

# Don't Just Screen – Intervene: Protecting the cardiometabolic health of people with severe mental illness

Johanna Taylor, David Shiers

**People with severe mental illness (SMI) have a reduction in life expectancy of around 15–20 years. A higher prevalence of diabetes and its complications contributes to this health inequality. The risk of diabetes and barriers to managing the condition alongside SMI require more tailored lifestyle interventions, regular monitoring of risk from the onset of psychosis, high-quality antipsychotic prescribing, smoking cessation, support for self-management and collaborative care. Increasing awareness about the particular risks that people with SMI face and the proactive approach that is needed to sufficiently screen and intervene for diabetes may help to ensure that these individuals are better supported. The Lester resource provides practitioners with a useful tool to help facilitate this.**

People with severe mental illness (SMI; e.g. schizophrenia, bipolar disorder) have a reduction in life expectancy of around 15–20 years. While suicide and accidents account for a quarter of premature deaths, most arise from illnesses that shorten lives in the general population, cardiovascular disease (CVD) being the single most common cause (Brown et al, 2010).

Diabetes is a particular concern, contributing to the morbidity and mortality gap and increasing the likelihood of premature CVD (Ward and Druss, 2015). Despite this, little is currently done to improve diabetes care in this population. This article aims to raise awareness about the particular risks that people with SMI face and the strategies that may help to better prevent and manage diabetes in this population.

## Why is diabetes a problem for people with SMI?

Around 1% of the overall population per year experiences an SMI (Reilly et al, 2015). Psychotic features may include altered perceptions, thoughts,

mood and behaviour, and can be highly distressing for the individuals and their family and friends. Some recover but the majority continue to experience difficulties. These include not only psychological difficulties but also poor physical health, which is often compounded by inequalities in healthcare (Ward and Druss, 2015).

Diabetes affects around 10–15% of people with SMI, a rate two to three times higher than in the general population (Reilly et al, 2015). Type 2 diabetes accounts for most of the excess cases and typically commences 10–20 years earlier in those with SMI, the relative risk being highest in younger individuals (Holt and Mitchell, 2015). People with comorbid SMI and diabetes, when compared to those with diabetes alone, experience more diabetes complications (microvascular and macrovascular), and have a significantly increased risk of death (Vinogradova et al, 2010).

The path to premature diabetes and CVD may be heralded by the onset of psychosis and the initiation of antipsychotic treatment. Aggressive early weight gain, averaging 12 kg in the first 24 months of

**Citation:** Taylor J, Shiers D (2016) Don't Just Screen – Intervene: Protecting the cardiometabolic health of people with severe mental illness. *Journal of Diabetes Nursing* 20: 297–302

## Article points

1. People with severe mental illness (SMI) are at increased risk of diabetes and experience more diabetes complications than those without SMI.
2. Antipsychotic medication can cause weight gain and metabolic disturbances that increase the risk of diabetes, although other factors also play a part.
3. The Lester resource provides a practical framework for assessing and managing cardiometabolic risk in people with SMI.

## Key words

- Bipolar disorder
- Cardiovascular risk
- Diabetes
- Psychosis
- Severe mental illness
- Schizophrenia

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**Table 1. Cardiovascular risk factors for people with severe mental illness: Estimated prevalence and relative risk compared to the general population.**

Risk factors	Schizophrenia		Bipolar disorder	
	Prevalence	Relative risk	Prevalence	Relative risk
Tobacco smoking*	50–80%	2–3	54–68%	2–3
Physical inactivity <sup>†</sup>	70%	2	No data	No data
Obesity*	45–55%	1.5–2	21–49%	1–2
Hypertension*	19–58%	2–3	35–61%	2–3
Diabetes*	10–15%	2–3	8–17%	1.5–3
Dyslipidaemia*	25–69%	≤5	23–38%	≤3

\*Data from De Hert et al (2011). <sup>†</sup>Data from Lindamer et al (2008).

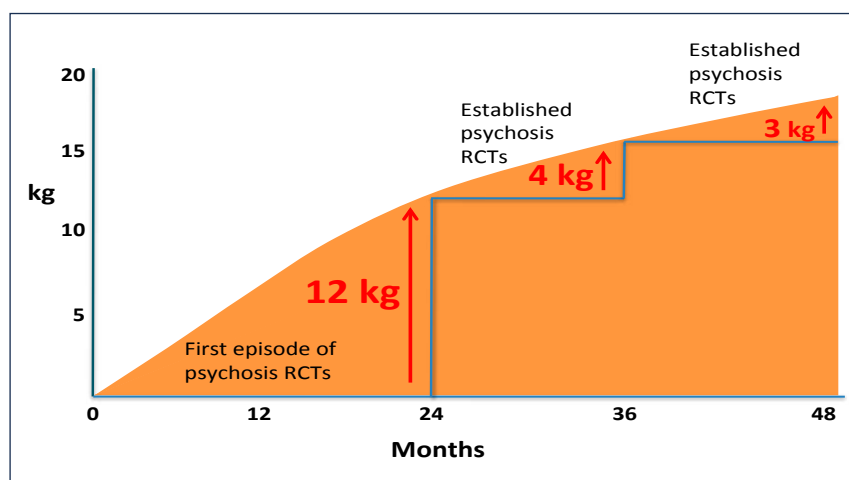


Figure 1. Weight gain on antipsychotic medication following a first episode of psychosis. Data from Alvarez-Jiménez et al (2008). Published with permission from Prof. Alvarez-Jiménez. RCT= randomised controlled trial.

treatment (Alvarez-Jiménez et al, 2008; Figure 1), increases the risk of future type 2 diabetes.

Other metabolic disturbances also increase the risk of type 2 diabetes in this population. A systematic review demonstrated significant glucose and lipid disturbance within 8 weeks of antipsychotic initiation, which worsened over the 12 months studied (Foley and Morley, 2011). Another review showed that antipsychotics could cause type 2 diabetes in people under the age of 24 years (Galling et al, 2016).

Metabolic syndrome, which describes a clustering of CVD risks, reliably predicts a five-fold increased risk of type 2 diabetes in the

general population (Alberti et al, 2006). Prior to antipsychotic initiation, metabolic syndrome is no more likely in people experiencing a first episode of psychosis than in peers without psychosis (Fleischhacker et al, 2013). Yet by age 40 years, people with schizophrenia have a three-fold increased rate of metabolic syndrome compared with age-matched people from the general population (De Hert et al, 2006).

Although antipsychotic treatment plays an important role in increasing the risk of type 2 diabetes, to understand this population's vulnerability to metabolic disturbance requires awareness of how psychosis impacts beyond simply the distress of symptoms and medication side effects. Social consequences, often profound, include damaged relationships and social isolation, stigma and discrimination, disrupted education and employment, and financial and accommodation uncertainties. SMI can also reduce motivation and cause paranoid thinking, and treatment side effects include sedation and appetite stimulation (Holt and Mitchell, 2015). Combined, these can influence lifestyles that predispose to type 2 diabetes, in particular physical activity, diet and smoking:

- **Physical activity** – fewer than 30% of people with schizophrenia are regularly active compared to 62% of their non-psychiatric peers (Lindamer et al, 2008). A systematic review found people with psychosis were sedentary for more than 11 hours per day, 3 hours more than their non-psychiatric peers (Stubbs et al, 2016).
- **Diet** – diet in people with SMI tends to be high in fat and refined sugar, low in dietary fibre and with inadequate fruit and vegetable intake (Dipasquale et al, 2013).
- **Smoking** – this is the single greatest preventable cause of premature death in people with SMI; smoking rates are two to three times higher than in the general population (Brown et al, 2010).

A list of cardiovascular risk factors in people with SMI can be found in Table 1.

### What about healthcare?

Unfortunately, people with SMI do not always receive the care they need for their physical health. This inequality occurs for several reasons,

including the lack of coordination and sharing of information between primary and mental healthcare providers, inadequate attention to physical health problems, limited understanding among healthcare professionals about the risk of diabetes and the challenges of managing diabetes alongside SMI, and barriers to accessing healthcare experienced by people with SMI due to their psychological, social and economic vulnerabilities (Mitchell et al, 2009; McGinty et al, 2015).

People with SMI describe primary care as the cornerstone of their physical and mental healthcare, and they especially value continuity and holistic approaches (Lester et al, 2005). However, annual GP consultation rates for people with SMI have plummeted from about 13 per year in the mid 1990s to around three per year more recently, only marginally higher than for the wider practice population. Additionally, practice nurses, who are key providers of health education and support for people with long-term conditions, are half as likely to see people with SMI as they are the wider population (Reilly et al, 2012).

Although annual physical health checks for people with SMI in primary care have been incentivised since 2004 as part of the Quality and Outcomes Framework (QOF), the National Audit of Schizophrenia (NAS) revealed that only 29% of 5091 people with this SMI had cardiometabolic risk (weight, smoking status, glucose, lipids and blood pressure) adequately assessed within the previous 12 months (Crawford et al, 2014). Moreover, only 53% of those found to have abnormal blood glucose levels had a record of appropriate intervention. The NAS found unacceptably wide variation in the prescribing of antipsychotics as well, including polypharmacy (multiple antipsychotic use, contrary to the evidence) and doses exceeding British National Formulary recommendations (Patel et al, 2014).

Inequalities in diabetes care may also contribute to poor outcomes in people with SMI and diabetes (Chwastiak et al, 2015). However, the evidence is unclear; some studies show that, compared to those with diabetes alone, people with SMI are less likely to be prescribed effective medications and tend to receive less monitoring and diabetes

education. Other studies show no difference, while some suggest that people with SMI actually receive more diabetes care (Mitchell et al, 2009; McGinty et al, 2015). However, no research has investigated these healthcare inequalities in the UK (Ward and Druss, 2015).

### What can be done? “Don't Just Screen – Intervene”

Consider the following scenario:

*Tim consults with you following your surgery's invitation to attend for a check-up. He is 34 years old, has experienced schizophrenia for 10 years and receives a repeat prescription for an antipsychotic medicine. You check his blood pressure and enquire of his smoking and alcohol consumption, just as QOF incentivises. You can find no problems. Job done. Or is it?*

Psychosis typically emerges in early adulthood, accelerating exposure to cardiometabolic risk below the age when primary care would normally consider active primary CVD prevention. Awareness of diabetes in people with SMI is also variable (Foley et al, 2016), and symptoms of psychosis can mask early indicators of metabolic disturbance.

Around 50% of cases of diabetes may go undetected in those with SMI (Foley et al, 2016), compared with about 15% in the general population (Diabetes UK, 2015). In an Australian study, the authors screened 1153 adults with psychosis and found that 12% had type 2 diabetes and 19% were biochemically at high risk; however, 54% of these participants were not previously aware of this, and awareness was lowest in the age group of 25–34 years (Foley et al, 2016). Failure to monitor this young at-risk population lies at the root of this health inequality.

The **Lester resource** (Figure 2) provides a practical framework for assessing and managing cardiometabolic risk in people with SMI. Developed in a process led by the late Professor Helen Lester, the resource has been endorsed by NICE, relevant Royal Colleges, Diabetes UK, NHS England and Public Health England. The Lester resource's mantra, “Don't Just Screen – Intervene”, highlights that, whilst identifying risk is essential, it is not sufficient in and of itself.

### Page points

1. People with psychosis are typically exposed to increased cardiometabolic risk below the age when primary care would normally consider active primary cardiovascular disease prevention.
2. Despite this, less than a third of people with schizophrenia in the UK are receiving annual health checks to assess cardiometabolic risk.
3. Around 50% of diabetes cases go undetected in people with severe mental illness, compared to 15% of cases in the general population.
4. It is, therefore, essential not only to screen for cardiometabolic risk in this population but also to act in order to mitigate the risk.

**Page points**

1. As with the general population, people with severe mental illness should be offered lifestyle interventions, which not only improve diabetes risk but also lessen the weight gain and metabolic disruption associated with antipsychotic medication.
2. Smoking cessation, the single most effective way to improve cardiometabolic risk, should be encouraged; however, currently in the UK, smoking cessation services are poorly suited to treat people with severe mental illness.

Let's return to our scenario:

*You decide to use the Lester resource. This means that, in addition to checking Tim's blood pressure and enquiring about his smoking and alcohol consumption, you check his BMI and test his total/HDL cholesterol ratio and HbA<sub>1c</sub>. Tim's risk of developing diabetes is now much clearer. Do you have all the information you need to intervene? And what's next?*

For the purpose of this article, let's assume Tim's BMI is 29 kg/m<sup>2</sup> and his lipid results are normal. However, his HbA<sub>1c</sub> results place him in the high-risk category for diabetes. There are numerous interventions that may help Tim. But first and foremost you need to gain a holistic understanding of him, including both the personal challenges he may face in making lifestyle changes and the positive resources he might be able to access. A shared approach to decision-making is essential; intervention adherence and treatment outcomes are both enhanced when people are involved in decisions about their care (Hamann and Heres, 2014). The interventions that may help Tim include the following.

**Lifestyle interventions**

NICE (2014) guidelines recommend that people with SMI who are at risk of diabetes should be offered lifestyle interventions. Systematic reviews show that these interventions can alleviate antipsychotic-induced weight gain and metabolic disturbances compared with routine care (McGinty et al, 2016). There is less understanding about the specific components and behaviour change techniques that lead to positive and sustainable lifestyle changes, and identifying suitable interventions tailored for people with SMI may therefore be a particular challenge.

**Smoking cessation**

A systematic review showed that smoking cessation interventions that work for the general population are equally effective for those with SMI (Banham and Gilbody, 2010), and a more recent study demonstrated that a bespoke intervention was acceptable to people with SMI and those who support them (Knowles et al, 2016). Currently, however, smoking cessation services are poorly suited to people with SMI, despite the fact that many who smoke wish to give up. For example,

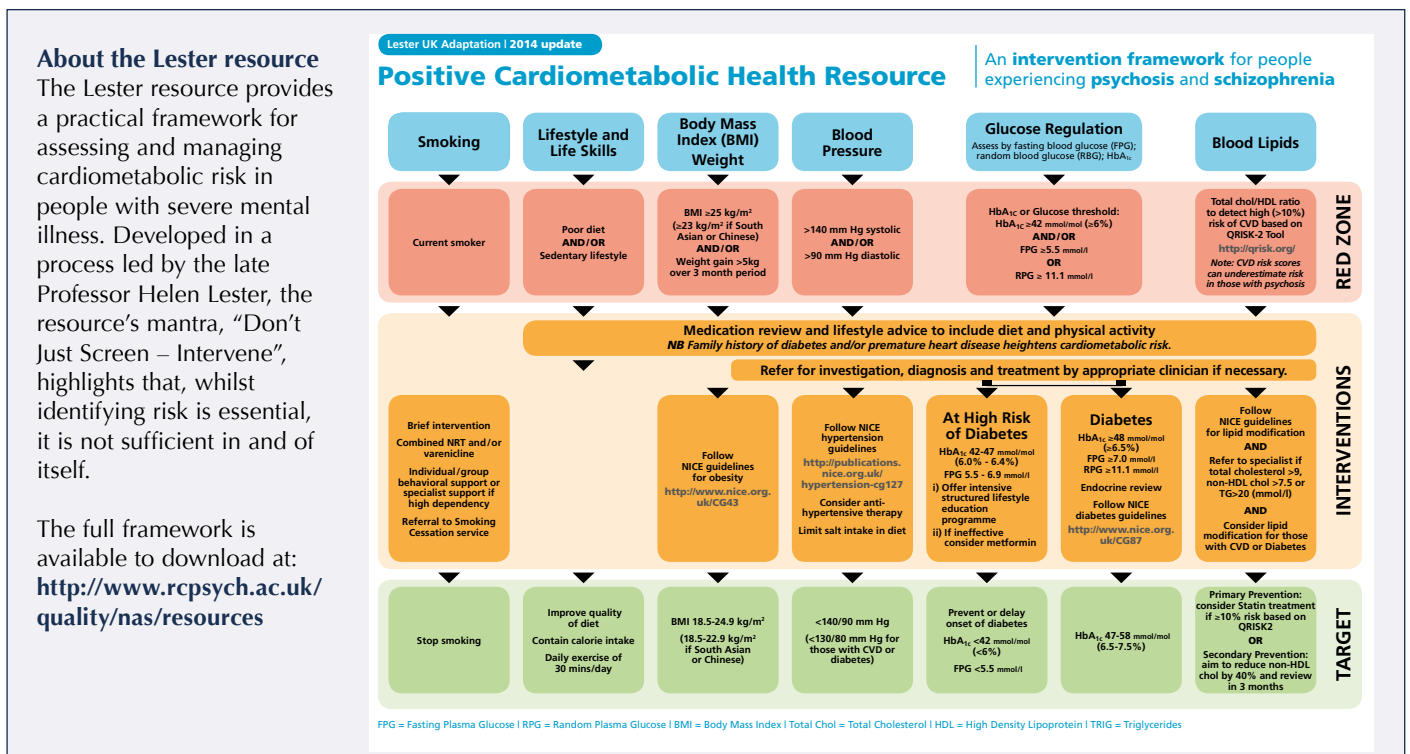


Figure 2. About the Lester resource.

stopping smoking can cause a rapid increase in blood levels of medications such as antipsychotics and certain antidepressants, and it may require accompanying dosage reductions (Banham and Gilbody, 2010). A useful guide to smoking cessation in people with SMI can be found at: <http://bit.ly/2c25bdJ>.

### Antipsychotic medication

Careful antipsychotic selection and dosage is vital given these agents' potential impact on cardiometabolic risk. It is important that prescribers in both primary and mental health settings provide clear information to patients about the risk of weight gain and metabolic disturbance. Treatment should be reviewed as a priority if there is rapid (e.g. <3 months) metabolic disturbance or weight gain (e.g. >5 kg in <3 months). Improving access to a dietitian at an early stage may help patients to make lifestyle changes alongside taking their medication. Considering an alternative antipsychotic medication associated with an improved metabolic profile may lessen these impacts (Mizuno et al, 2014), but any decision to change treatment should be carefully balanced against the risk of psychosis relapse and should always involve the patient's psychiatrist.

### Metformin

NICE (2012) already recommends use of metformin for the prevention of diabetes when other measures prove unsuccessful, and growing evidence suggests this agent may also lessen the weight gain and metabolic disturbance associated with antipsychotic medication (Mizuno et al, 2014).

### Monitoring risk

Monitoring risk is important for diabetes management as well as prevention. An annual diabetes check may help early detection of diabetes complications. This should include assessing for diabetes distress, which is correlated with poor diabetes control and comorbid depression (Snoek et al, 2015). For many people with diabetes, the annual check may be the only time they visit their GP. However, people with comorbid SMI may need more tailored and regular monitoring than this. For example, psychotic episodes or a change

in antipsychotic treatment may increase CVD risk and impede efforts to maintain a healthy lifestyle.

### Supporting self-management

Like the general diabetes population, people with SMI and diabetes need support for self-managing their diabetes.

Improving access to diabetes self-management education is essential; however, generic interventions may need to be tailored, for example, to address specific challenges such as poor locus of control, stigma and stress, motivational deficits affecting self-management, and limited social support (Blixen et al, 2016).

### Care coordination

People with SMI and diabetes identify fragmentation of care as a key barrier to self-management (Blixen et al, 2016). Poor continuity of care and limited sharing of information between different services are also identified as significant barriers. A collaborative approach to case management between primary and mental health services is needed; collaborative care models consistently show improvements in health outcomes for people with depression and comorbid physical illness (Coventry et al, 2014).

### Conclusions

People with SMI currently receive inferior care for diabetes, partly as a result of inequalities in healthcare provision but also because their exposure to risk and the challenges they face in accessing appropriate care mean that a more tailored and intensive approach is required. Primary care is ideally placed to tackle this health inequality. Nurse practitioners have the necessary skills and knowledge to proactively manage cardiometabolic risk and, moreover, are well placed to coordinate management of detected abnormalities within the low-stigma setting of primary care.

Let's return a final time to our scenario:

*Having established that Tim is at high risk of diabetes, you refer him to a lifestyle intervention, which includes regular physical activity and nutritional counselling. You also arrange for him to see his GP to review his antipsychotic*

### Other useful resources

**FACT FILE 13**  
**PROTECTING THE CARDIOMETABOLIC HEALTH OF PEOPLE WITH SEVERE MENTAL ILLNESS**

People with severe mental illness, such as schizophrenia and bipolar disorder, run a higher risk of physical health problems, including diabetes. Dr David Brown, GP Advisor in the National Collaborative Care and Prevention Group, Primary Care Diabetes and Endocrinology at the University of Southampton, discusses the issue.

**Cardiometabolic disease is the single biggest contributor to the premature death of people with severe mental illness.**

**Risk of diabetes and other cardiovascular disease in people with severe mental illness**

**Weight gain in antipsychotics can lead to heart health problems that increase blood pressure.**

**Antipsychotic medication**

**Weight gain in antipsychotics can lead to heart health problems that increase blood pressure.**

<http://bit.ly/2bRSkx9>

**NICE** Health and Care Division  
**guideline**

**Psychosis and schizophrenia in adults: prevention and management**

Clinical guideline  
Published: 12 February 2014  
[www.nice.org.uk/guidance/cg178](http://www.nice.org.uk/guidance/cg178)

[www.nice.org.uk/guidance/cg178](http://www.nice.org.uk/guidance/cg178)

**MENTAL HEALTH**  
Living well for longer

**Primary Care Guidance on Smoking and Mental Disorders**

**KEY LEARNING POINTS**

- Smoking is the largest preventable cause of disease and death in the UK, and is a major cause of health inequalities.
- People with mental health problems are at a higher risk of smoking than the general population.
- People with mental health problems are at a higher risk of smoking than the general population.
- People with mental health problems are at a higher risk of smoking than the general population.

Smoking is the single largest cause of the 10-20 year lower life expectancy of people with mental disorders.

<http://bit.ly/2c25bdJ>

## Acknowledgements

The authors would like to acknowledge the contribution of the DIAMONDS PPI panel. The panel, which consists of service users with severe mental illness and diabetes, has helped to prioritise research questions for the DIAMONDS research programme ([www.diamonds.nihr.ac.uk](http://www.diamonds.nihr.ac.uk)) and provides input on current projects. In particular, we would like to thank Lynne Camacho, Sally Carling, Paul Frazer and Ernie Lloyd, who helped to develop ideas for this paper and provided personal insights into their experiences of care, and also reviewed the draft manuscript.

Financial support to establish the DIAMONDS research programme was received through the NIHR CLAHRC Yorkshire and Humber mental health and comorbidities theme ([www.clahrc-yh.nihr.ac.uk](http://www.clahrc-yh.nihr.ac.uk)), which includes the Universities of York and Leeds, Bradford District Care NHS Foundation Trust, and Leeds and York Partnership NHS Foundation Trust. The views expressed in this article are the authors' and not necessarily those of the NHS, the NIHR or the Department of Health.

*medication. Tim has a care coordinator as part of the care he receives from specialist mental health services. You share information about Tim's risk of diabetes so that the coordinator can also help to support him as he makes lifestyle changes.*

Increasing awareness about the particular risks that people with SMI face and the proactive approach that is needed to sufficiently screen and intervene for diabetes may help to ensure that individuals are better supported. The Lester resource provides a useful tool to facilitate this. However, only recently has policy and research prioritised this health inequality, and tailored diabetes interventions for this population are still lacking. We hope the current focus on improving diabetes prevention and management for people with SMI will increase the opportunities to intervene as well as to screen. ■

## Disclaimer

David Shiers is a topic expert for a group undertaking surveillance of NICE guidance on psychosis and schizophrenia in children and young people (NICE CG155). The views presented in this article are the authors' and not those of NICE or the surveillance group.

- Alberti KG, Zimmet P, Shaw J (2006) Metabolic syndrome – a new world-wide definition. A Consensus Statement from the International Diabetes Federation. *Diabet Med* **23**: 469–80
- Alvarez-Jiménez M, González-Blanch C, Crespo-Facorro B et al (2008) Antipsychotic-induced weight gain in chronic and first-episode psychotic disorders: a systematic critical reappraisal. *CNS Drugs* **22**: 547–62
- Banham L, Gilbody S (2010) Smoking cessation in severe mental illness: what works? *Addiction* **105**: 1176–89
- Blixen CE, Kanuch S, Perzynski AT (2016) Barriers to self-management of serious mental illness and diabetes. *Am J Health Behav* **40**: 194–204
- Brown S, Kim M, Mitchell C, Inskip H (2010) Twenty-five year mortality of a community cohort with schizophrenia. *Br J Psychiatry* **196**: 116–21
- Chwastiak LA, Freudenreich O, Tek C et al (2015) Clinical management of comorbid diabetes and psychotic disorders. *Lancet Psychiatry* **2**: 465–76
- Coventry PA, Hudson JL, Kontopantelis E et al (2014) Characteristics of effective collaborative care for treatment of depression: a systematic review and meta-regression of 74 randomised controlled trials. *PLoS One* **9**: e108114
- Crawford MJ, Jayakumar S, Lemmey SJ et al (2014) Assessment and treatment of physical health problems among people with schizophrenia: national cross-sectional study. *Br J Psychiatry* **205**: 473–7
- De Hert M, van Winkel R, Van Eyck D et al (2006) Prevalence of diabetes, metabolic syndrome and metabolic abnormalities in schizophrenia over the course of the illness: a cross-sectional study. *Clin Pract Epidemiol Ment Health* **2**: 14
- De Hert M, Correll CU, Bobes J et al (2011) Physical illness in patients with severe mental disorders. I. Prevalence, impact of medications and disparities in health care. *World Psychiatry* **10**: 52–77

- Diabetes UK (2015) *Facts and Stats*. DUK, London. Available at: <http://bit.ly/1RINq4f> (accessed 02.09.16)
- Dipasquale S, Pariente CM, Dazzan P et al (2013) The dietary pattern of patients with schizophrenia: a systematic review. *J Psychiatr Res* **47**: 197–207
- Fleischhacker WW, Siu CO, Bodén R et al (2013) Metabolic risk factors in first-episode schizophrenia: baseline prevalence and course analysed from the European First-Episode Schizophrenia Trial. *Int J Neuropsychopharmacol* **16**: 987–95
- Foley DL, Morley KI (2011) Systematic review of early cardiometabolic outcomes of the first treated episode of psychosis. *Arch Gen Psychiatry* **68**: 609–16
- Foley DL, Mackinnon A, Morgan VA et al (2016) Awareness of pre-diabetes or diabetes and associated factors in people with psychosis. *Schizophr Bull* **42**: 1280–9
- Galling B, Roldán A, Nielsen RE et al (2016) Type 2 diabetes mellitus in youth exposed to antipsychotics: a systematic review and meta-analysis. *JAMA Psychiatry* **73**: 247–59
- Hamann J, Heres S (2014) Adapting shared decision making for individuals with severe mental illness. *Psychiatr Serv* **65**: 1483–6
- Holt RI, Mitchell AJ (2015) Diabetes mellitus and severe mental illness: mechanisms and clinical implications. *Nat Rev Endocrinol* **11**: 79–89
- Knowles S, Planner C, Bradshaw T et al (2016) Making the journey with me: a qualitative study of experiences of a bespoke mental health smoking cessation intervention for service users with serious mental illness. *BMC Psychiatry* **16**: 193
- Lester H, Tritter JQ, Sorohan H (2005) Patients' and health professionals' views on primary care for people with serious mental illness: focus group study. *BMJ* **330**: 1122
- Lindamer LA, McKibbin C, Norman GJ et al (2008) Assessment of physical activity in middle-aged and older adults with schizophrenia. *Schizophr Res* **104**: 294–301
- McGinty EE, Baller J, Azrin ST et al (2015) Quality of medical care for persons with serious mental illness: A comprehensive review. *Schizophr Res* **165**: 227–35
- McGinty EE, Baller J, Azrin ST et al (2016) Interventions to address medical conditions and health-risk behaviors among persons with serious mental illness: a comprehensive review. *Schizophr Bull* **42**: 96–124
- Mitchell AJ, Malone D, Doebbeling CC (2009) Quality of medical care for people with and without comorbid mental illness and substance misuse: systematic review of comparative studies. *Br J Psychiatry* **194**: 491–9
- Mizuno Y, Suzuki T, Nakagawa A et al (2014) Pharmacological strategies to counteract antipsychotic-induced weight gain and metabolic adverse effects in schizophrenia: a systematic review and meta-analysis. *Schizophr Bull* **40**: 1385–403
- NICE (2012) *Type 2 diabetes: prevention in people at high risk* (PH38). NICE, London. Available at: [www.nice.org.uk/guidance/ph38](http://www.nice.org.uk/guidance/ph38) (accessed 05.09.16)
- NICE (2014) *Psychosis and schizophrenia in adults: prevention and management* (CG178). NICE, London. Available at: [www.nice.org.uk/guidance/cg178](http://www.nice.org.uk/guidance/cg178) (accessed 05.09.16)
- Patel MX, Bishara D, Jayakumar S et al (2014) Quality of prescribing for schizophrenia: evidence from a national audit in England and Wales. *Eur Neuropsychopharmacol* **24**: 499–509
- Reilly S, Planner C, Hann M et al (2012) The role of primary care in service provision for people with severe mental illness in the United Kingdom. *PLoS One* **7**: e36468
- Reilly S, Olier I, Planner C et al (2015) Inequalities in physical comorbidity: a longitudinal comparative cohort study of people with severe mental illness in the UK. *BMJ Open* **5**: e009010
- Snoek FJ, Bremmer MA, Hermanns N (2015) Constructs of depression and distress in diabetes: time for an appraisal. *Lancet Diabetes Endocrinol* **3**: 450–60
- Stubbs B, Williams J, Gaughran F, Craig T (2016) How sedentary are people with psychosis? A systematic review and meta-analysis. *Schizophr Res* **171**: 103–9
- Vinogradova Y, Coupland C, Hippisley-Cox J et al (2010) Effects of severe mental illness on survival of people with diabetes. *Br J Psychiatry* **197**: 272–7
- Ward M, Druss B (2015) The epidemiology of diabetes in psychotic disorders. *Lancet Psychiatry* **2**: 431–51