Background Genomics has the potential to play a central role in 21st century research and clinical practice. Over the past decade, medical researchers have built powerful genomic tools and generated enormous sets of data, but have not yet developed strategies to overcome the many barriers to their use in treating patients. To fully implement genomic data into clinical practice will require overcoming numerous barriers, including lack of clinician and scientist knowledge about the potential uses of genomic information, lack of a standardized platform for using genomic data, disjointed access to genomics data, and concerns with appropriate informed consent for both primary and incidental genomic findings. Our goal is to identify the most pressing barriers to implementation of genomic findings.

Methods We performed stakeholder meetings with physicians, scientists, and community members to identify barriers to implementation of genomics science and developed an implementation plan to address these barriers.

Results We found that physicians are unaware of many genomic resources that can advance clinical care, and most clinicians are unprepared to select, interpret, explain, or apply genomic test results. Evidence of clinical validity, utility, and uptake of genomic information is limited, and there is no consensus on what (if anything) clinicians and researchers should do with “incidental” genomic findings that arise as a result of whole exome or whole genome sequencing. Finally, large-scale sequencing will present a methodological challenge to clinical efficacy studies, which have historically focused on single-gene tests. Based on these findings we developed institutional plans to make genomic resources more accessible and useful to a wide variety of researchers, facilitate formation of multidisciplinary teams who will use genomics in translational research, and educate researchers, clinicians, patients, and the public about the use of genomics. Patient and participant engagement supports the critical interplay between basic and translational researchers that will be required to make the clinical use of genomics a reality.

Discussion Research has greatly increased our understanding of the genetic underpinnings of psychiatric illnesses and many other disorders. Making use of genomic data to improve health will require an integrated, inclusive, and dynamic approach to incorporate expanding genomic knowledge into clinical care and will require psychiatric genetic research to move from discovery to implementation. Enhancing the education of health care providers at all levels as well as communication with patients and communities will be required to achieve the full potential of precision medicine. Genomic scientists must collaborate closely with clinical and translational researchers and members of the public to foster clinically relevant genomic discovery and to initiate the translation of such discovery into effective prevention, diagnosis, and treatment of psychiatric illnesses.

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