Arthritis Research UK

MUSCULOSKELETAL HEALTH

A public health approach

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AUTHORSHIP AND CONTRIBUTORS

This report was produced by the policy team at Arthritis Research UK. The lead author was Benjamin Ellis with additional support from Alan Silman, Tracey Loftis, Laura Boothman, Michael Watson and Amy Forbes.

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A major source of input to this report followed from a workshop on musculoskeletal public health, organised by Arthritis Research UK in August 2013. The programme and attendees to that workshop are listed in Appendix 3.

ARTHRITIS RESEARCH UK

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. We fund research into the cause, treatment and cure of arthritis, provide information on how to maintain healthy joints and bones and 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.

FOREWORD FROM THE UK CHIEF MEDICAL OFFICERS

Musculoskeletal conditions now account for the largest proportion of years lived with disability in the United Kingdom.[1] These painful, disabling conditions of joints, bones and muscles can devastate the lives of those living with them, and nationally are a leading cause of work absence. Like other long-term conditions, obesity and physical inactivity are major avoidable risk factors for developing musculoskeletal conditions. Our ageing population, rising obesity and reduced levels of physical activity will increase the prevalence of these conditions. Yet conditions such as arthritis and back pain are commonly perceived to be unavoidable, and too few people with these conditions are aware of the benefits of physical activity and maintaining healthy body weight to improve their symptoms.

In 2013 Arthritis Research UK held a workshop bringing together national leaders from both the public health and musculoskeletal academic communities to consider a lifecourse approach to musculoskeletal health and review the determinants of health, the potential opportunities for health improvement and emerging research questions. This guide reviews the opportunities for improving musculoskeletal health, discussing the risk factors across the lifecourse and outlining a framework for a co-ordinated public health approach.

At every age physical activity reduces the risk of developing musculoskeletal conditions, including osteoarthritis and osteoporosis, in later life. In 2011 we produced our joint Chief Medical Officers' physical activity guidelines outlining recommended levels of physical activity. Widespread uptake of these guidelines among the general public of all ages would lead to fewer people living with the pain and disability of these conditions. For people living with a painful musculoskeletal condition, national guidelines already recommend increasing physical activity and managing obesity. National and local government must work with local communities to create an environment where people are enabled and supported to make the changes that will improve their own health. At the front line, clinicians and care workers should routinely communicate these health improvement messages to people with these conditions.

This guide makes the case for changing the approach from tackling musculoskeletal disease to promoting lifelong good musculoskeletal health. The most common form of arthritis, osteoarthritis, has now been acknowledged as 'an unrecognised public health priority".[2] This guide challenges the perceptions that arthritis is unavoidable, and that 'nothing can be done' once symptoms have begun. All those working in public health should read this guide to a Public Health Approach to Musculoskeletal Health, consider its recommendations and ensure that musculoskeletal health is woven into the fabric of public health in all four nations.

Professor Dame Sally C Davies, Chief Medical Officer for England
Dr Michael McBride, Chief Medical Officer for Northern Ireland
Dr Aileen Keel CBE, Acting Chief Medical Officer for Scotland
Dr Ruth Hussey OBE, Chief Medical Officer for Wales

FOREWORD FROM PUBLIC HEALTH ENGLAND

Over the last 150 years, patterns of health and disease have dramatically shifted. Improvements in sanitation, air quality and nutrition led to substantial reductions in deaths from infectious diseases, leading to increased lifespan. Over the last 50 years, sustained public health efforts have reduced the prevalence of tobacco use, and a corresponding fall in smoking-relating illnesses. While the old challenges never quite go away, threats to public health now increasingly are due to unhealthy lifestyles. As well as causing diabetes and heart disease, rising levels of physical inactivity and obesity will lead to epidemic levels of painful, disabling arthritis.

Work by the Institute for Health Metrics and Evaluation's Global Burden of Disease Study (GBD) suggests that musculoskeletal conditions are now the leading cause of disability globally, and in the United Kingdom. As well as outlining opportunities to improve musculoskeletal health, this Arthritis Research UK Guide describes the relative poverty of data we have in England about these important disorders. This includes a lack of good quality local and national data about the prevalence and impact of musculoskeletal conditions; substantial gaps in the information we have about the care provided for people with these conditions, especially in outpatient, community and primary care settings; and the absence of systematic measurement and recording of health status and outcome measures for the majority of people with arthritis or back pain receiving non-surgical care from the NHS in England.

Public Health England welcomes this report from Arthritis Research UK highlighting the need for more attention to be given to musculoskeletal public health. The recommendations in this report provide a sound foundation for action. Public Health England is also keen to work with Arthritis Research UK to identify ways in which the gaps in data about musculoskeletal disorders can be filled.

Often, what gets measured gets done. We must acknowledge the results of studies such as GBD and make sure that people with musculoskeletal conditions receive the attention they deserve, and that improving the musculoskeletal health of the population is on the agenda of the public health community and national and local government.

Professor John Newton, Chief Knowledge Officer, Public Health England

FOREWORD FROM COUNCILLOR KATIE HALL, LOCAL GOVERNMENT ASSOCIATION

In recent years local authorities have taken on greater responsibility in relation to public health than at any point since the creation of the NHS in 1948. This is a fantastic opportunity for councils to develop public health policies that are innovative, original and tailored to the needs of their local population.

There are certain challenges that all local authorities have in common, not least in the area of musculoskeletal conditions. Our population is ageing at the same time that so many of us are living less healthy lives. Because of this musculoskeletal conditions will be more common. These conditions are already a significant cause of years lost to disability, and illness related work absence, every year.

The transition of public health into local government has seen one of the most significant changes for councils in recent years. It has created huge opportunities for local authorities to make a stronger impact on improving the health of local communities. I continue to be struck by the passion and enthusiasm of councillors, officers, clinicians and local communities to make the new public health system work. Preventing illness and empowering people to stay well and lead independent lives is not something health and care professionals can do alone; broader action from across all sections of the community is required. To ensure people receive the right support at the right time, we must continue to align services and ensure our finite resources are targeted in the most effective way.

This report demonstrates both the need for action, and the direction that action should take. To develop a truly public health approach to musculoskeletal conditions is a great challenge, but it is one that councils must meet.

Cllr Katie Hall, Chair of the Community Wellbeing Board, Local Government Association

FOREWORD FROM THE CHIEF EXECUTIVE OF ARTHRITIS RESEARCH UK

Arthritis is a painful, long term condition which has a substantial impact on quality of life. Along with other painful conditions affecting bones, muscles and joints, arthritis can affect every aspect of a person's life: from moving around in our homes to sleeping well, from going to work to playing with our children or grandchildren. The symptoms of musculoskeletal conditions may not be visible to the human eye, but we see their impact in every aspect of our lives.

Arthritis Research UK would now like to transform the conversation about these painful, disabling conditions. For too long, the focus has been on the end stages of musculoskeletal disease – treating these conditions when they are at their most severe. We would like to see a step change: alongside our search for a cure, we would like to see a change in emphasis towards the positive promotion of lifelong healthy bones, muscles and joints.

We must all address how we reduce the risk of developing a musculoskeletal condition, alongside how we reduce the impact of these painful conditions once they have developed. Awareness of the link between healthy lifestyles and musculoskeletal health is low, particularly for people who are already living with the pain and disability of arthritis or back pain. We need to challenge these misconceptions and explode the myth that nothing can be done about arthritis.

This guide presents a new way of thinking about musculoskeletal conditions, through the lens of public health. Everyone can do something to improve and maintain the health of their bones, joints, muscles and spine, at every age. Increasing physical activity and keeping a healthy body weight can markedly reduce the risk of developing a musculoskeletal problem. For those who have developed a musculoskeletal condition, lifestyle changes can substantially reduce the impact of the condition, at every stage of the disease.

Arthritis Research UK is calling for those responsible for health nationally and locally to transform the information, resources, facilities and support people need so they can take steps to improve their musculoskeletal health.

At the core of our public health approach to musculoskeletal health is physical activity. Remaining active is one of the best things anyone can do for their musculoskeletal health, to help strengthen muscles, keep bones healthy, reduce pain and prolong the life of joints. Initiatives aimed at increasing physical activity should always explicitly refer to the musculoskeletal health benefits. Those designing and implementing these programmes must ensure that joint or back pain is not seen as a barrier to participation. And those evaluating these activities need to ensure that they are making a difference to people who are living with a musculoskeletal condition.

Arthritis Research UK is committed to a world free from the pain of arthritis. Something can be done, at every age and at every stage. Through our research, policy and health promotion work we will help create a society where people can live healthy lives as well as long lives. We now need a public health approach to musculoskeletal health to help us all stay healthier for longer, remaining active, and doing the things we love.

Dr Liam O' Toole, Chief Executive, Arthritis Research UK

BACKGROUND TO THE REPORT FROM THE MEDICAL DIRECTOR OF ARTHRITIS RESEARCH UK

In August 2013, Arthritis Research UK convened an expert workshop of epidemiologists, public health specialists and others with an interest in helping shape a national agenda for musculoskeletal public health. The charity chose to adopt a life course approach, considering at each key stage from pregnancy, early infancy and childhood through to working life and older age, what were the opportunities for interventions to reduce the risk of musculoskeletal disorder and enhance musculoskeletal health. The aim was to identify those opportunities for which there was a robust evidence base and a potential that government, national and local, and other agencies, could by their actions achieve a beneficial change. The workshop was followed by further evidence gathering and synthesis and expert review resulting in the current report.

One key goal was to focus on the key challenges and the gaps in research both in terms of what is effective and how best public health interventions can be delivered. The main objective was to identify actions that could be initiated now and implemented by those bodies who have the leverage and ability to achieve change. This report is a living document and its future content will be shaped by emerging data and experiences. Arthritis Research UK is keen to ensure that you will join us on this journey.

Professor Alan Silman, Medical Director, Arthritis Research UK

INTRODUCTION

Healthy muscles, joints and bones work together to produce the good musculoskeletal health required to carry out daily activities with ease and without discomfort. Millions of people in the UK live with the pain and disability of arthritis, back pain or fragility fractures ruining their quality of life.

Pain can be a major barrier to people living full and active lives. The pain of a hip fracture from a fall may lead an older person to fear leaving their home. The pain of osteoarthritis may make it difficult for a once active person to exercise. And severe back pain may have a debilitating impact on someone's ability to work. The pain is indiscriminate, affecting every aspect of personal, intimate, family and working life.

Musculoskeletal conditions now account for the largest cause of disability in the United Kingdom, following a pattern that has emerged over the last two decades. The burden of painful conditions also falls disproportionately on those who are more disadvantaged in society. Pain at its worst is most common in groups that are more deprived.[3]

An ageing population, alongside rising levels of obesity and physical inactivity, will increase the number of people living with a painful musculoskeletal condition. Increasing numbers of people of working age will struggle to work due to these conditions, particularly as the retirement age reaches 70 years. More people than ever before will depend on health and social care services to manage their pain and disability. This economic pincer movement – lost productivity and increased costs – will place great demands on society.

Much is known about the potentially modifiable risk factors for musculoskeletal ill health. Some, such as injury prevention, workplace factors and vitamin D levels, are specific to these conditions. Others are more generic in their influence on health. Like many other long term conditions, physical inactivity and obesity are major risk factors for musculoskeletal conditions. There is, however, a lack of public awareness about the link between lifestyle and musculoskeletal health. Appropriate physical activity can both prevent and reduce the impact of these musculoskeletal conditions for people who develop them. Widely held, yet incorrect, beliefs about musculoskeletal health deprive people in pain of the opportunity to improve their own health.

A public health approach to musculoskeletal health is urgently needed to ensure that people are able to live not only long, but also well. Focus must shift from treating musculoskeletal *disease* to promoting lifelong *musculoskeletal health*. At every age, people should be supported to maintain and improve their musculoskeletal health. As well as the immediate benefits, this is an investment for the future, reducing their risk of developing a musculoskeletal condition later in life. For people with arthritis and other musculoskeletal conditions, perceptions must change that *nothing can be done*. People should be empowered with knowledge about keeping their own bones, joints and muscles healthy and supported to make the changes to achieve this. Local communities should be resourced and enabled to develop support systems for people living with painful long term conditions. The public health system should create an environment where musculoskeletal health is seen as a priority and barriers to good musculoskeletal health are removed.

This guide to musculoskeletal public health brings together a summary of current evidence and thinking about musculoskeletal conditions considered through a life-course approach. It will be of interest to members of the public health community and policy-makers who will be familiar with public health, but may be less familiar with what such an approach means for musculoskeletal health. For people working in the field of musculoskeletal conditions this guide will provide a useful framework by which a public health approach may be applied to musculoskeletal health.

Arthritis Research UK would like this to be the beginning of a much longer conversation between the public health community and those interested in musculoskeletal health. It is time for concerted action to address musculoskeletal health. A new approach is needed. A public health approach.

1.0 PUBLIC HEALTH AND MUSCULOSKELETAL HEALTH

1.1 Overview

The current approach to musculoskeletal health is to deal with problems when they arise, usually through the provision of medical care. This section will review what is meant by public health and by musculoskeletal health and conditions, and will consider why a public health approach is now needed for this area.

1.2 What is public health?

The practice of public health aims to promote health, prevent disease and prolong life for the whole population through the organised efforts of society to provide an environment in which people can be healthy.[4]

Health promotion: Wigan Council[5]

The Active Living Referral Scheme is a programme of physical activity designed to help people improve their health and quality of life. Anybody over age 16 can be referred to the scheme by local healthcare professionals including GPs, practice nurses and physiotherapists.

The programme lasts for 12 weeks with each activity session taking between two minutes and an hour, at accessible sites across the local authority. The wide range of available activities includes supervised gym sessions, walking, back rehabilitation, gentle circuit sessions and Xbox Kinect. Each year, 3500 people take part in the scheme which aims to motivate, empower and support people to make healthy lifestyle changes, improving their health and increasing self-confidence.

Sylvia is 66 years old and took part in the scheme in 2012 after a referral from her GP. She has a number of medical conditions, including osteoarthritis for which she has had two hip replacements. She states that the Active Living Referral Scheme "has changed her life" after generating a tailored physical activity programme. "You have no idea what you are capable of doing unless you have tried it," says Sylvia.

Three public health functions come together to work towards providing the conditions for healthy living. *Health promotion* enables people to take steps to maintain and improve their own health and wellbeing, including nutrition and physical activity. As well as supporting individual behaviour change, health promotion activities address social and environmental factors that affect individual health choices. *Health protection* approaches work to remove threats to health from the external environment, for example from infection, poisoning or injury, including falls and workplace injury. There is a *health services* role for public health in developing, planning, implementing and evaluating the services needed by a population, including occupational health services.

Two further public health functions support the above roles. First, collection, interpretation and publication of data to monitor health trends and health needs and inform public health activities. Second, the formulation and evaluation of policies to create the conditions in which people can become healthy, addressing the determinants of health and health inequalities.

Figure 1: What is public health?

1.3 Musculoskeletal health and musculoskeletal conditions

Musculoskeletal health means more than the absence of a musculoskeletal condition. Good musculoskeletal health means that the muscles, joints and bones work well together without pain. People with good musculoskeletal health can carry out the activities they want to with ease and without discomfort.
It is possible to have poor musculoskeletal health without having a specific musculoskeletal condition.

1.4 The benefits of musculoskeletal health

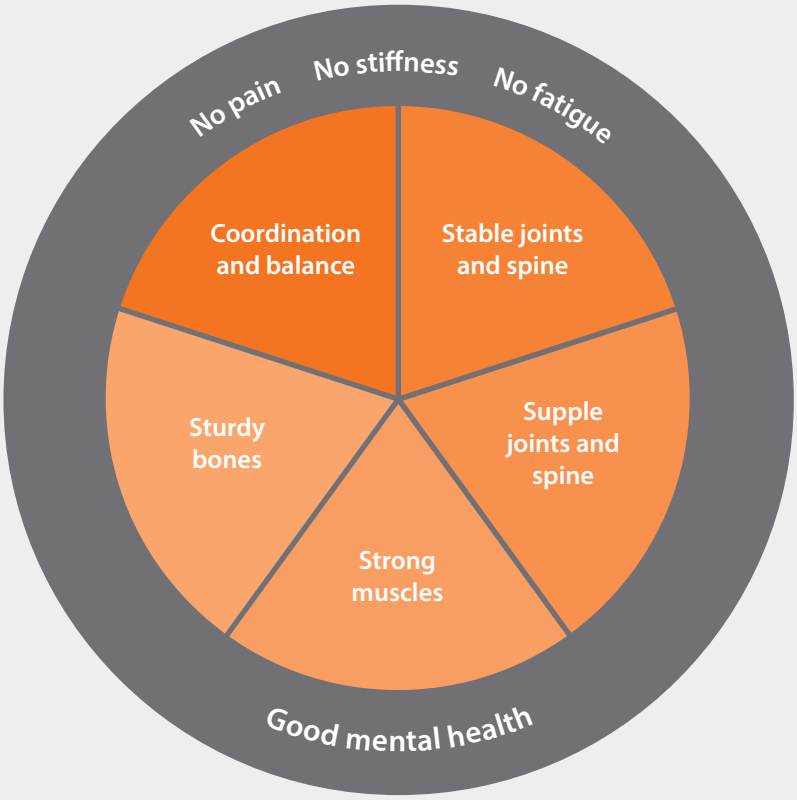
When all is well it is easy for people not to notice their own musculoskeletal health. But more than anything, it is musculoskeletal health that allows people to live independently. Being able to walk requires strength and co-ordination. Simple tasks like writing or eating need dexterity of the hands and wrists. Being able to reach up, or bend down, allows people to carry out everyday activities like gardening, cooking and cleaning.

As well as enabling people to live their lives now, good musculoskeletal health also includes building muscles, joints and bones that will continue to be healthy for many years ahead. Social perceptions of ageing are gradually changing. People increasingly hope to lead independent, active, pain-free lives in their older years. For many people this includes remaining part of the workforce. For most this includes an active retirement, without the fear of frailty and falls. In our ageing society it is more important than ever that people invest in their musculoskeletal health now so they can enjoy their later life.

1.5 What contributes to musculoskeletal health?

Several factors come together to produce musculoskeletal health. The joints and spine need to be both stable and supple to support the body and carry out a wide range of movements. Muscles need to be strong enough to provide the power to move. Bones need to be sturdy enough to withstand the normal knocks of everyday living without breaking. A healthy nervous system is needed to oversee all this activity, providing co-ordination and balance. Good mental health is required to provide energy and motivation to be physically active. What's more, all this should happen without pain, stiffness or fatigue.

Figure 2: Factors comprising musculoskeletal health



1.6 What are musculoskeletal conditions?

Musculoskeletal conditions are disorders of the bones, joints, muscles and spine, as well as rarer autoimmune conditions such as lupus. Musculoskeletal conditions interfere with people's ability to carry out their normal activities. Common symptoms include pain, stiffness and a loss of mobility and dexterity. The pain and disability caused by these conditions ruin quality of life, robbing people of their independence and impairing their ability to participate in family, social and working life. Broadly three groups of musculoskeletal conditions can affect people, leading to poor musculoskeletal health.

Conditions of musculoskeletal pain

Example: osteoarthritis

Common features:

» **Age:** rare in the young

» **Progression:** gradual onset

» **Prevalence:** very common

» **Impact:** affects the joints and pain system

» **Location of main treatment:** treatment based in primary care

» **Interventions:** treated with physical activity and pain management

» **Risk factors:** age, physical injury, obesity, gender

The commonest group comprises conditions of musculoskeletal pain such as osteoarthritis and back pain. Major risk factors for this group include obesity, physical inactivity and injury. In osteoarthritis there is painful wear and degeneration of joints. More than one-third of the population aged over 50 years has osteoarthritis pain that interferes with their normal activities.[6] Nearly three-quarters of people with osteoarthritis report some form of constant pain, with one in eight describing their pain as often unbearable.[7] Though for some people back pain is mild and self-limiting, one in six adults aged over 25 years reports back pain lasting over three months in the last year.[8] These very common conditions are normally treated by GPs in primary care, are much more common with rising age, and management usually involves physical activity and pain management. When osteoarthritis is severe people can need joint replacement surgery, which can restore their mobility.

Osteoporosis and fragility fractures

Common features:

» **Age:** affects mainly older people

» **Progression:** silent and gradual weakening of bone, sudden fracture

» **Prevalence:** very common

» **Impact:** hip, wrist and spinal bones are most common sites of fractures

» **Location of treatment:** prevention is based in primary and ambulatory care; fractures may require surgery

» **Interventions:** Medication to strengthen bones, falls prevention, fracture treatment

» **Risk factors:** smoking, alcohol, genetics, inflammatory disorders, poor nutrition, low physical activity

Another group is osteoporosis (weakening of the bones with rising age) and its major consequence: fragility fractures. The latter happen when frail bones break, sometimes after a minor trip or fall (including falling from standing height). One in two women and one in five men over the age of 50 will break a bone because of their bones being fragile.[9] Falls are more likely in those with poor musculoskeletal health, with weak muscles, stiff joints and reduced co-ordination. Fragility fractures affect large numbers of people and are commonly caused by osteoporosis where bones weaken with age. Identification of those at risk of a fragility fracture takes place mainly in primary care where treatments, including medication, can be prescribed. Fractures, however, require hospital treatment which can require surgery. Long term pain and loss of independence are common, and sometimes older people may not survive the trauma of a major fracture.

Inflammatory conditions

Example: rheumatoid arthritis

Common features:

» **Age:** affects any age

» **Progression:** often rapid onset

» **Prevalence:** less common

» **Impact:** internal organs can be affected

» **Location of treatment:** urgent specialist treatment needed including drugs

» **Interventions:** treated by suppressing the immune system

» **Risk factors:** genetics, smoking

The final group comprises inflammatory conditions such as rheumatoid arthritis, where the immune system attacks and destroys the joints and sometimes the internal organs. These relatively uncommon conditions affect less than one per cent of the population, and require specialist care from rheumatologists using drug treatments to suppress the immune system.

1.7 The wider health impacts of musculoskeletal conditions

As well as causing pain and disability, musculoskeletal conditions affect general physical health. People with osteoarthritis have increased risk of cardiovascular disease[10] and early mortality, an effect which appears to be partially reversed by joint replacement surgery, perhaps due to the restoration of normal activity levels.[a, 11] There is substantially increased mortality for older people following a fall and a broken hip.[12] Many of the rarer inflammatory musculoskeletal conditions such as rheumatoid arthritis can substantially shorten the lives of those affected.[13]

1.8 The interaction between mental health and musculoskeletal health

Perhaps unsurprisingly musculoskeletal conditions have a huge impact on mental health. Depression is four times commoner for those people in persistent pain than in those without such pain.[14] Two-thirds of people with osteoarthritis, the most common form of arthritis, report symptoms of depression when their pain is at its worst.[15] One in six people with rheumatoid arthritis has major depression.[16]

The connection between mental health and musculoskeletal health is complex and reciprocal. Living with a painful condition such as osteoarthritis can lead to depression and anxiety. Conversely, psychological distress and depression worsen pain. A vicious cycle can therefore develop with ever worsening pain and low mood leading to social withdrawal, and a progressive reduction in quality of life. People with back pain and depression have greater disability than those with back pain alone.[17] Depression in people with rheumatoid arthritis leads to progressively worsening pain and overall disability.[18]

Mental health conditions can increase the likelihood of developing some musculoskeletal conditions. Partly, this may be due to increased activation of the body's pain system in response to psychological stress and distress, with 75% of people with depression reporting persistent or recurrent pain.[19] Depression is an independent risk factor for developing back pain.[20] Poor mental health, life stress and childhood exposure to trauma and abuse are major risk factors for developing fibromyalgia, a condition where people experience severe, often disabling, persistent widespread pain.[21, 22]

[a] The authors looked at people undergoing hip and knee replacement surgery; alternative explanations suggested by the authors included reduced pain, and thus psychosocial stress, which are established risk factors for cardiovascular disease; and reduced use of non-steroidal anti-inflammatory drugs (NSAIDs), also associated with an increased risk for cardiovascular events

1.9 The public health impact of musculoskeletal conditions

The impact of musculoskeletal conditions on the health of the public is huge. In the UK, 10 million people live with long-term painful conditions of their joints, spine, bones or muscles.[23] The UK Global Burden of Disease study identified musculoskeletal conditions as the largest single cause of years lived with disability (YLDs), and the third-largest cause of disability adjusted life years (DALYs).[1] Musculoskeletal conditions are also an important but arguably under-recognised contributor to health inequalities. Not only are those in the lowest income quintile more likely to report chronic pain, but the pain they experience is also likely to be more severe.[24]

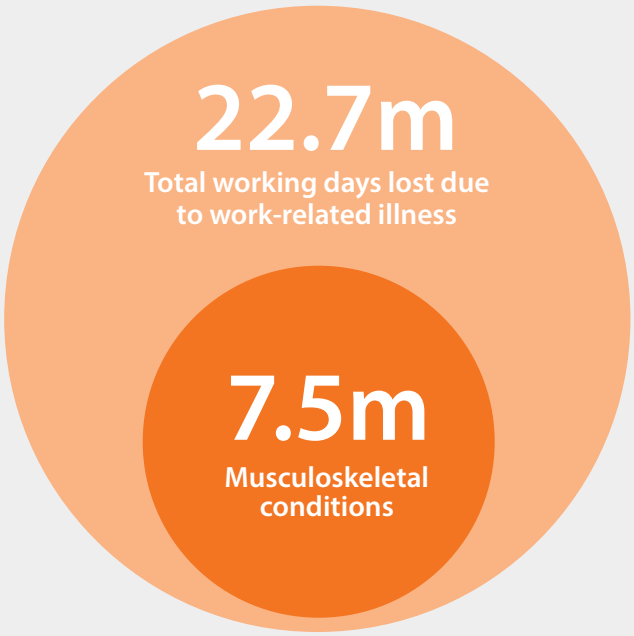
Impact of musculoskeletal conditions on health and social care services

Each year 20% of the general population sees a GP about a musculoskeletal problem.[23] The majority of these consultations are due to back pain and osteoarthritis. The NHS in England spends a further £5 billion per year on treating musculoskeletal conditions.[25] This includes the cost of performing around 150,000 joint replacements yearly for people with severe osteoarthritis of the hip and knee. The cost of treating hip fractures is calculated separately, and costs the UK around £2 billion annually in clinical and social care costs.[26] Musculoskeletal conditions are an important component of multimorbidity,[27] and are a contributor to frailty.[28] For people with multiple long-term conditions having a chronic painful musculoskeletal condition independently increases the risk of needing to be admitted for hospital care.[29] Pain and disability is a substantial barrier to independent living. The need for long term social and residential care is often due to worsening musculoskeletal health.

Wider economic impact of musculoskeletal conditions

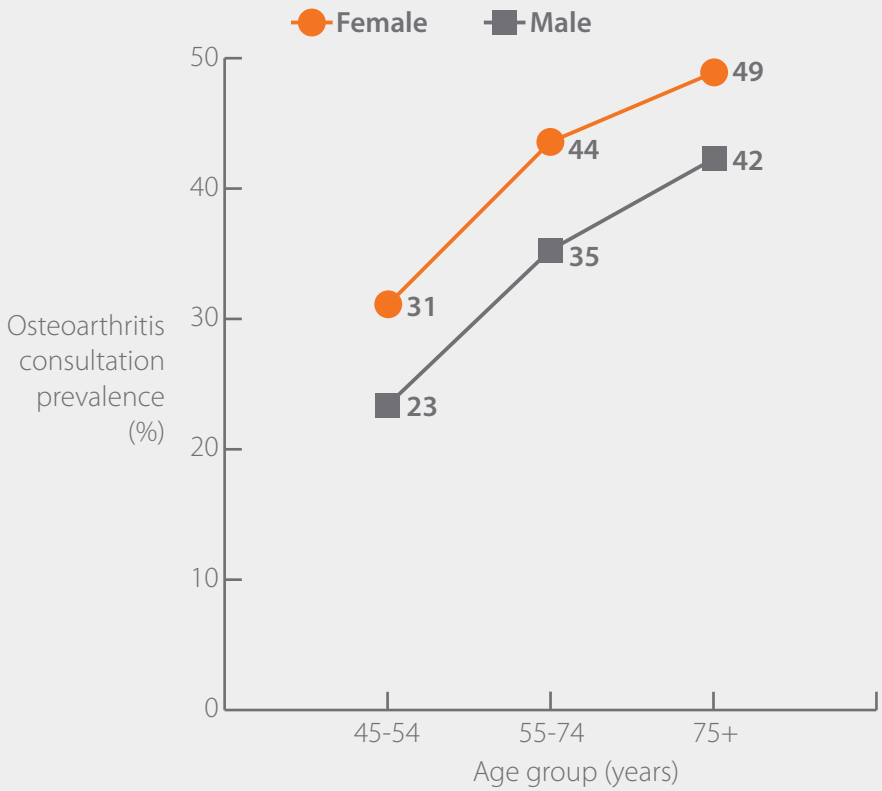
Poor musculoskeletal health is a major barrier to workplace participation. People with musculoskeletal conditions are less likely to be employed than people in good health, and more likely to retire early.[30] If employed, people with musculoskeletal conditions are more likely to need time off and have reduced household income compared to those who do not.[31] This lost productivity has an impact on the national economy, as well as affecting the state through lost revenue from taxation and increased need for state disability and low-income benefits. Each year in the UK around 7.5 million working days are lost because of musculoskeletal conditions, second only to mental health problems.[32] The costs of this, along with other indirect costs, are estimated at £14.8 billion for osteoarthritis and rheumatoid arthritis,[33] with up to a further £10 billion of indirect costs attributable to back pain in the UK.[34]

Figure 3: Working days lost due to work-related ill health (excluding workplace injuries)[32]



Musculoskeletal conditions in an ageing society

Figure 4: Estimated proportion of people in the UK who have sought treatment for osteoarthritis.



The estimated proportion of people in the UK[35] who have sought treatment for osteoarthritis, by gender and age group. In all, **one third of the population** aged 45 and over have sought treatment about osteoarthritis.

The likelihood of having osteoarthritis increases with age. A third of women and almost a quarter of men between 45 and 64 years have sought treatment for osteoarthritis, rising to almost half of people aged 75 and over.[35]

Because of improvements in health and health care, people in the UK are living longer than ever before. Musculoskeletal conditions are much more common in older age. For example, among people aged 45-64 years, 11% have sought treatment from their GP for osteoarthritis of the hip, rising to 21% among those aged 65-74 years.[35] As more people live longer the adverse effects of these conditions on those living with them – as well as on health services and wider society – will increase. This is part of a wider trend in health where so-called non-communicable diseases account for an ever greater part of overall ill health.

Expectations of older age are evolving. People hope to be active and pain free into older life, able to live independently and continue doing the things they enjoy. Society's expectations of older people are also changing. As the retirement age rises, more of the workforce will be affected by musculoskeletal problems.

Making musculoskeletal health a public health priority

Given the very high prevalence of musculoskeletal conditions, the substantial consequences for those affected and the impact upon health and care services and wider society, a public health approach is required to make effective, lasting and meaningful improvements in the musculoskeletal health of the population. This was recognised in 2012 when Dame Sally Davies, the Chief Medical Officer for England, referred to the commonest musculoskeletal condition, osteoarthritis, as a "generally unrecognised public health priority".[2] The tools of public health can and should be used to create an environment where musculoskeletal health can flourish, where fewer people develop musculoskeletal conditions, and where those who do have a musculoskeletal condition are able to take steps to reduce the impact it has on their lives, and where possible can restore their own health.

"Osteoarthritis… is the single largest cause of pain and disability in this country [and] is a generally unrecognised public health priority."

Professor Dame Sally C Davies,
Chief Medical Officer for England

2.0 MUSCULOSKELETAL HEALTH THROUGH THE LIFECOURSE: OPPORTUNITIES AND THREATS

2.1 Overview

At every stage of life people can take steps to improve their musculoskeletal health and reduce the risk of developing a musculoskeletal condition. This section will review at each life stage the avoidable risk factors for developing a musculoskeletal condition, such as obesity and physical inactivity. Many of these risk factors are widely known as those linked to other long-term conditions such as diabetes and heart disease. Their relationship with musculoskeletal conditions may be less familiar. Other risk factors such as injury prevention and some aspects of nutrition may be specific to musculoskeletal health. Tackling these risk factors would result in a dramatic improvement in the musculoskeletal health of the public.

2.2 Maternal health

Many of the foundations for lifelong musculoskeletal health are laid down before birth. The growth of muscles, bones and joints in the womb is an important determinant of musculoskeletal, especially bone, health in later life.

Infants with higher birthweight have stronger bones in adult life.[37] Conversely, those with low birthweight are at higher risk of osteoporosis and fragility fractures in later life.[38] Similarly, low birthweight is associated with reduced grip strength, a marker of musculoskeletal ageing, in later life.[39]

Strong bones begin before birth

Bones, joints and muscles begin to form before birth. Research supported by Arthritis Research UK at Southampton University[36] has found that musculoskeletal health throughout life is affected by conditions in the womb – and even by a woman's health before she conceives. Women who have a good diet, including enough vitamin D, and are physically active, have babies that go on to have stronger bones throughout life. Improving health for women who are trying to conceive and during pregnancy may reduce the risk of falls and fractures of future generations.

A number of maternal health factors affect infant bone density at birth, many of which may be amenable to public health approaches. Maternal smoking, lower pre-conception body mass index and body fat and more frequent vigorous activity are all linked to reduced infant bone mass and by implication increased risk of adult fragility fracture.[40] Similarly, higher maternal vitamin D levels are linked to higher child bone mass at birth which is maintained into childhood and probably through to adult life.[41] Higher maternal vitamin D levels have been associated with improved grip strength at age four years, which may persist to promote lifelong musculoskeletal health.[42]

2.3 Childhood and adolescence

Childhood and adolescence are important for musculoskeletal health in three ways. First, children and young people may themselves be affected by arthritis and musculoskeletal conditions. Second, adult musculoskeletal health depends on the normal, healthy growth and development of bones, muscles and joints in childhood. Finally, the lifestyle habits upon which good musculoskeletal health depends are often laid down in early life.

Obesity and pain

Conditions of persistent or recurrent musculoskeletal pain are relatively common among young people. Between one in four and one in seven young people have chronic low back pain.[43] Up to one in twelve young people reports chronic widespread pain.[44] Adolescents who are obese are more likely to experience persistent or recurrent joint pain, including knee pain, and obesity is also associated with more severe pain overall.[44]

Childhood obesity may have an impact on persistent pain later in life by placing strain on vulnerable joints. Joint hypermobility is very common among adolescents, present among one in four teenage girls and one in ten teenage boys.[45] Young people with joint hypermobility are nearly twice as likely to report joint pain at certain sites like the knee, but this rises to over ten-fold in those who are also obese.[46] Adults who are hypermobile have a 40% increased risk of severe pain compared to those who are not.[47] Reducing obesity in childhood may reduce both the risk of developing persistent pain in adolescence and of pain continuing into adult life.

"The epidemic of childhood obesity is widely recognised but it is not linked to the fact that half of disability in children is musculoskeletal, much of which is associated with obesity. Instead of focusing on the impact of childhood obesity in later life in terms of heart disease etc., why not focus on the message that obesity makes children suffer avoidable pain?"

Professor Cyrus Cooper
University of Southampton

Bone development, biomechanics and osteoarthritis

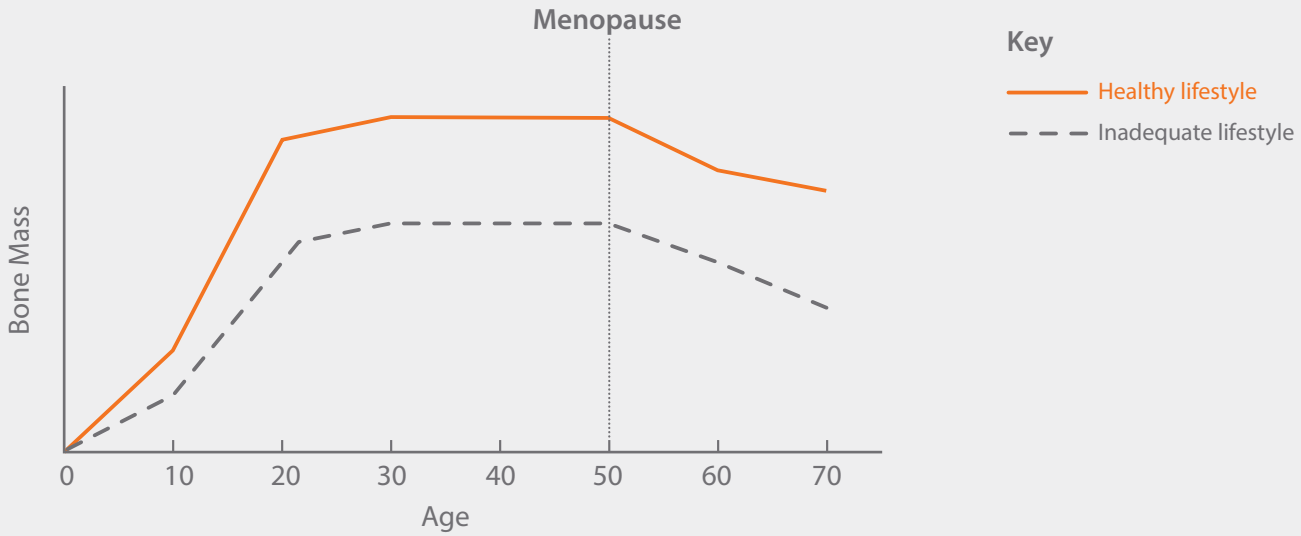
Musculoskeletal problems in adults can sometimes be caused by differences in the shape of bones and joints that develop early in life. Up to three children in every hundred have developmental dysplasia of the hip: a condition where the shape of the hip joint is abnormal.[48] This is an important cause of childhood disability, leading to delays in children starting to walk. In severe cases the hip can dislocate.

Early detection and intervention of hip instability can prevent the need for corrective surgery in childhood. Currently, screening is carried out by examining the hip. Ultrasound is more accurate, but is not routinely recommended unless there are other reasons to suspect a problem such as a family history of this condition.[49]

The size and shape of bones that develop throughout childhood and adolescence determine the biomechanics of a joint – the way joints handle and transmits forces. This in turn influences the risk of developing painful osteoarthritis later in life. People with abnormal hip shape and biomechanics have substantially increased risk of developing osteoarthritis. Abnormal hip shape accounts for nearly one in ten primary hip replacements in adults, rising to nearly one in three of hip replacements under the age of 60 years.[50]

Physical activity and bone strength

Figure 5: Graph showing changes in bone density with rising age according to lifestyle[57]



Source: Based on Heaney et al 2000.

Young people become progressively less physically active throughout adolescence.[57] Sixteen year-olds spend about two hours more in sedentary behaviour than those aged 12 years.[51] Sex difference emerge early and by four years old girls are less physically active than boys,[52] a phenomenon maintained throughout adolescence.[53]

Promoting physical activity among young people

The Scottish government's Take Life On campaign[54] aims to highlight the benefits of an active lifestyle and the importance of children and young people doing at least an hour of activity a day. The campaign encourages families to be active together and recognises the vital role that schools can play in delivering this change.

In 2013, 89% of primary and secondary schools met the government's target of at least two hours of physical education each week, compared with less than 10% of schools in 2004/5.

Schools in Canada introduced a daily 15-minute programme of physical activity which included a high-impact jumping program "bounce at the bell".[55] Children who used the programme had significantly greater gains in bone mass and strength, as well as overall health measures.

Physical activity in early life is important because it promotes healthy development of the adult skeleton. Throughout childhood, adolescence and early adult life bones increase in mineral density and strength, typically reaching a peak around age 30 years before beginning to decline predictably after age 50 years (Figure 5).[56] Over 90% of adult bone mass is accumulated during childhood and adolescence.[57] Bone strength is one of the most important factors in determining whether a minor injury, such as a fall from a standing height, will lead to a fragility fracture. The positive effects of physical activity on bone development in childhood and adolescence can reduce fracture risk much later in life.

Young people who take part in sport have greater bone density in adult life.[58] Not all weight-bearing exercise is equal. High impact activities such as those including jumping and running increase bone density much more than moderate and low-impact activities such as jogging and walking.[59] In adolescents, high impact activity in particular also promotes muscle development which may be associated with long term musculoskeletal health.[60]

Nutrition and bone strength

Adequate nutrition and maintaining a healthy body weight are important for bone strength. Being underweight harms normal bone development. Poor early childhood growth is associated with a doubling of risk of adult hip fracture.[62] Adolescent eating disorders and excessive dieting, lead to increased risk of fragility fracture in later life, particularly in the context of low levels of physical activity. The effect of obesity on bone mass is less clear. Though fracture rates appear to be higher in obese children and adolescents[63] and some studies have associated increased body fat to reduced bone mass, other studies have found increased bone mass among obese young people.[64]

Fragility fractures[61]

Janice was a busy teacher and an active hill climber from Aberystwyth when she fractured her hip aged 56.

Walking down the school playground path to speak to some pupils, Janice tripped and landed badly. At hospital she discovered she had fractured her hip, needing surgery to repair. Janice was on crutches for three months and off work for 6 months.

Janice's first contact with a specialist osteoporosis nurse took place on the day after her operation. A few months after that, Janice was contacted by the fracture liaison service in Aberystwyth as she had been identified as someone who needed assessment for osteoporosis. A scan confirmed osteoporosis and she started medication.

Janice found the support and advice from the Fracture Liaison Service invaluable. She received advice on keeping fit, having a calcium rich diet and how to approach her rehabilitation, including regular seafront walks and a phased return to full time work.

She is still in regular contact with the Fracture Liaison Service where she receives regular scans and advice. The medication has improved her bone density enormously and when she fell down an escalator last year she suffered no fractures. Janice remains an avid walker.

Micronutrient deficiencies impair bone growth. Calcium and vitamin D are both required for the production of normal, healthy bone. Major deficiencies in these leads to bone abnormalities such as rickets: a painful, deforming condition where bones are so soft that they become bent under the child's weight. For the majority of the population, who are not grossly deficient in these nutrients, there is some data to suggest that low childhood vitamin D levels predict reduced bone strength in future years, though the effects may be quite small.[65, 41]

2.4 Adult life

Although muscles, joints and bones are fully developed by adult life, opportunities to maintain and improve musculoskeletal health remain. Appropriate physical activity in particular builds muscle and bone strength, and reduces the risk of developing painful musculoskeletal conditions. In adult life, workforce participation presents new threats to – and opportunities for – musculoskeletal health. Lifestyle factors such as obesity and smoking may persist or begin in adult life, and are important risk factors for developing a musculoskeletal condition. For many people, adult life is the first time they will develop a musculoskeletal condition, creating important opportunities for people to make lifestyle changes to improve their musculoskeletal health.

Musculoskeletal injury

Injuries to joints, bones and muscles are an important cause of musculoskeletal ill health in adult life. Some injuries are distinct episodes of damage to tissues. These include major traumatic episodes such as broken bones or whiplash following vehicle collisions; injuries during intense physical exertion such as sports or dance injuries; or the common sprains, strains and falls that can happen in everyday life. Equally damaging can be gradual damage caused by long term overuse leading to abnormal wear of muscles and joints.

In the short term, injuries impair musculoskeletal health due to the pain and lost physical function while body tissues heal. Injuries may also cause long-term pain and disability due to a number of factors. Incomplete healing can leave damage to the cartilage surface of the joint itself. Damage to the surrounding tissues can alter the mechanical function of joints, leaving them unstable, leading to uneven wearing of cartilage over time. Changes in peripheral and central nerves following injury can result in persistent pain, even once healing is complete. Pain following an injury, and the fear of further injury, can lead people to reduce their physical activity, causing loss of muscle strength leading to further joint instability and damage. Together, these factors can result in a cycle of recurrent injury and long term damage to joints which manifests as irreversible osteoarthritis, with resultant pain and disability.

FIFA programme to reduce football injuries

FIFA 11+ is a comprehensive warm-up programme designed to reduce injuries among football players aged 14 years and over.[66] The programme is performed as part of a standard warm-up and takes around 20 minutes to complete. Research showed that teams had 30-50% fewer injured players when FIFA 11+ was performed at least twice a week.

A number of public health approaches can reduce likelihood of harm due to injury. Injuries can be prevented by modifying high risk physical environments, changing the rules and regulations such as those governing sports, and identifying high risk physical traits among certain people, for example very hypermobile people who may be at increased risk of injury in activities such as ballet or certain sports. People can reduce their own risk of harm through appropriate and evidence-based warm up routines, such as those advocated by FIFA[b] to reduce football injuries. Equally people need early access to high quality treatment after an injury. Effective treatment can prevent long term problems by restoring joint function and addressing pain.[67] Early treatment of pain can prevent the peripheral and central nervous system changes that result in persistent pain and associated disability even after healing of the original injury.[68]

[b] Fédération Internationale de Football Association

Musculoskeletal health and the workplace

There is a complex relationship between work and musculoskeletal health. For most people work can benefit health in two ways. First, undertaking meaningful work is an important part of an individual's sense of health and wellbeing.[69] Second, healthy workplaces provide an opportunity to promote good health in general and musculoskeletal health specifically.[70] This includes preventing injury as well as enabling and encouraging appropriate physical activity and addressing obesity. In contrast, certain types of work and workplace conditions may have a negative impact on musculoskeletal health, failing to create a healthy environment and increasing the risk of musculoskeletal conditions.

Regardless of the cause, musculoskeletal conditions can reduce people's ability to work. In the UK these conditions are the second greatest health cause of working days lost.[32] The psychological and financial impact of lost work on health compounds the ill health due to the condition itself.[71]

Preventing workplace injury

To an extent, ensuring good workplace musculoskeletal health falls within the theme of prevention of harm from injury. Certain occupational activities are known to predispose to particular types of musculoskeletal conditions. Jobs that require frequent bending and twisting can predispose to back pain, heavy lifting has been associated with back pain and osteoarthritis of the knees, and upper limb disorders such as carpal tunnel syndrome may be associated with some types of manual work.[75]

Musculoskeletal health in the NHS

Musculoskeletal problems are a major cause of ill health among NHS staff. Conditions such as back pain account for around 40% of all sickness absence in the NHS and costs around £400 million per year.[72] Such conditions account for half of early retirements of NHS staff due to ill health.[73] Estimates from UNISON suggest that around 3,600 nurses are forced to retire each year due to back problems alone.[74]

Much can be done to reduce any threats to musculoskeletal health from the workplace. Modifying physical environments and work practices reduces incidence of acute injury. Early intervention to identify and address problems and the underlying occupational exposure can prevent chronic pain, disability and work loss.[76]
A number of workplace interventions have been tried including exercise therapy, behavioural change techniques, workplace adaptations and provision of additional services. A study assessing the cost-effectiveness of such interventions estimated that they had the potential to return at least an additional 3% of employees to work and cost less than an additional £3000 per employee.[77]

Relationship between workplace psychological and musculoskeletal health in the workplace

Physical activities associated with a job only partly explain the varying prevalence of musculoskeletal problems at work. Cultural issues and psychological factors are an important component of musculoskeletal health at work in ways that are only partially understood.[78] Work-related pain disorders such as back pain are more strongly associated with perceived workplace stress, high job demands and low job satisfaction than they are with the physical characteristics of any particular job.[79]

Health promotion in the workplace

As well as the causal relationships described above, the workplace provides a unique opportunity for health promotion. There are high costs to employers of lost work due to musculoskeletal ill health. This is true for commercial organisations as well as large public sector employers such as local authorities and the NHS. This may provide particular incentives to promote physical activity and healthy nutrition in the workplace, for example through implementing the relevant NICE (National Institute for Health and Care Excellence) guidance.[70] For employees, availability of healthy food at work, employment packages including support for physical activity facilities and active transport,[c] and early access to high quality occupational health services when required all help to maintain musculoskeletal health and prevent associated lost work.[80]

Obesity

Musculoskeletal problems constitute one of the greatest threats to the health of people who are obese. Obesity substantially increases the risk of osteoarthritis and other musculoskeletal conditions such as back pain, gout and to some extent rheumatoid arthritis.

The risk of developing knee osteoarthritis appears to be similar to that of developing high blood pressure or type 2 diabetes.[82]

Overweight and obesity

Overweight and obesity is 'abnormal or excessive fat accumulation that may impair health', where body weight is beyond what is considered healthy. It is most commonly determined using the body mass index (BMI) which is calculated using weight in relation to height. The World Health Organization defines overweight in people with a BMI of 25 kg/m^2 or over, obesity as BMI between 30 kg/m^2 and 40 kg/m^2 and morbid obesity as 40kg/m^2 and above.[81]

Obese people are more than twice as likely to develop osteoarthritis of the knee than those of normal body weight,[83] with many estimates putting the risk between four and six times greater.[84, 85, 86, 87] The risk increases with the level of obesity, so being very obese rather than very slim could increase people's odds of developing persistent knee pain by 14 times.[88]

Alongside coronary heart disease, cancers and diabetes, osteoarthritis is a major contributor to healthcare costs attributable to obesity-related diseases in the UK.[89] More than two out of three knee replacements and one in four hip replacements in middle-aged women in the UK are attributable to obesity.[90] Rising levels of obesity, combined with our ageing society, could lead to a near-doubling in UK prevalence of osteoarthritis by 2035 with a corresponding increase in need for joint replacement surgery.[35]

[c] Non-motorised forms of transport involving physical activity, such as walking and cycling

Obesity and osteoarthritis[91]

When Jim got to the age of 65 his increasing weight and decreasing fitness levels forced him to take drastic action. Weighing 16½ stone at just 5ft 7ins, he was feeling more and more pain in his left knee. "I was square and squat and I knew I was too heavy for my knees; the pain never stopped me walking but it was constant and nagging," says Jim, a retired company director from Gloucestershire.

Jim started to attend a local slimming group. "It was a catalyst for me – having to be weighed publicly every week and everyone in the group knowing if you have gained or lost pounds was my incentive. I found it worked very well for me."

At the same time Jim started to exercise, going for a long walk every morning. A year and a half after starting his weight loss and exercise regime, Jim has lost four stone and is now a trim 12½ stone. "It's been terrific," he says. "Losing weight and exercising worked well together – the one encouraged the other. As I lost weight the pain in my knee gradually reduced, and it's practically gone now."

Obesity directly damages weight bearing joints such as knees and hips because of the abnormally high loads they have to carry.[92] Whole body metabolic or inflammatory changes may also explain why osteoarthritis of other joints, such as those in the hands, is more common with obesity.[93, 94, 95]

Among those who are receiving treatment for osteoarthritis, persistent obesity increases pain and disability while reducing the efficacy of pain-relieving drugs.[96, 97, 98] Although joint replacement surgery is equally effective in reducing symptoms for obese people and those of healthy body weight, this is not the case for those who are morbidly obese, who benefit less from the procedure.[99, 100] Artificial joints wear out more quickly in obese people compared with people of normal body weight. A joint replacement lasts less than five years for more than one in ten morbidly obese people having surgery.[100] Surgical complication rates, includes longer hospital stays, increased risk of major complications, higher rates of re-admission following discharge, all increase with rising body mass.[100]

Obesity and osteoarthritis[93]

- Lifetime risk of osteoarthritis increases with rising BMI
- Two in three obese adults will develop osteoarthritis
- Obesity in early adult life predicts osteoarthritis many years later
- Weight loss at every stage of life reduces the risk of developing osteoarthritis
- For people with osteoarthritis, losing weight improves symptoms and may slow progression
- A combination of dietary restriction and exercise is the best strategy to improve osteoarthritis symptoms
- Weight loss of 5kg over a decade in an average height woman (equivalent to a decrease of 2 BMI units) halves the risk of knee osteoarthritis
- For people with osteoarthritis, weight loss of 10% would be expected to lead to a substantial improvement in symptoms

In osteoarthritis, the damage to the surface of the joint is irreversible. Even so, relatively modest weight loss, particularly when combined with increased physical activity, reduces pain and disability in those who have already developed the condition.[93, 105, 106, 107, 108] Successful weight loss typically requires a supported programme, and people who are morbidly obese derive musculoskeletal health benefit from surgical interventions that induce substantial and rapid weight loss.[109, 110] Public health approaches to tackle obesity in the population generally, and targeted at those with osteoarthritis specifically, could reduce incidence of osteoarthritis,[111,112] improve symptoms and quality of life for those who have developed the condition already and may improve surgical outcomes for those with severe osteoarthritis requiring joint replacement.

Gout

Gout is common, painful and largely preventable. This extremely painful form of arthritis is caused by a build-up of uric acid in the blood. This is deposited in joints, particularly knees, ankles and feet, causing intense inflammation and excruciating pain.

Obesity doubles the risk of developing the condition. People with diets rich in red meat and seafood are at increased risk, as are those who consume sugar-sweetened soft drinks.[101] The risk of gout increases with rising alcohol intake, notably beer and spirits, but not wine.[102] Diets high in low-fat dairy products appear to protect from gout,[101] and some specific nutrients, such as vitamin C, may reduce the risk of developing gout by lowering the level of uric acid in the blood.[103, 104]

Obesity also increases the risk of other musculoskeletal conditions. Obese people are twice as likely to develop gout, and tend to develop it at a younger age.[113] Over a million people in the UK have been affected by gout and prevalence is rising, largely due to changes in diet and obesity.[114] The risk of developing back pain also increases with rising body mass index. The most obese are four times more likely to develop back pain than those of healthy body weight.[115, 116] For reasons that are not well understood, obesity also appears to increase the risk of rheumatoid arthritis.[117]

Physical inactivity

Physical activity can include all forms of activity, such as everyday walking or cycling, active play, work-related activity, active recreation such as working out in a gym, dancing, gardening or playing active games, as well as organised and competitive sport. In 2011/12 only a third (36%) of UK adults took part in sport of moderate intensity for 30 minutes at least once a week.[118] Around half the population is entirely physically inactive and does no sport or exercise.[111] Even when other forms of moderate activity like gardening and housework are taken into account, the average person only does around half the amount of activity recommended in national guidelines.[111] Much of the United Kingdom population is at increased risk of developing a long-term musculoskeletal condition due to their physical inactivity.[119]

Reducing risk: physical activity as primary prevention

Healthy physical activity improves musculoskeletal health. A wide range of physical activities have been shown to be beneficial in reducing overall risk of musculoskeletal pain and disability. These include swimming, walking, cycling and running.[120, 121, 122, 123] Regular physical activity may even reduce the risk of developing painful osteoarthritis, particularly in women.[124] High levels of walking are associated with a reduced need for hip replacement surgery.[125] Activities such as jogging that place greater strain on joints appear to be more protective than lower impact activities, and it is a myth than recreational running leads to osteoarthritis.[126] A number of plausible biological mechanisms have been demonstrated. These include better nutrition and structure of cartilage, and improved strength of the muscles surrounding joints providing stability.[127]

"There are fantastic new physical activity guidelines for children, adults and the elderly that are informed by good data and crucial in an increasingly sedentary society where inactivity and obesity are serious problems.[128] Yet in the health care world very few of us know about these guidelines and how they improve health care practice. So we have great guidelines but poor dissemination."

Professor Mark Batt
University of Nottingham

Physical activity is important in reducing risk of fragility fracture. Bone strength peaks in mid-adult life, typically between age 40 and 50 years.[57] As in early life, high impact physical activity promotes strengthening of the bones. People who are physically active reach a higher peak bone strength in mid-adult life and reduce the subsequent speed of decline in bone strength.[129] The benefits of this become apparent in later life with reduced risk of fragility fractures.

Reducing impact: physical activity as secondary prevention

For people who have already developed a painful musculoskeletal condition, engaging in appropriate physical activity reduces pain intensity, improves quality of life and prevents further disability.[130] Engaging in physical activity generally reduces overall pain. This includes aerobic activity such as walking or swimming,[131] as well as other forms of exercise such as t'ai chi or pilates.[132, 133, 134] For particular musculoskeletal conditions, specific types of strengthening and stretching exercises are also beneficial. For example, exercises to strengthen quadriceps muscles may be particularly helpful for people with knee pain due to osteoarthritis.[135]

Clinicians, medical, nursing and allied health professionals, as well as sports, fitness and leisure professionals, can contribute to public health improvement by consistently supporting the message that physical activity is safe and beneficial for both reducing risk of – and reducing impact due to – musculoskeletal conditions. Trained professionals can provide information and reassurance that minimal investigation, increased physical activity and weight management are the best approach for most conditions of musculoskeletal pain. People becoming physically active for the first time can also benefit from behavioural interventions and individualised advice to support initiation, build-up and maintenance of physical activity.[136] This includes opportunistic brief advice or brief interventions to promote uptake of physical activity. These are recommended as a cost effective way of changing behaviour in the short to medium term.[137]

Smoking

Around 10 million UK adults – roughly one in every five – smoke tobacco.[138] The association between smoking and cancer, particularly lung cancer, is well established in science and in public belief. Similarly, there is wide recognition that tobacco smoke causes cardiovascular diseases such as heart attacks and strokes.

Smoking is a well-established risk factor for rheumatoid arthritis.[139, 140] Tobacco smoke appears to trigger an immune system reaction in the lungs that then spreads to the joints. People that smoke are more likely to develop rheumatoid arthritis. Smokers who develop rheumatoid arthritis tend to have a more aggressive form of the condition, and to respond less well to the treatments to prevent permanent joint damage, pain and disability.[141, 142] For reasons that are less well understood, smoking is associated with conditions of musculoskeletal pain.

In general, people who smoke report more extensive and worse pain than non-smokers.[143] Smokers are at increased risk of chronic back pain,[144] and more than twice as likely to develop fibromyalgia as those who do not.[145, 146] Although any biological mechanism is unclear, quitting smoking appears to reduce pain for people with back pain[147] and fibromyalgia.[148] Increased smoking rates among people with chronic pain may partly explain the premature mortality associated with these conditions.[149]

Public health interventions aimed at reducing prevalence of smoking are well established. Further success in this area will also improve musculoskeletal health. The connection between smoking and arthritis is less well known than for other long term, disabling conditions. Better understanding of the links between smoking, pain and disability due to musculoskeletal conditions should further bolster the economic case for public health measures to reduce smoking. Increased public awareness of this association adds to the wealth of evidence that smoking is a contributory factor to many aspects of ill health. This may lend additional weight to public health messages on smoking cessation.

2.5 Older life

Longer life expectancy is a reality: a child born today will live five hours more than one born yesterday.[150] However, lifespan is outpacing healthspan – the number of years spent in good health. On average, women today have poor health for the last ten years of life and men for the last seven years.[151] Much of this morbidity is caused by musculoskeletal disease including osteoarthritis, back pain, falls and fragility fractures due to weakened bone caused by osteoporosis.[1]

Healthy musculoskeletal ageing

A retired West End dancer, actress and singer, Val is a firm believer in healthy ageing and being as fit and as healthy as possible. Now 78 years old, she credits her exercise regime for helping her stay supple and healthy, as well as helping to keep her back pain and osteoarthritis under control. She visits her local gym two to three times a week and has carried out a regime of stretching and limbering exercises at home every day for as long as she can remember.

Val finds that if she has to miss her exercise for a few days, her arthritis and back pain quickly become worse:

"I do feel that more older people should be aware of the benefits of exercising to stay healthy and keep arthritis under control."

Poor musculoskeletal health is a major contributor to frailty and multimorbidity. Four out of five people with osteoarthritis have at least one other long-term condition such as hypertension, cardiovascular disease or depression, which can worsen the impact of osteoarthritis.[152] People with painful osteoarthritis alongside their other long-term conditions have an increased general risk of needing hospital admission.[29] The extent of the indirect impact of musculoskeletal conditions on the overall health of older people, for example through loss of independence and increased need for social care, is not well understood.

Muscle mass and bone strength gradually decline with age. This is thought to be due to a combination of systemic inflammatory and hormonal changes associated with the ageing process, along with lifestyle factors such as physical inactivity, obesity and smoking.[153, 154] As a result, older people experience between two to four per cent loss in their muscle strength each year.[155] After the menopause, women lose bone twice as quickly as men, at a rate of around one per cent each year.[156] A quarter of women aged 80 years will have osteoporosis, compared with only two per cent aged 50 years.[157]

"Multiple falls are a major health risk among older people, and are a predictor of fracture and of death."

Professor Cyrus Cooper
University of Southampton

These twin vulnerabilities – weaker muscles and fragile bones – are major threats to the musculoskeletal health of older people. Weaker leg muscles make it more difficult to remain physically active; destabilise joints leading to injury, damage and pain; and increase the likelihood of falls. Falls are very common with one in three adults aged over 65 years falling each year.[158] Fear of falling can reduce older people's confidence, leading to loss of independence and a spiral of social isolation.[159] For people with osteoporosis, a simple fall from a standing height can result in a life changing fracture.

Physical inactivity

Exercise builds muscle bulk and strengthens bones at every stage of life. Although this increase is markedly attenuated in older age, it is possible to overcome this effect of ageing with additional and regular exercise, in particular resistance exercise,[161, 162] and increased muscle strength is associated with fewer falls.[163] After the menopause, women can slow their bone-density loss and prevent osteoporosis through physical activity, reducing risk of a fracture.[164] Even everyday activities such as taking the stairs can have a positive impact on muscle strength and bone health. It's also never too late to start – recent research has reported significant health benefits of physical activity, including improved function and mobility, even among those who take up physical activity relatively late in life.[165]

Physical activity for the over 65s[160]

- Build up to 150 minutes moderate intensity physical activity per week
- Exercise daily in bouts of at least 10 minutes
- Do muscle strengthening activities on at least two days a week
- Practise balance and co-ordination at least two days a week
- Spend less time being sedentary

Since 2011, there have been national guidelines for people aged over 65 years (see box). Retirement is associated with a decline in overall activity[166] and fewer than half of people aged over 65 years are physically active enough in everyday life to meet these guidelines.[111] This sedentary behaviour can be compounded by episodes of inactivity and bed rest due to ill health. Even short periods of such inactivity lead to significant loss of strength that can be difficult to regain.[167, 168] Physical activity among older people improves musculoskeletal health[169] by strengthening bones, muscles and joints, increasing flexibility and mobility, and improving balance and co-ordination. This lowers the risk of falls and fractures; sprains, strains and injuries; and back and joint pain.[163]

There may be specific barriers for older people engaging in physical activity. A low baseline of physical fitness can make it hard to engage with exercise. Public spaces for walking may be poorly lit or made unwelcoming or unsafe by traffic, uneven paving, poor lighting, or fear of crime. Enjoyable physical activities, such as golf or dancing, may be inaccessible due to cost or lack of transportation. Social isolation may therefore be both a cause and a consequence of poor musculoskeletal health. A public health approach to increasing physical activity among older people needs to address these wider factors too.

Nutrition

There are many reasons why nutrition may be poor in older people, including reduced appetite, poor dentition, low income, living alone, social isolation and difficulties with shopping and cooking.[170] An estimated one in ten people aged over 65 years is malnourished or at risk.[171] The population of people over 75 years is at highest risk of malnutrition and is projected to double in the next 30 years.[172] Nutritional deficiencies and imbalances have a cumulative adverse impact throughout life, and the process of ageing itself affects nutritional needs. Older people can increase opportunities for healthy ageing by ensuring a healthy and balanced diet.[173] Micronutrient deficiencies are often common in elderly people due to reduced food intake and a lack of variety in the foods consumed. Dietary changes appear to affect risk factor levels throughout life and may have an even greater impact in older people.[173]

Poor nutrition accelerates decline in musculoskeletal health. Inadequate protein intake contributes to loss of muscle mass, reducing strength and increasing risk of falls.[174] Low levels of vitamin D in particular are associated with poor muscle strength and weaker bones.[175, 176] This can be caused by low dietary intake combined with lack of skin exposure to sunlight. Poor musculoskeletal health itself can lead to reduced time outdoors and may make buying and preparing food difficult. In addition to these specific nutrients, the overall pattern of nutrition may be even more important for bone health among older people than any single aspect of diet.[173] Nutritional supplements such as vitamin D or protein may lead to improved musculoskeletal health, including fewer falls for some older people, particularly when combined with exercise.[175, 177, 178]

3.0 MUSCULOSKELETAL HEALTH: A PUBLIC HEALTH APPROACH

3.1 Overview

The high prevalence of musculoskeletal conditions and the modifiable risk factors outlined earlier in the report, support the use of a public health approach to musculoskeletal health. Rather than a clinical approach – treating symptoms when they arise, including advising individuals with symptoms to engage in a healthier lifestyle to improve their musculoskeletal health – a population-based approach is required to reduce the incidence and impact of musculoskeletal conditions. Small reductions in the prevalence of major risk factors across a whole population will result in substantial improvements in musculoskeletal health, reducing costs and burden on individuals, health and care services, the economy and wider society.

A comprehensive public health approach to musculoskeletal health requires both specific and generic components. For example, an assessment of the health needs of a population is produced by summing the prevalence and impact of different specific conditions. When designing services to meet these musculoskeletal needs, health services are generally condition-specific, whereas social care services are usually generic across conditions. Promoting physical activity or healthy eating is largely generic across populations, as are public health interventions to support this. Some groups, including those with musculoskeletal conditions, may require specific targeting of health promotion activities or public health interventions either because they have increased risk or because messages may need to be tailored to their needs. Outcome measures should be both generic and specific to ensure that while the health of the population overall is being improved, no specific groups are being left behind.

Figure 6: Condition-specific and generic components to a public health approach

3.2 Health promotion

Modifying risk factors

Many of the risk factors outlined here such as obesity and physical inactivity are already the subject of health promotion activities. Often the rationale for these has been framed in terms of the prevention of diabetes or cardiovascular disease.

"Now that local authorities are responsible for public health, there is a real opportunity to de-medicalise musculoskeletal problems and focus on what's happening in the park rather than the local hospital."

Professor Peter Kay
National Clinical Director
for musculoskeletal health, NHS England

Explicit consideration of musculoskeletal health should be built into these public health programmes for several reasons. First, when modelling and measuring the benefits of such programmes, specifically including the expected musculoskeletal health gain will improve the quality of any evaluation. Second, prevalent health beliefs mean that many people with musculoskeletal conditions are unaware of the benefits they may derive from modifying their own risk factors. Finally, for some people the opportunity of improved musculoskeletal health may be a particular incentive for changing some aspects of their lifestyle, particularly increasing physical activity. The connection between physical activity and musculoskeletal health may seem fairly intuitive for many people, where the benefits – such as reduced pain, increased functional ability – are relatively tangible compared with, for instance, reducing one's risk of developing diabetes or cardiovascular problems.

Changing health beliefs

Common but incorrect health beliefs about the inevitability or acceptability of musculoskeletal conditions can prevent people taking steps to improve their musculoskeletal health.

Among people who do not have musculoskeletal pain, few are aware that being overweight and physically inactive at every stage of life substantially increases their risk of joint or back pain and physical disability in the future. This is in spite of widespread recognition of the implications of those risk factors for diabetes, heart disease and other long-term conditions.

Health trainers to support lifestyle change[179]

Sheffield Health Trainers Programme is a free and confidential service that can support people on a one-to-one basis to lead a healthier lifestyle. Health trainers are recruited from the local community and support people over a six to seven week period to set goals to meet their health needs, such as healthy eating, weight loss or increased physical activity.

An evaluation of using health trainers to support people living with chronic pain found that one third of those using the service improved their general health, and one half improved their wellbeing, while reducing the need for referral to secondary care.

Misplaced health beliefs can prevent those with musculoskeletal conditions from taking active steps to improve their own health. For example, a commonly mistaken view is that persistently painful joints and backs require rest.[180] Many people with musculoskeletal conditions wrongly accept that 'nothing can be done' to improve their health[181] and do not realise the extent to which weight loss and healthy physical activity could reduce their pain and improve their quality of life.[182] These cultural perceptions are even common among the public and health professionals. If these health beliefs are not addressed, people with musculoskeletal pain will not be receptive to general public health messages about increasing physical activity. To be effective, such messages must be targeted towards people with musculoskeletal pain and explicitly challenge beliefs that nothing can be done and that painful musculoskeletal conditions require rest.

"De-medicalising musculoskeletal health will only work if there is a simple message about what people with aches and pains can safely do."

Professor Tony Woolf
Peninsula Medical School

Health beliefs are an important predictor of health outcomes for people with musculoskeletal conditions.[183, 184] In particular, people who mistakenly fear that physical activity or work will exacerbate their problem are at increased risk of long-term pain and disability, as are those with so-called 'catastrophising' beliefs who tend to focus on the worst possible outcomes of their pain.[185, 186] Tackling these beliefs has the potential to reduce chronicity and associated pain and disability.

Empowering self-management

Correct diagnosis with appropriate advice and support from health professionals is important for people living with musculoskeletal conditions.[187] But for people with conditions of musculoskeletal pain, excessive focus on medical solutions can result in an unrewarding cycle of investigations to identify the cause of the pain and a fruitless search for a simple cure. Such over-medicalisation discourages people in pain from taking simple steps to improve their own health through lifestyle change.[188] Media campaigns aimed at informing the general public about back pain have in some circumstances changed public beliefs about the need for medical investigation of back pain and the benefits of physical activity.[189]

Co-creating health in Calderdale and Huddersfield NHS Foundation Trust

People with musculoskeletal conditions need information and skills to improve their own musculoskeletal health. For people living with persistent musculoskeletal pain, being able to do this effectively can be life-changing. As part of the wider 'Co-creating health' programme, a five-year pilot in Calderdale and Huddersfield tested out the benefits of a self-management programme focusing on chronic pain. Those taking part improved their confidence in managing their condition, used less medication and needed fewer encounters with health professionals.

"I achieved my goals and have got a bit of confidence back." (Participant)[190]

Structured self-management education programmes are another approach to supporting people to improve their health by tackling health beliefs and improving self-efficacy. These are led by health professionals, health trainers or other people with long-term conditions. They can be delivered in a group or individual setting, or as self-directed e-learning. Some studies suggest these programmes improve people's symptoms and quality of life and their self-confidence to manage their symptoms without using health services.[191] Though generic self-management programmes only slightly improve self-management skills, pain and function for patients

with osteoarthritis,[192] tailored approaches may be more effective. A small scale self-management programme focussing specifically on pain management reduced healthcare use and reduced costs[193] and telephone cognitive behavioural therapy for patients with fibromyalgia delivered short and medium-term improvements in self-reported health outcomes.[194]

3.3 Health and care services

A public health approach is needed towards musculoskeletal health and care services. This includes making an accurate assessment of current and predicted burden of musculoskeletal ill health and any inequalities and adverse trends, so that appropriate services can be commissioned. A public health approach can also be used to design and improve services, embedding public health principles such as early diagnosis, widening access to services, use of risk stratification tools to improve clinical pathways, and encouraging those delivering services to engage in health promotion activities.

NICE Public Health Guidelines[196]

Since 2006 the National Institute for Health and Care Excellence (NICE) has published public health guidelines intended to help prevent disease or improve health. Many of these are directly relevant to musculoskeletal health.

For example:

- PH17 Promoting physical activity for children and young people (Jan 2008)
- PH8 Physical activity and the environment (Jun 2008)
- PH41 Walking and cycling (Nov 2012)
- PH44 Physical activity: brief advice for adults in primary care (May 2013)

NICE guidance on 'Promoting physical activity in the workplace' (PH13, May 2008) encourages organisations of all sizes – including the NHS, local authorities and the wider public, voluntary, community and private sectors – to take steps to improve the health of their employees.

If consistently implemented, NICE guidelines would help to prevent people developing musculoskeletal conditions, and reduce impact on those who have poor musculoskeletal health.

Early identification and diagnosis and treatment of musculoskeletal conditions, with high quality support from appropriate professionals, can prevent long-term pain and disability. Rheumatoid arthritis rapidly causes irreversible joint damage, but few people who develop this condition receive the urgent, intensive care that could prevent long-term pain and disability, and reduce NHS and societal costs.[195] In the case of injuries, early intervention and rehabilitation can prevent recurrent injury leading to cumulative and permanent damage.[67] Because untreated pain can become persistent, due to changes in pain pathways in the nervous system, early intervention can reduce chronicity and disability.[68]

A number of models have been suggested to enhance access to services for people with musculoskeletal pain and there is a role for public health in promoting these. In Scotland, NHS24 provides telephone triage directing people to appropriate services such as physiotherapy, without the need to first make an appointment with a GP. Elsewhere in the UK, people with an episode of musculoskeletal pain can directly self-refer to NHS physiotherapy services. Good public access to physical activity programmes could make health centres the first place where people with musculoskeletal pain would go to manage their condition. This will require fitness and leisure centre staff who are informed about musculoskeletal conditions and skilled in supporting people in pain to engage in appropriate physical activity.

Where large numbers of people seek healthcare each year, as is the case for back pain, a public health approach should include designing a system of care so that different populations receive the best treatment appropriate for them. For example, a clinical questionnaire such as STarTBack[198] allows three distinct populations of people with back pain to be identified, each of which can then receive appropriate care. Systems of care that routinely use STarTBack improve population musculoskeletal health outcomes and reduce overall cost.

Swedish physical exercise formulary

Swedish research shows the increase in motivation if advice is personalised, 'with health professionals being as specific as possible about the needs of the individual,' said Professor Mark Batt. To help with this, Sweden has produced a physical activity formulary.[197] By listing which types of physical activities are most useful for people with specific problems, this formulary helps clinicians tailor their advice to the specific needs of their patients.

Health and social care professionals, including clinical staff, can deliver public health messages to people with musculoskeletal conditions when providing care. The aim should be to empower people with musculoskeletal pain to take steps to improve their own health, to promote self-management and to avoid over-medicalisation. People with arthritis and musculoskeletal conditions encounter different professionals at different times, including clinical staff such as doctors, nurses and physiotherapists, social care and domiciliary care staff, sport and leisure staff and care home staff. These trusted professionals are well-placed to communicate public health messages, giving brief advice, or using brief interventions, to promote weight loss or appropriate physical activity.[199, 200]

Clinicians and others providing care may require training to acquire the knowledge, skills and attitudes to support lifestyle change in their patients. Specific resources may be helpful here, such as a nationally-agreed guide to recommended physical activities for people with different musculoskeletal problems.[197] System incentives and resources should be aligned to ensure that appropriate services are available and accessible for people to use. Currently, when the National Institute for Health and Care Excellence (NICE) recommends a drug therapy the NHS has a duty to provide it: this is not the case with other approaches of proven benefit, such as physical activity or weight management.

The NHS Health Check in England[201] may be a particular opportunity for intervention as physical activity advice is an important outcome of the assessment. Given the eligible age-group, 40-74 years, approximately one in four people accessing the NHS Health Check will have a musculoskeletal condition. Unaddressed, musculoskeletal pain is a barrier to physical activity. One or two simple screening questions could identify people with a musculoskeletal problem, allowing targeted physical activity and the reassurance that physical activity is safe and beneficial for their condition.

The Royal Mail's national occupational support and therapy programme, which includes physiotherapy, has cut work absence by 25% over three years and brought 3,600 employees back into work. The scheme returned £5 for every £1 invested.[211]

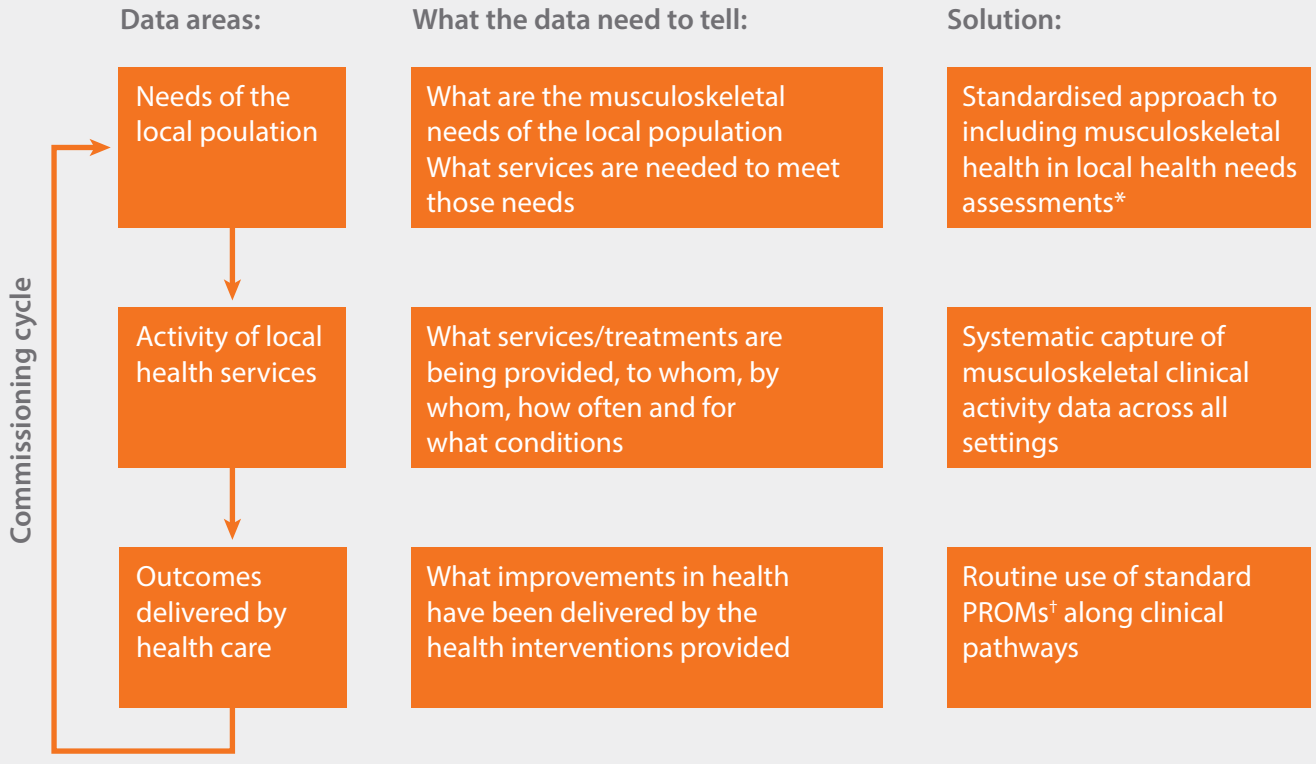
Occupational health services can improve the musculoskeletal health of populations by addressing the important and complex relationship between work and musculoskeletal health. Good occupational health services will identify and enable people with musculoskeletal conditions to recover their health and remain engaged with work;[202] and support people who have been out of work due to a musculoskeletal condition to make a successful return to meaningful work.[203] Occupational health services could play a leading role in musculoskeletal health promotion, using the workplace to tackle risk factors such as physical inactivity and obesity.

4.0 DATA IN MUSCULOSKELETAL HEALTH

4.1 Overview

The collection, interpretation and publication of data is an essential public health function that informs all other public health activity. The commissioning cycle broadly has three parts, each informed by data (Figure 7). First, in order to design public health and clinical services and programmes, robust information is required about the health of the population. Next, once services are running, data are required to understand what activity is being performed by those services – and at what cost – and who in the population is using them. Finally, the quality and value of services should be determined through the routine monitoring of health outcomes delivered by the service. This in turn will affect the health of the population and so the cycle repeats.

Figure 7: Types of data needed for musculoskeletal health intelligence



*Including Joint Strategic needs assessment in England
†Patient reported outcome measures

For musculoskeletal health, it is difficult to obtain data on population need, health service activity and health outcomes, risking a loss of public health focus on this topic.

Partly, this is because of historic attention to mortality[2] as the priority of health improvement and health service activity. This is reflected in health policies, which have tended to address the major killers such as cardiovascular disease and cancer. There has been less attention to conditions which mainly reduce quality of life, such as most musculoskeletal conditions.

High quality data are needed to help allocate appropriate resources towards tackling poor musculoskeletal health and addressing inequalities. Intelligence about patterns of ill health should guide design and location of services. Information about musculoskeletal health trends in the population and changes in response to interventions can guide quality improvement in specific services and enable identification of successful programmes, supporting their spread and wider implementation.

4.2 Assessing population health need

Health intelligence for public health purposes can come from a number of sources, including national and local surveys. For example, a number of local authorities currently use surveys to assess local population musculoskeletal health need, but there is no standard approach to the methodology or questions used.

The Musculoskeletal Calculator[204]

The MSK Calculator will use statistical modelling to produce robust estimates of prevalence of four musculoskeletal conditions of public health importance – osteoarthritis of the hip and knee, back pain, rheumatoid arthritis, and fragility fracture risk. Funded through an Arthritis Research UK research award, the MSK Calculator will be free to use online in 2014.

Nationally, publicly funded health surveys include questions about musculoskeletal health. The content of these varies between the four UK nations and is not always designed and included in a systematic way to maximise the benefit of those questions. For example, questions about musculoskeletal health should be linked to questions about health impact, as well as major risk factors such as physical inactivity and obesity.

4.3 Data about clinical activity

Clinical activity data, including information about diagnosis and treatment, are also largely absent. Musculoskeletal health care is often delivered in multiple settings by different health professionals providing different treatments. In England, for example, current routine NHS data collections centre on secondary care through hospital episode statistics (HES). HES provides good data on specific relevant episodes of inpatient care (such as joint replacement surgery, or treatment for major fractures such as broken hips), However, HES outpatient datasets usually only capture the attendance, without including any diagnosis or treatment information. Similarly, there is minimal information collected about community care.

Role of national registries

In the absence of systematic national data collection about musculoskeletal healthcare from secondary NHS settings, national registries provide an invaluable source of data to inform and protect public health. The National Biologics Register collects patient safety data on relatively new biologic treatments, where long-term effects are still unknown.

The National Joint Registry has been operating since 2002. It now collects information on all hip, knee, ankle, and elbow and shoulder joint replacement operations, monitoring the performance of joint replacement implants.[205, 206]

Primary care should be a rich source of data about musculoskeletal conditions, with one in five of the population consulting their GP each year about a musculoskeletal problem. Difficulties with standardisation of terminology and coding about musculoskeletal conditions can make primary care data difficult to interpret. The importance of primary care musculoskeletal data has also been overlooked by policymakers. For example, in 2013 NHS England did not include musculoskeletal conditions in the dataset planned to be extracted from GP records for care data, whereas many other long-term conditions were included.

4.4 Outcomes of clinical and public health interventions

Morbidity can be harder to measure than mortality. Whereas for many other long-term conditions there are biomarkers (such as blood sugar, blood pressure or cholesterol) that can be used to monitor treatment outcome, this is not the case in musculoskeletal conditions where such outcome biomarkers do not exist. Instead, symptoms such as pain, disability, fatigue, reduced dexterity, and inability to participate socially act as markers of health status. Patient reported outcome measures (PROMs) are therefore ideal for use in musculoskeletal health. Currently the NHS only routinely uses musculoskeletal PROMs for the small fraction of people with musculoskeletal conditions that require or seek knee or hip surgery.

The Musculoskeletal Patient Reported Outcome Measure (M-PROM)

Though there are many different musculoskeletal conditions, often the symptoms are similar, for example: pain, stiffness, fatigue, loss of mobility, low mood. The M-PROM is a health status measure that will allow people with a wide range of musculoskeletal conditions to report on their own health and track change over time, in multiple different settings. Funded through an Arthritis Research UK research award, the M-PROM will be available in 2014.[207]

There are a number of indicators that could be used to monitor musculoskeletal health outcomes at population level. Some of these relate to workplace participation, where musculoskeletal conditions are the second largest cause of work absence. These include receipt of employment and support allowance or fit notes relating to musculoskeletal problems. Other indicators include receipt of social care services, including home adaptations and individual care. The lack of a common identification number across health and social care services and benefits systems makes data linkage difficult.

How can musculoskeletal health be measured at a national level?

Indicators and outcome measures are an important means of quantifying health and provide a framework for the evaluation of healthcare and public health interventions at national level.

The European Eumusc.net group has developed a set of Health Care Quality Indicators for osteoarthritis and rheumatoid arthritis which can be used to monitor the structures, processes and outcomes of health care for musculoskeletal conditions in Europe. This indicator set could provide the basis for international standards for musculoskeletal health outcomes.[208]

In the USA, the Centres for Disease Control and Prevention use a national telephone survey to determine the level of walking among adults with arthritis. This provides weekly information at the level of individual states.[209]

In England, the Public Health Outcomes Framework[210] sets out a series of outcomes and indicators to help understand how public health is being improved and protected at a national level. It rightly includes measures relevant to musculoskeletal health, such as the number of hip fractures in people aged 65 and over.

5.0 CONCLUSION AND RECOMMENDATIONS

Millions of people across the United Kingdom are already affected by these painful conditions of joints, muscles, bones and spines, the single largest causes of disability in this country.

Only a public health approach can meet a problem of this scale.

The lifestyle factors that contribute to musculoskeletal health are well understood. At every age, obesity, physical inactivity and poor nutrition threaten musculoskeletal health, increasing people's risk of developing a musculoskeletal condition later in life. For people who are living with a musculoskeletal condition, addressing these factors can reduce the impact it has on their lives, lessening pain and disability.

Only a public health approach can support the behaviour change needed to achieve this across the whole population.

An ageing population and rising levels of obesity combined with physical inactivity will result in growing numbers of people affected by musculoskeletal conditions. As the retirement age rises, even more people of working age will be affected by arthritis, reducing personal income and productivity. Public expectations of high quality care are rising at a time when health and social care budgets are constrained.

Only a public health approach can identify cost effective programmes to prevent disability and avoid escalating costs.

A transformation is now needed from tackling musculoskeletal diseases when they arise to promoting lifelong good musculoskeletal health. The health of the public is everyone's responsibility. Change is needed at every level including national government and local authorities. New partnerships need to be forged between the public health community, national arthritis charities and local community groups. There needs to be a shift away from the perception that nothing can be done towards a public understanding that everyone can take steps to improve their musculoskeletal health and reduce their own risk of arthritis.

Arthritis is not inevitable. Living in pain should not be acceptable. It's time for a new approach. A public health approach to musculoskeletal health.

Arthritis Research UK and public health

Arthritis Research UK values public health approaches as an essential means of preventing and reducing the impact of musculoskeletal conditions. We work in partnership with national bodies and leading academics as part of our national public health landscape.

- **Providing information:** We are the major provider of information leaflets about arthritis and musculoskeletal conditions in the UK. In 2013, we supplied over 1.8 million leaflets to healthcare professionals and others across the country, with 118,000 copies being downloaded from our website in the last six months of 2013 alone.
- **Undertaking research:** We fund studies to inform public health approaches, for example to understand how people can use exercise to reduce musculoskeletal pain, and together with the Medical Research Council are funding a joint national centre on workplace disability from musculoskeletal conditions, to reduce working days lost.
- **Improving data:** We are working with government agencies to improve data about the prevalence of musculoskeletal conditions and the contributing risk factors, so that this information can be used to inform decision making at local and national levels.
- **Influencing policy:** We identify challenges for people with musculoskeletal conditions within healthcare, social care and their daily lives and seek to influence decision-makers on the policy changes that will make a difference.

Recommendations

When assessing local and national population health, musculoskeletal health must be included in the assessment. This should describe the needs of people living with musculoskeletal conditions and explore opportunities to promote good musculoskeletal health among the population.

When designing, implementing and evaluating programmes targeting lifestyle factors such as obesity and physical inactivity, impact on musculoskeletal health should be explicitly included. People with joint, muscle or back pain should have equitable access to these programmes and public health teams must ensure that joint or back pain is not seen by professionals or the public as a barrier to participation.

When developing health promotion messages, the benefits of physical activity to people with musculoskeletal conditions should be emphasised. Common misunderstandings should be challenged, including that nothing can be done if you have arthritis or back pain, that rest is beneficial for painful musculoskeletal conditions, or that physical activity is inherently harmful for people for people living with these conditions.

All this public health activity must be underpinned by high quality data about musculoskeletal health. The extent and quality of clinical data collected from primary care, community and out-patients health records must be urgently improved. Government agencies across the United Kingdom should work with the musculoskeletal community to agree a consistent question set for use in local and national population surveys to determine the impact of poor musculoskeletal health.

6.0 APPENDICES

6.1 Appendix 1: Table of risk factors

Table 1: Avoidable threats to musculoskeletal health through the lifecourse

LIFECOURSE

Stage of life	Risk factors	Associated condition	Opportunities	Examples of Interventions
Maternal health	Low birth weight	Osteoporosis Reduced muscle strength	» Tackle maternal smoking	
	High levels vigorous activity during pregnancy	Osteoporosis Reduced muscle strength	» Promote appropriate physical activity during pregnancy	
	Maternal nutrition	Osteoporosis Reduced muscle strength	» Low pre-conception BMI » Promote adequate nutrition (e.g. Vitamin D)	
	Maternal smoking	Osteoporosis Reduced muscle strength	» Tackle maternal smoking	
Childhood and adolescence	Hip dysplasia	Osteoarthritis	» Screening for developmental dysplasia	
	Poor early childhood growth and adolescent eating disorders	Osteoporosis	» Promote healthy childhood nutrition	
	Obesity	Musculoskeletal pain Osteoarthritis Back pain	» Reduce obesity	
	Physical inactivity	Osteoporosis	» Exercise to promote greater bone density and muscle strength in later life	» Take Life On (Scottish Government)
Adult	Musculoskeletal Injury	Osteoarthritis	» Modify high-risk environments in sports and workplaces » Early access to high quality treatment after injury	» FIFA 11+ » Workplace interventions (exercise therapy, workplace adaptations etc.)
	Obesity	Osteoarthritis Back pain Musculoskeletal pain Gout	» Reduce obesity	
	Smoking	Rheumatoid arthritis Musculoskeletal pain Osteoarthritis Gout	» Lifestyle changes	» Supported weight loss programmes » Smokefree (NHS)
	Physical inactivity	Musculoskeletal pain Osteoarthritis Osteoporosis	» Improve overall musculoskeletal health » High impact physical activity to promote strengthening of the bones	» Physical activity guidelines and health promotion in the workplace
Older life	Poor nutrition	Increased falls risk Osteoporosis	» Maintain healthy nutrition and body weight	» Vitamin D supplementation
	Obesity	Osteoarthritis Back pain Gout	» Reduce obesity	
	Physical inactivity	Increased falls risk Osteoporosis Musculoskeletal pain	» Increase physical activity to strengthen bones, muscles and joints and improve balance and co-ordination » Remove barriers that prevent older people engaging in activity (inaccessible, lack of transport, social fears)	» Implementing national physical activity guidelines (2011) for the over 65s

6.2 Appendix 2: Levels of prevention in musculoskeletal health

	Examples: Systemic inflammatory conditions (e.g. Rheumatoid arthritis).	Examples: Conditions of musculoskeletal pain (e.g. Osteoarthritis, back pain).	Examples: Fragility fractures and osteoporosis.
Primary prevention (Reducing the risk of the condition developing).	Reducing smoking prevalence to reduce the proportion of people who develop rheumatoid arthritis.	Reducing obesity across the whole population to reduce the number of people who develop osteoarthritis and back pain.	Increasing high impact physical activity in childhood to reduce risk of fractures in adult life.
		Increasing appropriate physical activity across the whole population to reduce the number of people who develop osteoarthritis and back pain.	Identifying adults who are at high risk of a fracture (for example due to medication, or illness) and promoting adequate nutrition, increasing physical activity and considering medication.
Secondary prevention (Stopping condition worsening once it has developed).	Rapid referral of people with early rheumatoid arthritis to begin urgent, intensive therapy to control the disease and prevent joint damage.	Increasing physical activity among people with osteoarthritis and back pain to reduce pain and disability in people with these conditions.	Ensuring that people who have had a fragility fracture receive treatment and support to prevent another fracture.
	Cardiovascular risk screening and bone health assessment for people with rheumatoid arthritis.	Decreasing obesity among people with osteoarthritis and back pain to reduce pain and disability in people with these conditions.	
Tertiary prevention (Reducing the impact of the condition on the person affected).	Services such as podiatry, physiotherapy and occupational therapy to help people remain active and independent.	Occupational health services to support people to remain at, or to return to, work.	Promoting recovery from fracture with re-enablement services after a hip fracture to support return to independent living.

6.3 Appendix 3: Workshop Programme and attendees

Public Musculoskeletal Health: A Lifecourse Approach

Thursday 29 August 2013
10am – 4.30pm
The Wesley Hotel, London NW1 2EZ

Programme

10.00	Welcome and Goals of the Day	Alan Silman
10.05	Introduction: Public Health England	John Newton
10.10	Musculoskeletal health: a role for public health?	Anthony Woolf
10.20	**A strong start: early life and nutrition**	
	The effect of maternal factors on MSK health	Cyrus Cooper
	Childhood influences on MSK health	Jon Tobias
	The role of Vitamin D in adult MSK health	David Reid
	Discussion	
11.35	Break	
11.45	**Living well: adult life**	
	MSK health and work: opportunities and risks	Siân Williams
	Potential of obesity reduction for MSK health	Alan Silman
	Why injury prevention is important for MSK health	Mark Batt
	Discussion	
1.00	Lunch	
1.45	**Remaining active: older life**	
	How does physical activity affect MSK health	Alan Maryon-Davis
	Enhancing MSK health and reducing frailty despite ageing	Janet Lord
	Preventing chronicity and disability from short term problems	Peter Croft
	Discussion	
3.00	Break	
3.15	Priority setting in Public Health England	Eugene Milne
3.45	General Discussion	
4.15	Summary	
4.30	Depart	

ADDITIONAL MEETING PARTICIPANTS

Nona Ahamat, British Society for Rheumatology

Phil Baker, Arthritis Care

Ian Bernstein, General Practitioner

Stephen Bevan, The Work Foundation

Laura Boothman, Arthritis Research UK

Shirley Cramer, Royal Society for Public Health

Benjamin Ellis, Arthritis Research UK

Jane Feinmann, Writer

Tom Gentry, Age UK

Jennifer Gill, UCL School of Pharmacy

Inam Haq, Arthritis Research UK

Doreen Huddart, Local Government Association Community Wellbeing Board

Jane Huntley, National Institute for Health and Care Excellence (NICE)

Peter Kay, NHS England

Jenny Lisle, Faculty of Public Health

Tracey Loftis, Arthritis Research UK

Louise Madel, National Osteoporosis Society

Tom Margham, Arthritis Research UK

Federico Moscogiuri, Arthritis and Musculoskeletal Alliance

Anita Nathan, Royal College of General Practitioners

George Peat, Keele University

Monika Preuss, Public Health England

Monica Roche, Public Health England

Matthew Rowbotham, Arthritis Research UK

Steve Tolan, Chartered Society of Physiotherapy

Belinda Wadsworth, Arthritis Research UK

Anthony Woolf, Royal Cornwall Hospitals NHS Trust

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Arthritis Research UK

Arthritis Research UK
Copeman House
St Mary's Gate
Chesterfield
S41 7TD

www.arthritisresearchuk.org

@ArthritisRUK /arthritisresearchuk