SUMMARY
Arthritis Research UK has partnered with Imperial College London to develop the Musculoskeletal Calculator, a prevalence modelling tool for musculoskeletal conditions. Data on the burden of musculoskeletal conditions are lacking and for the first time this prevalence model provides estimates of the burden of back pain to local areas.

Key messages
- Low back pain is the leading cause of disability in the UK.
- Approximately 1 in 6 adults in England have some form of back pain. There’s variation in the prevalence of back pain across local authority areas in England.
- The prevalence of back pain can be reduced through tackling obesity and improving physical activity. There also appears to be an association between smoking and back pain, but this doesn’t seem to be causative.

The Musculoskeletal Calculator for back pain is the second of four local datasets. The back pain estimates were preceded by estimates for knee and hip osteoarthritis, and will be followed by figures for rheumatoid arthritis and high risk fragility fractures.
**BACK PAIN IN ENGLAND**

**Prevalence**
There's variation in the prevalence of back pain at local authority level in England as estimated by the MSK Calculator. Approximately 1 in 6 people (16.9%) in England have back pain. This includes people of all ages and all causes of back pain.* The prevalence varies across local authorities in England, ranging from 11.8% to 21.4%.

**Severity**
In our modelling, we identified people with back pain as those with back pain lasting for three or more months.

Around 5.5 million people are estimated to have severe back pain, which is 61% of all people with back pain.

People were defined as having severe back pain if they reported experiencing either:

- a high intensity of pain
- severe limitation as a result of their pain.

*The model includes all ages however cases were identified in people aged 16 years and over only.

**Figure 1. Prevalence of total back pain at local authority level in England**
- Highest third
- Middle third
- Lowest third

**Figure 2. Prevalence of severe back pain at local authority level in England**
- Highest third
- Middle third
- Lowest third

*9m estimated people in England live with back pain
16.9% estimated prevalence of back pain in England
5.5m estimated people in England have severe back pain*
AREA SPECIFIC ESTIMATES FOR GLOUCESTERSHIRE

Prevalence
The Musculoskeletal Calculator estimates that 106,122 people in Gloucestershire live with back pain. This means that of the total Gloucestershire population, 17.6% are estimated to have back pain (overall prevalence). This is similar to the overall England prevalence of 16.9%.

Severity
It’s estimated that there are 63,708 people in Gloucestershire with severe back pain, which equates to 10.6% of the population.

Gloucestershire:

- **52,065** males have back pain (male prevalence 17.6%)
- **54,057** females have back pain (female prevalence 17.6%)

Of the total who have back-pain:

- **42,341** are aged under 35 years (39.9%)
- **43,150** are aged 35 to 64 years (40.7%)
- **20,630** are aged 65 years and over (19.4%)

*due to rounding, percentages may not always add up to 100%

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**Figure 3.** Back pain prevalence for local authorities in the South West, compared to England

- Torbay
- Dorset
- Cornwall
- Somerset
- Devon
- North Somerset
- Poole
- Isles of Scilly
- Gloucestershire
- Wiltshire
- Plymouth
- Bath and North East Somerset
- South Gloucestershire
- Bournemouth
- Swindon
- Bristol
- England

![Bar chart showing back pain prevalence for local authorities in the South West, compared to England.](image-url)
RISK FACTORS FOR BACK PAIN IN GLOUCESTERSHIRE

In our modelling, we found that risk of back pain is related to age, sex, socioeconomic status, body mass index, smoking status and education. Gloucestershire is among the least deprived local authority areas in England (deprivation decile 9). It has a similar proportion of adults who are overweight or obese compared to the England average. The proportion of adults in Gloucestershire who are physically active is similar to the England average and it has a significantly lower overall smoking prevalence. All local authority areas could benefit from further improvements to their risk factor profiles regardless of their position relative to the England average.

Figure 4. Indicators showing how Gloucestershire compares to England for risk factors relevant to back pain

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Period</th>
<th>Glouce'shire</th>
<th>Region</th>
<th>England</th>
<th>England</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Value</td>
<td>Value</td>
<td>Value</td>
<td>Worst</td>
</tr>
<tr>
<td>Obese adults</td>
<td>2012</td>
<td>22.9%</td>
<td>22.7%</td>
<td>23.0%</td>
<td>35.2%</td>
</tr>
<tr>
<td>Excess weight in adults</td>
<td>2012</td>
<td>978</td>
<td>63.8%</td>
<td>62.7%</td>
<td>63.8%</td>
</tr>
<tr>
<td>Smoking prevalence</td>
<td>2013</td>
<td>–</td>
<td>16.0%</td>
<td>17.3%</td>
<td>18.4%</td>
</tr>
<tr>
<td>GCSE achieved (5A*-C inc. Eng &amp; Maths)</td>
<td>2013/14</td>
<td>3,997</td>
<td>60.8%</td>
<td>56.7%</td>
<td>56.8%</td>
</tr>
</tbody>
</table>

GENERAL INFORMATION ON BACK PAIN

BACK PAIN IS THE MOST COMMON CAUSE OF DISABILITY IN THE UK AND HAS BEEN FOR AT LEAST 20 YEARS.¹

Cause
Some back pain can be due to underlying medical conditions, but about half of chronic cases have no identified cause (non-specific back pain).² Long-term back pain is associated with depression,³ so people with back pain are likely to have a greater need for mental health services.

Burden of disease
About 20% of people with low back pain consult their GP, which poses a large burden on the health and social care system.

Back pain results in millions of lost working days, and is responsible for £10 billion of indirect costs each year.¹

Risk factors
There are a number of risk factors for the development of back pain including increasing age, female sex, smoking, low educational attainment and heavy physical lifting in the workplace. The largest modifiable risk factor is obesity. Given the projected increases in obesity, and the growth and ageing of the population the proportion of people affected by low back pain is expected to rise.⁴

In terms of reducing the prevalence of persistent back pain, there’s reasonable evidence that many types of post-treatment back exercise can reduce low back pain recurrence.⁵ There’s also evidence that exercise in combination with education is likely to prevent episodes of low-back pain.⁶
This is an approach to back pain care developed by Keele University. Patients are stratified according to prognosis, and then matched to the appropriate treatment package. This new model of treatment results in greater health benefits, achieved at a lower average health-care cost, with an average saving to health services of £34.39 per patient and societal savings of £675 per patient. 

National Institute for Health and Care Excellence (NICE)

NICE make recommendations about the treatment and care of people with back pain. These recommendations include:

1. holistic care of people with back pain
2. self-management
3. initial treatments which include exercise and manual therapy, with consideration of psychological therapy and surgery at a later stage.

These recommendations can be found in ‘Low back pain and sciatica in over 16s: assessment and management’ (November 2016) www.nice.org.uk/guidance/ng59

An ageing population, alongside rising levels of obesity and physical inactivity, is expected to increase the number of people living with painful musculoskeletal conditions. Like other long-term conditions, obesity and physical inactivity are major avoidable risk factors for developing musculoskeletal conditions. This report adopts a life course approach to musculoskeletal health and makes four recommendations for a public health approach to musculoskeletal conditions:

1. When assessing local and national population health, musculoskeletal health must be included in the assessment.
2. When designing, implementing and evaluating programmes targeting lifestyle factors such as obesity and physical inactivity, impact on musculoskeletal health should be explicitly included.
3. When developing health promotion messages, the benefits of physical activity to people with musculoskeletal conditions should be emphasised.
4. All this public health activity must be underpinned by high-quality data about musculoskeletal health.

Local authorities and commissioners have an important role to play in supporting people that have back pain. However, our research shows that 62% of local authorities fail to include back pain in their assessment of local health needs.
Map of Medicine
http://mapofmedicine.com

Map of Medicine is a series of care pathways in flowchart form, including national ones on low back and radicular pain, developed by the British Pain Society. These consolidate the evidence-base, expert opinion and national policy to provide a best-practice pathway that can aid clinical and commissioning decisions.

You can find these pathways under Medicine / Pain management / Low back and radicular pain, and access them with an Athens account.

The Cochrane Library
www.thecochranelibrary.com

The Cochrane Collaboration publish high-quality systematic reviews to inform healthcare decision making covering a range of topics. Recent reviews relating to back pain include:

Muscle energy technique (MET) for non-specific low back pain (December 2014).
Multidisciplinary biopsychosocial rehabilitation treatment for chronic low back pain (September 2014).

Musculoskeletal Calculator prevalence estimates
Arthritis Research UK has worked with Imperial College London to develop the Musculoskeletal Calculator. Risk factors for back pain were identified through a comprehensive literature review. Questions in the Health Survey for England giving information related to these risk factors were then extracted and analysed. The Musculoskeletal Calculator incorporates these factors to estimate the total number of people with back pain lasting three months and over in each local area in England while specifically estimating the number of individuals with severe back pain. Severe back pain is pain rated by survey respondents as high intensity or severely limiting.

Information presented in this briefing is at local authority level. The Musculoskeletal Calculator generates estimates of the number of cases of back pain by local authorities, clinical commissioning groups and GP practices. The purpose of the Musculoskeletal Calculator is to provide estimates of the burden of back pain to inform joint strategic needs assessments, service planning and prioritisation in local areas.

As with all statistical models, the back pain estimates produced by the Musculoskeletal Calculator should be treated with caution.

MSK Calculator bulletins series
Currently available
\Osteoarthritis bulletin

MSK Calculator online tool
The MSK Calculator online tool will be re-launched in Spring 2017 with access to the prevalence estimates for all four models: osteoarthritis, back pain, rheumatoid arthritis and high risk of fragility fracture.

References
Arthritis Research UK is the charity dedicated to stopping the devastating impact that arthritis has on people’s lives.

Everything that we do is focused on taking the pain away and keeping people active. Our remit covers all conditions which affect the joints, bones and muscles including osteoarthritis, rheumatoid arthritis, back pain and osteoporosis. Together, these conditions affect around 10 million people across the UK and account for the fourth largest NHS programme budget spend of £5 billion in England.\textsuperscript{ix} We fund research into the cause, treatment and cure of arthritis, and we provide information on how to maintain healthy joints and bones and how to live well with arthritis. We also champion the cause, influence policy change and work in partnership with others to achieve our aims. We depend on public support and the generosity of our donors to keep doing this vital work.

About Public Health England

Public Health England exists to protect and improve the nation’s health and wellbeing, and reduce health inequalities. It does this through advocacy, partnerships, world-class science, knowledge and intelligence, and the delivery of specialist public health services. PHE is an operationally autonomous executive agency of the Department of Health.

Nature of partnership work

Arthritis Research UK has worked with Imperial College London to develop the Musculoskeletal Calculator modelled prevalence data. Public Health England has worked with Arthritis Research UK to develop this bulletin.

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