

Linking Artificial Intelligence (AI) and Mental Health Illnesses

Natalie Bubnick & Damaris Pasca

Cleveland State University, *College of Sciences and Health Professions*

Advisor: Dr. Amir Poreh, Ph.D

Choose  Ohio First

Abstract

There has always been a stigma surrounding mental illnesses and their treatment. Many people are misdiagnosed when they are seeking help for their mental illness. With the recent breakthrough of AI (Artificial Intelligence), this can be eradicated through tailored treatment. Communication between a mental health patient and AI can determine whether their assigned medication(s) are helping with their illness by analyzing their physical and emotional impact on a patient. Additionally, AI also will be able to prescribe the right dosage using a detailed patient profile. Within our project, we have analyzed the effectiveness of introducing AI into the mental health spectrum and we have determined that this process will be revolutionary for the patient and healthcare.

Introduction

Today, mental illness affects 1 in 5 Americans, and this number is continuously rising. This is why it is crucial to have up-to-date research on the best treatment and care for these patients. The current treatment is expensive and ineffective. It is costly to see a physician, which keeps many patients away. Current treatment also does not get to the root of the problem. Many times medication is given for the side-effects of a disorder but does not resolve the actual problem. New technology and research are now needed to search for a better solution.

Artificial Intelligence (AI) is defined as “the technology designed to perform activities that normally require human intelligence.” Using AI to identify mental illnesses, we can propose proper treatment, lessen the stigma, increase the availability of care, and provide care that will work. AI could speed up the decision process which would have economic benefits. It would lower the price which in turn would encourage more people to seek help. A patient would fill out a questionnaire, personal medical history, and log feelings and moods. AI would take all of this information, and from the questionnaire, determine what medication is needed.

How It Works

We will be using Jill, who is diagnosed with Bipolar disorder, as an example

- 1) Doctor inputs Jill’s full medical history, current symptoms, and relevant personal information into the AI system.
 - i) Jill is a 32-year-old woman, is 5’8” tall, weighs 165 lbs, has high blood pressure, a history of abusing painkillers, and exercises 4 times a week.
 - ii) Jill is currently taking 50mg pambrom a day for her high blood pressure and 30mg Aripiprazole for her bipolar which her psychiatrist prescribed.
 - iii) Jill experiences episodes in which she has extreme highs and lows. She also has trouble sleeping at night and experiences anxiety.
- 2) Jill continues to take her prescribed medications but inputs her feelings twice a day- at morning and at night into the computer.
 - i) AI asks a series of questions in a manner such as a deposition in order to ensure an accurate response.
- 3) AI takes this information, in addition to her medical background and determines that her current dosage is ineffective and she has clinical depression not bipolar, which was previously undetected and thus, unmedicated for.
- 4) AI recommends that Jill should start to take Bupropion.
- 5) The cycle continues- Jill inputs her feelings and AI computes them and makes recommendations.

How age groups respond to using an intelligent healthcare assistant

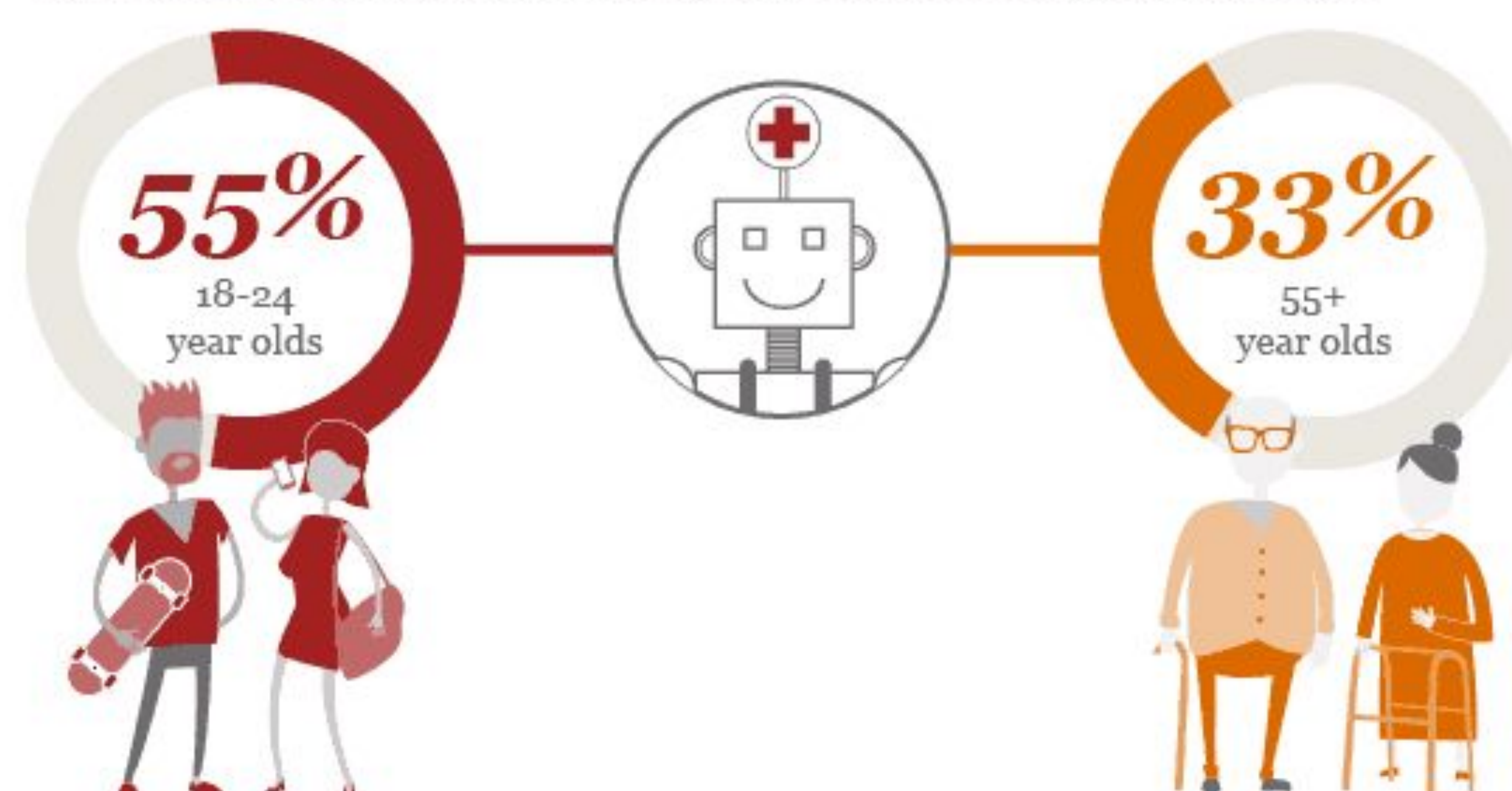


Figure 1. Comparison of age groups in relation to willingness to engage in AI for healthcare

Future Work

Seamlessly utilizing AI into healthcare can revolutionize the medical field. Treatment will be more personalized which will result in patients feeling better faster. More importantly, misdiagnosing will vanish.

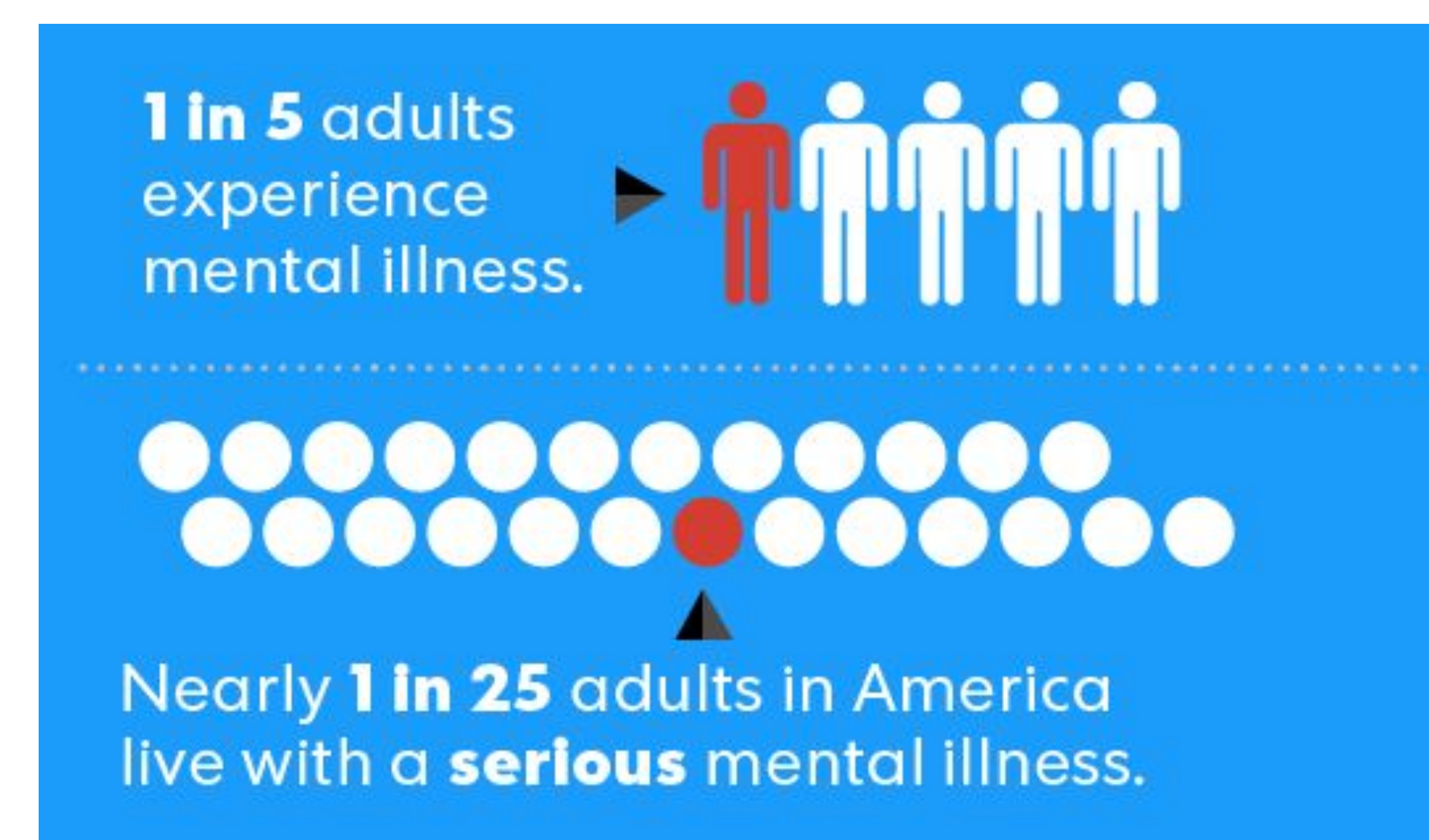


Figure 2. Statistics on mental illnesses in Americans (2015)

Conclusion

Integrating AI into mental health care will result in better diagnosis and overall happier patients. By removing the long process of doctor visits, and the cycle of wrong medications, AI will be able to pinpoint the direct issue. The diagnosis process will be faster, and less expensive, which is a benefit for both health care providers, and patients.

References (Calibri, 40 points, bold)

- Bowerman, M. (2017, May 3). Mental health in America, by the numbers [Digital image]. Retrieved March 14, 2019, from <https://www.usatoday.com>
- Luxton, D. D. (2016). *Artificial intelligence in behavioral and mental health care*. London: Academic Press.
- PwC. (2017). How age groups respond to using an intelligent healthcare assistant [Digital image]. Retrieved March 14, 2019, from <https://www.pwc.co.uk/industries/healthcare/patient-voice-2017/artificial-intelligence-results.html>

Acknowledgments (Calibri, 40 points, bold)

We would like to thank Dr. Poreh for his time, support, and topic idea. Also, we would like to thank Choose Ohio First for this invaluable research opportunity.