

Polygenic scores and clinical utility



Polygenic scores (PGS) are biomarkers that could be used to inform estimation of an individual's risk of developing disease. There is uncertainty as to whether they are clinically useful, and whether they would make a valuable addition to clinical practice and public health activities. Clinical utility is central to the debate on the use of polygenic scores within health systems.

Determining if polygenic scores should be integrated into healthcare requires considering their utility. However, this is not an easy task.

Polygenic scores and clinical utility explains some of the key topics that concern clinical utility, including how polygenic score analysis can be conceptualised as a test, what could be considered utility, and how the evaluation and regulation of tests impacts how specific applications of PGS may be used.

In this report we have brought together these elements, described the different perspectives on clinical utility of PGS in detail and set out a balanced consideration of the arguments. We show that assessment of the clinical utility of PGS is ultimately subjective, influenced by the context of the application's use and the perspective of the assessor. In addition, we also outline some of the key factors that will need to be addressed when considering utility of specific PGS applications.

Key points

For healthcare tests, value judgements about the information derived from a test and how this information influences decisions about next steps shapes considerations as to the test's utility. Similarly, a judgement on the clinical utility of polygenic scores analysis requires a clear understanding of what information it provides and how this information is intended to be used.

There are numerous options for how polygenic scores are generated and interpreted. For example, polygenic scores may stand on their own as discrete predictors, or they could be combined with other risk factors in an existing or novel risk prediction model, to provide a combined risk estimate.

So how we approach polygenic score analysis as a novel test is key to assessing utility to healthcare pathways as well as the regulatory requirements governing its generation and use.

Decision makers may consider a number of factors in relation to the use of a tests (e.g. clinical outcomes, personal outcomes, cost-effectiveness, feasibility, and test delivery). They may also place differing emphasis on these factors which can lead to contrasting decisions on utility despite having access to the same evidence for a particular test.

There is broad agreement that polygenic scores as a biomarker could have potential in informing different healthcare scenarios. But ultimately, the added value of information from polygenic scores is likely to vary for different use cases.

Next steps

Significant effort has gone into evaluating the performance of polygenic score models. Now attention should turn to evaluating the tests or test systems that are based on these models.

Research into how they might be used in specific care pathways is vital. Both require clear articulation of the proposed application, the specific clinical context, and the population to whom the test is to be offered. Without this information, their clinical utility cannot be determined sufficiently.

To deliver the best outcomes for both individuals and the health system, an assessment should be made on each potential test based on a polygenic score model.

Polygenic scores and clinical utility is freely available to download from the PHG Foundation website

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