

## LETTERS

### The authors respond to “NHS Health Check: national evaluation findings and implications”

We thank Newton and colleagues for their comments on our study evaluating the impact of the National Health Service (NHS) Health Check program.<sup>1</sup> The slow take-up of the NHS Health Check in the first four years and a delay in publicizing a universal code (i.e., Read code) for Health Check attendance is reflected in the data used for our study. In the random sample of 138 788 patients who were eligible for a Health Check in the first four years, only 10.6% (14712/138788) had a Read code indicating their attendance as compared with 21.4% identified by our algorithm.

Our algorithm identified Health Check attendees based on complete recordings of blood pressure, body mass index, cholesterol and smoking status within a six-month window, during which a patient was eligible for a Health Check, and this approach appears to be robust.<sup>2</sup> We found that 82% (11991/14712) of the Read coded Health Checks in this study were identified by our algorithm and, within those, 80% (9539/11991) were assigned a date of Health Check within three months of their original Read coded dates.

Newton and colleagues<sup>1</sup> suggest that the modest reduction in modelled cardiovascular disease risk we identified may be an underestimate. We used a robust difference-in-differences matching model to account for the underlying trends in cardiovascular risk over time.<sup>3</sup> We acknowledged the potential limitation in using multiple imputation to address missing data, but our findings using a complete case analysis (i.e., only considered non-attendees with complete risk factor data) were broadly similar.<sup>3</sup>

In response to their concerns about not basing our analysis on patient attendance identified by a Read code, we have compared risk reduction in attendees identified by Read codes and nonattendees (both without a Read code or algorithm-identified attendance). The results presented in Table 1 suggest a smaller impact of the NHS Health Check when attendance is defined using Read codes. This finding implies that using the algorithm did not result in underestimation of program impacts. However, we agree

**Table 1: Comparison with new findings based on Read coded Health Check attendance**

Outcome	DIDM estimator (95% CI)	
	Main findings in paper	New findings*
QRISK2 (10-yr CVD risk)	-0.21 (-0.24 to -0.19)	-0.10 (-0.13 to -0.07)
Systolic blood pressure (mm Hg)	-2.51 (-2.77 to -2.25)	-1.40 (-1.72 to -1.07)
Diastolic blood pressure (mm Hg)	-1.46 (-1.62 to -1.29)	-0.90 (-1.09 to -0.70)
Body mass index (kg/m <sup>2</sup> )	-0.27 (-0.34 to -0.20)	-0.19 (-0.26 to -0.13)
Total cholesterol (mmol/L)	-0.15 (-0.18 to -0.13)	-0.09 (-0.11 to -0.06)
Smoking prevalence (%)	-0.11 (-0.35 to 0.13)	-0.14 (-0.45 to 0.17)
Statin prescribing (%)	3.83 (3.52 to 4.14)	2.56 (2.19 to 2.93)
Antihypertensive prescribing (%)	1.37 (1.08 to 1.66)	0.37 (-0.002 to 0.74)

Note: CI = confidence interval, DIDM = difference-in-differences matching.  
\*The comparison between Health Check attendees identified by Read codes and non-attendees who had no Read code or algorithm identified attendance at Health Check.

that looking at longer-term impacts of the program are important, including an examination of the impacts of brief lifestyle advice.

The success of universal cardiovascular disease risk assessment programs is dependent on high uptake and delivery of effective interventions. Although the performance of the NHS Health Check has improved, current uptake of 49% seven years after the program started requires attention.<sup>4</sup> This is especially so, given the program has benefited from substantial investment and is being delivered in a system with universal health coverage, well-developed primary care, and very high electronic medical records use. On a more positive note, the program appears equitable with similar attendance among patients living in wealthier and poorer areas, although our previous findings of significantly lower participation among Black and Chinese communities is concerning.<sup>2</sup> Our findings also suggest that the NHS Health Check may have improved detection of hypertension, type 2 diabetes mellitus and chronic kidney disease.<sup>3</sup>

A recent microsimulation study performed by Kypridemos and colleagues<sup>5</sup> has estimated the impact of NHS Health Check on morbidity and mortality from cardiovascular disease, and compared that with other public health strategies. The authors found that universal screening was the least effective strategy in reducing health inequalities, whereas a combination of population-wide intervention and targeted screening (for the most deprived areas) was the most effective.

These findings highlight the ongoing need to invest in whole population interventions alongside programs that target high-risk individuals, such as the NHS Health Check.

**Kiara C.-M. Chang MSc**  
**Azeem Majeed MD**  
**Eszter P. Vamos MD PhD**  
**Michael Soljak PhD**  
**Christopher Millett PhD**

Department of Primary Care and Public Health, School of Public Health, Imperial College, London, UK

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### References

1. Newton JN, Thompson K. NHS health check: national evaluation findings and implications. [letter]. *CMAJ* January 30 2017; 189:E172.
2. Chang KC-M, Soljak M, Lee JT, et al. Coverage of a national cardiovascular risk assessment and management programme (NHS Health Check): retrospective database study. *Prev Med* 2015;78:1-8.
3. Chang KC-M, Lee JT, Vamos EP, et al. Impact of the National Health Service Health Check on cardiovascular disease risk: a difference-in-differences matching analysis. *CMAJ* 2016; 188:E228-38.
4. Explore NHS Health Check data. London (UK): NHS Health Check; 2016. Available: [www.healthcheck.nhs.uk/commissioners\\_and\\_providers/data/](http://www.healthcheck.nhs.uk/commissioners_and_providers/data/) (accessed 2016 Oct. 8).
5. Kypridemos C, Allen K, Hickey GL, et al. Cardiovascular screening to reduce the burden from cardiovascular disease: microsimulation study to quantify policy options. *BMJ* 2016;353:i2793.

**Competing interests:** Azeem Majeed's medical practice takes part in the NHS Health Check Program. No other competing interests were declared.