Hematology/Oncology Pharmacy Association

Oncology Clinical Pathways: What's the Endgame?

Jim Koeller, M.S.
Professor
The University of Texas at Austin and
the Health Science Center, San Antonio

Faculty Disclosures

- Received consulting fees from Merck, Amgen and Thorne Research
- Received fees for Non-CPE services from Merck, Eisai, Lilly and Clinical Connexion
- Receive research funding from BMS

Objectives

- Describe the processes in the development of an oncology clinical pathway
- Identify the impact oncology pathways will have on practice including benefits, disadvantages, barriers and measures of success
- Discuss how oncology pathways will impact patient care

A Clinical Pathway

A task-oriented, step-wise management tool for standardizing a specific disease care plan

Campbell H, et al. BMJ 1998;316:133. Dobesh PP, et al. Pharmacoth. 2006;26:1358-1368

Benefits of Clinical Pathways

- Allows the use of evidence-based medicine
- Excellent tool for resource utilization control
- Encourages the use of national guidelines and helps to establish standards of care
- Can set a framework for continuity of care

Campbell H, et al. BMJ 1998;316:133. Dobesh PP, et al. Pharmacoth 2006;26:1358-1368.

Benefits of Clinical Pathways (Cont.)

- Can account for variations in patient care
- Establishes a database on care patterns
- Allows for measurement of endpoints and/or outcomes
- Should maintain or improve quality of care

Campbell H, et al. BMJ 1998;316:133. Dobesh PP, et al. Pharmacoth 2006;26:1358-1368.

Concerns With Clinical Pathways

- Discourages personalized care and appropriate clinical judgment
- Risk of litigation (with use or without)
- May limit response to unexpected changes in a patient's condition
- May stifle innovation and progress (ie., new drug development)
- Could see exploitation (ie., financial)

Campbell H, et al. BMJ 1998;316:133. Dobesh PP, et al. Pharmacoth 2006;26:1358-1468.

Clinical Pathways Barriers

- Physician reluctance to change
  - It's just 'cook-book' medicine
- Existence of guidelines
- Time and resources
- Buy-in by all parties (administration, payers)
- May not work well with all medical scenarios

Campbell H, et al. BMJ 1998;316:133. Dobesh PP, et al. Pharmacoth 2006;26:1358-1468.

Clinical Pathways: Systematic Review

- Design: Systematic review and meta-analysis
- Evaluation: (these are hospital-based)
  - Patients managed according to clinical pathway vs usual care
  - Impact on patient outcomes, length of hospital stay and hospital cost
- Twenty-seven studies met inclusion criteria

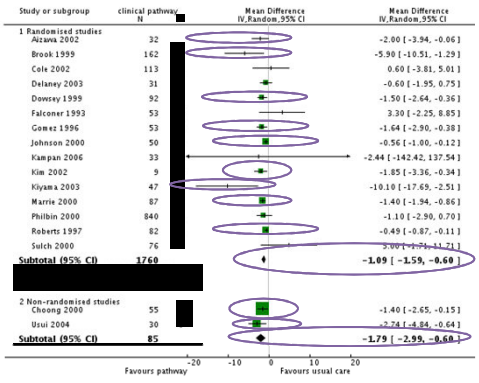
Rotter T, et al. Cochrane Database of Systemic Review. 2010; Issue 3,Article No., CD006632.

Randomized Controlled Studies

Study	Condition	Setting	Sample size	Country
Aizawa 2002	TURP	Surgical / Urology unit	69	Japan
Brook 1999	Mechanical ventilation	Medical ICU	321	USA
Delaney 2003	Laparotomy and Intestinal Resection	Surgical Rehabilitation	64	USA
Dowsey 1999	Hip and knee arthroplasty	Orthopedic unit	163	AUS
Falconer 1993	Stroke Rehabilitation	Stroke Rehabilitation	121	USA
Gomez 1996	Suspected MI	Coronary Care unit	100	USA
Johnson 2000	Asthmatic children	Emergency and Pediatric wards	110	USA
Kim 2002	Atrial fibrillation	Emergency Department	18	USA
Kiyama 2003	Gastrectomy	Surgical ward	85	Japan
Kollef 1997	Mechanical ventilation	Medical & Surgical ICU	357	USA
Marelich 2000	Mechanical ventilation	Medical ICU	253	USA
Marrie 2000	Pneumonia	Emergency	1743	Canada
Roberts 1997	Chest Pain/ possible MI	Emergency	165	USA
Sulch 2000	Stroke Rehabilitation	Stroke Rehabilitation	152	UK
Bauer 2006	Bipolar disorder	Mental health outpatient clinic	306	USA
Chen 2004	Asthmatic children	Pediatric unit	42	Taiwan
Cole 2002	Delirium	Medical units	227	Canada
Kampan 2006	Diabetes	Medical unit	65	Thailand
Philbin 2000	Heart failure	Medical Units	2906	USA

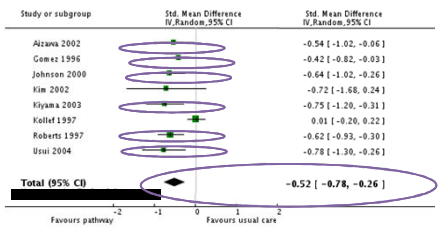
Rotter T, et al. Cochrane Database of Systematic Reviews 2010, Issue 3. Article. No.: CD006632

Length of Stay



Rotter T, et al. Cochrane Database of Systematic Reviews 2010, Issue 3. Article No.: CD006632

Cost



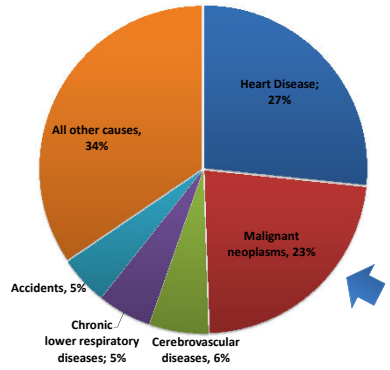
Rotter T, et al. Cochrane Database of Systematic Reviews 2010, Issue 3. Article. No.: CD006632

Why Cancer Clinical Pathways?

- Cancer is second leading cause of death in US
- Direct cancer medical costs nearing $100 billion
- Cancer drugs are expensive and their cost is rising faster than other drugs catagories
- Variation in cancer disease management can exceed 100%
- Availability of national guidelines

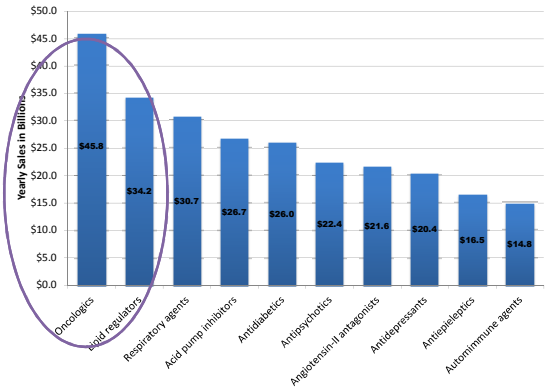
American cancer society: Cancer facts & figures, 2012. Atlanta, GA, 2012. IMS health report: top drug class 2008.

Causes of Death in US



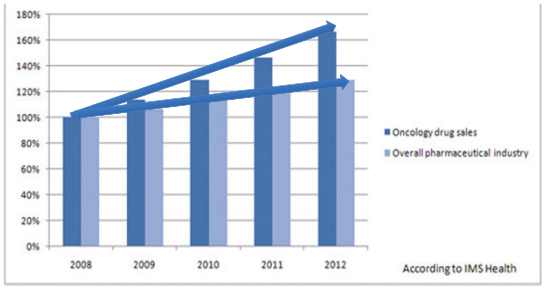
The Burden of Chronic Diseases and Their Risk Factors. 2004 Booklet. Department of health and human services.

Top 10 Drug Classes



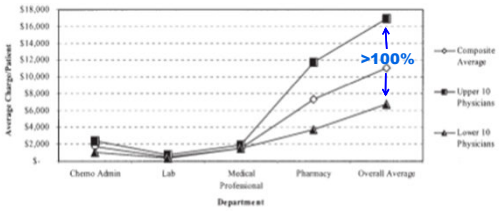
IMS Health Report. Top drug classes of 2008

Expected Sales Growth rate of Oncology Medicines vs. the Pharmaceutical Industry as a Whole



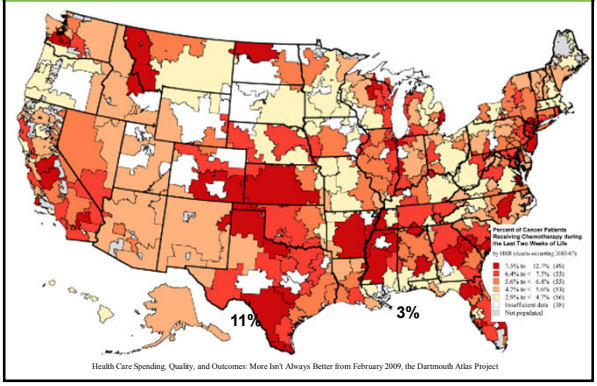
IMS Health Report. Top drug classes of 2008

Cost of Lung Cancer Treatment



Hoverman et al. Disease Management 2004;7:112-123.

Variation of Chemotherapy During the Last Two Weeks of Life



Health Care Spending, Quality, and Outcomes: More Isn't Always Better from February 2009, the Dartmouth Atlas Project

Cancer Treatment Guidelines

Oncology Clinical Pathways

- Defined as a set of treatment standards that should be used in some orderly fashion and consist of:
  - Diagnostics
  - Disease treatment (drug specific)
    - Should include chemotherapy and supportive care
    - Establish set regimen recipes
    - Set regimens to be used by line of therapy
  - Additional disease treatment
    - Surgery, radiotherapy
  - End-of-life care

Neubauer MA, et al. J Oncol Pract. 2010;6:12-18. Butcher L. Oncol Times. 2010;32:11-13.
Ellis PG. Oncol Times 2010;32:46-47.

Oncology Clinical Pathways (Cont.)

- To date, most active pathways have focused on the disease treatment phase of cancer care
- Oncology pathways should combine evidence-based medicine and practicing physician consensus to develop best approach
- Have mainly been applied in the oncology outpatient treatment setting

Butcher L. Oncol Times. 2010;32:11-13. Neubauer MA, et al. J Oncol Prac. 2010;6:12-18. Hoverman JR, et al. J oncol Prac. 2011;7(Suppl 3):52-59. D3 Oncology Solutions website. Accessed Nov., 2012.

Oncology Clinical Pathways (Cont.)

- May support better participation with accountable care organizations (ACO's) and other managed care programs.
- Two published pathway studies show cost savings using strict pathways versus no pathway, with outcomes consistent with published literature.

Butcher L. Oncol Times. 2010;32:11-13. Neubauer MA, et al. J Oncol Prac. 2010;6:12-18. Hoverman JR, et al. J oncol Prac. 2011;7(Suppl 3):52-59. D3 Oncology Solutions website. Accessed Nov., 2012.

Oncology Pathway Parameters

- Oncology pathways should be evidence-based and supported by scientific evidence and nationally recognized guidelines:
  - National Comprehensive Cancer Network (NCCN)
  - American Society of Clinical Oncology (ASCO)
- Pathways are designed to narrow treatment options and guide physicians to preferred treatment strategies
- When managed properly, pathways should maintain or enhance health outcomes and offer a cost benefit (ie., cost-effective care)

Carlson B. Biotechnology Healthcare. 2009; April 23-26.
Dunn JD. Manag Care. 2010;19:35-40.

Oncology Pathway Parameters (Cont.)

- Stakeholders should consider a variety of inputs when picking regimens for a specific pathway
  - Efficacy
  - Tolerability (toxicities)
  - Cost and reimbursement
- Once regimens are selected and standardized, they can be put in order by line of therapy
  - The number and type of regimens available in each line of therapy will indicate how restrictive or more lenient the pathway is.

Pathway Development & Implementation

Development	The pathway is evidence-based and formulated by representative physicians
Dissemination	All affected physicians and healthcare professionals are given the pathway to review, and are expected to critique
Implementation	Guideline should be readily available for reference and caregivers should be prompted to use. Follow-up and updating must be built into process
Accountability	All caregivers must be accountable, typically rewarded through maintaining or increased reimbursement

1. Smith TJ and Hillner BE. *J Clin Oncol*. 2001;19:2886–2897.

Available Oncology Clinical Pathways

- National NCCN
  - These are overall macro guidelines that represent 'clinical practice'
  - Are updated frequently
  - generally discuss all available treatments, do not provide 'best practice' or take cost into consideration
- McKesson/US Oncology
  - Currently, have been in-network (US Oncology) specific (applied across the US)
  - Promote relatively restrictive 'level 1' pathways
    - Have a 'preferred' regimen(s)(generally based on cost), then restrict other choices
  - Have demonstrated cost saving and improved outcome

Available Oncology Clinical Pathways (Cont.)

- UPMC/Via Oncology
  - Based off of UPMC Institutional pathways
  - Implemented by Horizon BCBS
  - These are also relatively restrictive pathways
- Cardinal Health/P4 Healthcare
  - Utilized by several state BCBS's (ie., CareFirst, Michigan)
  - Generally less-restrictive (more treatment options)
  - Provide monetary incentives for use
  - Have demonstrated cost savings

Oncology Pathway Results

- US Oncology: NSCLC 'Level 1' pathway evaluation
- Retrospective, 1409 patients
- 12-month cost of care on vs. off pathway
  - Evaluated:
    - Outpt/Acute care/Hospice visits
    - Chemotherapy/supportive care
    - Laboratory
    - Other
- Chemotherapy and supportive care drugs accounted for most of the decrease ~ 22% and 23%, respectively
- Survival was equivalent

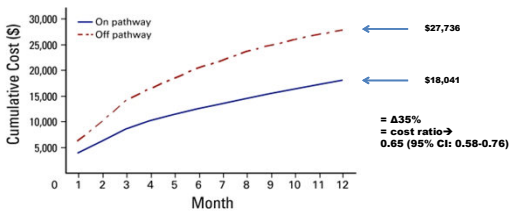
Neubauer MA, et al. JOP 2010;6:12-18.

US Oncology 'Level 1' NSCLC Pathway

- Metastatic: (Squamous cell)
  - First-Line
    - Carboplatin/paclitaxel
    - Vinorelbine (poor PS)
    - BSC
  - Second-Line
    - Docetaxel
    - Erlotinib
    - BSC
  - Third-Line
    - Erlotinib
    - BSC

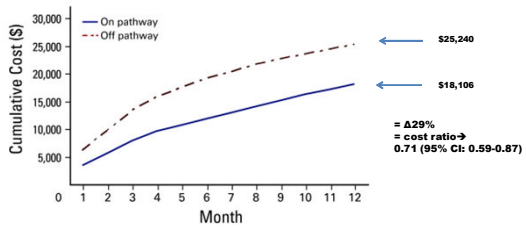
Neubauer MA, et al. JOP 2010;6:12-18

Total Twelve-Month Cumulative Costs



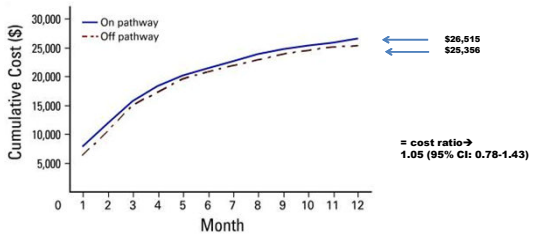
Neubauer MA, et al. JOP 2010;6:12-18.

Twelve-Month First-Line Cumulative Costs



Neubauer MA, et al. JOP 2010;6:12-18.

Twelve-Month Second-Line Cumulative Costs



Neubauer MA, et al. JOP 2010;6:12-18.

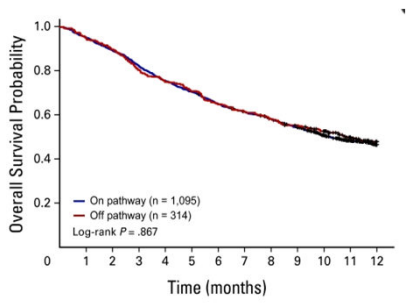
Categorized Costs

Charge Category	On Pathway costs ($) N= 1,095	Off Pathway costs ($) N=314	Expenditure Difference ($)	Cost Ratio	95% CI
Outpatient visits	1,124	1,060	64	1.06	0.99 to 1.11
Acute care visits	437	364	73	1.20	0.95 to 1.46
Chemotherapy	11,839	18,762	−6,923	0.63	0.55 to 0.76
Other medication	4,374	7,198	−2,824	0.61	0.52 to 0.74
ESAs	1,011	1,867	−856	0.54	0.42 to 0.69
CSFs	1,867	2,951	−1,083	0.63	0.52 to 0.83
Laboratory procedures	223	295	−73	0.75	0.67 to 0.84
Minor procedures	33	43	−10	0.78	0.66 to 0.92
Nursing care/hospice	2.68	2.16	0.52	1.24	0.14 to 15.20
Other	1.25	0.99	0.25	1.25	0.39 to 9.04
G codes	7.86	11.94	−4.08	0.66	0.40 to 1.27
Total cost	18,042	27,737	−9,695	0.65	0.58 to 0.76

→22% less infusion visits
→23% lower frequency of administration

Neubauer MA, et al. JOP 2010;6:12-18.

Survival



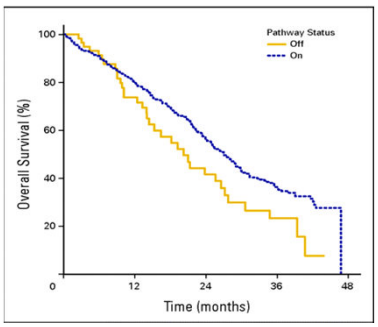
Neubauer MA, et al. JOP 2010;6:12-18.

Oncology Pathway Results

- US Oncology: Colon 'Level 1' pathway evaluation
- Retrospective review of 2 separate databases for on vs. off pathway (adjuvant & metastatic)
  - US Oncology EHR data for DFS and OS (2006 – 07)
    - 910 pts from 11 states (756 on/154 off)
    - DFS (338 pts) ~ 3-yr DFS 73% vs. 41% (p=<0.05)
    - OS (477 pts) ~ median 26.9 mo. vs. 20.1 mo. (p=0.03)
  - MedStat national claims database (4.9 million lives) to look at cost (2005 – 07) (30% difference in cost)
    - Adjuvant ~ $52,640 difference (P=0.001)
    - Metastatic ~ $60,163 difference (p=0.07)

Hoverman JR, et al. JOP 2011;7:52-59.

Median Overall Survival



Median OS
On – 26.9 mo.
Off – 20.1 mo.
HR 1.57 (1.04-2.39)
P=0.03)

Hoverman JR, et al. JOP 2011;7:52-59.

Claims Analyzed Costs

Cost and Use	Adjuvant Values On-Pathway (n = 80)	Adjuvant Values Off-Pathway (n = 70)	Adjuvant P	Metastatic Values On-Pathway (n = 10)	Metastatic Values Off-Pathway (n = 60)	Metastatic P
Member months*						
Mean	17.5	17.1		16.7	17.0	
SD	1.6	2.0		2.6	2.3	
→ Total cost per case, $						
Mean	103,379	156,020	< .001	131,059	191,222	.067
SD	113,272	104,014		107,461	133,649	
→ Per patient per month, $						
Mean	5,907	9,121	≤ .001	7,862	11,244	.102
SD	6,544	6,346		6,554	8,253	
→ Chemotherapy cost, $						
Mean	22,564	60,787	< .001	41,894	65,358	.305
SD	23,145	53,496		24,754	63,488	
→ Chemotherapy period (months)						
Mean	5.7	8.7	< .001	7.5	10.8	.053
SD	3.3	5.2		2.8	6.3	
No. of chemotherapy-related admissions per patient						
Mean	0.23	0.30	.236	0.20	0.43	.181
SD	0.57	0.62		0.42	0.70	

Hoverman JR, et al. JOP 2011;7:52-59.

CareFirst/P4 Pathways

Breast Cancer
- Adjuvant breast
  - Low risk
  - High Risk
  - Her2Neu Positive
- Metastatic Breast
  - Her2Neu Negative
  - Ner2Neu Positive

Colorectal Cancer
- Adjuvant Stage IB, II, IIIa
- Stage III unrestricted
- Stage IV
  - 1st line
  - Maintenance therapy after 1st line
  - 2nd line
  - 3rd line
  - 4th line and further

Non-Small Cell Lung Cancer (NSCLS)
- Adjuvant Colon (stage II and III)
- Metastatic Colon
  - 1st line
  - 2nd line
  - 3rd line

Small Cell Lung Cancer (SCLC)
- Initial
- Failed prior therapy
- 3rd Line

CareFirst/P4 NSCLC Pathway

- Metastatic: NSCLC
  - First-Line
    - Carboplatin + paclitaxel/docetaxel
      - + bevacizumab (non-squamous)
    - Platinum + pemetrexed (non-squamous only)
    - Platinum (carbo/cis)/gemcitabine (squamous only)
    - Erlotinib (EGFR (+) only)
  - Second-Line
    - Any non-cross resistant regimen from first-line
    - Docetaxel
    - BSC
  - Third-Line
    - Erlotinib
    - BSC

Provided with permission, P4 Healthcare

Oncology Pathway Results

- CareFirst/P4: CareFirst BCBS Large-Scale Pathway Evaluation (Maryland, Virginia, Washington DC)
- Measured pathway compliance and costs across a healthcare network
- Evaluated Breast, Lung and Colon Cancer
- Retrospective review of claims & EOB1 database, using a pre-test/post-test design (2007 – 10)
  - Chemotherapy & supportive care
  - Hospitalization
- Overall savings were based on per patient drug and hospital cost changes from yr -1 to yr +2 to expected annual increases of 12% & 7%, respectively

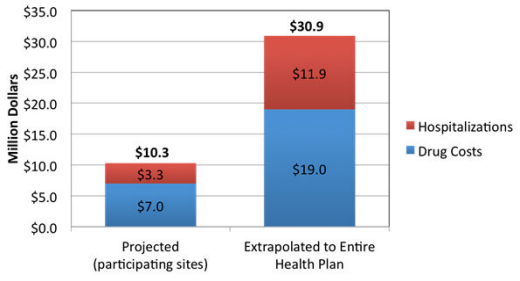
Koeller J, Kreys E. Proc ASCO 2012;30: abst 16522.

Oncology Pathway Results

- 46 sites, representing 4,713 patients and 78,821 claims were reviewed
  - Breast (50%); Lung (28%); colon (22%)
- Compliance by site:
  - Chemotherapy ~ yr +1 (83%) yr +2 (54%)
  - Supportive care ~ yr +1 & +2 (74%)
- Actual cost savings: (projecting no cost increases)
  - Using the yr -1 through yr +2 time frame
  - Drugs ↑$657,000 (2.5% ↑ over 3 yrs)
    - Chemotherapy ↓ $349,000
    - Supportive care ↑ $1,006,000
  - Hospitalization ↓ $2,935,000 (57% ↓ over 3 yrs)
  - Total actual cost savings ~ $2,278,000

Koeller J, Kreys E. Proc ASCO 2012;30: abst 16522.

Cost Savings



So Where Do We Go From Here?

- With the systematic application of resources with rules (ie., pathway), we are then able to collect the data generated from a specific cohort of patients (will have to be something more than claims data), we then can start to look at endpoints, outcomes and cost, and compare different resource applications (ie., comparative effectiveness)
- But, that's another lecture…

Self-Assessment Questions

- In the Rotter's Cochrane Systematic Review of the value of clinical pathways, length of stay was not significantly different between pathway's and 'usual care' of patients
  - A. True
  - B. False
- Which of the following is true concerning pathways in oncology practice
  - A. Most available pathways are consensus-based
  - B. Pathways are designed to narrow treatment options
  - C. Are routinely used in VA hospitals inpatient units
  - D. NCCN pathways are 'best practice' in nature

Self-Assessment Questions

- In the US Oncology colon cancer pathways study published by Hooverman looking at on/off pathway use, the data showed:
  - A. A statistical difference in DFS
  - B. Overall survival was not statistically different
  - C. The difference in adjuvant treatment cost was $10,200
  - D. The difference in metastatic cost was not significant