

Trends in Medtech Wearables

Maria Shepherd • Data Decision Group

The Affordable Care Act has brought great change to the healthcare industry, and indeed to the medical device business, driving interventionists and surgeons to reflect on how value-based care models will affect their practices.

In a 2012 study, pre-operative, intra-operative and post-operative outcomes were collected on patients between 2009 and 2011 while they had inpatient general surgery procedures at an academic center (n=1442).¹ Thirty-day readmissions in this study was measured at 11.3 percent. At a recent Medical Development Group Boston meeting on the Internet of Things, the room was packed as several physicians presented multiple future clinical applications for wearable technologies, including the identification of patients at risk for surgical complications.²

Why It's Important

The top three reasons for readmission in the study were gastrointestinal problem/complication (27.6 percent), surgical infection (22.1 percent), and failure to thrive/malnutrition (10.4 percent).

Can Wearables Prevent or Better Manage Readmission Rates?

Studies show that infections are a common cause of re-admissions. In the study, the top three procedures linked with higher readmission rates were pancreatectomy, colectomy, and liver resection.⁴ Post-operative events leading to an amplified re-admission risk were blood transfusion, pulmonary and wound complications, sepsis/shock and urinary tract infection. For example, a recent study that followed patients after coronary artery bypass graft surgery (n=33,936) determined that 16.5 percent patients were readmitted within 30 days of discharge and that the most common cause of readmission was post-op infection (16.9 percent).⁵

The study also notes the financial implications of hospital re-admission.⁶ When a patient returns to the hospital, further limitations are placed on hospital resources. Every readmission means a lost opportunity to treat another patient, and places a burden on the healthcare system.

Chart 1.

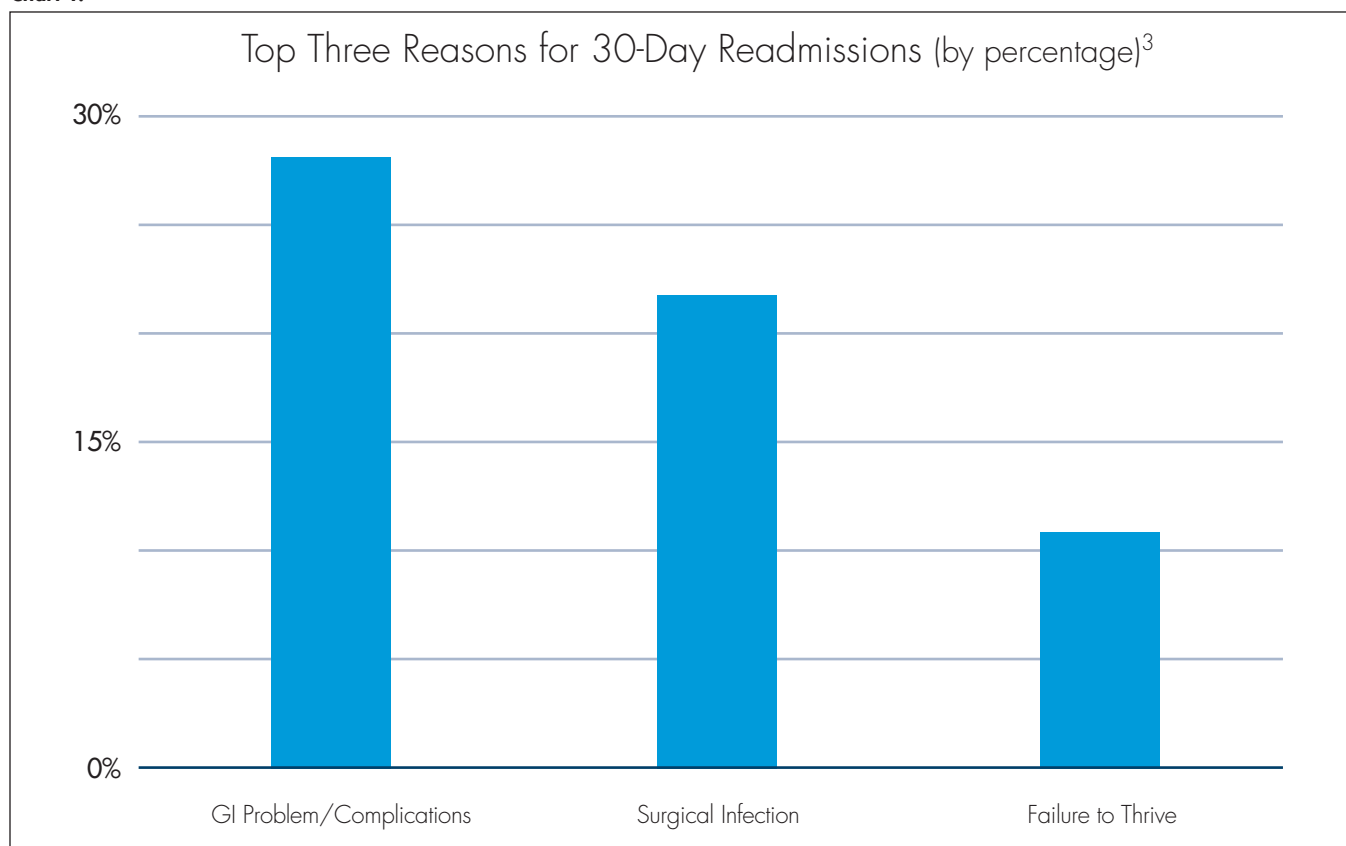
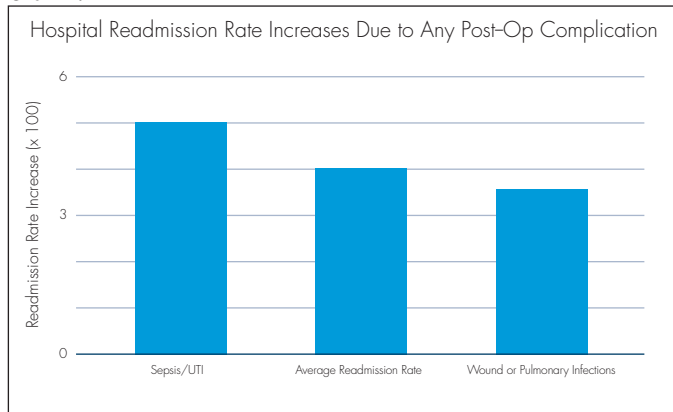


Chart 2.



Sepsis and other forms of surgical infections, without intervention, can result in organ dysfunction and/or failure.⁷ For treatment to be successful, early identification of patients at risk and needing intervention is critical.⁸

This study delivers evidence that post-op complications are the single most significant risk factor causing hospital readmission. The analysis shows that any post-op complication increases average readmission risk by a factor of four. Patients with post-op sepsis or urinary tract infection (UTI) experienced increased readmission by a five-fold increase. Patients with post-op wound infections or post-op pulmonary complications carry a risk increase by a factor of approximately 3.5 (see Chart 2).

How Can Wearables Help Identify Post-Op At-Risk Patients?

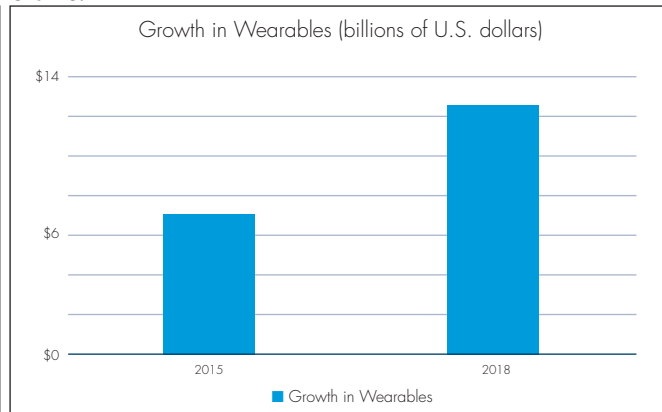
If at-risk patients were discharged with wearables configured to monitor early conditions such as sepsis, outcomes might be improved.⁹ The Systemic Inflammatory Response Syndrome (SIRS), created by the American College of Chest Physicians and the Society of Critical Care Medicine is used to recognize patients suffering from early signs that may indicate an infection, such as sepsis.¹⁰

SIRS is defined when patients present with two or more of the following symptoms:

- Temperature greater than 100.4 degrees Fahrenheit or less than 96.8 degrees Fahrenheit
- Heart rate greater than 90 beats per minute
- Respiratory rate greater than 20 breaths per minute or an arterial partial pressure of carbon dioxide less than 4.3 kPa (32 mmHg)
- White cell count above 12,000 cells/mm³ or less than 4,000 cells/mm³

Although it is a simplistic solution that requires substantially more development, wearables can be configured to monitor the first three of the four SIRS symptoms. Wearables are ubiquitous, and the wearable device market is valued to grow to more than \$12 billion by 2018.¹¹

Chart 3.



Technology Prevails

Identifying at-risk patients is only one of the many potential uses for wearable technology. How can wearables help your physician and hospital customers better manage the health of its patient population? ❖

References

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Editor's note: Readers are invited to submit market data and trend questions to Maria Shepherd. Periodically, selected questions will be presented in this column, with answers from Maria.

Maria Shepherd has 20 years of leadership experience in medical device/life-science marketing in small startups and top-tier companies. Following a career including roles as vice president of marketing for Oridion Medical (a company acquired by Covidien, which is now Medtronic), director of marketing for Philips Medical and senior management roles at Boston Scientific Inc., she founded Data Decision Group. Shepherd recently was appointed to the board of the ALIGO Healthcare Investment Committee. She can be reached at (617) 548-9892, mshpherd@ddecisiongroup.com, www.ddecisiongroup.com, or followed on Twitter @MedTechResearch.