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Advisory on the Use of Polygenic Risk Scores to Screen Embryos for Adult Mental Conditions

Several private companies are using polygenic risk scores to screen embryos for adult mental health conditions. The screening is done as part of *in-vitro* fertilization. A polygenic risk score is a single number that measures part of a person's genetic predisposition for a condition[1]. These genetic scores are built by adding up the small effects from many hundreds or thousands of genes. Although in general higher scores mean you are more likely to have a condition, many healthy people will have high scores; others might develop the condition even with a low score. The accuracy with which a polygenic score can predict psychiatric illnesses, such as schizophrenia, bipolar disorder and major depression, is currently not sufficient for clinical use. Furthermore, the unintended consequences of its use for embryo selection need to be considered. While polygenic risk scores are used in research, there are currently no clinical uses in psychiatry.

The ISPG views with concern the offering of polygenic embryo screening services for psychiatric conditions, for both scientific and ethical reasons. First, polygenic risk scores do not determine whether a person will develop a condition. They measure just one of many possible risk factors. Second, polygenic risk scores are not specific to a single condition. This means that selection for one condition can affect other genetic traits. Third, it is not known how to accurately communicate the level of risk to prospective parents. Fourth, in many countries, there is no regulation or oversight of polygenic embryo screening to protect against misuse, like there is for other kinds of genetic testing. Fifth, screening embryos for psychiatric conditions may increase stigma surrounding these diagnoses. Finally, psychiatric genetics has a history of misuse for eugenics[2-4], and polygenic embryo screening raises many ethical, legal, and social issues that can potentially lead to harm and have not yet been studied or addressed[5].

While scientific and ethical issues have been widely studied for single-gene embryo testing[6], the issues listed above have not been explored for polygenic embryo screening. The few published polygenic embryo screening studies have been mostly led by a private company selling these services[7–11]. Public discussion and debate including all potential stakeholders is urgently needed on a national and international scale. Given these considerations, the ISPG urges caution and calls for additional research and oversight on the use of polygenic embryo screening.

For those seeking additional information, we recommend **this introduction** to polygenic scores from the Broad Institute and **this blog post** from the National Society of Genetic Counselors.

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