Utilizing a Data Strategy to drive the Analytics Program at Massey Cancer Center

Predictive Analytics World Healthcare

September 28, 2015

Presented by Dr. Brian Cassel, Ph.D.
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Session Abstract

Utilizing a Data Strategy to drive the Analytics Program at Massey Cancer Center

Hear a case study from the Massey Cancer Center on utilizing a data strategy to drive their analytics program; example outcomes include gathering the data needed to make the case for creating, sustaining and expanding palliative care services. Many healthcare organizations struggle with palliative care. By using data, palliative care programs can grow and advance. These case studies will highlight using analytics to improve outcomes, improve care delivery, and reduce costs. We will provide key insights and lessons learned from laying the groundwork for using analytics to improve cancer and palliative care from success stories.

Session Presenters

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Palliative care – a critical piece of cancer care

- Palliative care specialist teams work alongside oncologists
- Provide additional layer of support
- Focus on prognosis, communication, goals of care, and symptom assessment & management
- 60% of US hospitals have PC
- 78% - 98% of cancer centers have inpatient PC, but only 22% - 59% have outpatient
- PC achieves the “Triple Aim” – it improves outcomes (quality of life, symptoms, survival), enhances satisfaction, and decreases costs

Sources: “Palliative care growth trend continues, according to latest CAPC analysis”. Available from: https://www.capc.org
Hui D, et al. Availability and integration of palliative care at US cancer centers. JAMA (2010) 303(11):1054-1061.
Cassel JB, Kerr KM, et al. The Business Case for Palliative Care: Translating Research Into Program Development in the U.S. Journal of Pain and Symptom Management (2015) (In press).

Palliative care – the impact is significant

- Estimated 4.03 million patients who might benefit from inpatient PC services are not being served
- These 4.03 million patients could expect savings of $2,131 per admission, at $8.59 billion annually.
- Estimated 5.8 million individuals who might benefit from community-based PC are not being served
- These 5.8 million individuals could expect an average reduction in health care costs ($18,140 per) is estimated at $106.6 billion, annually.

Sources:
National Palliative Care Registry™ Annual Survey Summary, 2014; VHA-UHC Alliance Research Institute
Morrison RS, Penrod JD, Cassel JB, Caust-Ellenbogen M, Litke A, Spragens L, Meier DE; Palliative Care Leadership Centers' Outcomes Group. Cost savings associated with US hospital palliative care consultation programs. Arch Intern Med. 2008 Sep 8;168(16):1783-90. PMID: 18779466.
Brumley RD, Enguidanos S, Jamison P, Seitz R, Morgenstern N, Saito S, et al. Increased satisfaction with care and lower costs: results of a randomized trial of in-home palliative care. J Am Geriatr Soc 2007;55:993-1000. PMID: 17608870

Palliative care is unfolding in three steps

1. Inpatient programs – late 1990's forward – passive, reactive, waiting for patients to be admitted and referred
2. Outpatient programs – 2007 forward – earlier in disease course, meeting patients in ambulatory settings and home
3. Predictive analytics – 2015 forward – proactive, available broadly, triggered, prompted

Role of data in deciding what PC to provide, and to whom

Phase	Decision to be made	Data Needed	Data Management	Analytic capability	Subject matter expertise
1 – inpatient	Yes/No, $	Inpatient fiscal	Ad hoc	✓	✓
2 – outpatient	Yes / No, How, How much, $	All settings, death date	Tactical	✓✓	✓✓
3 – proactive	When to proactively trigger PC for Mrs. Smith	Clinical, utilization, robust models	Strategic	✓✓✓	✓✓✓

This revolution is data driven

- The financial / business case must be demonstrated
- The clinical & financial imperatives must be aligned for a given setting and patient population
- Financial / economic context
- Healthcare often takes the form of a business in the US
- The US healthcare system is deeply rooted in the fee-for-service, third-party reimbursement model
- Toward the end of life, patients tend to use a lot of healthcare services
- Palliative care often takes a “less is more” approach

Dr. Donald Berwick on reforming US healthcare

"Healthcare's disintegration is not yet every man for himself, but it is every discipline for itself, every guild for itself. As a result, we tend to assume today that one guild's solution cannot be another's. We assume that either we will preserve quality or cut co
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"I think the toughest part of this may be in terms of the business and financing of care. There is a tendency to assume that financial success—e.g., thriving organizations—and great care are mutually exclusive. However, we will not make progress unless and until these goals become aligned with each other."

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http://www.commonwealthfund.org/usr_doc/berwick_escapefire_563.pdf

Phase 1: Inpatient palliative care
Consulting firm: "Close down PC program"

- VCU Massey opened one of first Palliative Care Units in the nation in May 2000.
- Consultants recommended closing it in 2002 because PCU cases cost a lot more than reimbursement.
- Detailed financial analyses of PCU patients, compared to other EOL admissions, convinced consultants that the unit produced significant cost-reduction
- Unit stayed open; financial analyses became core part of training curriculum for > 1,000 other programs in the country

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Final Days

Unlikely Way to Cut Hospital Costs: Comfort the Dying

Cost-avoidance in drugs (-77%), labs (-95%), imaging (-95%), supplies (-60%).

Care, Not Cure

Average cost for terminally ill patients in palliative and nonpalliative programs during their final five days at one hospital

	NON-PCU	PCU
Drugs and chemotherapy	$2,267	$511
Lab	1,134	56
Diagnostic imaging	615	29
Medical supplies	1,821	731
Room & nursing	4,330	3,708
Other	2,152	278
Total	**$12,319**	**$5,313**

Note: PCU stands for palliative care unit. Each figure represents average cost of last five days for a cancer patient aged 65-plus, prior to in-hospital death. Figures are for 2001 and 2002.

Source: Virginia Commonwealth University medical center

8-hospital study of cost reduction

ORIGINAL INVESTIGATION

Cost Savings Associated With US Hospital Palliative Care Consultation Programs

R. Sean Morrison, MD; Joan D. Penrod, PhD; J. Brian Cassel, PhD; Melissa Caust-Ellenbogen, MS; Ann Litke, MFA; Lynn Spragens, MBA; Diane E. Meier, MD; for the Palliative Care Leadership Centers' Outcomes Group

Background: Hospital palliative care consultation teams have been shown to improve care for adults with serious illness. This study examined the effect of palliative care teams on hospital costs.

Methods: We analyzed administrative data from 8 hospitals with established palliative care programs for the years 2002 through 2004. Patients receiving palliative care were matched by propensity score to patients receiving usual care. Generalized linear models were estimated for costs per admission and per hospital day.

Results: Of the 2966 palliative care patients who were

nificant reductions in laboratory and intensive care unit costs compared with usual care patients. The palliative care patients who died had an adjusted net savings of $4908 in direct costs per admission ($P=.003$) and $374 in direct costs per day ($P<.001$) including significant reductions in pharmacy, laboratory, and intensive care unit costs compared with usual care patients. Two confirmatory analyses were performed. Including mean costs per day before palliative care and before a comparable reference day for usual care patients in the propensity score models resulted in similar results. Estimating costs for palliative care patients assuming that they did not receive palliative care resulted in projected costs that were

Morrison, Penrod, Cassel et al. (2008). Cost savings associated with US hospital palliative care consultation programs. Archives of Internal Medicine 168 (16), 1783-1790.
For review see Smith S, Brick A, O'Hara S, Normand C. Evidence on the cost and cost-effectiveness of palliative care: A literature review. Palliat Med. 2014 Feb;28(2):130-50.

The challenge (and success) is knowing what questions to ask of the data

- How do PC-relevant cases compare to others in terms of costs and PC use?
- What are the daily costs before and after PC encounter?
- What are the costs, quality metrics, and involvement of PC in final months of life?

Role of data in deciding what PC to provide, and to whom

Phase	Decision to be made	Data Needed	Data Management	Analytic capability	Subject matter expertise
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Phase 2. Community-based PC

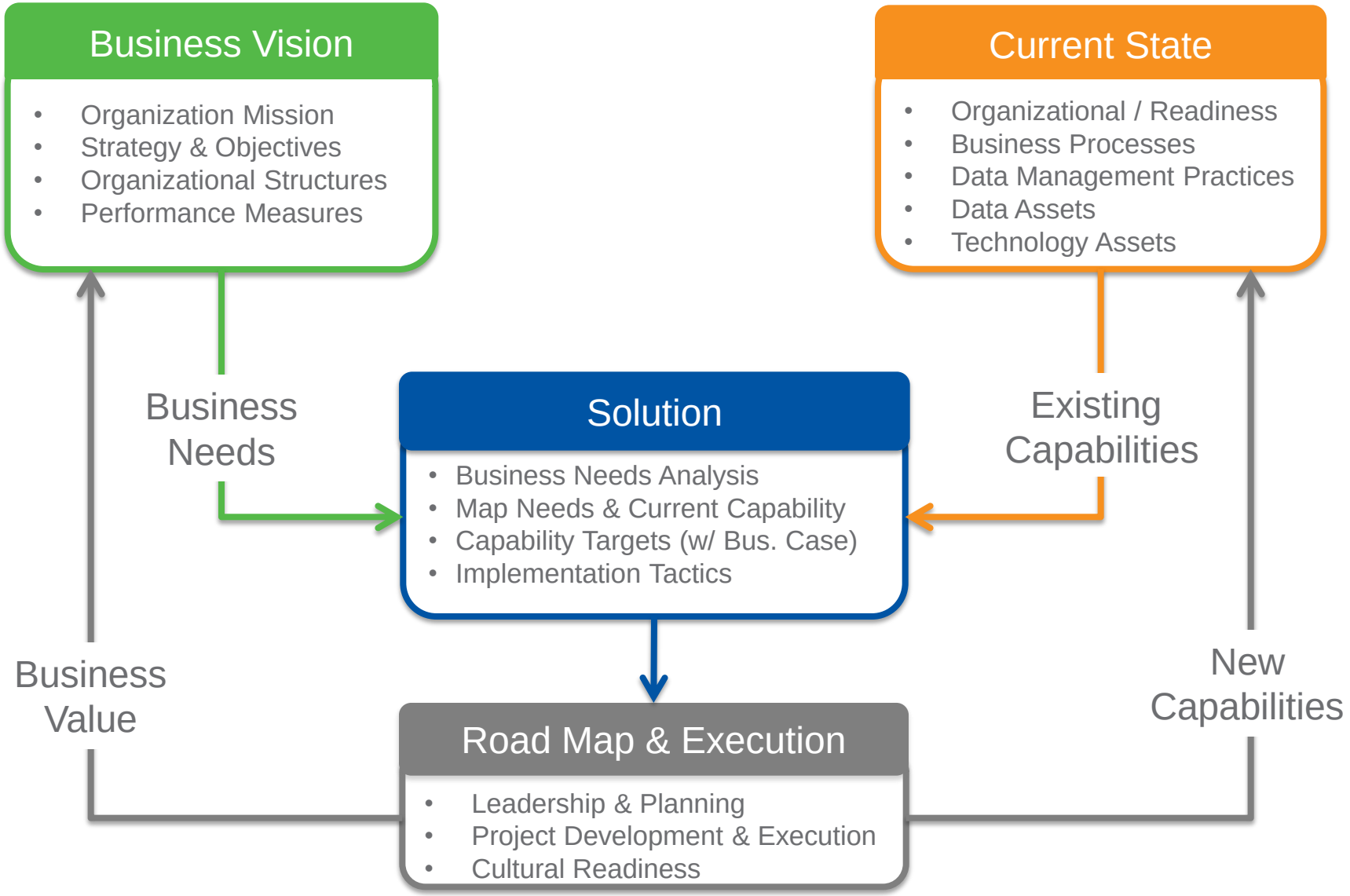
- Brumley (2007) RCT demonstrating impact of home-based PC on reducing hospital costs
- Temel (2010) RCT demonstrating impact of early clinic-based PC on quality of life, depressive symptoms, and survival
- Higginson (2009) RCT demonstrating impact of early PC in home & community settings, improving caregiver burden and reducing costs

Phase 2. Community-based PC

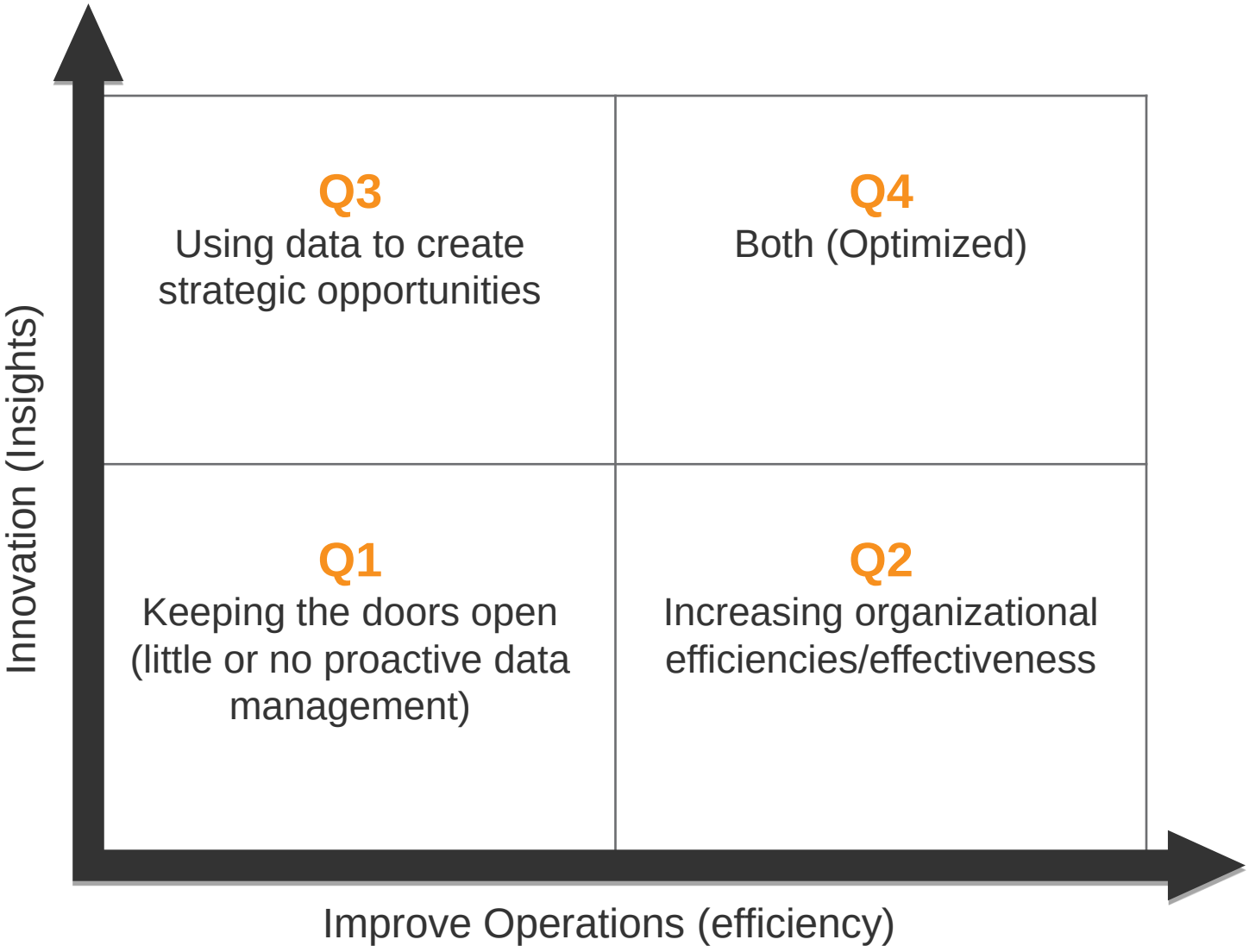
Making the "business case" requires better institutional data & analyses

- What are utilization, costs, revenue of PC-relevant patients in months prior to death?
- Which patients are receiving palliative care, and when?
- How many patients could be met earlier by PC proactively?
- What would it take to provide PC for them?
- Data challenges: Need to know date of death, and to use population health / longitudinal analytic approach

Data Strategy Framework

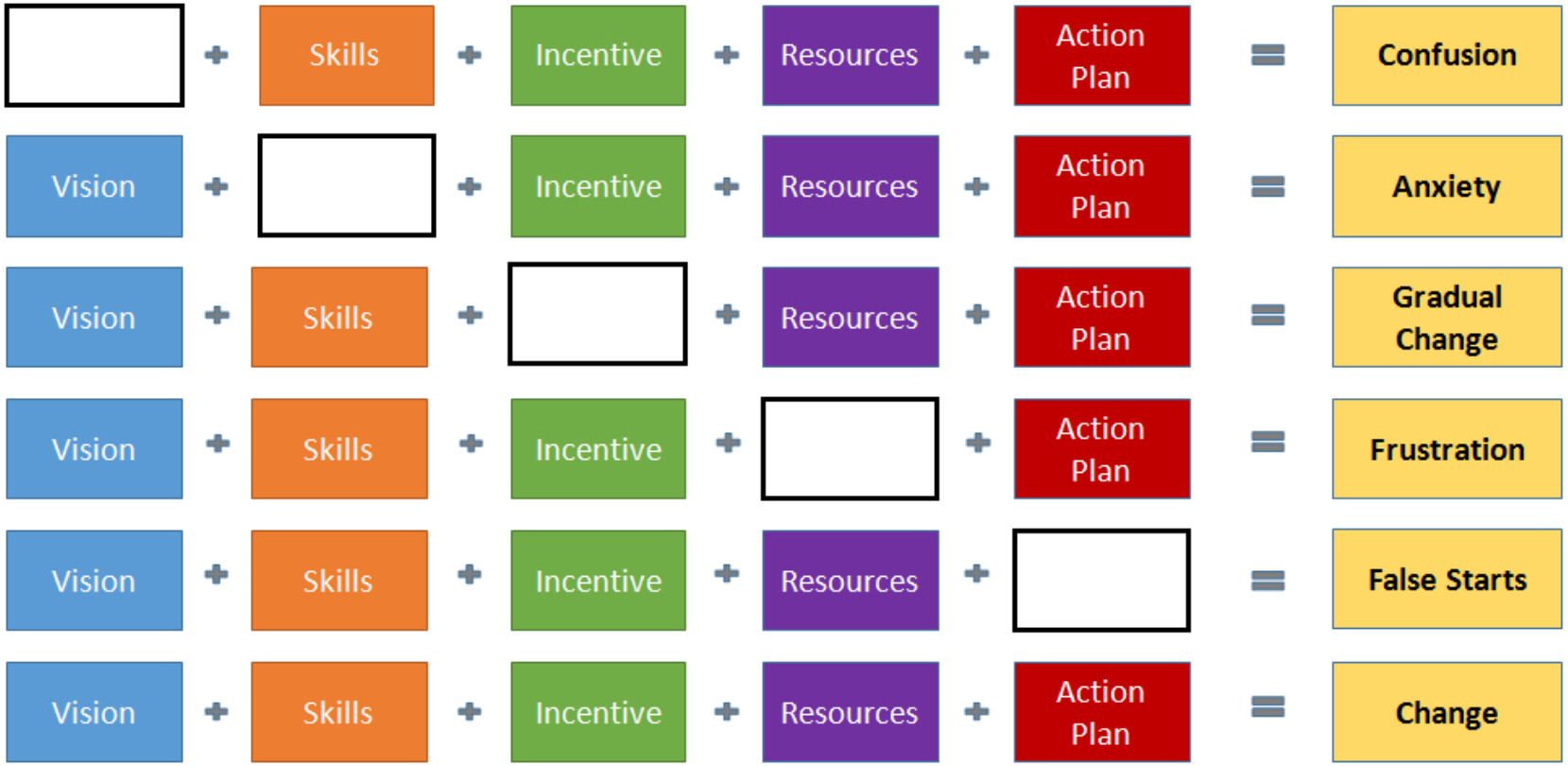


Data Strategy Choices

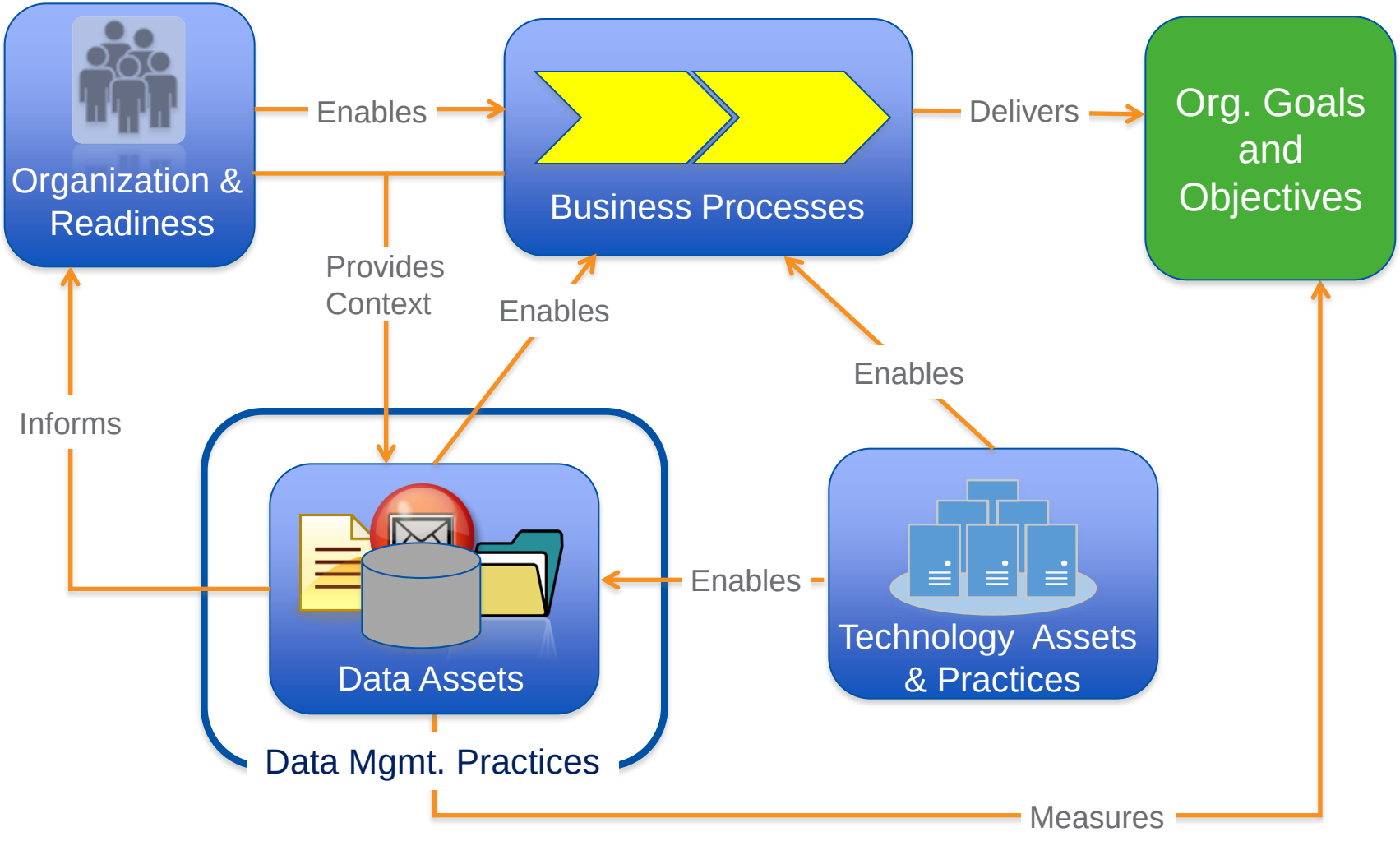


Dealing with Cultural Readiness

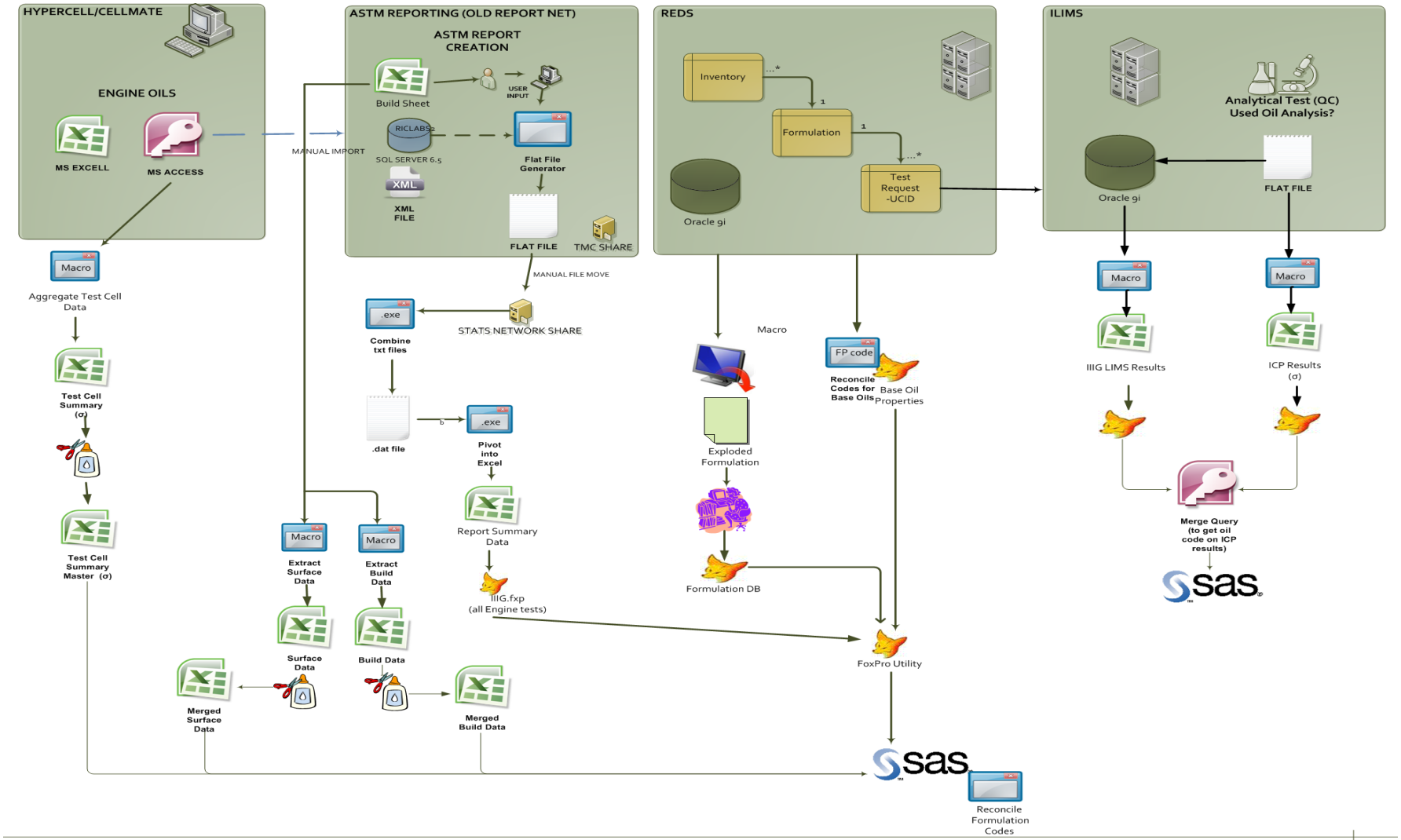
Culture is the biggest impediment to a shift in organizational thinking about data



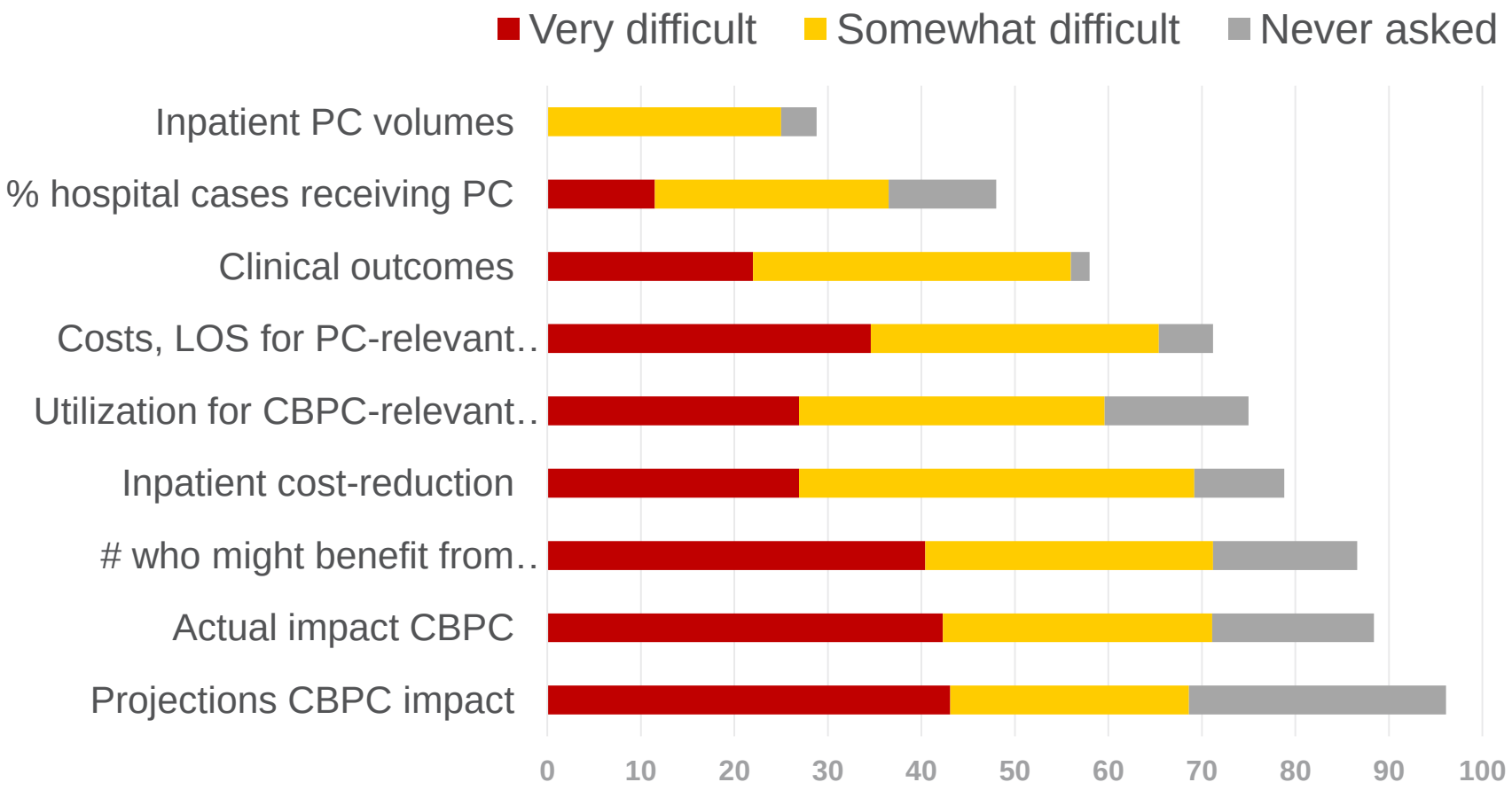
Framework for Current State Assessment



Current State – What We Typically See

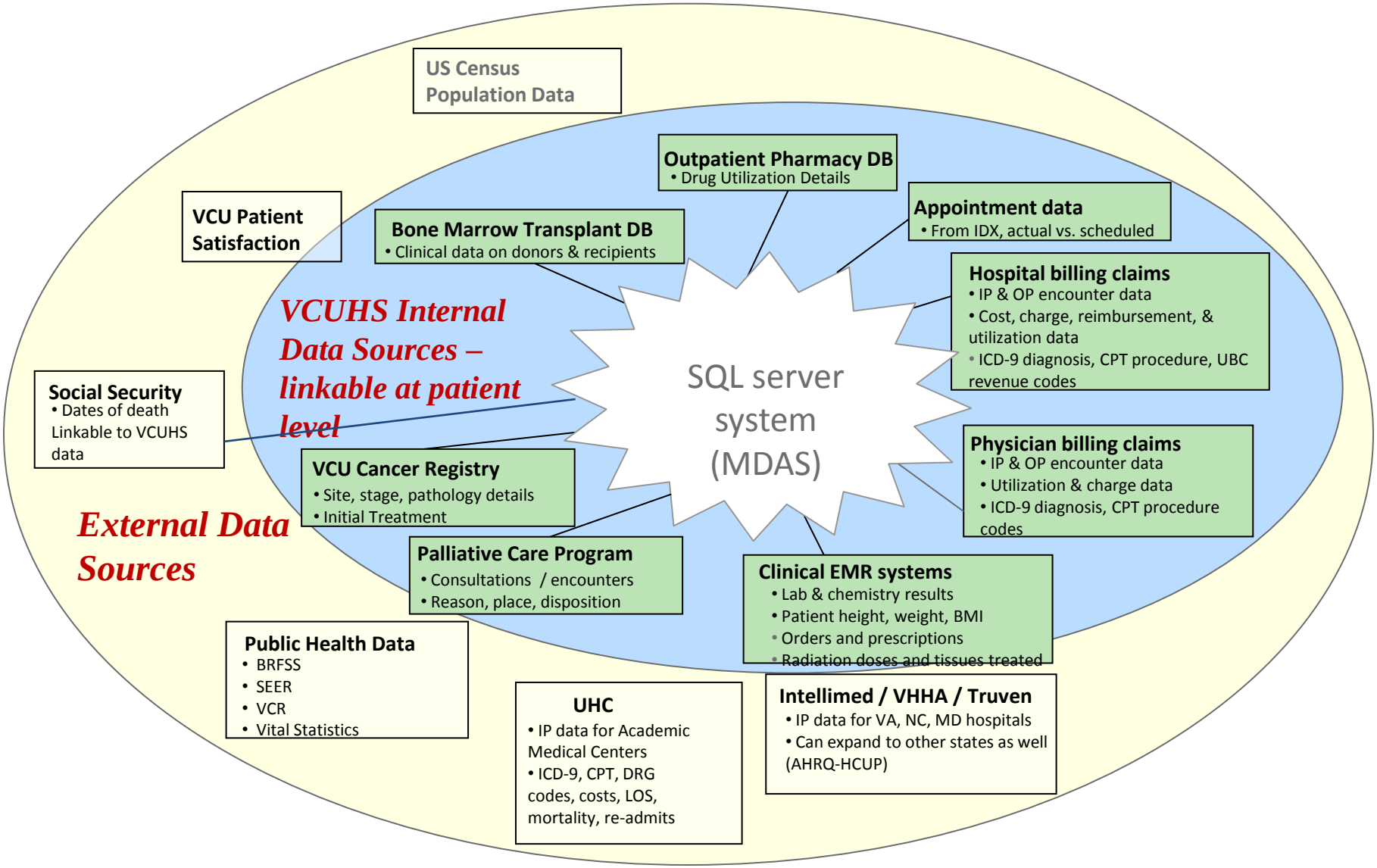


PC programs struggling to get good information



Source: VCU / PC Insights survey, 2015, n=54 PC clinical leaders

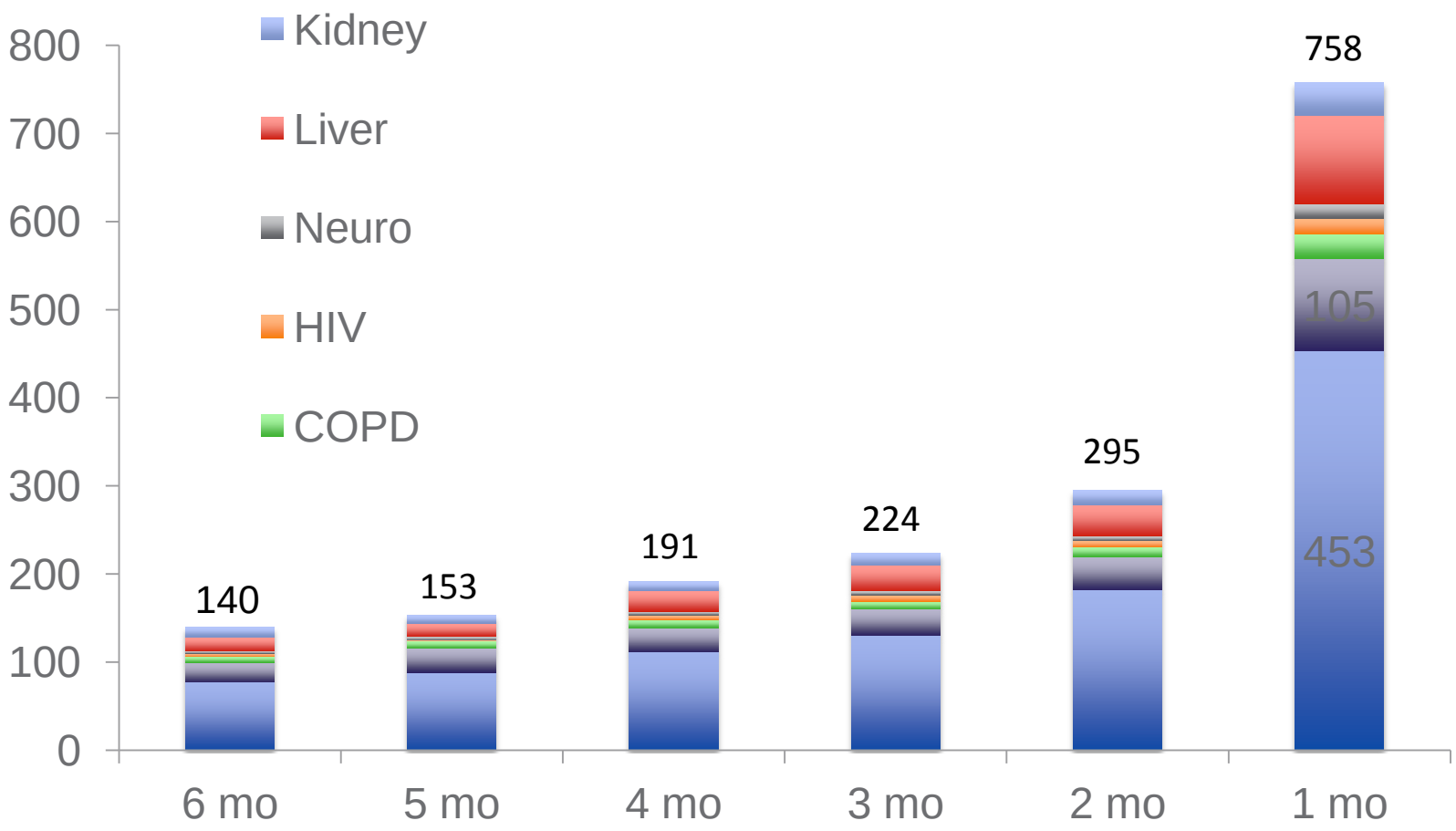
Solution: Massey Data Analysis System (MDAS)



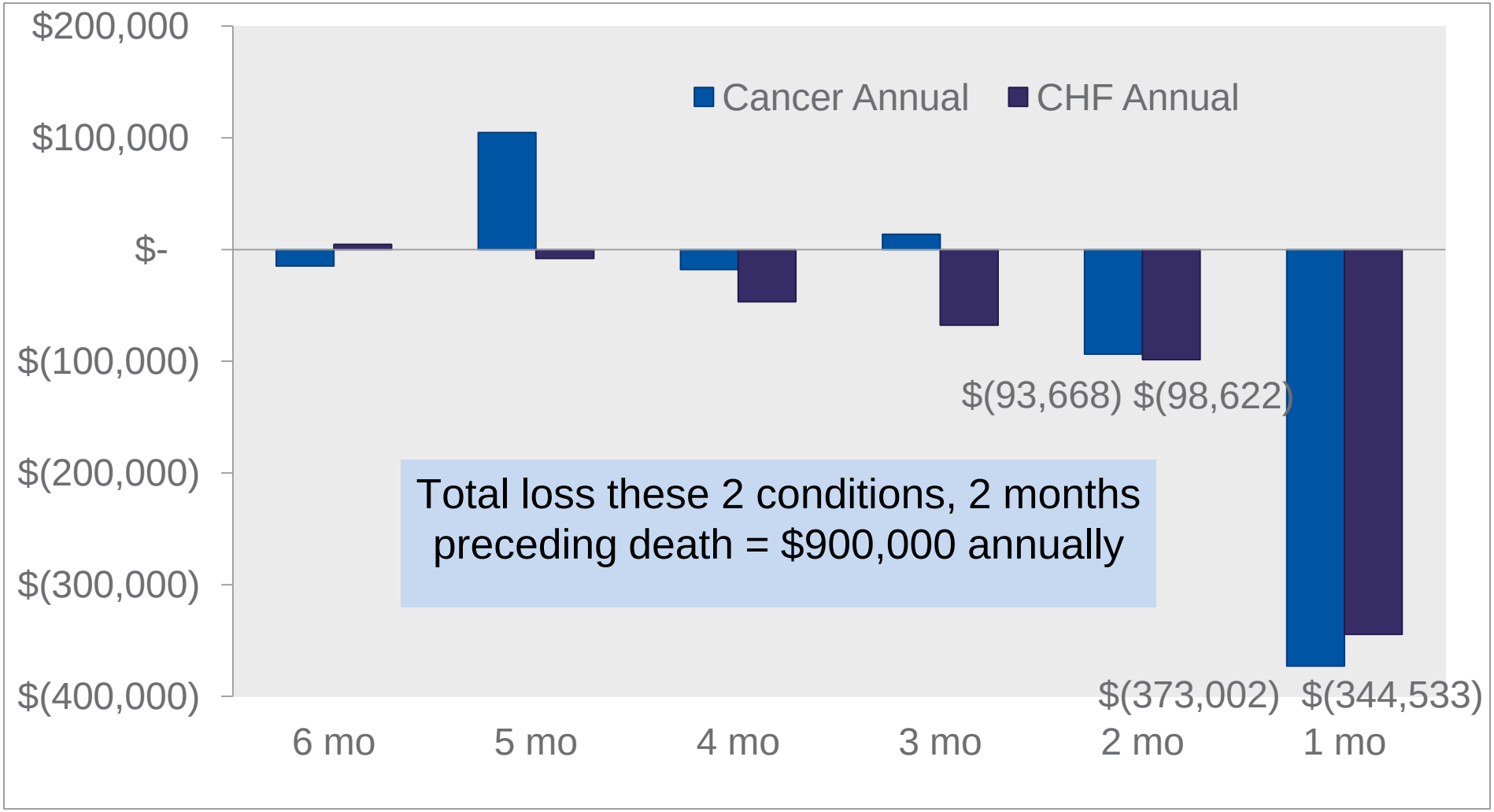
Frequency of hospitalizations

Admissions spike in final month of life

Analysis of decedent admission patterns, VCU, FY10-12



Annual Medicare inpatient net margin by month



Analysis of EOL utilization patterns, VCU, FY10-12. See Cassel JB, Kerr KM, et al. The Business Case for Palliative Care: Translating Research Into Program Development in the U.S. Journal of Pain and Symptom Management (2015) (In press).

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Phase 3. Proactive

How do we identify the next patient who will need PC, before it's "too little, too late"?

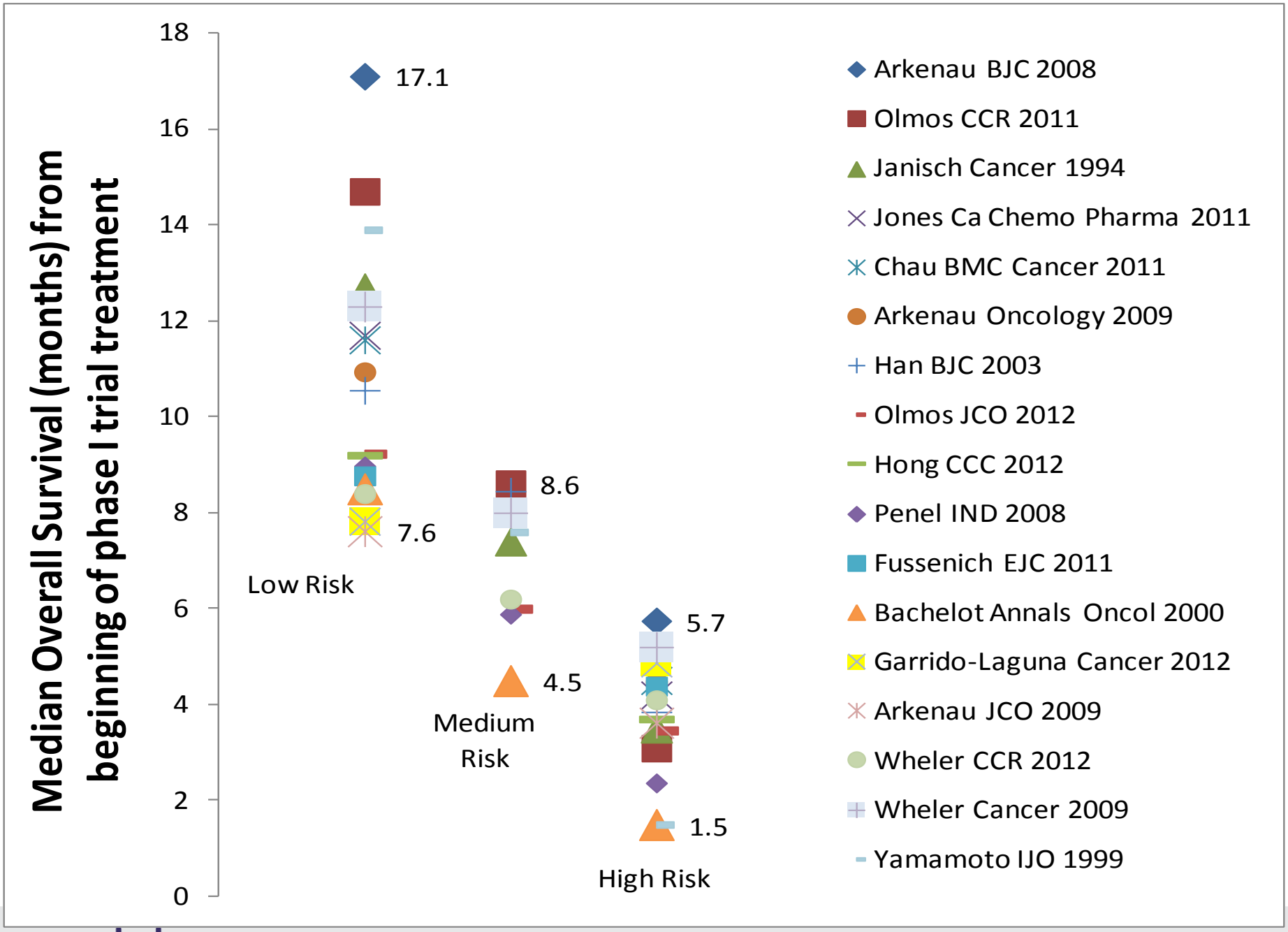
- Redesign from cancer data mart to enterprise data warehouse
- Build out foundational data management capabilities
- Easy integration of clinical (biometric, biomarker, laboratory, orders, prescriptions) and utilization / fiscal data
- Incorporate external data if possible via health information exchanges or payer data
- Robust statistical modeling that is setting and population-specific

Prognostic scoring systems for phase I

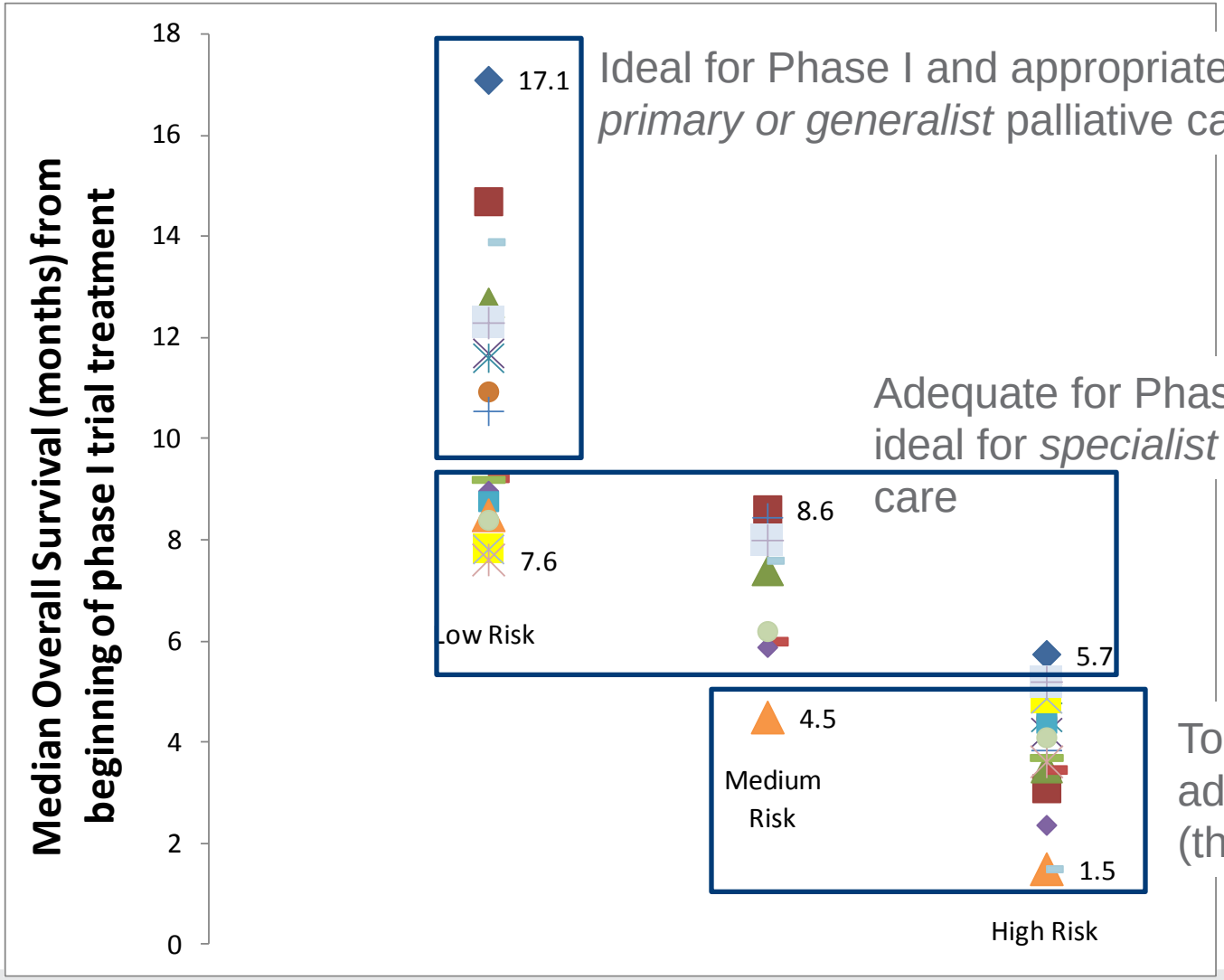
- RMH model: ↓ albumin, ↑ LDH, > 2 met sites
- Fussenich EJC 2011: ↑ LDH, anemia, ↓ sodium
- Han BJC 2003: poor PS, ↑ WBC, ↑ hemoglobin, ↑ LDH, >1 mets
- Janisch Cancer 1994: poor PS, ↑ platelets, ↓ albumin, non-GU/GYN ca, prior cisplatin
- Penel IND 2008: ↓ lymphocytes, ↓ albumin
- Wheler Cancer 2009: thromboembolism, ↑ platelets, liver mets
- Wheler CCR 2012: GI ↑ LDH, ↓ albumin, >2 mets, poor PS, tumor.

RMH: Royal Marsden Hospital. LDH: Lactate dehydrogenase. PS: performance status. WBC: white blood cells. GI: gastro-intestinal

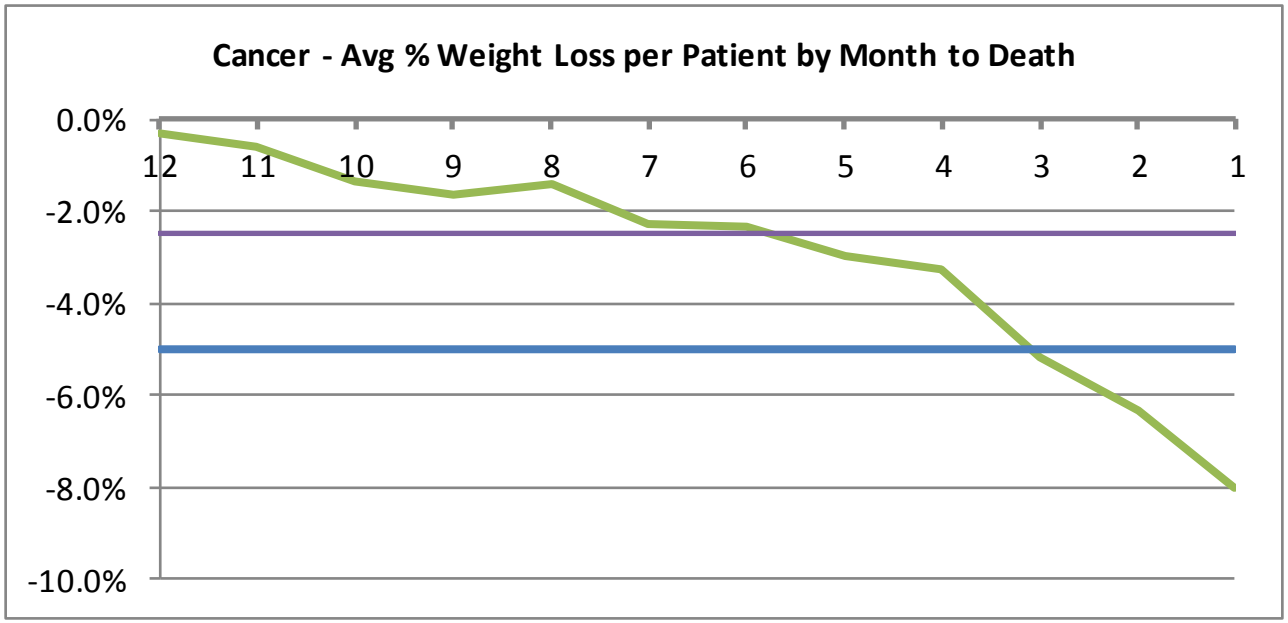
Source: Ploquin A, Olmos D, Ferte C, et al. Life-expectancy of patients enrolled in phase 1 clinical trials: A systematic review of published prognostic models. Critical Reviews in Oncology Hematology 2012; 83(2): 242-8.



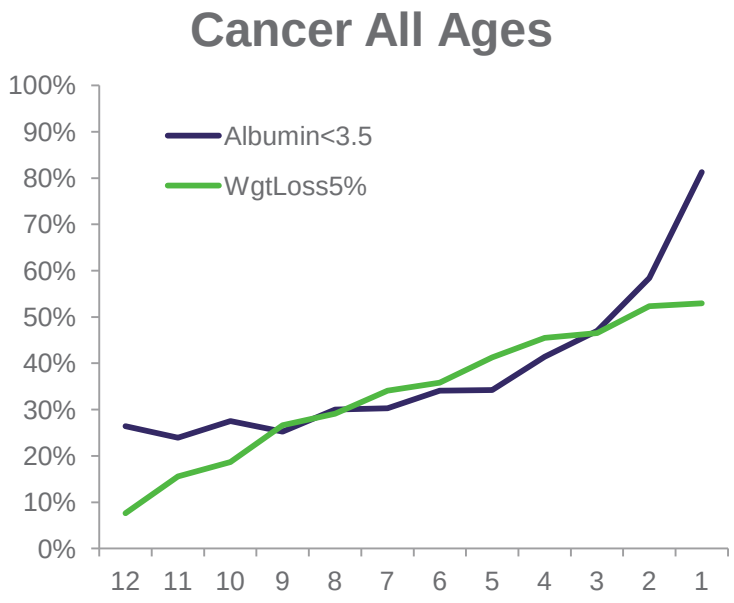
Similar interests between phase I trialists and palliativists – but for different reasons

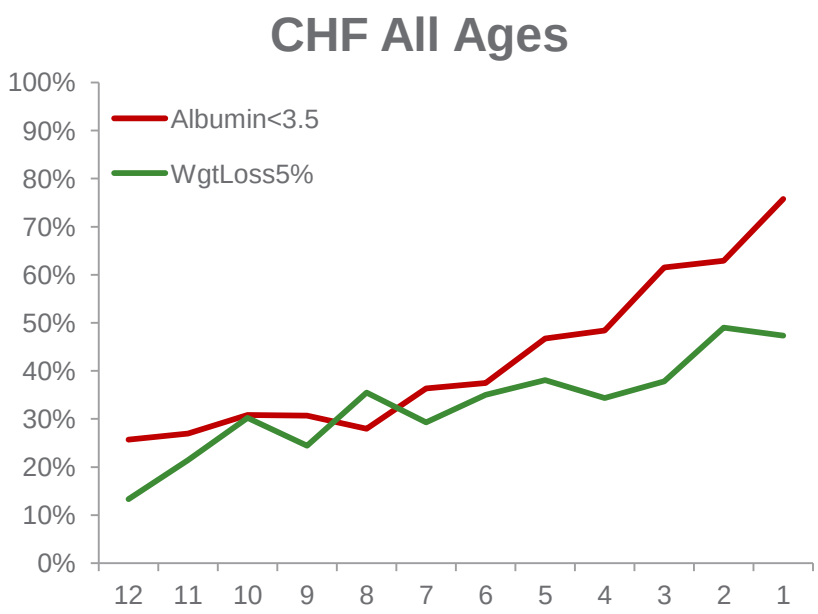


2.5% and 5.0% weight loss for cancer pts



Each disease slightly different





Challenges for predictive analytics for PC

- Data
  - Easy and complete access to clinical data
  - Clinical data surprisingly messy!
  - Integration of clinical & utilization data
  - Access to death data
  - Access to utilization & clinical data outside of your own institution
- Non-Data
  - How to trigger / prompt? Who should receive?
  - How integrate PC referral into clinical workflow?
  - Do we have enough PC specialist time available?

Overcoming the challenges at Massey

- Start by understanding what questions need to be answered – focus on what's important
- Take a crawl, walk, run approach
- Think and plan strategically about data solutions
- Understand the current environment – what to leverage and gaps to close
- Implement foundational data management capabilities for scalability and repeatability
- Make solutions easy to use – integrate into workflows

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