Challenges and Opportunities for Hospital Pharmacists

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Assistant Dean, Clinical Pharmacy
UCSF School of Pharmacy

Objectives

- Describe the rationale behind the focus on value in healthcare
- Define population health
- Describe pharmacy services that provide value
- Develop a process for value-based formulary decisions
What’s Driving the Focus on Value?

Inefficiency in the US

- Payment for volume vs value (episodes of care vs health outcomes)
- Insufficient attention to health: prevention, primary care, health literacy, and long-term results
- Lack of information on costs, comparative effectiveness, quality and health outcomes

Fineberg HV. A successful and sustainable health system—how to get there from here. NEJM. 2012;366:1020-27.
Inefficiency in the US

- Scientific uncertainty about effectiveness and cost, especially of newer tests and treatments
- Administrative complexity:
  - Multiple forms, regimens, and requirements of different insurers
- Fragmentation of care
- Insufficient involvement of patients in decision-making (as in end-of-life care)

What is Value?

Value = Quality / Cost

http://html.rincondelvago.com/000200731.png, accessed 1/22/17
In Search of Value

- Population Health
- Drug Costs
- End of Life/Palliative Care
- Opioid Crisis
- Transitions of care
- Cancer Care
- Patient Engagement
- Precision Medicine
Population Health

- Programs intended to improve health status of a population of patients
- Driven by payment reform to improve outcomes while lowering costs
- Focus on prevention, reducing readmissions and costs

- Annual wellness visits
  - Medication evaluation
- Transitions of care
- Pre- and post-acute care
- Palliative/End-of-Life care

Population Health Pyramid

Characteristics
- Super-utilizers
- Poly-chronic, frail, elderly, urban poor
- Frequent hospitalizations, emergency visits
- Psychosocial and socioeconomic barriers
- Costs make up 45 – 50 percent

- Limited and stable chronic conditions
- At risk for procedures
- Costs make up 30 – 40 percent

- Healthy
- Minor health issues
- Costs make up 10 – 20 percent

Population/Risk
- 5% High Risk
- 35% – 40% Medium Risk
- 50% Low Risk

High-Impact Care Priorities
- Care coordinators (RNs or social workers)
- Address psychosocial and non-clinical barriers
- Community resources navigation
- Intensive transition planning
- Frequent one-on-one interaction

- Reduce practice variation
- Systematic care and evidence-base medicine
- Team-based, coordinated care
- Scalable care team
- Practice at top of license

- Focused coordination and prevention
- Movement toward virtual, mobile, anytime access
- Convenience is critical

Cancer Care
Population Health Needs

- Preventing Readmissions
  - All-cause readmission for cancer pts: 14.6%
  - Drug-Drug Interactions (DDIs) in 72% of oncology pts
  - 2% of hospitalizations in cancer pts due to DDI

- Adherence
  - Only 64% to 88% of breast cancer patients are adherent
  - Non-adherent chronic myelogenous leukemia pts have poorer outcomes, higher costs, and more treatment resistance

“Inappropriate medication use among older patients with cancer”

- N=248 pts, average age=79.9 yrs
- Geriatric oncology assessment and medication reconciliation by pharmacist
- 87% had solid tumors

**Results**

- Average number of medications: 9.23/pt
- Inappropriate medication use based on Beers criteria: 40%
- Excessive polypharmacy: 43%
Preventing Harm with New Therapies

**Immunotherapy delayed reactions**

- Talimogene for melanoma
  - First oncolytic viral therapy-modified herpes simplex
  - Indication: inoperable melanoma
  - Pseudoprogression at 3 month post treatment-increased size of lesion associated with response to therapy
- Employee protection
- Ipilimumab for melanoma
  - Colitis 5 weeks and hepatitis 6-12 weeks after therapy
Do not use cancer-directed therapy for solid tumor patients with the following characteristics:

- low performance status (3 or 4),
- no benefit from prior evidence-based interventions,
- not eligible for a clinical trial,
- no strong evidence supporting the clinical value of further anticancer treatment

Why target chemotherapy use at the end of life?

Compared with patients receiving standard care for metastatic NSCLC, patients receiving early palliative care had **less aggressive care** at end of life but **improved quality of life** and **longer survival** (Temel, et al. NEJM 2010)
Determining Performance Status: Eastern Cooperative Oncology Group (ECOG) Score

- Which best describes the patient’s performance status?
  - Fully active, able to carry on all pre-disease performance without restriction (ECOG 0)
  - Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature (ECOG 1)
  - Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours (ECOG 2)
  - Capable of only limited self-care, confined to bed or chair more than 50% of waking hours (ECOG 3)
  - Completely disabled. Cannot carry on any self care. Totally confined to bed or chair (ECOG 4)
Cedars-Sinai Medical Center (CSMC) Chemotherapy Stewardship

- Reducing harm at end of life
  - ECOG required on chemotherapy (oral and IV) orders
  - Pharmacist to identify orders for chemotherapy where ECOG > 2
  - Case referred for MD review and discussion prior to initiation.
Oncology Pharmacist Specialist
Scope of Practice

- Evaluation of orders in context of patient
- Symptom management and supportive care
- Formulary management
- Guideline and order set development
- Cost-savings initiatives
- Drug shortage management
- Safe sterile compounding
- Medication adherence
- Research support
- Policy development
- Medication reconciliation
- Medication safety
- Maintenance of oncology medication–related electronic health records
- Clinician education
- Patient/Family Education
- Palliative/End of Life Care

http://jop.ascopubs.org/content/10/3/e142.extract
U.S. Healthcare Payment Reform

https://images.search.yahoo.com/yhs/search;_ylt=AwrTceE8eDBYx2EAfognllQ;_ylu=X3oDMTE0MG0odGlnlBGNvbG8DZ3ExBH8vcwMx8HZ0awQDUFEQkNLMI8x8HNlYyNzYw--?p=Payment&fr=yhs-mozilla-001&hspart=mozilla&hsimp=yhs-001&id=18&iurl=http%3A%2F%2Fsuperiornv.com%2Fwp-content%2Fuploads%2F2014%2F04%2FMake-a-payment-on-your-auto-insurance-las-vegas.jpg&action=close
A Journey Through the Bundle Jungle

48 Clinical Bundles Proposed

Goal: Determine whether bundled payments ↓ costs and maintain/improve quality

Cardiac Care
Effective 7/1/17, 98 areas

Includes medical as well as surgical services with goal of coordination among all health providers: hospital, MDs, SNFs, home health

- Coronary Artery Bypass Graft (CABG)
- Acute Myocardial Infarction (AMI)

Episode of care plus 90 days post-discharge

Metrics include:

- 30 day risk-adjusted mortality
- Excess days in hospital post MI
- 1 year mortality
- ED Visits
- Patient satisfaction
- Care deferred after 90 days
- Functional performance changes

https://innovation.cms.gov/initiatives/epm/, accessed 11/19/16
Patient-Centered Care Models
Focus on Team-Based Care

http://www.hmh.net/ContentMgmtNew/uploads/FCC-%20Freeman%20Creek/Screen%20Shot%202014-12-10%20at%2009.11.56%20PM.png, accessed 11/20/16
Healthcare Consumerism

http://ihearthealthcaredotcom.files.wordpress.com/2012/07/crop56.jpg, accessed 11/20/16
Patient Engagement Imperative

Pt. Engagement:
ICARE*
Integrity,
compassion,
respect,
accountability

Patient-Reported Outcomes Research

Bootcamp Translation**: teaching patients about evidence-based guidelines

Translation**:
- Treatment options
- Ability to work
- Costs

Integrating Pt Preferences in Decision-Making

Conversations with Patients

*https://muse.jhu.edu/chapter/1789675, accessed 11/1/16

**http://content.healthaffairs.org/content/35/4/613.abstract, accessed 11/22/16
### Patient Engagement: Digital Health

- **63%** of adult cell owners use their phones to go online
  - Has doubled since 2009
  - 34% mostly go online using their cell phone
  - 21% do most of their online browsing using their mobile phone—and not some other device such as a desktop or laptop computer

- **69%** of U.S. adults track a health indicator like weight, diet, exercise routine or symptom
  - Half track “in their heads”
  - One-third keep notes on paper
  - One in five use technology to keep tabs on their health status

- **35%** of U.S. adults have gone online to figure out a medical condition
  - Of these, half followed up with a visit to a medical professional
  - One in five use technology to keep tabs on their health status

- **39%** of U.S. adults provide care for a loved one
  - Up from 30% in 2010
  - Many navigate health care with the help of technology

% of Consumers Ready for Virtual Visits

- A consult with a psychologist seen from my PCP office: 62.7%
- A consult with my regular psychologist: 65.9%
- A consult with a new psychologist: 55.7%
- A consult with my regular dermatologist: 68.5%
- A consult with a new dermatologist: 62.3%

- Results from my oncologist: 73.9%
- Weight loss or smoking cessation classes: 65.5%
- Ongoing care for a chronic condition: 72.6%

- Select pregnancy check-ups: 63.9%
- Maternal fetal medicine consult in my OB/GYN's office: 59.2%
- Select post-op appointments: 71.8%
- Pre-surgery appointment: 73.8%
- A prescription question/refill: 76.8%

Founded in 2016 by an oncology pharmacist who completed training at MD Anderson

http://www.onccares.com/what-we-do, 11/20/16
Healthcare Challenges

- Cost of some drugs jumped as much as 3,600% over 2 years

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Description</th>
<th>Country</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Humira</strong></td>
<td>Rheumatoid arthritis</td>
<td>U.S.</td>
<td>$2,669</td>
</tr>
<tr>
<td></td>
<td>28-day supply</td>
<td>U.K.</td>
<td>$1,362</td>
</tr>
<tr>
<td></td>
<td>Development and sold in U.S. by AbbVie, spun off by Abbott Laboratories in 2013</td>
<td>Spain</td>
<td>$1,253</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switzerland</td>
<td>$822</td>
</tr>
<tr>
<td><strong>Harvoni</strong></td>
<td>Hepatitis C</td>
<td>U.S.</td>
<td>$32,114</td>
</tr>
<tr>
<td></td>
<td>four-week supply</td>
<td>U.K.</td>
<td>$22,554</td>
</tr>
<tr>
<td></td>
<td>Development and sold in the U.S. by Gilead Sciences. It was approved by the FDA in 2014</td>
<td>Spain</td>
<td>$18,165</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switzerland</td>
<td>$16,861</td>
</tr>
<tr>
<td><strong>OxyContin</strong></td>
<td>Pain</td>
<td>U.S.</td>
<td>$265</td>
</tr>
<tr>
<td></td>
<td>30-day-plus supply</td>
<td>Switzerland</td>
<td>$95</td>
</tr>
<tr>
<td></td>
<td>Sold by Purdue Pharma, generic versions marketed by a variety of companies</td>
<td>U.K.</td>
<td>$72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spain</td>
<td>$36</td>
</tr>
</tbody>
</table>

Crook D; Brynildsen E. The Short Answer, WSJ, 1/26/17
What an IPHONE could cost if it was a medication

<table>
<thead>
<tr>
<th>Percent increase of drug</th>
<th>Cost of an iPhone</th>
</tr>
</thead>
<tbody>
<tr>
<td>50% increase on average by Valeant Pharmaceuticals 2015</td>
<td>$823.50</td>
</tr>
<tr>
<td>91.5% increase in doxycycline in 2014</td>
<td>$50,755.05</td>
</tr>
<tr>
<td>529.9% increase in omeprazole in 2015</td>
<td>$291,464.10</td>
</tr>
</tbody>
</table>
- 269 drugs with >50% price increase since 2009
  - 117 of these have increased by at least 100%, *Business Insider* Sept. 8, 2016
- Biogen raised the price of its **Avonex drug for multiple sclerosis 21 times over a decade** despite steadily falling prescription demand. *WSJ* Oct 5, 2015
- **Mylan Price Increases**
  - **Mylan Tied Executive Pay to Aggressive Profit Targets**, *WSJ* September 1, 2016
  - **542%** increase for ursodiol, a generic medicine used to treat gallstones.
  - **444%** increase for metoclopramide, a generic drug for GI reflux, *statnews.com* June 10, 2016
Autoimmune Disorders
$70,000/year

Hemolytic Uremic Syndrome
$669,000/year

Multiple Sclerosis
$63,000/year

Cancer
$150,000/year

Orphan Drugs
>$300,000/year

Inflammatory Conditions
$24,000/year

Hepatitis C
$84,000/course

Autoimmune Disorders
$70,000/year

61 Orphan Drugs approved in past 5 years
Orphan Drugs

What are they?
- Drugs for disease states affecting <200,000 people or ultra-orphan <10,000
- 7 year exclusivity, tax credits, waived fees
- Gaucher’s Disease: $300,000/year
- Paryoxysmal nocturnal hemoglobinuria: $440,000/year
- Spinal muscular atrophy: $750,000 first year (nusinersen)
<table>
<thead>
<tr>
<th>Assess Clinical Evidence</th>
<th>Assess Safety/Tolerability</th>
<th>Cost Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superiority to existing therapies</td>
<td>Black Box Warnings and/or REMS</td>
<td>Cost/day vs. cost/treatment course vs. cost/QALY</td>
</tr>
<tr>
<td>Comparison to existing therapies</td>
<td>Harmful drug interactions</td>
<td>Long term cost-effectiveness?</td>
</tr>
<tr>
<td>Level of evidence</td>
<td>Incidence of discontinuation due to ADEs</td>
<td>Annual budget impact based on estimated volume</td>
</tr>
<tr>
<td>Endpoints measured in trials</td>
<td>Requires significant lab monitoring</td>
<td>Patient out-of-pocket costs</td>
</tr>
<tr>
<td>Resolves or prevents condition for admission</td>
<td>Requires ICU or cardiac monitoring</td>
<td>Costs for any required lab monitoring</td>
</tr>
<tr>
<td>Improves function or alleviates symptoms</td>
<td>Risk in elderly or special populations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Available for &lt;1 year</td>
<td></td>
</tr>
</tbody>
</table>
Value-Based Inpatient Formulary Framework

Assess Clinical Evidence
- Number Needed to Treat
- Confidence intervals
- Relative Risk Reduction vs. Absolute Risk Reduction
- New Drugs: FDA Advisory panel assessment

Site of Care Considerations
- Is inpatient administration required?
- Will insurance cover continued doses if needed?

Monitoring Utilization
- Pharmacist intervention for usage outside of approved criteria
- Concurrent physician champion review
- Retrospective evaluation
Value in Cancer Care

U.S. cost of oncology medicines in the ↑$15.9 billion or 72% over past 5 yrs.

Financial Toxicity: COST* Measure correlated with Health-Related Quality of Life

* Comprehensive Score for Financial Toxicity

Value-Based Formulary Management in Oncology

- Development of a standard definition of a “meaningful outcome” for new drugs
  - Minimum 25% improvement in baseline median overall survival using the current standard of care
- ASCO Value Framework: Clinical Efficacy+Toxicity and Cost
- Indication-based pricing for cancer drugs based on Memorial Sloan-Kettering model

- Cost per year of life gained: Nab-paclitaxel
  - Metastatic breast cancer improvement in median survival: 0.18 year
    - Cost per year of life gained: $145,000
  - Non-small cell lung cancer: improvement of 0.08 year
    - Cost per year of life gained: $400,000

Trabectedin For Liposarcoma And Leiomyosarcoma

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   o Toxicity
   o Cost consideration
Formulary consideration and/or Recommendation 9
References

Appendix I: American Society of Clinical Oncology Value Framework: Advanced Disease
Appendix II: NCCN evidence blocks categories and definitions
Appendix III: Level of evidence
## Implication for pharmacy operation:

<table>
<thead>
<tr>
<th>Complexity</th>
<th>Weight-based dosing/Calculation required?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Laboratory results review prior to each dose</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Special monitoring or observation (extravasation)</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special preparation (For compounded agent only)</th>
<th>Low-protein binding 0.2-1.2 micron in-line filter required?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Any special ancillary supplies (e.g. non-PVC bag, safety-shielded needles) or supplies not currently on standard hospital supplies?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Ambulatory infusion pump (CADD pump)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Preparation in BSC II or better?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Any stability issue (e.g. &lt; 1 hour after preparation)?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Any potential compounding issue? If yes, describe issue:</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Single-use vial</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Multi-dose vial</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Storage</th>
<th>Required refrigerator or freezer storage?</th>
<th>Yes</th>
<th>No</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Is the requested drug a controlled substance drug?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FDA/ISMP list?</th>
<th>Look-Alike drug names?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Alert medication list?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>“DO NOT CRUSH” list?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
### Value of Care Assessment (ADVANCED DISEASE)

**Trabectedin vs. Dacarbazine for metastatic liposarcoma or leiomyosarcoma after failure of conventional therapy (Phase III)**

### SECTION 1: CLINICAL BENEFIT

<table>
<thead>
<tr>
<th></th>
<th>Efficacy Elements</th>
<th>Bonus Point</th>
<th>NCCN Evidence block</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>ESQCA score:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Trabectedin</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR for death</td>
<td>NR</td>
<td>NR</td>
<td>N/A</td>
</tr>
<tr>
<td>Median OS</td>
<td>12.4 mo.</td>
<td>OS</td>
<td></td>
</tr>
<tr>
<td>Median PFS</td>
<td>4.2 mo.</td>
<td>PFS</td>
<td></td>
</tr>
<tr>
<td>RR</td>
<td>9.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tail of the curve</td>
<td></td>
<td>NR</td>
<td></td>
</tr>
<tr>
<td>Palliation</td>
<td>NR</td>
<td>NR</td>
<td></td>
</tr>
<tr>
<td>QoL</td>
<td>NR</td>
<td>NR</td>
<td></td>
</tr>
<tr>
<td>Treatment free interval</td>
<td>NR</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Dacarbazine</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HR for death</td>
<td>NR</td>
<td>OS</td>
<td></td>
</tr>
<tr>
<td>Median OS</td>
<td>12.9 mo.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median PFS</td>
<td>1.5 mo.</td>
<td>PFS</td>
<td></td>
</tr>
<tr>
<td>RR</td>
<td>6.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tail of the curve</td>
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<td>NR</td>
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</tr>
<tr>
<td>Palliation</td>
<td>NR</td>
<td>NR</td>
<td></td>
</tr>
<tr>
<td>QoL</td>
<td>NR</td>
<td>NR</td>
<td></td>
</tr>
<tr>
<td>Treatment free interval</td>
<td>NR</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

**Summary**

- **CLINICAL BENEFIT ASSESSMENT:** • HIGH (HR for death or median OS benefit) • MEDIUM • LOW
- Quality of evidence: Level 1

### SECTION 2: TOXICITY

<table>
<thead>
<tr>
<th></th>
<th>Reported toxicities</th>
<th>Emetogenicity</th>
<th>NCCN “S” score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade 1 and 2 &lt; 10%</td>
<td>Grade 1 and 2 ≥ 10%</td>
<td>Grade 3 and 4 &lt; 5%</td>
</tr>
<tr>
<td><strong>Trabectedin</strong></td>
<td>0</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td><strong>Dacarbazine</strong></td>
<td>4</td>
<td>12</td>
<td>7</td>
</tr>
</tbody>
</table>

**Summary**

- **TOXICITY ASSESSMENT:** • HIGH • MEDIUM • LOW

Seven treatment related deaths (2.1%) were reported in Trabectedin group, compared to none from Dacarbazine group.
Precision Medicine

- Precision Medicine Initiative: 2015 Presidential State of the Union Address
  - “The mission of the National Institutes of Health (NIH) is to “enable a new era of medicine through research, technology, and policies ...toward development of individualized care.”

- Population health goal: Reduce variation in care

- Precision Medicine goal: Leveraging understanding about molecular basis of diseases to support treatment decisions for patient subgroups

- >140 medications with pharmacogenomic labeling

- Clinical Pharmacogenetics Implementation Consortium (CPIC) has developed 17 guidelines for medications/classes

Sequencing the entire genome of a tumor and corresponding germline of an individual patient with cancer costs <$5000 (US)

Molecular matching of treatments possible

Evidence suggests that a biomarker-based selection of patients, even in the phase 1 setting, is associated with significantly better outcomes.1

Therapies that matched a patient’s molecular aberration had a 27% response rate and a median overall survival (OS) of 13.4 months compared with a 5% response rate and a median OS of 9 months among patients with no matched treatment.2

2. http://clincancerres.aacrjournals.org/content/18/22/6373.long, accessed 1/28/17
Opioid Stewardship

- National focus on opioid epidemic and harm
  - 32% misuse of opioid prescriptions
  - Initiation of opioids in hospitals has contributed to epidemic

- Overuse of opioids in health-systems due to focus on pain
  - 5th vital sign
  - Joint Commission requirements
  - Patient satisfaction

- Quality, safety and cost benefits of reducing opioid use
  - ↓ adverse drug events (ADEs): respiratory depression, falls
  - Reduced length of stay
  - ↓$$ across the continuum of care: overuse, addiction, ADEs

Opioid Stewardship Goals

- Minimize unnecessary opioids in order sets
- Discourage use of opioids for MILD pain and use other modalities and medications
- Minimize use of long acting opioids
- Implement automatic stop orders for opioids
- Standardize & reduce opioid duration of therapy prescriptions at discharge, i.e., 5 days
- Healthcare provider education (MD, RNs, Pharmacist)
Opioid Stewardship Goals

- Develop and implement pain mgmt. best practices for specific populations, e.g., spinal pts, orthopedics, etc
- Implement multi-modal analgesia
  - Gabapentin + oral acetaminophen
  - COX-2 inhibitors
- Evaluate opportunities associated with PCA/PCEA dosing and opioid monitoring
- Develop program to reduce chronic opioid use
Patient-Centered Model for Pharmacy Practice

**Traditional Focus**
- Resolving the Acute Care Episode
  - Medication Order Management

**Patient-Centered Focus**
- Why is the patient here?
  - Comprehensive Medication Management
- What do they need?
Comprehensive Medication Management (CMM)

- Evidenced-based clinical services
  - Decrease costs and improves chronic disease outcomes by ensuring optimal prescribing, monitoring, education, and use of medications that engages physicians, pharmacists, and patients
- Population: Complex high-risk patients
- Improved outcomes: quality of life, access, patients’ health literacy, physician and team satisfaction and continuity of care

Examples of CMM Results

- Pharmacist-Led Anticoagulation Center:
  - 53% decrease in admissions and 41% less emergency department visits

- Senior Transitions of Care Program
  - 60% decrease in 30-day readmissions and annual cost avoidance (inpatient and outpatient) was $503,278.

- Heart Failure Continuum of Care Network
  - 50% reduction in readmissions compared to patients that were not enrolled (12 percent vs. 24 percent, p=0.005)
Risks Across the Continuum of Care
CSMC Safe Medication Transitions

Methodology

Patient meets high risk criteria*

Pharmacy staff performs medication reconciliation and assesses MedAL score^

Patients with MedAL score < 6, pharmacist follow up within 72h post discharge

Drug-related problems identified are resolved with prescribing MD(s) and/or pt

Pharmacists identify pts with significant DRPs that may result in 30d readmission (MACEs)++

MedAL: medication adherence and literacy

*High risk criteria: > 10 chronic meds, on anticoagulant, diagnosis of CHF w/ EF< 40%, pneumonia

^MedAL score: CSMC algorithm to assess patient’s medication adherence and medication literacy

++Physician validation of likelihood of readmission
Pharmacy Impact on Reducing Readmissions

- Transitions of care services established 2010
- Preventing **Medication-related Acute Care Episodes (MACES)** began as a leadership goal in 2014
- Pharmacists contacted high risk patients within 72 hours after discharge

**Results**

- Relative reduction in readmissions by 25%
- Absolute reduction in readmissions by 5.4%
- Cost-effectiveness analysis proved this program to be **cost-effective** through 1000 simulations
Safe Medication Transitions Results

- 7.4 medication history errors/high risk pt on admission
- Pts with low and intermediate adherence have a 2.54-fold higher odds of readmission compared to those with high adherence (p=0.05).
- 4.3 drug-related problems/patient post-discharge
  - Approximately 50% of problems are pt. related and 50% are prescriber-related
Preventing Medication-Related Acute Care Episodes (MACES)

Multi-Center Quality Improvement Project

- **Objective:** Assess the impact of pharmacists’ post-discharge follow-up on high risk patients
- **Primary Outcome:** # drug-related problems and % (MACES prevented by pharmacist resolution of drug-related problems confirmed by MDs)
- **Study Period:** 6 weeks
- **# of Sites:** 9 academic medical centers
MACE Toolkit

Post Discharge Follow-up by TOC Rx

Exclude discharges to SNF, patient refused, lost to follow up

TOC Rx Review and Severity Rating of DRPs

Significant/Life Threatening

Low Harm

Would the DRPs have led to a MACE?

- **TOC Rx** – Transitions of Care Pharmacist
- **DRPs** – Drug-related problems
- **MACE** – Medication-related acute care episode
Key Principles

- **Assessment of likelihood of 30-day readmission**
- **Will be seen by primary MD within 14 days post-discharge**

*Definitions*

- **Yes, Very likely** = ≥50% increase above average risk for readmission
- **Yes, Somewhat likely** = 20-49% increase above average risk for readmission
- **Not likely** = not at significantly increased risk for readmission (0-19%)
## Examples of MACEs

<table>
<thead>
<tr>
<th>Case</th>
<th>DRPs Identified and Pharmacists Actions</th>
<th>Preventable MACE</th>
</tr>
</thead>
</table>
| 91 yo F  
CC: possible UTI  
PMH: CVA, afib | 1) Metoprolol dose ↑50 mg BID and started on digoxin. Family reports HR in the 40s.  
2) Levofloxacin prescribed 5-day course based on dirty UA. Denies symptoms; culture results suggests colonization.  
3) Rivaroxaban 20mg daily in pt w/ CrCL 29 ml/min. **Recommendations**  
1) Hold metoprolol and D/C digoxin or check level.  
2) D/C levofloxacin  
3) Rivaroxaban dose change to 15 mg daily | Yes, Very Likely  
Readmission due to bradycardia, bleeding |
| 77 yo F  
CC: hyperglycemia  
(BG 649 on admission)  
PMH: DM2, CAD, HTN | 1) Insulin: Pt did not pick up insulin glargine and not checking BG.  
2) Simvastatin: pt was not taking **Recommendations**  
1) Called in prescription and educated on compliance  
2) Called in prescription for simvastatin, test strips | Yes, Very Likely  
Readmission due to non-compliance with medication |
MACEs Results

- **Total # post-discharge follow-ups**
  - 840 patients
  - Average: 93.9 patients/site (range: 29-115 pts/site)

- **Total DRPs Identified**
  - 959 DRPs
    - Life threatening: 2.8%
    - Serious or significant: 56.6%

- **% of MACEs prevented**
  - 27.9% (range: 9.6% - 93.9%)
1/6 older pts at risk for major drug interactions

40% of older adults on >5 medications, 18% take >10

Deprescribing.org, accessed 11/20/16
Choosingwisely.org, accessed 11/20/16
You are now entering an **INNOVATION ZONE**. Please proceed with great ideas.