



Bone & Joint Decade 2010-2020
Global Alliance for Musculoskeletal Health
World Network Conference 2012
Ho Chi Minh City, Viet Nam

Global Burden of Disease (GBD) 2010

Prof Lyn March

Damian Hoy, Emma Smith, Fiona Blyth, Marita Cross, Marlene Fransen, Lidia Sanchez Riera, Theo Vos, Rachelle Buchbinder,

Peter Brooks, Anthony Woolf

[*lyn.march@sydney.edu.au*](mailto:lyn.march@sydney.edu.au)



GBD 2010



Greetings **“lời chào”** from Australia
&
Australian Rheumatology Association



Global Burden of Diseases, Injuries and Risk Factors (GBD) project

Summary measures of world population health by cause

- compare overall population health across communities and over time
- determine which conditions contribute most to health loss in a given population
- Identify health inequalities
- Help decision-makers to assess health priorities and allocate resources
- Identify gaps in the data sources required to generate the summary measures

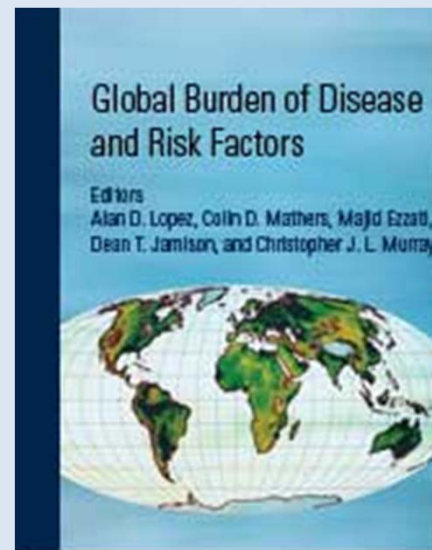
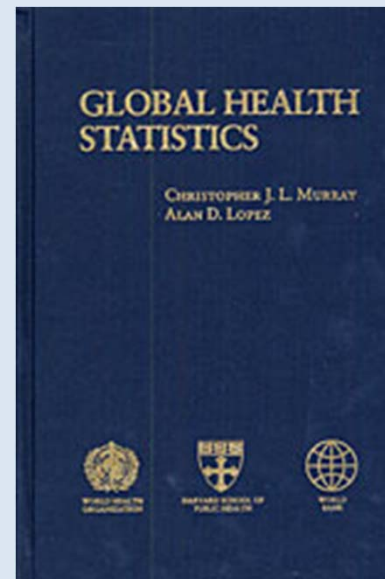
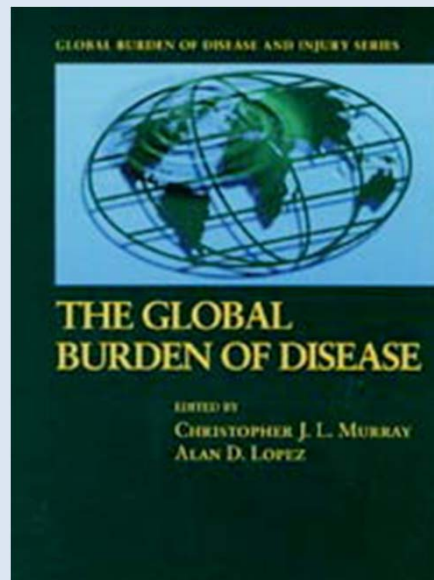
http://www.who.int/healthinfo/global_burden_disease/en/

GBD History

Global Burden of Diseases 1990 Study (1991-1996)

World Bank 1993; Murray & Lopez 1996: 109 diseases and injuries, 10 risk factors, 8 World Bank regions, projected to 2020

(GBD 2010 Study: 262 diseases and injuries, 44 risk factors, 21 World regions)



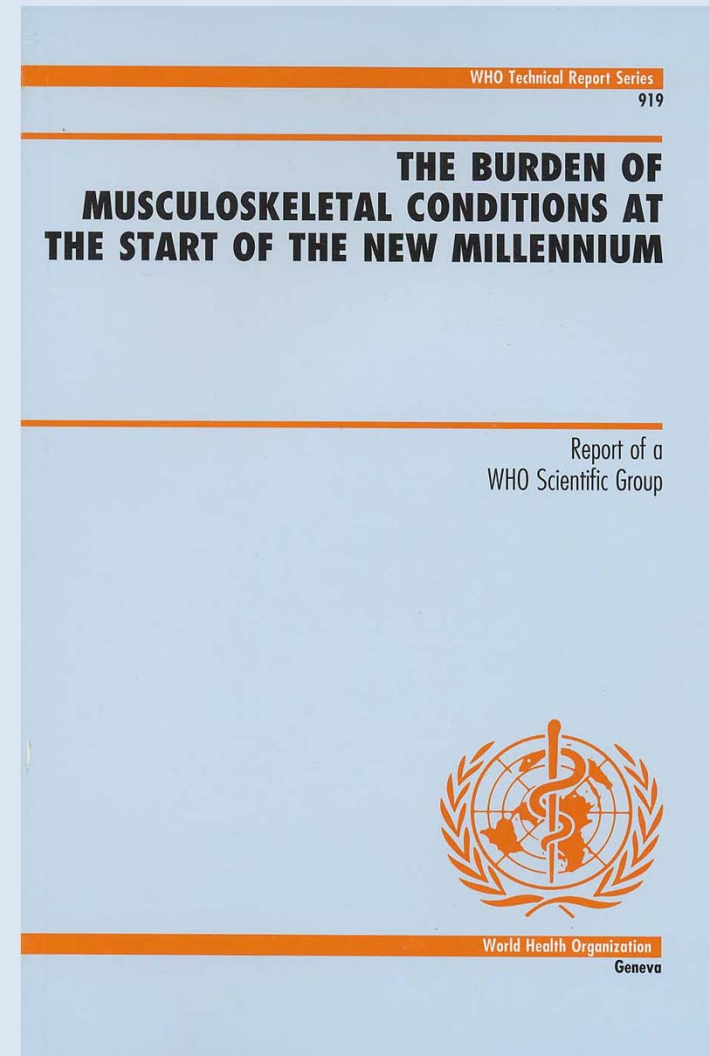
http://www.who.int/healthinfo/global_burden_disease/en/

“The Burden of Musculoskeletal Conditions at the Start of the New Millennium”

Geneva, January 2000



- Scientific Group Meeting organised by WHO and Bone and Joint Decade
 - what is the global burden?
 - how should we monitor the burden?
- WHO Technical Report October 2003 – *Chair, Prof Anthony Woolf*



Leading causes of GBD 2000

Rank N=136	YLL (mortality)	YLD (disability)	DALY (burden)
1	Lower respiratory infections	Unipolar depressive disorders	Lower respiratory infections (94.5m)
2	Diarrhoeal diseases	Hearing loss, adult onset	Diarrhoeal diseases (72.8m)
3	Ischaemic heart disease	Other unintentional injuries	Unipolar depressive disorders (65.5m)
27			Osteoarthritis (26m)
77			Rheumatoid arthritis (6.1m)
82			Gout (5.1m)
105			Low back pain (2.5m)

http://www.who.int/healthinfo/global_burden_disease/en/

Aim

The GBD 2010 Study estimates the 1990, 2005 and 2010 burden for more than 175 diseases and injuries (2007-2012)

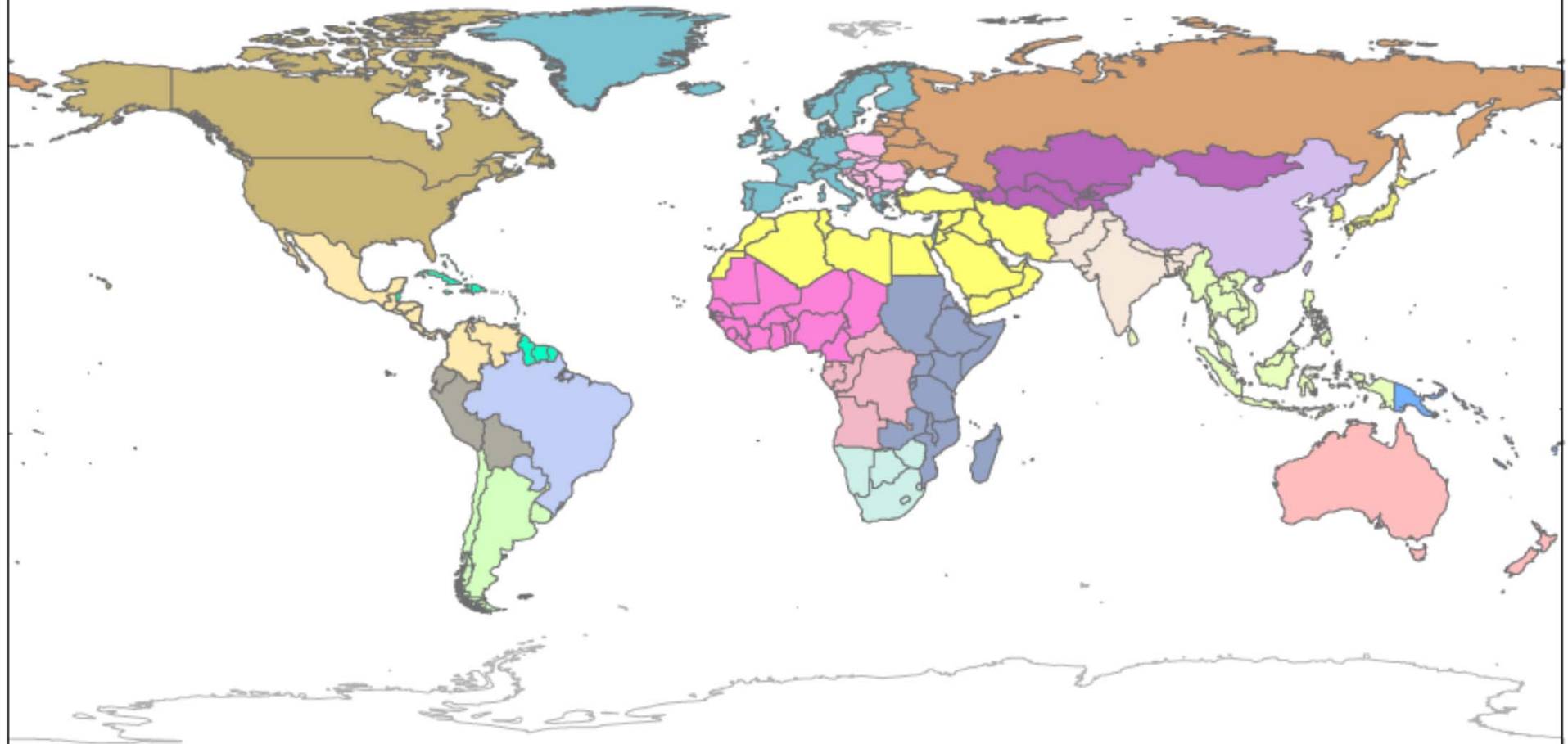
University of Washington
University of Queensland
Harvard University
World Health Organization
Johns Hopkins University
A series of expert groups




Funders: **The Bill and Melinda Gates Foundation, Australian National Health and Medical Research Council (NHMRC), Commonwealth Government of Australia DOHA, Institute of Bone & Joint Research, University of Sydney**

Brief of the MSK Expert Group, to estimate the burden of OA hip & Knee, RA, Gout, low back pain, neck pain, Other MSK

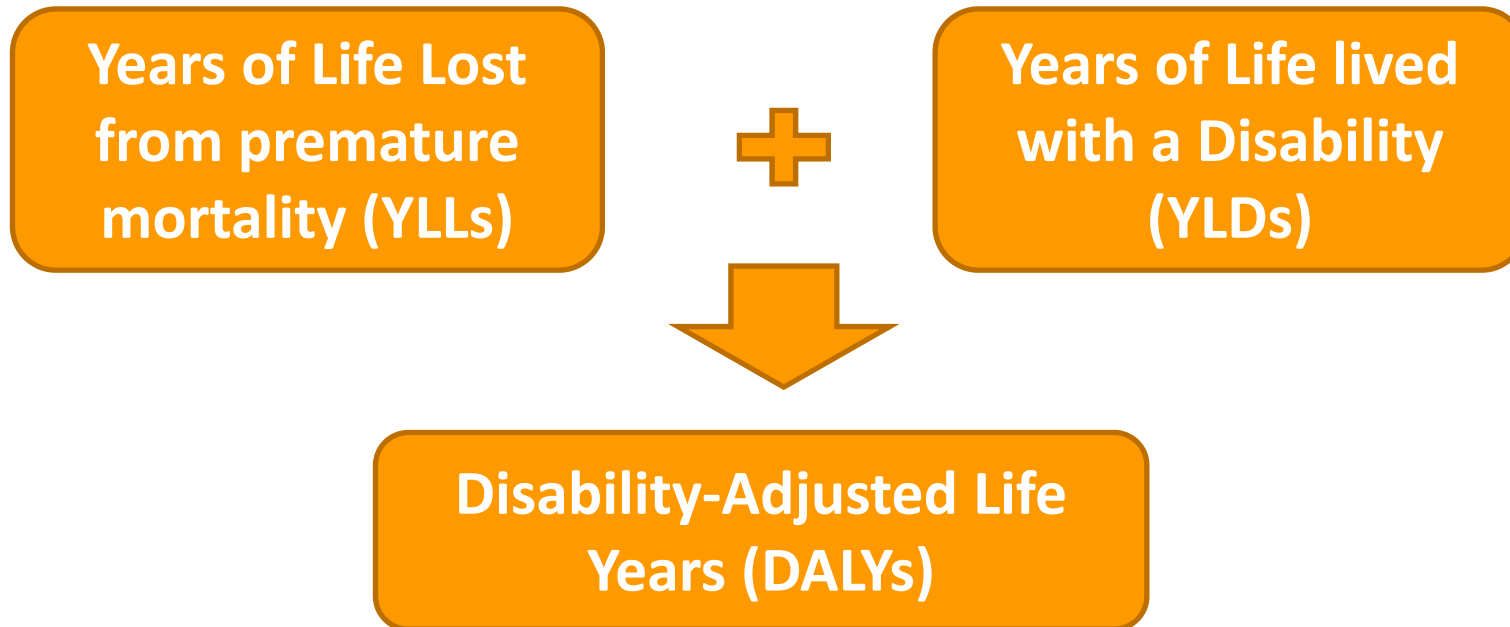
www.globalburden.org

Global Burden of Diseases, Injuries, and Risk Factors Regions



- | | | | |
|---|--|---|--|
|  Asia Pacific, High Income |  Caribbean |  Latin America, Southern |  Sub-Saharan Africa, East |
|  Asia, Central |  Europe, Central |  Latin America, Tropical |  Sub-Saharan Africa, Southern |
|  Asia, East |  Europe, Eastern |  North Africa / Middle East |  Sub-Saharan Africa, West |
|  Asia, South |  Europe, Western |  North America, High Income | |
|  Asia, Southeast |  Latin America, Andean |  Oceania | |
|  Australasia |  Latin America, Central |  Sub-Saharan Africa, Central | |

Summary measures in GBD



DALYs provide a ranking of how much death and disability each disease/condition causes

Methods MSK disorders GBD Study 2010

Systematic reviews

Disease parameters
(prevalence, incidence, duration, remission, mortality)

Disease modelling program
adjusts for heterogeneity,
derives missing values,
ensure internal consistency

DisMod III

Produces
age/sex/region/year-specific
estimates for each disease
parameter

Incidence



Duration



Disability
weight

YLLs



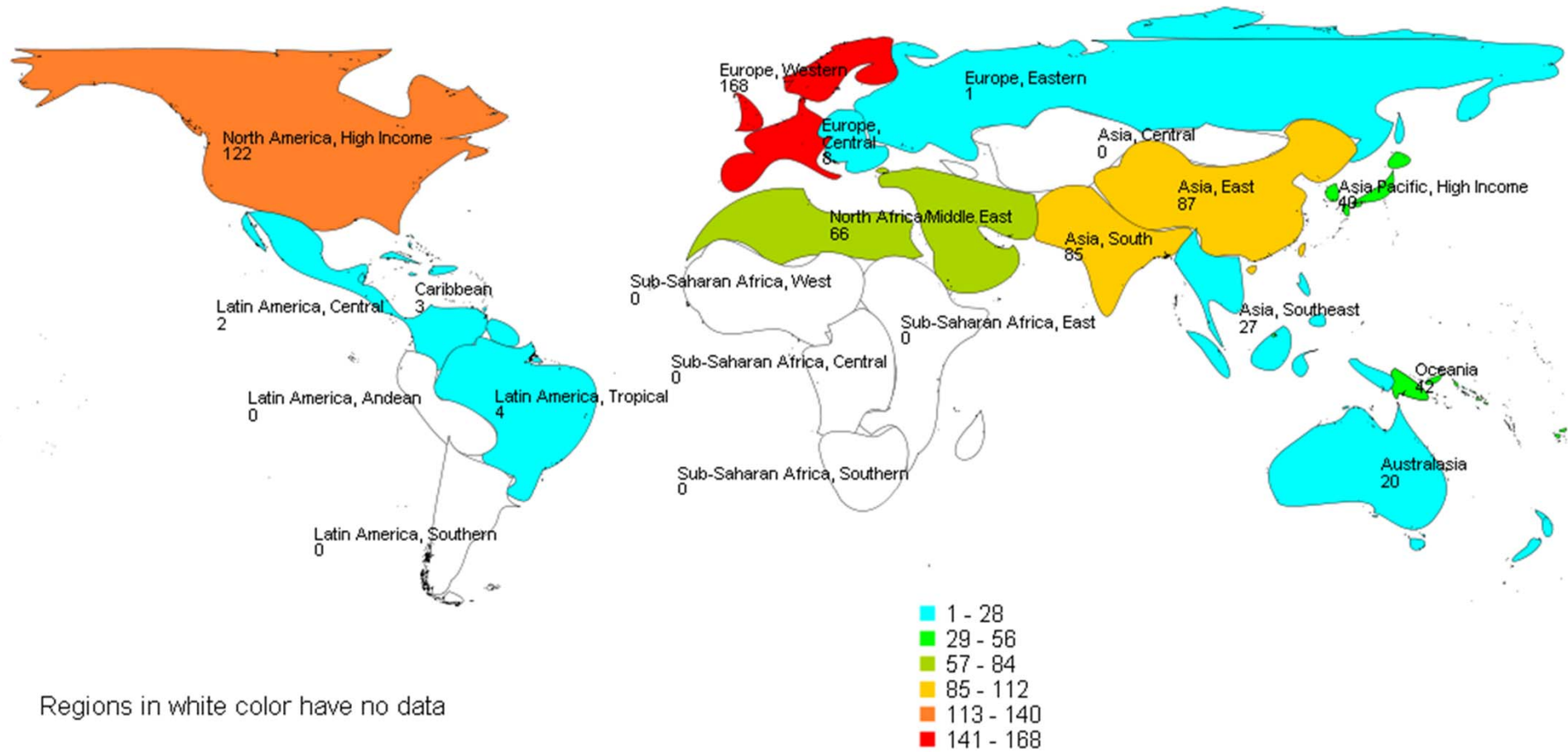
YLDs



DALYs

OA KNEE Data by GBD Region

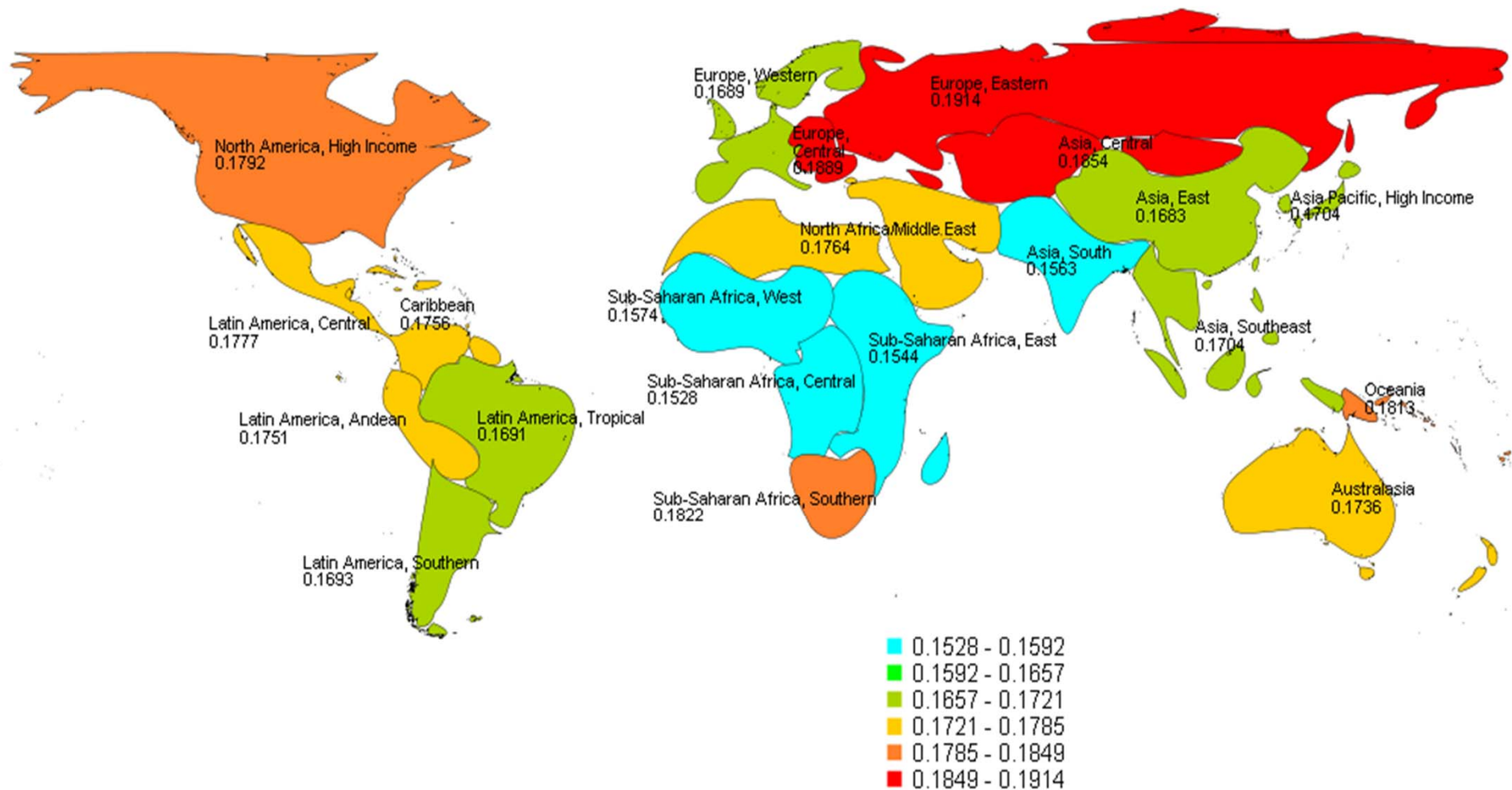
Data Count: model #11557 (all types, all years, all sexes, all ages)



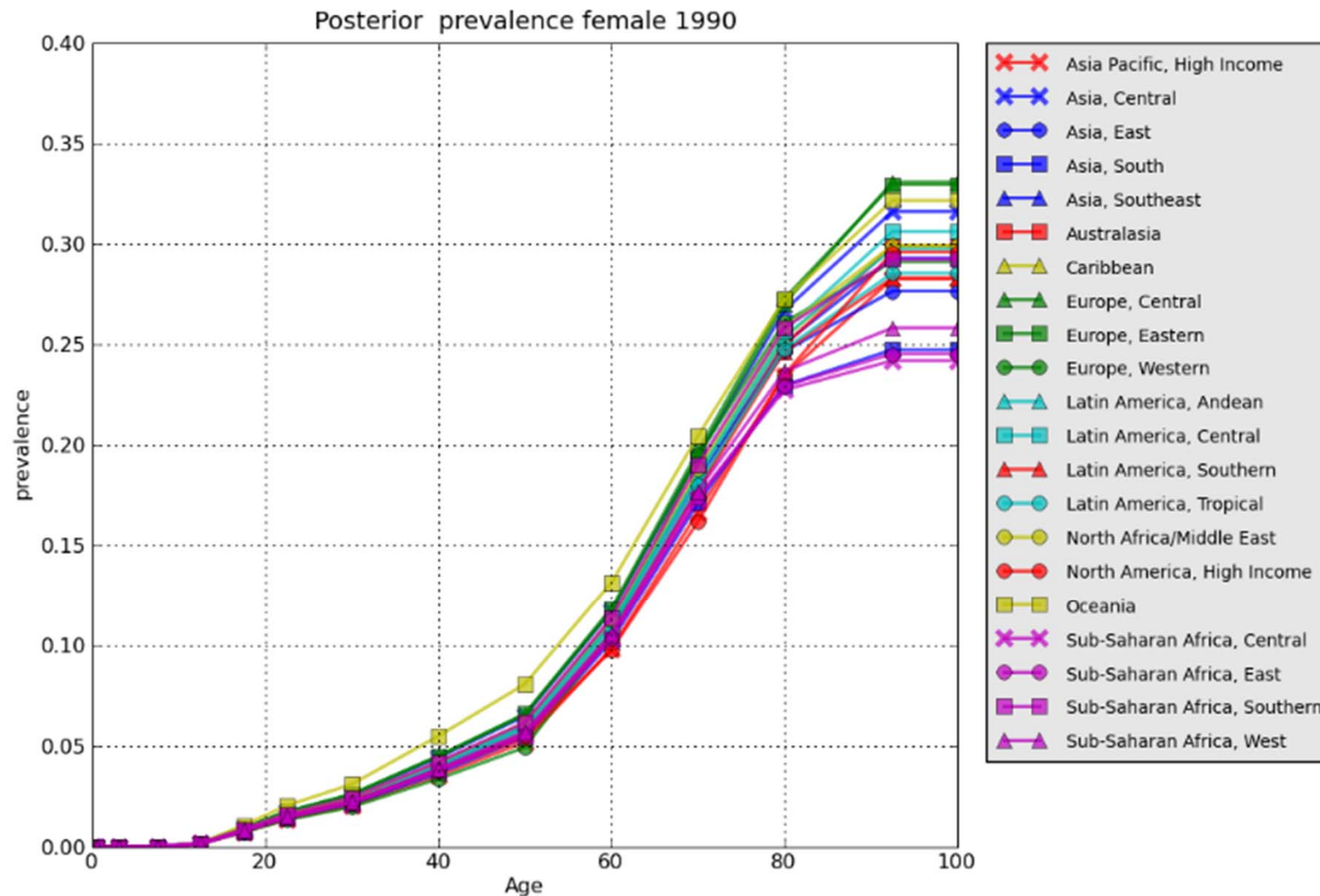
OA Knee Prevalence Estimates by GBD Region: 2010

(Males and Females Combined, age 30-100 years)

Posterior: model #11659 (prevalence, total, age 30-100, 2005)



OA Knee : Females 1990



Disability weights

- Surveys in Bangladesh, Indonesia, Peru, Tanzania, USA
- Open-access web-based survey
- Paired-comparison questions: two hypothetical individuals with different functional limitations (corresponding to a randomly selected pair of health states)
- Disability weights for all 220 unique health states on a scale from 0 (implying no loss of health) to 1 (implying a health loss equivalent to death)
- 14,710 respondents from household & phone surveys
- 16,328 respondents from web survey

Salomen JA, et al. Common values in assessing health outcomes from disease and injury: Global Burden of Disease 2010 disability weights measurement study Lancet (in press)

GBD 2010 Survey Disability Weights (DW)

Health state	DW
Neck Pain	0.221 (0.150-0.305)
OA - Mild	0.023 (0.013-0.039)
OA - Mod	0.079 (0.053-0.115)
OA - Severe	0.171 (0.117-0.240)
Gout - Acute	0.293 (0.198-0.404)
Gout Severe poly-articular	0.606 (0.421-0.771)
RA – Mild	0.114 (0.77-0.159)
RA – Mod	0.292 (0.197-0.410)
RA – Severe	0.606 (0.421-0.771)



MSK GBD2005 Study Group Leaders

ACR San Francisco 2008

GBD 2010

Disability weights for LBP derived from survey

Health State	Lay Description	DW
Low back pain, acute, without leg pain	Has severe low back pain, which causes difficulty dressing, sitting, standing, walking, and lifting things. The person sleeps poorly and feels worried.	0.269 (0.184-0.373)
Low back pain, acute, with leg pain	Has severe low back and leg pain, which causes difficulty dressing, sitting, standing, walking, and lifting things. The person sleeps poorly and feels worried.	0.322 (0.219-0.447)
Low back pain, chronic, without leg pain	Has constant low back pain, which causes difficulty dressing, sitting, standing, walking, and lifting things. The person sleeps poorly, is worried, and has lost some enjoyment in life.	0.366 (0.248-0.499)
Low back pain, chronic, with leg pain	Has constant low back and leg pain, which causes difficulty dressing, sitting, standing, walking, and lifting things. The person sleeps poorly, is worried, and has lost some enjoyment in life.	0.374 (0.252-0.506)

?

Modified disability weights (by core team)

Disability class	DW	Proportion (%)
Lowest acute neck pain, no psych or diff sleeping	0.040 (0.023-0.064)	56.5 (49.5-63.4)
Next lowest chronic neck pain, no psych or diff sleeping	0.101 (0.067-0.149)	17.6 (12.4-23.5)
More severe acute LBP, no leg pain	0.269 (0.184-0.373)	9.0 (7.0-11.6)
Most severe chronic LBP, no leg pain	0.366 (0.248-0.499)	16.9 (11.3-22.7)

- Used USA Medical Expenditure Panel Survey (MEPS) to determine % of LBP in each of 4 severity categories
- Similar to severity distributions from literature (6 studies) based upon Chronic Pain Grade

GBD Core team final results GBD2010

Rank N=291	Condition	YLDs	DALYs (burden)
1	Low back pain	83.1	Ischaemic heart disease
2	Major depression	63	Lower respiratory infections
3	Iron deficiency	42.9	Stroke
4	Neck pain	33.6	Diarrhoeal diseases
5	COPD	29.4	HIV/AIDS
6	Other MSK	28.2	Low back pain
11	Osteoarthritis	17.1	21 Neck pain, 24 Other MSK

EMBARGOED TILL DEC 15TH: Murray CJ, et al. Lancet (in press); Vos T, et al. Lancet (in press)

Global Burden of Diseases and Injuries 1990 - 2010

- There has been a large, and continuing shift in global disease burden away from communicable to non-communicable diseases and from premature death to years lived with disability.
.....The rising burden from mental, musculoskeletal conditions, and diabetes will impose new challenges on health systems.
- musculoskeletal disorders estimated to increase from 4.7% in 1990 to 6.8% (global DALYs) in 2010

Non-communicable diseases

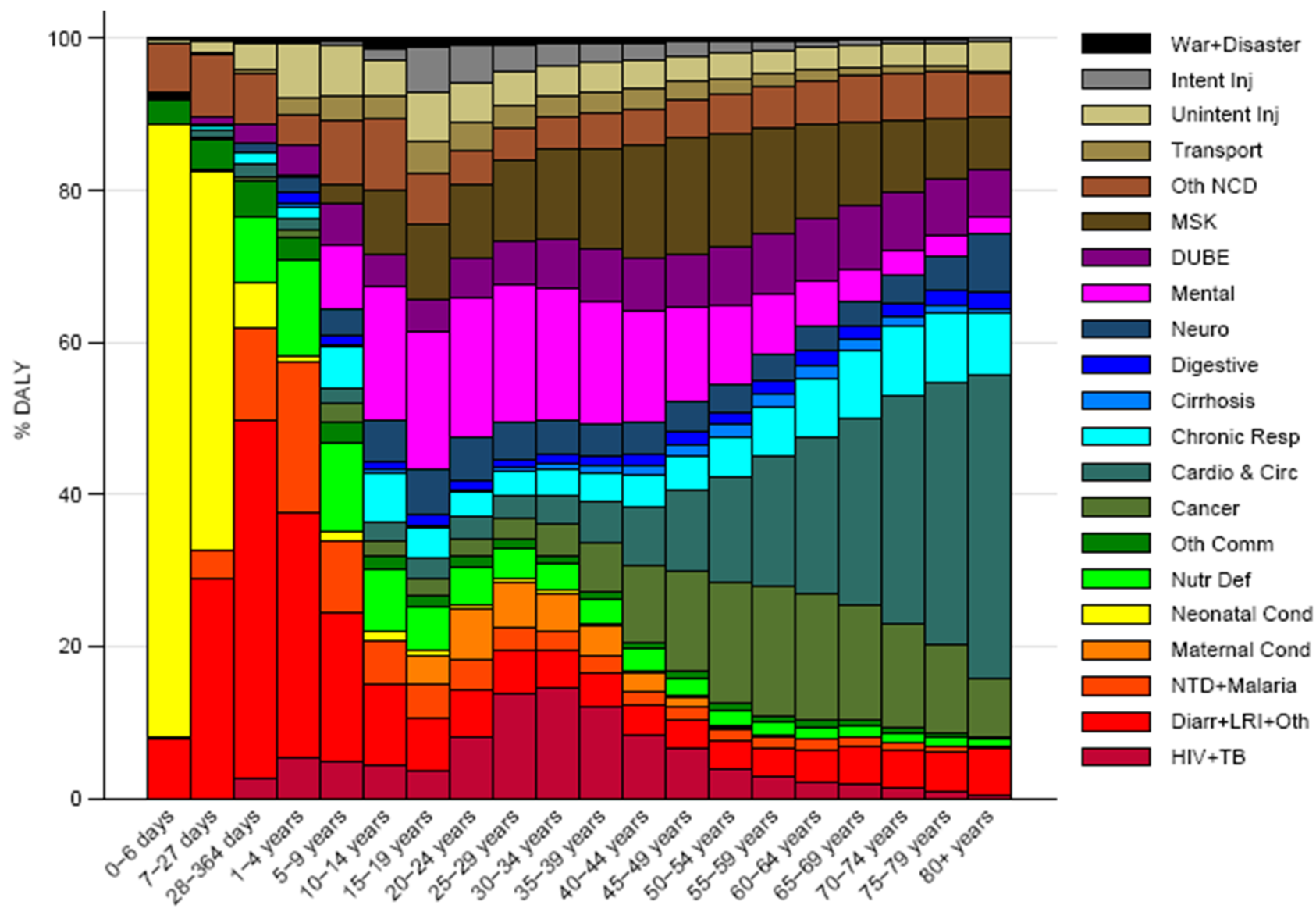
Globally

- Cardiovascular and circulatory diseases 295.0 million DALYs (11.8%)
 - ischemic heart disease 5.2%; hemorrhagic stroke 2.5%; ischemic stroke 1.6%; hypertensive heart disease 0.6%
- Injuries 278.7 million DALYs (11.2%)
 - road injuries 27% of the injury total. Within road injuries, nearly equal shares are due to pedestrian accidents, occupants of three or more wheeled vehicles, and the rest of road injuries. The next most important injury is self-harm (1.5%) followed by falls (1.4%) and interpersonal violence (1.0%). Drownings and fires each account for just over 19 million DALYs.
- All neoplasms 188.5 million DALYs (7.6%)
 - stomach cancer 0.7%; liver cancer 0.8%; trachea, bronchus and lung cancer 1.3%
- Mental and behavioral disorders 185.2 million (7.4%) DALYs
 - within this large grouping five different diseases cause more than 15 million DALYs each. In order of importance, the major causes are major depression (2.5%), anxiety (1.1%), drug use disorders (0.8%), alcohol use disorders (0.7%), and schizophrenia (0.6%).
- **Musculoskeletal disorders 6.8% DALYs**
 - **low back pain accounts for nearly one half, neck pain one fifth, and osteoarthritis about 10%.**
- Diseases in the diabetes, urogenital, blood, and endocrine group nearly 5% DALYs
 - diabetes mellitus 46.8 million DALYs (1.9%); chronic kidney disease 21.2 million DALYs (0.8%), and the group of hemoglobinopathies and hemolytic anemias 15.6 million DALYs (0.6%).
- Chronic respiratory diseases 4.7% DALYs
 - COPD making up two-thirds and asthma nearly one-fifth of the total.
- Neurological conditions 3% DALYs
 - one quarter is due to epilepsy and nearly one third is from migraine.
- Cirrhosis 31.0 million DALYs (1.2%)
 - nearly equal share related to hepatitis B, hepatitis C, and alcohol.
- Dementias 11.3 million DALYs

EMBARGOED TILL DEC 15TH: Murray CJ, et al. Lancet (in press); Vos T, et al. Lancet (in press)

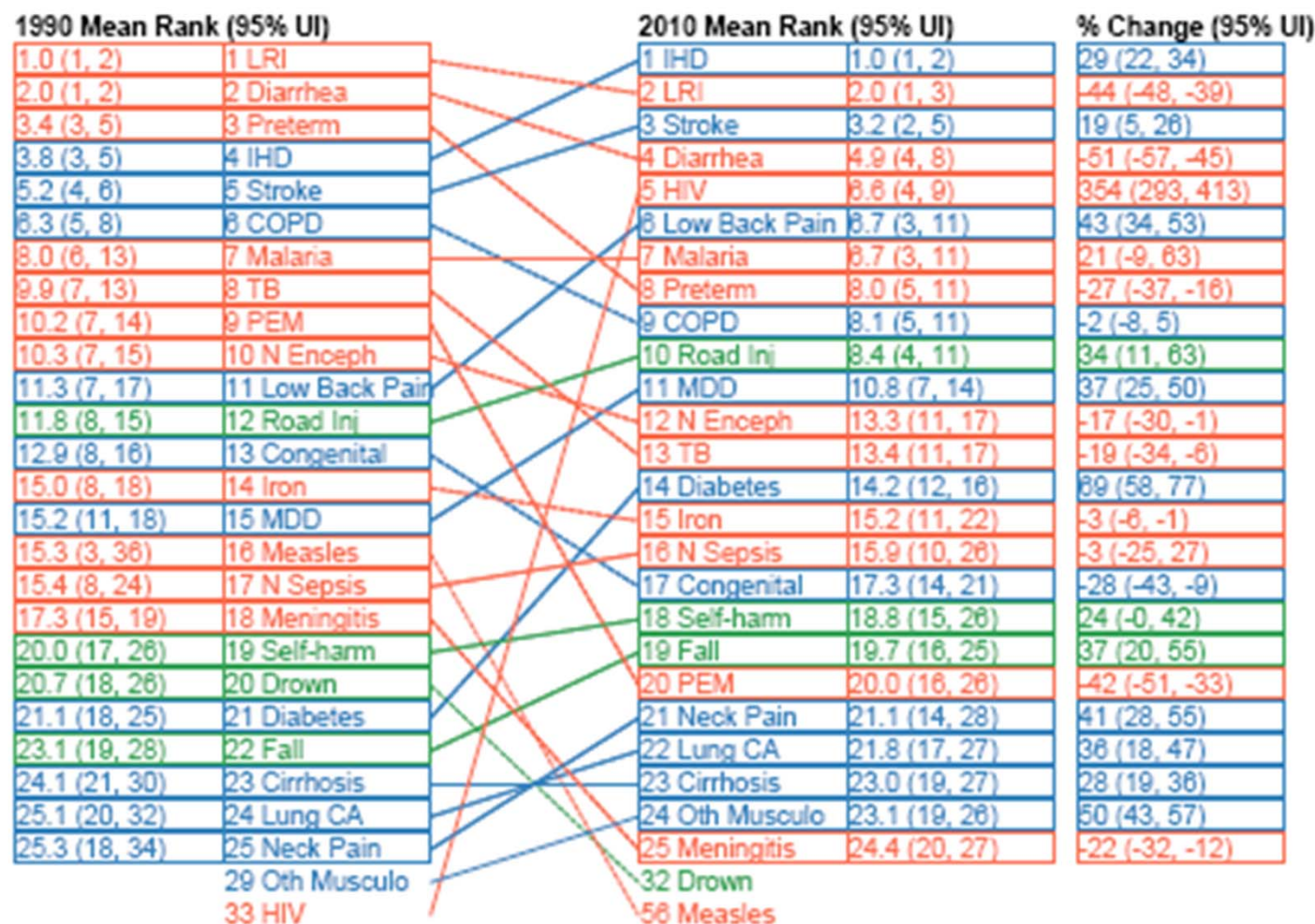
EMBARGOED TILL DEC 15TH: Murray CJ, et al. Lancet (in press); Vos T, et al. Lancet (in press)

DALYs (%) by Cause and Age, Females 2010



EMBARGOED TILL DEC 15TH: Murray CJ, et al. Lancet (in press); Vos T, et al. Lancet (in press)

Global DALY Ranks for Top 25 Causes, 1990 to 2010



Legend

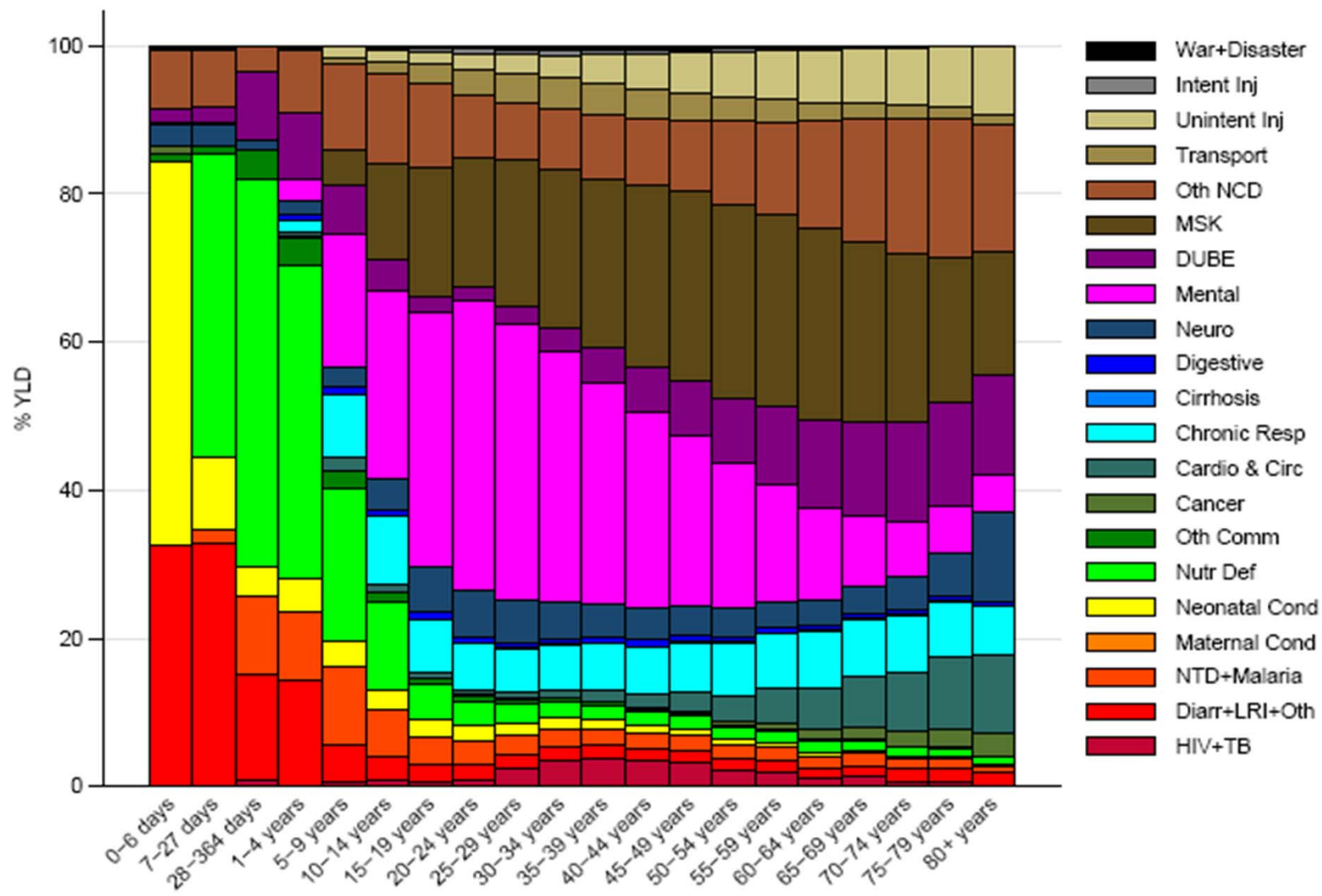
Communicable

Non-Communicable

Injury

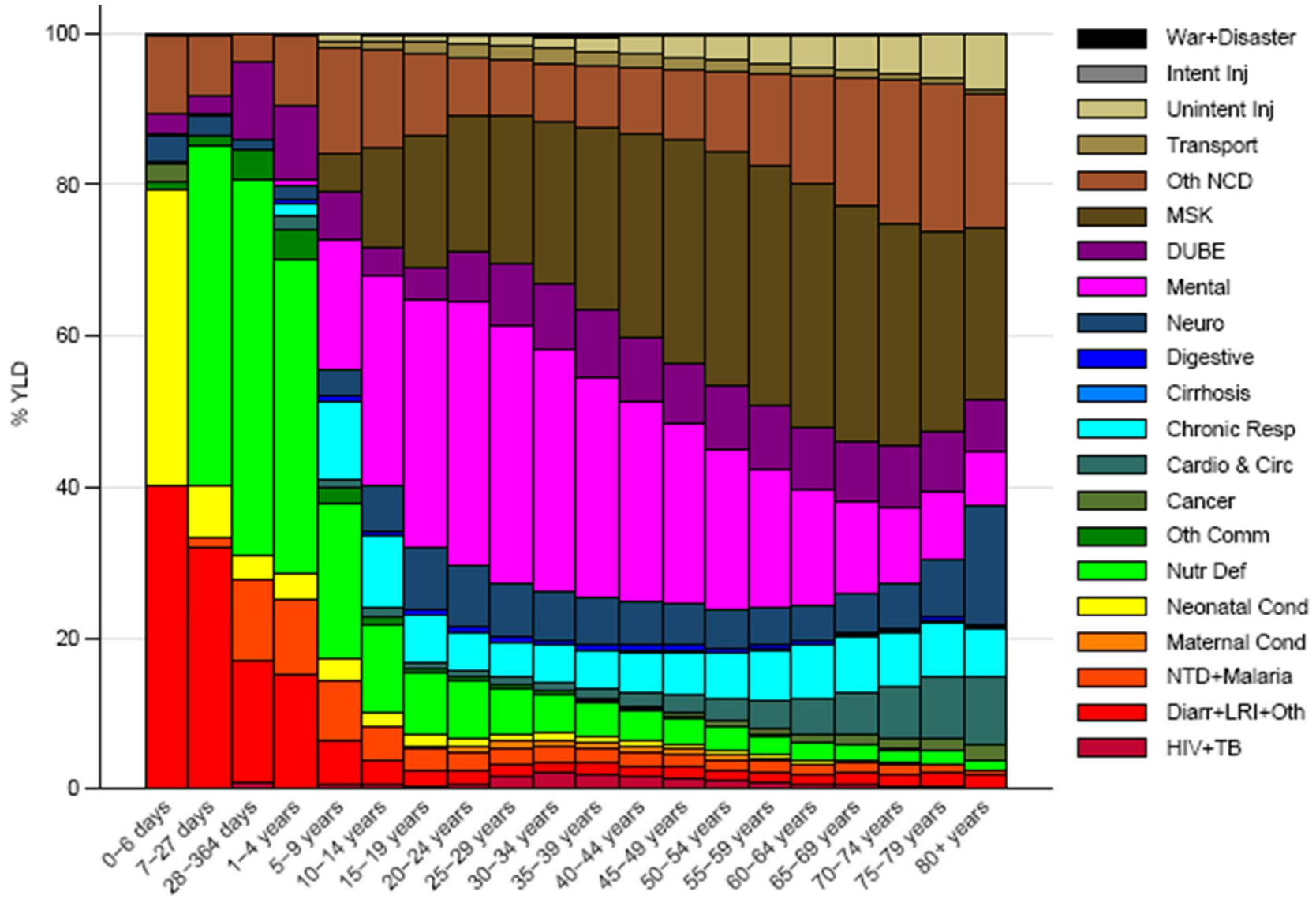
EMBARGOED TILL DEC 15TH: Murray CJ, et al. Lancet (in press); Vos T, et al. Lancet (in press)

Total YLD percentages for Cause and Age, Males, 2010



EMBARGOED TILL DEC 15TH: Murray CJ, et al. Lancet (in press); Vos T, et al. Lancet (in press)

Total YLD percentages for Cause and Age, Females 2010



GBD 2010 STUDY YLDs for top 25 causes

1990 Mean Rank (95% UI)		2010 Mean Rank (95% UI)		% Change (95% UI)
1.3 (1, 3)	1 Low Back Pain	1 Low Back Pain	1.1 (1, 2)	43 (34, 53)
2.2 (1, 3)	2 MDD	2 MDD	1.9 (1, 3)	37 (25, 50)
2.5 (1, 3)	3 Iron	3 Iron	3.3 (2, 6)	-1 (-3, 2)
4.4 (4, 7)	4 Neck Pain	4 Neck Pain	4.3 (3, 7)	41 (28, 55)
6.0 (4, 8)	5 Oth Musculo	5 COPD	5.8 (3, 10)	46 (32, 62)
6.1 (4, 9)	6 COPD	6 Oth Musculo	5.9 (4, 8)	45 (38, 51)
6.1 (4, 9)	7 Anxiety	7 Anxiety	6.4 (4, 9)	37 (25, 50)
8.7 (6, 15)	8 Migraine	8 Migraine	8.9 (6, 15)	40 (31, 51)
10.0 (7, 14)	9 Fall	9 Diabetes	9.1 (6, 13)	68 (56, 81)
11.4 (8, 16)	10 Diabetes	10 Fall	10.1 (7, 14)	46 (30, 64)
12.1 (8, 17)	11 Drugs	11 Osteo	12.3 (9, 17)	64 (50, 79)
12.2 (6, 19)	12 Hearing	12 Drugs	12.5 (9, 16)	40 (27, 54)
14.0 (9, 19)	13 Asthma	13 Hearing	13.5 (7, 20)	29 (22, 36)
14.9 (10, 21)	14 Alcohol	14 Asthma	15.3 (10, 20)	28 (21, 34)
15.0 (11, 21)	15 Osteo	15 Alcohol	15.8 (12, 21)	32 (16, 50)
15.2 (11, 20)	16 Road Inj	16 Schizo	16.0 (9, 22)	48 (37, 60)
17.1 (9, 25)	17 Bipolar	17 Road Inj	16.1 (12, 20)	30 (13, 49)
17.1 (9, 24)	18 Schizo	18 Bipolar	16.6 (9, 23)	41 (31, 51)
19.5 (12, 27)	19 Dysthymia	19 Dysthymia	18.6 (13, 26)	41 (34, 48)
19.8 (13, 25)	20 Diarrhea	20 Epilepsy	21.8 (18, 27)	36 (27, 47)
22.2 (13, 35)	21 Eczema	21 IHD	21.9 (17, 29)	48 (40, 57)
22.7 (19, 28)	22 Epilepsy	22 Eczema	22.3 (16, 35)	29 (19, 39)
23.9 (18, 32)	23 TB	23 Diarrhea	23.1 (19, 28)	5 (-1, 11)
24.5 (19, 34)	24 IHD	24 Alzh	25.9 (21, 33)	80 (71, 88)
25.3 (21, 33)	25 N Enceph	25 BPH	26.3 (20, 35)	84 (48, 120)
	30 Alzh	26 TB		
	35 BPH	27 N Enceph		

EMBARGOED TILL DEC 15TH

Conclusions of GBD2010

- Low back pain is estimated to be the leading cause of disability (YLDs) in the world
- It is estimated to be the 6th highest contributor to the global burden of disease (DALYs)
- Osteoarthritis of knee and hip are the most rapidly rising MSK condition
- Better epidemiologic data is needed to inform the next GBD study
- Identifying strategies to deal with this rising burden of arthritis and spinal pain is an urgent priority

Thank You - “Cảm ơn bạn”



Lyn (EG Leader) and the Happy MSK Team

