

Extending Telemedicine to Medication Management

Telepharmacy Models and Case Studies

Look inside for

- Description of various telepharmacy models
- Case studies of provider organizations
- Vendor profiles

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Table of Contents

Executive Summary	4
Extending Telemedicine into Medication Management	5
Hospital Telepharmacy—Basic Models	6
Case Study #1: Via Christi Health—Telepharmacy Support for Rural—and Urban—Hospitals	6
Operational Considerations	7
Vendor Profile #1: PipelineRx—A Single Consolidated Feed from Disparate Medication Order Sources	7
The Role of Video in Telepharmacy	8
Case Study #2: Peabody Health Care—Video-Enabled Telepharmacy for Emergency Department Admissions	8
Vendor Profile #2: CPS Telepharmacy—Providing Pharmacy Services Across the Care Continuum	9
Pharmacy Licensure—State-by-State Regulations	9
Case Study #3: Catholic Health Initiatives—Telepharmacy in Multi-state, Multi-EMR Environment	9
Return on Investment and Metrics Tracked	10
Additional Telepharmacy Use Cases	10
Action Items	11
Appendix: Additional Provider Case Studies	11
Case Study #4: Eastern Maine Healthcare Systems—Improving Population Health and ACO Metrics in Rural Communities	11
Case Study #5: Sonoma Valley Hospital—Telepharmacy to Support CPOE Go-live in a California Country District Hospital	12
Advisors to Our Work	13

Executive Summary

Problem

Health care provider organizations with small rural hospitals face major challenges providing the most basic services. Many rural hospitals are too small to afford full-time, round-the-clock pharmacist coverage for even the most basic task of medication order fulfillment, let alone more sophisticated tasks.

Background

Processing medication orders without real-time pharmacist review presents substantial risks. Off-hours orders are often reviewed by nursing or a pharmacy technician, omitting the pharmacist's checks for medication interactions, dosing adjustments for different diseases, and other considerations. Such omissions increase the likelihood of errors and adverse drug events. In addition, provider organizations have come to recognize that the role of highly trained pharmacists in the acute care setting goes well beyond sitting in the pharmacy fulfilling medication orders and answering questions for providers. Pharmacists are increasingly incorporated into rounding teams. Some organizations offer pharmacy consultations to address specific medication management challenges.

Analysis

Telemedicine programs can support real-time remote pharmacist order fulfillment. Such telepharmacy programs permit health care delivery organizations to staff remote hospitals efficiently and effectively, and address a number of other operational and care quality considerations. In the usual model, a remote pharmacist reviews medication orders from one or, more commonly, several remote hospitals. The pharmacist may be physically located at a larger hospital and devote a portion of his or her time to remote order review, or the pharmacist may work from home. In another model, provider organizations may outsource all or portions of their programs to telepharmacy vendors who supply pharmacists and technical resources for connectivity and other aspects of operations. Such vendors may be stand-alone and dedicated to the provision of telepharmacy services, or may be part of a larger pharmacy services management business.

The greatest technical challenge for organizations operating telepharmacy programs is data interchange, specifically, how to make medication orders and other patient data accessible to the remote pharmacist, and how to permit the pharmacist to enter reviewed and modified orders along with documentation of interventions into the remote hospital's pharmacy system. Several approaches have been developed, each with its advantages and disadvantages. In addition there are cases where use of video connections can be useful.

Action Items

- Investigate the legal requirements for telepharmacy and pharmacy licensure requirements in your state.
- Consider employing telepharmacy if you operate rural hospitals that cannot afford 24x7 pharmacist coverage, or if one of the above telepharmacy models might provide cost savings. Additionally, HCOs may wish to consider telepharmacy if they could better employ pharmacists beyond the order fulfillment role (for example, for more direct patient care work), but do not have adequate staffing.

- Examine telepharmacy options to better support post-discharge care in conjunction with care management services. Better medication management contributes to reductions in adverse drug events and 30- and 90-day readmission rates.
- Consider employing vendor products and staffing when building out a telepharmacy program. Vendor options may be most useful in the multi-EMR environment, or when you lack the in-house pharmacy resources to cover your needs. If you choose to provide these services in-house, you may wish to employ a telemedicine platform to manage video streams.

Extending Telemedicine into Medication Management

Over the past several decades, provider organizations have come to recognize that the role of highly trained pharmacists in the acute care setting goes well beyond sitting in the pharmacy fulfilling medication orders and answering questions for providers. Pharmacists are increasingly incorporated into rounding teams. Some organizations offer pharmacy consultations to address specific medication management challenges. Pharmacists are considered critical members of specialized teams addressing tasks such as antibiotic stewardship, management of critical care patients, and inpatient and outpatient oncology management.

But health care provider organizations with small rural hospitals face major challenges providing the most basic services. Many rural hospitals are too small to afford full-time, round-the-clock pharmacist coverage for even the most basic task of medication order fulfillment, let alone more sophisticated tasks. Many such hospitals employ a daytime pharmacist who reviews nighttime orders—for example, for a newly admitted patient—the following morning, by which time the first doses of medication have usually been administered.

Processing medication orders without real-time pharmacist approval presents substantial risks. Off-hours orders are often reviewed by nursing and (sometimes) a pharmacy technician, omitting the pharmacist's checks for medication interactions, dosing adjustments for different diseases, and other considerations. Such omissions increase the likelihood of errors and adverse drug events. Some smaller hospitals cannot afford even a full-time daytime pharmacist, and resort to periodic visits from a community pharmacist. This model further increases risks to patient safety.

To address this problem, some health care organizations (HCOs) have developed telemedicine programs to support real-time remote pharmacist order fulfillment. Such telepharmacy programs permit health care delivery organizations to staff remote hospitals efficiently and effectively, and address a number of other operational and care quality considerations.

Telepharmacy can also be used to support retail pharmacy operations. The model uses a combination of electronic receipt of prescriptions from electronic medical records (EMRs) and imaging systems to share images of written prescriptions; the remote pharmacies are staffed by pharmacy technicians.

This report will focus on hospital-based pharmacy support. We will present case studies of health care providers using telepharmacy, and examples of two telepharmacy vendors. Note that these are only examples; other provider organizations employ this model, and a number of other vendors, small and large, exist in this space.

Hospital Telepharmacy—Basic Models

A common scenario in which health care providers utilize telepharmacy is that of the multi-hospital system with a large urban tertiary center as well as small rural community and critical access hospitals (CAHs). In these situations, the parent HCO may elect to support basic pharmacy functions (medication order review and fulfillment) using telepharmacy. Frequently, a single remote pharmacist reviews medication orders from one or, more commonly, several remote hospitals in the absence of an on-site pharmacist. The remote pharmacist may be physically located at a larger hospital and devote a portion of his or her time to remote order review, or the pharmacist may work from home.

In another model, provider organizations may outsource portions of their programs to telepharmacy vendors. Such vendors may be stand-alone and dedicated to the provision of telepharmacy services, or may be part of a larger pharmacy services management business. Vendors may provide connectivity services and software as well as pharmacist resources. This is similar to teleradiology services, such as Nighthawk. Telepharmacy vendors may price services per order processed or, in the case of those handling transitions of care, per admission and discharge. For staff augmentation, they may price on a per hour basis.

Case Study #1: Via Christi Health—Telepharmacy Support for Rural—and Urban—Hospitals

Via Christi Health, based in Wichita, Kansas, operates hospitals throughout the state, including both large and small hospitals. They also provide telepharmacy services to several small hospitals that are not owned by Via Christi Health, which have limited hours of on-site pharmacist services. In addition, some counties in Kansas do not have a single pharmacy, creating challenges for patients living in rural areas of the state. Via Christi's largest hospital is a 427-staffed-bed acute care center in Wichita; at the other extreme, a rural critical access hospital they operate typically has only a handful of inpatients at a given time.

Kansas previously did not have regulations governing the practice of telepharmacy, and Via Christi worked with the Kansas Board of Pharmacy to help get legislation passed supporting implementation and utilization of telepharmacy services.

Via Christi pharmacists started their telepharmacy program nine years ago. At that time, pharmacy services were so scarce at some Kansas hospitals that medication orders were being reviewed only one day per week. In other settings, pharmacists were required to come in to the hospital to dispense drugs for administration to patients, as regulations prohibited them from remotely supervising a pharmacy technician restocking automated medication cabinets. Today they use video to oversee this process, as well as to oversee nursing preparation of chemotherapy agents in rural hospitals, saving patients many hours of driving for regular chemotherapy infusions. The basic telepharmacy program was initially established to provide full-time coverage to manage all of these situations.

The telepharmacy program has also been expanded to provide flexible staffing at even the larger hospitals, freeing on-site pharmacists to do more clinical and direct patient care work on the patient wards. They currently use the Vidyo platform to support their telepharmacy services.

Via Christi's telepharmacists mostly work from remote locations in several U.S. states. All of their pharmacists are required to obtain Kansas licenses.

Operational Considerations

The principle workflow consideration is the mechanism by which prescribers' orders are sent to a pharmacist for review. Following are the most common scenarios:

Single-Enterprise EMR

In the typical off-hours workflow, physicians and advanced practitioners order medications (for new admissions, or changes to current inpatient medications) by several mechanisms. If the delivery organization supports a single-enterprise EMR, the prescriber enters the medication orders directly into the EMR either on-site, or if they have such access, remotely. The order then automatically populates the pharmacy information system. In this case, remote pharmacists generally access the pharmacy information system via VPN¹ or Citrix, and can review orders directly in the EMR's pharmacy system.

In cases in which prescribers do not have remote access to the EMR, they typically call their orders in to the patient's ward nursing station. According to Joint Commission regulations, verbal orders taken by a nurse must be entered into the CPOE² system while the prescriber is on the phone with them; the nurse must then read the orders back after entry to confirm their accuracy and inform the prescriber of any clinical decision support alerts appearing during the order entry process

Disparate EMRs Across the Enterprise

Some delivery systems support multiple EMRs, each with its own CPOE and pharmacy information system. In these cases, remote pharmacists must either log into multiple EMRs to access the pharmacy systems, or they may utilize a vendor software product that generates a single stream of combined information from disparate CPOE systems, as well as faxes of orders from hospitals without CPOE.

This represents the most complicated scenario for telepharmacy. Data in multiple forms—fax, electronic (laboratory values), medication lists, allergies—must be made available to the pharmacist. In this scenario, telepharmacy vendors can offer an advantage by taking data in multiple formats and sending it to pharmacists (their own or the client organization's) in a single format, such as HL7³ messages.

Vendor Profile #1: PipelineRx—A Single Consolidated Feed from Disparate Medication Order Sources

PipelineRx was started in 2009 by its CEO, Brian Roberts. Roberts had previous experience with hospital staffing models and realized that virtualized pharmacy staffing offered a particularly attractive labor optimization model for community hospitals whose pharmacy staff often was not at full capacity or utilization. The virtual model scales efficiently across multiple hospitals, vastly reducing the cost of coverage for many community hospitals. In addition, the model applies to larger hospitals by shifting pharmacy staffing from a fixed to a variable cost, thereby freeing up hospital pharmacist resources to work closely with physician/nurse care teams and patients. It also offers improved quality, as many hospitals do not have easy access to highly trained PharmDs.

PipelineRx currently employs over 100 pharmacists who provide remote services for clients including specialists in areas such as pediatrics, behavioral, critical care, and oncology, to whom appropriate orders are routed.

1) VPN = Virtual private network.
2) CPOE = Computerized provider order entry.
3) HL7 = Health Level 7.

A unique aspect of PipelineRx's service is the use of an interoperable cloud-based technology that is capable of organizing medication orders from disparate EMRs and CPOE feeds, as well as accepting faxes and scans, and delivering this in a platform for hospital pharmacists to efficiently process and approve orders. Driven by vendor-hospital collaboration, PipelineRx delivers data via an HL7 stream from multiple sources to a single screen that also includes patient-specific data such as labs and allergies, and also incorporates hospital-specific policies and procedures to aid in fast and accurate approval and processing of medications.

The company also offers the software package independent of their remote pharmacy service on a Software-as-a-Service (SaaS) platform that, in addition to inpatient optimization, can also incorporate other areas of pharmacy on the continuum of care, such as outpatient and specialty pharmacy. Integrated delivery networks (IDNs) use the SaaS platform to optimize their own pharmacy staffing strategies across owned and non-owned hospitals. PipelineRx operates in 42 states and currently serves over 300 hospitals, including 22 IDNs.

The Role of Video in Telepharmacy

In addition to the central issue of how data is exchanged between remote pharmacist and dispensing location, provider organizations may employ video connectivity to support aspects of small hospital operations. One of the most common cases is video support of intravenous (IV) medication compounding. A video view of the IV preparation station in the hospital pharmacy allows remote pharmacists to observe, assist, and confirm accuracy of IV medication preparation by on-site pharmacy technicians. This is especially important for the oversight of chemotherapy medication compounding. Video is also used by some organizations to oversee pharmacy technician and nursing access to unit-based drug dispensing systems (such as Pyxis and Omnicell). Organizations employing video often make use of telemedicine platforms such as Vidyo or Polycom.

Case Study #2: Peabody Health Care—Video-Enabled Telepharmacy for Emergency Department Admissions

Peabody Health Care¹ uses telepharmacy to support hospital admissions from the emergency department (ED). Admission medication reconciliation is critical to ensure the accurate continuation or conversion of outpatient medications following admission.

Peabody employs dedicated laptops on wheels in the ED to support this process. Remote pharmacy technicians have access to the ED's census screen and watch for the determination that a patient's status has been changed to "admit." Upon this determination, a nurse moves the dedicated workstation into the patient's bay and the remote pharmacy technician interacts directly with the patient to obtain a complete medication history. Many patients bring in home medications but forget the names of the drugs, and the video connection permits the pharmacy technician to see the pills or bottles and identify the medication and dose. The pharmacy technician is also able to obtain the patient's retail pharmacy dispensing information via their electronic prescribing network, to further ensure medication list accuracy; they can also call pharmacies to confirm details.

Peabody employs the Polycom video platform; it runs constantly on the ED's PCs so there is no start-up login work for ED personnel. Program directors assembled a business case for the ED telepharmacy program. The demonstration of the potential hard dollars return on investment (ROI) was easy, as the alternative was to use the outsourced management company Peabody uses for other pharmacy services. In

1) Pseudonym.

addition, the case listed the soft benefits such as reduction in medication errors and adverse drug events and possible reduced length of stay.

Vendor Profile #2: CPS Telepharmacy—Providing Pharmacy Services Across the Care Continuum

CPS Telepharmacy began as RxKnights, which was founded in the mid-2000s as a remote pharmacy order entry business. It was purchased by CPS in 2008. Today CPS Telepharmacy serves over 170 clients, providing real-time review and fulfillment of CPOE order entry, support for transitions of care, and ED pharmacy services. They support several large hospital systems as well as tiny rural hospitals with average daily censuses of one. CPS Telepharmacy currently employs nearly 50 full-time pharmacists. CPS Telepharmacy serves clients in all of the lower 48 states with licensed pharmacists.

CPS Telepharmacy pharmacists use a secure VPN to access patient EMRs, permitting them direct access to hospital pharmacy systems. Their pharmacists are able to provide additional review that on-site pharmacists may not be able to do, such as documenting directly in the patient chart and examining medication reconciliation processes. Approximately 75% of orders are received from CPOE systems; the remainder comes in via fax, nursing calls, photographs of orders, and other electronic means.

In addition to providing remote order entry and verification during off-hours, CPS Telepharmacy also assists with transitions of care at hospital admission and discharge. At admission, pharmacists are able to review a patient's outpatient prescription and fulfillment record using a national database of retail prescriptions that have been dispensed. This permits the pharmacist to record a more complete home medication list, ensuring an accurate record of the medication types, doses, and forms (e.g., liquid vs. tablet). At discharge, the reconciliation process begins with bedside medication education by a remote pharmacist, discharge medication review, and post-discharge patient contact and education follow-up. These services target readmission reduction and patient safety with clients reporting up to 30% reductions in readmissions. CPS Telepharmacy has also shown an increase in patient medication adherence through follow-up telephone calls after discharge. Additionally, patient satisfaction has risen in facilities partnering with CPS Telepharmacy, with HCAHPS¹ scores rising as much as 13% in year one.

Pharmacy Licensure—State-by-State Regulations

As with other telemedicine models, telepharmacy practice must accommodate state-by-state licensure and regulatory requirements. Some states, for example, require pharmacists to be physically located at pharmacy facilities.

Provider organizations and telepharmacy vendors employing pharmacists must manage the complexity of interstate pharmacist licensure. Provider organizations may manage this by utilizing in-state pharmacists to manage hospitals in that state, but many have models that support interstate practice. In this instance, they need to license some pharmacists in multiple states. Vendors supplying support with employed pharmacists license pharmacists to practice regionally, with each pharmacist obtaining licenses in a handful of states, thus spreading the licensure burden across their pharmacist staff.

Case Study #3: Catholic Health Initiatives—Telepharmacy in Multi-state, Multi-EMR Environment

Catholic Health Initiatives (CHI) is a national 90-hospital system headquartered in Englewood, Colorado. Hospitals range in size from large tertiary centers to small CAHs.

1) HCAHPS = Hospital Consumer Assessment of Healthcare Providers and Systems

CHI got its start in telepharmacy with support from the North Dakota State University, based in Fargo. The program was established to support approximately 15 CAHs in North Dakota and Minnesota, covering evening, night, and weekend services. The current director of Remote Pharmacy Services, Ken Kester, expanded the program upon his appointment in 2014, and they expanded coverage to additional hospitals in Nebraska. The program has since been expanded to support 50 hospitals in eight states. The Remote Pharmacy Services program also contracts to serve non-CHI hospitals.

The CHI environment has multiple EMRs including Cerner, Epic, Meditech, and Paragon. To simplify order receipt by the remote pharmacists, the program employs the PipelineRx software product, which combines orders from some EMRs—Meditech and Paragon—and faxes from hospitals. For Cerner and Epic, pharmacists are required to connect remotely to the EMRs via point-to-point interfaces in order to receive CPOE orders. PipelineRx also provides additional patient information from some EMRs such as allergies, laboratory results, and medication lists.

CHI employs video links as well. They are particularly useful for overseeing nursing units lacking access to automated dispensing machines (such as Pyxis, Omnicell). In some states it is illegal for nurses to obtain drugs directly from drug storage areas (i.e., as opposed to from automated dispensing machines) without pharmacist supervision. In addition, nurses periodically use the video link to show the pharmacist a patient's medication tablets brought in from home on admission, to ensure proper identification.

Most CHI pharmacists work from home, with the exception of pharmacists who cover Minnesota sites, who must by law work from a physical pharmacy setting. At this time, CHI employs 35 remote pharmacists, each licensed in an average of six states.

Return on Investment and Metrics Tracked

Telepharmacy providers generally track metrics such as number of orders filled, number of interventions, and telephone time. In addition, particularly when telepharmacy is used to provide flexible staffing across sites, staff hours are tracked to ensure efficient use of pharmacist resources.

Return on investment for telepharmacy is generally easy to demonstrate. Allowing timesharing of a single pharmacist across multiple hospitals is far more efficient than supporting such hospitals with on-site pharmacists around the clock. Other soft dollar benefits of 24-hour pharmacy coverage include real-time order verification and the immediate intervention and correction of errors and medication safety problems.

Additional Telepharmacy Use Cases

Some provider organizations and vendors are pursuing ways of broadening telepharmacy services beyond basic inpatient services to admission and post-discharge medication management, patient management in the home, and support of other technology initiatives. The case studies in this report illustrate some of these uses.

In summary, telepharmacy can be employed to support many use cases, from coverage provision at small hospitals, to variable staffing at large hospitals, to improving quality during patient care transitions. As technologies continue to proliferate, the number of use cases for telepharmacy will doubtless continue to grow.

Action Items

- Investigate the legal requirements for telepharmacy and pharmacy licensure requirements in your state.
- Consider employing telepharmacy if you operate rural hospitals that cannot afford 24x7 pharmacist coverage, or if one of the above telepharmacy models might provide cost savings. Additionally, HCOs may wish to consider telepharmacy if they could better employ pharmacists beyond the order fulfillment role (for example, for more direct patient care work), but do not have adequate staffing.
- Examine telepharmacy options to better support post-discharge care in conjunction with care management services. Better medication management contributes to reductions in adverse drug events and 30- and 90-day readmission rates.
- Consider employing vendor products and staffing when building out a telepharmacy program. Vendor options may be most useful in the multi-EMR environment, or when you lack the in-house pharmacy resources to cover your needs. If you choose to provide these services in-house, you may wish to employ a telemedicine platform to manage video streams.

Appendix: Additional Provider Case Studies

Case Study #4: Eastern Maine Healthcare Systems—Improving Population Health and ACO Metrics in Rural Communities

Sebasticook Valley Health (SVH) is a small CAH outside of Bangor, Maine, and part of Eastern Maine Healthcare Systems (EMHS). SVH uses telepharmacy to augment face-to-face clinical pharmacy services in their three local primary care sites. The pharmacist doing this work quickly determined that it was efficient and effective to extend patient interactions beyond the office settings to the patient's home via telephone. This was especially important for patients who lacked access to or funds for transportation in the rural service area. The pharmacist uses phone calls with patients to improve key medication-related quality metrics, including those adopted by the organization's accountable care organization (ACO), and to counsel patients on how to better manage their complex medication regimens. Beacon Health, which manages EMHS's Medicare Shared Savings Program (MSSP) ACO, provides access to clinical quality data such as HbA1C values, blood pressure, medication compliance, and claims data. The pharmacist uses these data to target specific patients who appear to be drifting off course in their medication-related self-care. The result has been substantial improvements in several SVH-specific ACO measures.

In addition to monitoring patients at home, the pharmacist conducts patient education on drugs new to the patient. In one example, a newer anticoagulant is thought to be more effective and safer than warfarin, which many patients have been taking for years. Direct phone conversations with warfarin patients have helped with converting them successfully to new and safer alternatives.

In addition to remote care for patients in the home, SVH also uses elements of the more traditional telepharmacy model, using a remote pharmacist team at Eastern Maine Medical Center (EMMC) in Bangor, Maine. EMMC, the second largest Maine hospital, shares a medical record with SVH. This allows SVH patients access to 24/7 pharmacy support which includes real-time order verification, as well as on-demand clinical pharmacy services for both physicians and nurses. These remote pharmacists are trained in the policies and procedures of SVH and get to know the local care team

through constant interaction. Virtual care follow-up boards allow communication between the two sites providing care. Metrics regarding order turn-around time and clinical hours billed are tracked to ensure program sustainability.

Case Study #5: Sonoma Valley Hospital—Telepharmacy to Support CPOE Go-live in a California Country District Hospital

Sonoma Valley Hospital (SVH), located in Sonoma, California, has utilized telepharmacy since 2012. SVH is a small hospital with 75 licensed beds and an average daily census of 35 to 40 patients. The telepharmacy program was initially created to ease pharmacy support for the hospital's EMR, which went live the same year, and particularly to assist with 24/7 oversight of CPOE, bar coding, and eMAR operations due to growing requirements for pharmacy supervision of medication orders. Today CPOE is used in all environments except the perioperative unit and the outpatient infusion center, which still use paper. The same level of supervision would not have been manageable with the previous daytime-only coverage model, which involved morning-after pharmacist review and reconciliation of the night shift's orders.

SVH had already contracted with Comprehensive Pharmacy Services (CPS) for pharmacy management services, and CPS provided the expertise to build the telepharmacy program. The hospital utilizes CPS telepharmacists for off-hours coverage.

Advisors to Our Work

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