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2014 Defense Health Information Technology Symposium

Analytics: The DELTA Force



“Medically Ready Force . . . Ready Medical Force”

DHA Vision



“A joint, integrated, premier system of health, supporting those who serve in the defense of our country.”



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Learning Objectives



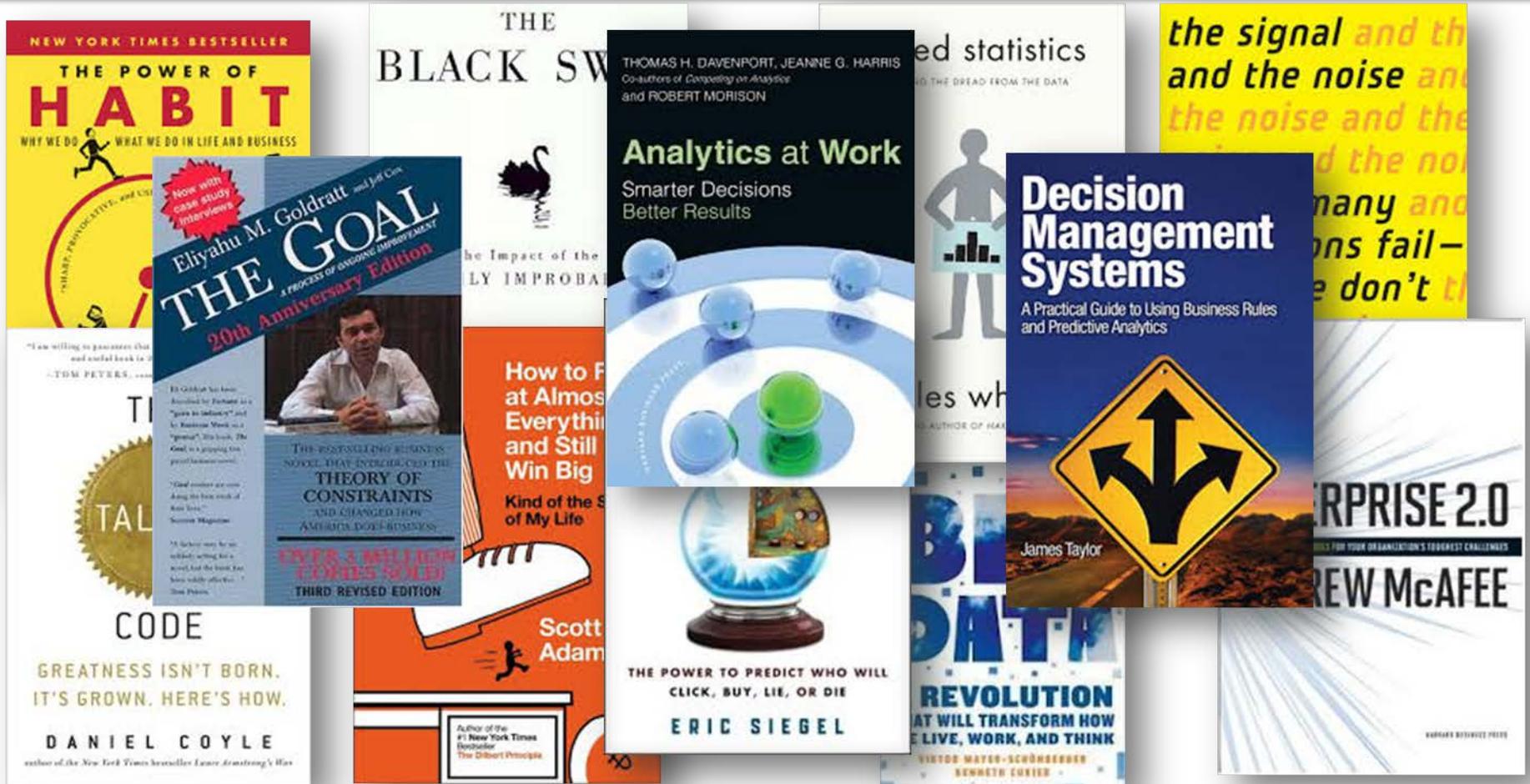
- Describe the data environment necessary for analytical excellence
- Understand how the enterprise approach creates the right environment for analytics
- Describe how leadership is a critical factor for successful analytic organizations
- Understand how selecting the right targets will enable analytics to be embedded into everyday workflow
- Understand the different kinds of analytics personnel that are needed for successful analytical organizations

Agenda



- Data
- Enterprise perspective
- Leadership
- Targets
- Analysts

Sources



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Why should I care?



- Target increased income from 44B to 65B when they focused on pregnant patients (predicted probability pregnancy)
- Olive Garden, using forecasting, reduced unplanned staff hrs by 40% and waste by 10%
- Best Buy learned its best customers represent 7% of all customers, but 43% of sales

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Why should I care?



- What patients have highest risk of readmission?
- Which referral has the highest probability of becoming a currency case?
- What factors are significantly associated with depression?
- What factors are associated with good outcomes?
- How can I focus my scarce human resources to get the biggest impact on quality care?

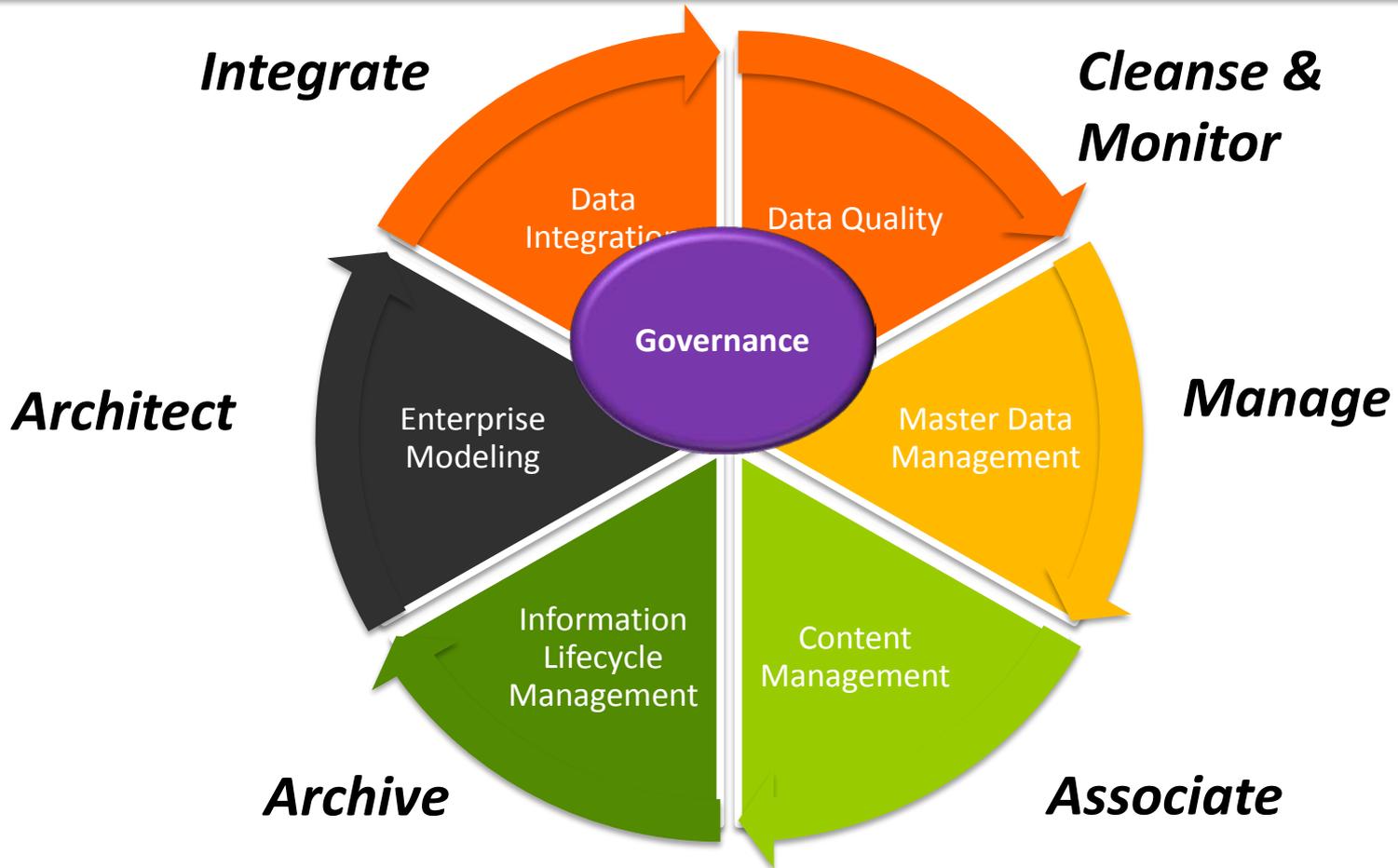
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Data



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Data Management



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Data Management



Logic Layer (SOA)

Data Services Layer (DSL)



AF fitness



Navy fitness



Army fitness



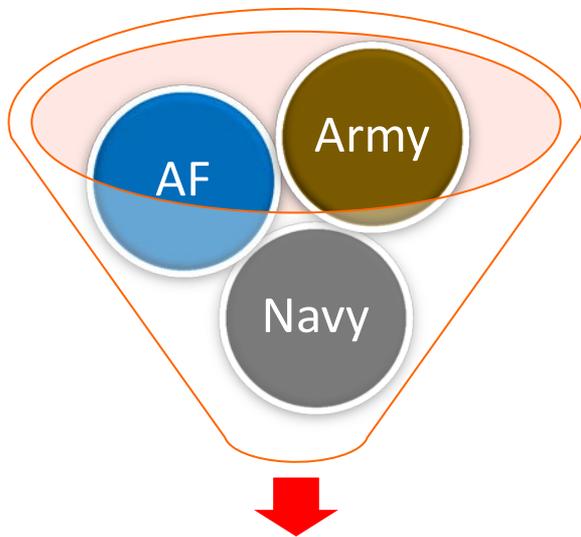
Immunizations



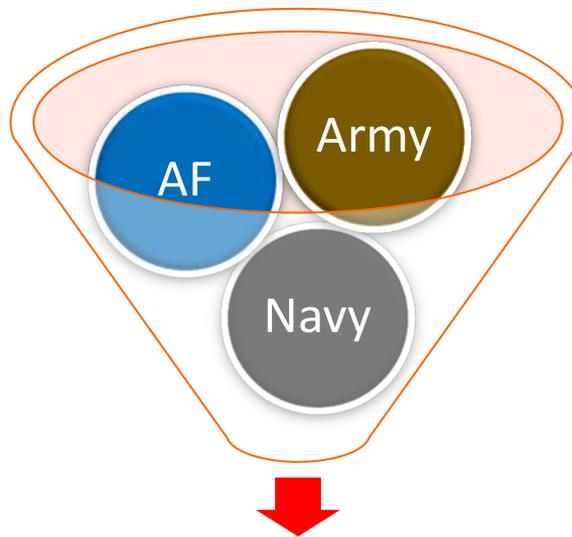
HSDW

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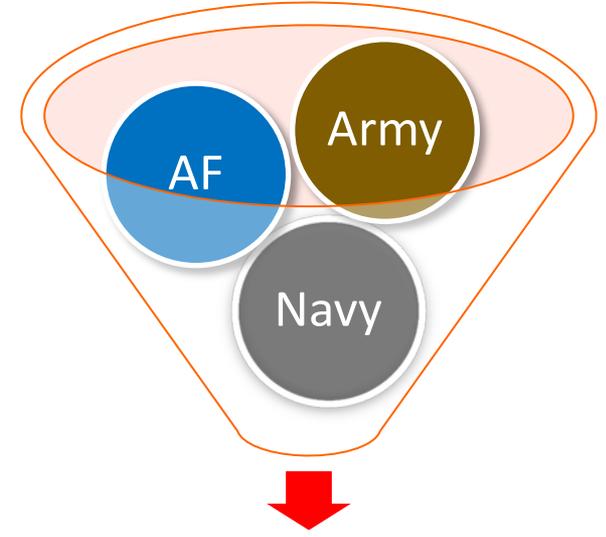
Data Integration Opportunities



Immunizations



AD Fitness



Surgical Outcomes

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Data Integration Opportunities

What is a Data Island?



Data islands are a **disconnected network** of systems connected by human interfaces

Data Impact

73% OF DATA OBJECTS ARE DISCONNECTED

55 of 75 Data Objects have Islands

1.9 Avg Islands/
Data Object

104 Total Islands

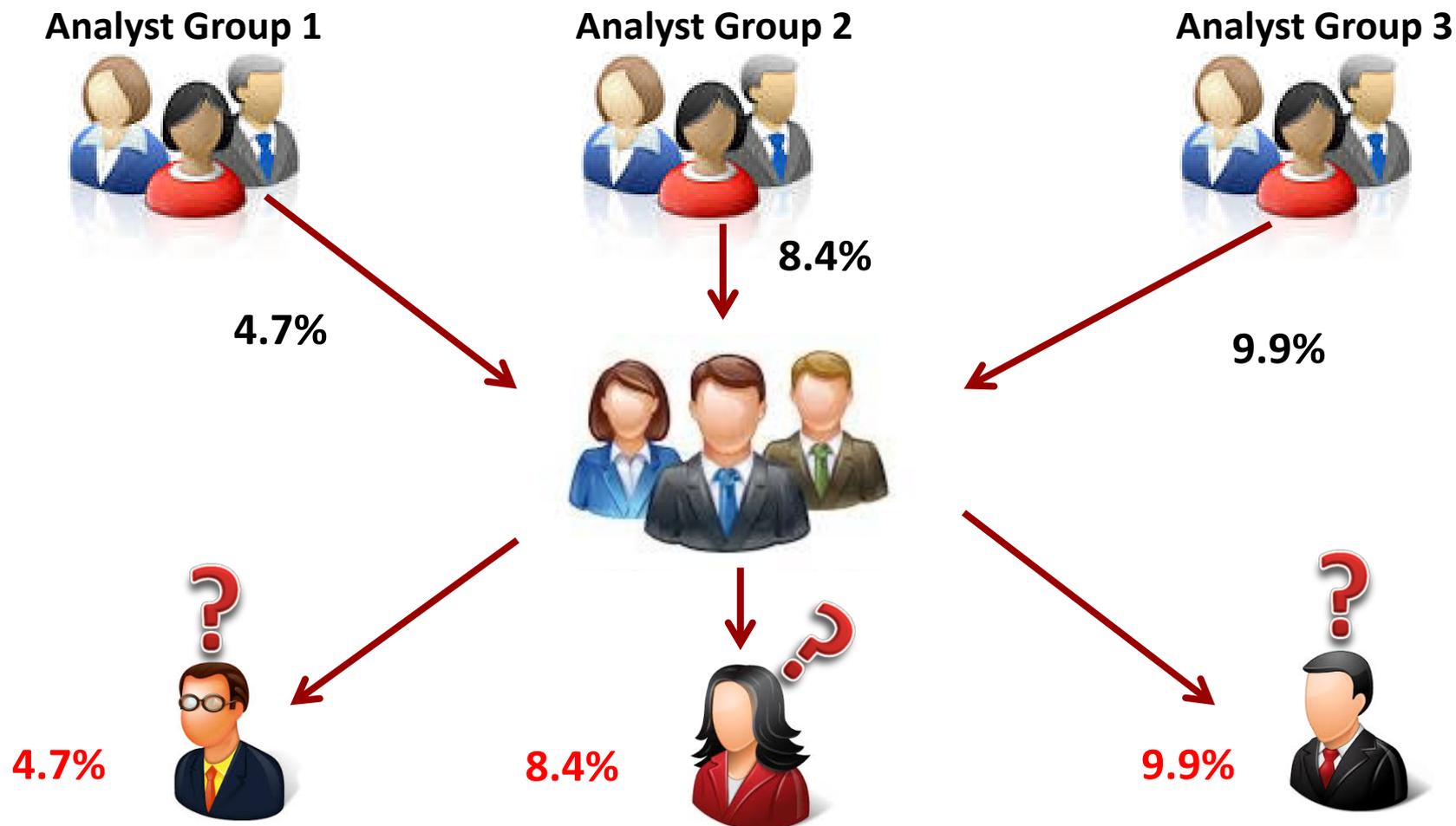
Enterprise



“The repercussions (of the fractured approach) are more ad hoc activity, more fire drills, and more spin-off databases... Expediency overrides strategy.”

Merck Executive, Robin DeHaan

What is the Readmission Rate for MHS?



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Enterprise



Group A

- Agenda
- Needs
- Challenges



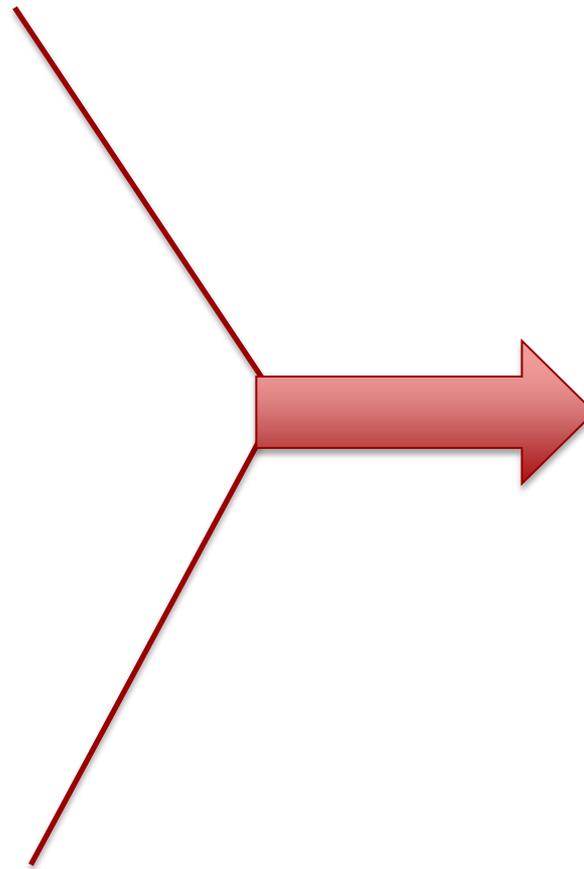
Group B

- Agenda
- Needs
- Challenges



Group C

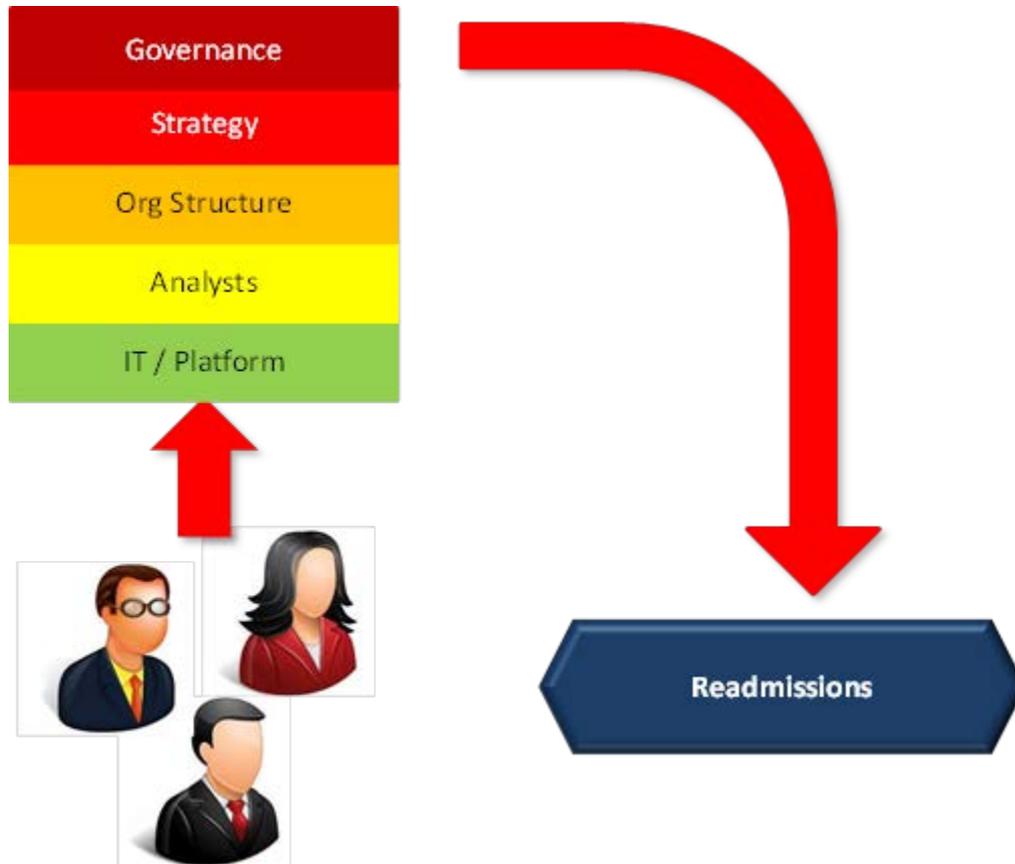
- Agenda
- Needs
- Challenges



Enterprise

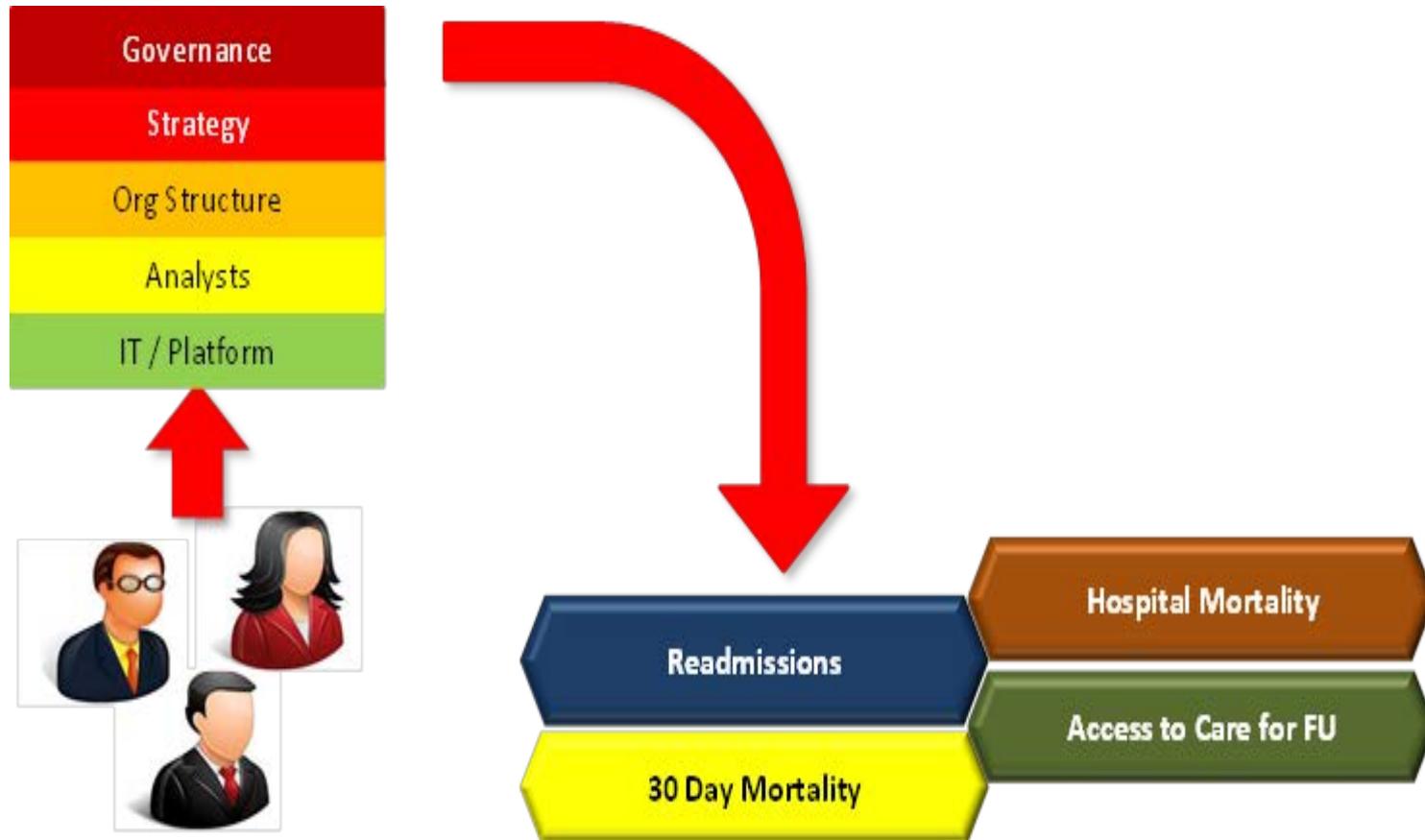
- Agenda
- Needs
- Challenges

Leadership



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Leadership



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Leadership Attributes



- Develop their people skills
- Push for more data and analysis
- Hire smart people, and give them credit for being smart
- Set a hands-on example
- Sign up for results
- Teach

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Leadership Attributes



- Set strategy and performance expectations
- Look for leverage
- Demonstrate persistence over time
- Build an analytical ecosystem
- Work along multiple fronts
- Know the limits of analytics

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Targets



- Align priorities with strategic goals
- Turn strategic goals into operational targets (actionable information)

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From Goal to Target

- 
1. Good Data
 2. Segmentation
 3. Differentiation
 4. Prediction
 5. Automation

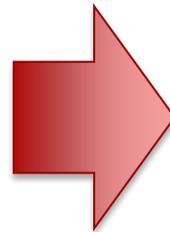
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Targets



Strategic Measures?

- 1) Right Person on Right Plane*
- 2) On-Time Departures*



Operational Target

Readmissions Analysis



	Past	Present	Future
<i>Information</i>	Reports & Description <i>Outcome</i>	Alerting <i>Trigger</i>	Extrapolation (Trends) <i>Outcome</i>
<i>Insight</i>	Models & Explanation <i>Profile / Target</i>	Recommendations <i>Target</i>	Prediction <i>Profile</i>

60+ yo
 RUB \geq 3
 3+ Chronic Conditions



F/U

RR

Profile

Trigger Event

Target Event

Outcome

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Readmissions Segmentation



Covariate	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Branch of service		
Army	Referent	Referent
Air Force	1.19 (0.86-1.65)	1.08 (0.90-1.29)
Navy	1.04 (0.77-1.41)	1.07 (0.91-1.27)
Peer Group		
Medium	Referent	Referent
Large	1.56 (1.22-1.98)	1.26 (1.08-1.47)
Small	0.73 (0.55-0.95)	0.89 (0.72-1.11)
Gender		
Female	Referent	Referent
Male	0.97 (0.93-1.02)	0.98 (0.92-1.03)
Age group		
20-29	Referent	Referent
1-19	0.81 (0.73-0.89)	0.84 (0.75-0.95)
40-59	1.13 (1.05-1.20)	1.05 (0.97-1.14)
60-79	2.03 (1.90-2.17)	1.34 (1.22-1.47)
>=80	2.93 (2.70-3.18)	1.44 (1.29-1.61)

Covariate	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Gagne score		
-1-0	Referent	Referent
1-2	1.68 (1.59-1.79)	1.34 (1.25-1.43)
3-4	3.03 (2.80-3.28)	1.68 (1.52-1.86)
>=5	5.23 (4.87-5.61)	2.37 (2.15-2.62)
# of Chronic condition		
0	Referent	Referent
1	1.07 (0.98-1.18)	1.09 (0.98-1.20)
2	1.29 (1.16-1.42)	1.20 (1.08-1.34)
>=3	2.56 (2.39-2.73)	1.66 (1.52-1.82)
Admission within 6mn		
No	Referent	Referent
Yes	2.76 (2.62-2.90)	1.74 (1.63-1.86)
30-Day follow-up visit		
Yes		Referent
No	3.20 (3.05-3.36)	4.48 (4.23-4.74)
Length of stay		
1-3	Referent	Referent
4-7	1.75 (1.65-1.86)	1.54 (1.44-1.65)

Readmissions *Prediction*



Number of Predictive Factors	% Readmissions	% Patients	Cumulative % Patients
0	4.5	7.6	7.6
1	4.9	29	36.6
2	6.9	29.6	66.2
3	9.7	17.2	83.4
4	13.8	13.6	97
5	25.6	3	100

4 factors will account for 40% of the readmissions but only 16% of the admissions cohort

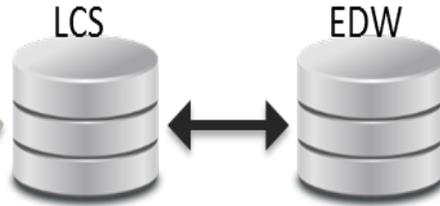
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PATIENT ADMITTED

Profile of HR Patient

- Age \geq 60
- Gagne \geq 5
- RUB \geq 3
- Chronic Condition Count \geq 3



Readmissions

Differentiation
Operational Analytics



Reviews Daily or Weekly Dashboard on F/U Rate for High Risk (HR) Patients

Assigns Scarce Resources for HR Patients (ie. Home Health Visit, Pharm Med Reconciliation)

Ensures F/U Appt is Given & Kept by HR Patients



LEADERSHIP DASHBOARD



CASE MGMT READMISSIONS REGISTRY



PCMH READMISSIONS REGISTRY

Readmissions

Automation



ADMISSIONS/RISKS OF READMISSIONS – data updated nightly

Applied filters: (NOT(FACILITY is missing value OR FACILITY equal to .)) AND M/S FLAG equal to M AND NOT (RISK is missing value OR RISK equal to .)

RISK	GENDER	AGE	ADM DX	ADM DX CCS	ADM PROV NAME	ADMIT PROV SPEC CODE
●	M	69				011
●	F	67				097
●	F	68				105
●	F	75				011
●	F	80				097
●	F	75				014
●	F	79				011
●	M	87				011

Readmissions

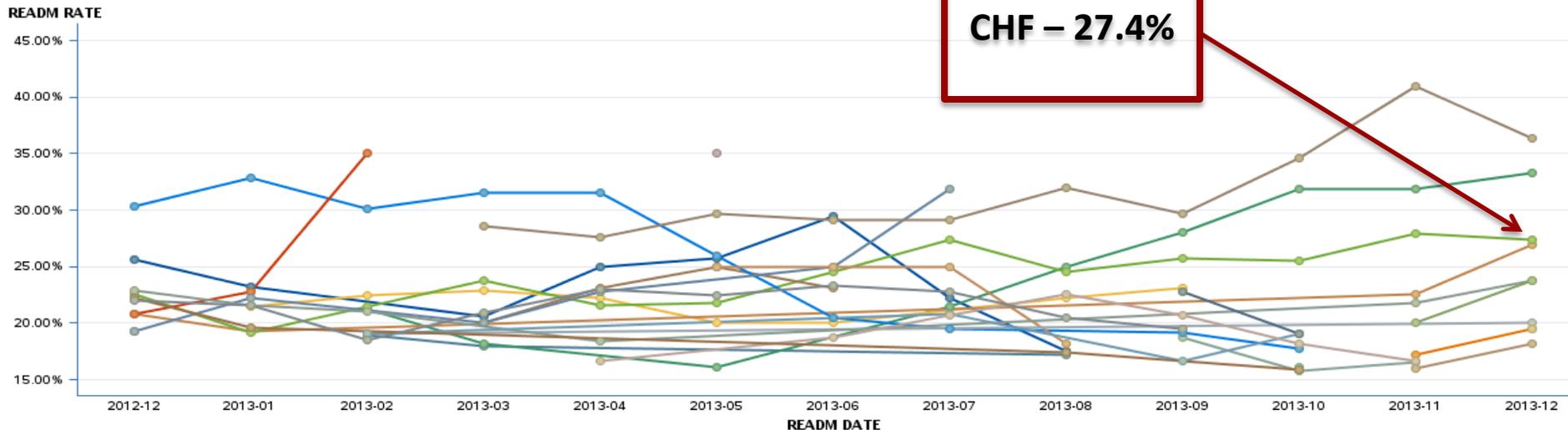
Leadership Dashboard



A report listing counts of missing inpatient discharge records by facility is available from the Table of Contents drop-down list to the left, "Inferred vs. Completed." *High inferred rates will*

READMISSION RATES – data updated monthly

Applied filters: (NOT (FACILITY is missing value OR FACILITY equal to .)) AND RANK equal to TOP 10 AND ADMISSION TYPE equal to M



Applied filters: (NOT (FACILITY is missing value OR FACILITY equal to .)) AND RANK equal to TOP 10 AND ADMISSION TYPE equal to M

DATE	DEC2012			JAN2013			FEB2013			MAR2013			APR2013			MAY2013			
	READM NUM	READM DEN	READM RATE	READM NUM	READM DEN	READM RATE	READM NUM	READM DEN	READM RATE	READM NUM	READM DEN	READM RATE	READM NUM	READM DEN	READM RATE	READM NUM	READM DEN	READM RATE	
CONDITIONS																			
ABDOMINAL PAIN	11	43	25.58%	10	43	23.26%	.	.	.	7	34	20.59%	9	36	25.00%	9	35	25.71%	10
ACUTE AND UNSPECIFIED RENAL FAILURE	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
ACUTE CEREBROVASCULAR DISEASE	.	.	.	.	.	.	7	37	18.92%	7	39	17.95%	.	.	.	.	.	.	.
ACUTE MYOCARDIAL INFARCTION	7	33	21.21%	6	33	18.18%	.	.	.	5	31	16.13%	.
ALCOHOL-RELATED DISORDERS	.	.	.	9	42	21.43%	9	40	22.50%	8	35	22.86%	8	36	22.22%	7	35	20.00%	6

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Readmissions

Leadership Dashboard



FOLLOW UP TOP 10 DX CONDITIONS – data updated monthly

Applied filters: (NOT (FACILITY is missing value OR FACILITY equal to .)) AND M/S FLAG FOLLOW UP equal to M AND RANK F/U equal to TOP 10

DX CONDITION	TOTAL ADMISS	SCHED F/U	SCHED F/U %	KEPT F/U	KEPT F/U %	-----	TOTAL READM	READM SCHED F/U	READM SCHEDULED F/U %	READM KEPT F/U	READM KEPT F/U %
ACUTE AND UNSPECIFIED RENAL FAILURE	36	29	80.56%	23	79.31%		7	4	57.14%	4	100.0%
ACUTE MYOCARDIAL INFARCTION	21	14	66.67%	12	85.71%		7	4	57.14%	2	50.00%
COMPLICATION OF DEVICE; IMPLANT OR GRAFT	26	17	65.38%	12	70.59%		7	5	71.43%	2	40.00%
CONGESTIVE HEART FAILURE; NONHYPERTENSIVE	106	91	85.85%	70	76.92%		29	20	68.97%	12	60.00%
HYPOSOLALITY	25	20	80.00%	13	65.00%		5	4	80.00%	2	50.00%
INTESTINAL INFECTION	36	24	66.67%	23	95.83%		7	4	57.14%	4	100.0%
INTESTINAL OBSTRUCTION WITHOUT HERNIA	42	30	71.43%	26	86.67%		10	6	60.00%	5	83.33%
OTHER FRACTURES	22	13	59.09%	10	76.92%		4	1	25.00%	1	100.0%
OTHER UPPER RESPIRATORY INFECTIONS	21	15	71.43%	9	60.00%		5	4	80.00%	3	75.00%
PERIPHERAL AND VISCERAL ATHEROSCLEROSIS	22	14	63.64%	12	85.71%		8	4	50.00%	3	75.00%

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Analyst



“An analyst is defined as a worker who uses statistics, rigorous quantitative or qualitative analysis, and information modeling techniques to shape and make business decisions.”

Analytical Champion



- Executive Decision Maker
- Depend heavily on data analyses to make business decisions
- Advocates for use of analytics and technology to guide decision making
- Translates benefits of enterprise wide analytics to business people to promote cultural and organizational change

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Analytical Amateur



- Apply analytical insights to their work
- Enter and manipulate data using excel spreadsheets & other basic tools
- Summarize & report data to others in their organization
- Typically make up 70-80% of the analyst cadre

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Analytical Semiprofessional



- Focus primarily on the application of the models/algorithms created by pros
- Have expertise in data creation, collection, interpretation, and use
- Translate between analytical pros and functional managers
- Typically make up 15-20% of the analyst cadre

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Analytical Professional



- Create advanced analytical applications by using statistical models & algorithms (i.e. principal component analysis, regression modeling, conjoint analysis, stochastic frontier analysis, data envelopment analysis, etc.)
- Require advanced degree in quantitative fields (economics, statistics, math, biostatistics, etc)
- Have technical skills including coding in statistical or data management languages (SAS, STATA, SQL, etc)
- Typically make up 5-10% of company's analyst cadre

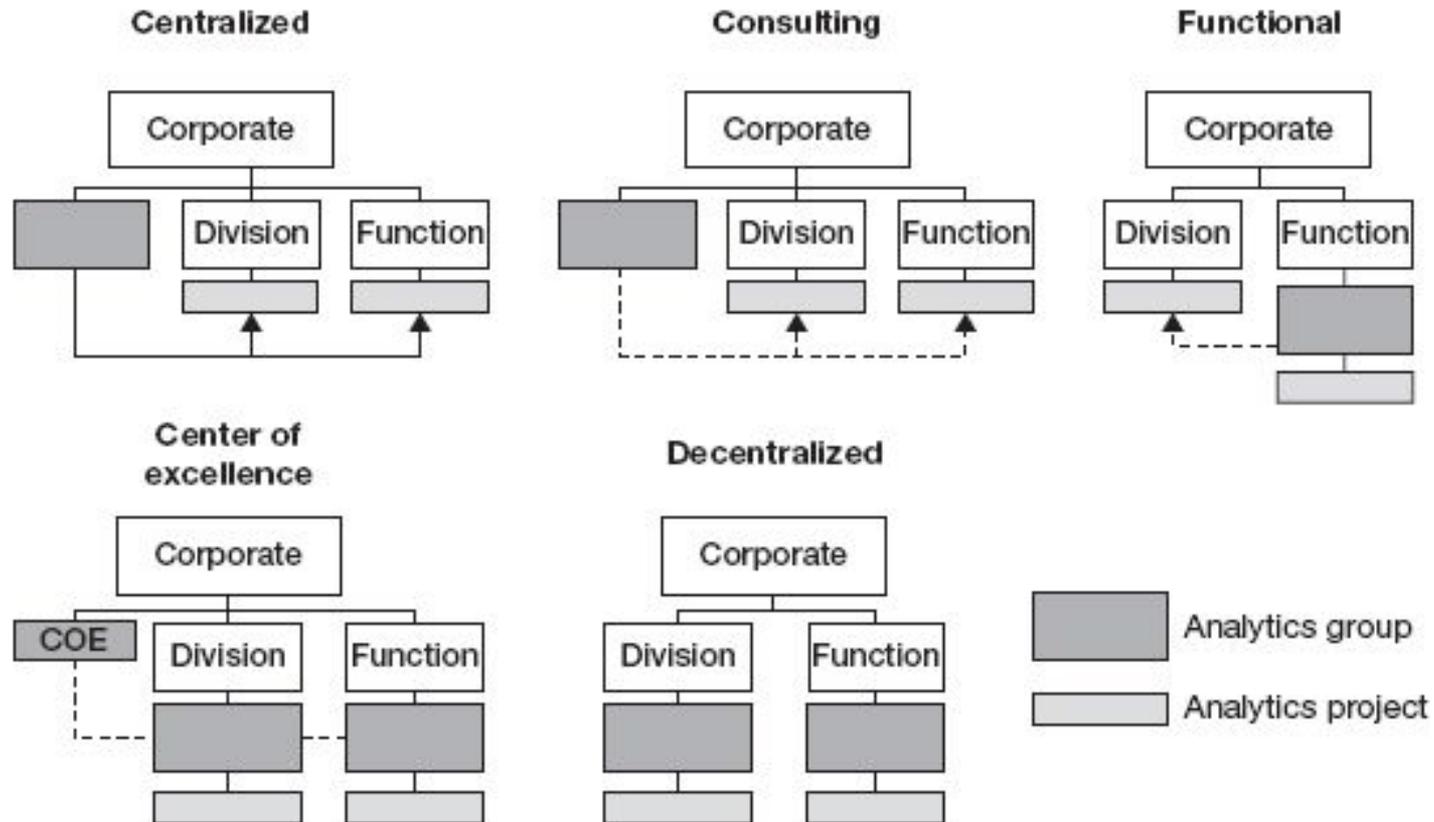
Analyst Attributes



- Enjoy interesting & challenging work
- Desire a variety in their work and a sense of personal progress
- Desire to do important work that makes a meaningful contribution
- Like to feel supported & enjoy autonomy in their work
- Like to be surrounded by other smart & capable colleagues

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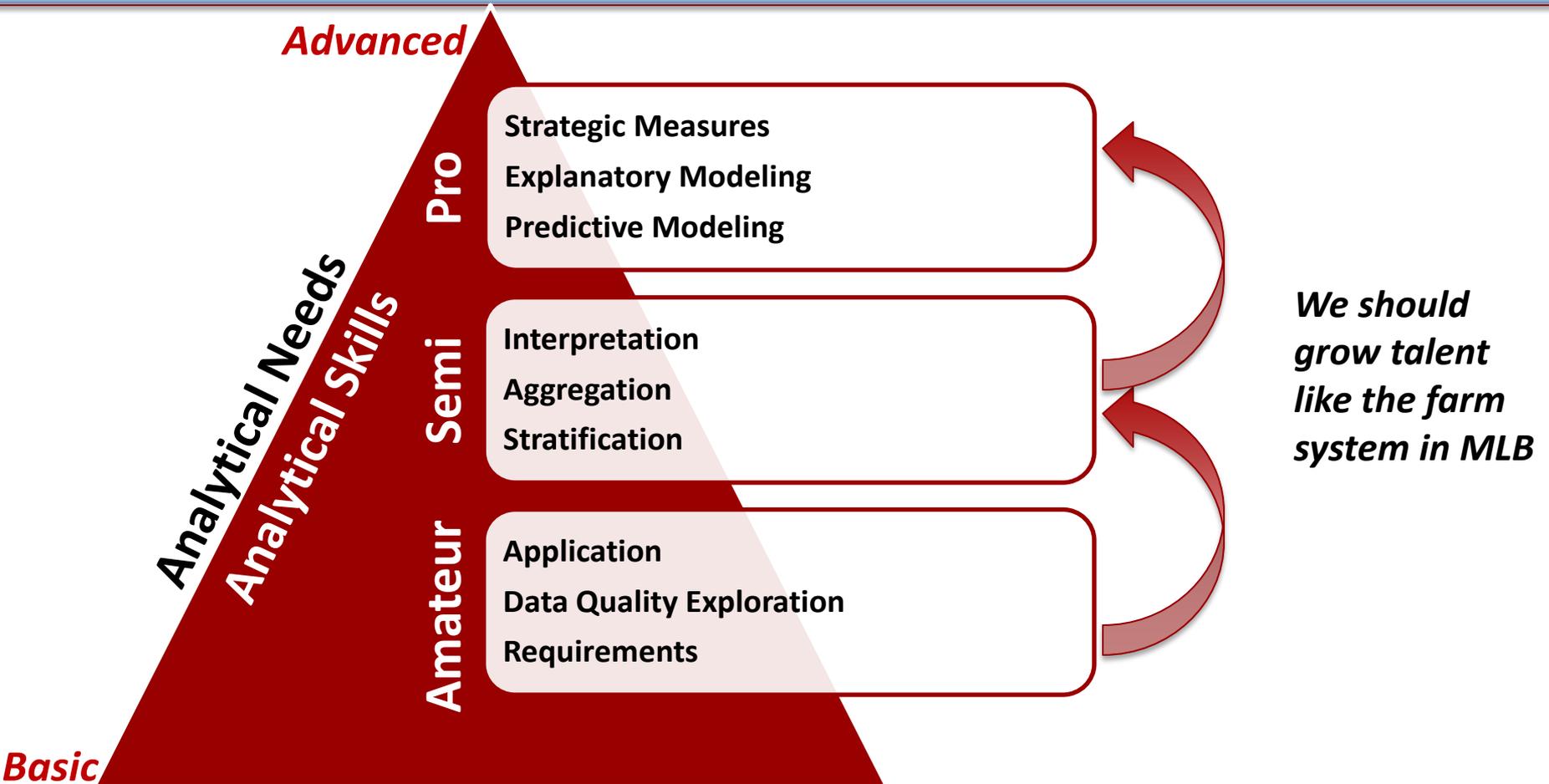
Organizing Analysts



Analytics at Work, Thomas Davenport

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Managing Analysts



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Summary



- De-conflict data / mgmt issues that compromise data quality
- Integrate data into common data services layer
- Develop enterprise mindset
- Prioritize strategic measures, then:
 - Build explanatory models
 - Build prediction models
 - Build automated operational dashboards
 - Decrease frequency of strategic measures to QTR
 - Monitor models over time and calibrate
- Hire, Grow, and Protect 'The Talent'

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Closing Thoughts



“What gets measured, gets managed.”

Peter Drucker

“The price of light is less than the cost of darkness.” Arthur C. Nielsen

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Evaluations



Please complete your evaluations

Contact Information



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This is Your DHA



Thank You For All Your Effor



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References



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- Predictive Analytics: The Power To Predict Who Will Click, Buy, Lie, or Die, Eric Siegel. Copyright © 2013 John Wiley & Sons, Inc, New Jersey.
- The Power of Habit, Charles Duhigg. Copyright © 2012 The Random House Publishing Group, New York.