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# **BURDEN OF ILLNESS**

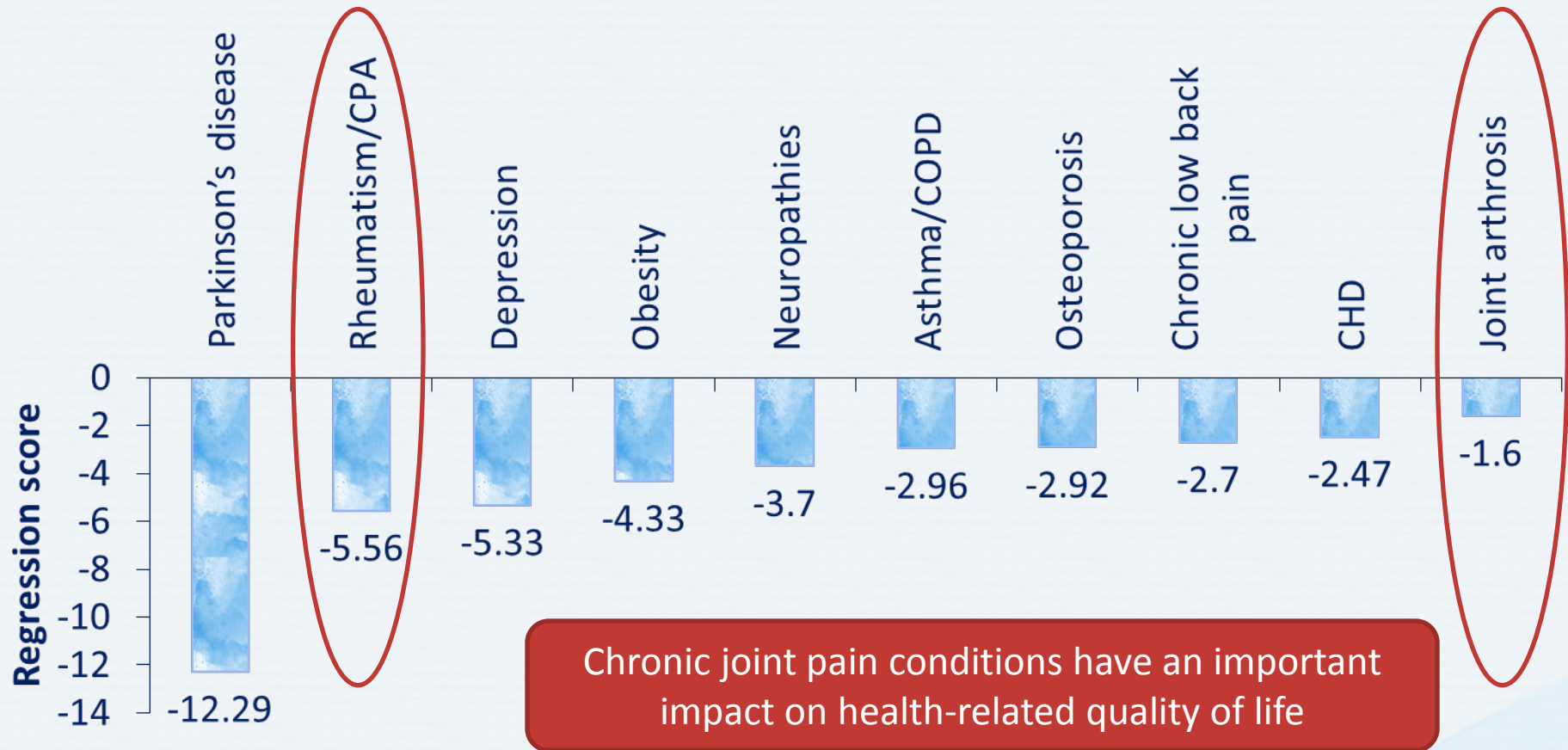
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# Overview

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# Impact of Chronic Conditions on Health-Related Quality of Life



Note: a larger negative score indicates a greater impact on health-related quality of life

CHD = coronary heart disease; COPD = chronic obstructive pulmonary disease; CPA = chronic polyarthrits

Brettschneider C et al. *PLoS One* 2013; 8(6):e66742.

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# Physical Burden

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# Ankylosing Spondylitis Negatively Impacts Quality of Life

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- Most common concerns:
  - Stiffness
  - Pain
  - Fatigue
  - Poor sleep
  - Appearance
  - Worry about the future
  - Medication side effects
- Ankylosing spondylitis patients have:
  - Higher well-being and lower direct cost of illness than patients with fibromyalgia or chronic low back pain
  - Higher mortality rate than the general population

# Rheumatoid Arthritis Negatively Impacts Daily Functioning

- Rheumatoid arthritis causes a functional burden by limiting ability to perform daily activities:<sup>1</sup>
  - Self-care (e.g., dressing, feeding, bathing, grooming and toileting)
  - Vocational (e.g., work, school and homemaking)
  - Avocational (e.g., exercise, recreation and leisure)
- Long-term studies have found that 50% of patients with rheumatoid arthritis have had to stop working 10 years after diagnosis<sup>2</sup>

**Rheumatoid arthritis results in functional burden to the patient and to caregivers**

1. Atkinson K *et al.* In: Frontera WR *et al* (eds). *Essentials of Physical Medicine and Rehabilitation*. 2nd ed. Saunders Elsevier, Philadelphia, PA: 2008;

2. O'Dell JR. In: Goldman L, Ausiello D (eds). *Cecil Medicine*. 23rd ed. Saunders Elsevier; Philadelphia, PA: 2007.



# Hand Rheumatoid Arthritis Can Have Severe Impact



# Osteoarthritis Negatively Impacts Daily Functioning

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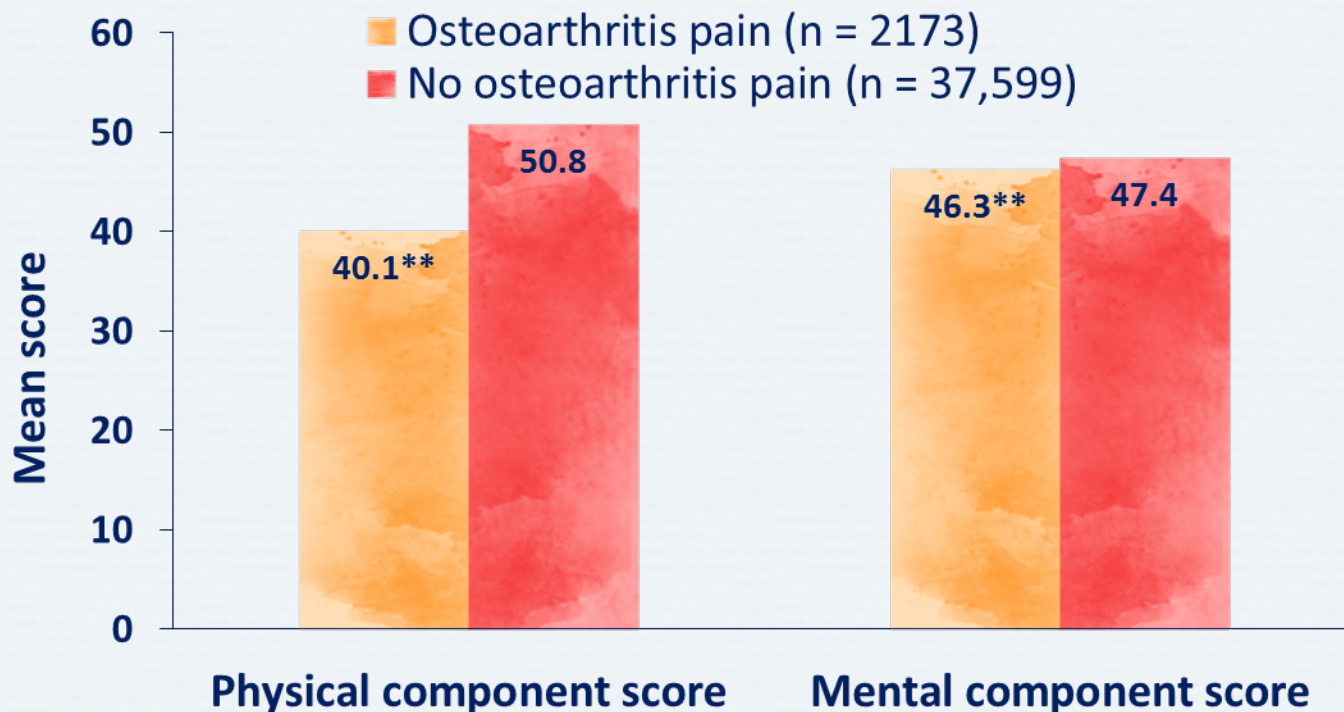
- Osteoarthritis causes a functional burden by limiting ability to perform daily activities, such as dressing, feeding, bathing, grooming and toileting<sup>1</sup>
- 80% of osteoarthritis patients report physical limitations due to disease<sup>2</sup>

**Osteoarthritis results in functional burden  
to the patient and to caregivers**



# Osteoarthritis Reduces Quality of Life

Physical and Mental Component Scores on the SF-12v2\*



**Workers with osteoarthritis pain have lower quality of life scores**

\*Range of 0–100, higher scores indicate better health, adjusted for covariates and normed to the US population (mean = 50, SD = 10)

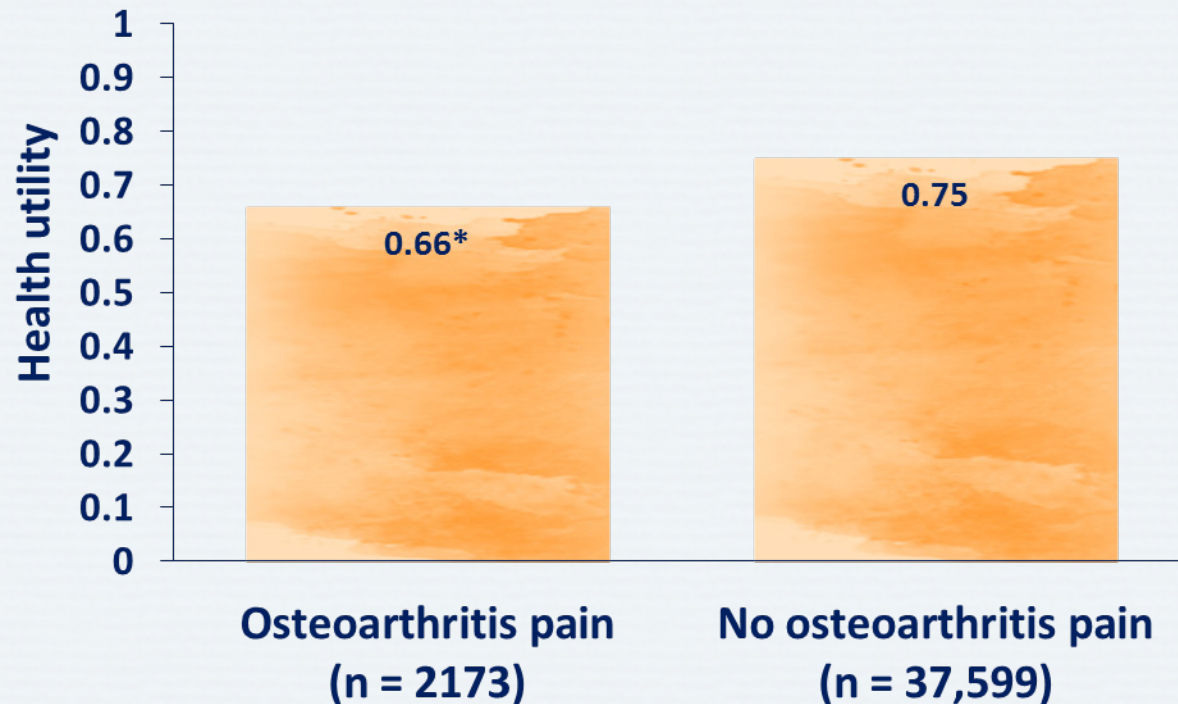
\*\* $p < 0.0001$  vs. the comparator cohort.

SD = standard deviation; SF-12v2 = Short Form 12 version 2; US = United States

Dibonaventura M et al. *BMC Musculoskelet Disord* 2011; 12:83.

# Osteoarthritis Reduces Quality of Life

Health Utility Score on the SF-6D<sup>†</sup>



**Workers with osteoarthritis pain have lower quality of life scores**

<sup>†</sup>Range of 0 = death to 1 = perfect health; <sup>‡</sup> $p < 0.0001$  vs. the comparator cohort

SF-6D = Short Form 6 Dimensions

Dibonaventura M *et al.* *BMC Musculoskelet Disord* 2011; 12:83.

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# Economic Burden

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# Health Care Costs of Ankylosing Spondylitis Are Significant\*

- 241 patients enrolled in the *Longitudinal Study of Outcomes in Ankylosing Spondylitis*
- Indirect costs dominated the total costs associated with ankylosing spondylitis

Annual cost/patient	Amount (1999 USD)			
	Mean	Median	Range	% of total cost
Direct	1775	1113	0–36,267	26.4
Indirect	4945	0	0–45,800	73.6
<b>Total</b>	<b>6720</b>	<b>1495</b>	<b>0–80,017</b>	<b>100</b>

\*United States study

US = United States; USD = United States Dollars

Ward MM. *Arthritis Rheum* 2002; 46(1):223-31.

# Economic Burden of Ankylosing Spondylitis

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- 234 individuals\* with ankylosing spondylitis (median duration = 21.4 years)
  - 84% still working after a 30-year history of the disease
    - 77% still working after a 40-year history
  - 13.2% reported work disability
  - 57 subjects (24.3%) had received work disability payments
    - 46% of these individuals received payments for  $\leq 1$  year

\*United States (US) study

Ward MM, Kuzis S. *J Rheumatol* 2001; 28(2):315-21.

# Economic Burden of Rheumatoid Arthritis

Cost	Amount (2000 USD)		
	With rheumatoid arthritis	With osteoarthritis	No arthritis
Direct	5763	N/A	N/A
Indirect	2785	1011	1002
<b>Lifetime<sup>†</sup></b>	<b>61,000–122,000*</b>	<b>N/A</b>	<b>N/A</b>

**Individuals with rheumatoid arthritis are estimated to be 6 times more likely than people without rheumatoid arthritis to incur medical charges.**

\*USD in 1995 † 25 years following a diagnosis of rheumatoid arthritis;  
lifetime costs were higher among younger people with rheumatoid arthritis  
N/A = not available; USD = United States Dollars

Centers for Disease Control and Prevention. *Rheumatoid Arthritis*. Available at: <http://www.cdc.gov/arthritis/basics/rheumatoid.htm#12>. Accessed: August 13, 2013.

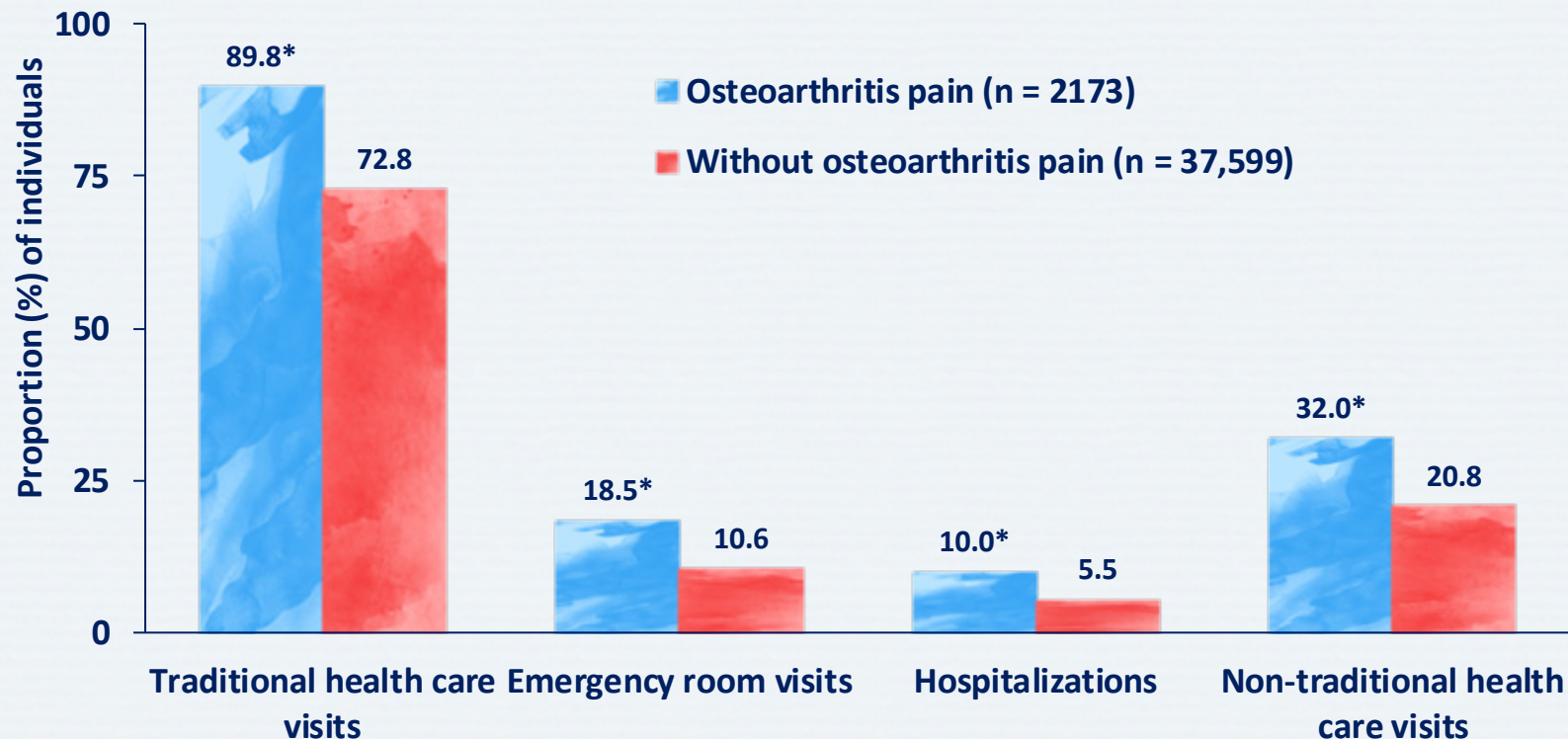


# Economic Burden of Rheumatoid Arthritis: Societal Costs

Annual cost	Amount (billions) (2005 USD)
Direct	8.4
Indirect	10.9

**Total costs are approximately \$14,900 per patient per year.  
Rheumatoid arthritis is a costly, chronic disease.**

# Osteoarthritis Increases Health Care Utilization

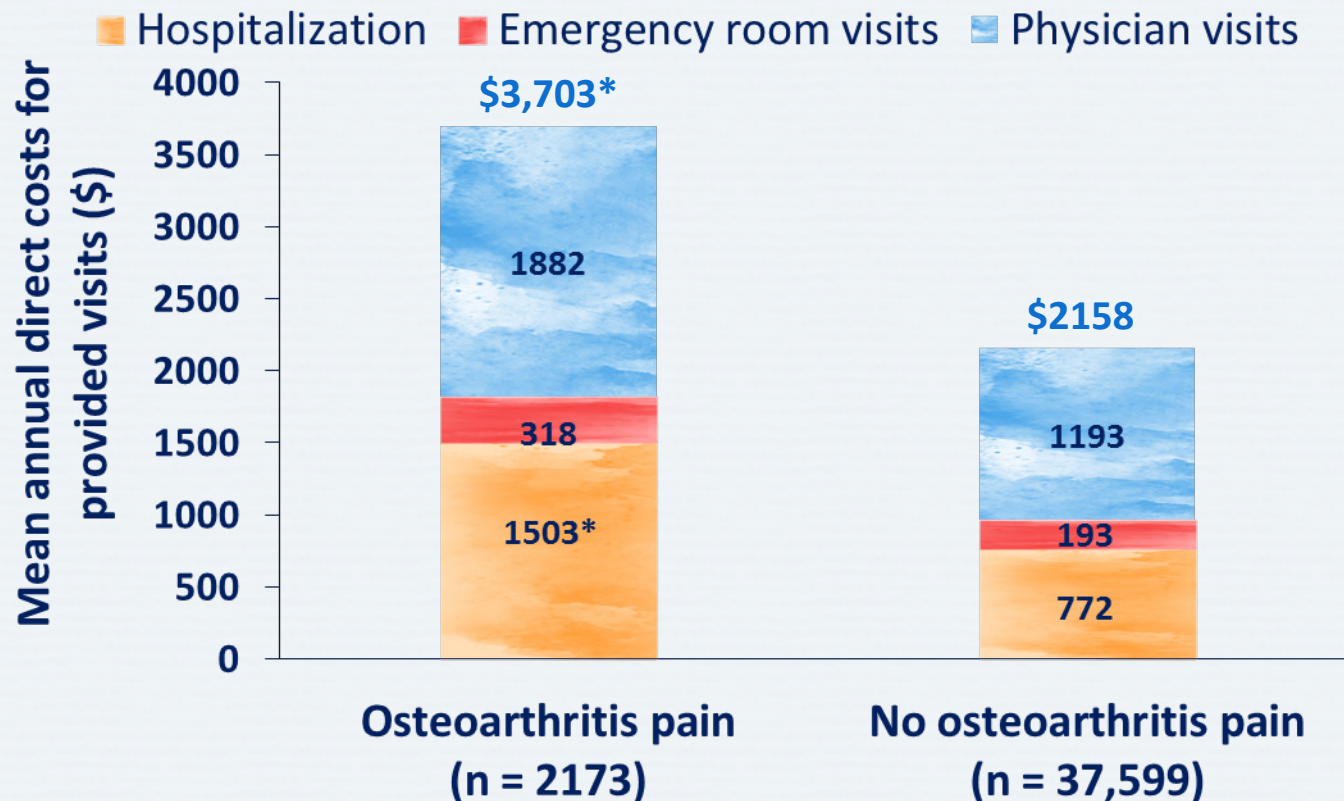


**Workers with osteoarthritis pain have higher health care utilization**

\* $p < 0.0001$  vs. the comparator cohort

Dibonaventura M et al. *BMC Musculoskelet Disord* 2011; 12:83.

# Osteoarthritis Increases Direct Health Care Costs

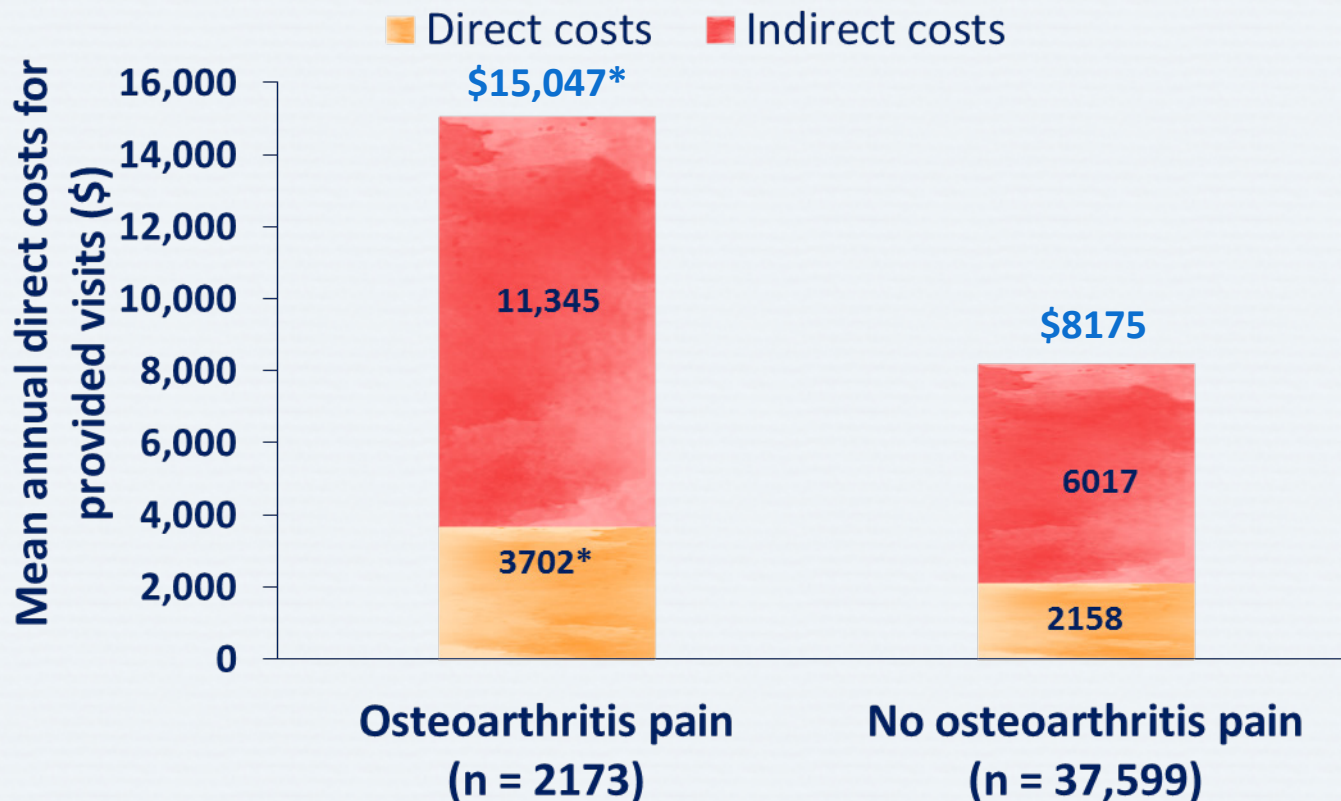


**Workers with osteoarthritis pain have increased health care costs.**

\* $p < 0.0001$  vs. controls

Dibonaventura M et al. *BMC Musculoskelet Disord* 2011; 12:83.

# Osteoarthritis Increases Total Health Care Costs†



**Workers with osteoarthritis pain have increased health care costs.**

\* $p < 0.0001$  vs. controls; †Including estimated indirect costs plus direct medical costs of provider visits

# Economic Burden of Osteoarthritis\*

Annual cost per patient (n=128,493)*	Amount (2007 USD)	
	Women	Men
Out-of-pocket	1379	694
Insurer	4833	4036

- Costs associated with osteoarthritis are high
- Osteoarthritis costs are disproportionately higher for women
- Out-of-pocket expenses are substantial

\*Data from Medical Expenditure Panel Survey (1996–2005); costs were converted to annual 2007 United States Dollars (USD)

Kotlarz H *et al. Arthritis Rheum* 2009; 60(12):3546-53.

# Economic Burden of Osteoarthritis

- Administrative claims for about 5 million privately insured patients (aged 18–64 years) with ICD-9-CM codes for osteoarthritis (1998–2004)
- Mean annual direct and indirect per-patient costs\* calculated from employer's perspective

Annual cost per patient	Amount (2005 USD)
Direct medical	8601
Prescription pain medications	445
Indirect medical	4603

**Osteoarthritis is a costly, chronic disease**

\*Mean costs were calculated from January 2003 to December 2004 and converted to annual 2005 dollars  
ICD-9-CM = International Classification of Diseases, 9th Revision, Clinical Modification; USD = United States Dollars  
White AG et al. *J Occup Environ Med* 2008; 50(9):998-1005.



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# Comorbidities

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# Chronic Joint Pain Conditions Have Sleep and Mental Health Comorbidities

Pain Cohorts				Depression (%)				
	>1 sleep comorbidity (%)	>1 mental health comorbidity (%)	Mental health condition Mean (SD)	MDD	Other depressive symptoms	Total	Other psych disorders (%)	Anxiety (%)
OA	8.0	15.2	1.4 (0.7)	3.5	3.4	6.2	4.8	4.5
RA	5.7	11.7	1.3 (0.7)	3.2	2.8	5.5	3.5	3.6
AS	7.4	17.3	1.4 (0.7)	4.4	4.1	4.7	4.1	5.8
PsA	7.6	13.3	1.3 (0.6)	3.5	3.2	6.1	2.8	3.9

AS = ankylosing spondylitis; OA = osteoarthritis; MDD = major depressive disorder;  
PsA = psoriatic arthritis; RA = rheumatoid arthritis; SD = standard deviation

Davis JA et al. *J Pain Res* 2011; 4:331-45.

# Chronic Joint Pain Comorbidities

Pain cohorts	Comorbid pain conditions (%)										Mean
	Stroke	LR	CR	Fibro	OA	LBP	Migraine	RA	PBS	IC	
Osteoarthritis	6.4	4.8	2.6	3.3	100.0	19.3	1.7	2.1	2.1	0.2	1.5
Rheumatoid arthritis	5.0	3.0	1.4	3.8	21.0	12.8	1.9	100.0	1.7	0.2	1.6
Ankylosing spondylitis	3.9	10.3	2.9	6.3	20.4	31.9	2.9	3.2	2.0	0.3	1.9
Psoriatic arthritis	2.6	1.8	1.5	2.5	16.0	10.6	1.6	17.1	1.8	0.1	1.6

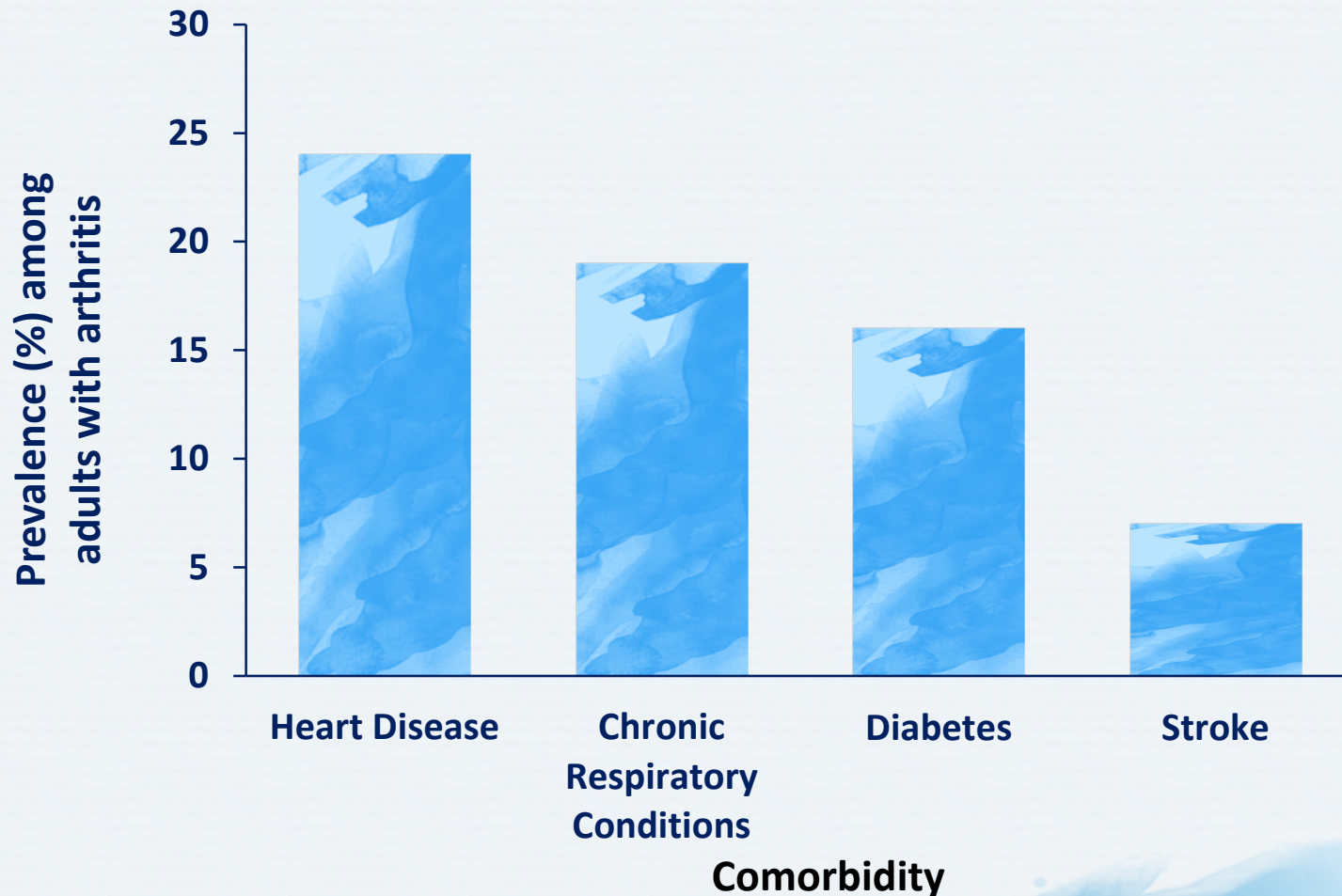
**Note:** infrequent comorbid conditions were omitted from the comorbid pain conditions in the table.

**CR** = cervical radiculopathy; **HIV** = human immunodeficiency virus; **IC** = interstitial cystitis; **Fibro** = fibromyalgia;

**LR** = lumbar radiculopathy; **MS** = multiple sclerosis; **OA** = osteoarthritis; **PBS** = painful bladder syndrome; **RA** = rheumatoid arthritis

Davis JA *et al.* *J Pain Res* 2011; 4:331-45; Dworkin RH *et al.* *J Pain* 2010; 11(4):360-8; Riley GF. *Med Care* 2009; 47(7 Suppl 1):S51-5.

# Comorbidities Associated with Arthritis



# Comorbidities Associated with Ankylosing Spondylitis

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- Most common comorbidities:
  - Hypertension
  - Peptic ulcers
  - Headaches
  - Uveitis
  - Bowel inflammation
  - Psoriasis
  - Heart disease

# Comorbidities Associated with Rheumatoid Arthritis

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- On average, patients with established rheumatoid arthritis have  $\geq 2$  comorbidities
- Especially problematic:
  - Cardiovascular disease
  - Interstitial lung disease
  - Osteoporosis
  - Cancer
  - Depression



# Rheumatoid Arthritis Increases Cardiovascular Risk

Cardiovascular risk  
in  
rheumatoid arthritis

≈

Cardiovascular risk  
in  
type 2 diabetes

Risk score models should be adapted for patients with rheumatoid arthritis by introducing a *multiplication factor of 1.5* when  $\geq 2$  of the following conditions are met:

- Disease duration >10 years
- RF or anti-CCP positivity
- Presence of certain extra-articular manifestations

# Comorbidities Associated with Osteoarthritis

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- Older patients with osteoarthritis are likely to have comorbidities
  - Visual disorders, diabetes, and heart disease occur more frequently in patients with osteoarthritis
  - Result in adverse physical function
  - Associated with adverse outcomes in joint replacement
- Recognizing and treatment comorbidities is crucial in preventing or reducing related physical decline

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# Summary

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# Burden of Illness in Chronic Joint Pain: Summary

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- Chronic joint pain can severely compromise functioning, quality of life and ability to work
  - It also increases health care utilization costs
  - In addition, patients suffering from chronic joint pain, frequently have other comorbidities, such as sleep disturbances, mood disorders, cardiovascular disease and other chronic conditions, all of which much also be addressed
- 