

Written evidence submitted by the REACT/ REFLECT research team, University of Manchester (ADM0023)

1. Executive summary

- Algorithms as decision aids are increasingly being used in medicine as part of a greater drive towards “precision medicine” that can include prevention, early diagnosis and treatment options. As such algorithms are an important tool to direct the most appropriate actions to the most appropriate individuals and groups to maximise benefits and minimise potential harms.
- As an example of two areas where such work offers great potential we describe here some early work around risk prediction and risk assessment in the field of cancer to illustrate how such algorithms are gaining ground and offer scope for improvement in services going forwards.
- **REACT** is an on-line cancer risk assessment tool, which estimates current risk of five common cancers. A risk score of having a current cancer diagnosis is generated by responding to questions about symptoms in an on-line questionnaire.
- **REFLECT** is an on-line assessment tool which estimates future risk of developing different cancers from responses to lifestyle questions. It also offers advice on how risk can be reduced by adopting healthy lifestyles.
- Currently, too many people are developing cancer in England and too many are diagnosed too late when treatments are less effective.
- Evidence-based, on-line risk assessment tools provide opportunity to provide information to help people to reduce their future cancer risk and, when people have actual symptoms, to encourage early diagnosis of cancer when treatments work best.

2. We are a team in the Faculty of Biology, Medicine and Health in the University, led by Prof Ken Muir. This work has evolved from knowledge and research about cancer epidemiology and a desire to use that evidence to impact on the numbers of cancer deaths. The team is partnered with The Christie Hospital, the National Cancer Vanguard and the NHS across Greater Manchester, especially GM Health and Social Care partnership. The submission is an opportunity to promote discussion and debate about the potential to use these tools within existing NHS and other public sector infrastructure.

3. In many areas, services to promote healthy living and healthy lifestyles are reducing and their range is limited. Some people find it difficult to or struggle to access these services. Use of the internet for health advice is extensive. Some people are more comfortable using on-line tools than having a face to face discussion.

4. The tools have been generated using existing epidemiological evidence about lifestyle risk factors and symptoms linked to early cancers. Focus group work has helped shape the websites to be clear, informative and user friendly. The latest stage of the work is to pilot the REACT tool within healthcare settings such as pharmacies and GP surgeries.

5. The tools are currently to be piloted for use by people supported by a health professional who is trained to help them understand the on-line tool and support them in completing the questionnaire. The healthcare worker will explain the risk assessment results and suggest any next steps and/or signpost to other services. There is however the potential for the tools to be used by people on their own without support. At the moment lifestyle advice within the tool is standalone however this could be linked to existing lifestyle support services in the person’s local area. Similarly, at the

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moment, if risk of having a cancer is high the pathway is back to the GP, however there is opportunity to link with developing “one stop shops” for cancer referrals where someone identified at high risk of cancer could be automatically referred to diagnostic services for follow up. In addition, there is opportunity to use the information generated to create on line support groups to help people adopt healthier lifestyle and access local events and services.

6. The work is linked to UK Biobank research and as more refined epidemiological evidence emerges this will be fed into the risk assessment tools to improve their efficacy. The current tools use only information on lifestyle and symptoms but future versions could use genetic information from biomarkers submitted by those using the tool.

7. Although current work focuses on cancer risk and cancer related symptoms, the work is applicable to other diseases such as cardiovascular disease, respiratory and liver disease where the evidence is already available to develop an expanded disease risk and early diagnosis tool.

8. Previous research has indicated that providing information about risk, although interesting, is often insufficient in itself to provoke action and lifestyle change. The project is therefore looking to future work where a wide cohort of health, social care, voluntary sector and others are trained and encouraged to use the tools with people and supported to offer brief advice to encourage lifestyle change. Trying this at street or neighbourhood level has been suggested but is not, as yet, planned.

9. A number of tools, such as ours, are available or under development. We are aware that NICE is considering how best to quality assure such websites/ apps/ tools. We are eager to participate in this work and to see how our tool can be developed to high standards and integrated with existing or reformed services to promote healthy living and early diagnosis of disease.

10. As this work is research, it is expected that it will be published in the scientific literature as results emerge. The approach has great potential to be expanded to include a range of other non-communicable diseases including dementia and work is in hand to pursue this in the **REACH** program.

The submission about this project is made to the committee at this early stage is to illustrate one example of how algorithms offer potential for improving healthcare provision and to encourage discussion and feedback on the work as it develops.

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