EQuIP, An Evidence-based Quality Improvement Process: Improving the Speed to Insight

3rd Seattle Symposium on Health Care Data Analytics

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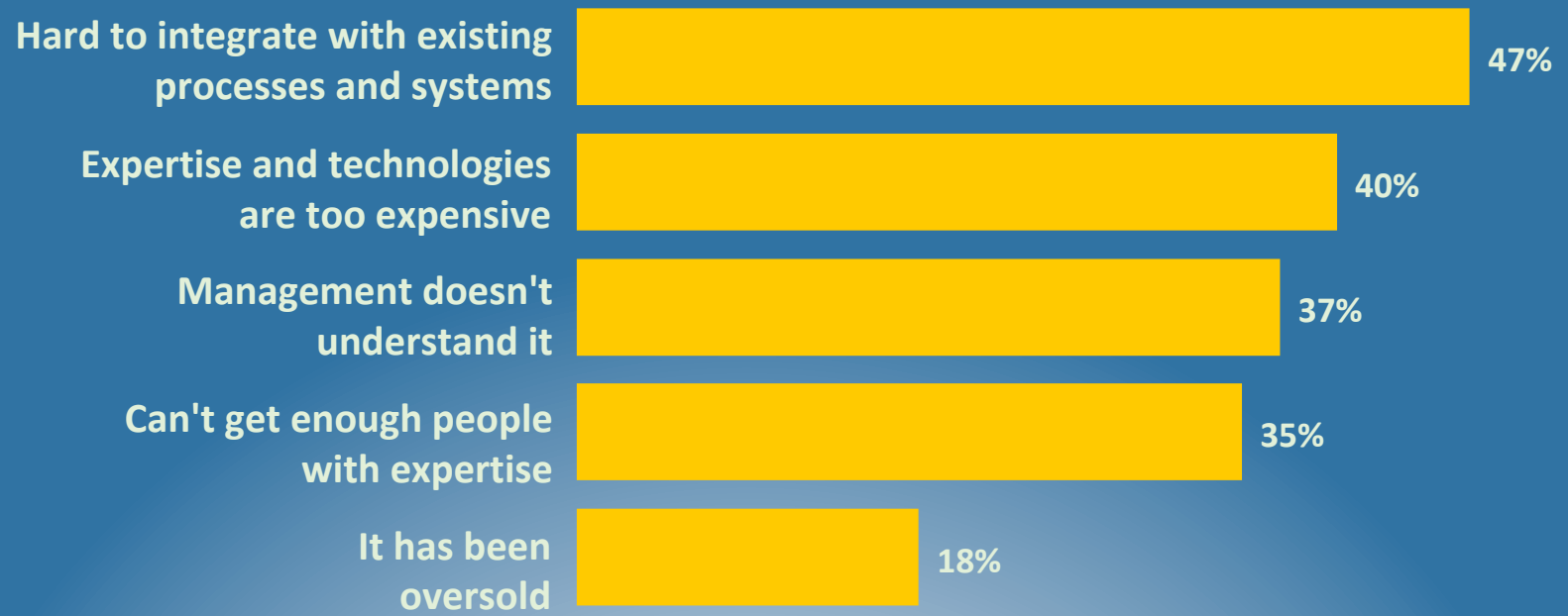
Background

- Having a systematic approach for extracting previously unknown and important actionable information and knowledge from disparate sources of data will create value for healthcare organizations
- This knowledge can be used to improve care by leveraging clinicians' and administrators' experience to objectively generate opportunities that might otherwise go undiscovered

Challenges

Despite the recognition that data can create value, only a few healthcare organizations have adopted rigorous analytic approaches to support their data mining efforts.

Percentage of executives who cite the following as obstacles of advanced analytics.



Source https://hbr.org/2018/01/artificial-intelligence-for-the-real-world

Healthcare Data are Complex

- While other industries have well developed data exploration processes (e.g., banking), healthcare is still developing its methods, with
  - miscellaneous data sources and types,
  - huge quantities of unstructured data,
  - diverse measuring precision, and
  - lots of uncertainties about data quality

Objective

- To propose an evidence-guided systematic approach for exploring data to identify QI opportunities.

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Literature monitoring in target clinical areas of importance for new comparative effectiveness evidence

- Comparative Effectiveness Studies
- Systematic Reviews
- Other Filtered Scientific Evidence

Horizon scanning: structured approach that provides a systematic process for exploring data

Provide parameters for guiding data exploration. Use prior available knowledge to define the scope and to add specificity to the data exploration.

Set the data exploration goals and build a logic model to describe the inputs and the outputs.

Assembling the needed data from various sources to examine local practices

- EHR Data
- Clinical Databases
- Digital Data
- Claims Data
- Geospatial Data
- Patient-Reported Outcome Measures

Build a robust dataset by combining relevant data sources

Extract only the data relevant for the data exploration.

Spend time cleaning, merging, defining, and validating the data. This should be a combined effort of the data scientist and business or clinical expert.

Try to fit the logic model with the data.

Data analytics

- Traditional Descriptive
- Statistics
- Traditional QI Tools
  - Root Cause Analysis
  - Pareto Chart
  - SPC Charts
  - Process Map
- Advanced Analytics
  - Geospatial Analysis

Combine different tools to draw insight from your data

Identify patterns, anomalies, and opportunities. Seek to answer the following questions: Who?, When?, Where?, What?, How?, and Why?

Begin with broad descriptions and then focus on areas of value, such as unwarranted variation or worse than expected clinical outcomes. Risk adjust and use benchmarks for meaningful comparisons.

Data visualization for business value

- Insight-Rich Illustrations
- Value-Rich Findings
- Annotated Charts
- Actionable Targets
- Measurable Impact

Specify improvement opportunities in the context of business value.

Clearly represent key points, tell a story with your data. Help stakeholders interpret your results, explain what they mean.

Present data only if it can lead to: safer care, better care, reduced costs, less waste, less unnecessary care, or innovation.

By Vincent Mor, Orna Intrator, Zhanlian Feng, and David C. Grabowski

The Revolving Door Of Rehospitalization From Skilled Nursing Facilities

ABSTRACT **Almost one-fourth of Medicare beneficiaries discharged from the hospital to a skilled nursing facility were readmitted to the hospital within thirty days; this cost Medicare $4.34 billion in 2006. Especially in an elderly population, cycling into and out of hospitals can be emotionally upsetting and can increase the likelihood of medical errors related to care coordination. Payment incentives in Medicare do not encourage providers to coordinate beneficiaries' care. Revising these incentives could achieve major savings for providers and improved quality of life for beneficiaries.**

PACE
PACING AND CLINICAL ELECTROPHYSIOLOGY
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DEVICES

Day-case device implantation—A prospective single-center experience including patient satisfaction data

Jessica Peplow RN, Esther Randall RN, Carolyn Campbell-Cole RN, MSc, Ravi Kamdar MBBS, FRCP, Ed Petzer MBCHB, FRCP, Para Dhillon PhD, MRCP, Francis Murgatroyd MA, FRCP, Paul A. Scott DM, FRCP ... See fewer authors

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Abstract

1 Purpose

Many centers perform day-case cardiac rhythm management (CRM) device implantation. However, there is a paucity of prospective data concerning this approach. We performed a prospective single-center study of day-case device implantation, including data on patient satisfaction.

BJC The British Journal of Cardiology

Evaluation of a new same-day discharge protocol for simple and complex pacing procedures

August 2016 Br J Cardiol 2016;23:114–8 doi:10.5837/bjc.2016.029

Authors: Thomas A Nelson, Aaron Bhakta, Justin Lee, Paul J Sheridan, Robert J Bowes, Jonathan Sahu, Nicholas F Kelland

There is variable adoption in same-day discharge for pacing procedures across Europe. We compared length of hospital stay and complication rates in two cohorts, using a same-day and next-day discharge protocol. Case notes were reviewed for 229 consecutive patients attending our tertiary centre for device implantation to establish the rate of hospital readmission and complications. These comprised 106 patients in the next-day discharge cohort, and 123 from the same-day cohort. All pacing procedures, including cardiac resynchronisation therapy (CRT) and implantable cardioverter-defibrillators (ICDs), were included.

Contents lists available at ScienceDirect

Cardiovascular Revascularization Medicine

ELSEVIER

Structural

Safety and predictors of next-day discharge after elective transfemoral transcatheter aortic valve replacement☆

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ABSTRACT

Objectives: We sought to determine the predictors of next-day discharge (NDD) for selected patients undergoing elective transfemoral transcatheter aortic valve replacement (TF-TAVR).
Background: Techniques have rapidly evolved over the last several years to simplify TF-TAVR allowing for a subset of patients to be discharged the next day.
Methods: Baseline and procedural characteristics, in-hospital and 30-day follow-up outcomes, complications and readmission rates of 100 TF-TAVR cases were assessed. Patients selected for NDD all met the following criteria: no procedural complications, same day ambulation, strong family support with home supervision, and access to our valve coordinator post discharge.
Results: There were 22 patients in NDD and 78 in later-day discharge (LDD) groups respectively. The mean length of stay was 3.4 days for LDD. There were no significant differences in baseline, pre-procedural characteristics, or frailty indices of the two groups. However, there were more baseline oxygen dependent patients in LDD ($p = 0.004$). Procedural characteristics included more balloon expandable valves ($p = 0.005$), less fluoroscopy time ($p = 0.008$), and higher use of moderate sedation ($p = 0.0001$) in NDD group. There were more minor vascular complications ($p = 0.04$) and new permanent pacemaker implantations ($p = 0.016$) in the LDD group. There were no vascular complications, stroke or blood transfusions in the NDD group. The 30-day re-admission and mortality rates were similar in both groups. In logistic analyses only moderate sedation was a strong predictor of next day discharge after TF-TAVR ($p = 0.003$).
Conclusion: Carefully selected patients without complications following TF-TAVR can be discharged safely the next day.

JACC: CARDIOVASCULAR INTERVENTIONS
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STRUCTURAL: FOCUS ON TAVR

Predictors and Clinical Outcomes of Next-Day Discharge After Minimalist Transfemoral Transcatheter Aortic Valve Replacement

Norihiko Kamioka, MD,[a] John Wells, MD,[a] Patricia Keegan, DNP,[a] Stamatios Lerakis, MD,[a] Jose Binongo, PhD,[b] Frank Corrigan, MD,[a] Jose Condado, MD,[a] Ateet Patel, MD,[a] Jessica Forcillo, MD,[c] Leslie Ogburn, NP,[a] Andy Dong, BS,[a] Hope Caughron, BA,[a] Amy Simone, PA,[c] Bradley Leshnower, MD,[c] Chandan Devireddy, MD,[a] Kreton Mavromatis, MD,[a] Robert Guyton, MD,[c] James Stewart, MD,[a] Vinod Thourani, MD,[c] Peter C. Block, MD,[a] Vasilis Babaliaros, MD[a]

Safety and Cost-Effectiveness of Same-Day Cardiac Resynchronization Therapy and Implantable Cardioverter Defibrillator Implantation

Gavin Atherton, BSc (Hons), MBChB[a], Christopher James McAloon, MBChB, MRCP, PGCME[a,b], Bhaveek Chohan, BSc (Hons)[a], Dominic Heining, MSc, MBChB[a], Benjamin Anderson, MBChB, MRCP[a], Jethro Barker, BSc (Hons)[a], Harpal Randeva, MBChB, PhD[a], and Faizel Osman, MBChB, MD[a,b,*]

Cardiac resynchronization therapy (CRT) and implantable cardioverter defibrillator (ICD) implantation improve morbidity and mortality in selected patients. Many centers still admit patients overnight. We evaluated the safety, feasibility, and cost savings of same-day CRT/ICD device implantation by performing a retrospective study of all consecutive elective CRT/ICD implants at a tertiary center from January 2009 to April 2013. All emergency and/or inpatient cases were excluded. Data were collected on baseline demographics, implantation indication, procedure details, complications (categorized as immediate [≤24 hours], short term [24 hours to 6 weeks], medium term [6 weeks to 4 months], and long term [>4 months]), and mortality (30 day and 1 year). Comparisons were made between those having planned same-day versus overnight stay procedures. A cost analysis was performed to evaluate cost savings of the same-day policy. A total of 491 devices were implanted during this period: 267 were elective (54 planned overnight, 213 planned same-day) of which 229 were CRT pacemakers or CRT defibrillators and 38 ICDs. There were 26 total overall complications (9.7%) with no significant differences between planned same-day versus planned overnight stay cohorts (9.4% vs 11.1%, p = 0.8) and specifically no differences in immediate, short-, medium-, and long-term complications at follow-up. The 30-

Results

- Our evidence-based approach was tested on one of Kaiser's target clinical areas of importance, interventional cardiology.
- Three potential improvement opportunities were identified:
  - network leakage;
  - avoidable hospital days; and
  - preventable 30-day hospital readmissions.
- Preliminary estimates suggest that our work could lead to approximately 1 million dollars in savings and up to 250 avoided hospital days while improving the quality and safety of care to our members.

Finding Variation among PCI, Pacemaker, ICD, TAVR and Open Heart Surgery Cases

"Uncontrolled variation is the enemy of quality." W. Edwards Deming

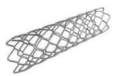
Leakage

Approximately 15% of non-emergent PCI and Pacemaker cases are done outside Kaiser

Care outside Kaiser

- **Longer LOS**

- **More Imaging ($ & ☢)**
- **More expensive**
  - Higher % of cases coded with MCC



MCC $19,396
w/o MCC $12,658

MCC $22,336
CC $15,727
w/o CC/MCC $12,898

Avoidable LOS

The proportion of same-day discharged patients was low in general

- **PCI**

26% of patients go home the same day

- **Pacemaker Implants**

24% of patients go home the same day
74% go home the next day

- **ICD Generator Procedures**

6% of patients go home the same day
50% go home the next day

Potential SDD by Procedure

88% Percentage of **pacemaker** patients

79% Percentage of **ICD** patients

Advisory Board

30-Day Readmissions

867 open heart surgery cases performed at SMC between 2016-2017

30 day readmission rate 9.9%

- Average cost of CABG readmission $14,600[1]

2017 Readmission Rate

- **Extended Care = 15.4%[2]**
- Home = 8.2%

2X more likely to be readmitted if female >= 70 years old

3X more likely to be readmitted if the patient is **female, seventy, and discharged to extended care**

2017 Volume	590 PCI Procedures	364 Pacemaker Implants	123 ICD Generator Procedures	456 Open Hearts	109 Structural Heart Procedures

[1]Strategies for reducing readmission following CABG

[2] Significantly higher

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Lessons Learned

- **Engagement, engagement, engagement.**
- **Be a trusted broker and ambassador of data.**
- **Need valid comparators.**