An Employer Case for Population Health:
Quantifying the Direct and Indirect Costs of the Top 20 Health Condition Cost Drivers at One Employer

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Presenter Disclosures

Kenton Johnston

(1) The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

Employment by Commercial Entity – BlueCross BlueShield of Tennessee

Overview

Research Objectives:

- Quantify the direct and indirect costs of the Top 20 health conditions in one workforce population
- Rely solely on administrative data sources to identify these conditions and attribute these costs

Outline:

- Introduction
- Methods
- Findings
- Discussion
- Appendix

Introduction

- Employer perspective on economic burden of disease in the workforce
  - Direct healthcare claims costs +
  - Indirect labor costs =
  - Significant negative impact on the bottom line
- How should employers deal with that burden?
  - Trend in past decade was disease management
  - Almost 75% of employers reported to Hewitt in a 2008 survey that they offered disease management to employees
- What diseases did traditional DM focus on?
  - The traditional DM 5: Diabetes, CAD, CHF, COPD, Asthma
  - Relatively high cost per case
  - Focus on the high cost members / high cost diseases
- **Research Question:** what health conditions drive total costs in a workforce population?

Methods – *Study Design*

- Cross-sectional analysis of administrative data
- **Independent Variable**
  - Employee disease status
    - Identified from episodes in healthcare claims in 2004 using Ingenix' Episode of Care Grouper (Version 5.0)
- **Dependent Variables***
  - Direct Healthcare Claims Costs
    - Inpatient, Professional/Outpatient, Pharmacy
  - Indirect Labor Costs
    - Absenteeism, Presenteeism, ST & LT Disability, FMLA
- Study underwent IRB approval and third-party was used to merge and blind the individual-level data in order to protect the privacy of participants

*See Appendix for detailed description of procedure used to measure dependent variables

Methods – *Population & Timeframe*

- Timeframe: CY2004
- Employees (not dependents) of insurance company in southeastern US
- Medical & RX claims—as well as personnel & benefits data—from CY 2004 obtained and merged at individual employee level
- Only employees with group medical benefits included

Selected Demographics Calendar Year 2004		
	N	*Percent*
Total Employees	4152	100.0%
Total FTEs	4127	
Median Age	38.3	
Males	860	20.7%
Females	3292	79.3%
Medical Benefit	4031	97.1%
No Medical Benefit	121	2.9%
Full-Time	4102	98.8%
Part-Time	50	1.2%
Exempt	1841	44.3%
Non-Exempt	2311	55.7%
Mean Salary	$40,116	
Mean Salary & Benefits	$56,162	
Total Hours Worked	6,845,751	
Mean Hours Worked*	1,797	
Mean Hours Lost*	283	

*Per 12-Month FTE

Findings – *Total Healthcare Costs*

Total Healthcare Costs = $23,237,422

$5,631 per FTE

Direct $ =
$13,761,278
$3,334 / FTE
59.2%

Indirect $ =
$9,476,144
$2,296 / FTE
40.8%

- **Inpatient** — $376 — 6.7%
- **Professional/ Outpatient** — $2,154 — 38.3%
- **Pharmacy** — $804 — 14.3%
- **Sick Leave** — $1,322 — 23.5%
- **Presenteeism** — $318 — 5.7%
- **FMLA** — $274 — 4.9%
- **STD** — $220 — 3.9%
- **LTD** — $4 — 0.1%
- **Turnover** — $74 — 1.3%
- **Work Comp** — $82 — 1.5%

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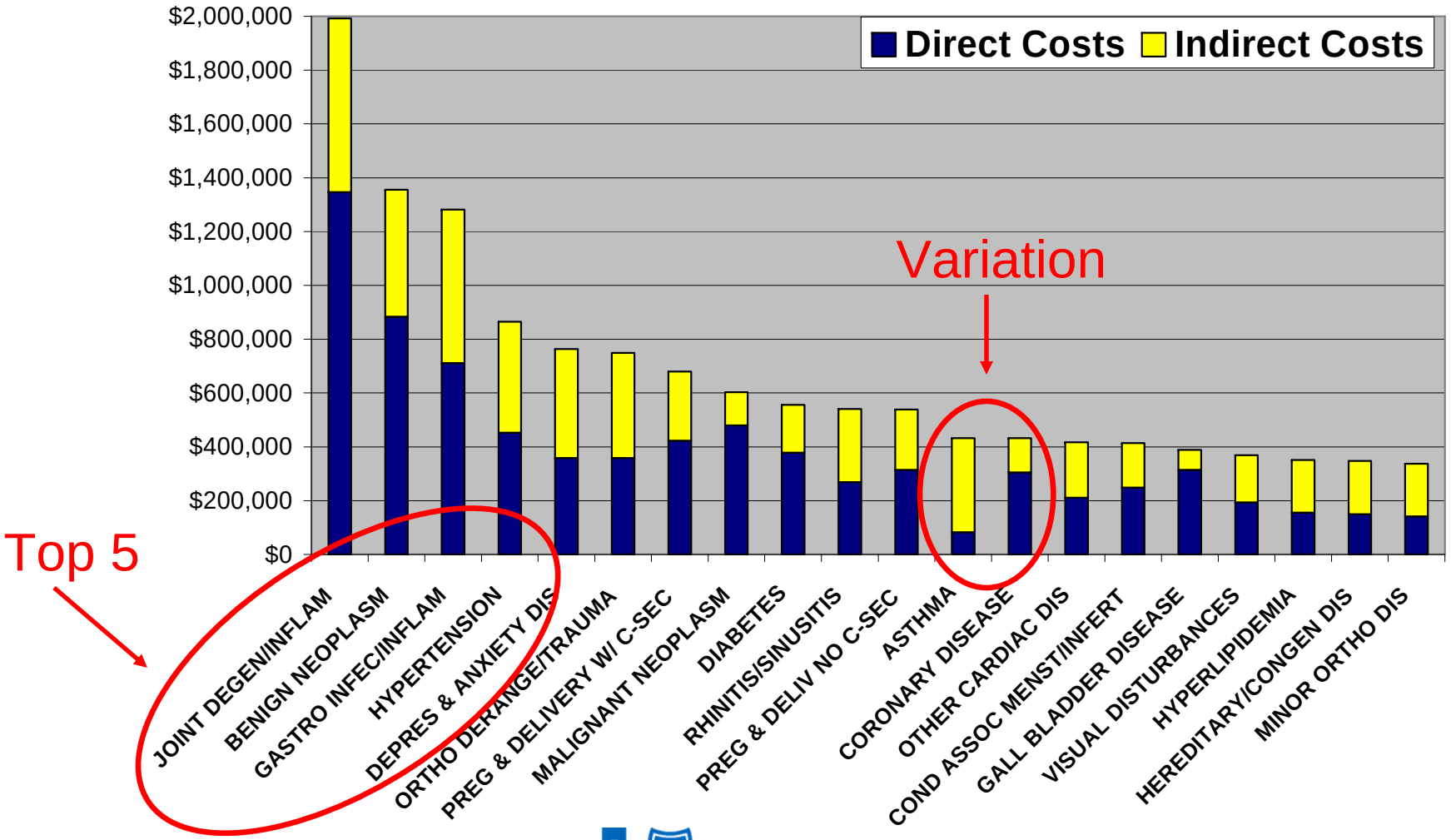
Findings – *Top 20 Condition Cost Drivers*



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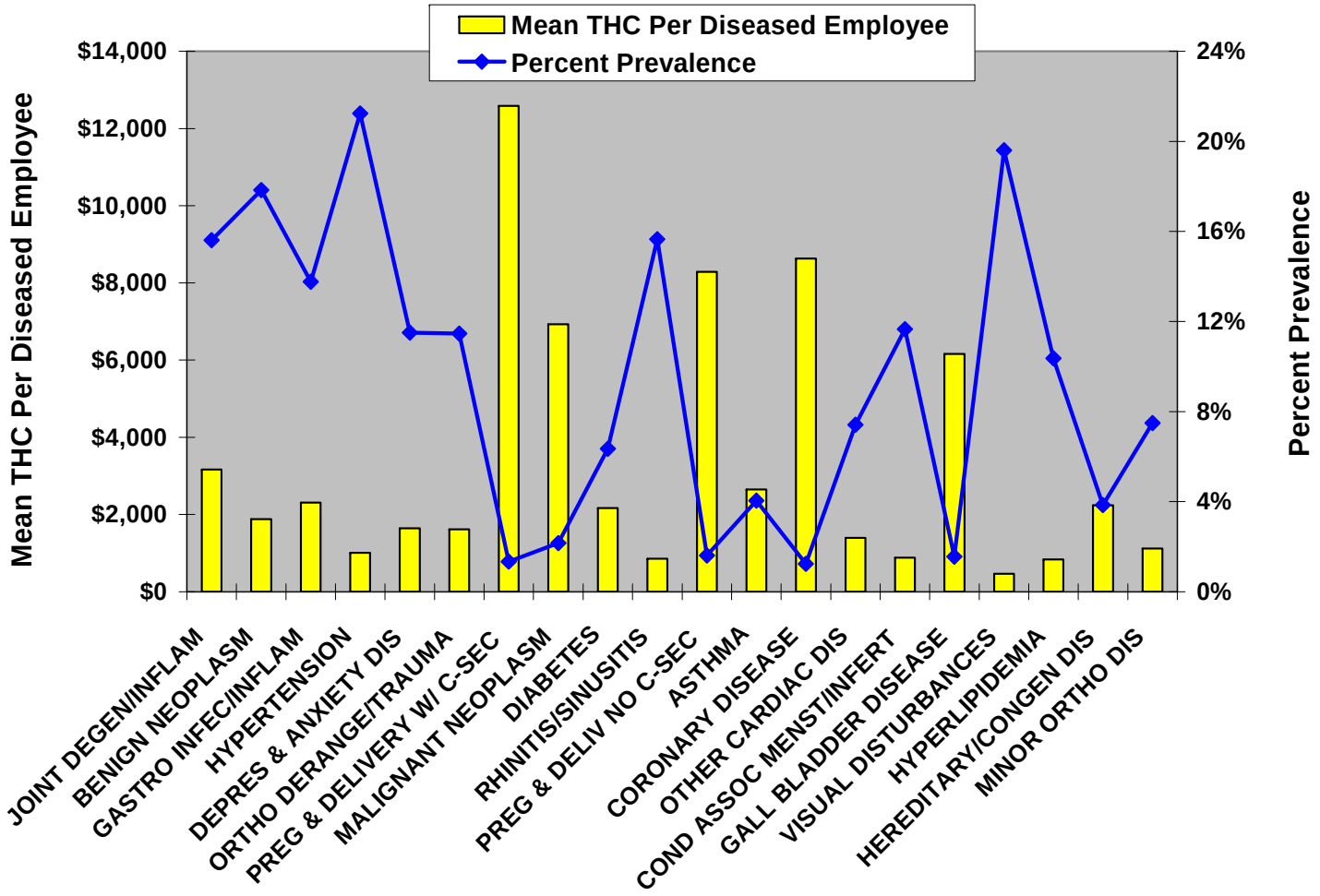
Findings – *Condition Prevalence and Mean Cost*



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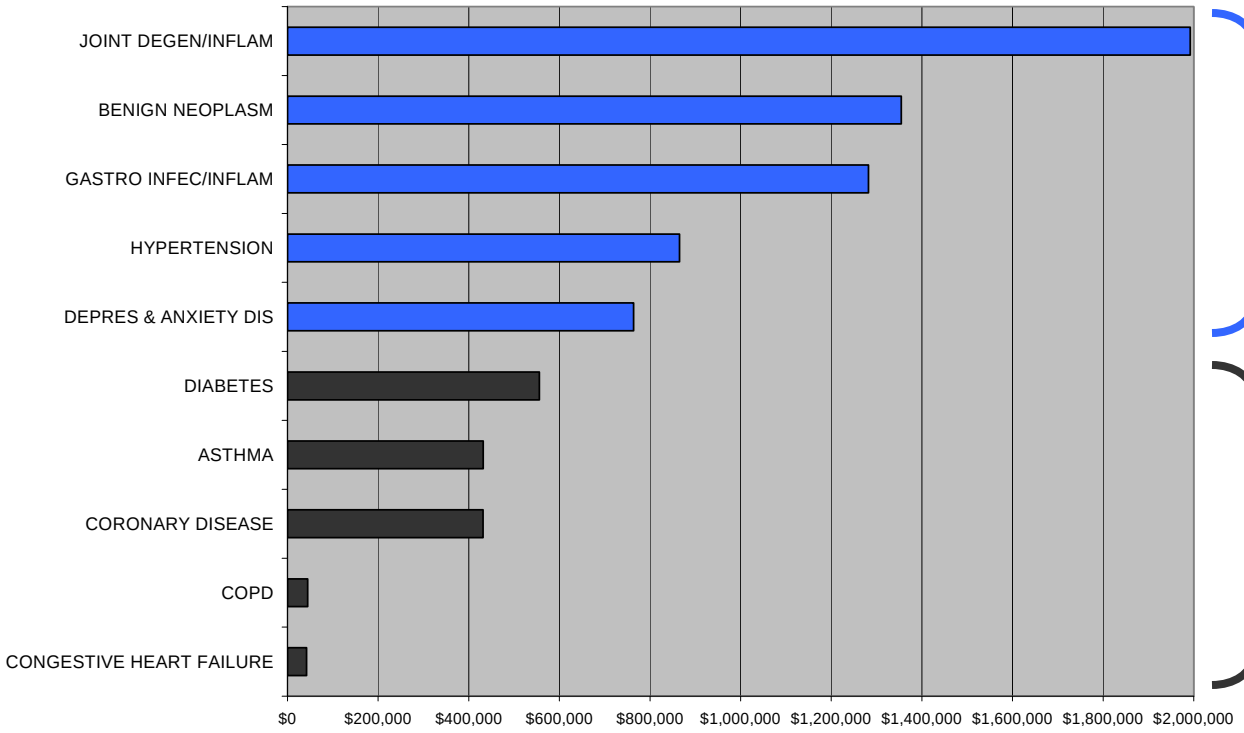
Findings – *The Case for Expanding Beyond Traditional DM*

Total Healthcare Costs for Top 5 vs. DM 5 Health Conditions



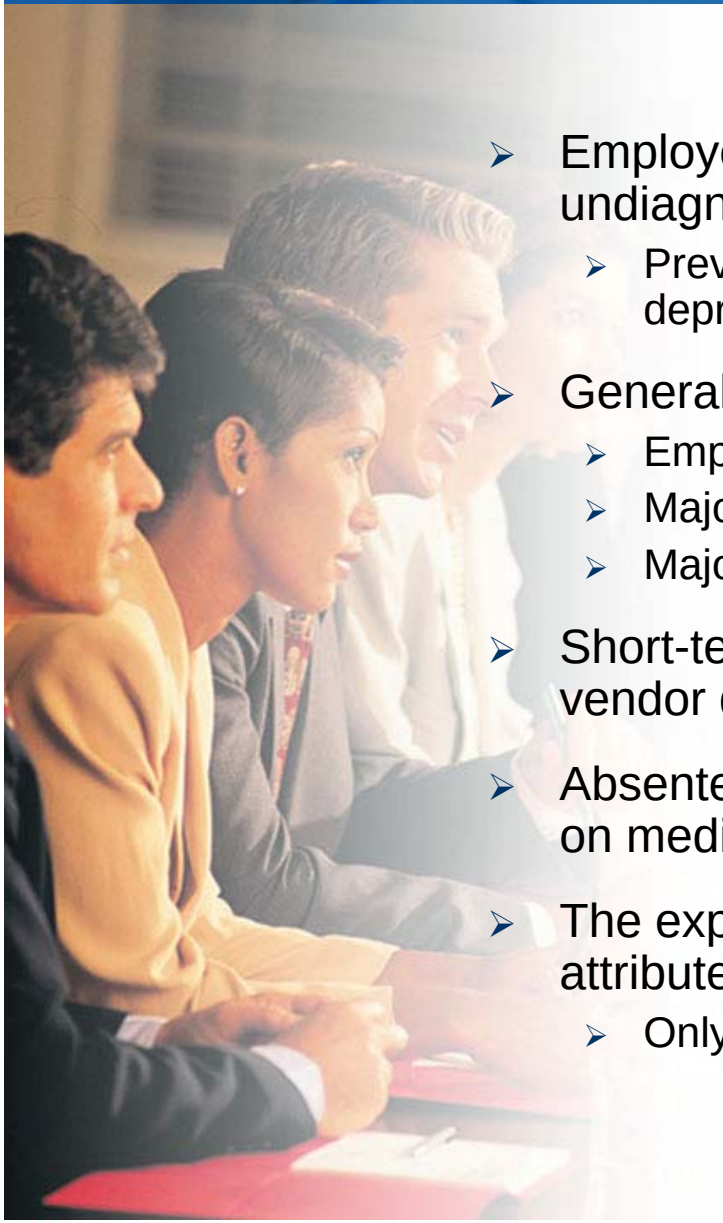
Top 5 =

$6.3 Million

Traditional DM 5 =

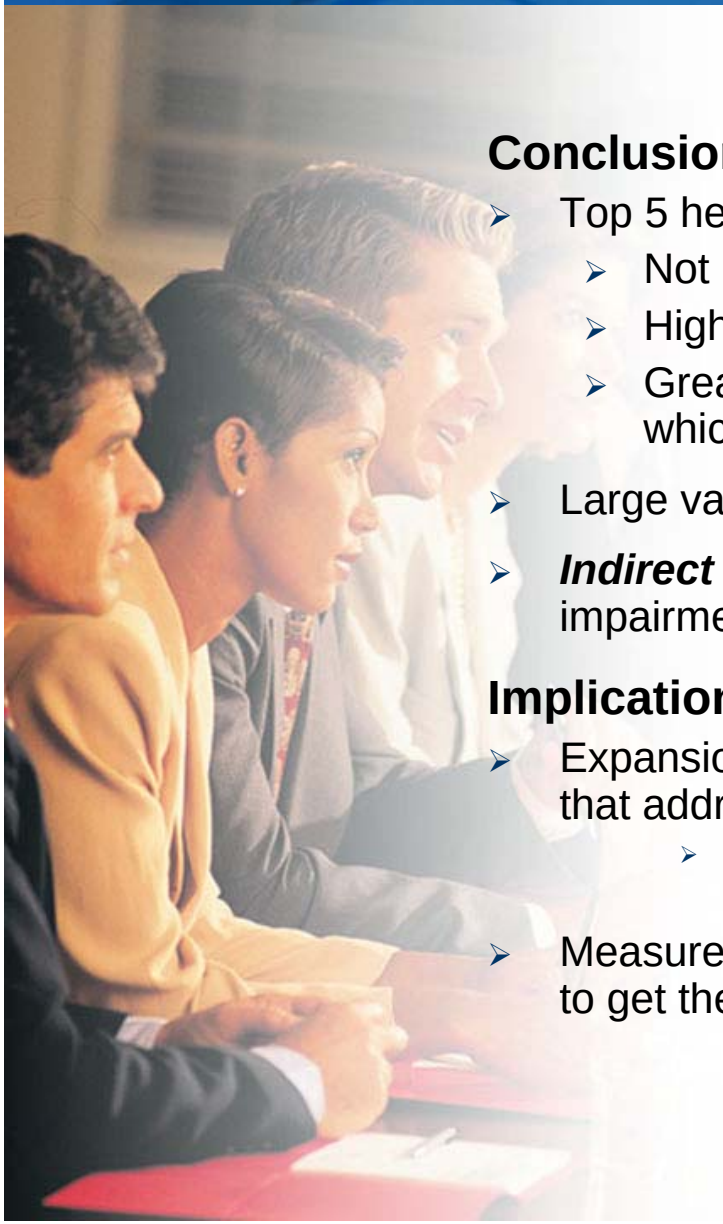
$1.5 Million

Limitations



- Employee medical conditions that were untreated or undiagnosed in a claims record went uncounted
  - Prevalence rates of hypertension, hyperlipidemia, obesity, depression & anxiety disorders probably are artificially low
- Generalizability
  - Employee population 80% female
  - Majority of population located in Southeastern US
  - Majority of population white collar workers
- Short-term disability costs were under-estimated because vendor did not provide detailed absence data
- Absenteeism estimates were conservative due to reliance on medical claim (missed absences without medical visit)
- The explanatory power of the regression model used to attribute presenteeism hours to disease status was weak
  - Only 6.6% of total hours were attributed by the model

Conclusions & Implications



Conclusions:

- Top 5 health conditions in total cost
  - Not managed by traditional DM
  - Highly prevalent in workforce
  - Greater cost burden than the more severe conditions to which they are precursors (e.g. hypertension vs. CAD)
- Large variation in direct vs. indirect cost areas by disease state
- ***Indirect*** + direct costs = better understanding of total financial impairment due to employee disease

Implications:

- Expansion beyond traditional DM to a population-based approach that addresses a larger segment of the workforce is appropriate
  - Hypertension, Orthopedic Conditions, Depression & Anxiety Disorders, Benign Tumors, Gastroenterological Conditions
- Measure employee indirect costs attributable to disease in order to get the full picture about what is going on in the workforce

Appendix – *Procedure for Measuring Direct Costs*

Direct Cost Components & Measurement Methods					
Component	**Definition**	**Measurement Method**	**Cost Conversion**	**Disease Attribution**	**Additional Notes**
Inpatient	Those costs directly associated with a hospital admission.	Measured with medical claims data using MCSource - a validated clinical data mart and product of ViPs, Inc.	The dollar measure used was the allowed amount – which is the amount the health plan and provider agreed upon for the given service(s).	Each inpatient hospital admission - and the associated dollars - were identified and classified into an episode treatment group (ETG) using the MCSource clinical data mart. ETGs were then grouped into broader disease categories.	These costs do not include charges related to surgery or other professional services that were incurred during the hospital stay.
Professional / Outpatient	Outpatient hospital services, professional services received during a hospital stay, services received at a clinic or provider office, and ancillary services.	Measured with medical claims data using MCSource - a validated clinical data mart and product of ViPs, Inc.	The dollar measure used was the allowed amount – which is the amount the health plan and provider agreed upon for the given service(s).	Each professional/outpatient service - and the associated dollars - were identified and classified into an ETG using the MCSource clinical data mart. ETGs were then grouped into broader disease categories.	Professional services provided during hospital stay include services such as surgery and patient management and diagnoses.
Pharmacy	Prescription drugs, including high-cost injectables and specialty pharmacy.	Measured with pharmacy claims data using MCSource - a validated clinical data mart and product of ViPs, Inc.	The dollar measure used was the allowed amount – which is the amount the health plan and provider agreed upon for the given service(s).	Each pharmaceutical prescription - and the associated dollars - were identified and classified into an ETG using the MCSource clinical data mart. ETGs were then grouped into broader disease categories.	None

*Johnston K, Westerfield W, Momin S, Phillippi R, Naidoo A. The direct and indirect cost of employee depression, anxiety, and emotional disorders—an employer case study. *J Occup Environ Med.* 2009;51(5):564-77.

Appendix – *Procedure for Measuring Indirect Costs*

Indirect Cost Components & Measurement Methods

Component	Definition	Measurement Method	Cost Conversion	Disease Attribution	Additional Notes
Absenteeism	Any absences for medical or health reasons.	Measured in hours on the basis of inpatient and outpatient work-day dates of service. Each inpatient day counted as 8 hours and each outpatient visit counted as 4 hours (limited to one outpatient visit per day).	Multiplied employee total wage cost (including benefits) by presenteeism hours and then by wage multiplier of 1.41 estimated for insurance industry by Nicholson & Pauly.	Lost hours/dollars were attributed to specific disease conditions using relative weights based on disease-specific population averages and individual comorbidity burden. This prevented attribution of the same costs to more than one disease for employees with multiple disease conditions.	Limited each absence episode to no greater than 5 work days in a row because sick days beyond 5 consecutive would have counted as disability or FML days.
Short & Long Term Disability	Any documented short-term or long-term disability claims.	Disability claims did not have a record of work-days on disability, but only dollars paid out by the vendor. (The vendor only included data on dollars paid out per claim per employee.)	Disability claims were already reported in terms of dollars paid out. No additional costs (such as the multiplier) were added because we were uncertain as to actual days absent from work.	Disability dollars were attributed to specific disease conditions using relative weights based on disease-specific population averages and individual comorbidity burden. This prevented attribution of the same costs to more than one disease for employees with multiple disease conditions.	The disability vendor did not include data that linked individual disability claims to specific disease conditions, so we employed the method we used for absenteeism and FML disease attribution.
Family & Medical Leave (FML)	Any recorded absences for family and medical leave.	Each FML occurrence for each employee had a record of work-days missed on FML. These FML days were converted into missed hours of work time.	Multiplied employee total wage cost (including benefits) by FML hours and then by the wage multiplier of 1.41 - 1 (FML is unpaid leave so only the hourly value exceeding wage cost was counted).	Lost hours/dollars were attributed to specific disease conditions using relative weights based on disease-specific population averages and individual comorbidity burden. This prevented attribution of the same costs to more than one disease for employees with multiple disease conditions.	Even though FML is unpaid leave it is still deemed to be an expense due to the elasticity between wage and value represented by the (insurance industry specific) wage multiplier of 1.41.

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Indirect Cost Components & Measurement Methods					
Component	**Definition**	**Measurement Method**	**Cost Conversion**	**Disease Attribution**	**Additional Notes**
Presenteeism - Direct Estimate	Productivity decrements while present at work.	For call-center/customer service employees whose productivity was quantified: employee productivity scores for "on-call" times were converted by the employer into unproductive versus productive hours. The exact number of each employee's unproductive hours were estimated by applying the "on-call" productivity score to all hours worked.	Multiplied employee total wage cost (including benefits) by presenteeism hours and then by wage multiplier of 1.41 estimated for insurance industry by Nicholson & Pauly.	OLS Regression was used with individual variable slstay at p<= .25 to model the relationship between Disease Categories, Sex, Age and Unproductive Ratio. For variables that remained in the significant (p <= .05) model, the parameter estimates were used to calculate proportion of presenteeism costs attributable to disease for each disease category.	Only employees from the bottom 25th percentile for productivity scores were counted as unproductive.
Presenteeism - Indirect Proxy Estimate	Productivity decrements while present at work.	For white collar employees whose productivity was not quantified: employees' annual percent salary raises were used as proxies for performance. Relative performance scores were created for employees on the basis of how their raise percent compared to their exempt or non-exempt peers. Scores were converted into productivity fractions and multiplied by hours worked to get unproductive hours.	Multiplied employee total wage cost (including benefits) by presenteeism hours and then by wage multiplier of 1.41 estimated for insurance industry by Nicholson & Pauly.	OLS Regression was used with individual variable slstay at p<= .25 to model the relationship between Disease Categories, Sex, Age and Unproductive Ratio. For variables that remained in the significant (p <= .05) model, the parameter estimates were used to calculate proportion of presenteeism costs attributable to disease for each disease category.	Presenteeism only attributed to subset of employees that were continuously employed for 12 months of the year (and had salary raise data available). Only the bottom 25th percentile were counted as unproductive.

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