Advanced Analytics and its Role in Transforming Health Care

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05/09/2013

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Takeaway from today's session

After today's meeting, you will:
- Understand the important role health analytics will play today and in the future
- Glean how other industries are using advanced analytics to drive performance
- Understand how your information, coupled with analytics, can solve your business problems

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Presentation Overview

1. **Understanding the analytics landscape**

2. **How analytics can address different business questions**

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Understanding the Analytics Landscape

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What is Advanced Analytics?

Advanced analytics is a set of techniques that can be used to build models and predict outcomes.
- Built on top of descriptive statistics and is data-based
- Models applied to inform better business decisions

Advanced analytics includes:
- Predictive analytics: What will hapen if the current trends continue?
- Simulation: What will happen if we change our strategy?
- Optimization: How can we maximize our resources?

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Analytics, Why Now?

The introduction of new technologies allow for new questions to be asked and answered.
- Data integration that allows for the linkage of clinical, financial, administrative and experiential information
- Ability to do calculations on the fly – support real-time decision-making process

The changing healthcare landscape demands improvement.
- Health care reform/transparency and the emergency of alternative delivery channels (ACOs, exchanges)
- Marketplace dynamics impacting health care insurance and large-sized employer driven ASOs

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Who is Using Advanced Analytics

Google — Delivers ads that are relevant, have a history of working, hides those that do not

hotels.com — Models percentage, performance and food stocks, which allows them to optimize staff on duty

American Airlines — Delivers pricing strategy to ensure every seat is filled at the maximum price passengers are willing to pay

NETFLIX — Matches supply with demand, predicts success of new, original content based on previous show selection

The Cheesecake Factory — Keep food waste low (97.5% food ordering efficiency) through "Guest Forecasting"
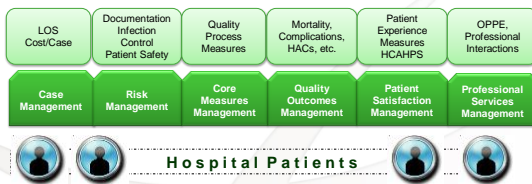
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Advanced Analytics is Changing Health Care

Traditionally Siloed Clinical Management Functions

LOS Cost/Case	Documentation Infection Control Patient Safety	Quality Process Measures	Mortality, Complications, HACs, etc.	Patient Experience Measures HCAHPS	OPPE, Professional Interactions
Case Management	Risk Management	Core Measures Management	Quality Outcomes Management	Patient Satisfaction Management	Professional Services Management

Hospital Patients

But … We wnow, in reality, these metrics interact.
This is where advanced analytics comes in.

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How Analytics is Changing Health Care

- How medicine will be distributed (telemedicine)
- How new devices will be brought to market
- How transparency will become a reality
- Underlying driver of population health
- Primary determinant between successful and non-successful ACOs
- Maximize reimbursement
- Bring patient closer to health care system (enhanced communication)

The world is going to change because
new systems will allow for data integration.

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If you had this integrated information, just imagine how it could change the way you behave.

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Application of Analytics to Business Questions

Managing the data is an important. Using the right statistical technique is an imperative.

- Text analytics – capturing the voice of the patient

- Decision tree analytics – identifying key non-controllable patient drivers

- Logistic modeling – targeting the right improvement opportunities

- Decision tree analytics – turning the lens to focus attention on the physician

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Text Analytics Affecting Patient Behavior

Assumption

Patient experiences are visceral. The way patients express themselves in terms of comments can tell us about the patient experience that a filled oval cannot.
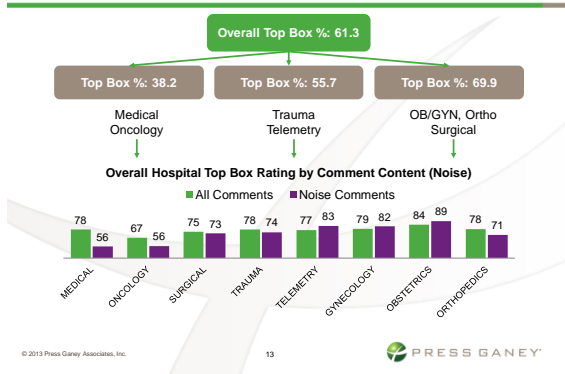
Analysis

Using text analytics to translate the "qualitative into quantitative" expressions allows for the examination of sentiments as they impact a key patient experience dimension.

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Noise Impact on Overall Survey Score

Overall Top Box %: 61.3

Top Box %: 38.2	Top Box %: 55.7	Top Box %: 69.9
Medical Oncology	Trauma Telemetry	OB/GYN, Ortho Surgical

Overall Hospital Top Box Rating by Comment Content (Noise)

■ All Comments ■ Noise Comments

	MEDICAL	ONCOLOGY	SURGICAL	TRAUMA	TELEMETRY	GYNECOLOGY	OBSTETRICS	ORTHOPEDICS
All Comments	78	67	75	78	77	79	84	78
Noise Comments	56	56	73	74	83	82	89	71

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Understanding Non-Controllable Patient Dimensions

Assumption — Patients do not enter a facility as a blank slate. The assumption is that certain characteristics can influence the way that they evaluate their experiences.
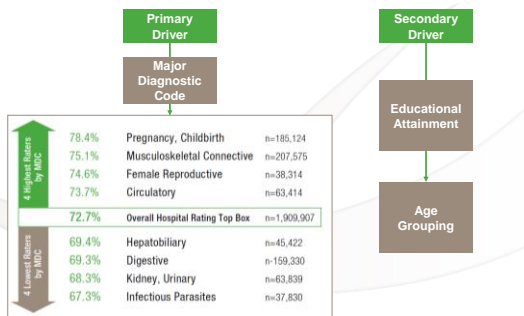
Analysis — Using analytics to identify administrative / demographic variables explain the greatest variation in overall hospital ratings.

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Understanding Non-Controllable Patient Dimensions

Primary Driver

Major Diagnostic Code

Secondary Driver

Educational Attainment

Age Grouping

4 Highest Raters by MDC

78.4%	Pregnancy, Childbirth	n=185,124
75.1%	Musculoskeletal Connective	n=207,575
74.6%	Female Reproductive	n=38,314
73.7%	Circulatory	n=63,414
72.7%	Overall Hospital Rating Top Box	n=1,909,907
69.4%	Hepatobiliary	n=45,422
69.3%	Digestive	n=159,330
68.3%	Kidney, Urinary	n=63,839
67.3%	Infectious Parasites	n=37,830

4 Lowest Raters by MDC

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Managing Patient Expectations

Assumption
Where patients are discharged makes a significant difference in terms of the way that they evaluate their hospital experience.
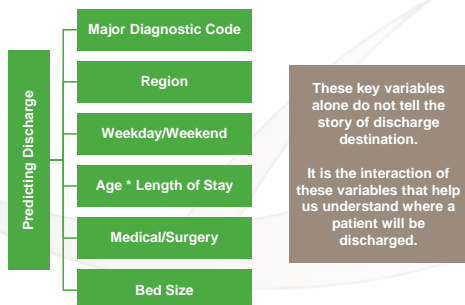
Analysis
Using analytics to identify which administrative / demographic variables explains the greatest variation in overall hospital ratings.

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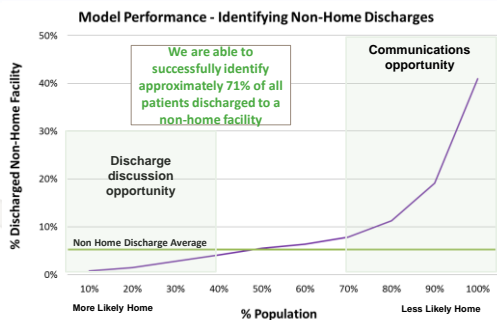
Identifying Key Discharge Destination Drivers

Predicting Discharge
- Major Diagnostic Code
- Region
- Weekday/Weekend
- Age * Length of Stay
- Medical/Surgery
- Bed Size

These key variables alone do not tell the story of discharge destination.

It is the interaction of these variables that help us understand where a patient will be discharged.

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Flagging Patients Early Can Lead to Better Discharge Location Decision or Preparation

Model Performance - Identifying Non-Home Discharges

We are able to successfully identify approximately 71% of all patients discharged to a non-home facility

Communications opportunity

Discharge discussion opportunity

Non Home Discharge Average

% Discharged Non-Home Facility

% Population

More Likely Home — Less Likely Home

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Turning the Lens Toward the Physician

| Assumption | If patients do not show up as a blank slate, physicians may not either. |

| Analysis | Using analytics to identify which physician characteristics can help understand patients' overall hospital top box rating. |

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Defining the Optimal Patient Experience

The objective of the hospital should be to service the patient optimally across all patient dimensions.
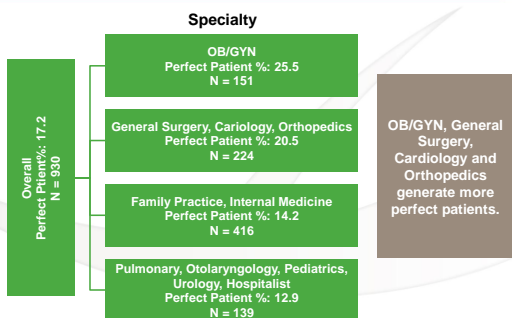
- It is important to examine patients across multiple dimension and define the optimal experience.

- For this analysis, patient responders who scored top box on all answered HCAHPS questions are considered as having an "optimal patient experience" or a **"Perfect Patient."**

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Do Certain Specialties Lend Themselves to a Perfect Score?

Specialty

Overall Perfect Ptient%: 17.2 N = 930

- **OB/GYN Perfect Patient %: 25.5 N = 151**
- **General Surgery, Cariology, Orthopedics Perfect Patient %: 20.5 N = 224**
- **Family Practice, Internal Medicine Perfect Patient %: 14.2 N = 416**
- **Pulmonary, Otolaryngology, Pediatrics, Urology, Hospitalist Perfect Patient %: 12.9 N = 139**

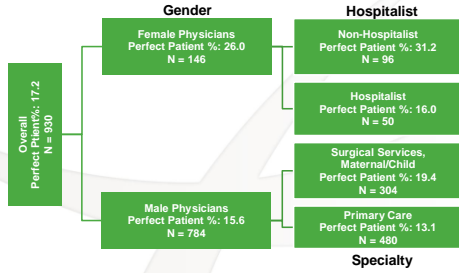**OB/GYN, General Surgery, Cardiology and Orthopedics generate more perfect patients.**

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Do Certain Physician Characteristics Generate More Perfect Patients?

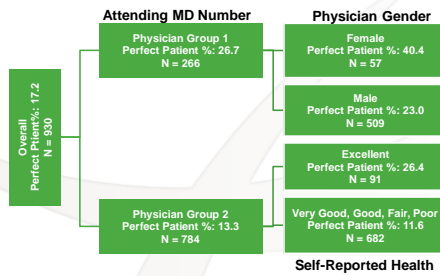**Female non-hospitalists and male surgeons generate more pefect patients.**

Gender

Hospitalist

Overall Perfect Pient%: 17.2 N = 930

Female Physicians
Perfect Patient %: 26.0
N = 146

Non-Hospitalist
Perfect Patient %: 31.2
N = 96

Hospitalist
Perfect Patient %: 16.0
N = 50

Surgical Services, Maternal/Child
Perfect Patient %: 19.4
N = 304

Male Physicians
Perfect Patient %: 15.6
N = 784

Primary Care
Perfect Patient %: 13.1
N = 480

Specialty

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Do Certain Physician Characteristics Generate More Perfect Patients?

Start a physician mentoring program.

Attending MD Number

Physician Gender

Overall Perfect Pient%: 17.2 N = 930

Physician Group 1
Perfect Patient %: 26.7
N = 266

Female
Perfect Patient %: 40.4
N = 57

Male
Perfect Patient %: 23.0
N = 509

Excellent
Perfect Patient %: 26.4
N = 91

Physician Group 2
Perfect Patient %: 13.3
N = 784

Very Good, Good, Fair, Poor
Perfect Patient %: 11.6
N = 682

Self-Reported Health

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Discussion: How Do We Use Advanced Analytics at Press Ganey?

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Today's objectives and discussion

Based on today's discussion, you are better able to go back to your work and discuss:

- The important role health analytics will play today and in the future
- Use case studies which show how other industries are using advanced analytics to drive performance
- Have analytic case studies that show what type of analytics you can use to solve your business problems
  - Taking the voice of the patient and integrating with the overall patient experience
  - Using administrative and/or 3rd party data to help understand how non-controllable information can help understand patient experience
  - Understanding how analytics can help with discharge management
  - Turning data so that the focus switches to other audiences impacting the patient experience

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