



WellSpan Health Finds Missing Medication History Close to Home to Improve Patient Safety

AI, Legacy EHR Data Conversion, and Local Pharmacy Connections Deliver 97% of Medications for Patients Over 65



York, Pennsylvania

8 hospitals

200+ patient care locations

1,600 physicians and advanced practice providers

Approximately 20,000 employees

EHR: Epic

WellSpan Health is a non-profit, integrated health system serving the communities of central Pennsylvania and northern Maryland. This eight-hospital health system has been recognized with an Eisenberg Award for innovation in patient safety and quality, and has achieved HIMSS Stage 7 status for both inpatient and outpatient Electronic Medical Record Adoption Model (EMRAM and O-EMRAM). In late 2020, WellSpan was certified as Level 8 Acute in the CHIME Digital Health Most Wired, a program designed to elevate the health and care of communities around the world by encouraging the optimal use of information technology.

The Challenge

Discrepancies in a patient's medication history can have serious downstream consequences. Up to 70% of patients have errors on their medication list when admitted to the hospital through the emergency department (ED), and up to 59% of these errors can cause harm.¹ Plus, one-third of inpatient orders have errors, with 85% of these originating from the medication history collected during the admission process.²

WellSpan Health experienced similar issues. Missing, incomplete, and inconsistent patient data from external medication history sources caused unnecessary complications and delays in the medication reconciliation process. As a result, clinical staff had to call pharmacies and providers to gather, confirm, and manually enter medication data, opening the door for transcription errors and potential adverse drug events (ADEs).

Along with gaps in the medication history feed, medication data from their converted legacy EHR systems was essentially unusable within the current Epic EHR. This would require manual intervention and corrections each time a patient presented at a WellSpan facility. Seeing this as an obstacle to quality patient care, WellSpan leadership sought out a solution through a partnership with DrFirst and its AI-powered SmartProcessorSM solution.

"We went live with Epic in 2017 and leveraged another medication history vendor as our data source. We had high hopes for improving our medication reconciliation process, but we quickly realized that we were still missing a lot of information on our patients," said Donald "Chip" Gerhart, R.Ph., Manager of Pharmacy Clinical Informatics.

In addition to missing medication history, WellSpan also was struggling with consistency in medication instruction terminology (sigs) and the variations in terms used between different data sources. Where one prescription might use the word "orally," another would say "by mouth," which caused import and mapping issues that clinicians needed to manually resolve in each patient record.

"We initially tried to do some mapping on our own to manage the variation of sig terms and how they were translated in our Epic system, but we quickly realized there was a significant amount of ongoing work we would need to do," Gerhart explained. "At a certain point, we realized we were fighting a losing battle, and this was something we were going to have to continually manage with dedicated internal resources and would still not be able to get to 90% and more."

¹Tam, V. C., Knowles, S. R., Cornish, P. L., Fine, N., Marchesano, R., & Etchells, E. E. (2005). Frequency, type and clinical importance of medication history errors at admission to hospital: A systematic review. In CMAJ. <https://doi.org/10.1503/cmaj.045311>

²Gleason, K. M., McDaniel, M. R., Feinglass, J., Baker, D. W., Lindquist, L., Liss, D., & Noskin, G. A. (2010). Results of the medications at transitions and clinical handoffs (match) study: An analysis of medication reconciliation errors and risk factors at hospital admission. Journal of General Internal Medicine. <https://doi.org/10.1007/s11606-010-1256-6>



By the Numbers

- Now finding medication history for 93% of patients, and 97% of patients over 65
- 73 local pharmacies now sharing medication history data
- 2.4 million additional prescription fills in first six months
- 270,000 patient records from legacy systems processed
 - This included 5.5 million medications, with 4.8 million imported into the Epic EHR

The Solution

To improve access to accurate and actionable patient medication history, WellSpan began conversations with DrFirst in 2019. MedHxSM provides a combination of local and national medication history sources directly within the native Epic workflow for the most comprehensive database of medication history available. Along with providing data from HIEs and other EHR partners, DrFirst identifies and connects local pharmacies for healthcare organizations that share mutual patients and makes the dispensed fills available as part of MedHx.

“One of the things that was particularly attractive to us was DrFirst’s ability to connect with local pharmacies to pull in more information for our patients aside from PBMs,” Gerhart said.

With additional data sources that more closely aligned with the patient population in Pennsylvania and Maryland, WellSpan also leveraged SmartSigSM, a patented artificial intelligence (AI) solution included in MedHx, to normalize sig information into consistent terms, safely infer missing information, and prepopulate drug and sig information within its Epic EHR.

In addition to improving access to patients’ medication history, WellSpan leveraged SmartProcessor in late 2020 to normalize medication data across three legacy systems (NextGen, MEDENT, and MEDITECH) as it transitioned multiple facilities to one Epic system.

The Results

WellSpan integrated MedHx with SmartSig into its Epic EHR in late 2020. As a result, when clinicians at WellSpan search for a patient’s medication history, they find usable data on 93% of patients and 97% of patients over 65. In the first six months, 73 local pharmacies began sharing medication history data, which provided 2.4 million additional prescription fills that would have otherwise needed to be manually entered. Pre-populating sig information dramatically increased access to local patients’ histories, improving the quality of data imported into Epic and saving more than seven clicks per medication.

“By partnering with local pharmacies and DrFirst, we’re receiving more complete and accurate prescription fill information, which means our staff doesn’t have to manually gather that data and complete those fields in each patient’s medication history. We are saving time previously spent calling pharmacies and confirming medications and missing sig information, reducing errors associated with manual entry, and improving patient safety,” Gerhart said.

Along with upgrading their external medication history source, WellSpan’s efforts to improve quality and access to legacy data yielded impressive results. SmartProcessor converted data from over 270,000 patient records from NextGen, MEDENT, and MEDITECH legacy systems, accounting for over 5.5 million medication records. Of these records, 88% were normalized and imported into WellSpan’s enterprise-wide Epic system. Access to this data saved five to seven minutes per patient record while preventing countless opportunities for transcription errors and subsequent ADEs and readmissions.

“To **save time** and **improve quality of medication history data** when consolidating three EHRs into a network-wide implementation of Epic, we developed a data conversion process using **DrFirst’s SmartProcessor AI engine that cleans and structures data beyond standard neuro-linguistic programming (NLP) using clinical and statistical context**. This normalized the medication data to be used in our Epic system while **addressing discrepancies and variations from the old EHRs, inferring missing data with context from medication histories to prevent blank fields while avoiding labor-intensive manual entry.**”

—Robert Lackey, M.D., FAAFP
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