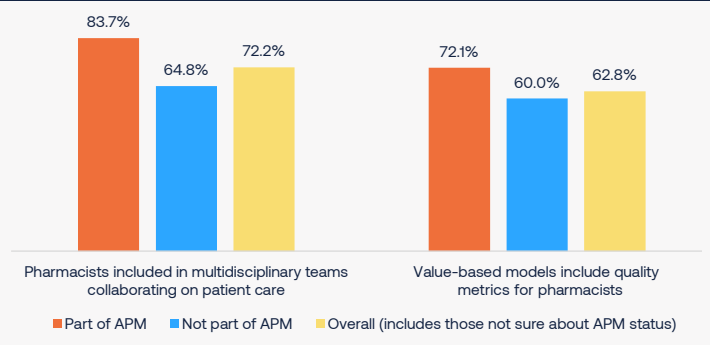
A 2021 survey published by the Health Care Payment Learning & Action Network reported that 40.9% of health care payments were made as part of a value-based payment arrangement, or an alternative payment model (APM).⁶ This model gives added incentive payments to provide high-quality and cost-efficient care. The penetration of APM payments ranged from 35% in commercial insurance plans to 58% in Medicare Advantage plans.⁵ Many states are even trying to shift Medicaid dollars to APMs, sometimes modeling APM efforts on the already developed Medicare programs.⁷

As providers shift focus to more population health metrics, primary care providers that choose to participate in these models will most likely need to enhance their care teams to include expertise that allows them to improve access and continuity, care management, and coordination, among other goals. For example, the Primary Care First model, which started in 2021 and now has more than 3,000 practitioners participating, is “a voluntary alternative five-year payment model that rewards value and quality by offering an innovative payment structure to support the delivery of advanced primary care.”⁸ Two of the metrics included in the Primary Care First model include blood pressure and diabetes hemoglobin A1c control.⁶ These are both metrics that could be aided by partnership with a pharmacist to help with medication management.

In total, 28.8% of provider respondents indicated their practice was part of a shared savings or value-based payment model. Of those that responded yes to being part of a shared savings model, 83.7% agreed or strongly agreed that pharmacists would be regularly included in multidisciplinary teams that collaborate on patient care, as compared to 72.2%

overall. (Figure 3) Further, 72.1% of respondents that are part of a shared savings model agreed or strongly agreed that value-based payment models would include quality metrics for pharmacists, as compared with 62.8 overall. (Figure 3)

Figure 3. Provider respondents strongly agree or agree to multidisciplinary team of value-based model inclusion



⁶ LAN survey - <https://www.fiercehealthcare.com/payer/lan-survey-40-health-payments-tied-to-alternative-payment-models-2020>

⁷ <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/life-sciences-health-care/us-lshc-alternative-payment-models-in-Medicaid-MACRA.pdf>

⁸ CMS - <https://innovation.cms.gov/innovation-models/primary-care-first>

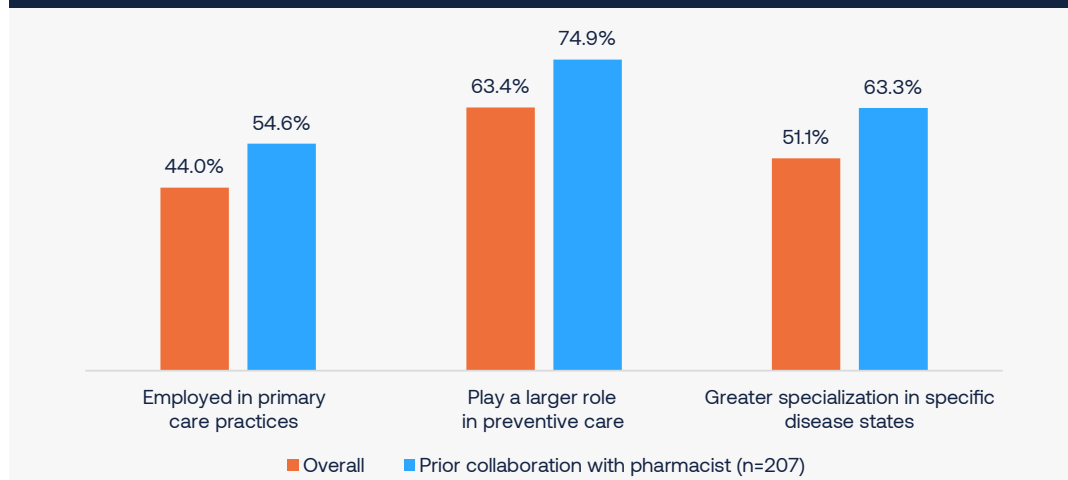
Primary care supply shortages and gaps can be filled with pharmacists

A 2020 report from the Association of American Medical Colleges showed a continued shortage of physicians in the United States. For primary care, the shortage was estimated to be between 21,400 and 55,200 physicians by 2032.⁹ Trends contributing to the physician shortage include an increased demand with population growth and aging coupled with an aging physician workforce with many nearing retirement.

While nurse practitioners have closed some of the shortage gap, and there is a projected surplus of nurse practitioners, restrictive practice models continue to limit how much nurse practitioners can close the shortage gap.¹⁰

Providers do expect pharmacists to play a greater role in traditional primary care activities. For instance, 63.4% of provider respondents agree or strongly agree that pharmacists will play a greater role in preventive care activities and 51.1% agree or strongly agree pharmacists will have greater specialization in specific diseases. Of provider respondents, 44.0% agree or strongly agree that more pharmacists will be employed in primary care practices, allowing for more direct collaboration. Agreement with these statements increased when limiting to provider respondents that have collaborated with pharmacists on a multidisciplinary care team. (Figure 4)

Figure 4. Provider respondents strongly agree or agree to primary care employment, role in preventive care or disease specialization



⁹ AAMC study - <https://www.aamc.org/news-insights/us-physician-shortage-growing>

¹⁰ <https://www.aanp.org/advocacy/state/state-practice-environment>

The expanded role of the pharmacist will include more patient care activities



Pharmacist comments

“Less time filling and dispensing prescriptions and more time directly interacting with care teams, prescribers, and patients, especially via technology (video, text, phone, etc.)”

– *Ambulatory clinic pharmacist*

“I hope that pharmacists have the authority to prescribe drugs. We are highly trained and since we have direct info with the insurance formulary it would be a seamless process”

– *Retail pharmacist*

“I hope pharmacy will be more patient-specific and less diagnosis-specific. Each patient will be treated as a patient and not their disease-state”

– *Retail pharmacist*



Provider comments

“I’m hoping that pharmacists will be more deeply involved in patient care especially in chronic illnesses and mental health conditions where patients need consistent support and reassurance with regard to medication”

– *Psychiatrist*

“With health care provider shortages, alternative knowledgeable health care professionals will have to take a more active role”

– *Internal Medicine physician*

“Engagement with pharmacists will increase due to the increasing complexity of health care with many new medications”

– *Nurse practitioner*

Pharmacists are positioned to fill more direct patient care gaps. As respondents to the pharmacist survey considered the field of pharmacy in 2030, there was significant agreement that the pharmacist would take on more direct patient care responsibilities. In fact, more than 80% of pharmacists agreed or strongly agreed they will increase patient counseling responsibilities, take on more of a role in preventive care measures, and be more integrated in a care management team structure. Similarly, 80% or more of pharmacists felt, that in the future, patients would see pharmacists as an integral part of the health care team, have confidence in utilizing their pharmacist as a primary liaison to the medical care system, and establish a consistent relationship with a pharmacist like other health care professionals. (Figure 5)

Figure 5. Pharmacist respondents strongly agree or agree to anticipated changes in pharmacy care

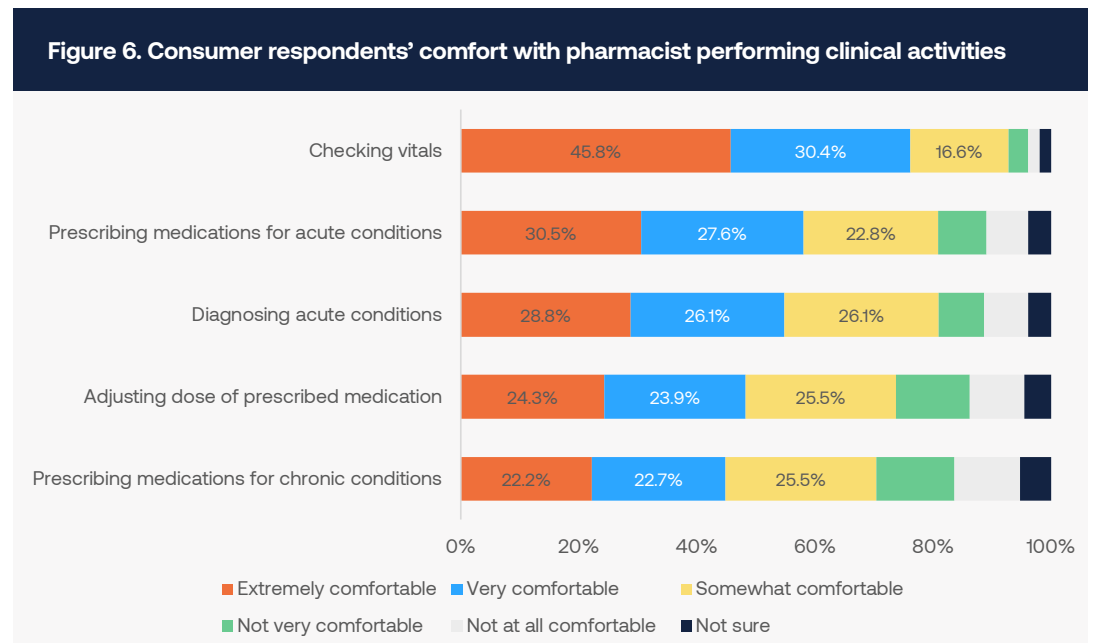




77.3%

of patient respondents agree or strongly agree that the pharmacist is an integral member of the care team.

Currently, patients also see the integral role that pharmacists play in the care process. 77.3% of patient respondents agree or strongly agree that the pharmacist is an integral member of the care team. Patients also have a relatively high level of comfort with pharmacists performing clinical activities. For instance, 76.2% of respondents would be extremely to very comfortable with pharmacists checking vitals and 54.9% of respondents would be extremely or very comfortable with pharmacists checking vitals and 54.9% of respondents would be extremely or very comfortable with pharmacists diagnosing acute conditions, with even more, 58.1% of respondents, comfortable with pharmacists prescribing medications for acute conditions. (Figure 6)

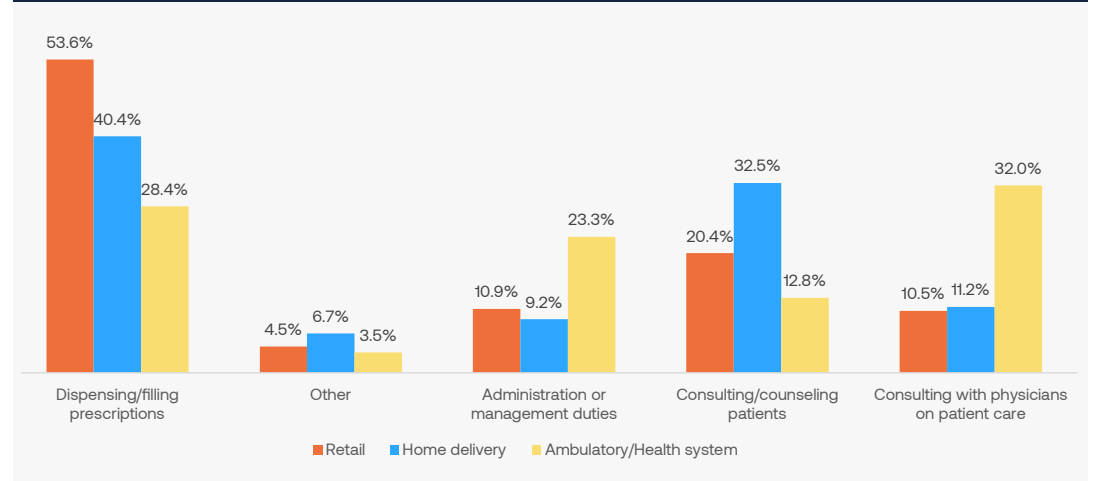




Pharmacists in ambulatory clinic/health system settings and home delivery settings **tend to provide more patient care activities** than those in retail settings.

In some ways, certain pharmacists are already shifting to being involved in more patient care activities. In examining how pharmacists spend their time, pharmacists in retail settings tend to be more transactional whereas pharmacists in ambulatory clinic/health system settings and, to some extent, home delivery settings are focused more on patient care activities. (Figure 7) Going deeper into specific patient care activities, pharmacists in ambulatory clinics/health systems are more likely to prescribe medication (20.2%), act as a disease specialist (39.9%) and interact with a larger health team about patient care (77.4%), while home delivery pharmacists are more likely to act as a disease specialist (20.4%) as compared with retail pharmacists (11.9%).

Figure 7. Continuum of pharmacist activities – work activities by work setting – average time spent



To meet growing demand and fill gaps in care, pharmacist training will be a key focus

Both pharmacists and physicians understand that for pharmacists to take on more direct patient care responsibilities, additional training is required. Only slightly more than half (53.3%) of pharmacist respondents agreed or strongly agreed that their current training and education was sufficient to manage patients. Further, the top challenge that physicians noted (49.3% of respondents) in greater pharmacist involvement in patient care was “insufficient pharmacist training.” Specifically, pharmacists identified that to meet the patient needs of the future, more knowledge is needed in the following categories: chronic disease education (35.5%), diagnosing (17.4%) and prescribing (13.3%).



Pharmacists comments

“Physical exam training. Training in diagnostic techniques.”

- *Ambulatory clinic/health system pharmacist*

“Education on specific disease states and monitoring parameters. Ability to interact more with the health care team and easier access to the medical team. There is a distinct boundary drawn by most physicians and they see pharmacists as not being as educated as we are. Instead of seeing us as an asset they disregard our opinions. Mutual respect will be needed in order for a new health care system to prosper.”

- *Retail pharmacist*

“1. Direct patient care training for sure. Not all pharmacists are trained to conduct a 15 minutes or 30 minutes direct patient visit on their own.
2. More training on the chronic diseases for the elderly population.
3. Have some training on how to properly diagnosis common minor conditions such as UTI, sinus infection, etc.”

- *Retail pharmacist*

“Training in prescribing for common disease states ie blood pressure and statins”

- *Retail pharmacist*

“Training for potential prescribing of medications for chronic conditions”

- *Home delivery pharmacist*

There is a high level of trust in pharmacists to expand their role



Health care provider comments

“A familiar, trusted source of information about: Medications, risks, side effects, interactions, regulations”

- *Family Medicine physician*

“Working on written down protocols and follow orders. Order basic labs for diabetes and renal monitoring in hypertension.

Titration of the medications properly.

Identifying and addressing polypharmacy.

Helping with those reductions in patients

who are dependent on opioids and

benzodiazepines. Pharmacists are integral

part of our team and help in the scenarios

mentioned above. I fully trust them.”

- *Internal Medicine physician*

“I often call my pharmacist for questions; they are trusted”

- *Internal Medicine physician*



Patient comments

“He is able to see all my meds and the possibility of side effects that may occur. I trust him”

- *California resident, Medicaid coverage*

“I don’t use prescription medication often, but I when I do, I always go to the same pharmacist. I trust that she’s knowledgeable, and as far as managing my overall health is concerned, I have faith that she would prevent me from taking combinations that may be harmful.”

- *Florida resident, uninsured*

“The role of the pharmacist in managing my overall health is to advise me on how to take my medications properly and the dangers of taking medications when not following instructions. Pharmacists are very knowledgeable about their specialty which is medications and I trust them to tell me everything that has to do with the way I manage my medications and also even give me advice about my health.”

- *Florida resident,*

employer-based insurance

“I trust them a whole lot more and I feel confident when talking to them on the phone and in person. I know I can count on them for my prescriptions. I know they are there for me.”

- *Kansas resident,*

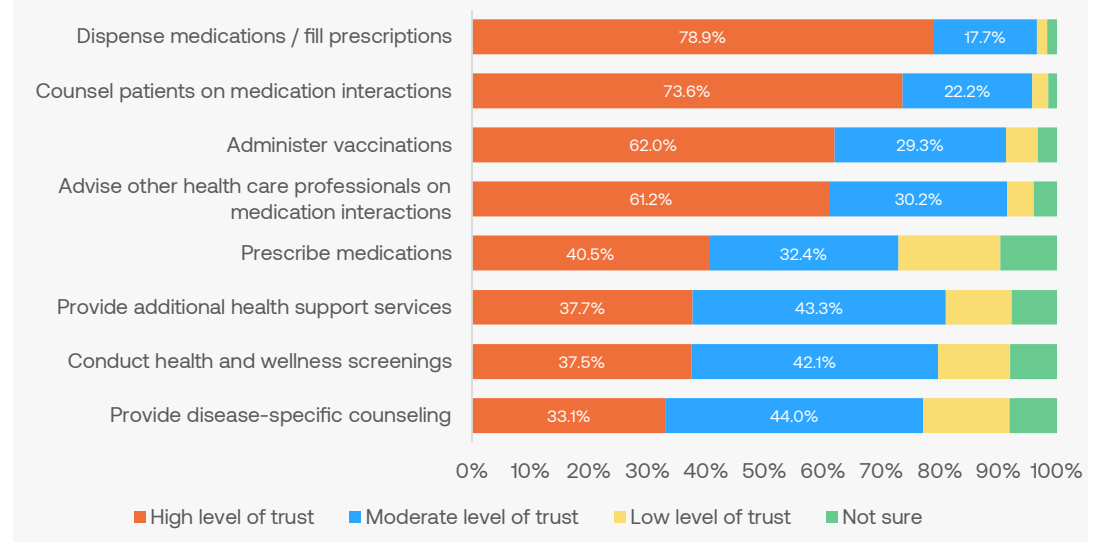
employer-based insurance



Pharmacists believe in their abilities to expand their role, while also recognizing the need for additional training.

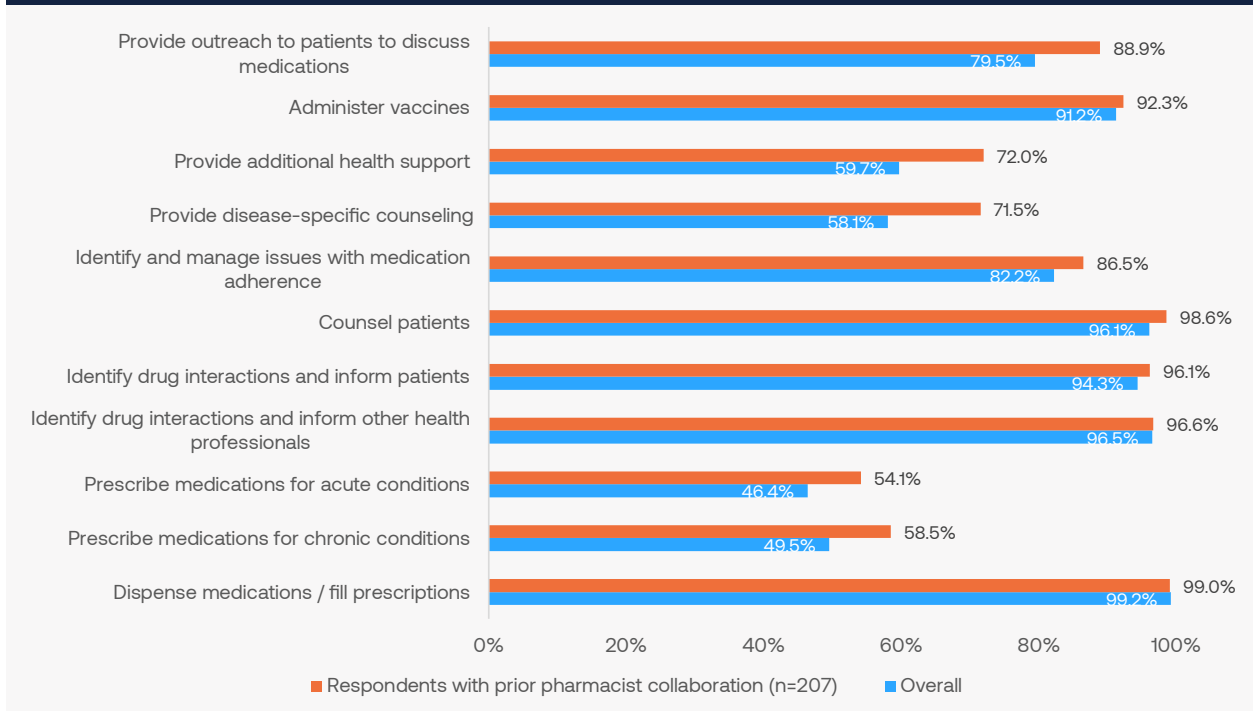
Pharmacists believe in their abilities to expand their role, though also recognize the need for additional training, as noted in the previous section. When pharmacists were asked if they had the interest and confidence to meet the needs of physicians and patients in the future of pharmacy, greater than 75% agree or strongly agree with the ability to be a resource for drug interactions, medication management, and pharmaceutical therapy. Patients have a high level of trust in pharmacists. Patient respondents have a high to moderate level of trust in pharmacists to complete most activities, including prescribing medications (40.5% high trust, 32.4% moderate trust), conducting health and wellness screenings (37.5% high trust, 42.1% moderate trust), and providing disease-specific counseling (33.1% high trust, 44.0% moderate trust). (Figure 8) 79.3% of patient respondents and 55.0% of provider respondents find pharmacists to be a reliable source of general health information beyond general medication questions.

Figure 8. Consumer level of trust in pharmacists to perform certain activities



When providers were asked whether they trusted pharmacists to perform specific activities for patients with chronic conditions, providers noted a high level of trust for traditional pharmacist tasks, with high to moderate trust often exceeding 90%. For more direct patient care tasks, providers' level of trust declined from slightly above to slightly below 50%. However, for those providers that have prior experience collaborating with pharmacists on multidisciplinary teams, the level of trust for providing additional health support and disease specific counseling or for prescribing medications (both acute and chronic) increased significantly. (Figure 9)

Figure 9. Provider respondents' high or moderate level of trust for pharmacists to perform listed activities for patients with chronic conditions



Growth in use of technology will help free up pharmacist time to focus on patient care



Telehealth utilization is at 38x the levels it was pre-pandemic (compared with February 2020).

Telehealth utilization exploded during the COVID-19 pandemic. A recent McKinsey report estimated that as telehealth volume has stabilized following the initial surge at the onset of the pandemic it remains at 38x pre-pandemic levels (compared with February 2020).¹¹ However, telehealth/telepharmacy adoption may be slower in some settings than others. 71.1% of patient respondents never engaged with a pharmacist via video in the past year and only 16% of pharmacists in total currently engage with patients via telehealth/telepharmacy all or most of the time. Home delivery pharmacists are found to engage more with patients via telehealth at 55.6%, whereas retail pharmacists engage with patients less via telehealth at 14.5%. For those who do engage with this technology, more than a third (35.2%) feel that it results in more time to interact with their patients. Despite the limited telehealth usage, 49.7% of patients did note they would find it extremely or very helpful to be able to conduct routine testing and medical visits from home and 56.4% of pharmacists expect to spend more time conducting telehealth appointments.

62.6% of provider respondents agree or strongly agree that pharmacists will have access to electronic medical records in the future. This level of interoperability is important, as 64.8% of patients would find it extremely or very helpful to have information and data seamlessly connected across settings. This level of access is not unprecedented for pharmacists. In considering the impact of technology on efficiency, 97.6% of pharmacists in an ambulatory clinic/health system setting found electronic medical record access to improve efficiency, whereas nearly 30% of pharmacists in the retail setting responded “not applicable” because they do not have access.

Other supportive technologies have the ability to have an impact on the pharmacy of the future, including the safety of patients. 70.8% of pharmacists agree or strongly agree that automation will lead to reductions in human error and 86.1% agree or strongly agree that technology advances will make the practice of pharmacy safer for patients. 68.5% of pharmacists that utilize the technology feel that barcode technology will result in more time to spend addressing patients’ needs and 83.9% note that it makes their work more efficient.

Finally, 64.2% of patient respondents would find it extremely or very helpful to have an easy way to compare pharmacy quality. Couple this with the high percentage of provider and pharmacist respondents that expect greater integration of pharmacists into value-based models, and the need for greater transparency and data interoperability is clear.

¹¹ <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/telehealth-a-quarter-trillion-dollar-post-covid-19-reality>

Pharmacists at the center of patient care



By 2025,
**164 million
Americans
will have a
chronic disease,**
amounting to
\$4 trillion
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care costs.

Chronic disease remains a significant concern among the American population, with greater than half of adults having at least one chronic condition.¹² By 2025, 164 million Americans will have a chronic disease, amounting to \$4 trillion in health care costs.¹³ Patients with chronic diseases account for 81% of hospitalizations.¹³ They also have increasingly complex medication usage, and account for 91% of prescriptions filled.¹³

Despite some pharmacists being able to oversee the care of chronic diseases and engage in preventive clinical counseling around vaccination and screening, their potential has been underutilized when it comes to medication therapy management (MTM). MTM is a group of services that is primarily focused on managing and optimizing therapeutic outcomes for patients, typically through medication reviews, preventing adverse drug events, increasing medication adherence, decreasing misuse, and handling polypharmacy.

Data shows that pharmacist involvement in the MTM process can improve outcomes and reduce costs.¹⁴ Pharmacists are better equipped to identify duplicate therapies in the form of polypharmacy and prevent medication-related hospitalization. Because patients often engage with a pharmacist more frequently than other care providers, pharmacists can aid in monitoring, behavior, and lifestyle changes to improve outcomes and reduce health care costs.

For more acute situations, the integration of pharmacists can help reinforce continuity of care as patients transition providers or health care settings. Pharmacists can oversee the transition from acute care settings to the home or other post-acute care options through discharge counseling, medication history overview, and reducing readmission.

¹² https://www.cdc.gov/pcd/issues/2020/20_0130.htm

¹³ https://www.fightchronicdisease.org/sites/default/files/docs/GrowingCrisisofChronicDiseaseintheUSfactsheet_81009.pdf

¹⁴ https://www.jmcp.org/doi/10.18553/jmcp.2017.23.5.541?url_ver=Z39.88-2003&rft_id=ori:rid:crossref.org&rft_dat=cr_pub%20%20pubmed

As the U.S. health care system continues to evolve, pharmacists can play a pivotal role by serving as the connection point between primary care gaps, medication management complexities, and value-based model goal attainment. This expanded role will be accelerated by technologies that shift focus to the patient, such as telehealth visits, dispensing automation, and electronic medical records allowing greater data connection and interoperability. Trust is high that pharmacists will be an integral part in patient care, particularly among patients and to a growing degree among providers. Pharmacists are embracing this new definition of their role with 70.1% saying they are excited about the evolving role of the pharmacist in the next decade.



Pharmacist at the center of patient care

As health care continues to evolve, pharmacists will take on a larger role in managing patients' health.

Primary care	Medication	Value-based models
<ul style="list-style-type: none"> ✕ Pharmacist serves increasingly clinical role ✕ First-contact provider ✕ Mid-level provider status ✕ Pharmacist patient counseling 	<ul style="list-style-type: none"> ✕ Medication Therapy Management goal attainment ✕ Medication adherence ✕ Drug cost optimization ✕ Pharmacist monitoring for drug interactions, including OTC 	<ul style="list-style-type: none"> ✕ Pharmacist helps to improve continuity of care ✕ Medication management and reconciliation

About the authors



John McHugh, MBA, PhD is an Assistant Professor in the Department of Health Policy and Management at Columbia University's Mailman School of Public Health. His research focuses on health care organizations and how they operate and respond to changing incentives. More specifically, the most effective ways to provide services to individuals with changing needs, focusing on organizations and how they function independently and in the context of other organizations in a health care network. The goal of his research is to find structures, programs, and processes that reduce variability in outcomes by reducing complications before, during and after transitions from the hospital. Dr. McHugh holds an MBA from Duke University's Fuqua School of Business and a PhD from Brown University's School of Public Health and spent nearly 10 years conducting strategy consulting engagements with hospitals and health systems across the country at Navigant Consulting (now Guidehouse).



Batya Elul, PhD, MSc, is an Associate Professor of Epidemiology at Columbia University's Mailman School of Public Health. She has 25 years of experience in the non-governmental and academic sectors where she has conducted health services and implementation research and evaluated large health programs. Her work is focused on HIV and reproductive health in resource-limited settings. She has particular expertise in the development and implementation of surveys using a variety of modalities, including face-to-face interviewing, phone interviewing and Audio Computer-Assisted Self-Interviewing (ACASI). She also teaches courses in epidemiology, program evaluation, and public health surveillance for graduate students at Columbia University and public health professionals around the world.



Sahana Narayan is a Master of Science candidate in the Department of Sociomedical Sciences at Columbia University's Mailman School of Public Health. She has previously conducted community-based research on the impact of the COVID-19 pandemic on small businesses and the implications of maternal mortality within disadvantaged communities. Her previous work experience in pediatric health care provision and for Kipu Health, a behavioral health care focused electronic medical records (EMR) company, as a communications and business analyst has fostered an interest in both the corporate and provider sides of health care. She also has experience implementing public health practices abroad as a volunteer, primarily related to sanitation and vaccinations, and has provided policy insights as a health care-focused journalist. She holds a BS in Public Health with a concentration in Medicine Sciences from the University of California, San Diego.