



Public Health  
England

Protecting and improving the nation's health

# Tackling high blood pressure

## From evidence into action

Developed together by the 12 member organisations of the  
Blood Pressure System Leadership Board

## Published in partnership with:



NHS England  
NHS Improving Quality

# About Public Health England

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

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## Executive summary

High blood pressure affects more than one in four adults in England, and is the second biggest risk factor for premature death and disability. Improvements in tackling blood pressure in the last decade have prevented or postponed many thousands of deaths, but at present only four in ten of all adults with high blood pressure are both aware of their condition and managing it to the levels recommended. Compared to international leaders (in particular Canada and the US), there is much room for improvement.

A group of leaders across national and local government, the health system, voluntary sector and academia have come together to support the better prevention, detection and management of high blood pressure. This is our vision and action plan, developed from the best evidence and practical experience of our group. It is intended to support partners at all levels to focus upon the work that will make the biggest impact tackling this condition. Nationally, our work supports wider strategies, notably the NHS Five Year Forward View and Public Health England's (PHE) priorities to protect and improve the nation's health. In parallel we recognise it is local leadership and implementation which will be the critical ingredients to achieve sustainable change on this topic.

People from the most deprived areas are 30% more likely than the least-deprived to have high blood pressure, and the condition disproportionately affects some ethnic groups including black Africans and Caribbeans. So a focus on blood pressure has potential to address health inequalities and variation in outcomes, and this work sets out how we might best achieve that.

Across every part of the blood pressure pathway, the importance of professional leadership and collaboration between partners for system improvement is emphasised. This work is designed especially to support this.

### **Prevention** (p.11-16)

In ten years, 45,000 years of life could be saved and £850m not spent on related health and social care if we achieve a reduction in the average population blood pressure. Key approaches are:

- reducing salt consumption and improving overall nutrition at population-level
- improving calorie balance to reduce excess body weight at population-level
- personal behaviour change on diet, physical activity, alcohol and smoking, particularly prompted through individuals' regular contacts with healthcare and other institutions

### **Detection** (p.17-22)

In ten years, 7,000 years of life could be saved and £120m not spent on related health and social care if we achieve an improvement in the diagnosis of high blood pressure.

Key approaches are:

- more frequent opportunistic testing in primary care, achieved through using wider staff (nurses, pharmacy etc.), and integrating testing into the management of long term conditions
- improving take-up of the NHS Health Check, a systematic testing and risk assessment offer for 40-74 year olds
- targeting high-risk and deprived groups, particularly through general practice records audit and outreach testing

### **Management** (p.23-31)

In ten years, 7,000 years of life could be saved and £120m not spent on related health and social care if we achieve (via lifestyle and/or drug therapy) better control of blood pressure levels among those on treatment. Key approaches are:

- local leadership and action planning for system change, to tackle particular areas of local variation, and achieve models of person-centric care
- health professional support (communication, tools and incentives) to bring practice nearer to treatment guidelines where this falls short
- support adherence to drug therapy and lifestyle change, particularly through self-monitoring of blood pressure and pharmacy medicine support

### **How different groups can contribute**

Immediate partners to our group have identified actions they commit to support in 2014-16 (see p.32). These are primarily enabling actions at a national level, and are a strong basis for improvement. In addition, we have translated the areas of focus into support and pointers for local professionals and leaders – we know from international experience that local leadership will be the key to success.

This plan outlines possible roles for key groups:

- local government
- health care commissioners
- health care providers
- individuals and families
- voluntary and community sector
- national government, agencies and public bodies
- employers

### **Next steps**

This system wide approach to tackling high blood pressure is a new effort – the publication of this plan is just the start of this focus. We want to foster joint leadership at local and national levels. The Blood Pressure System Leadership Board will promote work to reduce this important risk factor, providing tools and support for local areas keen to make a difference. PHE will monitor progress, and has provided a [resource hub](#) and [data maps](#) as an initial offer to local areas.

If we act together as partners, a step change in tackling high blood pressure has the potential to improve the lives of one quarter of adults across England.

## Introduction

More than a quarter of adults in England have high blood pressure (hypertension).<sup>1,2</sup> It is the most common long term condition<sup>3</sup> and second biggest risk factor (after smoking) for premature death and disability in this country.<sup>4</sup>

The last decade has seen positive change:

- a moderate drop in the average blood pressure of the population (systolic down 3mmHg)
- around two million people with existing high blood pressure have been newly identified
- of people on treatment for blood pressure 10% more are now achieving good control

However, England's performance is still a long way off what has been achieved in top performing countries, such as Canada and the US.<sup>5</sup>

High blood pressure is often preventable, and is worsened by poor lifestyle behaviours (such as poor diet and physical inactivity). It is a risk factor for cardiovascular disease (including stroke and heart attack), cognitive decline (including dementia) and kidney disease. High blood pressure does not usually cause symptoms, so has often been overlooked, and there has been no government programme on the topic in recent years.

However, the opportunity is immense. New estimates suggest the annual burden to the NHS in England from conditions attributable to high blood pressure is over £2bn (including stroke, coronary heart disease, chronic kidney disease and dementia).<sup>6</sup> High blood pressure costs the economy much beyond this indeed – from clinical time and medication costs of managing high blood pressure as a condition in its own right, to the impacts on social care and the wider economy.

The right approach to reducing the number of people with high blood pressure, and better detecting and managing those with the condition, can simultaneously achieve significant individual benefits to health and quality of life, reduce health and social care expenditure, as well as have wider impacts such as worklessness and lost productivity.

Tackling high blood pressure also offers a great opportunity to reduce variation in outcomes, both geographically and in terms of social inequalities. People from the most deprived areas are 30% more likely to have high blood pressure than the least-deprived, and these inequalities are wider still for outcomes of high blood pressure like stroke and coronary heart disease. The condition disproportionately affects some ethnic groups including black Africans and Caribbeans. New legal duties require key public bodies to reduce health inequalities.<sup>7</sup>



Tackling high blood pressure is an important contribution to the major strategies of system leaders in healthcare and public health. Our work supports the commitment to disease prevention in the NHS (set out in the Five Year Forward View<sup>8</sup>) and is a key link to PHE's public health priorities around dementia, obesity and alcohol.<sup>9</sup> Our proposals also respond to the new drivers and opportunities highlighted in those strategies – such as new models of care, the role of employers, transparency and behavioural insights.

## System leadership

With support from PHE, the Blood Pressure System Leadership Board has come together from across national and local government, the health system, voluntary and community sector and academia to consider what we can do to raise performance in England to be among the best in the world.

From success both internationally<sup>10</sup> and locally in England,<sup>11</sup> we know the importance of collaboration between clinical, public health and wider leaders to support dissemination and implementation of evidence, guidelines and innovation.

Our objective is to work together to support a shared and coherent approach to high blood pressure, to improve performance across the pathway of:

- prevention
- detection
- management (investigation, treatment and care)
- reducing inequalities in health outcomes (across all themes)

We aim to tackle high blood pressure alongside the broader approaches to preventing and managing cardiovascular disease as detailed in the government's Cardiovascular Disease Outcomes Strategy.<sup>12</sup>

## From evidence into action

This plan is the first major output from the Blood Pressure System Leadership Board. It sets out a vision for tackling high blood pressure, drawing upon the combination of the best evidence and professional judgment from our group, in order to:

- highlight specific issues on the blood pressure pathway where there is greatest opportunity for transformation
- demonstrate examples of roles in promoting the transformation for a wide range of organisations
- provide a compelling case to tackle high blood pressure
- set out what key partners have already pledged to do in support of our ambition

We recognise that local leadership and partnership working will be the keys to success, and that each local area will wish to tailor work to suit their particular circumstances. We hope that this plan will be a useful contribution towards achieving our shared ambition.

As a key part of the evidence to inform this work, PHE commissioned a cost-effectiveness review comparing interventions to prevent, detect and manage high blood pressure. Headlines are throughout this plan, and Optimity Matrix publish its **results report** in parallel.

### Further resources

Linked to this plan, PHE is making available:

- **an online resource hub** (including case studies, templates, data and more – providing a ‘one stop shop’ for professionals to support their work)
- **data on local performance** (interactive maps, down to GP level for most indicators – highlighting variation and the relative performance of areas to support local data analysis and prioritisation)

### Members of the Blood Pressure System Leadership Board

We are grateful to representatives from:

- Association of Directors of Public Health
- Blood Pressure UK
- British Heart Foundation
- British Hypertension Society
- Department of Health
- Faculty of Public Health
- Local Government Association
- NHS England
- NHS Improving Quality
- Pharmacy Voice
- Public Health England
- Royal College of General Practitioners

## Prevention

**Over ten years, an estimated 45,000 quality adjusted life years could be saved, and £850m not spent on related health and social care, if England achieved a 5mmHg reduction in the average population systolic blood pressure.<sup>13</sup>**

### Background

High blood pressure is often preventable. Even individuals with blood pressure currently in the 'normal' range could reduce their future risk of cardiovascular disease by lowering their blood pressure still further down to a threshold of 115/75mmHg.<sup>14</sup> The focus of this chapter is on the *primary* prevention of high blood pressure.

#### Key modifiable risk factors for high blood pressure

Risk factor	Evidence	Inequalities
Excess weight	There is a strong and direct relationship between excess weight and high blood pressure. <sup>15</sup> Obesity multiplies the risk of developing high blood pressure about threefold in men and fourfold in women <sup>16</sup>	Obesity is far more common in women in the lowest household income quintiles (24-26%) compared to the highest (13-17%). There is not a significant relationship of income to BMI in men, <sup>17</sup> though obesity decreases with educational attainment <sup>18</sup>
Excess dietary salt	The Scientific Advisory Committee on Nutrition identified a strong association between salt intakes and elevated blood pressure, noting this was evident across a range of salt intakes, not only among those with the highest intakes <sup>19</sup>	Levels of salt consumption, relative to guidelines, are higher among younger people, ethnic minorities and lower socio-economic groups <sup>20,21</sup>
Lack of physical activity	Large studies have shown a link between habitual aerobic physical <i>inactivity</i> and high blood pressure <sup>22</sup> – one found a reduction in risk of developing high blood pressure of up to 52% in those who exercise regularly and maintain their cardiovascular fitness <sup>23</sup>	Inequalities are present across almost all protected characteristics. People in least prosperous areas are twice as likely to be physically inactive as those living in more prosperous areas (38.5% compared to 17.2%) <sup>24</sup>
Excessive alcohol	Heavy habitual consumption of alcohol links to raised blood pressure. <sup>25</sup> Blood pressure rises, in some cases to dangerous levels, when large amounts of alcohol are consumed – particularly when binge drinking <sup>26</sup>	Adults living in households in the highest income quintile were twice as likely to have drunk heavily (exceeding 8 units for men, 6 units for women, on one day) in the previous week – 23% versus 10% in the lowest income quintile <sup>27</sup>
Psychosocial stress	Blood pressure may persistently increase over a longer period in relation to a wide range of stressful situations <sup>28</sup>	Social and psychological circumstances can cause long-term stress. Continuing anxiety, insecurity, low self-esteem, social isolation and lack of control over work and home life, have powerful effects on health. The lower people are in the social hierarchy of industrialised countries, the more common these problems become <sup>29</sup>

Other modifiable risk factors (including cold homes or consumption of particular medicines) have been shown to raise blood pressure, and international research is underway on wider risk factors.

Within diet, benefits to blood pressure levels have been associated with other individual diet components (such as potassium, calcium, magnesium and oats), but there is not yet consensus on the strength of evidence for individual links. However, the key to obtaining these elements is a healthy, varied and balanced diet<sup>30</sup> – the “DASH diet” rich in fruits, vegetables and low-fat dairy products has been shown to significantly reduce blood pressure versus a typical diet.<sup>31</sup> On average, English diets exceed recommended levels of salt and saturated fat, and fall below on fruit, vegetables and fibre.<sup>32</sup>

The independent long-term effect of smoking on blood pressure is small, however, the risk of cardiovascular disease at any blood pressure level is higher for smokers,<sup>33</sup> meaning it remains relevant to preventative work.

#### Key non-modifiable risk factors for high blood pressure

Older age	Increasing age is associated with increasing systolic blood pressure. <sup>34</sup> This is thought to reflect the length of time people are exposed to modifiable risk factors <sup>35</sup>
Family history	Research on twins suggest that up to 40% of variability in blood pressure may be explained by genetic factors <sup>36</sup>
Ethnicity	High blood pressure is more common among: black Caribbean men and women; black African men and women; Chinese women; Irish men; Indian men and women; Pakistani women <sup>37</sup>
Gender	For any given age up to 65 years women tend to have a lower blood pressure than men. After 65 years, this relationship is reversed <sup>38</sup>

The burden of high blood pressure is greatest among individuals from low-income households and those living in deprived areas. The Health Survey for England identified that the prevalence of high blood pressure increased from 26% of men and 23% of women in the least deprived quintile of the Index of Multiple Deprivation, to 34% and 30% respectively in the most deprived quintile.<sup>39</sup>

#### Performance to date

Metric	Trend	Data (England, all adults) <sup>40</sup>
Systolic and diastolic blood pressure	Improved	2011: 126.5/72.8mmHg 2003: 129.3/74.2mmHg
Prevalence of high blood pressure (≥140/90mmHg)	Improved	2012: 29% 2003: 32%
Dietary salt consumption	Improved	2011: 8.1g/day 2003: 9.5g/day
Physical inactivity	Improved	2012: 28% (men) and 37% (women) taking less than 30 minutes of physical activity per week 2003: 32% (men) and 40% (women) inactive as defined above
Body mass index	Worsened	2012: 27.3 (men) and 27.0 (women) mean BMI 2003: 26.9 (men) 26.7 (women) mean BMI

Alcohol consumption	Improved	2012: 31% (men) and 24% (women) who drank in past week, consumed over twice recommended daily limit at least once 2006: 34% (men) and 28% (women) drank as defined above
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By looking at the population average blood pressure level, we can monitor the combined impact of these risk factors over time. It is encouraging that almost all trends are moving (slowly) in the right direction which shows that we can achieve a change with concerted efforts. Population average blood pressure has fallen despite an increase in the average age of the population. However, when looking at variance within and beyond England on the above metrics, it is clear that there remains significant scope for improvement.

The impact of what may appear small population-level changes should not be underestimated. For example, a study looking at coronary heart disease deaths estimated that a 3mmHg reduction in systolic blood pressure in England prevented or postponed more than 11,000 deaths over seven years, and was the single biggest contributor to this improvement (accounting for 29% of all improvement).<sup>41</sup> Notably, this population level change was predicted to be of greatest benefit to the most deprived areas, actively reducing health inequalities.<sup>42</sup> This does not include the additional positive impact on reducing strokes, kidney disease, dementia or other conditions to which high blood pressure contributes.

## Vision and priorities

### Key approaches:

- 1. Reducing salt and improving overall nutrition:** focusing on population-level salt reduction, plus better diet balance (including increased fruit and vegetable consumption) in line with the eatwell plate.<sup>43</sup> If taking targeted approaches, focus on low income households and deprived areas.
- 2. Improving calorie balance to reduce excess body weight:** focusing on population-level approaches to tackle the dietary causes of overweight and obesity (typically excess fat and sugar). If taking targeted approaches, focus on low income households and deprived areas.
- 3. Systematic behaviour change interventions on diet, physical activity, alcohol, and smoking:** developing practical and sustainable interventions and programmes based on latest NICE guidance.<sup>44</sup> Take local needs into account and make use of individuals' regular contact with healthcare and other institutions (workplaces, schools).

## Discussion

Our consensus has been formed after considering which measures have the best combination of:

- potential to reduce population and individual blood pressure

- practicability
- cost efficiency
- potential to reduce inequalities

A comprehensive approach to improving health is obviously paramount, but we are focusing here on what can make the biggest difference to blood pressure (and the variety of medical conditions which follow).

### **Influence of lifestyle factors on blood pressure**

NICE recently carried out a meta-analysis of randomised trials on the impact of various lifestyle changes to reduce blood pressure.<sup>45</sup> The three interventions with the greatest and most certain reductions in high blood pressure were:

- dietary change to achieve weight loss (principally calorie reduction)
- multiple Intervention (principally combining physical activity with dietary change)
- salt reduction (which showed the greatest certainty of impact of any change)

### **Scope to achieve practical and efficient change**

We are likely to see the greatest overall impact where we are able to make changes at a population level compared to treating only high-risk individuals,<sup>46</sup> even when population-level changes are relatively moderate. As well as looking at national levers, this is about looking at prevention interventions to access wide groups, for example through workplaces and schools.

NICE has undertaken a systematic review around prevention of CVD<sup>47</sup> which makes a range of evidence-based recommendations for national implementation. They highlight the national levers available to drive change in the population's diet (in particular, opportunities upstream of individual food choices), through changes such as food re-formulation, promotion, labelling, catering and procurement. The national salt reduction programme shows what is possible, with a 15% reduction in population salt intake achieved within the last decade.<sup>48</sup>

Nonetheless, individual-based approaches are also an essential element of an overall approach, through encouraging individual behaviour change. This is challenging and often requires multiple interventions,<sup>49</sup> but NICE has now advised on successful methods to adopt.<sup>50</sup>

The interventions review commissioned to inform this plan identifies national dietary salt reduction as the most cost effective intervention reviewed (cost saving to health and social care within one year).<sup>51</sup> General healthy lifestyle change (based primarily on studies looking at diet and exercise) were potentially cost-effective at ten years and cost-saving over a lifetime (40 years).<sup>52</sup> These figures are based on these interventions applying at population-level, but where applied specifically to people diagnosed with high blood pressure their cost-effectiveness improves further.

Two principles from Marmot<sup>53</sup> are a key consideration in terms of tackling inequalities: proportionate universalism (taking universal actions with a scale and intensity proportionate to the level of disadvantage); and focusing upon the earlier years of life (to achieve the greatest impact, as positive and negative effects on wellbeing accumulate over an individual’s life course). Forming healthy habits in younger life can positively influence those in adulthood.<sup>54</sup> Obesity (particularly in women), physical inactivity and salt consumption are all issues which most affect more deprived groups – tackling these can help transform inequality in outcomes.

## How different groups can contribute

This listing proposes key roles and activities that different groups are encouraged to take up, based on evidence and the experience of those who developed this plan.

Cross-cutting	<ul style="list-style-type: none"> <li>• wherever feasible, include promotion of healthy lifestyle within any procurement or service designed<sup>55</sup></li> <li>• ensure services and interventions are accessible and appropriate to those at higher risk and those living in low income households and in deprived areas</li> <li>• build blood pressure into joint strategies (such as Joint Strategic Needs Assessments and Health and Wellbeing Strategies)</li> <li>• adopt healthier catering and food procurement approaches, in line with government advice<sup>56,57</sup></li> </ul>
Local government (officers and elected members)	<ul style="list-style-type: none"> <li>• create an environment and incentives which promote physical activity and reduce likelihood of obesity, including use of local planning, transport, schools, environmental health, licensing, policy powers and leveraging influence with other local organisations of all sectors<sup>58,59,60,61</sup></li> <li>• implement integrated behaviour change programmes in support of healthy lifestyles, in line with latest NICE guidance<sup>62</sup></li> <li>• commission services to support risk assessment, awareness and management of high blood pressure – including NHS Health Check, weight management and alcohol services</li> <li>• public health teams link with local communities, neighbourhoods, and primary care to ensure initiatives are accessible and sustainable.</li> <li>• commission social care services that integrate prevention and lifestyle modification as part of all pathways, eg, physical activity, healthy eating, weight management, sensible drinking, smoking cessation<sup>63</sup></li> <li>• support behavioural change training for a variety of social care professionals to enable effective conversations about healthy lifestyle, as part of their wider work</li> </ul>
Healthcare commissioners	<ul style="list-style-type: none"> <li>• commission services that integrate prevention and lifestyle modification as part of all clinical care pathways, eg, physical activity, healthy eating, weight management, sensible drinking, smoking cessation<sup>64</sup></li> <li>• support behavioural change training for a variety of healthcare professionals to enable effective conversations about healthy lifestyle, as part of their wider work</li> </ul>
Healthcare providers, practitioners and professional organisations	<ul style="list-style-type: none"> <li>• incorporate healthy lifestyle information and behaviour change support to the public as part of their regular contact with the health system in a range of settings (general practice, pharmacy, other community settings, secondary care)<sup>65</sup></li> <li>• professional organisations – promote clinical leadership, education and training in primary care to support delivery of preventative interventions</li> </ul>
Individuals and families	<ul style="list-style-type: none"> <li>• make positive changes to their health, and support friends and family to do the same, drawing on support including the Change4Life campaigns and wider resources. Appropriate advice will vary for children and some others but typically includes:</li> </ul>



	<ul style="list-style-type: none"> <li>○ following the eatwell plate and seeking to maintain a healthy weight (which for most means eating fewer calories)</li> <li>○ maintaining a salt intake below 6g/day and ideally lower</li> <li>○ plan to achieve 150 minutes physical activity per week</li> </ul>
Voluntary and community sector	<ul style="list-style-type: none"> <li>● integrate prevention messages into everything they do, working across disease and topic silos</li> <li>● support personalised advice and information sharing to members of the public<sup>66</sup></li> <li>● provide insight into under-served communities to support local commissioning and development of the JSNA and Health and Wellbeing Strategy</li> <li>● where appropriate, support the development or tailoring of interventions and resources for the particular audience (such as men or the black African/Caribbean community) to achieve maximum impact</li> </ul>
National government, agencies and public bodies	<ul style="list-style-type: none"> <li>● DH: support continued evidence-based reform of available levers to reduce salt and saturated fat and improve overall nutrition of food – including: encouraging food manufacturers, caterers and producers to reformulate commonly consumed food; implementing and promoting nutritional labelling; managing advertising restrictions<sup>67</sup></li> <li>● cross-government: create an environment and incentives which promote physical activity, including physically active travel to and at work – such as investing in active travel<sup>68</sup></li> <li>● PHE: provide advice and tools for effective, evidence-based, commissioning of health and wellbeing interventions</li> <li>● PHE: provide consumer-focused advice, information and campaigns to encourage a change towards healthier behaviours</li> <li>● PHE: maintain and improve national evidence and surveillance of non-communicable disease and health risk behaviours</li> </ul>
Employers	<ul style="list-style-type: none"> <li>● sign-up to and comply with the Public Health Responsibility Deal (Health at Work pledges)<sup>69</sup> and Workplace Wellbeing Charter<sup>70</sup> as mechanisms to demonstrate commitment to staff employed in these organisations, and identify opportunities to support employee health and wellbeing, including addressing healthy eating, physical activity, smoking and alcohol</li> </ul>
Other	<ul style="list-style-type: none"> <li>● businesses and influential organisations: Participate in Public Health Responsibility Deal pledges across alcohol, food and physical activity pledges – particular emphasis on food industry signing-up to and seeking to exceed the food pledges, including updated salt targets by specific product groups<sup>71</sup></li> </ul>
<p>NB: Categories are taken to include representative/umbrella organisations. Healthcare sections will often also apply beyond primary medical care (for example to pharmacy and the allied health professions). Many actions would best be carried out through a partnership of bodies, and are not restricted to the main group identified.</p>	

### Areas of interest for further research and innovation

- impact of monitoring general practice performance based on registered population recorded blood pressure levels (to promote lowering blood pressure not only among those diagnosed with high blood pressure)
- potential to create a pathway for those identified as pre-hypertensive (commonly 120/80mmHg to 139/89mmHg) for lifestyle improvement
- return on investment for employer and wider public sector from workplace-based health improvement measures relating to preventing high blood pressure



## Detection

**Over ten years, an estimated 7,000 quality adjusted life years could be saved, and £120m not spent on related health and social care costs, if England achieved a 15% increase in the proportion of adults who have had their high blood pressure diagnosed.<sup>72</sup>**

### Background

High blood pressure is usually symptomless so simple measurement is needed to determine an individual's blood pressure. Ensuring an individual understands their "numbers" and their cardiovascular risk, enables them to consider steps to reduce their blood pressure and improve their health.

Common advice is for adults to have their blood pressure measured at least every five years.<sup>73,74</sup> Once tested, NICE recommends that adults are re-measured within five years, and more frequently for people with high-normal blood pressure<sup>75</sup>. People near to the threshold for hypertension are particularly liable to become hypertensive in the near future.<sup>76</sup> There is not a definitive science on testing intervals – US and Canadian guidelines recommend a higher frequency.<sup>77,78</sup>

Blood pressure can be highly variable, and a diagnosis of high blood pressure cannot be made from a single point in time test.<sup>79</sup> Testing in a medical environment can lead to 'white coat' hypertension (high readings which are exaggerated compared to readings taken outside healthcare settings because patients are nervous) in as many as 15-30% of the population.<sup>80</sup> By contrast, 'masked' hypertension (where a high reading only shows outside of the clinic) is estimated to affect around 10% of the population.<sup>81</sup> As such, NICE defines the threshold for high blood pressure as a clinic blood pressure of 140/90 mmHg or higher *and* either subsequent ambulatory blood pressure monitoring daytime average or home blood pressure monitoring average of 135/85 mmHg or higher. Both ambulatory and home monitoring have shown greater prognostic accuracy than clinic readings.<sup>82</sup>

Pulse checks are recommended as part of a blood pressure test<sup>83</sup> – these can help identify irregularities which may relate to conditions such as atrial fibrillation which itself is a major cause of stroke. New technology can also assist here.<sup>84</sup>

The vast majority of blood pressure testing occurs within primary care – many millions of tests each year in the course of general practice attendance. Many other testing opportunities exist, including (but not limited to):

- the NHS Health Check, which invites 40-74 year olds in England without a pre-existing cardiovascular condition for a check including a blood pressure test. Almost 1.4 million checks were undertaken in 2013/14<sup>85</sup>

- independent testing initiatives – for example Blood Pressure UK’s Know Your Numbers Week enables over 100,000 tests per year,<sup>86</sup> and the Stroke Association’s Know Your Blood Pressure events test around 50,000 per year<sup>87</sup>
- many pharmacies offer testing on demand: for example in 2013 Lloydspharmacy carried out around 65,000 tests in England<sup>88</sup>
- validated self-monitoring devices are available at low cost<sup>89</sup>

The focus of this chapter is on the detection and diagnosis of high blood pressure among those who are not already established as having this condition.

### Performance to date

Metric	Trend	Data (England, all adults)
Number of people diagnosed with high blood pressure <sup>90</sup>	Higher	2012/13: 7,660,010 (13.7% of all registered patients) 2004/5: 5,973,062 (11.3% of all registered patients)
% of people diagnosed vs. expected to have high blood pressure <sup>91</sup>	Improved	2012/13: 59.4% 2004/5: 46.3%

Progress has been made, with almost two million more people diagnosed with high blood pressure in the last decade. However, with an estimated 12.9 million adults in England with high blood pressure, there are likely to be over five million people in England with undiagnosed high blood pressure.<sup>92</sup>

The proportion of English adults aware of their high blood pressure remains *at least* 10% behind detection levels in the US and 15% behind those in Canada, suggesting a further improvement is possible.<sup>93</sup> GP practices have, on average, no blood pressure reading in the last five years on file for 10% of their patients aged 40 or over<sup>94</sup> (central statistics are not collated for younger adults). As such, a significant minority of adults are not being tested often enough to identify high blood pressure at an early stage.

Diagnosis levels (and implicitly, testing levels) are lowest among males and younger adults.<sup>95</sup> A 2004 survey suggested minority ethnic groups tended to have similar or marginally better detection rates than the general population.<sup>96</sup>

### Vision and priorities

#### Key approaches:

1. **Promote clinical leadership, engagement and education on detection of high blood pressure in primary care:** aspiring to more frequent opportunistic testing not only by general practitioners but wider staff groups (for example, nurses, pharmacists, healthcare assistants) and new pathways (for example, automated systems, integration blood pressure testing in long-term condition management).

2. **Improving take-up of the NHS Health Check:** ensuring this statutory, systematic offer of blood pressure testing and cardiovascular risk assessment has the widest possible reach, and is in particular able to reach those at highest risk and is followed up from.
3. **Pro-active provision of testing for high-risk and deprived groups of all ages.** In particular via:
  - a. Systematic approaches in general practice (in particular auditing records for unresolved high blood pressure readings and high risk adults to follow-up, supported by call and recall).
  - b. Outreach testing beyond general practice, particularly through pharmacy (in order to access those groups least likely to otherwise present, such as younger men, low income households and those in deprived areas).

## Discussion

Our consensus has been formed after considering which measures have the best combination of:

- potential to increase (accurate) detection of high blood pressure
- practicability
- cost efficiency
- potential to reduce inequalities

## Testing provision

Case-finding can be approached with a dual track of opportunistic case-finding (in practice and/or in community settings) and targeted case-finding (which relies on practice records to review risk factors, disease registers and other key determinants).

The vast majority of current testing is in primary care, so this will be a central area to improve performance. General practice overall is not currently meeting the recommended testing frequency, and capacity for ambulatory monitoring (recommended since 2011)<sup>97</sup> is in development. While current pressures on general practice are well-documented,<sup>98,99</sup> there are new models of provision which can help mitigate this – using a wider range of staff as well as general practitioners, and looking at opportunities to integrate a brief blood pressure test within existing work (notably as part of management of long term conditions and co-morbidities).

The interventions review commissioned to inform this plan identified testing as most cost effective in pharmacy and then general practice, compared to the study identified for testing in community venues.<sup>100</sup> However, published studies suitable for this rapid review were somewhat limited, and consideration needs to be given to alternative approaches, and the how best to access the target group. There is more to understand about innovative detection routes such as detection at home, community or workplace settings, or use of skilled volunteers (as trialled at scale in Canada accompanied by

wider education of the public).<sup>101</sup> PHE carried out a testing pilot in partnership with local teams in Wakefield earlier this year and will be sharing resources and findings.

### **Testing audience and demand**

Recent focus group work<sup>102</sup> in England suggests blood pressure is not at the forefront of health considerations for most adults, and few feel any urge to pro-actively have their blood pressure checked. Currently only half of eligible adults take up the NHS Health Check.<sup>103</sup> There is significant variation in uptake of medical services, with men under 45 visiting general practice two to three times per year on average (compared to five and a half times for the average patient), with a large number visiting very rarely.<sup>104</sup>

Furthermore, the health system does not always have equally good provision for people in deprived communities,<sup>105</sup> we know people living with mental health problems are prone to worse physical health outcomes,<sup>106</sup> and there is geographic variation.<sup>107</sup>

Putting together evidence set out across this paper on groups most at risk of high-blood pressure, and groups among whom diagnosis rates are lowest, we suggest that in instances where testing is targeted, the greatest impact will likely come from a focus on high-risk adults of all ages, particularly in lower income households and deprived areas.

Achieving demand for testing is about a combination of changing individual attitudes and behaviour. The emerging evidence around patient activation<sup>108</sup> suggests measuring and developing this has potential to lead to better engagement in checking initiatives.

### **Testing quality**

Many variables (including arm position, cuff size, patient talking during reading) can have significant impacts on blood pressure reading accuracy,<sup>109</sup> and limited evidence suggests such errors are common among clinicians<sup>110</sup> and those testing themselves.<sup>111</sup> However, the current NICE diagnosis pathway mitigates for this to an extent by requiring multiple testing in multiple settings.

Another dimension of quality is around results communication. Surveys connected to a major testing initiative suggest around a half of adults do not understand their blood pressure numbers and had not had this explained by a health professional before.<sup>112</sup> Though patient education alone does not appear to be associated with large net reductions in blood pressure<sup>113</sup> it is an important element of an overall approach – particularly where it helps motivate individuals to take any appropriate action following their test result.

### **Scope to achieve practical and efficient change**

It is important to consider the existing assets and infrastructure which provide the potential to support our objectives. Notably:

- under the Health and Social Care Act 2012 local authorities now have a statutory duty to offer the NHS Health Check to 100% of the eligible population (40-74,

without pre-existing conditions) once every five years. These checks are delivered by a range of partners, based on local commissioning decisions. Further work is underway evaluating the implementation and impact of this programme, however, it offers a systematic opportunity to reach a very large population

- provided testing is accepted as a worthwhile activity, there is a greater likelihood of latent capacity for provision of testing in pharmacies, and by individuals themselves
- general practice comes into contact with the vast majority of the public on a semi-regular basis, including more systematic care for the 53% of patients with long term conditions<sup>114</sup>
- there is a significant amount of resource and engagement from the voluntary and community sector in creating new opportunities for detection
- health technology in this field is rapidly developing, increasing accuracy, reducing cost, and bringing opportunities to think differently about our approach to testing

Experience suggests while creating demand for testing can be beneficial, the most effective route is to create easily accessible testing opportunities.<sup>115</sup> There is a drive towards extended opening hours in general practice<sup>116</sup> which could support this, plus pharmacy<sup>117</sup> and other community<sup>118</sup> or workplace settings have demonstrated they can offer accessible and attractive venues to those less engaged in the health system (and lighten the load on other services).

### How different groups can contribute

This listing proposes key roles and activities which different groups are encouraged to take up, based upon evidence and the experience of those involved in developing this plan.

Cross-cutting	<ul style="list-style-type: none"> <li>• ensure services and interventions are accessible and appropriate to those at higher risk and those living in low income households and in deprived areas<sup>119</sup></li> <li>• support data sharing and inter-system communication across testing opportunities to ensure blood pressure readings are logged on patient records</li> <li>• ensure adequate focus and resourcing on follow-up for any testing initiative (in particular, prompting individuals to take recommended action)<sup>120</sup></li> </ul>
Local government (officers and elected members)	<ul style="list-style-type: none"> <li>• commission the NHS Health Check, seeking in particular to: drive uptake as high as possible, ensure those in more deprived communities and those less regularly accessing healthcare services take this up; use commissioning specifications and scrutiny reviews to ensure follow-up is provided and accessed<sup>121</sup></li> <li>• collaborate with NHS and wider partners to deliver targeted additional testing, including in non-traditional settings, as determined by local needs<sup>122</sup></li> <li>• consider opportunity for scrutiny reviews to support improvements in detection, offering constructive challenge and opportunity to identify solutions among partners<sup>123</sup></li> </ul>
Healthcare commissioners	<ul style="list-style-type: none"> <li>• identify the local size and distribution of the shortfall in detection and review testing provision in light of this<sup>124</sup> (connecting to CCG five year planning on reducing avoidable mortality)<sup>125</sup></li> <li>• CCGs to consider the case for local investment in enhanced community pharmacy services to provide better information and support about blood pressure management; to introduce opportunistic screening in some areas; and to use the medicine usage review to review the blood pressure of those on anti-hypertensive and others at high risk of developing high blood pressure</li> <li>• provide opportunity for healthcare staff to refresh skills on accurate blood</li> </ul>

	pressure testing and effective results communication <sup>126</sup> , including via use of risk communication tools such as QRiskII and JBS3
Healthcare providers, practitioners and professional organisations	<ul style="list-style-type: none"> <li>take opportunity of patient engagement to test all adults regularly<sup>127</sup> (this includes any suitably trained professional – including health trainers, pharmacists, general practice teams, allied health professionals, as well as opportunities for guided self-testing, such as waiting room devices)</li> <li>undertake case-finding audits in general practice to identify those high-risk individuals or who have unresolved high blood pressure readings to follow-up with testing and, if appropriate, diagnosis<sup>128</sup> (with potential support from call and recall systems)</li> <li>professional organisations: Promote clinical leadership, education and training in primary care for the detection (and optimal treatment) of high blood pressure</li> <li>carry out pulse checks as part of blood pressure measurement<sup>129</sup></li> <li>ensure adequate provision of ambulatory blood pressure monitoring to ensure it is possible to complete a diagnosis without delay<sup>130</sup></li> </ul>
Individuals and families	<ul style="list-style-type: none"> <li>learn about what blood pressure is and what different readings mean</li> <li>seek out regular blood pressure testing to know and track their “numbers”, including potential for self-testing</li> </ul>
Voluntary and community sector	<ul style="list-style-type: none"> <li>provide high-quality supplementary testing opportunities (in particular to high risk groups and those least engaged in the health system)<sup>131</sup></li> <li>provide insight into under-served communities to support local commissioning and development of detection approaches which reduce inequalities</li> <li>provide resources and support materials to increase accuracy and take-up of self-monitoring</li> </ul>
National government, agencies and public Bodies	<ul style="list-style-type: none"> <li>PHE: support and coordinate system leaders to improve performance in detection of high blood pressure<sup>132</sup></li> <li>PHE and NHS England: support and promote delivery of the NHS Health Check<sup>133</sup></li> <li>NHS England: consider in leadership of performance measures and incentives for clinical practice, opportunities to encourage regular clinical blood pressure testing</li> </ul>
Employers	<ul style="list-style-type: none"> <li>offer high-quality workplace blood pressure testing to staff (options might be as part of a health check or induction, self-service machines or kiosk, or sign-posting to other providers)</li> </ul>
Other	<ul style="list-style-type: none"> <li>medical technology industry to continue developing more accurate, affordable and innovative testing technologies</li> <li>GP software providers to support embedding of blood pressure testing within clinical protocols</li> </ul>
<p>NB: Categories are taken to include representative/umbrella organisations. Healthcare sections will often also apply beyond primary medical care (for example to pharmacy and the allied health professions). Many actions would best be carried out through a partnership of bodies, and are not restricted to the main group identified.</p>	

### Areas of interest for further research and innovation

- better linkage of blood pressure readings (wherever obtained) to patient records and for follow-up
- opportunities, in the English context, to harness expert volunteers to deliver high-quality testing and education on results interpretation
- home testing as an approach for detection of high blood pressure (rather than diagnosis confirmation or ongoing management)
- models for ambulatory blood pressure monitoring outside of primary medical care or secondary care



## Investigation, treatment and care

**Over ten years, an estimated 7,000 quality adjusted life years could be saved, and £120m not spent on health and social care, if England achieved a 15% increase in the proportion of adults on treatment controlling their blood pressure to 140/90mmHg or below.<sup>134</sup>**

### Background

Primary care is central to the management of hypertension, with multiple opportunities to test and adjust treatment recommendations (lifestyle and/or drug therapy). Currently, initiation of treatment and blood pressure management decisions most frequently take place in general practice (involving GPs and wider practice staff), while wider primary care (in particular pharmacy) plays a role supporting adherence and medicines optimisation.

Latest NICE guidelines recommend lifestyle interventions for all patients with high blood pressure. NICE recommend initiation of drug therapy for clinic readings above 160/90mmHg, unless there is evidence of target organ damage, CVD risk of more than 20% in ten years, or established diabetes, cardiovascular or renal disease, in which case intervention should start at lower blood pressure levels.<sup>135</sup>

Lifestyle changes are important as a precursor to treatment and alongside drug therapy. With good adherence levels, reduction in blood pressure similar to that caused by some medicines can be achieved (particularly from weight reduction, physical activity, and a calorie-balanced diet, low in salt and rich in fruit and vegetables).<sup>136</sup> Impact can also be rapid, for example salt reductions can lower blood pressure within four weeks.<sup>137</sup> Evidence on emerging non-dietary alternative lifestyle changes (such as device guided breathing and tailored exercise regimes) is also gathering.<sup>138</sup>

Where it is appropriate, drug therapy for high blood pressure has been proven to reduce CVD morbidity and mortality.<sup>139</sup> Recommended approaches to management of high blood pressure and control targets have changed significantly over the last 20 years. Latest NICE guidance lowered the targets for blood pressure control, and set out a clear four step approach to incremental drug treatment, with renin-angiotensin system blockers and calcium-channel blockers the mainstays of treatment (rather than diuretics and beta blockers, as in previous years).<sup>140,141</sup> Around 80% of people require two or more anti-hypertensive agents to achieve blood pressure control<sup>142</sup>, and some need up to four agents. The rationale for increasing the number of agents rather than the dose is that the peak effect on blood pressure is at low to medium doses and hence side effects are kept to a minimum.

It is estimated that between 50-80% of patients with high blood pressure do not take all of their prescribed medicine.<sup>143,144</sup> Adherence with lifestyle modifications is lower than drug therapy by between 13% and 76%.<sup>145</sup> Misconceptions, particularly the view that there will be clear outward symptoms of high blood pressure, are still common.<sup>146,147</sup>

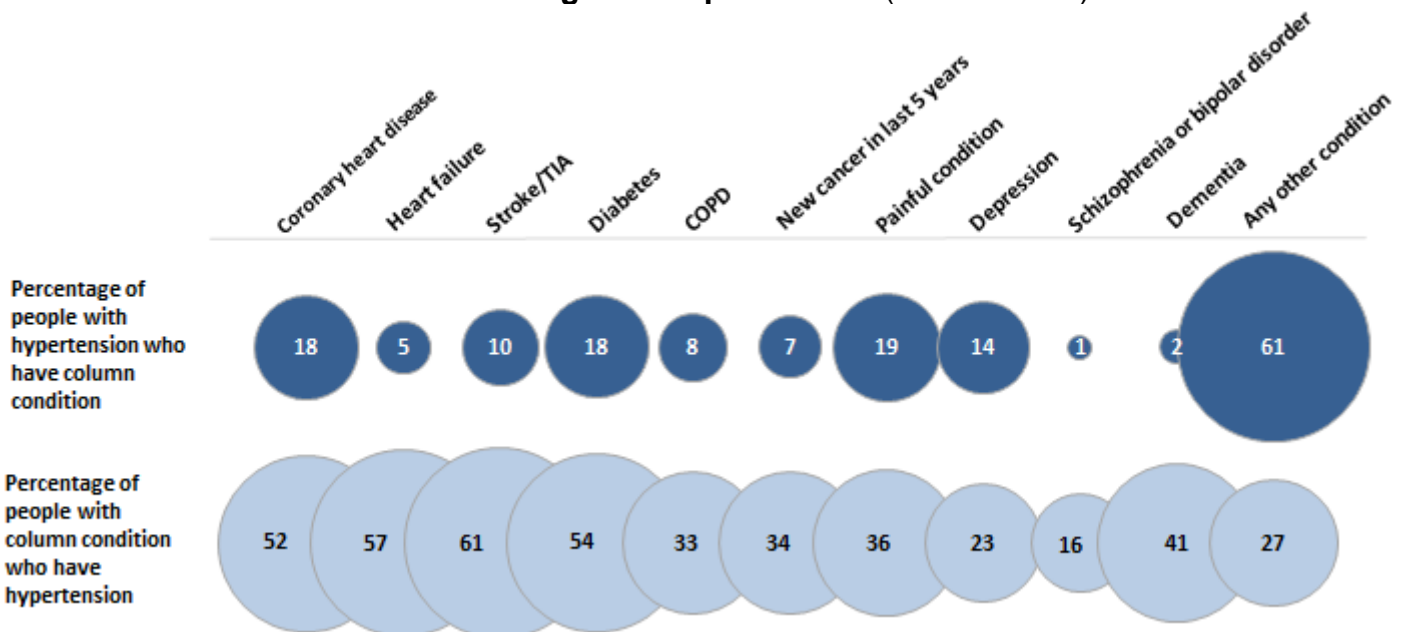
For adults under 80 years with treated high blood pressure, NICE set a treatment target of 140/90mmHg (although it is notable that financial incentives to general practice through the Quality and Outcomes Framework are not currently aligned, as they reward a less stringent control level of 150/90mmHg). In terms of cardiovascular risk, consensus is that treatment should focus on management of systolic blood pressure.<sup>148</sup>

A key aim of high blood pressure management is to prevent end organ damage. NICE recommends investigation of target organ damage and CVD risk in assessing patients with suspected high blood pressure. People with high blood pressure are 2.5 times more likely to develop end stage renal disease than non-hypertensives.<sup>149</sup>

Management of high blood pressure in the elderly (older than 80 years) needs special consideration due to the increased likelihood of postural hypotension (which raises risk of cardiovascular mortality, and of falls), since diastolic blood pressure falls after age 60 while systolic blood pressure in untreated populations continues to rise.<sup>150</sup>

High blood pressure very frequently accompanies other conditions, suggesting blood pressure will be relevant to most clinicians regardless of speciality.

**Comorbidities with high blood pressure<sup>151</sup> (Scottish data)**



Tackling inequalities in the management of high blood pressure will also help reduce the social gradient in common complications of high blood pressure:



### Inequalities in high blood pressure and common complications<sup>152</sup>

Prevalence		Socioeconomic gradient	
		Lowest income/most deprived	Highest income/least deprived
High blood pressure	Men	34%	26%
	Women	30%	23%
Cardiovascular disease	Men	22%	15%
	Women	21%	13%
Coronary heart disease	Men	11%	5%
	Women	5%	2%
Stroke	Men	6%	2%
	Women	5%	2%

### Performance to date

Metric	Trend	Data (England) 2011 <sup>153</sup>	Comparators <sup>154</sup>		
			England (2006)	US (2007-10)	Canada (2007-9)
% with high blood pressure ( <i>diagnosed or undiagnosed</i> ) who are on treatment	Improved	58%	51%	74%	80%
% with high blood pressure ( <i>diagnosed or undiagnosed</i> ) achieving BP <140/90mmHg	Improved	37%	27%	53%	66%
% with high blood pressure ( <i>diagnosed and on treatment</i> ) achieving BP <140/90mmHg	Improved	63%			
% on two or more hypertensive drugs		55%	~80% for optimum control <sup>155</sup>		

Metric	Trend	Data (England) 2012/13
% of recently-diagnosed hypertensives receiving a CVD risk assessment with a risk assessment tool <sup>156</sup>	Not known	71%
% with high blood pressure ( <i>diagnosed or undiagnosed</i> ) with CVD risk > 20% whose BP is controlled <sup>157</sup>	Not known	24%
% receiving lifestyle advice on first diagnosis of high blood pressure <sup>158</sup>	Not known	80%

Improvements in high blood pressure drug therapy between 2000-2007 accounted for 5% of the total fall in CHD deaths in the UK.<sup>159</sup> However, performance still falls considerably short of some international achievements – of all those with high blood pressure (diagnosed or undiagnosed) only 37% are controlled compared to 53% in the US and 66% in Canada.<sup>160</sup>

Assessment of ten year CVD risk is low (around one in three do not receive this) and of those deemed high CVD risk the control levels are poor (24% among all people with high blood pressure, and the numbers remain poor, 42%, among those under treatment).

There is still high variation in practice (for example, there is a variation of 230% between the highest and the lowest achieving practice on the even less stringent treatment target of 150/90mmHg),<sup>161</sup> suggesting the lack of a whole system organisational response.

## Vision and priorities

### Key approaches :

1. **Local leadership and action planning for system change:** Partners working together to reduce variation and improve outcomes for all, in particular:
  - a. Providing system leadership (with primary care engagement and ownership at the heart) with clarity of messages about treatment targets and incentives aligned to these.
  - b. Highlighting variation in care and outcomes, as well as costs and impacts of high blood pressure across the whole pathway.
  - c. Developing models of co-ordinated, personalised care, particularly for individuals with co-morbidities.
  
2. **Support health professionals to focus on key clinical challenges** to achieving blood pressure control, building education, training, tools, leadership and incentives in line with NICE guidance, especially for:
  - a. Using the registered population list to implement rigorous call and review systems.
  - b. Prescribers and dispensers providing advice on lifestyle changes alongside prescribing.
  - c. Control among those with high CVD risk.
  - d. Prescribers feeling confident to intensify treatment using the stepped approach proposed by NICE by adding in additional classes of drugs.
  
3. **Support individuals' adherence to anti-hypertensive drug therapy and lifestyle advice:** Building and monitoring patient activation, with particular emphasis upon:
  - a. Wider use of self-monitoring.
  - b. Pharmacy support for improving the use of medicines.

## Discussion

Our consensus has been formed after considering which measures have the best combination of:

- potential to increase the proportion of people with high blood pressure who achieve a systolic blood pressure of 140mmHg or less and reduce end organ damage
- practicability
- cost efficiency
- potential to reduce inequalities

## Health care

Each patient's treatment plan will be different and should include lifestyle changes, as well as drug therapy where necessary. This advice is covered in more depth in NICE hypertension guidance.<sup>162</sup> This discussion focuses on the methods to support efficient and effective implementation of this guidance.

The interventions review commissioned to inform this plan looked at range of initiatives over and above standard care. Health lifestyle improvement interventions became cost effective within five years and potentially cost-saving to health and social care within ten years. Other categories of study showed wider variation, but typically intensive work on drug adherence became cost saving within a lifetime (by 40 years), and self-management support programmes were cost effective over the same period. Other intensive primary care interventions above standard care showed poorer results.<sup>163</sup> However, in considering different approaches it is clear that dividing responsibility across the practice staff team (including nurses and healthcare assistants) and, if appropriate, to wider primary care partners such as pharmacy, can be a key to higher cost-effectiveness. We also suggest it is possible to improve outcomes with less intensive (and thus less costly) interventions than those which met the criteria for formal inclusion in the interventions review.

A Cochrane review<sup>164</sup> showed that the key to improving blood pressure control was by primary care providing a programme of regular call and recall with vigorous anti-hypertensive drug therapy following a step-wise approach to increasing medicine as required to meet treatment targets. This led to an additional 8mmHg reduction in systolic blood pressure compared to usual care, which was sustained over time. Clinical decision support systems can aide this, improving clinical practice by up to 94%<sup>165</sup> if they are integrated as part of the clinician workflow to provide live recommendations.

Two recent UK trials (both using mobile phones as a tool) supported tele-monitoring as an effective method for achieving clinically important reductions in blood pressure in patients with uncontrolled high blood pressure in primary care settings.<sup>166,167</sup> There are a range of telehealth solutions available, including the NHS' own initiative "Florence".<sup>168</sup>

Pharmacies are increasingly demonstrating their ability to support effective blood pressure control with studies suggesting improved medicine adherence as well as reductions in blood pressure levels as a result of pharmacist interventions.<sup>169,170</sup> English pharmacies already offer the new medicine service (aimed at increasing patients' adherence with new medicines). Pending regulatory changes, high blood pressure is to be added to the conditions for targeted medicine use reviews (for patients on multiple medicines, to improve knowledge and identify any problems with the medicines). There could be further opportunities to use the capacity and skills in pharmacy to improve blood pressure control levels.

Reflecting that high blood pressure is very frequently found alongside other long-term conditions, person-centred, coordinated care is important. Future models of care can help achieve improvement for the patient, and have the potential to achieve cost savings. NHS England has adopted the House of Care model.<sup>171</sup> There are many current programmes, funds and initiatives which offer a chance to build these principles into services, from information sharing to integrated care pioneers. One specific radical model of integration is that of Accountable Care Organisations<sup>172</sup> – while their implementation has been varied (and seen mixed success) in the US, they offer inspiration for the future about potential levers for coordinated care.

### **The patient**

The likelihood of the patient keeping to their treatment plan is determined by a number of factors including their confidence, understanding of information provided, empowerment, participation in decision making and the degree to which questions and concerns are addressed.

These factors are encapsulated in the concept of patient activation, which can be measured (Patient Activation Measure – PAM) using a 13 item validated questionnaire that stratifies people into four levels of activation. There is good evidence that higher levels of activation are associated with better health outcomes, and that interventions to improve PAM scores also lead to better outcomes.<sup>173</sup> We briefly discuss some approaches to achieve better activation and adherence in patients with high blood pressure.

Shared decision making between the clinician and the patient is an ethical imperative<sup>174</sup>, and evidence suggests engaged patients typically select less expensive treatment or self-management support options than where clinicians decide alone.<sup>175</sup>

NICE medicines adherence guidance<sup>176</sup> explains that clinicians need to identify the specific perceptual and practical barriers to adherence for a given individual. Although evidence supporting specific interventions is inconclusive, where there is a specific need identified, NICE suggest clinicians do seek to respond to this with tools such as patient record-keeping of medicine taking, simplifying dosing regimen or using a multi-compartment medicines system. There can be a significant role for pharmacy alongside general practice in supporting adherence. The interventions review carried out to support this plan identified several examples of adherence interventions which proved cost-effective to the health and social care system over a lifetime.<sup>177</sup>

Particularly of note is the role for self-monitoring of blood pressure. Validated monitors suitable for use at home are available at low cost.<sup>178</sup> A Cochrane review suggest that self-monitoring of blood pressure is associated with moderate net reductions in both systolic blood pressure (around 2.5mmHg).<sup>179</sup> As such this is an important adjunct to clinical care which should be encouraged.

## System improvement

The system leadership board looked in particular to the experience of Canadian colleagues who have overseen a very marked improvement in performance on high blood pressure.<sup>180</sup> The lessons from their programme (notably a rigorous focus on knowledge translation, reviewing guidelines and outcomes, with a significant leadership cohort built across a broad group of primary care staff – GPs, nurses and pharmacists) are embedded across this plan.

The NHS change model<sup>181</sup> has been developed as a shared approach to leading change and transformation. In particular, the improvement methodology<sup>182</sup> identifies a host of evidence-based resources, which will support a range of circumstances.

The system leadership board looked at the work of some key thinkers in translation science, to provide insight on approaches for translating evidence into practice in complex systems.<sup>183,184</sup> Some themes were clear:

- there is no single solution and what works in one place may not work elsewhere – context needs to be taken into account down to the level of micro-cultures within teams. Context is also important at a macro-level such as financial incentives, national leadership etc.
- when context is taken into account, multi-factorial changes are more successful than single interventions
- both individual and organisational approaches are needed. Individual adoption of new practices leads to variation in care that is usually not sustainable while organisational approaches without engagement of the individual leads to patchy implementation

To explore one intensive example, Robson and colleagues in Tower Hamlets applied translational science to the implementation of a system of managed clinical networks across all primary care teams in 2009. The aim of these networks was to improve four areas of clinical practice – cardiovascular disease, diabetes, COPD and immunisations.<sup>185, 186</sup> Practices were allocated to small groups with a network manager, educational budget and financially-incentivised attainment targets for the network as a whole to meet, monitored on a monthly basis. Change champions (including GPs) led educational engagement with multi-disciplinary teams (including practice nurses, practice managers, receptionists, GPs, prescribing advisors, consultants). This was underpinned by local clinical effectiveness guidelines which fitted the local context, introduction of computerised decision prompts and introduction of standard recall audits in each practice and regular timely feedback of performance.

The introduction of the managed clinical networks was associated with moving from the bottom national quartile of performance to the top national quartile in three years across a range of outcomes. In high blood pressure there was a 10% increase in high blood

pressure prescribing, and an improvement of 6% in reaching the target of less than 150/90mmHg for those on hypertension registers (compared to less than 2% improvement in England overall) and an 18% point greater reduction in CHD mortality (45% in Tower Hamlets versus 25% nationally) over three years. This specific approach used in Tower Hamlets may not be suitable for all other areas, but it highlights how a model of translation science ('Diffusion into Practice' implementation)<sup>187</sup> can shape a multi-factor approach where each part of the approach reinforces the rest.

Given the majority of patients being treated for high blood pressure have one or more other long term conditions, drawing the connections in treatment approaches and outcomes with major connected issues such as coronary heart disease and diabetes is key.

### How different groups can contribute

This listing proposes key roles and activities which different groups are encouraged to take up, based upon evidence and the experience of those involved in developing this plan.

Cross-cutting	<ul style="list-style-type: none"> <li>ensure services and interventions are accessible and appropriate to those at higher risk and those living in low income households and in deprived areas</li> <li>consider building blood pressure into joint strategies (such as Joint Strategic Needs Assessments and Health and Wellbeing Strategies)</li> <li>develop collaborative local leadership and action planning for improvement in the (detection and) management of high blood pressure</li> </ul>
Local government (officers and elected members)	<ul style="list-style-type: none"> <li>commission services to support risk assessment, awareness and management – including weight management, healthy eating and alcohol services</li> <li>public health teams work directly with local communities, neighbourhoods, and primary care to ensure that initiatives are accessible to those who need them most, and deliver sustainable programmes that work with community assets to deliver effective long-term results.</li> <li><i>also relevant are the population-level health improvement actions set out in the prevention chapter</i></li> </ul>
Healthcare commissioners	<ul style="list-style-type: none"> <li>promote and support clinical leadership for improvement by GPs, nurses and pharmacists</li> <li>support whole system action planning for the primary care system to implement NICE guidance particularly in terms of step-wise treatment increasing number of agents and lifestyle changes to reach control with regular review of hypertensive patients. Ensure in particular a catch-up plan for full assessment and initiation of blood pressure treatment in those at high CVD risk<sup>188</sup></li> <li>CCGs to consider the case for local investment in enhanced community pharmacy services to provide better information and support about blood pressure management; to use the Medicine Use Review and New Medicines Service to support blood pressure management; and to introduce opportunistic screening in some areas</li> <li>embed management of high blood pressure within communications about long term conditions given its prevalence in these groups</li> <li>support use of the Patient Activation Measure, and commission services in response to findings to raise activation<sup>189, 190</sup></li> <li>support spread of good practice in primary care of minimising exception reporting for people with high blood pressure, and optimising access to care of people from marginalised or disadvantaged groups</li> </ul>
Healthcare providers, practitioners and	<ul style="list-style-type: none"> <li>undertake regular practice-level audit of blood pressure control levels and supporting metrics (eg, prescription data), in order to ensure consistent and effective treatment<sup>191</sup></li> </ul>

professional organisations	<ul style="list-style-type: none"> <li>pharmacy to maximise opportunities to provide ancillary support to general practice in supporting effective management (including monitoring, medicine and adherence review, lifestyle advice)<sup>192</sup></li> <li>give patients opportunities to participate in decision-making on treatment and provide information and explanation to support compliance<sup>193</sup></li> <li>professional organisations: promote clinical leadership, education and training in primary care for the (detection and) optimal treatment of high blood pressure</li> </ul>
Individuals and families	<ul style="list-style-type: none"> <li>self-monitor blood pressure levels regularly to assess success in managing the condition, raising any major changes or difficulties with a clinician</li> <li>discuss with their clinician any barriers encountered to adherence with drug therapy or lifestyle changes (from side effects or difficulty maintaining routines) so that these can be addressed<sup>194</sup></li> </ul>
Voluntary and community sector	<ul style="list-style-type: none"> <li>provide high-quality patient information materials and sources of advice and support to those managing/monitoring their own high blood pressure, particularly ensuring these are accessible and comprehensible to a diverse audience</li> </ul>
National government, agencies and public bodies	<ul style="list-style-type: none"> <li>PHE: support and coordinate system leaders to improve performance in management of high blood pressure</li> <li>PHE: provide performance data and analysis tools</li> <li>NHS England: consider in leadership of performance measures and incentives for clinical practice, how to best support effective management of high blood pressure</li> </ul>
Employers	<ul style="list-style-type: none"> <li>offer high-quality workplace blood pressure testing to staff (options might be as part of a health check or induction, self-service machines or kiosk, or sign-posting to other providers)</li> </ul>
Other	<ul style="list-style-type: none"> <li>cross-cutting: all local partners to come together to support action planning for a coherent approach to reduce variation and improve outcomes</li> <li>cross-cutting: identify champions who can spread clear information and training – a well-informed leadership group (may be GPs, CCG leaders...)</li> <li>clinical software firms and system providers to integrate support for effective management of high blood pressure into clinical systems and decision support tools</li> </ul>
<p>NB: Categories are taken to include representative/umbrella organisations. Healthcare sections will often also apply beyond primary medical care (for example to pharmacy and the allied health professions). Many actions would best be carried out through a partnership of bodies, and are not restricted to the main group identified.</p>	

### Areas of interest for further research and innovation

- the contribution from, and techniques for, effective clinical and public health leadership
- most effective techniques to support medicine and lifestyle adherence (to include consideration of behavioural insights)
- role of employers in supporting better management



## Supporting actions

We are delighted that stakeholders across the health system have come together to take action on blood pressure. Below we set out commitments for the near future – 2014-16. These are categorised by whether they apply across the whole pathway (cross-cutting) or sit under one of the three strands (prevention, detection, or investigation, treatment and care).

Our system leadership group includes clinician and local representation, but the actions below are focused upon national actions which we hope are of benefit across England. This is not to diminish the important local action taking place across local government, the NHS and wider partners – as set out throughout this plan, it is clear that locally led and supported change is vital.

We recognise further action is possible and desirable, and wider partners not listed have much to contribute. But these commitments show how we are starting to take forward action to achieve better outcomes in relation to high blood pressure.

### Cross-cutting

British Hypertension Society	<ul style="list-style-type: none"> <li>develop a hypertension diploma covering latest developments in clinical practice, and the science underpinning current guidelines</li> </ul>
DH	<ul style="list-style-type: none"> <li>promote and advocate for improvement in performance across high blood pressure as part of strategic leadership on reducing avoidable mortality</li> <li>consider any opportunities to take forward areas for further research and innovation, including behavioural insights approaches</li> </ul>
Health Education England	<ul style="list-style-type: none"> <li>contribute towards education and training issues identified – specifically through the behaviour change and pharmacy consultation skills workstreams, and considering opportunities within HEE's workforce</li> </ul>
Royal College of General Practitioners	<ul style="list-style-type: none"> <li>partner with the newly established Primary Care CVD Leadership Forum and other professional groups, to build the strength and coordination of primary care leadership in cardiovascular disease and to support improvements in prevention, detection and optimal treatment of hypertension as a high priority</li> <li>provide professional support for members in raising standards and reducing variation in quality of primary care, in relation to high blood pressure</li> </ul>
Pharmacy Voice	<ul style="list-style-type: none"> <li>sponsor a group of senior pharmacy stakeholders to develop a response from the sector to this initiative – early outputs could include consensus statements, baseline data collection, best practice research, and specific member actions</li> <li>adopt high blood pressure as a theme for Pharmacy Voice's public campaign programme in 2015, with a particular focus on pharmacy's role in increasing testing and supporting the better use of prescribed medicines</li> </ul>
NHS Choices	<ul style="list-style-type: none"> <li>refresh site blood pressure content informed by the themes in this document, and promote new pages to raise public understanding</li> </ul>
NHS England	<ul style="list-style-type: none"> <li>deliver the long-term commitment to prevention as set out in the NHS Five Year Forward View</li> </ul>



	<ul style="list-style-type: none"> <li>work with PHE to make the case to CCGs to invest in locally commissioned community pharmacy services to provide better information and support about blood pressure management, to introduce opportunistic screening, and to refer patients to their regular community pharmacy for a medicine use review to review the blood pressure of those on anti-hypertensives and others at high risk of hypertension</li> </ul>
NHS Improving Quality	<ul style="list-style-type: none"> <li>explore opportunities to support service improvement, through the spread and implementation of sector best practice in relation to high blood pressure</li> </ul>
NICE	<ul style="list-style-type: none"> <li>support system partners in the implementation of the related NICE guidance and quality standards through development and endorsement of implementation tools and resources, including collecting and disseminating NICE shared learning examples</li> <li>work towards collating and publishing information on the uptake of guideline recommendations and quality standard statements</li> <li>review and uptake of related NICE guidelines and standards in line with NICE's policy</li> </ul>
Public Health England	<ul style="list-style-type: none"> <li>continue supporting the Blood Pressure System Leadership board to, and dedicate resource to, delivering the next phase of our ambition on blood pressure</li> <li>ongoing development of resource hub to support local leadership</li> <li>action learning events to support implementation of the plan locally</li> <li>map and enable scrutiny of local performance data on detection of high blood pressure via healthier lives atlas</li> <li>support translation of interventions cost-effectiveness review outputs</li> </ul>

## Prevention

Blood Pressure UK	<ul style="list-style-type: none"> <li>develop and update resources to support healthy lifestyle behaviours, including working with Consensus Action on Salt and Health and PHE to drive use of the FoodSwitch mobile app</li> </ul>
British Heart Foundation	<ul style="list-style-type: none"> <li>deliver activity as part of 2014-2020 strategic ambition on prevention including a spotlight on blood pressure as a risk factor</li> </ul>
DH	<ul style="list-style-type: none"> <li>continue to build and strengthen the Public Health Responsibility Deal, in particular continuing to review the case for more ambitious pledges, and driving sign up to the updated salt pledges</li> </ul>
LGA	<ul style="list-style-type: none"> <li>highlight blood pressure as part of ongoing programme promoting good practice and supporting local authorities in their public health function</li> <li>promote the opportunity for local government procurement in helping to reduce high blood pressure, in particular through adoption of Government Buying Standards for Food and Catering Services</li> </ul>
NHS England	<ul style="list-style-type: none"> <li>deliver an action plan on 'making every contact count' to support proactive conversations in the healthcare system to promote healthy lifestyle, including:             <ul style="list-style-type: none"> <li>promoting clinical leadership</li> <li>developing the learning and evidence base on NHS contributions to 'making every contact count'</li> <li>supporting integration of NICE behavioural change guidance into services commissioned by NHS England and CCGs</li> </ul> </li> <li>working with DH, PHE, and HEE on the education, training and development of all health and social care professionals on behavioural change</li> </ul>
Public Health England	<ul style="list-style-type: none"> <li>lead on national social marketing approaches to health improvement – both existing campaigns (including a Change4Life focus on healthy eating in New Year 2015) and through development of a new lifestyle focused programme specifically for mid-life adults</li> <li>ongoing national social marketing activity, including Change4Life focus on healthy eating (New Year 2015)</li> </ul>

	<ul style="list-style-type: none"> <li>• diet and obesity programme, including support to local authorities and partners on diet evidence and messages (including on links to high blood pressure); support in best procurement of weight management services; whole systems approach to obesity prevention]</li> <li>• pursue Everybody Active Every Day physical activity programme, leading action with national and local partners across 4 strands to: create a social movement; activate networks of expertise; create environments for active lives and scale-up interventions that make us active</li> <li>• prevent and reduce the harmful effects of alcohol, through a work programme including setting out evidence-based policies, prevention and treatment interventions for government, local authorities and the NHS, to enable partners to invest with confidence</li> <li>• reducing smoking and stopping children starting by: stimulating quit attempts through smokefree campaigns; promoting and supporting effective local commissioning; and supporting NHS mental health and secondary care services to become smoke-free</li> <li>• Healthy People Healthy Places programme, including work to reduce the obesogenic environment</li> <li>• general advice and tools for commissioning of health and wellbeing interventions</li> </ul>
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### **Detection**

Blood Pressure UK	<ul style="list-style-type: none"> <li>• pursue and look at opportunities to grow the Know Your Numbers testing initiative</li> </ul>
NHS England	<ul style="list-style-type: none"> <li>• delivering an action plan on improving patient management following an NHS Health Check, including promoting clinical leadership</li> <li>• exploring tools and resources to support NHS England and CCGs commission for better clinical follow up to NHS Health Check</li> <li>• CQUIN (financial incentive) aimed at promoting screening and management of physical health risks in people with psychosis</li> </ul>
Public Health England	<ul style="list-style-type: none"> <li>• make available a campaign toolkit for local use/adaptation based on the Blood Pressure Drop In pilot held in Wakefield in 2014, including medical protocols, marketing materials and learning points from the evaluation of that pilot.</li> <li>• refresh hypertension disease prevalence modelling</li> <li>• carry out and evaluate staff pilot for detection of high blood pressure</li> <li>• support local partners delivering the NHS Health Check programme to uptake and improve quality, including: deliver a sector-led improvement programme; develop a behavioural insight network</li> </ul>
Stroke Association	<ul style="list-style-type: none"> <li>• pursue and look at opportunities to grow the Know Your Blood Pressure testing initiative</li> </ul>

### **Investigation, treatment and care**

British Heart Foundation	<ul style="list-style-type: none"> <li>• best practice sharing around high blood pressure management as part of ongoing programmes of engagement with health professionals</li> <li>• piloting the House of Care model to enhance the quality of life for people with long term conditions, including hypertension</li> </ul>
Medicines Optimisation Team, Keele University	<ul style="list-style-type: none"> <li>• seek funding to update and promote the primary care decision support tool for management of high blood pressure, in line with NICE guidelines</li> </ul>
NHS England	<ul style="list-style-type: none"> <li>• developing learning through pilots of the Patient Activation Measure</li> <li>• roll out of Lester tool to give people with mental health better care in relation to cardiac health</li> </ul>
Public Health England	<ul style="list-style-type: none"> <li>• support World Health Organisation hypertension mHealth initiative, as part of PHE's role as a digital collaboration centre</li> </ul>

## Next steps

This system wide approach to tackling high blood pressure is a new effort – the publication of this plan is just the start of this focus. We hope that the material in this plan will encourage partners to take action at all levels. In terms of national work on blood pressure, we will continue to pursue this agenda and work to provide support to local leaders.

PHE, working with and reporting to the Blood Pressure System Leadership Board, is committed to supporting and tracking progress. The full scope of our next phase of work on blood pressure is in development, however, this will include:

### Promotion and engagement

- PHE and partners will disseminate and promote the plan among our networks, and we invite colleagues from across the health and care system to do the same – critically, this will include advocating for the roles and interventions set out in “how different groups can contribute” sections across this plan
- PHE and partners will look for other opportunities (including via professional and public media, and through events) to share messages and insights from this work

### Supporting local action

- As part of its commitment to support local leadership on blood pressure, PHE has created a **resource hub** which provides practical guidance and tools to help local areas tackle high blood pressure. This will be updated on an ongoing basis.
- PHE has local centres and regions which are partners in the local public health system, bringing high quality expertise and advice to local areas. Areas are invited to approach their local PHE centre for support and connections in relation to work on blood pressure. The national programme team will work closely with local PHE teams, and is happy to hear directly from people who would like to discuss their activities relating to high blood pressure. Please contact [bloodpressure@phe.gov.uk](mailto:bloodpressure@phe.gov.uk)
- PHE is testing at small scale an action learning approach to bringing the work and expertise underpinning the plan to directly support groups of local partners to tackle the particular issues in the blood pressure pathway in their area.

### Monitoring progress

- PHE will monitor progress against the specific actions in the plan twice yearly
- PHE will monitor England's performance in terms of population blood pressure, detection levels, high blood pressure management and health inequalities, on an annual basis (or as frequently as data are refreshed)
- PHE will canvas feedback on this plan and its supporting resources, to inform us as to the reach and impact of this work, and to inform future work

## Glossary

**Adherence** = the extent to which a person's behaviour (taking medication, following a diet, and/or executing lifestyle changes) corresponds with agreed recommendations from a health care provider

**AF** = atrial fibrillation, a heart condition that causes an irregular and often abnormally fast heart rate

**Ambulatory monitoring** = blood pressure is measured over a 24-hour period, using a monitor. The monitor typically takes a reading every 20 minutes but less frequently (once an hour) at night

**BMI** = body mass index, a measure of body fat based on height and weight

**CCG** = clinical commissioning group

**CHD** = coronary heart disease, when the heart's blood supply is blocked or interrupted by a build-up of fatty substances in the coronary arteries

**CKD** = chronic kidney disease, progressive loss in kidney function over a period of months or years

**Comorbidity** = the presence of one or more additional diseases co-occurring with a primary disease

**COPD** = chronic obstructive pulmonary disease, an umbrella term for people with chronic bronchitis, emphysema, or both, where the airflow to the lungs is restricted

**CQUIN** = Commissioning for Quality and Innovation, a payment framework enabling commissioners to reward excellence by linking a proportion of English healthcare providers' income to the achievement of local quality improvement goals

**CVD** = cardiovascular disease

**“DASH” diet** = dietary approaches to stop hypertension, a specific research-based eating plan which is designed to lower blood pressure

**DH** = Department of Health

**Diastolic blood pressure** = the pressure in the arteries between heartbeats (when the heart muscle rests between beats and refills with blood). This is the second, and lower, number in a blood pressure reading

**HEE** = Health Education England

**JSNA** = Joint Strategic Needs Assessment, an analysis of the health needs of populations to inform and guide the commissioning of health, well-being and social care services within a local authority area

**Life years lost to disease** = the number of years lost to a disease, taking into account the age at which deaths occur, by giving greater weight to deaths at younger age and lower weight to deaths at older age

**Medicines management** = a system of processes and behaviours that determines how medicines are used by the NHS and patients

**NICE** = National Institute for Health and Care Excellence

**Pre-hypertension** = blood pressure which is raised, but not high enough to classify as hypertension (commonly defined as 120/80mmHg to 139/89mmHg)

**Prevalence** = the total number of cases of a disease in a given population at a specific time

**PHE** = Public Health England

**QALY** = quality-adjusted life-year, a measure which takes into account both the quantity and quality of life generated by healthcare interventions. It is calculated using life expectancy and a measure of the quality of the remaining life-years

**QOF** = Quality and Outcomes Framework, the annual reward and incentive programme detailing GP practice achievement results

**Systolic blood pressure** = the pressure in the arteries when the heart beats (when the heart muscle contracts). This is the first, and higher, number in a blood pressure reading

## Annex: Economic scenario information

As part of a wider cost-effectiveness **review** carried out by Optimity Matrix, published in parallel with this plan, we demonstrate potential impacts from specific levels of improvement in the prevention, detection and management of high blood pressure.

This modelling estimates the “size of the prize” in terms of health outcomes and costs to health and social care. It is based upon assessing the costs related to coronary heart disease, stroke, chronic kidney disease and vascular dementia which would be avoided from the improvements to high blood pressure.

Note the figures here assume the change is effective from year zero, and do not specify or allow costs for specific interventions which may be needed to achieve the change. All figures relate to England. Full methodology details are within the Optimity Matrix **report**.

### Population change: 5mmHg reduction to average population systolic blood pressure

	1 year	5 year	10 year	Lifetime
<b>Quality Adjusted Life Years saved</b>	11764	21274	45663	130036
<b>Health care costs avoided</b>	£25,992,749	£213,582,217	£795,153,693	£3,517,404,798
<b>Social care costs avoided</b>	-	-	£60,443,345	£941,560,707
<b>Life years savings</b>	-	-	-	139154

### Improved detection: 15% increase in proportion of adults who have had their blood pressure diagnosed

	1 year	5 year	10 year	Lifetime
<b>Quality Adjusted Life Years saved</b>	710	3317	7290	22727
<b>Health care costs avoided</b>	£7,126,898	£33,304,559	£112,234,662	£568,598,147
<b>Social care costs avoided</b>	£0	£0	£11,031,755	£169,706,192
<b>Life years savings</b>	-	-	-	22142

### Improved management: 15% increase in proportion of adults on treatment controlling their blood pressure to 140/90mmHg or below

	1 year	5 year	10 year	Lifetime
<b>Quality Adjusted Life Years saved</b>	718	3356	7375	22993
<b>Health care costs avoided</b>	£7,210,351	£33,694,542	£113,548,885	£575,256,205
<b>Social care costs avoided</b>	£0	£0	£11,160,932	£171,693,384
<b>Life years savings</b>	-	-	-	22401

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