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Reducing Hospital Readmissions with the Pharmacy of the Future

Powered by technology from Onyx and Intel, USF Health Pharmacy Plus* reinvents the pharmacy with smarter consulting and engagement.

Studies show that problems with medication account for a substantial portion of readmissions. The answer to preventing hospital stays may be at the pharmacy.

Designing a Pharmacy for Smarter Care

As hospital readmissions strain healthcare systems, pharmacies are rethinking the role they play in the connected healthcare workflow. Hospitals want to enable pharmacists to provide more informed counseling, while leveraging the pharmacy as a channel to encourage patients to be more proactive in their health. USF Health at the University of South Florida, Tampa, has digitally transformed its pharmacy with Onyx medical-grade all-in-one computing systems, powered by Intel® processors.

At USF Pharmacy Plus*, new Internet of Things (IoT) technologies allow patients to conduct follow-up visits via videoconference and real-time screen sharing with doctors. Robotic arms can automatically fill prescriptions, and pharmacists can connect to patient records to help avoid drug interactions or allergic reactions. This new generation of pharmacy is leading to fewer hospital readmissions, more satisfied patients, and a higher caliber of care.

Pharmacies Key to Fewer Readmissions

Hospital readmissions have become a costly problem for patients, healthcare systems, and insurers in the U.S. For Medicare patients alone, the cost of readmissions has climbed to roughly $26 billion annually, of which an estimated $17 billion could have been avoided with better post-discharge care.[1] Adding to the pressure are penalties in the form of reduced payments from the Centers for Medicare and Medicaid Services (CMS) to hospitals with too many readmissions.[2]

An important, but often overlooked, step in preventing readmissions exists at the pharmacy. Studies show that problems with medication—patient nonadherence, adverse drug events, unintentional overdoses, and missing information—account for a substantial portion of readmissions. One study in particular found that patients with medication discrepancies had a 30-day hospital readmission rate of 14.3 percent, compared with 6.1 percent for patients without a discrepancy.[3]

By 2014, three-quarters of hospitals in the U.S. had adopted electronic health record (EHR) systems, which make patient records available to providers in real time.[4] However, most pharmacies do not have access to EHR systems. It's a missed opportunity for expertly trained pharmacists to avoid drug interactions, prevent allergic reactions, and offer better patient education to reduce other potential problems.

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30-DAY HOSPITAL READMISSION RATES[3]
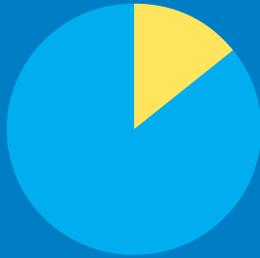
14.3%
patients with
a medication
discrepancy
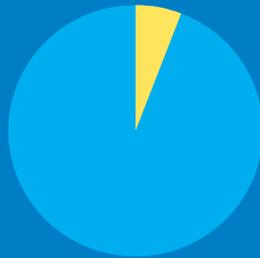
6.1%
patients
without a
discrepancy

Patients who take a different medication than the one on their discharge list are more than twice as likely to be readmitted to the hospital.

Better Engagement, Smarter Consulting

At the forefront of digital pharmacy innovation is USF Health. In 2015, the hospital system unveiled its Pharmacy Plus, a new model designed to help pharmacists provide better consulting, encourage patients to be more involved in their care, and enable patients to communicate more extensively with providers. At the core of the pharmacy's reinvention are Onyx medical-grade, all-in-one workstations, mobile nursing workstations, patient infotainment terminals, and medical-panel PCs powered by Intel processors.

To start with, Onyx solutions enable USF Health to feed its EHR system into Pharmacy Plus. Now prescriptions are automatically transmitted to the pharmacy and filled immediately. This process not only provides faster customer service, but also minimizes human errors and saves employee time. More important, pharmacists can access the EHR for additional information about patients, such as allergies or other conditions, on their physician workstations. This helps pharmacists provide better consultations or recommend medications that may lead to better outcomes.

To empower patient self-management, Pharmacy Plus added private patient-education stations. These stations feature the ONYX-BE182 patient infotainment terminal, which provides interactive, educational content for post-treatment and recovery guidance. In the pharmacy reception area, patients can conduct simple self-triage prior to their telemedicine visits using wearable devices that communicate with ONYX Venus mobile nursing workstations and ONYX-121/2112 slim patient kiosks.

Technology for Telemedicine

Telemedicine is growing as the healthcare industry looks for ways to improve value-based care. The global telemedicine market is expected to grow 14.3 percent each year[5] as hospitals, practices, and pharmacies expand their scope of care. Traditional pharmacies, including CVS and Walgreens, have already launched telemedicine programs that are designed to educate and connect patients with health resources. Both chains are expanding their services in 2016.

With computing equipment specially designed for healthcare, Onyx makes it easier for pharmacies, clinics, and hospitals to extend their reach and boost patient satisfaction. The new Pharmacy Plus includes two private rooms where patients can conduct teleconsulting sessions with a doctor via an ONYX Smart View Medical Station. The stations feature integrated, high-definition, multipurpose diagnostic scopes that can capture images and collect readings with help from an on-site physician practitioner. These tools enable preliminary ENT, ultrasound, and dermatology exams, providing remote physicians with more information about the patient's condition. In addition, pharmacists can teleconference directly with physicians on call for real-time joint counsel on treatment.

USF Health Pharmacy Plus* reimagines the roles of both the patient and the pharmacist in healthcare.

Designed for the Pharmacy

Onyx offers a full line of medical-grade computing platforms powered by Intel processors, including surgical workstations, medical panel PCs, bedside infotainment terminals, medical box PCs, medical tablets, mobile nursing workstations, and medical embedded motherboards.

ZEUS-227S Smart View Medical Station

At USF Health Pharmacy Plus, this 22-inch multitouch medical station is connected to a robotic arm that can quickly grab the right bottle of medication and automatically fill a prescription. Designed with fanless operation and an Intel® Core™ i7 processor, the medical station features a barcode reader for better tracking of drug dispensing and easy infection-control maintenance.

ONYX-2122 and ONYX-121 Slim Medical Patient Kiosks

These slim patient kiosks feature Intel® Atom™ processors and serve as point of sale and information terminals. Patients can conduct preliminary self-triage via wearable health devices that communicate with kiosks.

ZEUS-247 Smart View Medical Station

Pharmacy Plus's tele-counseling platform delivers power performance with an Intel Core i7 processor, fanless design, and DICOM-compliant display for clinical-level images. Medical

INTEL IOT FOR HEALTHCARE

Intel is collaborating with others in the healthcare industry to develop innovative new solutions that improve global healthcare quality, affordability, and accessibility. The latest IoT technology, such as Intel® processors and Intel® IoT Gateways, is making it possible to transform remote patient monitoring, personalize treatment, improve patient outcomes, and lower healthcare costs.

images and readings are captured and shared via real-time screen-sharing with physicians, while an integrated webcam facilitates counseling.

Venus Series Mobile Workstations

Onyx's mobile nursing workstations feature Intel® Celeron® processors and are powered by built-in, hot-swappable batteries. These mobile workstations are ideal for hospital and long-term-care facilities that require a workstation-on-wheels with mobility and telemedicine capabilities.

ONYX Patient Infotainment Terminals

These terminals feature an Intel Celeron processor and provide interactive patient education, TV entertainment, and patient-side record access with security credentials.

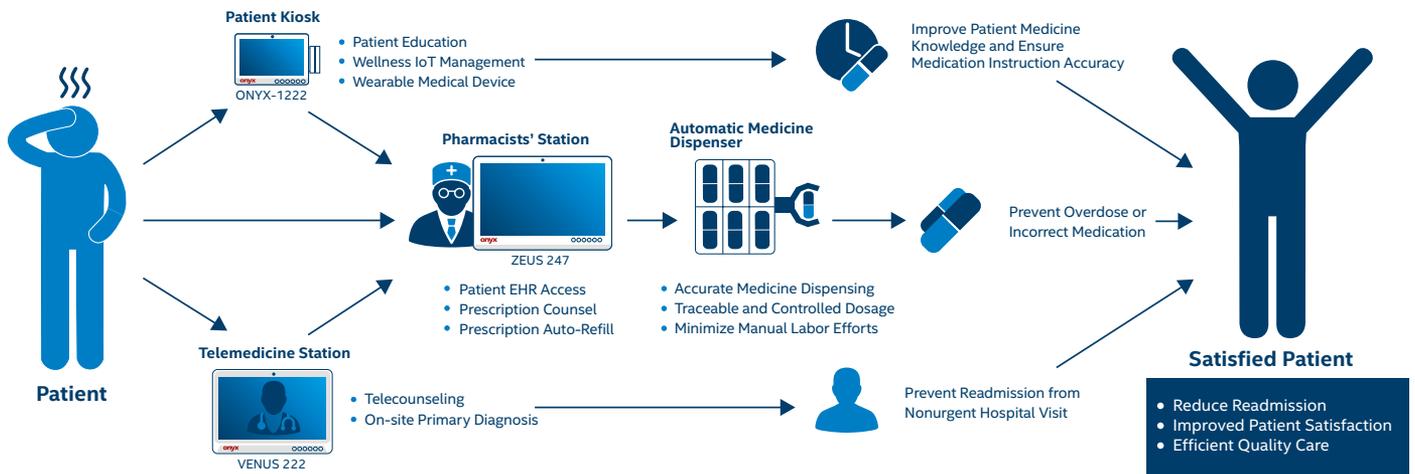## ONYX DIGITAL PHARMACY SOLUTION ARCHITECTURE

Patient Kiosk
ONYX-1222
- Patient Education
- Wellness IoT Management
- Wearable Medical Device

Improve Patient Medicine Knowledge and Ensure Medication Instruction Accuracy

Patient

Pharmacists' Station
ZEUS 247
- Patient EHR Access
- Prescription Counsel
- Prescription Auto-Refill

Automatic Medicine Dispenser
- Accurate Medicine Dispensing
- Traceable and Controlled Dosage
- Minimize Manual Labor Efforts

Prevent Overdose or Incorrect Medication

Telemedicine Station
VENUS 222
- Telecounseling
- On-site Primary Diagnosis

Prevent Readmission from Nonurgent Hospital Visit

Satisfied Patient
- Reduce Readmission
- Improved Patient Satisfaction
- Efficient Quality Care

Figure 1. Onyx has developed a full line of medical computing equipment powered by Intel® processors.

Better Patient Outcomes

With smart computing designed for healthcare, next-generation pharmacies can improve patient outcomes and boost customer satisfaction. Telemedicine and computing stations that connect to EHR systems can help patients understand their medications and take them as prescribed, while enabling pharmacists to avoid adverse effects—and keep patients from returning to the hospital.

Learn More about IoT

For more information about Intel® IoT technologies, visit intel.com/iot.

To learn more about ONYX medical-grade computing solutions for healthcare, visit usa.onyx-healthcare.com.

1. "The Revolving Door: A Report on U.S. Hospital Readmissions." Robert Wood Johnson Foundation, February 2013, http://www.rwjf.org/content/dam/farm/reports/reports/2013/rwjf404178.

2. "Readmissions Reduction Program." Centers for Medicare & Medicaid Services, August 2014, https://www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/readmissions-reduction-program.html.

3. Grissinger, Matthew, "Reduce Readmissions With Pharmacy Programs That Focus on Transitions From the Hospital to the Community." Pharmacy and Therapeutics, April 2015, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4378513/.

4. "Adoption of Electronic Health Record Systems among U.S. Non-Federal Acute Care Hospitals: 2008-2014." Office of the National Coordinator for Health Information Technology, April 2015, https://www.healthit.gov/sites/default/files/data-brief/2014HospitalAdoptionDataBrief.pdf.

5. "Five Telemedicine Trends Transforming Health Care in 2016." The National Law Review, November 2015, http://www.natlawreview.com/article/five-telemedicine-trends-transforming-health-care-2016.