



- Executive Summary
- Pharmacist Role/Technology Interoperability
- Industry Leader Insights
- Clinical Data Exchange
- Readiness Assessment
- Conclusion
- Recommendations
- Pharmacy Technology Interoperability
- Pharmacy Systems
- Quality Measurement & Reporting



Pharmacy Interoperability:

A Comprehensive Assessment of the Current Landscape

Research and Whitepaper Produced by



This whitepaper was funded by the



with major contribution by Surescripts and additional support from GoodRx and First Databank, Inc (FDB).





Table of Contents

Executive Summary	3
Introduction to Interoperability.....	3
Summary of Key Takeaways:	4
The Expanding Role of the Pharmacist and the Importance of Technology Interoperability	5
Current State of Pharmacy Technology Interoperability	6
Landscape Overview	6
Challenges by Pharmacy Type	6
Limitations of Existing Systems.....	7
Vendor Consolidation Trends.....	9
Emerging Technologies	9
Certification of Pharmacy Systems	10
Quality Measurement and Reporting in Pharmacy	12
Payment Model Complexities	13
Insights From Industry Leaders	14
Technology Availability vs. Adoption.....	14
Challenges With Standardization	14
Payment Model Complexities.....	14
Standards Collaboration	14
Integration With EHR Systems	14
Regulatory Pressures.....	14
Clinical Data Exchange: Current State	15
Existing Capabilities.....	15
Barriers to Exchange	15
Insights from Interviews	15
Readiness Assessment	16
Technology Vendors.....	16
Pharmacies.....	17
HIEs and QHINs	17
The Role of TEFCA in Pharmacy Interoperability	18
Conclusion	19
Recommendations	20
1. Develop Dual-Path Strategy for Pharmacy Data Exchange	20
2. Advocate for Comprehensive Pharmacist Reimbursement and Incentive Models	21
3. Expand Educational and Training	21
4. Promote Vendors and HIEs/QHINs Collaboration.....	22
5. Define Minimum Data Set.....	22
6. Implement Advanced Documentation and Billing Solutions	23
7. Prepare for Advanced Technology	23
8. Promote Flexible, Modular Systems	24
9. Develop Certification Program(s).....	24



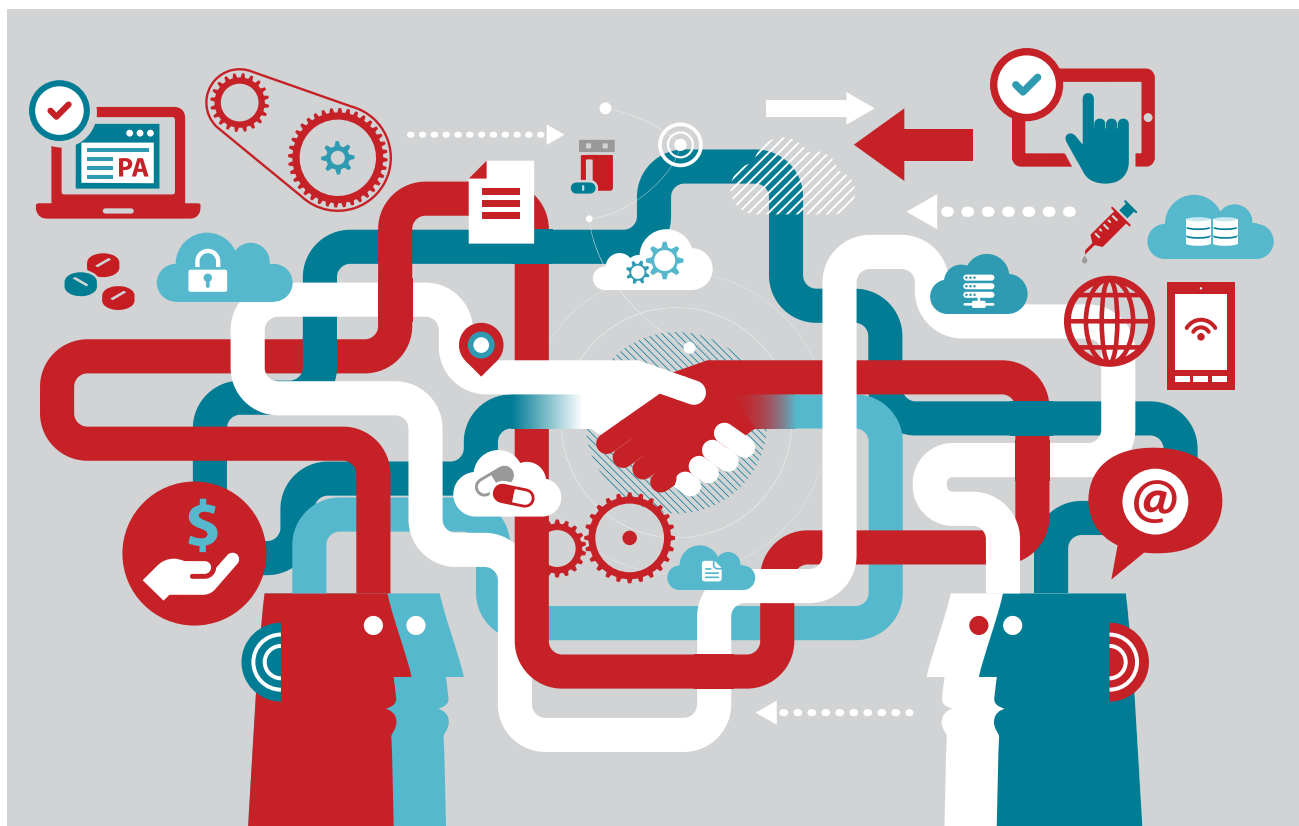
Executive Summary

The pharmacy sector is experiencing rapid transformation, driven by increasing demand for clinical services, the critical need for enhanced interoperability, and the imperative to enhance patient care. This white paper, funded by the NCPDP Foundation, with major contribution by Surescripts and additional support from First Databank (FDB) and GoodRx, provides a comprehensive assessment of the current state of pharmacy interoperability, identifies key challenges, and proposes actionable steps to advance the field.¹

Through interviews with industry leaders and analysis of supporting documentation, this paper underscores the urgency of moving from discussion to concrete action in achieving meaningful progress. A central finding is the critical importance of ensuring pharmacy representation in all interoperability initiatives to address the sector's unique needs and contributions.

Introduction to Interoperability

Interoperability enables the secure exchange of electronic health information with, and the use of electronic health information from, other health information technology without special effort on the part of the user, allows for complete access, exchange, and use of all electronically accessible health information for authorized use under applicable State and Federal law; and reasonable and necessary activities that do not constitute information blocking.^{2,3}





For pharmacy practice, interoperability is crucial for improving patient outcomes, enhancing care coordination, and reducing costs. Pharmacists resonate deeply with the understanding that their ultimate goal is to enhance patient care. They recognize that every aspect of their practice, from medication dispensing, care coordination, patient counseling, and permissible clinical services, revolves around improving the health of patients. Interoperability ensures seamless access to complete medical histories across different healthcare providers, leading to more accurate and efficient care. Interoperability reduces the risk of errors by providing up-to-date information, essential for informed decision-making.

Summary of Key Takeaways:

Our analysis has revealed several critical factors shaping the future of pharmacy interoperability. These key takeaways highlight both the challenges and opportunities facing the industry:

- 1. Increasing Need for Data Exchange to Support Evolving Pharmacy Practice:** As pharmacy practice expands to include more clinical services, there is an increasing need for improved data exchange with other healthcare providers. This requires technological advancements, updated reimbursement models and new strategies for workflow integration.
- 2. Interoperability Challenges:** Standardizing data exchange between pharmacies and other healthcare entities is essential for addressing and improving patient care. Current challenges include outdated pharmacy management systems, inconsistent adoption of standards, and barriers to accessing comprehensive patient data.
- 3. Standards and Technology Adoption:** While standards like the Health Level 7 (HL7) Pharmacist eCare Plan (PeCP) show promise, adoption and implementation remain inconsistent.^{4,5} There's growing interest in leveraging newer technologies like Fast Healthcare Interoperability Resources (FHIR) and exploring the potential of the Trusted Exchange Framework and Common Agreement (TEFCA) for improved data exchange.^{6,7}
- 4. System Integration:** Most pharmacy management systems lack robust integration capabilities with EHR systems, creating significant barriers for pharmacies trying to access and share clinical information with other healthcare providers.
- 5. Financial Incentives:** New reimbursement models and financial incentives are needed to support clinical services and drive adoption of new technologies and standards. A phased approach to incentives, rewarding early adopters and eventually penalizing non-adopters, could effectively drive widespread adoption.
- 6. Workflow and Change Management:** Incorporating new clinical services into existing pharmacy workflows presents significant challenges. Pharmacists and pharmacy staff need additional and ongoing training and support to take on expanded clinical roles.
- 7. Specified Use Cases for Data Access Coupled with Privacy and Security:** As pharmacies expand their clinical roles, there's an increasing need for access to comprehensive patient and clinical data. However, there is a need to establish the specific use cases based on the care provided coupled with the balance of robust security measures and compliance with evolving regulations.
- 8. Collaborative Approach:** Expanded pharmacy clinical services requires coordinated efforts across the industry, encompassing technology vendors, payers, regulators, pharmacy organizations and the standards development organizations that support them.
- 9. NCPDP's Expanded Role:** NCPDP's leadership remains essential in creating standardized frameworks. However, there's potential for NCPDP to play a larger role in promoting and facilitating adoption of standards, including education, certification programs, and strategic collaboration with other standards organizations.
- 10. Future Technologies:** Emerging technologies like Artificial Intelligence (AI), automation, and cloud-based systems present opportunities for enhancing pharmacy operations and clinical services but require careful implementation and appropriate safeguards.⁸



The Expanding Role of the Pharmacist and the Importance of Technology Interoperability

Pharmacy practice is rapidly evolving from its traditional role of dispensing medications to a more comprehensive approach that includes patient care services, such as immunizations, comprehensive medication reviews, and chronic disease management. This shift demands that pharmacies not only focus on the clinical aspects of care but also integrate seamlessly into the broader healthcare ecosystem. To achieve this, robust technological interoperability is crucial. Without robust technological interoperability, pharmacies lack the essential tools for clinical information exchange, hindering their ability to fully utilize their expertise and evolve their practices to meet the growing and diverse needs of patients.





Current State of Pharmacy Technology Interoperability

Landscape Overview


The landscape of pharmacy interoperability is marked by significant advancements and persistent challenges. Many pharmacies find themselves without the technological infrastructure needed to effectively engage in clinical information access, use and exchange. This lack of interoperability hinders the ability to access and use the information needed to assist and care for patients but also to share crucial clinical data with other healthcare providers, undermining the potential for pharmacists to fully contribute to patient care.

As highlighted in this effort as well as other industry research, while technology is available for pharmacists, the actual sharing of clinical data is limited due to barriers such as a lack of demand driven by inadequate reimbursement models, inconsistent use of available standards, insufficient integration between existing standards, and the inability of partner systems to consume and act upon pharmacy-generated data effectively.

While many pharmacies are still primarily focused on dispensing, some larger chains and community pharmacies are piloting expanded clinical roles for pharmacists. These initiatives aim to leverage pharmacists' expertise in medication management and patient care, potentially serving as models for broader industry adoption. However, the transition from traditional dispensing to more clinical roles remains challenging for many pharmacies, particularly smaller independent operations.

Challenges by Pharmacy Type

Pharmacy technology interoperability is also marked by great variability across different pharmacy types:

 COMMUNITY PHARMACIES	 CHAIN PHARMACIES	 SPECIALTY PHARMACIES
<p>Often operate with limited resources and older systems, making it difficult to implement advanced interoperability solutions. These pharmacies frequently struggle with access to comprehensive patient data and integration with other healthcare systems</p>	<p>While often having more resources, they face challenges in balancing corporate policies, patient privacy concerns, and the need for system-wide changes. Some are piloting more advanced clinical roles and interoperability solutions, but widespread adoption remains a challenge</p>	<p>Generally, more advanced in their interoperability capabilities due to the complex nature of their services, but still face challenges in standardizing data exchange with other healthcare entities</p>

- Executive Summary
- Payment Model Complexities
- Pharmacist Role/Technology Interoperability
- Industry Leader Insights
- Clinical Data Exchange
- Pharmacy Technology Interoperability
- Readiness Assessment
- Pharmacy Systems
- Conclusion
- Quality Measurement & Reporting
- Recommendations



Limitations of Existing Systems

Many existing pharmacy management systems fall short in meeting the evolving needs of modern pharmacy practice. Originally designed primarily for dispensing operations, these systems struggle to support the expanding clinical services and complex data exchange requirements of today’s pharmacies. Specific limitations include:

1. Outdated clinical documentation features
2. Lack of integration capabilities with other healthcare systems
3. Inability to support complex billing models for clinical services
4. Insufficient functionality to maintain a comprehensive longitudinal patient record
5. Inadequate tools for capturing and presenting essential information for patient encounters
6. Limited functionalities required for a robust pharmacy patient record system

These systems often lack the capacity to effectively aggregate and present a patient’s complete medication history, health conditions, and clinical interventions over time. They frequently fail to provide pharmacists with quick access to essential information needed during patient encounters, such as recent lab results. Furthermore, many existing systems fall short in offering the advanced functionalities necessary for a comprehensive pharmacy patient record system with features like clinical decision support, care gap analysis, or tools for tracking patient outcomes over time.

Below rubric sourced from work produced by the Community Pharmacy Foundation⁹

ESSENTIAL ELEMENTS FOR A LONGITUDINAL PATIENT RECORD	YES	NO
Patient demographics (names, ethnicity, sex, date of birth)	<input type="checkbox"/>	<input type="checkbox"/>
Patient contact information (current address, email address, phone number)	<input type="checkbox"/>	<input type="checkbox"/>
Health insurance (coverage type, identifiers & numbers)	<input type="checkbox"/>	<input type="checkbox"/>
Allergies and intolerances (substance and reaction)	<input type="checkbox"/>	<input type="checkbox"/>
Immunizations	<input type="checkbox"/>	<input type="checkbox"/>
Vital signs (blood pressure, body height & weight)	<input type="checkbox"/>	<input type="checkbox"/>
Laboratory (tests, values/results)	<input type="checkbox"/>	<input type="checkbox"/>
Goals of therapy	<input type="checkbox"/>	<input type="checkbox"/>
Assessments (screenings and questionnaires)	<input type="checkbox"/>	<input type="checkbox"/>
Plan of treatment	<input type="checkbox"/>	<input type="checkbox"/>
Outcomes of therapy (reported, assessed)	<input type="checkbox"/>	<input type="checkbox"/>
Past medical history	<input type="checkbox"/>	<input type="checkbox"/>
Prescription/OTC/supplement/alternative medication history (complete medication record)	<input type="checkbox"/>	<input type="checkbox"/>
Social history (substance use, social determinants of health)	<input type="checkbox"/>	<input type="checkbox"/>
Special needs of patient (patient note, eg, delivery, caregiver, language)	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacist intervention history	<input type="checkbox"/>	<input type="checkbox"/>



ESSENTIAL ELEMENTS FOR A PATIENT ENCOUNTER	YES	NO
Encounter information (encounter time, type & reason)	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacist identifier (author)	<input type="checkbox"/>	<input type="checkbox"/>
Patient identifier (first name, middle name/initial, last name, date of birth)	<input type="checkbox"/>	<input type="checkbox"/>
History of present illness (problems, social determinants of health problems/health concerns)	<input type="checkbox"/>	<input type="checkbox"/>
Relevant prescription/OTC/supplement/alternative medication history/adherence (medications relevant to the acute patient care episode)	<input type="checkbox"/>	<input type="checkbox"/>
Assessment (identification of medication-related problems)	<input type="checkbox"/>	<input type="checkbox"/>
Plan of action to address problems (interventions, procedures)	<input type="checkbox"/>	<input type="checkbox"/>

ESSENTIAL FUNCTIONALITIES FOR A PHARMACY PATIENT RECORD SYSTEM	YES	NO
Formatted for intuitive navigation of patient record	<input type="checkbox"/>	<input type="checkbox"/>
Searchable patient clinical notes shown chronologically by date of encounter	<input type="checkbox"/>	<input type="checkbox"/>
Multiple filters for sorting content (e.g. date of encounter, type of medication-related problems, medications, health conditions/indications, interventions made, results of interventions)	<input type="checkbox"/>	<input type="checkbox"/>
Dashboard for viewing and analyzing patient information	<input type="checkbox"/>	<input type="checkbox"/>
Calendar/scheduling	<input type="checkbox"/>	<input type="checkbox"/>
Date & time stamp for care plans	<input type="checkbox"/>	<input type="checkbox"/>
Author and location of patient information including care plans	<input type="checkbox"/>	<input type="checkbox"/>
Quick and efficient documentation (eg, templates to guide actions)	<input type="checkbox"/>	<input type="checkbox"/>
Patient identification by selected criteria, affiliations, or payer programs (tag, flag, color code, sort/filter)	<input type="checkbox"/>	<input type="checkbox"/>
Running reports based on selected criteria, affiliations, or payer programs	<input type="checkbox"/>	<input type="checkbox"/>
Work queue for navigating care plan progress	<input type="checkbox"/>	<input type="checkbox"/>
Longitudinal observations and notes (eg, labs/vitals or notes over time)	<input type="checkbox"/>	<input type="checkbox"/>
Dashboard for viewing and analyzing pharmacy performance metrics (eg, adherence rate, appropriate statin use, vitals/labs at goal)	<input type="checkbox"/>	<input type="checkbox"/>
Capture of information from ePrescriptions (eg, labs, vitals)	<input type="checkbox"/>	<input type="checkbox"/>
User initiated import and export of selected patient files or documents	<input type="checkbox"/>	<input type="checkbox"/>
Transmission of secure information to other providers (ie, interoperability)	<input type="checkbox"/>	<input type="checkbox"/>
Bidirectional sharing of selected patient information with providers	<input type="checkbox"/>	<input type="checkbox"/>
Seamless transition across various platforms (eg, from clinical documentation to pharmacy management system; using a single sign-on)	<input type="checkbox"/>	<input type="checkbox"/>
Integration with pharmacy management system (ie., no dual entry)	<input type="checkbox"/>	<input type="checkbox"/>
Risk stratification of patients	<input type="checkbox"/>	<input type="checkbox"/>
Automated medical billing	<input type="checkbox"/>	<input type="checkbox"/>
Automated background mapping of terminology to codes (eg, SNOMED, CPT)	<input type="checkbox"/>	<input type="checkbox"/>
Standardization of care plan for use by other providers & settings of care	<input type="checkbox"/>	<input type="checkbox"/>

Abbreviations: CPT, Current Procedural Terminology; OTC, over-the-counter.



This misalignment between current systems, the variations between retail, chain and community systems and evolving needs creates substantial barriers to advancing interoperability in the pharmacy sector. These shortcomings highlight the urgent need for continuity of systems and comprehensive system upgrades to support expanded pharmacy roles, enhance interoperability, and enable seamless integration with the broader healthcare ecosystem.

Vendor Consolidation Trends

The pharmacy technology landscape is also experiencing significant consolidation. A few companies are creating comprehensive ecosystems that integrate various pharmacy services and technologies. This trend towards consolidated ecosystems has potential implications for interoperability and data sharing. While it may streamline processes within a single ecosystem, it could also create new challenges for data exchange between different ecosystems. These challenges include difficulties in achieving interoperability due to varying data formats, the creation of data silos that hinder comprehensive patient care, the risk of vendor lock-in which complicates switching providers, and complexities in ensuring data security and patient privacy across different systems.

Emerging Technologies

There is growing recognition of the need for more advanced interoperability solutions. Many stakeholders are looking towards technologies like FHIR-based Application Programming Interfaces (APIs) and blockchain to address current limitations in data exchange.¹⁰ Additionally, there is increasing interest in leveraging AI and machine learning to enhance clinical decision support and streamline operations. However, the adoption of these technologies remains in early stages, with significant work needed to overcome existing barriers and ensure widespread, consistent and unbiased implementation across different pharmacy settings.





Certification of Pharmacy Systems

While Electronic Health Record (EHR) systems have long been subject to certification processes through the Office of the National Coordinator for Health Information Technology (ONC), pharmacy systems have largely remained outside of this framework. As pharmacies continue to expand their clinical roles and become more integrated into the broader healthcare ecosystem, there is a growing need to consider similar certification processes for pharmacy management systems.

Implementing a certification process for pharmacy systems, similar to the ASTP's program for EHRs, could help address these issues. Such a program could ensure that pharmacy systems meet minimum standards for interoperability, clinical documentation, and patient safety. It could also facilitate the integration of pharmacies into broader healthcare initiatives like TEFCA and value-based care programs.

Work was started in 2015 contemplating the framework needed for pharmacy system readiness to function in a similar manner as an EHR and/or EMR. At that time and even now, there are no established financial incentives for pharmacies to develop EHR capabilities or adopt as is/was the case for providers with Promoting Interoperability (PI) Programs (previously Medicare and Medicaid EHR Incentive Programs) administered by the Centers for Medicare & Medicaid Services (CMS).

The Pharmacy HIT Collaborative (PHIT) WG4 created and published the *HL7 EHR-System for a Pharmacist/Pharmacy Electronic Health Record Implementation Guide for Community Practice*. This work was based on HL7 Functional Model R1. and was jointly balloted by NCPDP and HL7 in 2012. The PHIT Implementation Guide: Pharmacist/Pharmacy Provider Functional Profile for Community Practice, R1 (R1) (2015) was established to advance industry adoption, provide guidance on applying the Pharmacist/PharmacyEHR Functional Profile R1 specifically to the community pharmacy practice setting and specifies the functional requirements needed to support messaging among prescribers, pharmacists, pharmacy providers and other health care entities.¹²

The Functional Profiles are derived from the HL7 EHR-System Functional Model (EHR-S FM), which provides a comprehensive list of features, functions, and conformance criteria that EHR systems should meet to support clinical and some administrative processes. These profiles are designed to be conformant with the Functional

Currently, there is no standardized certification process for pharmacy systems equivalent to the ASTP Health IT Certification Program for EHRs. This lack of certification has several implications:

1. **Interoperability Challenges:** Without standardized certification, pharmacy systems may not meet the necessary interoperability standards to effectively communicate with other healthcare IT systems.
2. **Variable Capabilities:** The capabilities of pharmacy systems can vary widely, making it difficult for healthcare partners and payers to know what to expect when interacting with different pharmacies.
3. **Quality and Safety Concerns:** Lack of certification means there's no standardized way to ensure that pharmacy systems meet minimum requirements for patient safety and quality of care.
4. **Barriers to Clinical Service Expansion:** As pharmacies seek to expand their clinical services, non-certified systems may lack the necessary functionalities to support these expanded roles.

Of Note: July 2024, the ONC was renamed to the Assistant Secretary for Technology and Policy (ASTP); therefore, throughout the remainder of this whitepaper, ONC will be referred to as ASTP.¹¹



Model for the specific functions required by each profile, supporting the goal of interoperability between EHRs and enabling the exchange of information in the most structured format possible.

It's important to note that the Functional Profiles focus on the system's functions rather than addressing the technology or data content of the EHR itself. This approach ensures flexibility in implementation while maintaining standardized functionality across different systems.

The NCPDP Guidance is available for download in the "Standards Lookup" section at NCPDP.org under "Functional Profiles for EHR".

NCPDP and the PHIT are collaborating to reassess and update the functional model. This effort aims to address two key areas:

1. Incorporate industry advancements that have occurred since the initial 2012/2015 work.
2. Align with the requirements set forth by the 21st Century Cures Act, which focuses on improving access to, use of, and exchange of clinical and administrative data. This alignment includes addressing the certification program overseen ASTP.

The ultimate goal of these updates is to better support and advance pharmacy operations in the current healthcare landscape. This collaborative effort ensures that the functional model remains relevant and effective in meeting three key objectives:

1. Addressing the evolving needs of the pharmacy industry
2. Improving patient care coordination
3. Satisfying the requirements for voluntary Health Information Technology (HIT) certification for pharmacies

By focusing on these areas, the updated functional model will not only enhance pharmacy operations but also align with broader healthcare initiatives and regulatory standards, positioning pharmacies to play a more integral role in the modern healthcare ecosystem.



However, developing and implementing such a certification program would require careful consideration of the unique needs of pharmacy practice, as well as collaboration between pharmacy organizations, technology vendors, and regulatory bodies.



Quality Measurement and Reporting in Pharmacy

As pharmacies expand their clinical services, there is a growing focus on developing and implementing quality measures specific to pharmacy practice.¹³ However, this effort faces several challenges:

1. **Data Collection:** Many pharmacies struggle to collect the necessary clinical data for quality reporting. The variability in pharmacy management systems and lack of standardization in data capture methods complicate this process.
2. **Standardization:** There's a lack of standardization in how data is captured and reported across different pharmacy systems. This variability makes it difficult to implement industry-wide quality measures.
3. **Focus on “Low Hanging Fruit”:** Given the challenges, there's an emphasis on developing measures that are feasible to implement across the industry. This includes measures for A1C testing, blood pressure monitoring, and immunizations.
4. **Health Plan Integration:** Even when pharmacies can collect quality data, there are often barriers to sharing this information with health plans in a format they can use. Many health plans are not yet equipped to consume and utilize granular clinical data from pharmacies effectively.
5. **Pilot Programs:** Several organizations are running pilot programs to test new quality measures. These pilots are revealing both the potential and the challenges of implementing pharmacy quality measures at scale.

Despite these challenges, the pharmacy industry continues to make strides towards more comprehensive and meaningful quality measurement, due in part to the efforts of organizations like the Pharmacy Quality Alliance (PQA) and NCPDP.¹⁴ As technology evolves and stakeholders align on priorities, the path forward will likely involve continued collaborative efforts to standardize data collection, improve interoperability, and demonstrate the value of pharmacy services in improving the quality of care for patients.





Payment Model Complexities

The complexity of payment models in pharmacy practice further complicates the interoperability landscape. While traditional fee-for-service structures remain common, new models such as per-member-per-month payments, pay-for-performance bonuses, and shared savings arrangements are increasing. These diverse payment models have significant implications for interoperability needs and data sharing requirements. They necessitate more sophisticated systems capable of handling complex financial arrangements and reporting structures. Many current pharmacy management systems struggle to accommodate these evolving payment models, creating additional barriers to full participation in value-based care initiatives and other advanced payment arrangements.

An emerging trend that further underscores the need for adaptable, interoperable systems is the exploration of direct contracting relationships between pharmacies and local employer groups. This approach introduces new interoperability challenges, as these arrangements often require data sharing outside traditional healthcare networks. Pharmacies engaging in these direct contracts need systems that can support unique reporting requirements, tailored formularies, and specialized billing arrangements. The ability to exchange data securely and efficiently with a diverse range of stakeholders becomes even more critical in these scenarios. Current pharmacy systems often lack the flexibility to fully support these innovative business models, highlighting the urgent need for more versatile and interoperable solutions.





Insights From Industry Leaders

Through interviews with key stakeholders, including representatives from specialty pharmacies, traditional community pharmacies, chain pharmacies, technology vendors, and Health Information Exchanges (HIE) and Qualified Health Information Networks (QHINs in TEFCA), several key themes emerged regarding the current state of interoperability.

Technology Availability vs. Adoption

While many vendors have developed capabilities for clinical data sharing, actual adoption by pharmacies remains low. Interviewees consistently cited the lack of reimbursement models and business incentives as significant barriers to broader adoption of these technologies.

Challenges With Standardization

Pharmacists and pharmacy management expressed frustration with the lack of standardization in clinical documentation requirements across different health plans. This inconsistency complicates efforts to integrate clinical services into routine pharmacy operations.

Payment Model Complexities

The growing complexity of pharmacy payment models, including per-member-per-month payments and performance bonuses, demands more sophisticated systems for managing diverse financial arrangements. Many current pharmacy management systems struggle to accommodate these new models, hindering participation in value-based care initiatives and underscoring the need for more adaptable, interoperable solutions.

Standards Collaboration

Many industry leaders emphasized the need for closer collaboration between NCPDP and HL7. There were suggestions to create an “interoperability dictionary” between these standards, which could significantly ease the implementation of interoperable systems across pharmacy and other healthcare settings.

Integration With EHR Systems

Many pharmacies struggle with the technical integration of their systems with EHRs and other healthcare information systems. Even when data exchange is possible, the inability of these systems to effectively use the data limits its utility.

Regulatory Pressures

Pharmacy Management System (PMS) vendors perceive that they are heavily burdened by regulatory requirements, which often divert resources away from innovation in interoperability features. There is a strong demand for clearer, more unified guidelines that would make compliance less onerous and innovation more feasible.



Clinical Data Exchange: Current State

Existing Capabilities

Today, pharmacies have some capacity to capture and share clinical data using existing standards. Many technology vendors support standards developed by NCPDP, HL7, and x12, and are utilizing FHIR-enabled solutions, such as the PeCP.

Barriers to Exchange

Despite these capabilities, the actual exchange of clinical data is limited due to several barriers:

- Lack of standardization across health plans
- Insufficient integration between existing standards
- Inability of partner systems (EHR or Health Plan) to effectively use pharmacy-generated data
- Inadequate reimbursement models and underdeveloped business cases for clinical data sharing
- Lack of demand driven by financial incentives
- Operational constraints in integrating data exchange into existing workflows

Insights from Interviews

Pharmacists, particularly those in specialty and community settings, expressed a strong desire to engage more fully in clinical data exchange. However, they pointed out several critical challenges:

- **Lack of adequate incentives:** Many pharmacies do not receive adequate financial incentives to invest in the necessary technology for data sharing. This lack of ROI model was highlighted as a significant deterrent to adopting new interoperability solutions.
- **Operational Constraints:** Pharmacies noted that integrating clinical data exchange into their existing workflows often requires significant changes to operations, which can be disruptive and costly.
- **Lack of end-to-end use of PeCP:** Pharmacists, especially community pharmacists, are using the PeCP to capture clinical data, but it is not being ingested or consumed by providers and their EHRs. The inability of providers' EHRs to ingest and integrate the clinical data captured in pharmacists' PeCPs, despite it being sent, creates a critical gap in the patient record and disrupts the feedback loop between care providers, ultimately hindering timely, informed decision-making and seamless care coordination.
- **Misalignment of Clinical Documentation Tools and Reimbursement Processes:** Some in the pharmacy industry are using the PeCP as a means to secure reimbursement from health plans. This approach is proving ineffective and burdensome for both pharmacies and health plans, creating inefficiencies in the reimbursement process and compromising the intended use of the PeCP for clinical documentation.
- **Incomplete Data Sets:** A significant challenge reported was the incompleteness of data received by pharmacies. This limits the ability of pharmacies to fully engage in patient care and coordination, especially during transitions of care where pharmacist play a highly valuable role in reducing patient readmissions.¹⁵
- **Limited awareness:** Many technology vendors who support pharmacies/pharmacist reported a limited awareness among pharmacists about available capabilities and how to integrate them into workflows.

These insights highlight the gap between existing technological capabilities and the practical realities of implementing clinical data exchange in pharmacy settings.



Readiness Assessment

Technology Vendors

Technology vendors have made some strides in enabling clinical data exchange for pharmacies via standards, such as the PeCP; however, as previously noted, the uptake of these technologies remains low due to a lack of demand and underdeveloped business cases for clinical data sharing. Additionally, wide-scale education on the potential services and uses of clinical features is lacking, leaving many pharmacists and other stakeholders unaware of the possibilities.

While many technology vendors are making strides in interoperability, there's a growing interest in leveraging AI and machine learning in pharmacy operations. Some vendors are exploring AI applications for clinical decision support, primarily on the prescriber side, and using machine learning to identify patients and populations for care coordination. However, these technologies are still in early stages of adoption in pharmacy settings.

During interviews, technology vendors emphasized the following:

- **Capability vs. Demand:** Vendors noted that while they have developed capabilities for clinical data sharing, the market demand from pharmacies remains limited. This disconnect is primarily driven by the lack of clear financial incentives and payer engagement.
- **Education and Training:** Vendors also highlighted the need for better education and training for pharmacists on how to leverage these technologies effectively. Many pharmacists are either unaware of the capabilities available to them or unsure how to integrate them into their workflows.





Pharmacies

Pharmacies are increasingly interested in clinical data sharing, recognizing its potential to enhance patient care. However, several challenges hinder readiness. These include a lack of standardization in health plan requirements for pharmacist interventions, difficulties in managing program start/stop dates, and the inability of current systems to effectively use critical data such as diagnoses even when obtained by the pharmacist. These barriers create significant challenges for pharmacies attempting to integrate clinical data exchange into their operations.

Pharmacies, particularly independent and community-based ones, face unique challenges:

- **Resource Constraints:** Smaller pharmacies often lack the financial and technical resources to implement advanced interoperability solutions. This disparity creates a gap in readiness compared to technical resource availability found within the larger chain pharmacies.
- **Workflow Disruption:** Integrating new interoperability capabilities often requires significant changes to existing workflows or new workflows altogether, separate from the dispensing workflow, which can be disruptive and resource-intensive.
- **Data Export and Third-Party Analysis:** Many pharmacies have resorted to exporting data from their primary systems to third-party vendors for analysis and reporting. While this workaround addresses some limitations in current pharmacy management systems, it also creates potential data silos and introduces new interoperability challenges. This practice underscores the need for more robust, integrated solutions within primary pharmacy systems.
- **EHR Integration Challenges:** Pharmacies continue to face significant challenges when integrating with EHR systems, particularly in terms of data digestibility and usability.

HIEs and QHINs

Health Information Exchanges (HIEs) and QHINs are beginning to engage with pharmacies, but their connections remain minimal and fraught with complications. The scale of FHIR implementation, which is a future state for TEFCA, is still uncertain, and there is ambiguity about how pharmacies would use the data they receive.^{15,16} Moreover, pharmacists' access to data is often encounter-based, which may not align with the needs of broader data exchange practices. Nevertheless, HIEs and QHINs expressed a growing interest in connecting more pharmacies to their networks.





Interviews with representatives from HIEs and QHINs revealed the following insights:

- **Data Relevance:** There is ongoing debate about the relevance and utility of the data that pharmacies can contribute to broader health information exchanges. While medication data is valuable, some HIEs question how this data fits into the broader care continuum.
- **Technical Integration:** Many HIEs and QHINs face technical challenges in integrating pharmacy data into their existing platforms. The lack of standardized formats for this data complicates integration efforts.

QHINs are tasked with facilitating nationwide health information exchange, including among pharmacies. However, the readiness of QHINs to fully support pharmacies in this role remains a work in progress. The complexities of integrating pharmacy data into broader healthcare data exchanges, coupled with the unique needs of pharmacies, present challenges that QHINs must address to enable comprehensive clinical information exchange.

It's important to note that familiarity with TEFCA varies widely among pharmacy professionals. Many interviewees in our research were not familiar with TEFCA or were uncertain about the benefits of engaging with a QHIN. This suggests a need for broader education and outreach efforts to ensure the pharmacy sector is prepared to participate effectively in this framework.

- **Pharmacy Participation in TEFCA:** There is a consensus that TEFCA could play a crucial role in enhancing pharmacy interoperability, but pharmacies need to be more actively involved in shaping how they participate in this framework. The lack of a clear business case and understanding of how pharmacies fit into TEFCA remains a barrier, highlighting the need for clear guidelines and support for pharmacy participation in TEFCA.

The Role of TEFCA in Pharmacy Interoperability

TEFCA is positioned to play a critical role in enhancing pharmacy interoperability by providing a standardized framework for data exchange across different healthcare entities. As TEFCA matures, it will be essential for pharmacies, technology vendors, and HIEs/QHINs to align their efforts with TEFCA's guidelines and requirements. This alignment will ensure that pharmacies can fully participate in the exchange of administrative and clinical data, thereby supporting the broader goals of improved patient care and healthcare efficiency.



Conclusion

The findings from our interviews and supporting documentation make it clear that the time for action is now. The pharmacy industry must move beyond discussions and take concrete steps to implement interoperability and clinical integration. This requires sincere collaboration, rolling up our sleeves, and doing what is right for healthcare as a whole, but most importantly for the patient. The path forward involves standardizing systems, enhancing data exchange, and integrating clinical services into everyday pharmacy practice.

As one industry leader aptly put it, “Standardizing interfaces and increasing productivity are paramount. The need for seamless integration into pharmacy workflows cannot be overstated.”

Looking ahead, the pharmacy sector stands at the cusp of significant technological and operational advancements. The integration of artificial intelligence and machine learning into pharmacy practice holds promise for enhancing clinical decision support, improving patient care coordination, and optimizing pharmacy operations. As these technologies mature, it will be crucial for the industry to approach their adoption thoughtfully, ensuring that they enhance rather than replace the critical role of pharmacists in patient care. Furthermore, as interoperability improves and clinical roles expand, addressing the financial barriers will become increasingly important to ensure that these advancements translate into better access to care and improved health outcomes. The path forward will require continued collaboration, innovation, and a steadfast focus on patient-centered care.



Recommendations

To build on the conclusions drawn and to address the challenges identified in the white paper, the following are recommendations to be considered by the industry:

1. Develop Dual-Path Strategy for Pharmacy Data Exchange



OBJECTIVE

Support and enhance data exchange methods that align with the different needs and preferences of various pharmacy settings to exchange clinical data between pharmacist and other providers, payers, HIEs, and other healthcare entities.



ACTION STEPS

Unified Pharmacy Data Exchange Strategy:

- Promote and enhance existing standards like the PeCP while exploring new technologies such as HL7 Clinical Data Exchange (CDex) and APIs to create a comprehensive data exchange ecosystem.
- Engage stakeholders from both community and retail pharmacy sectors to understand diverse needs and preferences for data exchange.
- Provide implementation support and share best practices across all pharmacy types, recognizing and addressing the unique challenges of each setting.
- Collaborate with standards organizations and technology vendors to ensure solutions meet requirements for all pharmacy environments.
- Facilitate integration of pharmacy data, regardless of exchange method, with other healthcare systems to improve overall care coordination.
- Develop guidelines for data translation and mapping between different exchange methods to maintain consistency and interoperability across the pharmacy sector.

Pilot Programs: Launch pilot programs to test and refine the framework before a broader rollout.

Education and Outreach: Provide targeted education on the benefits and implementation of the approaches to foster understanding among healthcare partners on the approach to clinical data exchange for the various sectors of pharmacy.



EXPECTED OUTCOME

A flexible, approach to clinical services data exchange that respects the different needs and preferences of pharmacies, while still ensuring overall interoperability and improved patient care coordination.



2. Advocate for Comprehensive Pharmacist Reimbursement and Incentive Models

OBJECTIVE

Collaborate with CMS, ASTP, private payers, and other stakeholders to develop sustainable reimbursement models for pharmacist-provided clinical services and incentive programs for pharmacy technology investments.

ACTION STEPS

Engage with Payers: Hold discussions with payers to emphasize the value of pharmacist-provided clinical services and the importance of pharmacy data in improving patient outcomes and reducing overall healthcare costs.

Develop Consistent and Equitable Service-Based Reimbursement: Create and propose models that fairly and consistently compensate pharmacists for clinical services, aligning payment with the value of these services.

Design Technology Incentives: Develop incentive programs that support pharmacies in investing in and implementing interoperability solutions and other necessary technologies.

Educational Campaign: Launch a comprehensive educational campaign targeting pharmacies, regulators, and health plans to foster a shared understanding of the evolving pharmacy landscape. This initiative will highlight the potential financial benefits of expanded clinical services, the value of interoperable health information exchanges, available reimbursement models, and technology investment incentives.

EXPECTED OUTCOME

This comprehensive educational approach will create a more informed and aligned healthcare ecosystem. Pharmacies will be empowered to expand their clinical services and adopt new technologies, while regulators and health plans will better understand and support these advancements. This alignment is expected to accelerate the adoption of interoperability solutions, enhance the implementation of fair reimbursement models, and ultimately improve patient care through more integrated and efficient pharmacy services.

3. Expand Educational and Training

OBJECTIVE

Increase awareness and understanding of interoperability standards and technologies among pharmacists and pharmacy staff.

ACTION STEPS

Create Educational Materials: Develop easy-to-understand guides, webinars, and workshops that explain the benefits of interoperability and how to implement it in pharmacy settings.

Certification Programs: Offer certification programs for pharmacists and pharmacy staff that focus on best practices for using interoperability standards such as but not limited to the PeCP, Real-Time Prescription Benefit, SCRIPT, etc.

Partner with Pharmacy Schools: Collaborate with pharmacy schools to integrate interoperability training into the pharmacy curriculum, ensuring that future pharmacists are well-prepared.



EXPECTED OUTCOME

Enhanced knowledge and skills among pharmacists will lead to better implementation of interoperability solutions, ultimately resulting in improved patient care and more efficient pharmacy operations.

4. Promote Vendors and HIEs/QHINs Collaboration

OBJECTIVE

Facilitate stronger collaboration between pharmacy technology vendors and HIEs/QHINs to ensure seamless integration and data exchange.

ACTION STEPS

Roundtable Discussions: Organize roundtable discussions that bring together vendors and HIEs/QHINs to identify and address integration challenges.

Joint Development Initiatives: Encourage joint development projects that focus on creating interoperable solutions tailored to the needs of pharmacies.

Monitor and Report Progress: Regularly monitor the progress of these collaborations and report on best practices and successful integration stories to the broader industry.

EXPECTED OUTCOME

Improved collaboration will lead to more effective and widely adopted interoperability solutions, reducing the technical barriers that currently hinder data exchange between pharmacies and the broader healthcare ecosystem.

5. Define Minimum Data Set

OBJECTIVE

Define the core set of data elements that should be exchanged between pharmacies and providers to support coordinated care and enhance patient outcomes.

ACTION STEPS

Identify Key Data Elements: Work with pharmacies and healthcare providers to identify the most critical data elements needed for effective care coordination, such as medication lists, allergies, and care plans.

Develop Pharmacy-Specific Standards: Collaborate with NCPDP and HL7 to develop standards that define how these data elements should be structured and exchanged.

Test and Validate: Implement pilot programs to test the exchange of these data elements between pharmacies and providers, ensuring that the data is meaningful and actionable.

EXPECTED OUTCOME

A clearly defined minimum data set will ensure that pharmacies and providers have access to the essential information needed to provide high-quality, coordinated care, thereby improving patient outcomes and enhancing the overall efficiency of the healthcare system.

Executive Summary
Payment Model Complexities
Pharmacist Role/Technology Interoperability
Industry Leader Insights
Clinical Data Exchange
Readiness Assessment
Conclusion
Recommendations
Pharmacy Technology Interoperability
Pharmacy Systems
Quality Measurement & Reporting



6. Implement Advanced Documentation and Billing Solutions

OBJECTIVE

Develop and promote the adoption of sophisticated documentation and billing systems that can handle complex clinical services and varied payment models.

ACTION STEPS

Collaborate with technology vendors to develop automated documentation tools that integrate seamlessly with pharmacy workflows.

Create standards for time-based billing in pharmacy clinical services that align with other healthcare providers.

Develop best practices for documenting and billing pharmacy services across different payment models (e.g., fee-for-service, value-based care, per-member-per-month).

Pilot advanced AI-assisted documentation and billing systems in diverse pharmacy settings.

EXPECTED OUTCOME

More accurate and efficient documentation and billing processes, enabling pharmacies to expand clinical services and participate in diverse payment models.

7. Prepare for Advanced Technology

OBJECTIVE

Position the pharmacy sector to effectively leverage emerging technologies such as AI, machine learning, and advanced data exchange methods.

ACTION STEPS

Develop guidelines for the responsible integration of AI and machine learning in pharmacy practice, focusing on areas like clinical decision support and patient care coordination.

Collaborate with technology vendors to ensure that AI and machine learning solutions are developed with pharmacy-specific needs in mind.

Create educational programs to prepare pharmacists and pharmacy staff for working with advanced technologies.

Establish pilot programs to test and evaluate the impact of new technologies on pharmacy operations and patient outcomes.

Work with regulatory bodies to ensure that the use of advanced technologies aligns with existing healthcare regulations and privacy standards.

EXPECTED OUTCOME

Enhanced capability of pharmacies to adopt and benefit from advanced technologies, leading to improved operational efficiency and patient care. This proactive approach will position the pharmacy sector as a leader in healthcare innovation and ensure it remains at the forefront of technological advancements in healthcare delivery.



8. Promote Flexible, Modular Systems

OBJECTIVE

Encourage the development of pharmacy management systems that can be easily customized to accommodate various workflows, services, and contract requirements.

ACTION STEPS

Collaborate with system vendors to define requirements for modular, customizable pharmacy management systems.

Develop use cases that demonstrate the need for flexible workflows in different pharmacy settings (e.g., community pharmacy, long-term care, specialty pharmacy).

Create a certification program for pharmacy systems that meet defined flexibility and customization standards.

Provide resources and best practices for pharmacies on how to effectively customize their systems to support diverse clinical services and payment models.

EXPECTED OUTCOME

More adaptable pharmacy systems that can quickly respond to changing market demands and support a wide range of clinical services and payment models.

9. Develop Certification Program(s)

OBJECTIVE

Create a standardized certification process for pharmacy management systems to ensure they meet necessary interoperability, clinical documentation, and patient safety standards.

ACTION STEPS

Form a task force comprising representatives from pharmacy organizations, technology vendors, ASTP, and other relevant stakeholders to define certification criteria for pharmacy systems.

Develop a set of standards that align with existing healthcare IT certifications (such as ASTP's Health IT Certification) while addressing the unique needs of pharmacy practice.

Create a testing and certification process for pharmacy management systems.

Establish a timeline for voluntary adoption of certified systems, with potential for mandatory adoption in the future.

Develop incentives for pharmacies to adopt certified systems, possibly in collaboration with payers and healthcare partners.

Create educational resources to help pharmacies understand the benefits of certified systems and guide them through the transition process.

EXPECTED OUTCOME

A standardized certification process will lead to improved interoperability between pharmacy systems and other healthcare IT systems, enhanced patient safety, and better support for expanded clinical services in pharmacy settings. This will ultimately facilitate better integration of pharmacies into the broader healthcare ecosystem and support their participation in advanced care models and health information exchange initiatives.



References: **1.** National Council for Prescription Drug Programs (NCPDP). NCPDP. Accessed July 10, 2024. <https://www.ncdp.org> **2.** Section 4003, 21st Century Cures Act. HealthIT.gov. Accessed July 17, 2024. https://www.healthit.gov/sites/default/files/facas/2018-02-23_TEF_TF_21stCenturyCures_4003_508.pdf **3.** HealthIT.gov. Government-mandated standards, interoperability challenges. HealthIT.gov. Published 2020. Accessed September 11, 2024. <https://www.healthit.gov/topic/interoperability> **4.** HL7 International. HL7 FHIR® overview. HL7 International. Published 2022. Accessed August 1, 2024. <https://www.hl7.org/fhir/overview.html> **5.** Pharmacy interoperability challenges and needs under the 21st Century Cures Act. Pharmacy Times. Published 2022. Accessed October 11, 2024. <https://www.pharmacytimes.com/view/pharmacy-interoperability-challenges-and-needs-under-the-21st-century-cures-act> **6.** HealthIT.gov. Trusted exchange framework and common agreement (TEFCA). HealthIT.gov. Published 2021. Accessed September 15, 2024. <https://www.healthit.gov/topic/interoperability/trusted-exchange-framework-and-common-agreement-tefca> **7.** Office of the National Coordinator for Health Information Technology (ONC). TEFCA overview. HealthIT.gov. Accessed October 17, 2024. <https://www.healthit.gov/topic/interoperability/trusted-exchange-framework-and-common-agreement-tefca> **8.** The rise of digital pharmacy: how emerging technologies are changing the practice. NABP. Published 2023. Accessed October 1, 2024. <https://nabp.pharmacy/news/blog/rise-of-digital-pharmacy-how-emerging-technologies-are-changing-the-practice/> **9.** Community-based pharmacy patient clinical record rubric. Community Pharmacy Foundation. Accessed July 1, 2024. https://communitypharmacyfoundation.org/resources/grant_docs/CPFGrantDoc_58633.pdf **10.** The digital transformation in pharmacy: embracing online platforms and the cosmeceutical paradigm shift. J Health Popul Nutr. Published 2024. Accessed September 10, 2024. <https://jhpn.biomedcentral.com/articles/10.1186/s41043-024-00550-2> **11.** HHS reorganizes technology, cybersecurity, data, and artificial intelligence strategy and policy functions. HHS.gov. Published July 25, 2024. Accessed September 30, 2024. <https://www.hhs.gov/about/news/2024/07/25/hhs-reorganizes-technology-cybersecurity-data-artificial-intelligence-strategy-policy-functions.html> **12.** Electronic health record certification: making the pharmacists' case to system vendors. Pharmacy HIT. Published 2014. Accessed October 6, 2024. <https://web.archive.org/web/20220617064421/https://pharmacyhit.org/pdfs/workshop-documents/WG4-Post-2016-01.pdf> **13.** Impacting pharmacy performance measures: the need for fair and reasonable compensation for pharmacists. Pharmacy Times. Published 2015. Accessed August 10, 2024. <https://www.pharmacytimes.com/view/impacting-pharmacy-performance-measures-the-need-for-fair-and-reasonable-compensation-for-pharmacists> **14.** Pharmacy Quality Alliance (PQA). Pharmacy quality measures and standards. PQA. Published 2023. Accessed September 10, 2024. <https://www.pqaalliance.org/> **15.** Pharmacists are vital to transitions of care. Pharmacy Times. Published 2023. Accessed October 6, 2024. <https://www.pharmacytimes.com/view/pharmacists-are-vital-to-transitions-of-care>