REWARDS FOR INNOVATION:
Do we Capture the Value of Innovation in Economic Analyses of Health Care Technology to Provide Appropriate Rewards to Innovators?

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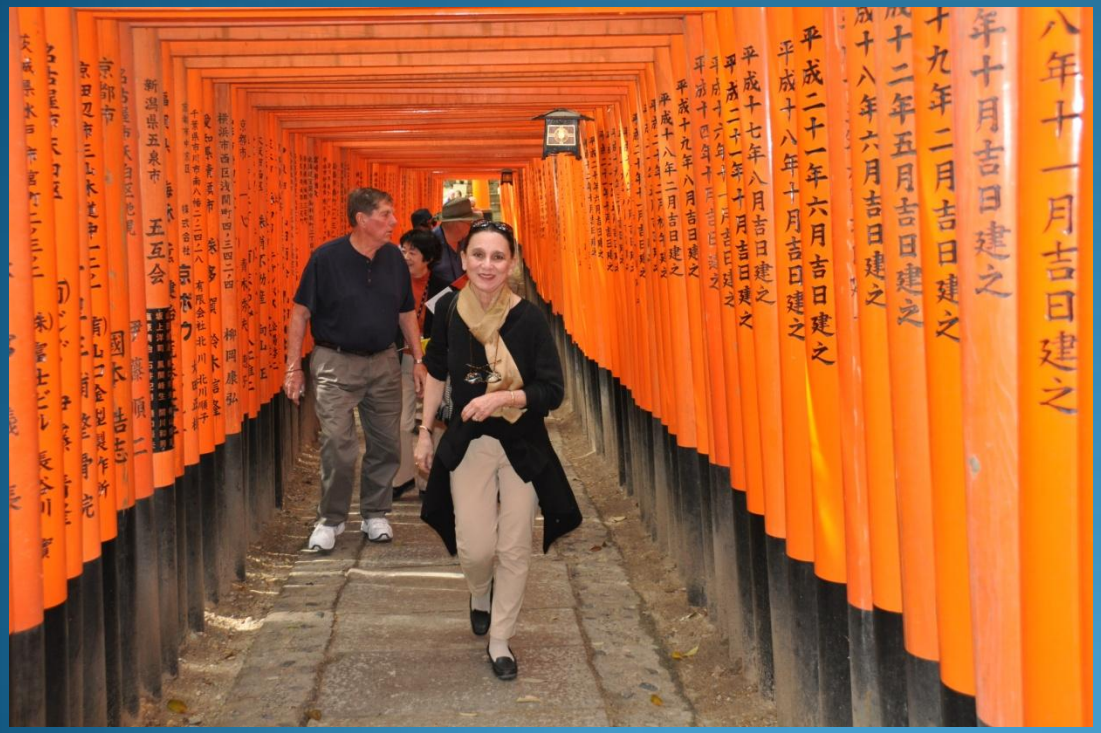
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Economic Analysis of Health Technology

- What is commonly included?
  - Life Extension
  - Health Status / Quality of Life
  - Direct Health Care Costs Avoided
- What is not commonly included?
  - Indirect Costs
    - Care-giver Burden & Family Effects
    - Productivity: Absenteeism / Presenteeism

More commonly included in CBA?
Rarely included in CEA.

Can build on an existing research agenda

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Implications of spillover effects within the family for medical cost-effectiveness analysis

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We conclude that cost-effectiveness analyses may better reflect the full costs and benefits of medical interventions if they incorporate these family effects. However, concerns about equity present a dilemma for the practice of CEA from the societal perspective.

Global workplace productivity not a World Cup goal

By DAVID RISING (AP) – Jul 5, 2010

BERLIN — Told they couldn't watch the World Cup on the job, Italian auto workers went on strike — conveniently, a half hour before game time. German companies set up office viewing areas to keep employees from defecting on game days.

And Brazil? Brazil basically shuts down when its team plays, with businesses and schools closed and elective surgery put off so people can be in front of a TV.

The soccer tournament is the world's most watched sporting event, and the fact that it comes around only once every four years is probably fortunate for anyone trying to get some work done.

One study suggests the German economy, Europe's largest, loses more than $8 billion in productivity, about 0.27 percent of gross domestic product, during the month long tournament. Surveys in Britain predict output losses there of $1.5 billion to $2.3 billion.

And that's just two of the 214 countries and territories where the 2006 World Cup drew the cumulative viewership of 26 billion people. That's a lot of eyes not on the job.

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FAST TRACK ARTICLE

The Assessment of Chronic Health Conditions on Work Performance, Absence, and Total Economic Impact for Employers

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Catherine M. Baase, MD
Claire E. Sharda, RN, MBA
Ronald J. Ozminkowski, PhD
Sean Nicholson, PhD
Gary M. Billotti, MS
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Marc L. Berger, MD

Objective: The objective of this study was to det

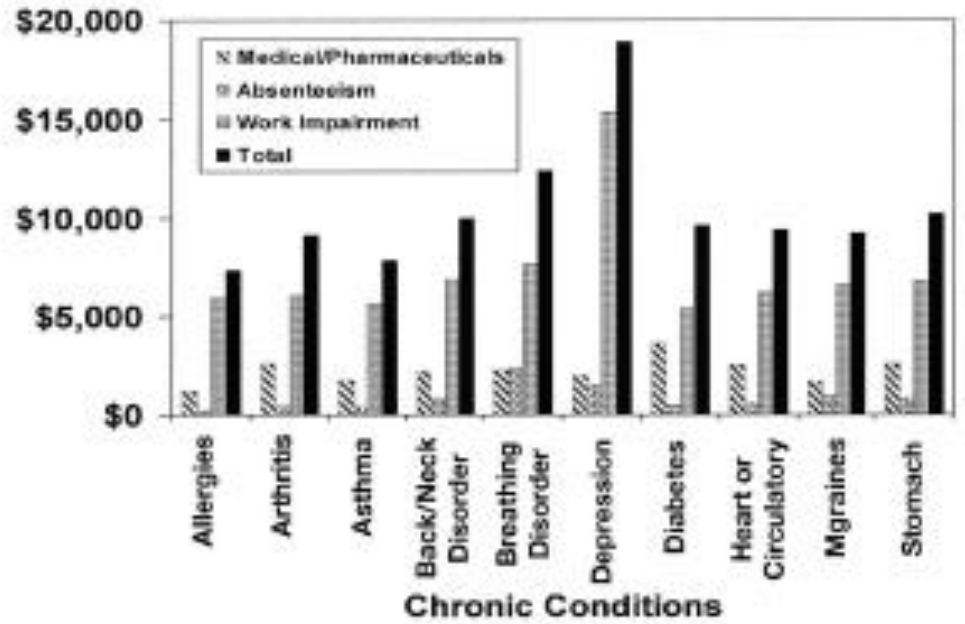

Fig. 3. Chronic Conditions.

JOEM • Volume 51, Number 4, April 2009

FAST TRACK ARTICLE

Health and Productivity as a Business Strategy: A Multiemployer Study

Ronald Loeppke, MD, MPH
Michael Taitel, PhD
Vince Haufle, MPH
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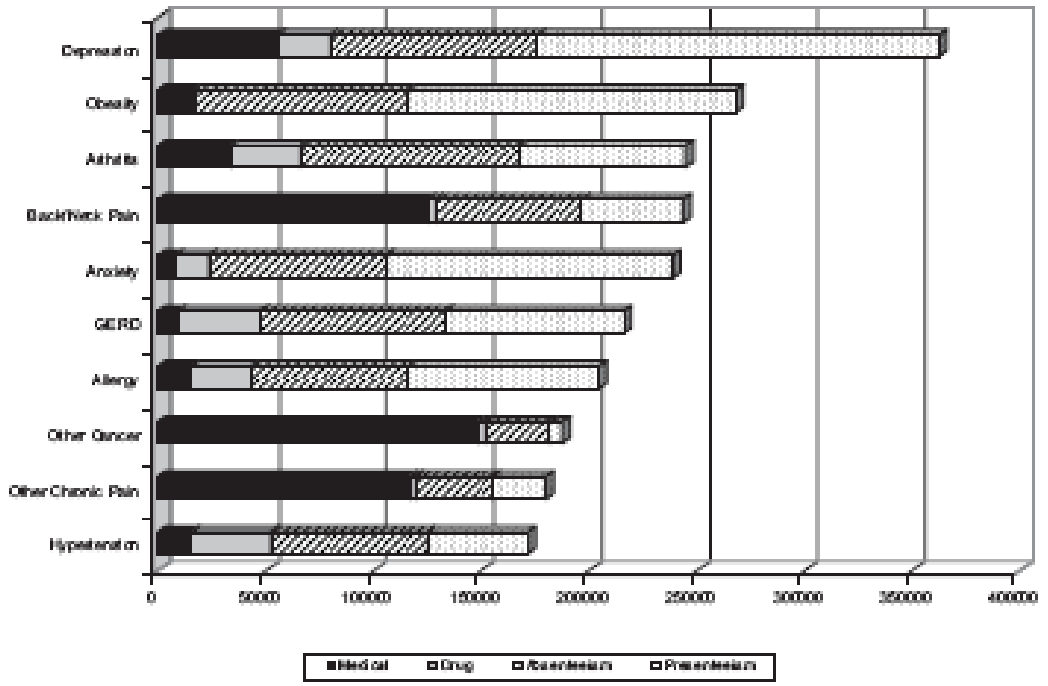

Fig. 1. Top 10 health conditions by annual medical, drug, absenteeism and presenteeism costs per 1000 FTEs for phase 2 companies.

Productivity impact > Direct Medical Costs; More research needed to establish importance of presenteeism

HEALTH ECONOMICS
Health Econ. **17**: 469–485 (2008)
Published online 12 July 2007 in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/hec.1266

VALUING REDUCTIONS IN ON-THE-JOB ILLNESS: 'PRESENTEEISM' FROM MANAGERIAL AND ECONOMIC PERSPECTIVES

MARK V. PAULY[a,*,†], SEAN NICHOLSON[b,‡], DANIEL POLSKY[c,‡], MARC L. BERGER[d,§] and CLAIRE SHARDA[e,¶]

Table II. Estimated absence multipliers

Job type	Observations	Absence multipliers
Auto service technicians	19	1.05
Hotel maids	22	1.05
Customer service reps	15	1.10
Receptionists – MD office	16	1.10
Waiters/waitresses	29	1.10
Automobile sales	37	1.10
MD office receptionists	16	1.10
Cashiers	26	1.15
Medical assistants	11	1.20
Team assemblers	14	1.25
Hotel desk clerks	18	1.25
Legal secretaries	20	1.27
Construction workers	21	1.35
Cooks	19	1.36
Truck drivers	41	1.50
RNs	49	1.52
LPNs	17	1.52
Retail sales – department store	15	1.60
Office clerks – auto or department store	27	1.89
Paralegals	16	2.00
Carpenters	11	2.00
Engineers	25	2.04

More research needed to establish network impact of impaired productivity

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FAST TRACK ARTICLE

Investing in Healthy Human Capital

Marc L. Berger, MD
Robert Howell, PhD
Sean Nicholson, PhD
Claire Sharda, RN, MBA

TABLE 2
Excluded Corporate Assets

Technology	
Internal innovation, R&D, information systems, software	
Sales	
Customer base and records on preferences, credit	
Market	
Brand equity, distribution channels, geographic presence	
Contractual	
Licensing agreements, royalties	
Organizational (management)	
Corporate culture, business model, policies/procedures	
Statutory	
Intellectual property: patents, copyrights	
Workforce (human capital)	
Technical expertise, trained staff, proven managers, recruiting/retaining/training expertise	

Adapted from: "Getting a Grip on Intangible Assets," Harvard Management Update 2001

TABLE 3
Intel (2001) General Income Statement

		Estimated Human Capital
Revenues	$ 26.6 Billion	
Less cost of sales	($ 13.5)	$ 1.5 Billion
Gross margin	$ 13.1 Billion	
Less operating expenses		
R & D	($ 4.0)	$ 3.5 Billion
Marketing, G & A	($ 4.5)	$ 3.5 Billion
Earnings before interest & taxes	$ 4.6 Billion	
Less amortization of goodwill, other intangible assets	($ 2.3)	
Losses on equity securities	($ 0.5)	
Earnings before taxes	$ 2.2 Billion	
Less taxes	($ 0.9)	
Net income	$ 1.3 Billion	
Total		$ 8.5 Billion

Market Value = $ 300 Billion
Book Value = $ 36 Billion
Valve Gap = $264 Billion

TABLE 4
Intel Expenses Related to Human Capital and Other Assets, 2001

Proportion of value gap due to human capital	40%	50%	60%
Value gap due to human capital ($ B)-VGH	105.6	132	158.4
Value gap due to other assets ($ B)-VGO	158.4	132	105.6
Book value + value gap due to other assets ($ B)	194.4	168	141.6
Human capital expenses ($ B)-HCE	8.5	8.5	8.5
All other expenses ($ B)-AOE*	13.5	13.5	13.5
Human capital expense rate (HCE/VGH)	8.0%	6.4%	5.4%
All other asset expense rate (AOE/VGO)	7.1%	8.2%	9.8%

* AOE = (cost of sales + operating expenses) − total Estimated Human Capital

Research needed into alternative accounting practices;
Modeling guidelines need to advocate for incorporation of productivity

Economic Analyses are largely based on the results of RCTs

Does this bias for or against the value provided by innovation?

- Bias For
  - Efficacy typically better than effectiveness
    - **→ SHOULD BE ADDED AS SENSITIVITY ANALYSIS TO CEA BASED ON RCTs**
- Bias Against
  - Only employs initial cost of new technology
    - Does not look at "product life-time" weighted average cost across patent protected and generic periods
      - Patent system is supposed to allow capture of reasonable profits to innovator based upon ; however, effective patent life is decreasing; competition is increasing; development costs are increasing; R&D efficiency has been decreasing
- Bias Unclear
  - Impact of schedule/mode of delivery/other services on adherence and compliance
    - Issues: Assessment methods beyond medication possession ratio
      - **→ NEED A RESEARCH AGENDA** (how to measure, how to influence)
    - Has been the basis for market access schemes

METHODS

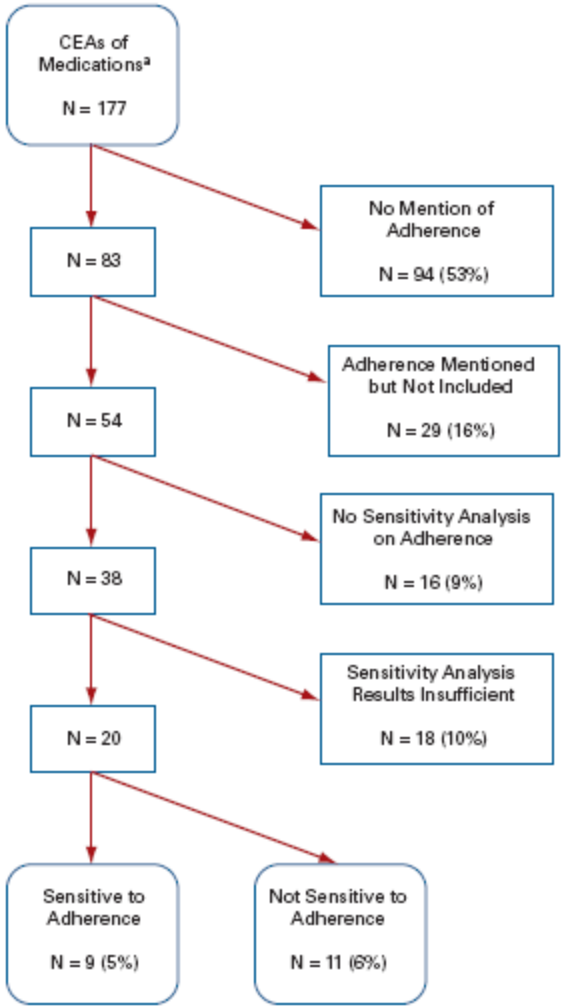
Patient Adherence: A Blind Spot in Cost-Effectiveness Analyses?

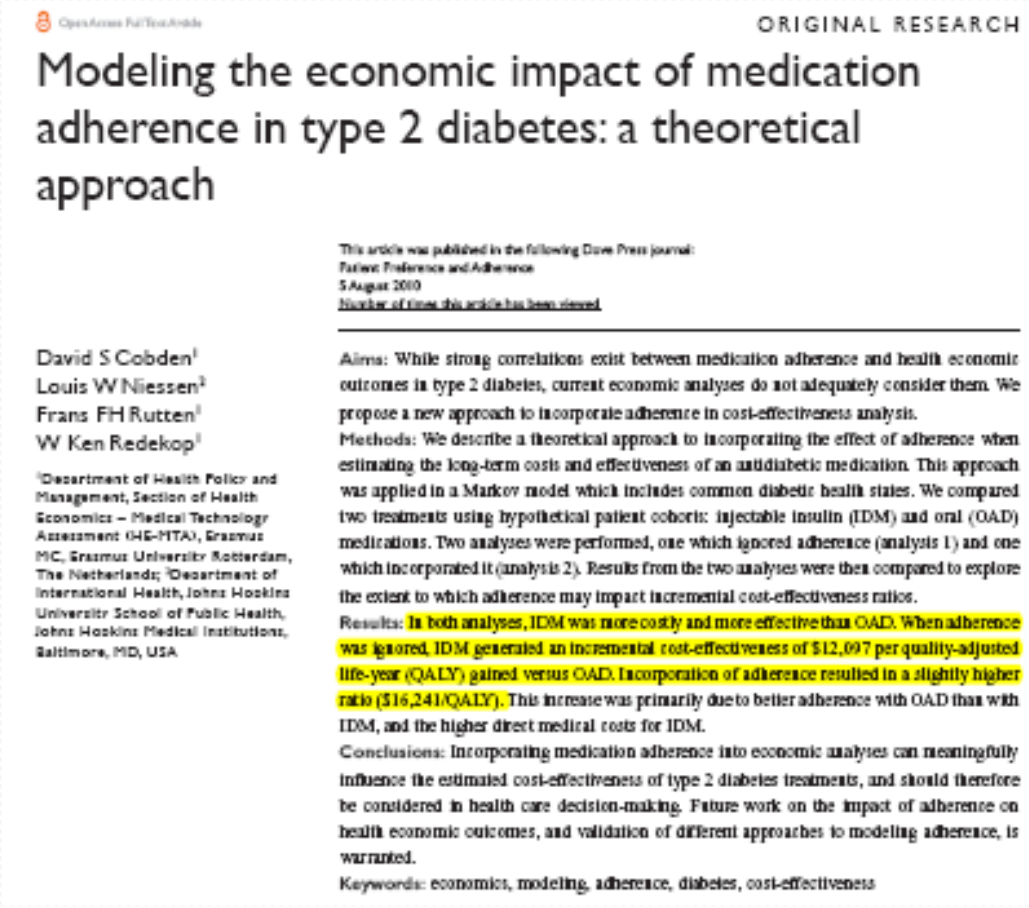
Allison B. Rosen, MD, MPH, ScD; Alicen B. Spaulding, MPH; Dan Greenberg, PhD; Jennifer A. Palmer, MS; and Peter J. Neumann, ScD

Conclusions: Few CEAs modeled suboptimal medication adherence. As CEAs are meant to model "real world" costs and effects of interventions, investigators would do well to explicitly consider medication adherence in the future.

(Am J Manag Care. 2009;15(9):626-632)

Figure 1. Flow Chart of Adherence Inclusion in Cost-Effectiveness Analyses of Self-Administered Medications





ORIGINAL RESEARCH

Modeling the economic impact of medication adherence in type 2 diabetes: a theoretical approach

This article was published in the following Dove Press journal:
Patient Preference and Adherence
5 August 2010
Number of times this article has been viewed

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Aims: While strong correlations exist between medication adherence and health economic outcomes in type 2 diabetes, current economic analyses do not adequately consider them. We propose a new approach to incorporate adherence in cost-effectiveness analysis.

Methods: We describe a theoretical approach to incorporating the effect of adherence when estimating the long-term costs and effectiveness of an antidiabetic medication. This approach was applied in a Markov model which includes common diabetic health states. We compared two treatments using hypothetical patient cohorts: injectable insulin (IDM) and oral (OAD) medications. Two analyses were performed, one which ignored adherence (analysis 1) and one which incorporated it (analysis 2). Results from the two analyses were then compared to explore the extent to which adherence may impact incremental cost-effectiveness ratios.

Results: In both analyses, IDM was more costly and more effective than OAD. When adherence was ignored, IDM generated an incremental cost-effectiveness of $12,097 per quality-adjusted life-year (QALY) gained versus OAD. Incorporation of adherence resulted in a slightly higher ratio ($16,241/QALY). This increase was primarily due to better adherence with OAD than with IDM, and the higher direct medical costs for IDM.

Conclusions: Incorporating medication adherence into economic analyses can meaningfully influence the estimated cost-effectiveness of type 2 diabetes treatments, and should therefore be considered in health care decision-making. Future work on the impact of adherence on health economic outcomes, and validation of different approaches to modeling adherence, is warranted.

Keywords: economics, modeling, adherence, diabetes, cost-effectiveness

Patient Preference and Adherence 2010:4 283-290

Injected insulin was more costly and more effective than oral diabetes medications

Unadjusted for Adherence
ICER = $ 12, 097/QALY

Adjusted for Adherence
ICER = $ 16, 241/QALY
due to assumption of better adherence with oral medications based upon MPRs from Observational studies

Additional Issues

- What is the appropriate frame for CEA? Can CEA incorporate considerations of distributional justice?
  - Payer vs Health System vs Society
  - Nation vs World
    - How should the reward for innovation be distributed?
      - Current Regime: Willingness-to-pay
      - Ability-to-pay
        - Differential pricing based upon ability to pay would maximize global social welfare
          - Challenges: re-importation and international reference pricing

Additional research needed on benefits of differential pricing
Additional research needed on relative roles of health care and healthcare technology on social welfare

Additional Issues

- CEA Thresholds and Incentives for Innovation
  - Original CEA threshold set based upon US funding of renal dialysis ($50,000/QALY)
    - It's never been updated ($120,090/QALY)
    - Braithwaite et al: acceptable range is $95,000 to $264,000/LYG*
  - CEA threshold focus is on optimizing resource allocation; not incentive for future innovation
    - Current focus in HTA shifting towards affordability and budget impact; little political appetite to consider upward adjustment of threshold
    - Nevertheless, should there be a analytic framework developed to incorporate incentives for innovation based upon health and health care priorities?

Braithwaite, Meltzer, King et al. What does the value of modern medicine say about the $50,000 per quality-adjusted life-year decision rule? *Med Care* 2008; 46:349-356

Summary and Conclusions

- Current economic models largely focus on direct costs
  - Productivity benefits are ignored and represent a significant proportion of overall societal benefit
  - Productivity loss can be measured and can be incorporated into CEA
- CEA is largely based on RCTs and do not address real-world effectiveness
  - Adherence/compliance impacts can be incorporated into CEA
- CEAs most commonly take a payer/national viewpoint
  - Issues of transnational burden of rewards for innovators and distributional justice can be considered in CEA
- CEA thresholds as decision rules would require re-examination to directly incorporate incentives for innovation


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