Value Assessment of Technology: The Pharmacotherapy Outcomes Research Center, College of Pharmacy

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The University of Utah Pharmacotherapy Outcomes Research Center

Agenda

- Background on Effectiveness Research
- The Pharmacotherapy Outcomes Research Center
- Case Studies
  - Evaluation of exenatide in national EMR database
  - Utah Medicaid Exclusivity Analysis in Statins
  - Down Syndrome Research Plan
  - Other ongoing research programs
- Summary

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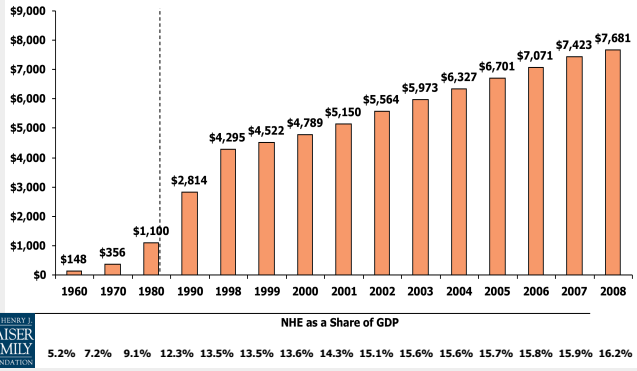
National Health Expenditures per Capita and Their Share of Gross Domestic Product,1960-2008



THE HENRY J. KAISER FAMILY FOUNDATION

Source: Centers for Medicare and Medicaid Services, Office of the Actuary, National Health Statistics Group, at http://www.cms.hhs.gov/NationalHealthExpendData/ (see Historical; NHE summary including share of GDP, CY 1960-2008; file nhegdp08.zip).

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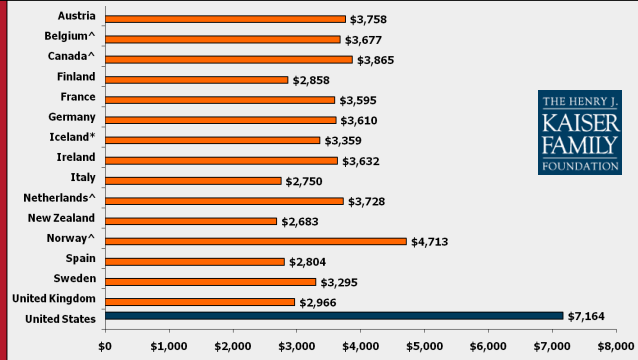
Per Capita Total Current Health Care Expenditures, U.S. and Selected Countries, 2008



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^OECD estimate.
*Differences in methodology.

Notes: Amounts in U.S.$ Purchasing Power Parity, see www.oecd.org/std/ppp includes only countries over $2,500. OECD defines Total Current Expenditures on Health as the sum of expenditures on personal health care, preventive and public health services, and health administration and health insurance; it excludes investment.

Source: Organization for Economic Co-operation and Development. OECD Health Data 2010, from the SourceOECD Internet subscription database updated June 2010. Copyright OECD 2010, http://www.oecd.org/health/healthdata Data accessed on 07/02/10.

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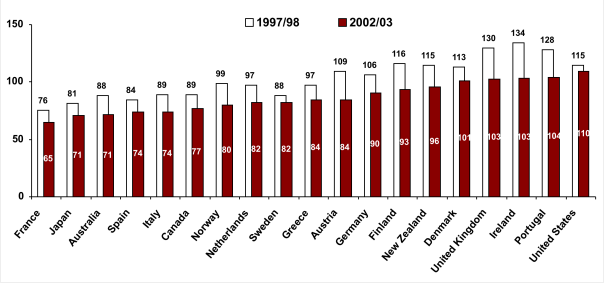
Mortality Amenable to Health Care

HEALTHY LIVES

Deaths per 100,000 population*



* Countries' age-standardized death rates before age 75; including ischemic heart disease, diabetes, stroke, and bacterial infections.
See report Appendix B for list of all conditions considered amenable to health care in the analysis.
Data: E. Nolte and C. M. McKee, London School of Hygiene and Tropical Medicine analysis of World Health Organization mortality files (Nolte and McKee 2008).

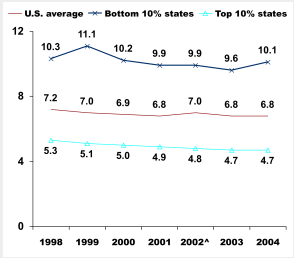
Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008

Infant Mortality Rate

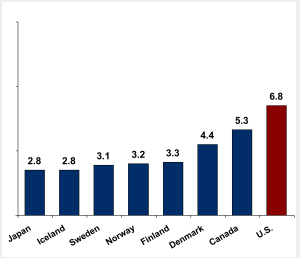
HEALTHY LIVES

Infant deaths per 1,000 live births

National Average and State Distribution



International Comparison, 2004



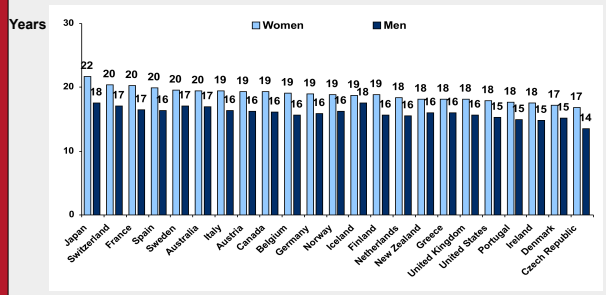
^ Denotes baseline year.
Data: National and state—National Vital Statistics System, Linked Birth and Infant Death Data (AHRQ 2003, 2004, 2005, 2006, 2007a); international comparison—OECD Health Data 2007, Version 10/2007.

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008

Healthy Life Expectancy at Age 60, 2002

HEALTHY LIVES

Developed by the World Health Organization, healthy life expectancy is based on life expectancy adjusted for time spent in poor health due to disease and/or injury



Note: Indicator was not updated due to lack of data. Baseline figures are presented.
Data: The World Health Report 2003 (WHO 2003, Annex Table 4).

Source: Commonwealth Fund National Scorecard on U.S. Health System Performance, 2008

When you spend more than you have ….

- Where the expenditure on health grows faster than the national health budget, there are 3 reactions possible.
  1. Increase funding sources
  2. Improve system functioning for better efficiency
  3. Ration public financing of medical services
- There are various examples in countries around the world where each one of these approaches are used differently.
- The United States has defined their approach as "Healthcare Reform."

U.S. Healthcare Reform Goals

- To deliver near-universal access to U.S. citizens.
- To identify funding and savings as an additional goal of the healthcare reform initiative.
- To create a system that is sustainable over the long term.
- In order to do so, payment reform as well as an emphasis upon quality, efficiency, wellness, and prevention will be required.

Defining Value in Healthcare

Comparative Effectiveness

- The generation and synthesis of evidence that compares the benefits and harms of alternative methods to prevent, diagnose, treat, and monitor a clinical condition or to improve the delivery of care.
- The purpose of CER is to assist consumers, clinicians, purchasers, and policy makers to make informed decisions that will improve health care at both the individual and population levels.

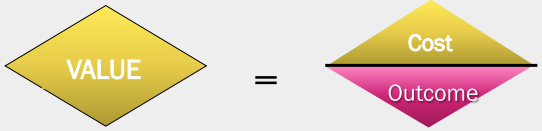
Comparative Effectiveness Research, Institute of Medicine, 2009

Patient Centered Outcomes Research Institute (PCORI); an independent, non-profit organization

- A project agenda based on the burden of diseases in the U.S., particularly chronic conditions.
- Primary research and systematic reviews of existing studies.
- Research conducted for the institute will be peer reviewed and made available to the medical community and general public.
- AHRQ is authorized to take proactive steps to disseminate the findings to physicians, health care providers, patients, insurance providers, and health care technology vendors.
- The bill also calls for AHRQ to award grants for training in the research methods used by the institute.

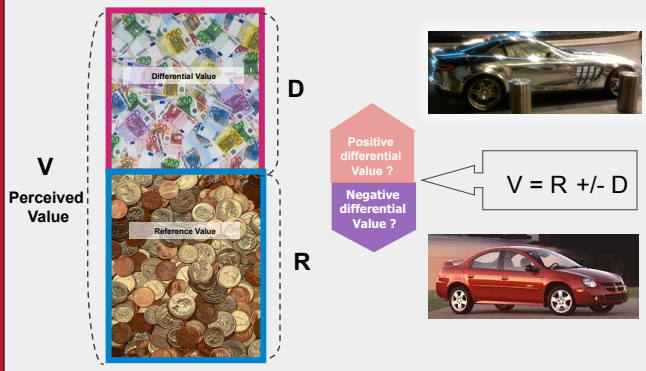
Key Issues for Private and Public Payers

- Healthcare is getting too expensive
- We need to prioritize
  - Step 1: Do not pay for treatments which do not deliver value
  - Step 2: Define Value: How much do we pay for what we get?



Value is Comparative

The perceived value of a *product* to a *customer* is based on….



Source: PriceSpective

Efficacy / Effectiveness

- **Efficacy**
  - RCT
  - High internal validity
  - Limited generalizability
- **Effectiveness**
  - Observational studies
  - High external validity
  - Lack of Controls

Payers Want Information Beyond RCTs . . .

Efficacy and safety in a small population with a restricted study protocol

RCT
Randomized Clinical Trials

GAP

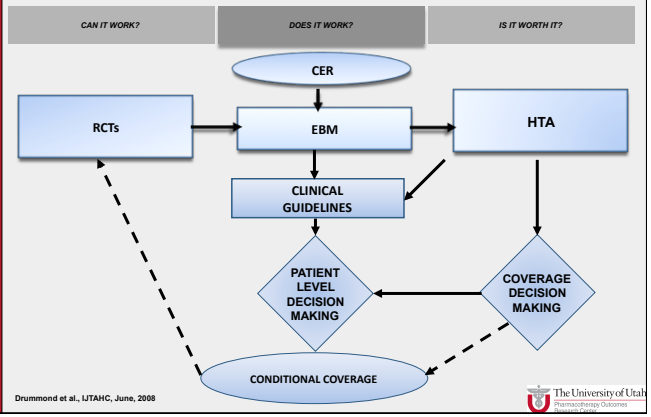
Patient Population

Decision makers need real world information to make health care decisions for large populations within defined budgets

Real World Data

ISPOR Real World Task Force Draft, July 25, 2006

Answering Basic Questions



Drummond et al., IJTAHC, June, 2008

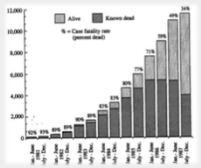
What Are Health Outcomes?

"Outcomes beyond safety and efficacy which capture *the psychological, social, physical, functional and economic* impact of disease and treatment for the individual and society."

Identifying Health Related Outcomes

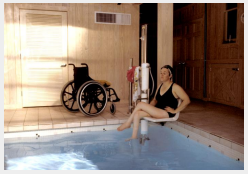
- **Economic outcome**
  - Hospitalizations avoided
  - Worker productivity

- **Clinical outcome**
  - **Clinical efficacy/effectiveness – cure rate**
  - **Relief / reduction in symptoms**
  - **Decreased/increased incidence of morbidity**
  - **Mortality**



Identifying Health Related Outcomes

- **Humanistic outcome:**
  - Health Related Quality of Life (QoL)
  - Patient satisfaction and compliance
  - Ability to perform activities
- **Challenges:**
  - Identifying relevant outcomes
  - Valuing outcomes



PERSPECTIVE

Who and Where

What and When

Costs to Consider for Drugs

- Drug Acquisition Costs
- Preparation Costs
- Offset of Medical Costs
- Cost of Adverse Events
- Cost of Treatment Failures
- All are components of true drug cost

When is Economic Evaluation Necessary?

Drug A relative to the alternative B

	Drug A: More Costly	Drug A: Less Costly
Drug A: More Effective	PE Study necessary	Drug A – Optimal Strategy: Study not necessary
Drug A: Less Effective	Drug B is Optimal Choice: PE Study not necessary	PE Study necessary

US Health Technology Assessment Examples

- Blue Cross Blue Shield Technology Evaluation Center (TEC)
- Wellpoint Comparative Effectiveness Guidelines
- AMCP's Format for Formulary Submissions
- Oregon's Drug Effectiveness Review Project (DERP)
- Agency of Healthcare Policy & Research (AHRQ)
  - Evidence Based Practice Centers (EPCs)
  - Centers for Education and Research on Therapeutics (CERTs)
  - Developing Evidence to Inform Decisions about Effectiveness (DEcIDE) Program
  - Comparative Effectiveness Reports

Utilization of the AMCP Format

- >150 million members in health plans are exposed to the AMCP *Format.*
- Health plans are in different stages of AMCP *Format* implementation
- Wide acceptance by pharmaceutical companies – building Dossiers into overall development and reimbursement planning
- Similar submission requirements in other countries – Great Britain, Australia, Canada, other countries

Who is Using Real World Data?

- **Germany**
  - Institut für Qualität und Wirtschaftlichkeit im Gesundsheitswesen (IQWiG)
    - RCTS for clinical evidence
    - Less reliance on modeling
- **Australia**
  - Pharmaceutical Benefits Advisory Committee (PBAC)
    - Clinical evidence for approval
    - Clinical evidence for reimbursement

ISPOR Real World Task Force Report, July 25, 2006

Who is Using Real World Data?

- **United Kingdom**
  - National Institute for Clinical Effectiveness (NICE)
    - Clinical evidence
    - Modeling for real world effectiveness
- **Canada**
  - Canadian Agency for Drugs and Technologies in Health (CADTH)
    - Canadian Drug Review (CDR) process

ISPOR Real World Task Force Report, July 25, 2006

Who is Using Real World Data?

- **United States**
  - Medicare Modernization Act (MMA) 2003
    - Section 1013
  - Agency of Healthcare Policy & Research (AHRQ)
    - Comparative clinical effectiveness
    - Appropriateness of health care
  - Academy of Managed Care Pharmacy (AMCP)
    - Format Dossiers

ISPOR Real World Task Force Draft, July 25, 2006

Pharmacotherapy Outcomes Research Center

Mission:

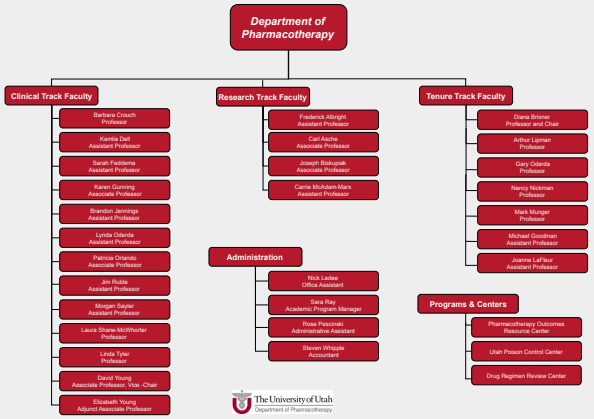
Design, conduct and communicate outcomes research studies to demonstrate the value of new technologies in the treatment of disease

The University of Utah
Pharmacotherapy Outcomes Research Center

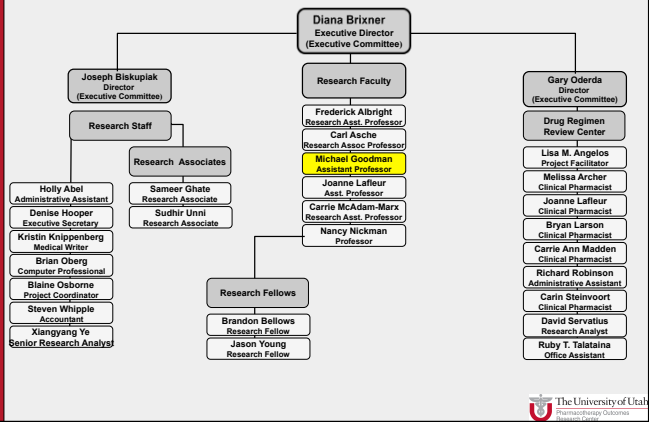
Center Objectives

- Define the research question to define “value”
- Work with payer organization or sponsor in the design of research projects and selection of appropriate database to answer the question
- Publish study results through professional meetings and peer-reviewed publications

Department of Pharmacotherapy Organization Chart



PORC Organization Chart



PORC's Skills Base

- Health economics
- Modeling
- Various clinical subspecialties
- Drug information (pharmacoepidemiology)
- Statistical analysis
- Programming
- Psychometrics
- Database management
- Internationally recognized in Outcomes Research and Health Technology Assessment

Data Base Expertise

- PORC has research experience and access to numerous secondary datasets
  - Commercial claims
  - Medicaid claims
  - Electronic medical record (EMR)
- Core competencies in multiple database types enables PORC to utilize the most appropriate data to address outcomes research questions in the target population

Data Base Expertise

- National Commercial Insurance Claims
- U.S. and Utah Medicaid claims
- Electronic medical record (EMR); national and regional
- Medicare (Part A&B)
- UUHC Enterprise Datawarehouse
  - Community Clinics (EPIC)
  - Cerner (Inpatient; hospital clinics)
  - UPDB
- Government Supported Databases
  - NHANES
  - NAMCS

Key Accomplishments 2007-2010

- 2005 - 2010 Publications
  - Published: *113*
  - Posters: *154*
  - Invited Presentations: *66*
- M.S. program *5*
- Graduated fellows *9*
- Visiting faculty program *on going*
- PhD Program approved in 2010 in Pharmacotherapy Outcomes and Health Policy
- Total Dollars in research grants since 2004 *11.4 Million*

Case Studies

University Based Research

- **Oncology**
  - Resource Use and Cost across 7 different cancers using EDW and UPDB.
  - Evaluation or radiation therapy in bone metastasis of breast and prostate cancer.
- **Sarcopenia**
  - Development of predictive model based on NHANES.
  - Validation in Community Clinic patients.
- **Orthopedics**
  - Evaluation of anesthesiology techniques in pain management.
- **Physical Therapy**
  - Assessment of outcomes and cost in back pain management.
- **Community Clinic Research**
  - Assessment of diabetes intervention programs by pharmacists in the Community Clinics.
- **UU Brain Institute**
  - Collaboration on assessment of QoL in Down Syndrome Patients

National Database Work

- Adherence based on weight loss in diabetes
- Cardiovascular outcomes in atrial fibrillation patients
- Impact of generic to brand switching in warfarin patients
- Evaluation of discontinuation of treatment in HCV and HIV
- Development of a cost model for obesity management
- Osteoporosis risk stratification for treatment in the VA setting

Six-month outcomes on A1C and cardiovascular risk factors in patients with type 2 diabetes treated with exenatide in an ambulatory care setting

D. I. Brixner,[1] C. McAdam-Marx,[1] X. Ye,[1] K. S. Boye,[2] L. L. Nielsen,[3] M. Wintle,[3] D. Misurski[2] and R. Fabunmi[2]
[1]University of Utah, Pharmacotherapy Outcomes Research Center, Salt Lake City, UT, USA; [2]Eli Lily and Company, Indianapolis, Indiana; [3]Amylin Pharmaceuticals, San Diego, CA, USA

Diabetes Obes Metab. 2009 Dec;11(12):1122-30.
file://localhost/Diabetes Obes Metab. 2009 Dec%3B11(12)/1122-30.

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Study Population

EMR Population Jan 1, 2000 to June 30, 2007; N = 7,935,736

↓

T2DM population ≥18 years and older; n = 564,170 (7.1%)

↓

Eligible patients after exenatide prescription inclusion; n = 12,745 (2.3%)

↓

Eligible patients after continuous activity applied; n = 5,961 (46.8%) (≥395 days pre and 6 month post index date)

↓

Eligible patients with data for at least one outcome measure pair; n =4,823 (80.9%)

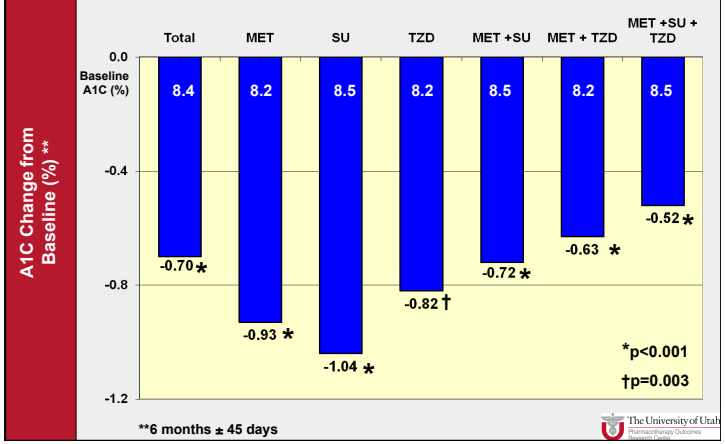
↓

Eligible patients after treatment medication identified; n = 2,086 (43.3%)

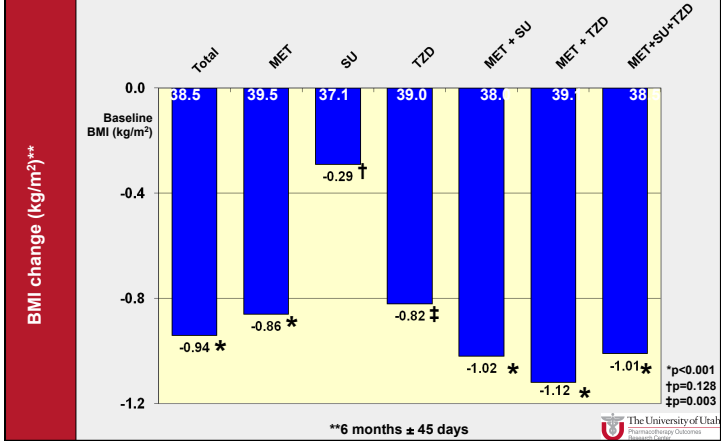
Characteristics of Study Population

Age mean age 55.9 years (10.7sd)	<40	146	7.0%
	40-64	1482	71.0%
	≥ 65	458	22.0%
Gender	Male	885	42.4%
Race	Caucasian	825	39.5%
	Black	80	3.8%
	Hispanic	20	1.0%
	Other	11	0.5%
	Unknown	1150	55.1%
Region	Northeast	394	18.9%
	Southeast	928	44.5%
	Midwest	618	29.6%
	West	146	7.0%
Clinical Characteristics	Mean A1C (%)	8.5	1.2 sd
	Mean BMI (kg/m^2)	38.5	7.9 sd
	Mean Weight (lbs)	243.4	54.8 sd

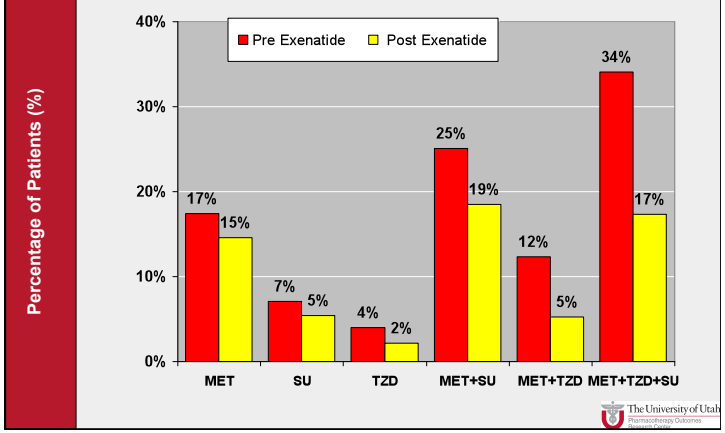
Percent Change in A1C After Exenatide Initiation**



BMI (kg/m^2) Change After Exenatide Initiation**



Proportion on a Select OAD Before and After Exenatide Initiation



Conclusions

- Average baseline A1C (8.5%) and BMI (38.5 kg/m^2) was high in this T2DM population.
  - It is difficult for T2DM patients to achieve A1C and body weight goals in the real world.
- Exenatide therapy over 6 months demonstrated significant reductions in A1C, weight and BMI.
  - Results were consistent with clinical trial data.
- Use of concomitant medications decreased when exenatide was added.

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Documentation of Pharmacy Cost

Pharmacy Cost in the Preparation of Chemotherapy Infusions

- Determine key components of pharmacy-related costs in preparation of chemotherapy infusions
- Project data from four centers to national insurance claims database
- Describe implications of resources and costs on reimbursement policy under MMA of 2003

Brixner DI, Oderda GM, Nickman NA, Beveridge R, Jorgenson JA. (2006). Journal of the National Comprehensive Cancer Network, United States,4(3),197-208.

Documentation of Pharmacy Cost

Survey: Fixed-Cost Analysis

Key Cost Variables

- Drug Storage
- Space Rental
- Inventory Management
- Insurance Management
- Waste Management
- Payroll
- Equipment
- Supplies
- Shipping
- Information Resources

Fixed Cost Survey

- Annualized pharmacy-related production costs
- No purchasing costs
- No patient administration costs

Documentation of Pharmacy Cost

Survey: Time-and-Motion Analysis

Analysis Description

- Stopwatch study of at least 10 infusion production occurrences
- Pharmacist/Technician activities to produce chemotherapy and supportive agents
- Describes details of clinical and cognitive activities related to oncology pharmacy services

Major Components

- Therapy Evaluation
- Professional Consultation
- Patient Care
- Order Entry/ Compounding
- Production/Evaluation

Documentation of Pharmacy Cost

National Projection Results

Infusion Preparation Costs for Medicare Patients Receiving Chemotherapy

		Patients	Infusions
Total *		**427,605**	**2,651,824**
Proportion of Chemotherapy Infusions from Top 15 Agents	**0.66**		
Projected Medicare Chemotherapy Infusions			**3,990,495**
Number of Infusions X Calculated Cost/Infusion from Current Study	**$36.03**		**$143,777,535**

* *MedStat Marketscan® Medicare and COB Database*

Summary

- Due to increased healthcare spending reimbursement decisions for new health technology has become more rigorous.
- Decision making on reimbursement now more commonly considers the principles of health economics and outcomes research.
- The PORC conducts outcomes research to develop the evidence used in health care decision to public and private payers involved in allocating resources for new technologies.

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