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## An evaluation of opportunistic health checks at cricket matches: the Boundaries for Life initiative

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### ABSTRACT

In 2009, a population level health screening programme was established in the UK for people over the age of 40 years. The primary aim of the service was to identify and treat the leading causes of preventable disease and death, including cardiovascular disease and diabetes. Checks are offered every five years through scheduled appointments at primary care settings, and uptake of such checks has been relatively low to date with 12.7% of those eligible to have a NHS health check receiving one between 2009 and 2013. Non-clinical settings such as sports stadia have previously been used to offer health interventions and opportunistic health checks. Despite relatively modest results in football and rugby settings, professional cricket fixtures with high footfall may offer higher levels of uptake and participant satisfaction, and provide a novel setting for engaging BME communities. This paper describes the process and results from the Boundaries For Life initiative that delivered health checks at professional cricket matches over the 2014 and 2015 seasons. Uptake of the checks was significantly high in comparison to other sports settings, with very strong feedback from participants on the convenience of service.

### Background

Cardiovascular disease (CVD) including ischaemic heart disease, stroke, diabetes and obesity are major public health concerns in the United Kingdom (UK). Data showed that in 2013 there were over 3.2 million diabetics living in the UK and this figure was projected to increase to 5 million by 2025 (Diabetes UK 2013). The costs associated with treating these conditions are extremely high, with diabetes alone costing £10 billion pounds a year in the UK, equivalent to 10% of the annual NHS budget. The Centre of Economics and Business Research (CEBR) reported that the cost of treating CVD in the UK in 2014 was £14.4 billion (which equates to 1.4% of the UK GDP), predicted to rise to £17.6 billion by 2020 (CEBR 2014).

In 2009, the NHS introduced a new programme of Health Checks, defined as a: ‘risk assessment, risk reduction and risk management programme’ (PHE 2015). The primary aims of the programme are to identify and treat the leading causes of preventable deaths from some types of non-communicable diseases (NCDs), including CVD, diabetes, kidney disease and stroke. Members of the population aged between 40 and 74 are invited by a letter from either their general practitioner (GP) or a local government department responsible for public health to attend a health check every five years to assess their risk, and promote suitable interventions including lifestyle changes. Checks are based upon set appointments, and are usually undertaken in GP surgeries and local pharmacies, but may also be offered at other neighbourhood locations such as leisure centres, whilst in some areas, NHS Health Checks are offered by mobile units. Reminders to attend checks are sent by phone and email, whilst those with a previously diagnosed NCD are excluded from being invited to five year checks. Public Health England (PHE) has suggested that: ‘each year NHS health checks could prevent 1600 heart attacks and save 650 lives, prevent 4000 from developing diabetes and detect 20,000 cases of diabetes or kidney disease earlier’ (PHE 2015). Economic modelling has suggested the programme would result in savings to the NHS of £57 million per year after four years and £176 million per year after 15 years (PHE 2015).

While there is some evidence that the introduction of this programme has led to an increase in the detection of cardiovascular risk factors (Robson et al. 2016), uptake of the programme is lower than anticipated. A recent study which has evaluated the first four years of the programme found that the uptake of health checks was relatively low, with 12.7% of those eligible to have a NHS health check receiving one between 2009 and 2013 (Robson et al. 2016). There is little data to support the reasons for the significant variation in the uptake of NHS health checks, and it is possible that barriers such as the lack of awareness of the programme, appointments allocated during normal working hours, the inconvenience of appointment locations and the lack of motivation to have a health check in the absence of symptoms may have contributed to the low uptake. There is also evidence suggesting that health checks offered outside traditional clinical settings, for example the GP surgery, may be beneficial in leveraging greater levels of uptake (Visram, Carr, and Geddes 2015).

### **Delivery of health checks at sports settings**

One non-clinical setting that may offer a useful locus of engagement for health promotion education and health interventions such health checks are professional sports clubs and their stadia. There is now an emerging body of literature demonstrating the potential for sports stadia to be used in the promotion of healthy lifestyles, highlighting the power of a club’s brand and the iconic status of sports venues to engage fans and members of the local community with a view to influence changes in lifestyle behaviours (Drygas et al. 2013; Pringle et al. 2013). The majority of successful projects are those that engage target groups of fans or members of the local community on *non-matchdays*, for example work undertaken in Scotland using sports clubs and their venues for successful weight loss programme for overweight male football fans (Hunt et al. 2014), a project in Belgium using professional football settings and players to promote better diet and levels of physical activity in socially disadvantaged young people (Dubuy et al. 2014), and a project using football settings to improve levels of physical activity and social interaction in older adults over 55 years old (Parnell et al. 2015). As sporting events attract large crowds in their tens of thousands, it

has been speculated that matchday sports settings may be harnessed for the purposes of health promotion and health interventions, whilst certain sports may be effective in targeting particular high risk groups. The efficacy of such projects to date has been mixed, with lower than anticipated levels of engagement from fans in health-related behaviours, and time pressures being cited as a main barrier to participation (Witty and White 2011; Curran, Drust, and Richardson 2014).

However, in distinction to sports such as football and both codes of rugby, professional cricket offers a different type of matchday experience, in terms of a much longer format (up to seven hours play), more relaxed atmosphere and a different fan demographic. The latter observation is particularly significant for targeted health interventions, for example, live cricket audiences include greater levels of black, minority and ethnic (BME) groups who have a higher prevalence of Type 2 diabetes, coronary heart disease and cancer when compared to White British populations (Gholap et al. 2011; Jin et al. 2015). Therefore, targeting cricket matches – in particular international fixtures featuring teams from South Asian and Caribbean countries – as a health promotion setting may be effective in engaging BME groups with a view to reducing the burden of these diseases in these populations. Furthermore, unlike football and rugby where the fan is in the venue for two to three hours, the long form of international cricket (Test Matches and One Day Internationals) can see fans in the venue for up to eight hours, in some cases over five consecutive days, thereby increasing the opportunity for fans to engage with health promotion interventions such as health checks without fear of missing a significant proportion of the game. In addition, scheduled breaks in play and unscheduled interruptions (for example, due to bad weather) only increase the opportunity for fans to engage with health promotion activities.

In 2010, a team of health care professionals developed a voluntary initiative known as Boundaries for Life (BFL) with the intention of offering free health checks for fans and staff attending international cricket matches. After early successes and growth of BFL to feature at more fixtures in the following years, an evaluation study of the initiative was established, with funding provided by a small research grant from Institute of Advanced Studies (IAS) at Warwick Medical School. The primary aims of the study were to explore the feasibility of offering free health checks at cricket matches with high footfall (predominantly international fixtures), and user experience data concerning suitability of using professional cricket settings for delivery of health checks. Ethical approval for the study was granted by Warwick Medical School.

## Methodology

The BFL health check service was delivered at professional cricket venues by a team of clinicians, including doctors, dentists, nurses and medical students. The service was provided to participating venues free of charge over the course of the 2014 and 2015 season, and there was no cost to either fans or staff to undertake a health check. Checks either took place in a designated room within one of the venue's stands, or in a large 'gazebo' style tent near to other commercial concessions (eg food and drink stalls) positioned behind the main spectator stands. Checks were promoted to fans through web articles on the host club's website, social media channels, public address announcements, and in some cases, messages on the stadium 'big screen' and promotion through broadcast radio ('Test Match Special'). An additional promotional email was also sent to members of staff at some of

the participating clubs making them aware of the free service. The service was promoted primarily to people over the age of 40, but anybody over the age of 18 wanting to have a check was allowed to participate.

Prior to undertaking a health check, participants were asked to complete a simple medical questionnaire enquiring about their health and lifestyle, including questions concerning their current health, any previous incidence of ill health, any relevant family history of ill health, as well as current levels of smoking and alcohol consumption (see Table 3). The health checks included a measurement of blood pressure, random blood sugar, random total cholesterol, random high density cholesterol (HDL), low density cholesterol, body mass index (BMI) and a screen for mouth cancer. The results were recorded onto a data card for the patient to take to their GP and each patient was signposted to an appropriate health care provider if deemed necessary. The health data were anonymously recorded onto an excel spreadsheet post-event. Participants were also asked to complete an anonymous qualitative questionnaire on their experience of the health check.

## Results

### Demographics

Data were available for 513 participants who completed health checks over the 2014 and 2015 cricket seasons. Seven cricket grounds participated in the health checks and the breakdown of participation is shown in Table 1.

There were 324 males with a mean age of  $49 \pm 15.2$  years and 107 females with mean age of  $47 \pm 14.2$  years. Gender was not recorded for 83 individuals. Of the 499 where data were available, 338 (67.7%) were fans attending the match, and another 161 (32.3%) were staff employed at the cricket ground as either club staff or event specific staff (eg security or catering staff). 84% gave their ethnicity as white (British), 14% were of Asian origin, 1% Chinese and another 1% falling into the 'other' category.

### Medical history

Over two-thirds of the participants reported not having any health issues relating to high blood pressure, diabetes, high cholesterol, heart disease or mouth cancer while 43.4% had no family history of these conditions. The distribution of self-reported illness in this group is summarized in Table 2.

**Table 1.** Distribution of health checks conducted across cricket venues in 2014 and 2015 seasons.

Venue/locations	Number of events	Type of match	Total screened
Edgbaston (Birmingham)	1	One Day International	25
Headingley (Leeds)	1	Test Match	48
Sussex County Ground (Hove)	2	Domestic County Match	75
Lord's (London)	2	One Day County Cup Final	122
Emirates Old Trafford (Manchester)	2	Test Match and ODI	98
Kia Oval (London)	2	Test Match	97
SWALEC (Cardiff)	1	International T20 (men's and women's matches)	48

**Table 2.** Self-reported health status of users attending for a health checks (n = 513).

Condition	Current history	Family history*
None	339 (65.8%)	221 (43%)
High blood pressure	65 (12.6%)	123 (23.9%)
Diabetes	17 (3.3%)	113 (22%)
Heart disease	13 (2.5%)	91 (17.7%)
High cholesterol	74 (14.4%)	96 (18.7%)
Mouth cancer	1 (0.2%)	26 (5.1%)

\*As many patients had multiple conditions in their family history the total percentages for these exceed 100%.

**Table 3.** Findings of health checks in cohort of 513 users.

Parameter	Findings
Body mass index (BMI)	28% normal 42% overweight 10% obese 10% morbidly obese
Blood pressure	High blood pressure according to measurement of systolic blood pressure (40%)
Random cholesterol >5 mmol/L (high risk)	39%
Random HDL <1.04 mmol/L (high risk)	17%
Random blood sugar (>11 mmol/l) suggestive of diabetes	7–11 mmol/l (17.1%) >11 mmol/l (1.23%)
Mouth check	11% abnormal mouth check
Alcohol consumption	Male >21 units a week 9% Female >14 units a week 7% Non-drinkers 30%
Smoking	89% non-smokers

### Health check findings

The clinical findings of the health checks is summarized in Table 3.

### Feedback

The feedback for the health check initiative was very positive with all (100%) participants reporting that they would recommend the health checks to others through a qualitative feedback form. Many of those participating in health checks were made aware of the service on the day through promotional activities or had simply happened to come across the health check service when walking past, and felt that it was convenient in terms of time and location. It was interesting to note that only 1% of the users underwent a health check because they were worried that something was wrong. A summary of the feedback is provided in Table 4.

### Discussion

A review of the literature found no publications that had evaluated health checks conducted in professional cricket venues around the world. As such, this pilot study has important findings and implications for health commissioners, in particular those working in the area of health checks provision, stadium managers, researchers and practitioners. The high indices for risk factors such as BMI (with 20% either obese or morbidly obese and 42% overweight) are in line with the findings of the UK's National Obesity Observatory data from 2009, which

**Table 4.** Summary of the feedback for the health checks.

Feedback questions	Response
How did they hear about the service?	Walking past (60%) Word of mouth (19%) PA announcement (14%) Other (7%)
Reason for attendance? (multiple answers per person)	Convenience of location (54%) Convenience of time (34%) Curious (35%) Walking past (30%) To get a clean bill of health (29%) Free Service (26%) Recommendation (7%) Worried something was wrong (1%) Unable to see GP (2%) Good previous experience (1%)
Would you recommend the health check to others?	100% yes
Were you provided an explanation of health checks?	100% yes
Were you treated with dignity?	100% yes
Did you feel to location of the checks gave you enough privacy?	86% yes, definitely 14% yes, to some extent
How would you rate the time of the checks?	99% about the right time 1% not enough time
Were you provided with any information?	56% verbal 26% written 12% none 6% non-response
Were you advised to have a follow up?	19% GP follow up 13% dentist follow up
How would you rate your experience?	83% excellent 17% very good

found that 23% of the adult UK population were obese and 38.3% were overweight (PHE 2016). This suggests that the BMI sample in this study is representative of the overall UK population. The percentage of elevated random cholesterol of 39% in this study was lower than the WHO data for Europe (54% for both sexes) but in line with the global prevalence of raised cholesterol figure of 39% (World Health Organization 2008). As blood pressure measurements are subject to fluctuations especially in uncontrolled environmental conditions such as those encountered on a match day, it is difficult to make a definitive diagnosis of high blood pressure based on a single reading. Finally, as there is no follow up data available on this cohort of users, it is difficult to quantify the actual health benefits of disease prevention, although anecdotal data suggested that a small number of individuals ( $N \leq 10$ ) who had undertaken a BFL check three years running had demonstrated reduction in risk factors such as BMI, cholesterol and blood pressure, whilst they reported feeling healthier.

The initial data from 513 users of the service demonstrates high levels of interest amongst fans and staff undertaking opportunistic health checks offered at cricket matches, something which is substantiated further when comparing this data with the uptake of health interventions at professional football and rugby league matches (Witty and White 2011; Curran, Drust, and Richardson 2014). Whereas previous studies using football and rugby settings have cited problems of engaging fans in health interventions on matchdays (in particular men), and the complexities of implementing and delivering such interventions over a short period of time, user feedback from the BFL service was almost entirely positive, with many participants commenting on the convenience of the service and how this complemented their matchday experience. Given the overall acceptance of the initiative it

is possible that the initiative could be scaled up to offer free health checks targeting cricket loving fans from South Asian and Afro-Caribbean populations who exhibit higher levels of NCD-related risk factors, and lower levels of access to traditional primary care services. Given relatively poor levels of uptake at population level for NHS health checks, it is possible that cricket may play an important role in incentivizing those attending a match to have an opportunistic health check, in part owing to the convenience of time and place. The study also demonstrates that due to the longer form of the game fans are not overtly discouraged by the 10–15 min spent having a health check. In addition, both scheduled breaks (lunch interval) and unscheduled breaks in play (rain breaks) during a cricket match also provide further opportunities for the uptake of health checks. It was also observed that many of the users had a health check because they saw others having the same.

There were also concerns that the checks would be selective and favour those who were worried about their health and would therefore be biased towards the ‘worried well’ or those who could not get an appointment to see their GP. However, the feedback data found that only 1% of participants attended because they were worried about their health. In addition, only 2% of participants stated that they were unable to see their GP for a check, thus suggesting that they could have seen their GP but felt a check at a cricket match was more convenient. Although the findings of this study support the acceptance of health checks outside of the traditional medical model, it is unknown whether the checks themselves can change or modify health behaviour.

A behavioural change framework, the COM-B model (Michie, Atkins, and West 2014), may be used to classify the reasons for attendance, as well as non-attendance at opportunistic health checks provided at cricket matches, based upon three broad categories: capabilities, opportunities and motivations. The BFL initiative provides users with *capability and opportunity* as there is the option for a free health check at a venue that they have already chosen to attend. Furthermore, the breaks in play provide further opportunities to have a health check. It is also possible that behaviour of the users may have been influenced through the positive association of sports and health and this may encourage them to have a health check. The authors are developing further work streams which will look at the application of the COM-B model to see if whether the NHS style health checks can modify health behaviour.

All seven cricket venues who hosted the BFL service have offered positive feedback from an organizational perspective, and additional work is underway to look at how venues can work more closely with local health commissioning groups to maximize the cost-effectiveness and sustainability of the impact of offering free health checks during cricket matches. Further work is also being planned to include greater levels of user follow up after participation in a health check, and comparisons in service uptake between different time formats of the game (T20 compared to One Day Internationals) and domestic cricket compared to international matches. Initial data suggests that it is not the format of the game but the positioning of the health checks service that prompts greater levels of uptake, something which can be attributed to the opportunistic nature of participants choosing to undertake a health check whilst passing by.

## Conclusion

The findings of this initial study suggests that cricket stadia may be a feasible setting for providing health promotion interventions in populations that may not otherwise engage

with primary care. Although the types of health checks illustrated are not intended to replace NHS health checks, they may play a role in augmenting the uptake of statutory checks using the power of sport to modify health perceptions and ultimately health behaviour. Further studies are required to look at the scalability and cost-effectiveness of rolling out similar initiatives on a larger scale.

## Disclosure statement

No potential conflict of interest was reported by the authors.

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