



ONE IN TEN THE MALE DIABETES CRISIS

Report written by Peter Baker
November 2017





MEN'S HEALTH FORUM

The Men's Health Forum is the independent voice for the health and wellbeing of men and boys in England, Scotland and Wales.

- > **OUR MISSION:** to improve the health of men and boys.
- > **OUR AMBITION:** that all men and boys – particularly those in the most disadvantaged areas and communities – will have the information, services and treatments they need to live healthier, longer and more fulfilling lives.
- > **OUR WORK:** we carry out research, raise awareness, work to change health policy, share and encourage good practice, work with other charities and provide health information to men off and online.

One man in five dies before the age of 65. TOGETHER we can change that.

One In Ten: The Male Diabetes Crisis
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1 IN 10

A diabetes crisis is unfolding in the UK and men are the worst affected. One man in 10 now has Type 1 or Type 2 diabetes and a tripling in the incidence of diabetes in middle-aged men has been predicted for the next 30 years.

Men are more likely to be overweight and to develop Type 2 diabetes than women and especially so at younger ages and lower average weights. They are more likely to suffer the complications of diabetic retinopathy and foot ulcers and to have a limb amputation. They are more likely to die, and to die prematurely, as a result of diabetes.

The sex inequalities in diabetes have not yet been fully recognised by health policymakers and practitioners. More attention must urgently be paid to engaging men in diabetes prevention, early diagnosis and improving care and treatment delivery.

Specifically, men must be better engaged in NHS Health Checks, routine eye tests, weight management programmes, and diabetes education programmes. The new National Diabetes Prevention Programme must be designed and delivered in ways that appeal to men.

This report shows that taking account of sex- and gender-specific needs and challenges really matters in tackling the diabetes crisis. It is time now for the health system to act and tackle the gaps affecting both men and women.

INTRODUCTION

It is estimated that 4.5 million people are now living with diabetes in the UK. 3.5 million of these have been diagnosed and one million are so far undiagnosed.¹ In the past 20 years, the number of people with diabetes has more than doubled and, on average, around 700 more cases are diagnosed every day.

Diabetes has been described by Diabetes UK and others as an epidemic and a national health emergency with profound consequences for the individuals and families affected, communities, workplaces and the health and social care system.

As well as developing better treatment and care for those affected, effective prevention and early diagnosis are also of vital importance. Sex and gender have, to date, not received sufficient attention in diabetes policy and professional practice. This report describes how diabetes impacts on the half of the population who are male and the challenges and opportunities currently facing men and boys as well as the health and other professionals who work with them.

INCIDENCE AND PREVALENCE

Being male is undoubtedly a major risk factor for diabetes. Diabetes affects more males than females in the UK. One man in 10 (9.6%) now has Type 1 or Type 2 diabetes, according to Public Health England.² This compares to 7.6% of women, a 26% difference. The prevalence of diabetes in men in England more than doubled between 1994 and 2015.³ National Diabetes Audit data for England and Wales in 2015-16 shows that over 1.5m males and about 1.2m females had diabetes; the respective proportions were 56% and 44%.⁴ The male:female ratio was very similar for Scotland in 2015.⁵

Both Type 1 and Type 2 diabetes are more common in males. Type 1 diabetes, which accounts for about 10% of all cases of the disease, is more common in males of all ages below 80. 57% of all cases of Type 1 diabetes in England and Wales were male in 2015-16.⁴ Prevalence rates were highest in the 45-54 age group.

The prevalence of Type 2 diabetes in England and Wales in 2015-16 was higher for males than females in the 35-79 age-range. The highest prevalence rate for males (8.5%) was in the 65-69 age group.

In 2013, the incidence of Type 2 diabetes in males was 3.99 compared to 3.73 per 1000 for females, according to an analysis of primary care patient data.⁶ In the period 2000-13, the rate in males increased by age-group up to a peak of 12.68 for 70-79 year olds and then declined. For males, the incidence rate is low below the age of 30. For the 50-59 and 80-89 age-groups, the rate is roughly double that for all males; for 60-79 year olds, it is about three times the rate for all males. There was also a clear social gradient in incidence: males in the most affluent quintile had an incidence rate of 3.86 while those in the most deprived quintile had a rate of 4.82.

The Health Survey for England 2004 found that the prevalence of diabetes (Types 1 and 2) was significantly higher in Black Caribbean, Indian, Pakistani, and Bangladeshi men than in the general population.⁷ After adjusting for age, diagnosed diabetes was almost four times as likely in Bangladeshi men, and almost three times as likely in Pakistani and in Indian men compared with men in the general population. Men of south Asian, Chinese, African-Caribbean and black African origin also have an increased risk of developing type 2 diabetes at an earlier age than the general population.

The incidence and prevalence of Type 2 diabetes is expected to increase significantly over the next 30 years. One projection suggests that rising obesity levels could see incidence levels of Type 2 diabetes in men aged 40-60 almost tripling between 2006 and 2046.⁸

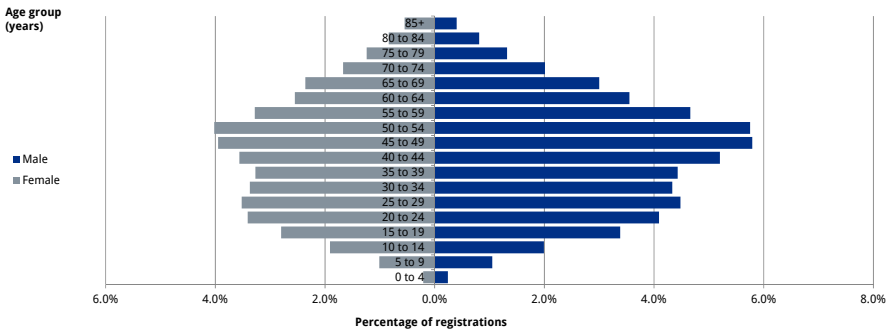
Undiagnosed diabetes is a significant problem. Over one million people in the UK are believed to have diabetes but not be aware of it. The majority of these are likely to be men. One study found that, in England in 2004, men aged 52-79 were much more likely than women of the same age to be undiagnosed. Of those in the study who had diabetes, 22% of men and 12% of women were undiagnosed.⁹ A more recent analysis (2009-13) found that 1.9% of men and 1.4% of women had undiagnosed diabetes, meaning that the prevalence was 36% higher in men.¹⁰

People with non-diabetic hyperglycaemia are at increased risk of developing Type 2 diabetes. (Non-diabetic hyperglycaemia, also known as pre-diabetes or impaired glucose regulation, refers to raised blood glucose levels just below the diabetic range.) It is important to identify people with this condition so that steps can be taken to reduce their risk of developing diabetes through lifestyle changes.

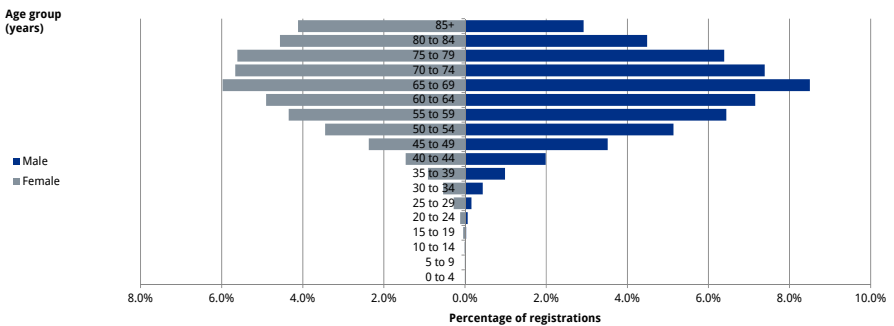
A Public Health England study found that about one in 10 men has non-diabetic hyperglycaemia.¹¹ Prevalence varies significantly by age group with a prevalence of

less than 3% for those aged 16-39, 8% for people aged 40-49, 16% for ages 50-69 and 26% for ages 70 and over. There are higher proportions of people with non-diabetic hyperglycaemia in Asian and black ethnic groups compared to white, mixed and other ethnic groups. Significantly, there is evidence that men, on average, have pre-diabetes for eight years and women for 10 years before they progress to diabetes.¹² The window for identifying men at high risk is therefore smaller.

AGE/GENDER PROFILE - TYPE 1 DIABETES



AGE/GENDER PROFILE - TYPE 2 DIABETES



Age and gender of patients with diabetes in England and Wales, from NHS Digital, National Diabetes Audit – 2015-2016



CAUSES OF DIABETES

The principal modifiable cause of Type 2 diabetes is being overweight or obese.

In England in 2015, 62.9% of adults were overweight or obese (67.8% of men and 58.1% of women).¹³ In Scotland, the comparable figures were 67% for men and 62% for women.¹⁴ The prevalence of obesity (BMI 30+) is similar among men and women, but men are more likely to be overweight (BMI 25-30).

According to Public Health England, the prevalence of diagnosed diabetes in England (2010-12) increased from 0% of men who were underweight to 3.3% for men of a healthy weight, to 6% for men who were overweight, to 14.6% for men who were obese.¹⁵ Men with a raised waist circumference (greater than 102cm) are five times as likely to have diagnosed diabetes than those without a raised waist circumference.

A large study of people with diabetes in Scotland found that men are more likely than women of a similar age to develop diabetes at a lower BMI (body mass index).¹⁶ Mean BMI closest to date of diagnosis of type 2 diabetes was 31.8 in men and 33.7 in women. Men and women had comparable blood glucose levels at the time of diagnosis, suggesting that these findings were not a consequence of men being diagnosed at an earlier stage of their condition. The BMI gap between men and women was most significant at younger ages. According to the researchers, men who developed diabetes at age 40 had a BMI of around 34-35 versus 38-39 in women who developed diabetes at the same age. The gap gradually diminished as people got older, until eventually men and women who developed diabetes around the age of 80 or older had comparable BMI scores.

Men are less likely than women to realise that they are overweight. A study which compared people's self-

reported weight status with their actual weight found that a large proportion of objectively overweight people, particularly men, perceived their weight as being 'about right'.¹⁷ Weight misperception may make it harder to engage overweight people in weight management activities.

Regular smokers are known to be at greater risk of Type 2 diabetes than non-smokers and the risk is also linked positively to the number of cigarettes smoked. Men are more likely to smoke (in Great Britain in 2015, 19.1% of men smoked compared to 16.6% of women) and they smoked marginally more (11.6 cigarettes a day compared to 11.0 for women).¹⁸ Historically, the sex 'gap' for smoking prevalence and the number of cigarettes smoked has been far greater.

Low testosterone levels in men are associated with Type 2 diabetes. 16% of males with type 2 diabetes have lower than normal levels of testosterone and an additional 24% have testosterone levels close to the border of low levels.¹⁹ Low testosterone has been linked with low libido, erectile dysfunction (ED), increased body fat and reduced muscle strength, fatigue as well as with impacts on motivation and self-confidence. Low testosterone levels have also been linked to an increase in all-cause and cardiovascular mortality in men with type 2 diabetes.²⁰

Some research suggests that men with diabetes who have low testosterone levels could benefit from testosterone replacement therapy²¹ but this is not widely accepted in part because of evidence that replacement therapy can increase levels of coronary artery plaque.²² Further research is to determine whether low testosterone is a cause or effect of diabetes, the efficacy and possible risks of replacement therapy and the value of screening men for testosterone deficiency.



CONSEQUENCES OF DIABETES

Diabetes considerably increases an individual's risk of death. In England and Wales in 2011-12, people with all types of diabetes were 34% more likely to die. Men with Type 1 diabetes were 117% more likely to die than their peers in the general population and the corresponding figure for Type 2 diabetes was 29%.²³

Data on deaths from the underlying cause of diabetes mellitus for England and Wales in 2015 shows that the age-standardised mortality rate for men of all ages (12.5 per 100,000 population) was 40% higher than the rate for women (8.9).²⁴ The biggest male:female 'gap' in mortality is in the 45-74 age group where the rate for men is about twice that for women.

A wide range of specific health problems are associated with diabetes, including angina, myocardial infarction, heart failure and stroke. Women with diabetes are at greater risk of cardiovascular diseases than men.

There are several problems that are particularly significant for men:

LOWER LIMB DISEASE

It is estimated that 10% of people with diabetes will have a diabetic foot ulcer at some point in their lives.²⁵ Men are much more likely to be affected. The National Diabetes Foot Care Audit for England and Wales for 2014-15 found that 69.6% of those presenting with a foot ulcer were male and 30.4% were female.²⁶ For reasons that are not clear, foot ulcers in males are also less likely to heal.

Men develop diabetic foot disease at an earlier age and more frequently undergo lower limb amputations than women.²⁷ (This may, in part, be due to historically higher smoking rates in men.) A study of the prevalence of lower

limb amputation in England in the period 2003–2013 found that, in 2013, diabetic men were more than twice as likely as women to be affected.²⁸ The prevalence rate for major amputations per 100,000 for diabetic men aged 50-64 was 82.2 compared to 34.6 for women. In the 65-74 age-group, the rates for men and women were 127.8 and 60.1 respectively. The highest rates – 193.6 for men and 94.6 for women – were found in the 75-84 age-group. There was a similar pattern for minor amputations.

Mortality rates after diabetic foot ulceration and amputation are high, with up to 70% of people dying within five years of having an amputation and around 50% dying within five years of developing a diabetic foot ulcer. Fortunately, the prevalence rate of amputations has fallen, especially for major amputations (for example, down by 41.8% for men aged 75-84 in the period 2003-2013) because of more effective prevention.

DIABETIC RETINOPATHY

Being male is an independent risk factor for diabetic retinopathy. One study in Scotland found that that men were at 20% greater risk and a US study suggested men were at twice the risk of women.²⁹ Men also tend to have more severe retinopathy at the time of Type 2 diagnosis. There is also evidence that retinopathy can be present at the pre-diabetes stage.³⁰

Men are less likely to opt for routine eye checks³¹ and this may mean that opportunities to diagnose diabetes and diabetic retinopathy are being missed.

ERECTILE DYSFUNCTION

Erectile dysfunction is a common problem amongst men who have diabetes, affecting 35-75% of such men.³² Men who have diabetes are thought to develop ED between 10 and 15 years earlier than men who do not suffer from the disease. Men with ED can also have undiagnosed diabetes. One study found that the prevalence of undiagnosed diabetes was 11.5% in men with ED

compared with 2.8% in men without ED. The difference was most pronounced in middle-aged men (those aged 40-59), in whom the prevalence of undiagnosed diabetes was 19.1% among men with ED compared with 3.3% among men without the condition.³³

Because men often delay seeking help for ED – one study found an average delay of about 2.5 years between ED onset and seeking medical help³⁴ – there can be significant delays in the diagnosis of diabetes as well as other possible underlying conditions.



DIABETES CARE AND TREATMENT

National Diabetes Audit data for 2014-15 suggests that men diagnosed with Type 1 and Type 2 diabetes are more likely than women to be meeting treatment targets and receiving the eight annual care processes.³⁵ 41.2% of men and 37.5% of women were meeting all treatment targets and 58.3% of men and 55.6% of women were receiving all eight care processes. This does not mean, however, that men do not still have unmet needs or worse outcomes than women in some areas.

Annual foot screening is recommended for all people with diabetes to determine their risk status. A survey of patients by Diabetes UK found that only 69% of people with Type 1 and 80% of people with Type 2 say they are getting their legs and feet checked.³⁶ Sex-disaggregated data on the uptake of foot screening is not available.

There is evidence that men, particularly younger men, with a diabetes diagnosis are less likely than women to respond to invitations to attend diabetic retinopathy screening.³⁷

Although 52.6% of people with Type 1 diabetes in England are male only 38.6% of people using an insulin pump are male.³⁸ Pumps can help people with diabetes to control their long-term blood sugar levels more effectively.

A range of diabetes education programmes now exist in the UK, including DAFNE, DESMOND and X-PERT. These diabetes courses are structured to empower diabetes patients to manage their own condition successfully. Only a minority of people with diabetes attend such courses, however, and there is evidence that men are even less likely to attend³⁹ and that those who do would also benefit from a gender-sensitive approach.⁴⁰

PREVENTION

People can reduce their risk of developing Type 2 diabetes primarily by achieving a healthy weight.

Despite men being more likely than women to be overweight (BMI 25+), they are less likely to participate in weight management programmes. For example, in the Counterweight programme in 65 general practices in seven UK regions, only 23% of participants were men.⁴¹ Men's Health Forum data collected from 93 local authorities in England suggests that just one in five participants in weight loss programmes were male. Men are even less likely to attend commercial weight-loss programmes than programmes provided by the public sector.

There is good evidence that many men would prefer programmes that adopt a different approach to weight loss than that of programmes primarily aimed at women. The Men's Health Forum has published evidence-based guidance on how to deliver weight management programmes to men.⁴² One effective approach has been to provide male-targeted programmes at top-flight soccer clubs.⁴³

NHS Health Checks for those aged 40-74 have an important role in diagnosing diabetes and identifying people at risk. They are, however, sub-optimally attended by men. A study of those attending in England in 2009-13 found that just 12.3% of eligible men and 13.2% of eligible women attended.⁴⁴ A recent Men's Health Forum survey of working-age men over 40 suggested why some men are not participating: only 22% of respondents said they had heard of NHS Health Checks and only 14% said they had been invited.⁴⁵ The survey showed that taking time off work can also be barrier to male attendance.

Men's Health Forum data on referrals from NHS Health Checks found that just 2.2% of men and 3.5% of women

were referred to weight management services and 18.4% of men and 20.1% of women referred to exercise programmes.

People identified through an NHS Health Check or by a GP as being at risk of developing diabetes will be referred to the new NHS Diabetes Prevention Programme (NDPP). This started in 2016 with a first wave of 27 areas covering 26 million people, half of the population, and is scheduled to cover the whole of England by 2020. Those referred will get tailored, personalised help to reduce their risk of Type 2 diabetes including education on healthy eating and lifestyle, help to lose weight and bespoke physical exercise programmes, all of which together have been proven to reduce the risk of developing the disease.

Although guidance to NDPP providers has mentioned the need to make the service attractive to men ('men are a traditionally hard to engage group in health improvement programmes but have been successful in improving health behaviours when engaged in activities such as football sessions'⁴⁶), it is not yet clear how the Programme is in practice being tailored to meet men's specific needs. There is also, as yet, no available sex-disaggregated data on referrals to or the uptake of the Diabetes Prevention Programme.

There is some evidence that men and women with pre-diabetes might benefit from sex-specific strategies. For example, men who increase their physical activity levels appear to have a lower risk of progressing to diabetes; for women, the risk is reduced by lowering their waist circumference.⁴⁷



SUMMARY OF KEY FINDINGS

- > One in 10 men now has Type 1 or Type 2 diabetes, a more than two-fold increase over the past 20 years.
- > Diabetes affects more males than females in the UK. In England and Wales in 2015-16, over 1.5m males and about 1.2m females had diagnosed diabetes; the respective proportions were 56% and 44%.
- > The mortality rate for diabetes in men aged 16-64 is double the rate for women.
- > Males in the most deprived communities and Black Caribbean, Indian, Pakistani and Bangladeshi men are more likely than other men to develop diabetes. Action on prevention and early diagnosis should include a focus on these groups.
- > Undiagnosed diabetes is a significant problem and is more common in men. This could be addressed through efforts to improve participation in NHS Health Checks (currently under-used by men) and male-targeted symptom awareness campaigns.
- > Men are more likely to be overweight (BMI 25+) and to develop diabetes at a lower BMI (body mass index) than women but are less likely to be aware that they are overweight or to participate in weight management programmes. More men should be referred to these programmes which should also be made more responsive to men's specific needs.
- > The new Diabetes Prevention Programme must ensure that it engages men effectively. About 10% of men have non-diabetic hyperglycaemia (pre-diabetes) and could benefit from the Programme.
- > Although men do better than women against many of the national care and treatment targets, they are more

likely than women to develop diabetic retinopathy or diabetic foot ulcers and more likely to undergo a lower limb amputation. This excess burden is not adequately understood and should be addressed.

- > Erectile dysfunction is a common problem for men with diabetes and should be more regularly assessed and included in the NHS Health Check.
- > The under-use of insulin pumps by men with Type 1 diabetes should be investigated and action taken to improve uptake.
- > Men are under-represented in diabetes education programmes and action is needed to improve uptake and to ensure that providers take a gender-sensitive approach.
- > The National Diabetes Audit should publish a wider range of sex-disaggregated data.
- > A greater focus on sex and gender differences in diabetes policy and professional practice is needed to improve service delivery and outcomes for both men and women.



RECOMMENDATIONS

A diabetes crisis is unfolding in the UK and men are the worst affected. One man in 10 now has diabetes and men are more likely to develop diabetes than women. They are more likely to suffer the complications of diabetic retinopathy and foot ulcers and to have a limb amputation. They are more likely to die, and to die prematurely, as a result of diabetes. A three-fold increase in the incidence of diabetes in middle-aged men has been predicted for the next 30 years.

This report argues that taking account of sex and gender really matters in tackling the diabetes crisis. There are 10 specific actions that should now be taken to improve outcomes for men:

1. A greater focus on gender-specific needs and challenges in diabetes policy and professional practice is needed to improve service delivery and outcomes for both men and women.
2. Action is required to drive down male overweight/obesity. There should be a greater effort to increase male participation in weight loss programmes, including though the development of initiatives that are more likely to appeal to men and which are available at times convenient to men in full-time work. The new Diabetes Prevention Programme must also ensure that it engages men effectively.
3. The level of undiagnosed diabetes in men should be addressed in part through initiatives that improve uptake of NHS Health Checks and also routine eye examinations. Public health campaigns aimed at men which improve symptom awareness could also encourage more men to seek medical advice sooner. There is good evidence that the Be Clear on Cancer campaign has had a positive impact on men's

symptom awareness and medical help-seeking⁴⁸ and this could be replicated for diabetes.

4. Action on prevention and early diagnosis should include a focus on those groups of men (e.g. men from some ethnic minority communities) most likely to develop diabetes, in particular at a younger age.
5. The excess burden of diabetic retinopathy, foot ulcers and lower limb amputations in men should be addressed.
6. Further research is needed into the relationship between diabetes and low testosterone levels in men.
7. The under-use of insulin pumps by men with Type 1 diabetes should be investigated and action taken to improve uptake.
8. GPs and other health professionals should be more pro-active in asking men if they have ED and it should be covered in the NHS Health Check. This could contribute to the earlier diagnosis of diabetes and cardiovascular disease.
9. More men should be encouraged to attend diabetes education programmes and these should also take a gender-sensitive approach to ensure that men are effectively engaged.
10. The National Diabetes Audit should publish a wider range of sex-disaggregated data to improve knowledge of sex-specific needs and challenges and to identify further areas where targeted action for men (or women) might be needed. For example, more information is needed in respect of the care processes (including diabetic retinopathy screening) and the treatment targets.

REFERENCES

- 1 Diabetes UK, Facts and Stats (October 2016) https://www.diabetes.org.uk/Documents/Position%20statements/DiabetesUK_Facts_Stats_Oct16.pdf (accessed 6 April 2017)
- 2 Public Health England, Diabetes Prevalence Model (PHE; London, 2016).
- 3 NHS Digital, Health Survey for England 2015. Trend tables commentary. <http://www.content.digital.nhs.uk/catalogue/PUB22616/HSE2015-Trend-comm.pdf> (accessed 6 April 2017).
- 4 NHS Digital, National Diabetes Audit – 2015-2016: Report 1, Care Processes and Treatment Targets. <http://www.content.digital.nhs.uk/catalogue/PUB23241> (accessed 6 April 2017).
- 5 Scottish Diabetes Survey Monitoring Group, Scottish Diabetes Survey 2015 <http://www.diabetesinscotland.org.uk/Publications/SDS2015.pdf> (accessed 6 April 2017).
- 6 Sharma M, Nazareth I, Petersen I. Trends in incidence, prevalence and prescribing in type 2 diabetes mellitus between 2000 and 2013 in primary care: a retrospective cohort study. *BMJ Open* 2016;6:e010210. DOI: 10.1136/bmjopen-2015-010210
- 7 The Information Centre, Health Survey for England 2004 Volume 1 The health of minority ethnic groups (Information Centre; Leeds, 2006).
- 8 Brown M, Byatt T, Marsh T, et al. Obesity Trends for Adults: Analysis from the Health Survey for England 1993-2007. (National Heart Forum; London, 2010).
- 9 Pierce MB, Zaninotto P, Steel N, et al. Undiagnosed diabetes—data from the English longitudinal study of ageing. *Diabetic Medicine* 2009;26: 679–685.
- 10 Moody A, Cowley G, Ng Fat L, et al. Social inequalities in prevalence of diagnosed and undiagnosed diabetes and impaired glucose regulation in participants in the Health Surveys for England series. *BMJ Open* 2016;6:e010155. DOI:10.1136/bmjopen-2015-010155
- 11 Public Health England. NHS Diabetes Prevention Programme (NHS DPP) Non-diabetic hyperglycaemia. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/456149/Non_diabetic_hyperglycaemia.pdf (accessed 6 April 2017)
- 12 Peters SAE, Huxley RR, Sattar N, et al. Sex Differences in the Excess Risk of Cardiovascular Diseases Associated with Type 2 Diabetes: Potential Explanations and Clinical Implications. *Current Cardiovascular Risk Reports* 2015;9(7):36. DOI:10.1007/s12170-015-0462-5.
- 13 Public Health England, UK and Ireland prevalence and trends. https://www.noo.org.uk/NOO_about_obesity/adult_obesity/UK_prevalence_and_trends (accessed 6 April 2017).
- 14 The Scottish Health Survey 2015: Volume 1: Main Report. <http://www.gov.scot/Publications/2016/09/2764/downloads#res505810>
- 15 Public Health England. Adult obesity and type 2 diabetes (Public Health England; London, 2014).
- 16 Logue J, Walker JJ, Colhoun HM et al. Do men develop type 2 diabetes at lower body mass indices than women? *Diabetologia* 2011;54:3003. DOI:10.1007/s00125-011-2313-3.
- 17 Robinson E, Oldham M. Weight status misperceptions among UK adults: the use of self-reported vs. measured BMI. *BMC Obesity* 2016;3:21 DOI 10.1186/s40608-016-0102-8
- 18 Office for National Statistics. Adult Smoking Habits in Great Britain. <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/drugusealcoholandsmoking/datasets/adultsmokinghabitsingreatbritain>
- 19 Diabetes UK. Low Testosterone and Diabetes. <http://www.diabetes.co.uk/low-testosterone-and-diabetes.html> (accessed 6 April 2017).
- 20 Muraleedharan V, Marsh H, Kapoor D, et al. Testosterone deficiency is associated with increased risk of mortality and testosterone replacement improves survival in men with type 2 diabetes. *European Journal of Endocrinology* 2013;169:725–733.
- 21 Dhindsa S, Ghanim H, Batra M, et al. Insulin Resistance and Inflammation in Hypogonadotropic Hypogonadism and Their Reduction

- After Testosterone Replacement in Men With Type 2 Diabetes. *Diabetes Care* 2015; dc151518; DOI: 10.2337/dc15-1518.
- 22 Budoff MJ, Ellenberg SS, Lewis CE, et al. Testosterone Treatment and Coronary Artery Plaque Volume in Older Men With Low Testosterone. *JAMA*.2017;317(7):708-716. doi:10.1001/jama.2016.21043
 - 23 Health and Social Care Information Centre. National Diabetes Audit 2012–2013 Report 2: Complications and Mortality. <http://content.digital.nhs.uk/catalogue/PUB16496/nati-diab-audi-12-13-rep2.pdf> (accessed 5 July 2017).
 - 24 Data extracted from ONS nomis database <https://www.nomisweb.co.uk/> (accessed 6 April 2017).
 - 25 NICE. Diabetic foot problems: prevention and management. NICE guideline NG19. <https://www.nice.org.uk/guidance/ng19/chapter/introduction> (accessed 6 April 2017).
 - 26 Clinical Audit and Registries Management Service Health, Social Care Information Centre. National Diabetes Foot Care Audit Report 2014-2015. England and Wales. <http://content.digital.nhs.uk/catalogue/PUB20343/nati-diab-foot-care-audit-14-15-rep.pdf> (accessed 6 April 2017).
 - 27 Kautzky-Willer A, Harreiter J, Pacini G. Sex and Gender Differences in Risk, Pathophysiology and Complications of Type 2 Diabetes Mellitus. *Endocrine Reviews* 2016;37(3):278-316. DOI:10.1210/er.2015-1137.
 - 28 Ahmad N, Thomas GN, Gill P, et al. The prevalence of major lower limb amputation in the diabetic and non-diabetic population of England 2003–2013. *Diabetes & Vascular Disease Research* 2016;13(5):348–353.
 - 29 Ozawa GY, Bearnse MA, Adams AJ. Male–Female Differences in Diabetic Retinopathy? *Current Eye Research* 2015;40(2):234-246, DOI: 10.3109/02713683.2014.958500.
 - 30 Chen X, Zhao Y, Zhou Z, et al. Prevalence and risk factors of diabetic retinopathy in Chongqing pre-diabetes patients. *Eye* 2012;26:816–820.
 - 31 Dickey H, Ikenwilo D, Norwood P, et al. Utilisation of eye-care services: the effect of Scotland's free eye examination policy. *Health Policy* 2012;108(2-3):286-93. DOI: 10.1016/j.healthpol.2012.09.006. Epub 2012 Oct 11.
 - 32 Diabetes UK, Diabetes and Erectile Dysfunction. <http://www.diabetes.co.uk/diabetes-erectile-dysfunction.html> (accessed 6 April 2017).
 - 33 Skeldon SC, Detsky AS, Goldenberg SL, et al. Erectile Dysfunction and Undiagnosed Diabetes, Hypertension, and Hypercholesterolemia. *Annals of Family Medicine* 2015; 13(4).
 - 34 Salonia A, Ferrari M, Sacca A, et al. Delay in Seeking Medical Help in Patients with New Onset Erectile Dysfunction Remained High Over and Despite the PDE5 Era – An Ecological Study. *The Journal of Sexual Medicine* 2012;9(12): 3239-3246.
 - 35 National Diabetes Audit data supplied to Men's Health Forum by Diabetes UK.
 - 36 Diabetes UK. Results of our diabetes care survey – 2015. https://www.diabetes.org.uk/About_us/News/Care-survey-2016/ (accessed 6 April 2017).
 - 37 Orton E, Forbes-Haley A, Tunbridge L, et al. Equity of uptake of a diabetic retinopathy screening programme in a geographically and socio-economically diverse population. *Public Health* 2013;127(9):814-821.
 - 38 Health and Social Care Information Centre. National Diabetes Insulin Pump Audit Report, 2013-15 England. <http://www.hqip.org.uk/public/cms/253/625/19/520/National%20Diabetes%20Insulin%20Pump%20Audit%20report%202013-15.pdf?realName=hOfPw8.pdf?v=0> (accessed 6 April 2017).
 - 39 Harris S, Mulnier H, Amiel S. The Barriers to Uptake of Diabetes Education study. *The Lancet* 2017;389:S44
 - 40 Mathew R, Gucciardi E, De Melo M, et al. Self-management experiences among men and women with type 2 diabetes mellitus: a qualitative analysis. *BMC Family Practice* 2012;13(122). <http://doi.org/10.1186/1471-2296-13-122>.
 - 41 Robertson C, Archibald D, Avenell A, et al. Systematic reviews of and integrated report on the quantitative, qualitative and economic evidence base for the management of obesity in men. *Health Technology Assessment* 2014;18(35).

- 42 Men's Health Forum, Public Health England. How To Make Weight Loss Services Work for Men (Men's Health Forum; London, undated).
- 43 Hunt K, Wyke S, Gray CM, et al. A gender-sensitised weight loss and healthy living programme for overweight and obese men delivered by Scottish Premier League football clubs (FFIT): a pragmatic randomised controlled trial. *The Lancet* 2014;383(9924):1211-1221.
- 44 Robson J, Dostal I, Sheikh A, et al. The NHS Health Check in England: an evaluation of the first 4 years. *BMJ Open* 2016;6: e008840. doi:10.1136/bmjopen-2015-008840.
- 45 Tod M. Making NHS Health Checks work for men. <http://www.nhshealthcheck.nhs.uk/nhs-health-check-e-bulletin-november-2016/front-page/foreword-by-martin-tod-chief-executive-mens-health-forum/print> (accessed 6 April 2017).
- 46 Public Health England, NHS England Behaviour Insight Team. NHS Diabetes Prevention Programme: An opportunity to partner with the Behavioural Insight Team to improve outcomes. <https://www.england.nhs.uk/wp-content/uploads/2016/07/behav-insight.pdf> (accessed 6 April 2017).
- 47 Song X, Qiu M, Zhang X, et al. Gender-related affecting factors of prediabetes on its 10-year outcome. *BMJ Open Diabetes Research and Care* 2016;4:e000169. doi: 10.1136/bmjdr-2015-000169
- 48 Moffat J, Bentley A, Ironmonger L, et al. The impact of national cancer awareness campaigns for bowel and lung cancer symptoms on sociodemographic inequalities in immediate key symptom awareness and GP attendances. *British Journal of Cancer* 2015;112:S14-S21. doi:10.1038/bjc.2015.31

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ONE IN TEN THE MALE DIABETES CRISIS

A diabetes crisis is unfolding in the UK and men are the worst affected. One man in 10 now has diabetes and in middle-aged men the disease is expected to increase sharply in frequency over the next 20 years.

Yet the sex inequalities in diabetes have not been fully recognised by health policymakers or practitioners. More attention must urgently be paid to engaging men in diabetes prevention, early diagnosis and improving care and treatment delivery.

This report shows that taking account of sex- and gender-specific needs and challenges is vital in tackling the diabetes crisis. It is time now for the health system to act and tackle the gaps affecting both men and women.

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