

Database translates schizophrenia research into one 'language'

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Functional magnetic resonance imaging (fMRI) and other brain imaging technologies allow for the study of differences in brain activity in people diagnosed with schizophrenia. The image shows two levels of the brain, with areas that were more active in healthy controls than in schizophrenia patients shown in orange, during an fMRI study of working memory. Credit: Kim J, Matthews NL, Park S./PLoS One.

[SchizConnect](#), a new meta-database that translates all clinical schizophrenia studies into a single scientific "language," has been launched to help researchers long stymied by inconsistent findings between traditionally small studies.

The Northwestern Medicine portal is the first meta-data base dedicated to schizophrenia neuroimaging data and has the largest collection of schizophrenia neuroimaging in the country.

"It's rare for any single research group to have the sufficiently large datasets needed to test hypotheses and capture schizophrenia's full variability and complexity," said Lei Wang, the creator of SchizConnect and an assistant professor in psychiatry and behavioral sciences and of radiology at Northwestern University Feinberg School of Medicine.

"This project will help scientists draw meaningful conclusions about the disease using very large data samples that are well beyond the scope and capability of a single scientist."

Despite hundreds of studies, schizophrenia remains poorly understood. In part, that's because the findings of traditionally small individual schizophrenia studies are variable and difficult to replicate. The larger database of SchizConnect allows scientists to see broader results across 1,000 subjects instead of 100.

Wang expects SchizConnect to accelerate discoveries related to the mechanisms underlying schizophrenia, the complex and disabling brain disorder that affects 1 percent of the population and starts in the late teens or early 20s. That is a key strategic objective of the National Institute of Mental Health.

Schizophrenia researchers' data now sit in individual databases or even in common repositories but none of them talk to each other across studies, creating silos that prevent collaboration and discovery. It's been difficult to share and compare data because the studies are essentially recorded in different scientific "dialects."

All scientists collect data on gender, but they may code it M and F, 0 and 1 or 1 and 2. If scientists search for the number 1 in all the studies'

gender code, they may get male or female or nothing at all. Thus, scientists don't know if they are studying the correct gender.

Wang and his team had to painstakingly analyze every study and translate key data terms into a searchable common language. These include neuroimaging, cognition and clinical symptoms terms.

They translated disparate study assessments for structural and functional magnetic resonance imaging, working memory, attention, executive function and learning abilities as well as symptoms of patients including mood assessments, standard demographics and whether they are right- or left-handed.

"Our scientific goal is to provide data so key questions about schizophrenia can be answered, such as how the brain's regions communicate differently and where the breakdowns of communication are," said Wang, who also is director of Northwestern's Neuroimaging and Applied Computational Anatomy Lab and Northwestern University Neuroimaging Data Archive. "Sometimes you need big data to answer these questions and understand the heterogeneity of the illness."

Now the site pulls from initial repositories contributed by Feinberg, the Functional Biomedical Informatics Research Network at the University of California-Irvine, the Mind Research Network in New Mexico and the Information Sciences Institute at the University of Southern California.

In 2016, three or more large institutional datasets will be added, bringing the number of subjects to between 2,000 and 3,000, Wang said. To a user, the system appears as a single virtual database with a uniform schema (language), but the data remains at the repositories and under the control of the data providers.

"The more subjects we have, the faster the discoveries in this disabling mental disorder," Wang said.

People with [schizophrenia](#), one of the leading causes of disability, may experience hallucinations, delusions and thought and movement disorders among other symptoms. Scientists believe the disorder is caused by genes and the environment.

Provided by Northwestern University

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