Musculoskeletal pain: incidence, prevalence and impact on healthy ageing

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Chair, Bone and Joint Decade 2010-20
Why are musculoskeletal conditions important?

- Musculoskeletal conditions are the most common cause of severe long term pain and physical disability.
- The prevalence of musculoskeletal conditions increase markedly with age.
- Musculoskeletal conditions are the main cause of disability among older age groups.
- The pain and physical disability brought about by musculoskeletal conditions affect social functioning and mental health, further diminishing the patient’s quality of life.
BUT

There is little priority or concerted action for the prevention and management of musculoskeletal conditions
What are musculoskeletal conditions?

• The musculoskeletal system provides form, support, stability, and movement to the body. It is made up of bones, muscles, cartilage, tendons, ligaments and other connective tissues. It is essential for normal physical functioning.

• Musculoskeletal conditions are a diverse group of conditions which affect the musculoskeletal system and are associated with pain and impaired physical function.

• Musculoskeletal conditions range from those that arise suddenly and are short lived to life long progressive disorders.

• Musculoskeletal conditions lead to major health and social care costs and are a significant cause of lost productivity.
Musculoskeletal conditions are diverse. For simplicity they may be grouped under:

- Joint conditions—for example, rheumatoid arthritis (RA), osteoarthritis (OA)
- Spinal disorders—for example, low back pain
- Regional and widespread pain disorders
- Bone conditions—for example, osteoporosis and associated fragility fractures
- Musculoskeletal injuries—for example, high-energy limb fractures, strains and sprains often related to occupation or sports
- Genetic, congenital and developmental childhood disorders
- In addition there are multisystem inflammatory diseases which commonly have musculoskeletal manifestations such as connective tissue diseases and vasculitis.
22% of the population currently has, or has experienced “long-term muscle, bone and joint problems such as rheumatism and arthritis”

Do you have, or have you had any of the following?

- Long-standing troubles with muscles, bones and joints (rheumatism, arthritis)
- Hypertension (high blood pressure)
- An allergy
- Migraine or frequent headaches
- Chronic anxiety or depression
- Asthma
- Diabetes
- Osteoporosis
- Chronic bronchitis, emphysema
- Cataract

Health in the European Union
Eurobarometer Special Report 272, 2007
74.5% reported any musculoskeletal pain during the past 12 months
53.9% reported musculoskeletal pain during survey (point prevalence)
44.4% reported musculoskeletal pain lasting longer than 3 months

The majority of respondents reported pain at multiple sites
Musculoskeletal pain often goes undiagnosed and it is difficult to quantify severity. An important widely used measure is that of musculoskeletal pain which restricts activities of daily living.
1 in 3 experience musculoskeletal pain restricting activities of daily living

32% experienced activity-limiting musculoskeletal pain in the preceding week

Health in the European Union
Eurobarometer Special Report 272, September 2007
Musculoskeletal pain restricting activities of daily living for 3 months or more

25% of all respondents say that at some point in their life they have experienced chronic restrictive musculoskeletal pain

Health in the European Union
Eurobarometer Special Report 272,
September 2007
EHIS - Physical pain disturbs daily activities

The degree to which physical pain restricts daily activity is also included in the EHIS. Below is an example from Estonia

Estonia 2006: Physical pain disturb daily activities

<table>
<thead>
<tr>
<th>Physical pain disturb activities</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>13.2</td>
</tr>
<tr>
<td>A little</td>
<td>16.7</td>
</tr>
<tr>
<td>Moderately</td>
<td>14.0</td>
</tr>
<tr>
<td>Much</td>
<td>7.3</td>
</tr>
<tr>
<td>Very much</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Prevalence of self reported musculoskeletal diseases

40.8% men and 48.0% women have had a physician diagnosis of a musculoskeletal disease

Age dependent diseases & non-age dependent diseases

Age related diseases

Mean SF-36 physical component scores and mental component scores by age and occupational grade

Physical health deteriorated for all occupational groups at older ages, while mental health tended to improve with age.

T Chandola  Social inequalities in self reported health in early old age: follow-up of prospective cohort study  
BMJ 2007; 334: 990
Chronic diseases ranked in terms of impact on quality of life: higher scores imply poorer quality of life


Summed rank scores for disease clusters
Musculoskeletal conditions and population ageing

The number of people in Europe over 60 is increasing dramatically. Ageing-related musculoskeletal conditions and decline in the function of musculoskeletal system are increasingly major contributors to limitations of physical performance and poorer quality of life in older people including frailty, with its accompanying risk of falling.
Musculoskeletal Conditions

• Musculoskeletal pain
  – Back pain
  – Regional pain
  – Widespread pain

• Joint diseases
  – Osteoarthritis
  – Rheumatoid arthritis
  – Gout
  – Infections

• Systemic connective tissue disorders

• Osteoporosis and low trauma fractures

• Bone infections

• Trauma

• Injuries (occupation, sports)
  and more……..
The most common musculoskeletal pain experienced is back pain.

Pain is the most prominent symptom in most people with arthritis and the most important determinant of disability in patients with osteoarthritis.

Respondents often report having more than one musculoskeletal complaint and musculoskeletal pain is often widespread.

Chronic widespread pain (CWP) is a symptom of the fibromyalgia syndrome.
Low Back Pain

• Low back pain is a major health and socioeconomic problem in Europe.

• Many people will experience one or more episodes of low back pain in their lives.

• It is usually classified as being “specific” or “non-specific”.

• The majority of back pain is due to non-specific causes, where there is no known underlying pathology.
Classification of low back pain

• Non-specific low back pain is when there is no clearly defined pathophysiologic cause. Non-specific low back pain accounts for about 90% of cases.

• Non-specific low back pain is usually classified according to duration and recurrence:
  – Acute back pain is of less than 6 weeks duration;
  – Subacute is between 6 weeks and 3 months duration;
  – Chronic when it lasts more than 3 months.

• Frequent episodes are described as recurrent back pain.
<table>
<thead>
<tr>
<th>Citation</th>
<th>Country</th>
<th>Age range (years)</th>
<th>Inclusion criteria at baseline</th>
<th>Incidence (unadjusted) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biering-Sorensen</td>
<td>Denmark</td>
<td>30 to 60</td>
<td>Never had low back pain</td>
<td>6.3</td>
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<tr>
<td>Croft et al</td>
<td>United Kingdom</td>
<td>18 to 75</td>
<td>Never had low back pain</td>
<td>15.4</td>
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<tr>
<td>Croft et al</td>
<td>United Kingdom</td>
<td>18 to 75</td>
<td>No low back pain at baseline</td>
<td>36.0</td>
</tr>
<tr>
<td>Hestbaek et al</td>
<td>Denmark</td>
<td>30 to 50</td>
<td>No low back problems over past year</td>
<td>19.3</td>
</tr>
</tbody>
</table>

Adapted from Hoy D et al. 2010. Low back Pain. *low back pain/problem over past year

*Best Practice Res Clin Rheumatol*
## Standardised period prevalence rate of low back pain per 100

<table>
<thead>
<tr>
<th>Country</th>
<th>Data collection date*</th>
<th>Age</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>2001</td>
<td>17-99</td>
<td>41.6 (LBP &gt; 1 day)</td>
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<tr>
<td>Czech Republic</td>
<td>2000</td>
<td>0-99</td>
<td>64.2 (back pain)</td>
</tr>
<tr>
<td>Denmark</td>
<td>1995</td>
<td>14-41</td>
<td>49.2</td>
</tr>
<tr>
<td>Finland</td>
<td>2003</td>
<td>14-18</td>
<td>36.4</td>
</tr>
<tr>
<td>France</td>
<td>2003</td>
<td>30-64</td>
<td>55.4</td>
</tr>
<tr>
<td>Germany</td>
<td>2003</td>
<td>18-99</td>
<td>61.8 (back pain)</td>
</tr>
<tr>
<td>Greece</td>
<td>2000</td>
<td>15-99</td>
<td>32.3</td>
</tr>
<tr>
<td>Italy</td>
<td>1999</td>
<td>65-99</td>
<td>58.9 (back pain)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>2003</td>
<td>12-16</td>
<td>7.5 (LBP &gt; 4 days)</td>
</tr>
<tr>
<td>Spain</td>
<td>2004</td>
<td>65-99</td>
<td>43.7 (LBP &gt; 1 day)</td>
</tr>
<tr>
<td>Sweden</td>
<td>1997</td>
<td>35-45</td>
<td>45.6</td>
</tr>
<tr>
<td>UK</td>
<td>1993</td>
<td>25-64</td>
<td>28.4 (LBP/ache &gt; 1 day)</td>
</tr>
</tbody>
</table>

* Mid point data collection period

It is estimated that 60% and 85% of adults have a lifetime prevalence of low back pain at any time.
Impact of low back pain

• Back pain has a marked effect on the patient and on society because of its frequency and economic consequences.
• Pain often is persistent during the episode, and many patients do not have complete resolution of their symptoms but have “flares” against a background of chronic pain.
• Pain is often worse with prolonged walking, standing, and sitting, which restricts mobility.
• Pain may affect sleep.
• The risk of disabling back pain rises in older age.
Osteoarthritis

- Joint failure
- Loss of cartilage
- Pain
- Loss of function
OA: Joints typically involved

Can occur in any joint but most common in hip, knee and the joints of the hand, foot and spine
Incidence of osteoarthritis

For both males and females the incidence of osteoarthritis rises steeply after the age of 50 peaking in the 70-79 age group.
Age-related prevalence of radiographic OA

Men

- DIP
- Knee
- Hip

Women

- DIP
- Knee
- Hip
A survey of 2,000 people with OA commissioned by Arthritis Care in 2011 showed 71 per cent of the UK's 8.5 million osteoarthritis (OA) sufferers are in some form of constant pain and one in eight describes the pain as often "unbearable".

The study found that people with osteoarthritis in the UK face £2.6 billion in extra costs a year as a result of paying for medical prescriptions, heating bills and transport costs. One in five have had to give up work or retire early because of their symptoms.
Rheumatoid Arthritis

• The most common inflammatory disease of the joints
• It is usually progressive over time affecting further joints.
• The destructive disease process causes irreversible changes to the bone and the joints become deformed, with long-term pain and disability.
Characteristics of Rheumatoid Arthritis

- Symmetrical peripheral polyarthritis
  – pain, tenderness, swelling, warmth, stiffness
- Evidence of inflammation
  – ESR or CRP elevated
- Rheumatoid factor and/or anti-cyclic citrullinated peptide antibodies (ACPA)
- Joint erosions
- Extra-articular features such as anaemia, weight loss, nodules and vasculitis
<table>
<thead>
<tr>
<th>Country</th>
<th>Data collection date**</th>
<th>Age</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>2003</td>
<td>19-90</td>
<td>34.5 (urban)</td>
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<tr>
<td></td>
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<td></td>
<td>30.21 (rural)</td>
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<td>1998</td>
<td>15-99</td>
<td>29.56</td>
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<td>1995</td>
<td>16-99</td>
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<td>France</td>
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<td>18-99</td>
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<td>1991</td>
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<td></td>
<td>1996</td>
<td>16-99</td>
<td>22.11</td>
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</table>

* * Not standardised, ** Mid point data collection period
## Standardised prevalence rate RA per 100 population

<table>
<thead>
<tr>
<th>Country</th>
<th>Data collection date**</th>
<th>Age</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2003</td>
<td>16-99</td>
<td>0.64 (urban) 0.70 (rural)</td>
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<td>France</td>
<td>2005</td>
<td>16-99</td>
<td>0.20*</td>
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<td>2002</td>
<td>18-99</td>
<td>0.32</td>
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<td></td>
<td>2001</td>
<td>30-79</td>
<td>0.31</td>
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<tr>
<td>Greece</td>
<td>2008</td>
<td>0-99</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td>1983</td>
<td>19-99</td>
<td>0.66</td>
</tr>
<tr>
<td>Hungary</td>
<td>2002</td>
<td>14-65</td>
<td>0.36</td>
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<td>Ireland</td>
<td>1995</td>
<td>18-99</td>
<td>0.49</td>
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<td>Italy</td>
<td>2004</td>
<td>18-91</td>
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<td>1992</td>
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<td>0.33</td>
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<td>Lithuania</td>
<td>2004</td>
<td>18-99</td>
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<td>The Netherlands</td>
<td>2000</td>
<td>25-99</td>
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<td>Spain</td>
<td>1998</td>
<td>20-99</td>
<td>0.52</td>
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<td>Sweden</td>
<td>2006</td>
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<td>1995</td>
<td>20-74</td>
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<td></td>
<td>1985</td>
<td>50-70</td>
<td>0.50*</td>
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<td></td>
<td>1975</td>
<td>16-74</td>
<td>0.70</td>
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<td>UK</td>
<td>1999</td>
<td>16-99</td>
<td>0.83</td>
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<tr>
<td></td>
<td>1994</td>
<td>23-68</td>
<td>0.30*</td>
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</tbody>
</table>

* Not standardised, ** Mid point data collection period
Impact of Rheumatoid Arthritis

- Rheumatoid arthritis is a more disabling (although not necessarily more painful) than lower limb osteoarthritis with 2/3rds of patients having mild-to-moderate disability

- Unlike osteoarthritis rheumatoid arthritis is not age related
Osteoporosis

- Fragility fractures have doubled in last decade
- 40% of all women over 50 years in developed countries will suffer an osteoporotic fracture
- In 2001 there were about 2.1 million hip fractures worldwide
- Risk to die following a hip fracture equals the risk to die of breast cancer (20%)
Osteoporosis

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- In 2001 there were about 2.1 million hip fractures worldwide
- Risk to die following a hip fracture equals the risk to die of breast cancer (20%)
Bone density
Prevalence of osteoporosis in men and women by gender-specific scores

Schuit et al. Bone 2004; 34:195
Fragility fractures in Sweden

Holmberg et al, Osteoporos Int. 2006; 7:1065-77
The site specific pattern of osteoporotic fractures by age worldwide

Hip Fracture: age related incidence
Sweden 1992-1995

Rate per 10,000 inhabitants

Rogmark 1999
Hip fracture rates in Europe

Osteoporosis in the European Union in 2008: Ten years of progress and ongoing challenges  IOF Report
Vertebral fracture prevalence

The EVOS Study

% vertebral deformity

Age (years)

50-54
55-60
60-64
65-69
70-75
75-79

10% 11% 12% 12% 13% 18% 5% 8% 10% 13% 17% 25%

Men
Women

McCloskey Method

O’Neill, J Bone Miner Res 1996; 11:1010
Incidence of vertebral fractures in women and men

EPOS Group, J Bone Miner Res 2002; 17:716-24
European variations in remaining lifetime probability of hip fracture at the age of 50 years in men and women

Impact of osteoporosis – hip fracture

• Hip fracture results in pain, loss of mobility, and excess mortality.
• Nearly all patients are hospitalized, and most undergo surgical repair of the fracture or replacement of the joint. At one year, hip fracture is associated with 20% mortality within the first year after fracture and 50% loss of function; only 30% of patients regain function.
• Many patients lose their independence and need long-term care.
Hip fractures associated morbidity

One year after a hip fracture:

- Death within one year: 20%
- Permanent disability: 30%
- Unable to walk independently: 40%
- Unable to carry out at least one independent activity of daily living: 80%

Outcome will depend on fracture management / healthcare system

From the individual to health of the population
Measuring population health

Summary measures of population health combine information on mortality and non-fatal health outcomes to represent the health of a particular population as a single number:

*Disability Adjusted Life Year (DALY)*

\[ \text{DALY} = \text{YLL} + \text{YLD} \]

DALY is one lost year of healthy life.
## The 20 Leading Causes of Global Burden of Disease (DALYs), 2001

<table>
<thead>
<tr>
<th>Cause</th>
<th>DALYs (millions of years)</th>
<th>Percentage of total DALYs (3,0)</th>
<th>Cause</th>
<th>DALYs (millions of years)</th>
<th>Percentage of total DALYs (3,0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Perinatal conditions</td>
<td>90.48</td>
<td>5.9</td>
<td>11 Road traffic accidents</td>
<td>35.06</td>
<td>2.3</td>
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<tr>
<td>2 Lower respiratory infections</td>
<td>85.92</td>
<td>5.6</td>
<td>12 Hearing loss, adult onset</td>
<td>29.99</td>
<td>2.0</td>
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<tr>
<td>3 Ischemic heart disease</td>
<td>84.27</td>
<td>5.5</td>
<td>13 Cataracts</td>
<td>28.64</td>
<td>1.9</td>
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<tr>
<td>4 Cerebrovascular disease</td>
<td>72.02</td>
<td>4.7</td>
<td>14 Congenital anomalies</td>
<td>24.95</td>
<td>1.6</td>
</tr>
<tr>
<td>5 HIV/AIDS</td>
<td>71.46</td>
<td>4.7</td>
<td>15 Measles</td>
<td>23.11</td>
<td>1.5</td>
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<td>6 Diarrheal diseases</td>
<td>59.14</td>
<td>3.9</td>
<td>16 Self-inflicted injuries</td>
<td>20.26</td>
<td>1.3</td>
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<tr>
<td>7 Unipolar depressive disorders</td>
<td>51.84</td>
<td>3.4</td>
<td>17 Diabetes mellitus</td>
<td>20.00</td>
<td>1.3</td>
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<td>8 Malaria</td>
<td>39.97</td>
<td>2.6</td>
<td>18 Violence</td>
<td>18.90</td>
<td>1.2</td>
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<td>9 Chronic obstructive pulmonary disease</td>
<td>38.74</td>
<td>2.5</td>
<td>19 Osteoarthritis</td>
<td>17.45</td>
<td>1.1</td>
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<td>10 Tuberculosis</td>
<td>36.09</td>
<td>2.3</td>
<td>20 Alzheimer’s and other dementias</td>
<td>17.11</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Global Burden of Disease and Risk Factors
Lopez et al

DCPP World Bank 2006
Deaths and burden of disease (DALYs) of Non-Communicable Diseases
WHO European Region 2002 (by cause and mortality strata)

<table>
<thead>
<tr>
<th>Group of causes</th>
<th>Eur-A</th>
<th>Eur-B</th>
<th>Eur-C</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deaths</td>
<td>DALYs</td>
<td>Deaths</td>
<td>DALYs</td>
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<tr>
<td>CVD</td>
<td>1612</td>
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<td>Neuropsychiatric disorders</td>
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<td>13732</td>
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<tr>
<td>Cancer</td>
<td>1038</td>
<td>8549</td>
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<td>Digestive diseases</td>
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<td>Respiratory diseases</td>
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<td>Diabetes mellitus</td>
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<td>Other NCDs</td>
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<td>3489</td>
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<tr>
<td>Total for NCDs</td>
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<td>45091</td>
<td>1590</td>
<td>27441</td>
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<tr>
<td>Total for all causes</td>
<td>3920</td>
<td>51725</td>
<td>1865</td>
<td>37697</td>
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</tbody>
</table>

Deaths in 1000’s
DALY’s in 1000’s
# Global Burden of Disease: the 10 Leading Causes of YLD, 2001

<table>
<thead>
<tr>
<th>Low- and middle-income countries</th>
<th>High-income countries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cause</strong></td>
<td><strong>YLD (millions of years)</strong></td>
</tr>
<tr>
<td>1 Unipolar depressive disorders</td>
<td>43.22</td>
</tr>
<tr>
<td>2 Cataracts</td>
<td>28.15</td>
</tr>
<tr>
<td>3 Hearing loss, adult onset</td>
<td>24.61</td>
</tr>
<tr>
<td>4 Vision disorders, age-related</td>
<td>15.36</td>
</tr>
<tr>
<td>5 Osteoarthritis</td>
<td>13.65</td>
</tr>
<tr>
<td>6 Perinatal conditions</td>
<td>13.52</td>
</tr>
<tr>
<td>7 Cerebrovascular disease</td>
<td>11.10</td>
</tr>
<tr>
<td>8 Schizophrenia</td>
<td>10.15</td>
</tr>
<tr>
<td>9 Alcohol use disorders</td>
<td>9.81</td>
</tr>
<tr>
<td>10 Protein-energy malnutrition</td>
<td>9.34</td>
</tr>
</tbody>
</table>

Global Burden of Disease and Risk Factors Lopez et al. DCPP World Bank 2006
Percentage of total non-communicable disease years lived with disability (YLDs) by condition and European region

WHO 2004

% Non-communicable disease YLDs by cause and European region

2004

YLDs due to musculoskeletal conditions vary by European region

WHO 2004

YLDs musculoskeletal diseases by European region 2004

## Determinants of musculoskeletal health – examples

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<th>Conditions and problems</th>
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<th>Personal Extrinsic</th>
<th>Environmental</th>
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<td>Back pain</td>
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<td>Psychological assets</td>
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</tbody>
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The way we live today – Consequences tomorrow?

- Physical fitness decreasing
- Obesity increasing
- Alcohol consumption still excessive in many countries
- Smoking - increasing
- Musculoskeletal injuries common - sport, occupational, road traffic accidents, falls

A 25-yr old woman today spends 4 times as much time watching TV as exercising
Europe’s Population is Ageing

It is estimated that by 2050 there will be 58 million more people aged 65 and over in the EU.
Obesity

- There is growing evidence of the association between obesity and musculoskeletal conditions.

- Obesity is associated with a range of disabling conditions in adults.

- There is evidence that childhood obesity can have a significant effect on a child’s musculoskeletal system.
Obesity rates are increasing among adults in EU countries.

Increasing obesity rates among adults in EU countries

Romania (2004, 2008)
Switzerland (1997, 2007)
Italy (1999, 2008)
Norway (1998, 2007)
Sweden (1998, 2008)
France (1996, 2005)
Austria (1996, 2004)
Poland (1997, 2008)
Germany (1997, 2008)
Belgium (1997, 2008)
Spain (1997, 2008)
Portugal (1997, 2008)
Cyprus (1997, 2008)
Latvia (1998, 2008)
Lithuania (1998, 2008)
Luxembourg (2002, 2007)
United Kingdom (1998, 2008)

Source: OECD Health Data 2010; Eurostat Statistics Database; WHO Global Infobase.
How often do you exercise or play sport?

- Regularly
- With some regularity
- Seldom
- Never

- Regularly
- With some regularity
- Seldom
- Never

60% of adults seldom or never do exercise or play sport
Maximising musculoskeletal health in older people

There is an urgent need to develop and implement simple solutions that can minimise the risk of physical disability due to musculoskeletal problems and conditions that become an increasing burden with ageing.

Many musculoskeletal conditions and their determinants develop in earlier years.

A “bone and joint healthy lifestyle” is important at all stages of life.
A Bone & Joint Healthy Lifestyle

Also benefits other noncommunicable diseases
There are effective interventions for the management of musculoskeletal conditions

- **Osteoarthritis**
  - pain control and self management
  - exercise
  - joint prostheses
- **Rheumatoid arthritis**
  - education and self management
  - symptom control & rehabilitation
  - effective disease modifying therapy eg methotrexate
- **Back Pain**
  - early rehabilitation
- **Osteoporosis and Fractures**
  - fracture prevention strategies for those at highest risk eg previous fragility fracture treat with bisphosphonates

BUT they are not being implemented across Europe
Greater priority and resources to enable:

• Promotion of a lifestyle that will **optimise musculoskeletal health** at all ages
• **Identify** and treat those who are **at highest risk**
• Accessible, timely, safe, appropriate **treatment to control symptoms and prevent unnecessary disability** due to musculoskeletal conditions and injuries
• Accessible and appropriate **rehabilitation to reduce any disability** due musculoskeletal conditions and injuries
• **Equity** across and between countries
To gain priority for prevention and control of musculoskeletal conditions when current priorities focus on conditions with high mortality, their needs to be recognition that they are the leading cause of disability, much of which can now be prevented.

Changing the paradigm from quantity of life to quantity of quality life.
“Keep people moving”