Family Medicine and Community Health

OUR VISION:  Healthy people, families, and communities – with equal access for all

OUR MISSION:

• We pioneer novel approaches devoted to clinical care, medical and health professions education, research and health policy in Family Medicine and in Community Health, with a commitment to the health of populations who are most at risk

• We foster partnership and collaboration to enhance and spread innovations that improve health and promote access for all
WELCOME
Practice Transformation and Rapid Change

Vision, Reality and “Proactivity”

Dan Lasser, MD, MPH
Faculty Retreat
September 16, 2016
Disclosures

• None
Objective

• To stimulate discussion regarding how we as a department can build on our current strengths to help UMass/UMass Memorial to become a state and national leader in managing population health
2016 External Department Review

• “The Department . . . is a very strong, respected, senior department, with strong institutional support.”

• “The dominant theme of this review . . . is the Department’s experience and expertise managing populations”

• “The Department has been a local and national leader developing systems of care for underserved communities, and for teaching and studying those needs”

• “This department is also a leader in integrated mental health, (which) is well established at all sites . . . Beyond integrated mental health, the integration of other health professionals positions the Department to provide national leadership for unique, robust, efficient models of interprofessional care”

• “ . . . faculty have a history of managing community and population risk which could be useful to the institution.”
2016 External Department Review

• “However, there appears to be little institutional awareness that
  the department has the needed knowledge and skills to manage
  populations”

• “At times the leadership may be slow to recognize and utilize
  contemporary models of clinical care, learning and communication.
  In all, the Department is perhaps more thoughtfully reactive rather
  than strategically proactive”

• “The current rapidly evolving clinical environment will likely require
  the department to take on larger leadership roles in developing
  strategies for managing populations at risk, and building larger
  clinical networks”

• “The outcome should be a Department that builds on its current
  strengths, and helps University of Massachusetts become a state
  and national leader in managing population health”
The question for today

*How can we build on our current strengths to help UMass/UMass Memorial to become a state and national leader in managing population health?*
KEY DRIVERS OF HEALTH CARE TRANSFORMATION
Exhibit 1. Health Care Spending as a Percentage of GDP, 1980–2013

Notes: GDP refers to gross domestic product. Dutch and Swiss data are for current spending only, and exclude spending on capital formation of health care providers.
Source: OECD Health Data 2015.
A recent international study compared 11 nations on health care quality, access, efficiency, and equity, as well as indicators of healthy lives such as infant mortality.

### Overall Health Care Ranking

<table>
<thead>
<tr>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.K.</td>
<td></td>
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<tr>
<td>SWITZERLAND</td>
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<tr>
<td>SWEDEN</td>
<td></td>
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<tr>
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<td>FRANCE</td>
<td></td>
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<tr>
<td>CANADA</td>
<td></td>
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<tr>
<td>U.S.</td>
<td></td>
</tr>
</tbody>
</table>

Exhibit 8. Health and Social Care Spending as a Percentage of GDP

Notes: GDP refers to gross domestic product.
Addressing the social determinants of health

Primary prevention

Safety net programs and secondary prevention

Medical care and tertiary prevention

Jones CP et al. *J Health Care Poor Underserved* 2009.
Jones CP et al. *J Health Care Poor Underserved* 2009.
Lessons Learned

• Making change leading to the improved health of a population calls for skill sets that range from changes in clinical processes to advocacy
Drivers of Transformation

• Development of HMOs

• 1967=> Contributions by Dr. John Wennberg
  – Demonstrated variations in health care from one area to another
    • Underuse of effective care
    • Outcome variations related to quality
    • Misuse of treatments and services
  – Estimates that within Medicare, reducing variation could improve quality while reducing cost by 30%

• In 2012, Berwick and Hackbarth identified six categories of waste which accounted for a minimum of 20% of total health care expenditures, noting that the actual total may be far greater
  – Overtreatment
  – Failures of care coordination
  – Failures in execution of care processes
  – Administrative complexity, pricing failures and fraud and abuse
  (JAMA 2012;307(14): 1513-1516)
Understanding of the Efficiency and Effectiveness of the Health Care System

For more than 20 years, the Dartmouth Atlas Project has documented glaring variations in how medical resources are distributed and used in the United States. The project uses Medicare data to provide information and analysis about national, regional, and local markets, as well as hospitals and their affiliated physicians. This research has helped policymakers, the media, health care analysts and others improve their understanding of our health care system and forms the foundation for many of the ongoing efforts to improve health and health systems across America.
Percent of Decedents Spending 7 or More Days in ICU/CCU During the Last Six Months of Life, by Gender

(Gender: Overall; Year: 1996 to 2012; Region Levels: HRR, State)

<table>
<thead>
<tr>
<th>Year</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>1997</td>
<td>13%</td>
</tr>
<tr>
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<td>17%</td>
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<td>26%</td>
</tr>
<tr>
<td>2011</td>
<td>27%</td>
</tr>
<tr>
<td>2012</td>
<td>28%</td>
</tr>
</tbody>
</table>

Legend:
- Appleton, WI
- La Crosse, WI
- Massachusetts
- National Average
- Worcester, MA
Inpatient Spending per Decedent During the Last Six Months of Life, by Gender and Level of Care Intensity

(Level of Care Intensity: Overall; Gender: Overall; Year: 1996 to 2012; Region Levels: HRR, State)
Lessons Learned

• Making change leading to the improved health of a population calls for skill sets that range from changes in clinical processes to advocacy.

• Up to 30% of health care in the US is unnecessary.
• It appears that there is a lot that could be done to reduce health care utilization and cost in central Massachusetts.
• There are web-based tools, such as data bases, that can be used for planning, teaching, etc.
Drivers of Transformation

• Early 1990s: Ambulatory Care Sensitive Conditions
  – Conditions where appropriate ambulatory care prevents or reduces hospital admissions

• 1990s: Growth of Managed Care across health plans
  – Strong focus on utilization review, data transparency
    • Cost per case
    • Utilization of imaging, lab, other resources
    • Formulary management, focus on use of generics

• 1993: proposed Clinton Health Care Plan

• Public backlash to managed care regarding bureaucracy, lack of choice, concerns about paying bonuses for restricting access
  – PCP backlash to the concept of the “gatekeeper”
The chronic care model was designed in 1998 by Ed Wagner, MD, director of the MacColl Institute for Healthcare Innovation at the Group Health Cooperative of Puget Sound, Seattle. The Institute for Healthcare Improvement in Boston offers seminars and practice-centered training in the model, which has six components. According to IHI, they are:

**Self-management support** — Patients manage their own care.

**Decision support** — Treatment decisions are based on proven guidelines supported by at least one defining study. Health care organizations integrate proven guidelines into day-to-day practice.

**Delivery system design** — Delivery requires clear roles and tasks, and all clinicians have current information about patient status. Follow-up is standard.

**Clinical information system** — A registry or an information system that can track individual patients as well as populations is a necessity.

**Organization of health care** — Health care systems create an environment in which organized efforts improve care.

**Community** — Health care organizations make an effort to form powerful alliances and partnerships.

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**The chronic care model**

![Chronic care model diagram](image)

Drivers of Transformation

• 2003: Rand Study of Quality in Health Care*
  – Study of care provided to a representative sample of the US population for a broad range of conditions in 12 metropolitan areas
    • Overall, adults received about half of recommended care
    • All socioeconomic groups were at risk for poor care
    • Recommended systemwide investments in health information technology, performance tracking, and incentives for improvement
      – First recommendation that every acute visit should get turned into a chronic care visit

Lessons Learned

• Making change leading to the improved health of a population calls for skill sets that range from changes in clinical processes to advocacy
• Up to 30% of health care in the US is unnecessary
• It appears that there is a lot that could be done to reduce health care utilization and cost in central Massachusetts
• There are web-based tools, such as data bases, that can be used for planning, teaching, etc.

• **Even for acute visits, we are now in a world of longitudinal care**
Drivers of Transformation

Starfield: Contribution of Primary Care to Health Systems and Health*

• “Evidence of the health-promoting influence of primary care has been accumulating ever since researchers have been able to distinguish primary care from other aspects of the health services delivery system.

• “This evidence shows that primary care helps prevent illness and death, regardless of whether the care is characterized by supply of primary care physicians, a relationship with a source of primary care, or the receipt of important features of primary care.

• “The evidence also shows that primary care (in contrast to specialty care) is associated with a more equitable distribution of health in populations, a finding that holds in both cross-national and within-national studies.

• “The means by which primary care improves health have been identified, thus suggesting ways to improve overall health and reduce differences in health across major population subgroups.”

*Starfield, B, Shi, L, Macinko, J. Contribution of Primary Care to Health Systems and Health. Milbank Q. 2005 Sep; 83(3): 457–502
Primary care and cost across countries

Per Capita Health Care Expenditures vs. Primary Care Score

Countries:
- UK
- DK
- FIN
- NTH
- SR
- AUS
- CAN
- SWE
- JAP
- BEL
- FR
- GER
- US

Starfield 10/00 IC 1731
Primary care and cost across the US

EXHIBIT 9
Relationship Between Provider Workforce And Medicare Spending: General Practitioners Per 10,000 And Spending Per Beneficiary In 2000

<table>
<thead>
<tr>
<th>Spending per beneficiary (dollars)</th>
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<tbody>
<tr>
<td>8,000</td>
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<td>7,000</td>
</tr>
<tr>
<td>6,000</td>
</tr>
<tr>
<td>5,000</td>
</tr>
<tr>
<td>4,000</td>
</tr>
</tbody>
</table>

General practitioners per 10,000

SOURCES: Medicare claims data; and Area Resource File, 2003.
NOTE: Total physicians held constant.
Specialty care and cost across the US

EXHIBIT 7
Relationship Between Provider Workforce And Medicare Spending: Specialists Per 10,000 And Spending Per Beneficiary In 2000

SOURCES: Medicare claims data; and Area Resource File, 2003.
NOTE: Total physicians held constant.
Primary care and quality across the US

EXHIBIT 8
Relationship Between Provider Workforce And Quality: General Practitioners Per 10,000 And Quality Rank In 2000

Quality rank

1

26

51

General practitioners per 10,000

SOURCES: Medicare claims data; and Area Resource File, 2003.
NOTES: For quality ranking, smaller values equal higher quality. Total physicians held constant.
Specialty care and quality across the US

EXHIBIT 6
Relationship Between Provider Workforce And Quality: Specialists Per 10,000 And Quality Rank In 2000

<table>
<thead>
<tr>
<th>Quality rank</th>
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<tbody>
<tr>
<td>1</td>
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<tr>
<td>26</td>
</tr>
<tr>
<td>51</td>
</tr>
</tbody>
</table>

Specialists per 10,000

**SOURCES:** Medicare claims data; and Area Resource File, 2003.

**NOTES:** For quality ranking, smaller values equal higher quality. Total physicians held constant.
Primary care and life expectancy across the US

Source: Shi et al, JFP 1999
More comprehensive care among family physicians is associated with lower costs and fewer hospitalizations*

- Analysis of merged data sets from the 2011 Medicare Part A and B claims files for a random sample of 3652 family physicians engaged in direct patient care, as well as self-reported data reported by these same physicians as a part of their Maintenance of Certification process with the American Board of Family Medicine.
- Hypothesis: Measures of comprehensiveness of care would correlate with lower costs of care for 555,165 Medicare patients

- They found that “increasing family physician comprehensiveness of care . . . . is associated with decreasing Medicare costs and hospitalizations.”

Lessons Learned

• Making change leading to the improved health of a population calls for skill sets that range from changes in clinical processes to advocacy
• Up to 30% of health care in the US is unnecessary
• It appears that there is a lot that could be done to reduce health care utilization and cost in central Massachusetts
• There are web-based tools, such as data bases, that can be used for planning, teaching, etc.
• Even for acute visits, we are now in a world of longitudinal care

• There is a solid literature base demonstrating the value of pure, unadulterated primary care
Drivers of Transformation

2007: **The Patient Centered Medical Home**

- **Principles**
  - A physician-led practice
  - A whole person orientation (acute care, chronic care, preventive services, end of life care, etc)
  - Integrated and coordinated care
  - A focus on quality and safety
  - Access

- **Accreditation process through the NCQA and others**
Drivers of Transformation

2008: The “Triple Aim”*

• Improving the U.S. health care system requires simultaneous pursuit of three aims:
  – Improving the experience of care
  – Improving the health of populations
  – Reducing per capita costs of health care

• Preconditions for this include
  – the enrollment of an identified population
  – a commitment to universality for its members, and
  – the existence of an organization (an “integrator”) that accepts responsibility for all three aims for that population

• The integrator’s role includes at least five components
  – Partnership with individuals and families
  – Redesign of primary care
  – Population health management
  – Financial management, and
  – Macro system integration

Tying it all together: The EHR

2009: Meaningful Use

• The Health Information Technology for Economic and Clinical Health Act (HITECH) authorized incentive payments through Medicare and Medicaid to clinicians and hospitals when they use EHRs privately and securely to achieve specified improvements in care delivery.

• The federal government incented the adoption and use of EHRs by making available incentive payments totaling up to $27 billion over 10 years, or as much as $44,000 (through Medicare) and $63,750 (through Medicaid) per clinician.
HEALTH CARE TRANSFORMATION
DEPARTMENT ACTIVITIES
The question for today

*How can we build on our current strengths to help UMass/UMass Memorial to become a state and national leader in managing population health?*
Department Activities

• 2005: Department Quality Improvement Project Manager

• 2007: Ron Adler appointed UMass Director for Primary Care Improvement
  – Improvement Advisor Fellow at IHI
    • First Chronic Disease registries
  – Problem solving across primary care practices

• 2008: Title VII training grant – “Quality Scholars”

• 2011-14: Massachusetts Primary Care Medical Home Initiative
  – A partnership with the state to support primary care practices in the transition to a patient centered medical home
  – Motivated by the state’s desire to move toward alternative payer relationships
  – Some of our faculty involved as consultants to practices across the Commonwealth
Department Activities

• 2011-14: Pilot projects through the UMass Center for the Advancement of Primary Care to support PCMH development
  – Ongoing training and support, including imbedded care management
  – Switched incentives from production to value
  – Level III NCQA PCMH Designation
    • Barre, Benedict, EMK, Hahnemann, FHC/W, Plumley Village
Department Activities

- Clinical and training programs for the future
  - Integration of Behavioral Health into Primary Care across clinical sites
  - Training programs through the Center for Integrated Primary Care
  - Integration of Primary Care into Mental Health
  - Clinical and training network in addiction medicine across the department
  - Creation of a Palliative Care Division (joint with the Dept of Medicine)
  - Project ECHO
Primary Care Payment Reform (PCPR)

• 2013-2016: MassHealth Pilot Program, a prelude to a Medicaid ACO
  – Capitated Primary Care with three tiers
    • I: Primary care
    • II: Primary care and clinical psychology
    • III: Primary care, clinical psychology and psychiatry
  – Funds flow supported practice-based services and workflow redesign
    • Behavioral health
    • Outreach worker, care manager, social workers
    • Workspace at Hahnemann FHC
  – Program ends in December
Lessons Learned

• Making change leading to the improved health of a population calls for skill sets that range from changes in clinical processes to advocacy
• Up to 30% of health care in the US is unnecessary
• It appears that there is a lot that could be done to reduce health care utilization and cost in central Massachusetts
• There are web-based tools, such as data bases, that can be used for planning, teaching, etc.
• Even for acute visits, we are now in a world of longitudinal care
• There is a solid literature base demonstrating the value of pure, unadulterated primary care

• It’s hard to write meaningful financial incentives into compensation plans to support activities related to practice transformation
• Good ideas funded through pilot projects can get ahead of institutionalized funds flow
  – Two steps forward, two steps backward
• In the long run, payment reform is the only way to support innovation and sustainability
PRACTICE TRANSFORMATION IN THE UMASS MEMORIAL SYSTEM
• BC/BS Alternative Quality Contract
  – Scores on a series of primary care and inpatient measures drive incentives and future rates
  – Many of the primary care scores driven by HEDIS measures
  – OCI developing an infrastructure

Note: Currently, Umass Memorial is disputing methodology changes within the current contract surrounding Patient Experience, Certain Outcome Measures, and Gate changes that negatively impact the ambulatory score by .58
What the “futurists” say to large health systems

• The health care marketplace will become more and more focused on price and convenience
• Low acuity acute care and elective care is becoming commoditized
• Younger consumers are demanding immediate access to consumer-friendly health care services
• We will see disruptive innovation in the form of retail clinics, medical consumerism, low cost MRI/imaging, standalone urgent care centers, and point of care lab testing
Lessons Learned

• It’s much easier to develop a new, coordinated program than it is to convince a fragmented system to change

• We need to take care of ourselves

• Above all, we should measure what matters

• A standardized approach to change (e.g. Lean) and to quality science are critical for successful transformational change

• Let’s find ways to make it ridiculously easy to do the right thing

• Change is a long hard process

• Some of the best ideas are piloted without leadership support, without adequate funding, or without enough data

• Specialists are as stressed as PCPs, and they aren’t the enemy
What the “futurists” say to large health systems

• Surgery continues to move to ambulatory care
  – The growth of minimally invasive surgery
  – The number of joint replacements in the US is likely to double, and will move from inpatient to outpatient procedures
• Recognize that a small percentage of patients account for a large percentage of the cost
• Recognize that when you talk about population health, you’re really talking about three separate populations
Concentration of Health Spending Among Highest Spenders

- Top 1% of spenders account for >20% of all spending
- Top 5% of spenders account for ≈50% of all spending
- Top 10% of spenders account for 65% of all spending

Bottom 50% of spenders account for 3% of all spending

Source: National Institute for Health Care Management Foundation analysis of data from the 2013 Medical Expenditure Panel Survey
Our Population Characteristics Drive Approach to Population Health Interventions

“5% of the population use up 50% of the health care resources”

### Medicare

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<th>Inpatient Admission Gain/(Loss)</th>
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<td>Prescriptions per Year per Member</td>
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### Medicaid (includes MSF)

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<td>ED Visits per Year per Member</td>
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<td>SNF Days per Year per Member</td>
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### Commercial

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#### Pop Health Strategy

- Post Acute & Medication Mgmt.
- Emergency & Inpatient
- Prevention/Wellness — Quality Measure Targets
## UMMACO by the Numbers – Today and Beyond?

<table>
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<tr>
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<td>&gt;326 patients</td>
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UNINTENDED CONSEQUENCES
PUSHBACK
NEW CHALLENGES
Recent commentaries

Care that matters: Quality measurement and healthcare*

• There is limited evidence that many quality measures – including those tied to incentives and those promoted by health insurers and governments - lead to improved health care outcomes
• These measures are often based on easily measured, intermediate endpoints such as risk factor control or care processes, not on meaningful patient-centered outcomes;
• Their use interferes with individualized approaches to clinical complexity and may lead to gaming, overtesting and overtreatment
• Measures used for financial incentives and public reporting should meet higher standards
• We propose a set of core principles for the implementation of quality measures with greater validity and utility

Recent commentaries

The map is not the territory: Medical records and 21st century practice*

• Documentation at risk of overtaking care delivery in terms of time, clinician focus, and perceived importance. The medical record as currently used for documentation contributes to increased cognitive workload, strained clinician-patient relationships, and burnout.
• The authors point out five critical consequences of current documentation practices, including:
  – Increased physician time devoted to documentation
  – Loss of proposed benefits (accurate billing at the cost of clinical efficiency)
  – Loss of clarity
  – Professional isolation, focused on asynchronous communication at the cost of face-to-face communication between team members; and
  – Degradation of the doctor-patient relationship

The Quadruple Aim*

• Physicians and other members of the health care workforce report widespread burnout and dissatisfaction
• Burnout is associated with lower patient satisfaction, reduced health outcomes, and may increase costs.
• While the “Triple Aim” is widely accepted as a compass to optimize health system performance, burnout this imperils the Triple Aim.
• This article recommends that the Triple Aim be expanded to a “Quadruple Aim,” adding the goal of improving the work life of health care providers, including clinicians and staff

The Quadruple Aim*

- Enhancing the patient experience
- Improving population health
- Reducing costs
- Improving the work life of health care providers, including clinicians and staff

Era 3 for Medicine and Health Care*

- A health care landscape characterized by discord and sinking clinician morale can be traced to the collision of two eras characterized by beliefs that have proven to be incompatible with each other.
- The first era was based in the belief that the medical profession is noble, beneficent, and self-regulating, and because of this, society gave the profession the right to judge the quality of its own work.
- The second era, resulting from the discovery of variation in practice, high rates of medical error, and profiteering, has been characterized by attempts to provide accountability through measurement and incentives.
- It’s time for a third era, the “moral era,” “guided by updated beliefs that reject both the protectionism of Era 1 and the measurement of Era 2
  - Nine guiding characteristics

“Era 3”

Era 3 for Medicine and Health Care*

• A reduction in mandatory measurement: Measure only what matters, and mainly for learning
• A moratorium on complex incentives which are confusing, unstable, and invite gaming
• A shift in the focus from revenue to quality, which should be a core competency for health care leaders
• Clinicians must move away from self-sufficiency (and physician organizations must move away from “self protective rhetoric and policies”) to consider themselves as part of a larger enterprise
• Clinicians should embrace improvement science; academicians must “make mastery of improvements sciences part of the core curriculum”
• Data should be readily available to the public to assure complete transparency
• Discourse must be civil, not argumentative
• We must pay attention to the voices of our patients, including the needs of the poor, the disadvantaged, and the marginalized, firmly defending health care as a universal human right.
• “Health care’s tolerance for greed has to stop”

Recent Commentaries

Counting Better – The Limits and Future of Quality Based Compensation*

- At the Swedish Medical Group, “. . . the focus on metrics felt stifling to many clinicians, who found themselves scouring lists of potentially overdue patients, tracking down old records, and scanning them into the chart to get ‘credit’ for tests and satisfy the compensation metric.”

  “Measuring quality in terms of task-based care can diminish the value of clinicians’ essential role of deciphering medical complexity and building relationships.”

- The authors suggest a few responses:

  Measure what’s important to patients (several examples are given)

  Optimize the use of existing metrics by prioritizing those more tightly linked with producing health

  Clinical groups can embrace quality improvement science

  Acknowledge quality metrics’ limitations for compensation (“. . . making it ‘ridiculously easy to do the right thing’ can powerfully affect care delivery”)

Health care organizations committed to sustained performance improvement are characterized by “relentless hard work of local operational design:

- “Teams often redesign local structures and processes despite the lack of senior support, adequate data, capital, or a reimbursement system that rewards their efforts”
- “Transformation is a long series of local experiments”
- “Redesign teams are typically led by clinicians,” and successful organizations heavily in leadership development”
- They rely on a standardized and consistent approach to change (lean, six sigma, etc), with internal support for “design, project management, data analysis, financial analysis, and organizational development”
- They have well developed measurement systems and widely-understood unifying values and norms

Lessons Learned

• It’s much easier to develop a new, coordinated program than it is to convince a fragmented system to change

• We need to take care of ourselves
• Above all, we should measure what matters
• A standardized approach to change (e.g. Lean) and to quality science are critical for successful transformational change
• Let’s find ways to make it ridiculously easy to do the right thing
• Change is a long hard process
• Some of the best ideas are piloted without leadership support, without adequate funding, or without enough data
On the immediate horizon

• More experience in the Medicare ACO
• More infrastructure development
• A Medicaid ACO (2018)
• A transition pilot year in Medicaid between the current PCPR program (ends this December) and the 2018 Medicaid ACO
• MACRA
MACRA: Are You Ready for Risk?
MACRA

MACRA – Most significant transformation in health care payment since the creation of Medicare

What does the proposed MACRA rule do?

1. Repeals Sustainable Growth Rate (SGR)

2. Streamlines Medicare Reporting and consolidates Incentive Programs

3. Creates two payment structures to incent transition from volume to value
   - Alternative Payment Models (APMs)
   - Merit-Based Incentive Payment System (MIPS)
The question for today

How can we build on our current strengths to help UMass/UMass Memorial to become a state and national leader in managing population health?
Lessons Learned

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• Specialists are as stressed as PCPs, and they aren’t the enemy
The question for today

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PARKING LOT
In 2012 the ABIM Foundation launched Choosing Wisely® with a goal of advancing a national dialogue on avoiding wasteful or unnecessary medical tests, treatments and procedures.

Choosing Wisely centers around conversations between providers and patients informed by the evidence-based recommendations of “Things Providers and Patients Should Question.” More than 70 specialty society partners have released recommendations with the intention of facilitating wise decisions about the most appropriate care based on a patient’s individual situation.

Consumer Reports is a partner in this effort and works with specialty societies to create patient-friendly materials to educate patients about what care is best for them and the right questions to ask their physicians. Through a coalition of consumer groups like AARP and the National Partnership for Women and Families, Consumer Reports is ensuring patients get the information they need just when they need it.
## Exhibit 5. Diagnostic Imaging Supply and Use, 2013

<table>
<thead>
<tr>
<th>Country</th>
<th>Magnetic resonance imaging</th>
<th>Computed tomography</th>
<th>Positron emission tomography</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MRI machines per million pop.</td>
<td>MRI exams per 1,000 pop.</td>
<td>CT scanners per million pop.</td>
</tr>
<tr>
<td>Australia</td>
<td>13.4</td>
<td>27.6</td>
<td>53.7</td>
</tr>
<tr>
<td>Canada</td>
<td>8.8</td>
<td>52.8</td>
<td>14.7</td>
</tr>
<tr>
<td>Denmark</td>
<td>–</td>
<td>60.3</td>
<td>37.8</td>
</tr>
<tr>
<td>France</td>
<td>9.4</td>
<td>90.9</td>
<td>14.5</td>
</tr>
<tr>
<td>Japan</td>
<td>46.9(^{b})</td>
<td>–</td>
<td>101.3(^{b})</td>
</tr>
<tr>
<td>Netherlands</td>
<td>11.5</td>
<td>50.0(^{b})</td>
<td>11.5</td>
</tr>
<tr>
<td>New Zealand</td>
<td>11.2</td>
<td>–</td>
<td>16.6</td>
</tr>
<tr>
<td>Switzerland</td>
<td>–</td>
<td>–</td>
<td>36.6</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>6.1</td>
<td>–</td>
<td>7.9</td>
</tr>
<tr>
<td>United States</td>
<td>35.5</td>
<td>106.9</td>
<td>43.5</td>
</tr>
<tr>
<td>OECD median</td>
<td>11.4</td>
<td>50.6</td>
<td>17.6</td>
</tr>
</tbody>
</table>

\(^{a}\) 2012.  \(^{b}\) 2011.  \(^{c}\) 2010.

Source: OECD Health Data 2015.
**UMMHC 2020 Vision**
We will become the best academic health system in America based on measures of patient safety, quality, cost, patient satisfaction, innovation, education and caregiver engagement.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Deliver exceptional quality, service and value to the patients we serve</td>
<td>Expand 855-UMASS-MD hours and include on-line appointment scheduling capabilities for existing (portal) and new patients (Zoc Doc)</td>
<td>24/7/365 electronic and telephonic patient access to all of our services</td>
</tr>
<tr>
<td>Deliver world class access to our services through our 855-UMASS-MD platform</td>
<td>Develop and implement entity/dept level quality and service improvement plans</td>
<td>Patient and family-centered, cost effective, high-quality care</td>
</tr>
<tr>
<td>Improve patient flow and reduce ED boarders</td>
<td>Expand our capacity to deliver low acuity care at a lower cost (ASC, Urgent Care and virtual visits)</td>
<td>Efficient, contemporary facilities for our patients and providers</td>
</tr>
<tr>
<td>Be completely transparent about our quality and service results</td>
<td></td>
<td>Elimination of ED boarders</td>
</tr>
<tr>
<td>Standardize care to enhance quality, efficiency and the educational experience of our students, residents and fellows</td>
<td></td>
<td>Top decile quality/service</td>
</tr>
<tr>
<td><strong>II</strong> Invest in the best</td>
<td>Service line investments analyzed and adjusted annually based on clinical and academic quality and efficiency of program, profitability and growth potential</td>
<td>Innovative, select specialty services that are internationally recognized</td>
</tr>
<tr>
<td>Programmatic service line review and initial investments in new MDs and resources based on the clinical and academic quality of current program, profitability and growth potential</td>
<td>Continued growth of owned (CMG) and affiliated (MCN) community based primary and specialty care practices</td>
<td>Academic health system with a strong community presence</td>
</tr>
<tr>
<td><strong>III</strong> Increase our community presence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grow community-based primary care</td>
<td>Become a Medicare ACO, enhance TME management capabilities, expand successful pilot programs (My Link)</td>
<td>A fully integrated delivery system (Payer/Provider) managing the overall cost and quality of care for defined populations</td>
</tr>
<tr>
<td>Increase private physicians in MCN</td>
<td>Align with payers and employers</td>
<td></td>
</tr>
<tr>
<td>Increase community-based specialist programs</td>
<td>Create an ACO laboratory with UMMS</td>
<td></td>
</tr>
<tr>
<td><strong>IV</strong> Build our population health capabilities</td>
<td>Enhance employee development and recognition programs</td>
<td></td>
</tr>
<tr>
<td>Governmental payer pilots (duals)</td>
<td>Partner with UMMS to build an IT system that integrates all available clinical data, is fast, dependable and easy to use from a secure mobile platform</td>
<td>Top decile employee satisfaction</td>
</tr>
<tr>
<td>Shared savings and quality-focused shared risk (AQC) with commercial populations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build HCC coding and quality infrastructure</td>
<td></td>
<td>Patient and provider-centric integrated EHR</td>
</tr>
<tr>
<td><strong>V</strong> Create an enabling culture of ownership</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve IT dependability, speed and usability and open the patient portal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee wellness program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>World-class employee idea system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Executive rounding program</td>
<td>Time and/or capital intensive</td>
<td></td>
</tr>
<tr>
<td><strong>Rationale</strong></td>
<td>Time and/or capital intensive</td>
<td></td>
</tr>
<tr>
<td>Doable &amp; financially feasible</td>
<td>Dependent on Phase I</td>
<td></td>
</tr>
<tr>
<td>Path critical</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Position Ourselves for Future</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: The chart highlights the 2020 Vision with a focus on the population health capabilities section.*
Our Population Characteristics Drive Approach to Population Health Interventions

“5% of the population use up 50% of the health care resources”

<table>
<thead>
<tr>
<th>Inpatient Admission Gain/(Loss)</th>
<th>Medicare</th>
<th>Medicaid (includes MSF)</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$911</td>
<td>($1,292)</td>
<td>$3,481</td>
</tr>
<tr>
<td></td>
<td>($521)</td>
<td>($123)</td>
<td>$197</td>
</tr>
<tr>
<td>Admissions per Year per Member</td>
<td>.28</td>
<td>.09</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>.07</td>
<td>.02</td>
<td>.02</td>
</tr>
<tr>
<td>Readmissions per Year per Member</td>
<td>35</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Prescriptions per Year per Member</td>
<td>.71</td>
<td>.89</td>
<td>.25</td>
</tr>
<tr>
<td>ED Visits per Year per Member</td>
<td>1.4</td>
<td>.14</td>
<td>.03</td>
</tr>
<tr>
<td>SNF Days per Year per Member</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Pop Health Strategy**

- Post Acute & Medication Mgmt.
- Emergency & Inpatient
- Prevention/Wellness
  - Quality Measure Targets
Tying it all together: The EMR
Total Medicare Reimbursements per Enrollee, by Adjustment Type
(Adjustment Type: Age, Sex & Race Only; Year: 2003 to 2012; Region Levels: HRR, State)

Currency

- Massachusetts
- National Average
- Worcester, MA
Discharges for Congestive Heart Failure per 1,000 Medicare Enrollees, by Gender
(Gender: Overall; Year: 1996 to 2012; Region Levels: HRR, State)

THE DARTMOUTH INSTITUTE
FOR HEALTH POLICY & CLINICAL PRACTICE
Percent of Patients Readmitted within 30 Days of Discharge, by Cohort
(Cohort: All Medical Discharges; Year: 2004 to 2012; Region Levels: State, HRR)

- Massachusetts
- National Average
- Worcester, MA

THE DARTMOUTH INSTITUTE
FOR HEALTH POLICY & CLINICAL PRACTICE
Ambulatory care sensitive conditions

• Ambulatory care sensitive conditions
  – a concept first introduced in New York in the early 1990s as an indicator of population level access to outpatient care
  – Conditions where appropriate ambulatory care prevents or reduces the need for admission to the hospital
  – ACSCs fall into three categories:
    • vaccine preventable
    • acute conditions
    • chronic conditions
      . Although variously defined, generally they are those conditions which respond well to interventions deliverable in community-based healthcare settings, and if managed well should not require hospital admission. Chronic ACSCs such as congestive heart failure and chronic obstructive pulmonary disease (COPD) make up the largest proportion of all ACSC admissions in Australia, particularly amongst older people