Reducing non-attendance rates in community psychiatry: a case for sustainable development?

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Non-attendance at mental health clinics is an international problem. A survey was conducted in the UK investigating communication methods used by staff to inform and remind patients about appointments. Increased number of communication methods used was associated with a reduced non-attendance rate. A care modelling analysis is provided that explores the healthcare use of three hypothetical patients following clinic non-attendance. The financial and environmental costs of each are then calculated and results discussed. Reducing non-attendance is achievable through the use of multiple communication methods. This small change can improve the sustainability of mental healthcare in different countries by improving quality of care and reducing financial and environmental costs.

Healthcare, globally, is a carbon-intensive industry. In the USA, healthcare contributes 8% of national greenhouse gas emissions (Chung & Meltzer, 2009). In the UK, healthcare emits 25 million tonnes of carbon each year (NHS Sustainable Development Unit, 2013), which is more than the whole carbon footprint of some European countries (Rogers, 2012, pp. 1–2). Mental health services account for 1.47 million tonnes of this. The World Health Organization has stated that climate change is the largest threat to human health in the 21st century (Chan, 2008). It is already having significant effects on global mental health (McDermott et al, 2014; OBrien et al, 2014). It is a concern that the healthcare sector is contributing so much to this threat as a consequence of its carbon footprint.

Importantly, improving the environmental sustainability of mental health services is not just about reducing energy use: it is also about transforming clinical care. Buildings and energy use make up 17% of the carbon footprint, but clinical factors make up the majority of the footprint: pharmaceuticals, 22%; medical equipment, 13%; and clinically related travel, 13% (NHS Sustainable Development Unit, 2013). This paper seeks to highlight how mental health services can improve financial and environmental sustainability by making simple changes to clinical practice. It uses the example of how reducing rates of non-attendance at clinic appointments (known as DNA, for 'did not attend') can improve quality of care while reducing financial and environmental costs.

Reducing DNA rates can improve the sustainability of mental healthcare

Internationally, the average DNA rate across mental health services lies between 15% and 20% (NHS England, n.d.; Pang et al, 1995; Adelufosi et al, 2013), although some countries report rates of over 30% (Alnamlah, 2006). Mental health services in every country would benefit from a reduction in DNA rates, for many reasons. From a clinical perspective, there are three main reasons why mental health services need to reduce DNA rates. First, patients who do not attend are more unwell and more functionally impaired than those who do attend (Killaspy et al, 2000). Second, non-attendance following hospital admission predicts readmission (Mitchell & Selmes, 2007). Patients who do not attend their follow-up appointments have a 25% chance of being readmitted, compared with 10% for those who do attend (Nelson, 2000). And third, higher DNA rates are closely linked with medication non-adherence, further increasing the chances of relapse (Mitchell & Selmes, 2007). Non-attendance, therefore, likely indicates a group of patients who are at increased risk of poor health outcomes and high future service use.

From a service evaluation perspective, there are three further reasons to reduce DNA rates. First, missed appointments are financially costly. In the UK, the cost has been estimated at £600 million per year (Sims et al, 2012). Second, they have an opportunity cost of wasting staff time. Third, there are environmental costs. These include the energy for heating and lighting the clinic room and the use of fuel from failed home visits or attempts at 'cold calling'. However, these environmental costs increase dramatically when the future health costs potentially arising following multiple missed appointments are included, such as the carbon footprint of an in-patient admission. These environmental costs are considered in this paper.

Reducing DNAs. What works?

The two most common reasons for DNAs are patients forgetting about the appointment and administrative errors (NHS Institute for Innovation and Improvement, 2008). Between mental health services in the UK there is a nine-fold variation in DNA rates for initial assessments (Quest, n.d.), which suggests that much non-attendance is avoidable. A Cochrane review looking at the effectiveness of communications to improve appointment attendance for people with serious mental illness

found that telephone calls and texts might increase rates of attendance (Reda & Makhoul, 2001). Evidence suggests that patients are more likely to attend following telephone reminders even if they have failed to attend their initial clinic appointment (Mitchell & Selmes, 2007) and that the higher the DNA rate, the greater the impact of reminders (NHS Institute for Innovation and Improvement, 2008). One study found that SMS reminders (i.e. text messages via mobile phone) led to a DNA rate reduction of 25% (Sims *et al*, 2012). However, there is no evidence to suggest that simply sending further repeat appointment letters will increase attendance (Mitchell & Selmes, 2007). Using a range of communication methods is therefore an important component of reducing DNA rates.

To explore the question of whether reducing DNA rates can improve the sustainability of mental healthcare, a survey is next presented here that investigates the association between DNA rates and the use of different communication methods. Following this, an exploratory care modelling analysis investigated the potential impacts of DNAs on subsequent healthcare use and the associated financial and environmental costs.

## Survey of methods used by staff to remind patients about appointments

A survey was conducted at Oxford Health NHS Foundation Trust, in the UK, investigating how DNA rates vary against the number of different communication methods used by staff to inform patients about appointments. The survey analysed the following methods: telephone call; letter; arranging the appointment in the room; offering an appointment card; and text messaging.

Methods

An electronic survey was sent in January 2014 to all staff working in community settings. It asked about the communication methods they used for different types of appointment. DNA rates were obtained from administrative data for each community mental health team from April 2013 to January 2014. For each team, the average number of communication methods used was calculated. For example, 100% of members of one team may send an initial appointment letter, 57% call the patient and 71% routinely send text messages. Individual communication options were then added together to give an average percentage of the total possible communication methods, so $(100 + 57 + 71)/3 = 76\%$ of possible total communication methods used by the team.

Results

The survey was sent out to 450 staff and received 153 responses (a 34% response rate). There was no association between any individual communication method and team DNA rate. There was, however, a clear relationship between total number of communication methods used and team DNA rate for adult community teams (Fig. 1). In services for older adults, there was no association between communication methods and DNA rate.
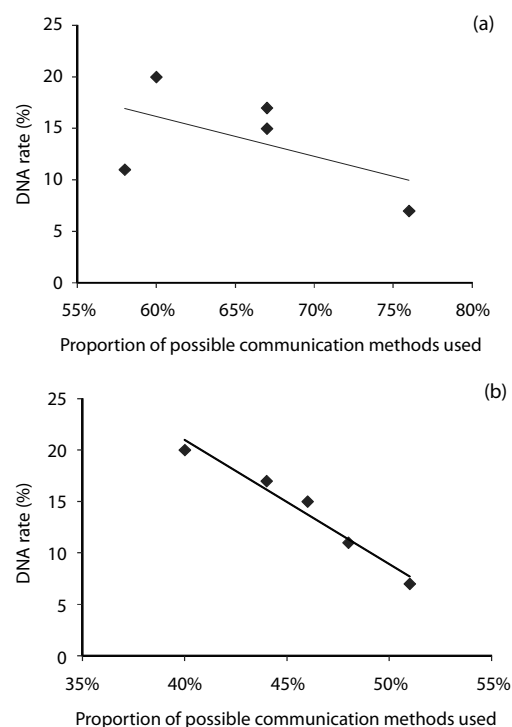
Fig. 1
Effect of communications on team DNA rate: (a) initial assessments; (b) follow-up appointments

A care modelling analysis of the potential financial and environmental impacts of DNAs

There is great variation in the type of DNA and some types are more serious than others. It is therefore useful to present scenarios of the type of problems that can present in any (international) setting. Patient types have been created using key international predictors of non-attendance at mental health clinics from three countries: Nigeria (Adelufosi *et al*, 2013), China (Pang *et al*, 1995) and the UK (Mitchell & Selmes, 2007). These predictors have been grouped into three hypothetical patient types. The scenarios attempt to illustrate the potential financial and environmental costs of DNA, compared with the costs of prompting patients to attend appointments. Table 1 summarises the associated costs in each scenario.

Scenarios

Patient A: low risk

Ms A is 22 years old and has depression. She is referred to mental health services following a poor response to antidepressant treatment. She receives a letter asking her to attend an appointment but she forgets. She is sent another letter but, as her family doctor had told her that he is sceptical about the value of psychiatric support and because she lives far from the clinic, again she does not attend. Following this, a third letter is sent and the secretary phones her to encourage her to attend; however, the patient's depression has now worsened and she does not want to leave the house, so a home visit is arranged.

Table 1

Financial and environmental costs of predicted healthcare use for three hypothetical cases, patients A–C

Stage of presentation	Financial cost (£)	Financial cost (% burden)	Environ-mental cost (kg CO$_2$e^a)	Environ-mental cost (% burden)
Patient A				
Cost prior to DNA				
Initial letter	0.53	<0.1	0.14	0.3
First appointment	139	24.8	13	23.9
Total cost prior to DNA	**139.53**	**24.9**	**13.14**	**24.2**
Cost following DNA				
Second letter	0.53	<0.1	0.14	0.3
Second appointment	139	24.8	13	23.9
Third letter	0.53	<0.1	0.14	0.3
Phone call (5 min)	0.27	<0.1	0.003	<0.1
Third appointment	139	24.8	13	23.9
Travel to home visit	2.12	0.4	1.87	3.4
Fourth appointment	139	24.8	13	23.9
Total cost following DNA	**420.45**	**75.1**	**41.15**	**75.8**
Total cost	**560**	**100**	**54**	**100**
Patient B				
Cost prior to DNA				
Initial letter	0.53	<0.1	0.14	<0.1
First appointment	139	8.7	13	2.1
Total cost prior to DNA	**139.53**	**8.3**	**13.14**	**2.1**
Cost following DNA				
Second letter	0.53	<0.1	0.14	<0.1
Three phone calls	0.81	<0.1	0.009	<0.1
Second appointment	139	8.7	13	2.1
Travel to first home visit	2.12	0.1	1.87	0.3
Third appointment	139	8.7	13	2.1
Travel to second home visit	2.12	0.1	1.87	0.3
Fourth appointment	139	8.7	13	2.1
Mental Health Act assessment^b				
travel	6.36	0.4	5.61	0.9
appointment	371	23.1	13	2.1
Ambulance call-out	235	14.7	68	11.0
Mental health admission	430	26.8	476	76.9
Total cost following DNA	**1464.94**	**91.3**	**606**	**97.9**
Total cost	**1604**	**100**	**619**	**100**
Patient C				
Cost prior to DNA				
Initial letter	0.53	<0.1	0.14	<0.1
First appointment	139	11.1	13	2.35
Total cost prior to DNA	**139.53**	**11.2**	**13.14**	**2.4**
Cost following DNA				
First phone call	0.27	<0.1	0.003	<0.1
Second appointment	139	11.1	13	2.35
Second phone call	0.27	<0.1	0.003	<0.1
Third appointment	139	11.1	13	2.35
Ambulance call-out	235	18.8	68	12.3
General hospital admission	598	47.8	446	80.6
Total cost following DNA	**1111.54**	**88.8**	**540**	**97.6**
Total cost	**1251**	**100**	**553.1**	**100**

^{a} Carbon dioxide equivalent units.

^{b} Requires two doctors plus a social worker, so travel costs are 3 × 2.12 to give the 6.36 and 3 × 1.87 to give the 5.61, and costs for the appointment are 2 doctors each at 139 plus 1 social worker at 93 = 371.

Data for financial and environmental costs were obtained from the following sources: Post Office website; Curtis (2013); British Telecom website; local travel survey (unpublished); NHS Sustainable Development Unit (2013); Berners-Lee (2010).

DNA, did not attend.

Patient B: moderate risk

Mr B has bipolar disorder. He is referred due to concerns about his behaviour following recent discharge from hospital. He is homeless and has been smoking cannabis and displaying signs of mania. An appointment letter is sent to his sister's house (where he often stays) but it is not read. A letter is sent for another appointment and three calls are made to his mobile phone, but he does not agree with the referral so initially does not respond. He answers the last phone call and agrees to attend but then forgets to do so. The team cold-call at his sister's home but he is not there. Reports have been made about increasingly erratic behaviour and a Mental Health Act assessment is arranged, following which he is admitted.

Patient C: high risk

Ms C has low mood and personality disorder. As the referral letter is poor and the referrer is not aware that her suicide risk is high, the psychiatrist sends a letter for an appointment in the following week. She does not attend and is upset as she expected a review the following day. The secretary calls the patient to make another appointment. After some persuading, she agrees to be assessed, but again fails to attend, due to anxiety. A further phone call is made and she again agrees to be seen, but she becomes overwhelmed with anxiety again so does not attend. Her suicidal thoughts worsen and she takes an overdose of tablets. She is found collapsed at home by her mother, who calls an ambulance and she is admitted to hospital for resuscitation.

Projected financial and environmental costs per mental health trust

To provide a benchmark cost for DNAs per mental healthcare organisation, average costs from the scenarios have been multiplied by the average number of DNAs for initial assessments. The data were available for 33 of the 53 mental health trusts in England during October and December 2013 (NHS England, n.d.). A national average DNA rate was calculated from the data. In Table 2, projected financial and environmental costs of healthcare use potentially due to DNAs are displayed.

Discussion

This paper provides a strong rationale for maximising all types of communication prompts to patients for every appointment. First, there is evidence to suggest that avoiding non-attendance can provide significant health benefit. Second, the survey demonstrates that using a variety of simple communications can be effective at reducing DNA rates. Lastly, these scenarios show how small the financial and environmental costs are for the different communication methods (<1%) when compared with the healthcare costs of patient non-attendance (>75%). Most of the financial costs are due to staff and admissions. The vast majority of the carbon footprint is due to admissions, with the next largest component being the energy use for heating and lighting clinical spaces.

Table 2

Projected financial and environmental costs of DNA for initial assessments

Parameters	Values
Number of initial assessments seen across 33 trusts per year	199 344
Number of DNAs for initial assessments across 33 trusts per year	23 596
National DNA rate for initial assessments	11.8%
Average number of DNAs per trust per year for initial assessments	715
Average financial cost of healthcare use per patient following DNA (taken from values reported in Table 1)	£1 044 999
Average environmental cost of healthcare use per patient following DNA (taken from values reported in Table 1)	534 kg CO_2e
Total financial cost per trust per year of DNAs for initial assessment	£714 000
Total environmental cost per trust per year of DNAs for initial assessment	293 tonnes CO_2e

The Cochrane review (Reda & Makhoul, 2001) on DNAs corroborates the finding that the best way to reduce non-attendance is through combining all types of communication methods. That review then draws the conclusions that prompts to encourage attendance are 'cheap' and, considering the financial implications of missed appointments, the intervention 'would potentially pay for itself through the reduction in costs associated with non-attendance' (Reda & Makhoul, 2001). The scenarios presented here demonstrate these potential savings.

The financial impacts of DNAs in mental health have been reviewed (Sims *et al*, 2012). However, the environmental impacts of DNAs have not been discussed. These are significant and add weight to the argument that communications to patients about upcoming appointments should be prioritised. In fact, missed appointments are so common across all countries that avoiding them would have a significant effect on the environmental impact of global healthcare. Taking England as an example, in 2013 there were over 5.5 million non-attendances; given that the environmental impact of the energy use for each appointment is $13 \, kg \, CO_2$, this means that, without including travel or subsequent attempts to see the patient, the environmental saving could be as much as 70 000 tonnes of CO_2 per year.

Implications

A significant increase in the use of the different communication methods is needed to remind patients about their appointments. Mobile phone use is now ubiquitous, even in low- and middle-income countries and, with the use of smartphones increasing rapidly, mental health services in all countries should be using text messages, emails and social media alongside letters and phone calls to increase attendance. An automated system could be developed to provide the patient with phone, text (SMS) and email communications automatically. While this system would have environmental and financial costs, it would most likely lead to a significant reduction in healthcare costs following reductions in DNA rates and reduced subsequent healthcare use, as indicated in this study.

It will sometimes be necessary to perform a home visit for patients who are disengaged or who cannot attend the clinic. Nonetheless, aiming for maximum attendance rates at clinics is an essential part of a sustainable service. Patient attendance of standard community appointments can improve health outcomes and reduce financial and environmental costs.

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