



Implementing Technology Into The Management Of Patients With Mental Health Disorder

Learning Objectives

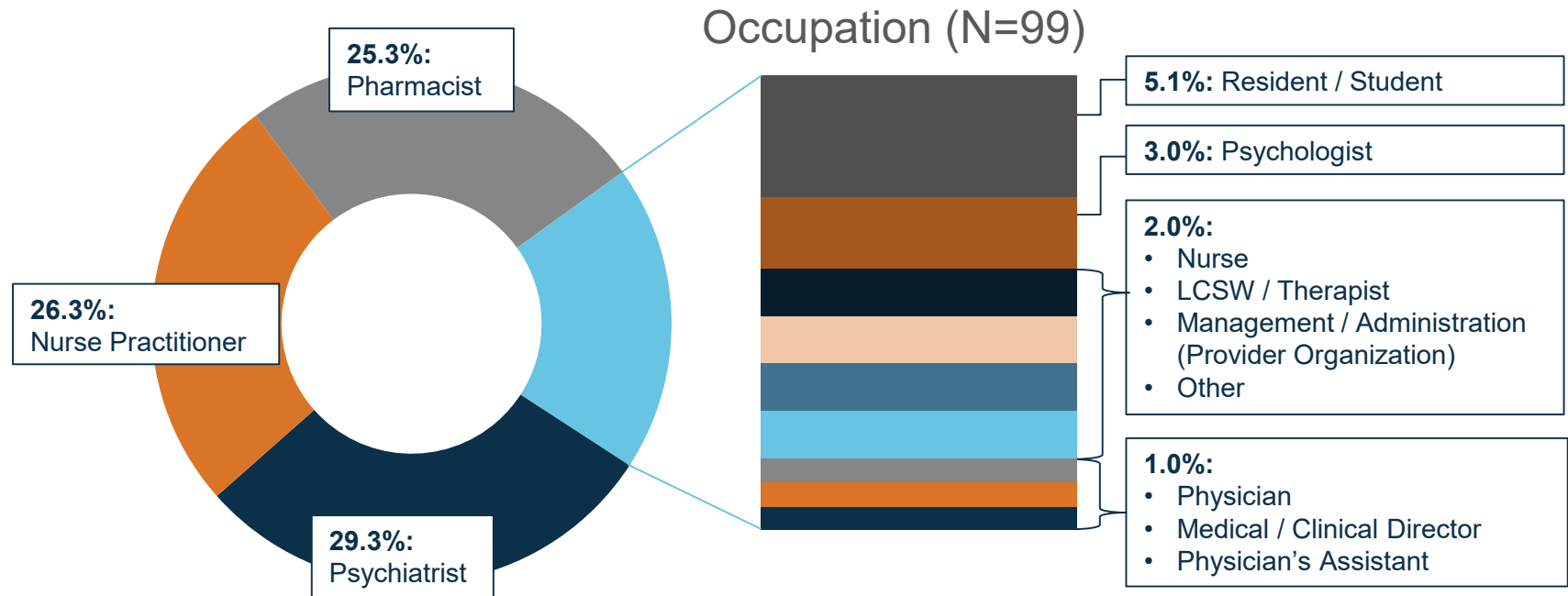
- Review current digital health developments in psychiatry and areas in which technology can be used in clinical practice
- Consider advantages and challenges of using digital tools in mental health care
- Discuss approaches and challenges to implementation and adoption of digital technology in the mental health clinic

This program is paid for by
Otsuka Pharmaceutical Development
& Commercialization, Inc.

Speakers are paid
consultants for Otsuka Pharmaceutical
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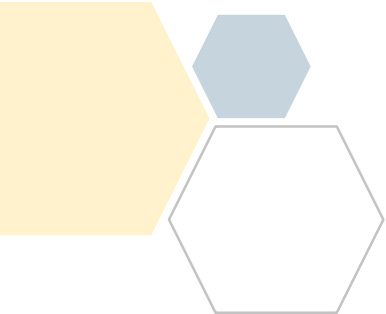
PsychU Digital Technology Survey

- A survey was conducted through MSL/MML interactions, PsychU programs, and PsychU emails
- Data were collected over the past 2 months
- A total of 143 responses were collected

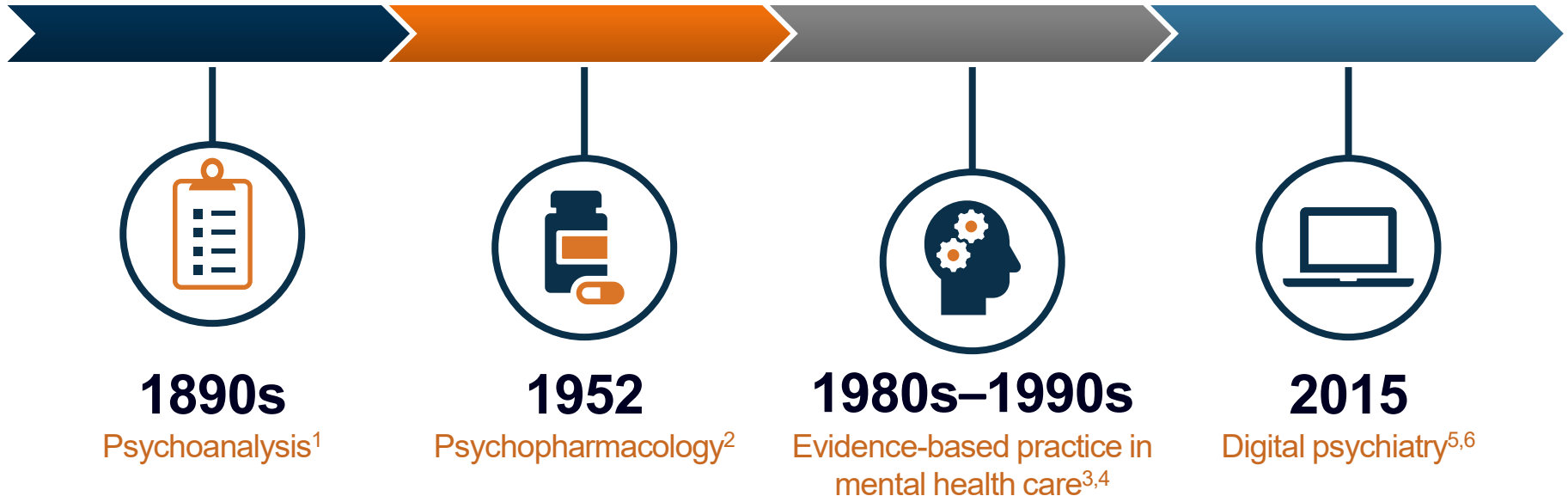


LCSW, licensed clinical social worker; MML, managed market liaison; MSL, medical science liaison.

Introduction: The Digital Age



Digital Technology Is Poised to Become the Fourth Wave of Evolution in Mental Health Care



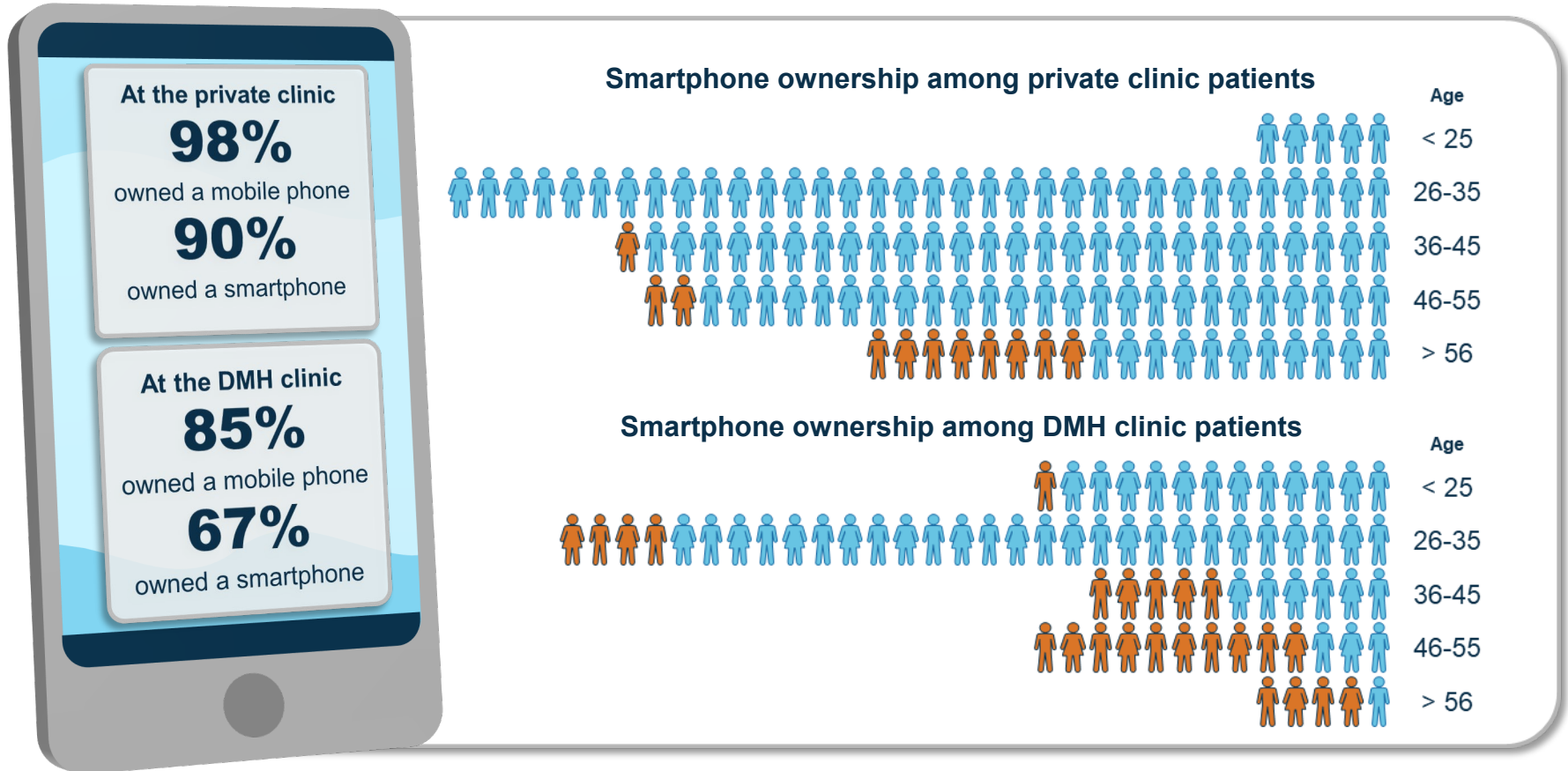
Suboptimal treatment response remains an ongoing concern⁷

1. Gleitman H et al. *Psychology*. 8th ed. W. W. Norton & Company. 2011:591-633.
2. Ahuja N. *A Short Textbook of Psychiatry*. 7th ed. Jaypee Brothers Medical Publishers Ltd. 2011:172-198.
3. Spring B. *J Clin Psychol*. 2007;63:611-631.

4. APA Presidential Task Force on Evidence-Based Practice. *Am Psychol*. 2006;61:271-285.
5. Kumar S et al. *Am J Prev Med*. 2013;45:228-236.
6. Mohr DC et al. *Gen Hosp Psychiatry*. 2013;35:332-338.
7. Lehman AF et al. *Am J Psychiatry*. 2004;161:1-184.

Widespread Use of Digital Devices Includes Patients With Mental Illness

A 2018 survey of patients at either a department of mental health (DMH) clinic or a private psychiatry clinic* found:



*The private clinic primarily served patients for mood and anxiety disorders and the DMH site primarily served patients with psychotic disorders; both clinics were within the urban environment of Boston, Massachusetts. Torous J et al. *JMIR Ment Health*. 2018;5(4):e11715.

The Role of Technology in Encouraging Patient-Centered Care



Patient Portals

- Can improve patient education, increase satisfaction with care, and enhance communications with HCPs^{1,2}



Electronic Patient-Reported Outcomes Assessments

- Automate administration and scoring, saving time¹
- Can help encourage patients to discuss health issues^{1,3}



Internet Resources

- Can increase patient health literacy and access to support networks¹
- May increase patient interest and autonomy in their care⁴

HCP, health care provider.

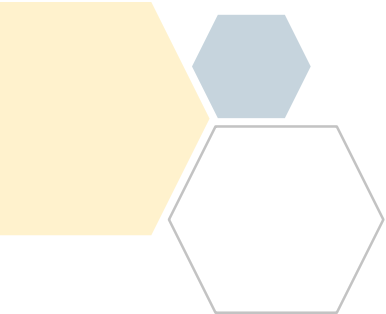
1. Snyder CF et al. *Cancer J*. 2011;17(4):211-8.

2. McAlearney AS et al. *J Med Internet Res*. 2019;21(6):e13126.

3. Berry DL et al. *J Clin Oncol*. 2011;29(8):1029-35.

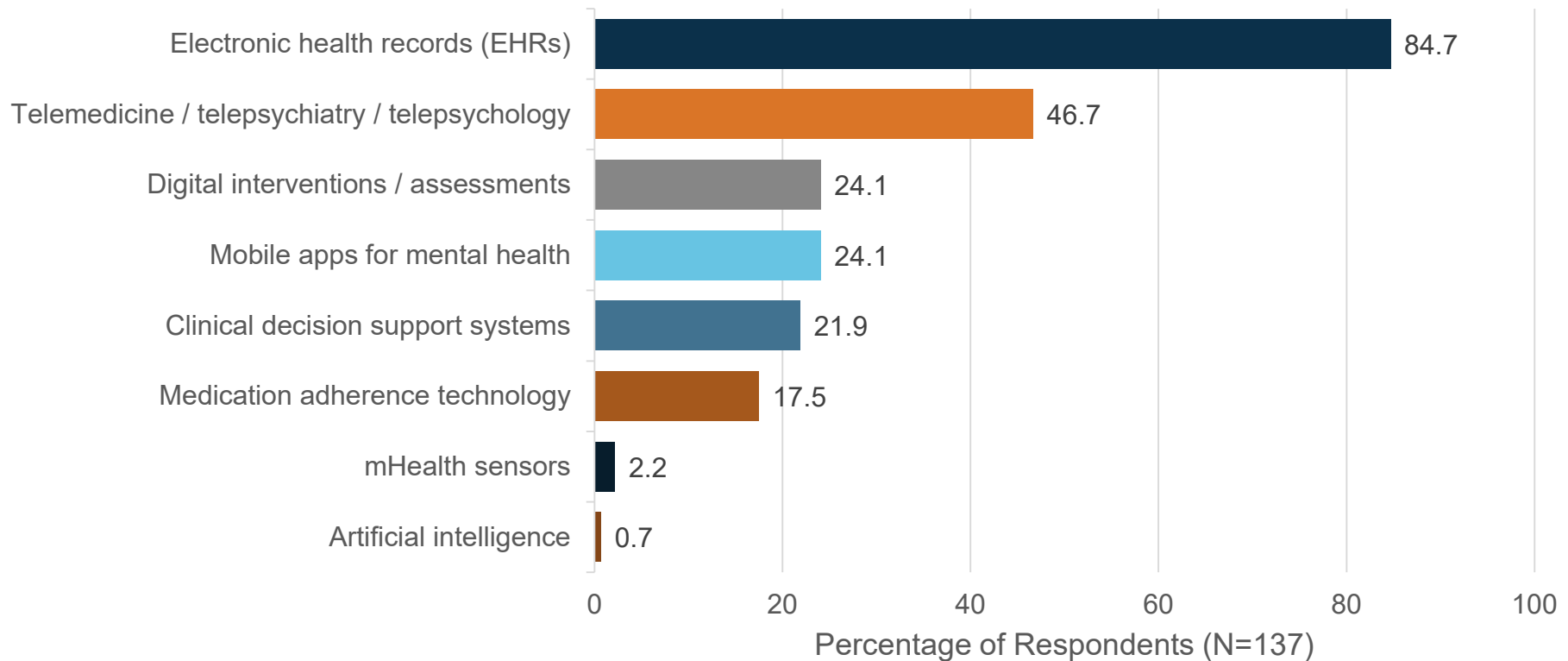
4. Xie B et al. *J Med Internet Res*. 2013;15(7):e132.

The Current Landscape



Survey Results

Which digital health technologies are you currently using in your clinical practice? (Select all that apply)



Digital Health Technology Terms

mHealth or mobile health:

Medical and public health practice supported by mobile devices, such as smartphones, patient monitoring devices, personal digital assistants, and other wireless devices¹

Mobile medical application or “mobile medical app”:

A software application that can be operated on a mobile platform (i.e., smartphones, tablets, or other portable devices) that is to be used alongside a regulated medical device, or to transform a mobile platform into a regulated medical device²

Telemedicine:

The delivery of health care services, where distance is a critical factor, by all health care professionals using information and communications technologies for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and for continuing education of health care providers³

Digital Therapeutics:

Tools that deliver evidence based therapeutic interventions that are driven by software programs to prevent, manage, or treat a medical disorder or disease. They are reviewed and cleared or approved by regulatory bodies, as required, to support product claims regarding risk, efficacy, and intended use⁴

Health Information Technology (IT):

The electronic systems healthcare professionals and patients use to store, share and analyze health information. Health IT includes electronic health records, personal health records, electronic prescribing, and privacy/security protections⁵

1. World Health Organization. *mHealth: New horizons for health through mobile technologies: second global survey on eHealth*. Geneva: World Health Organization, 2011.
2. US Department of Health and Human Services, Food and Drug Administration. Center for Devices and Radiological Health. *Mobile Medical Applications: Guidance for Industry and Food and Drug Administration Staff*. February 9, 2015. www.fda.gov/downloads/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/UCM263366.pdf. Accessed June 19, 2019.
3. World Health Organization. *Telemedicine: Opportunities and Developments in Member States: Report on the Second Global Survey on eHealth*. Geneva: World Health Organization, 2010.
4. Digital Therapeutics Alliance. 2018. https://www.dtxalliance.org/wp-content/uploads/2018/09/DTA-Report_DTx-Industry-Foundations.pdf. Accessed July 9, 2019.
5. The Office of the National Coordinator for Health Information Technology. Health IT: Advancing America's Health Care. <https://www.healthit.gov/sites/default/files/pdf/health-information-technology-fact-sheet.pdf>. Accessed July 9, 2019.

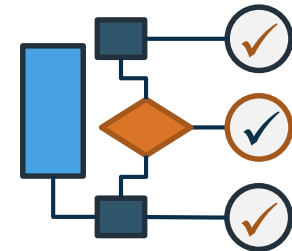
Digital Technology May Provide New Tools for the Assessment and Management of Mental Health



mHealth sensors¹



Digital interventions and assessments²



Clinical decision support systems³



Mobile apps for mental health⁴



Medication adherence technology^{5,6}



Telepsychology and telepsychiatry^{7,8}

mHealth, mobile health.

1. Ben-Zeev D et al. *Psychiatr Rehabil J*. 2015;38(3):218-226.
2. Firth J et al. *J Psychiatr Research*. 2016;80:3-4.
3. Davis S et al. *J Am Med Informatics Assn*. 2017;24(4):857-866.
4. Donker T et al. *J Med Internet Res*. 2013;15(11):e247.
5. Mistry N et al. *J Am Med Inform Assoc*. 2015;22(e1):e177-93.

6. Granholm E et al. *Schizophrenia Bull*. 2012;38(3):414-25.
7. Joint Task Force for the Development of Telepsychology Guidelines for Psychologists. *American Psychologist*. 2013;68(9):791-800.
8. American Psychiatric Association and American Telemedicine Associations. *Best Practices in Videoconferencing-Based Telemental Health*. 2018.

New Technologies May Be Harnessed for the Treatment of Mental Health Disorders

Artificial intelligence



Example

An algorithm that analyzes linguistic cues on social media and can provide early detection of the onset of depression¹

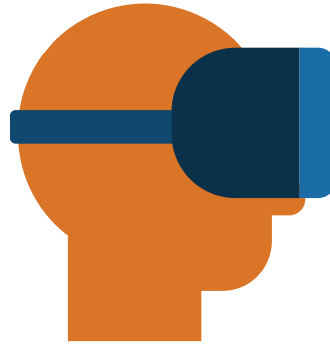
Big data



Example

Integration of the full stack of patient information, from genomics to socioeconomic factors, to guide clinical care²

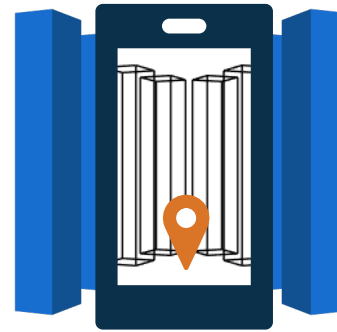
Virtual reality



Example

Exposure therapy for PTSD delivered in a safe, controllable virtual environment³

Augmented reality



Example

Virtual insects set on a real-world backdrop for the treatment of insect phobias⁴

Digital phenotyping



Example

Use of smartphone sensors, keyboard performance, and voice or speech features to provide a continuous, objective measure of behavior and cognition²

PTSD, post-traumatic stress disorder.

1. Marr B. *Forbes*. May 3, 2019. <https://www.forbes.com/sites/bernardmarr/2019/05/03/the-incredible-ways-artificial-intelligence-is-now-used-in-mental-health/#3352a163d02e>. Accessed June 13, 2019.
2. Insel TR. *Nature*. 2017;551:23-26.

3. Botella C et al. *Neuropsychiatric Disease and Treatment*. 2015;11:2533-2545.
4. Ventura S et al. *Virtual and Augmented Reality: New Frontiers for Clinical Psychology*. In: Mohamudally N, ed. *State of the Art Virtual Reality and Augmented Reality Knowhow*. Intechopen; 2018:99-118.

Potential Advantages of Mobile Mental Health Technologies

Clinician's Perspective

Improved access to clinical information and up-to-date information¹

Reduced resource intensity and flexibility in administration of care³

Could improve patient satisfaction and therapeutic alliance⁴



Patient's Perspective

Improved access to:

- Mental health professionals^{2,3}
- Psychoeducation¹
- Emergency support¹

Can allow for continuous real-time data collection and tailored interventions³⁻⁵

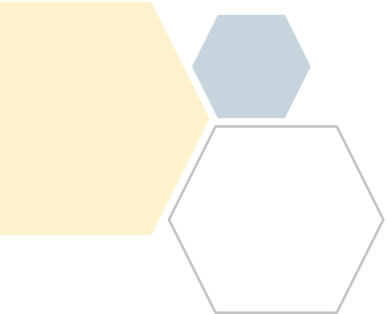
Can promote self-monitoring and behavioral modifications and contribute to illness management^{3,4}

Can facilitate adherence and self-management of medication regimens⁶

1. Luxton DD et al. *Professional Psychology: Research and Practice*. 2011;42(6):505.
2. Harrison V et al. *J Ment Health*. 2011;20(6):509-24.
3. Depp CA et al. *J Nerv Ment Dis*. 2010;198:715-721.
4. Palmier-Claus JE et al. *BMC Psychiatry*. 2013;13:34.

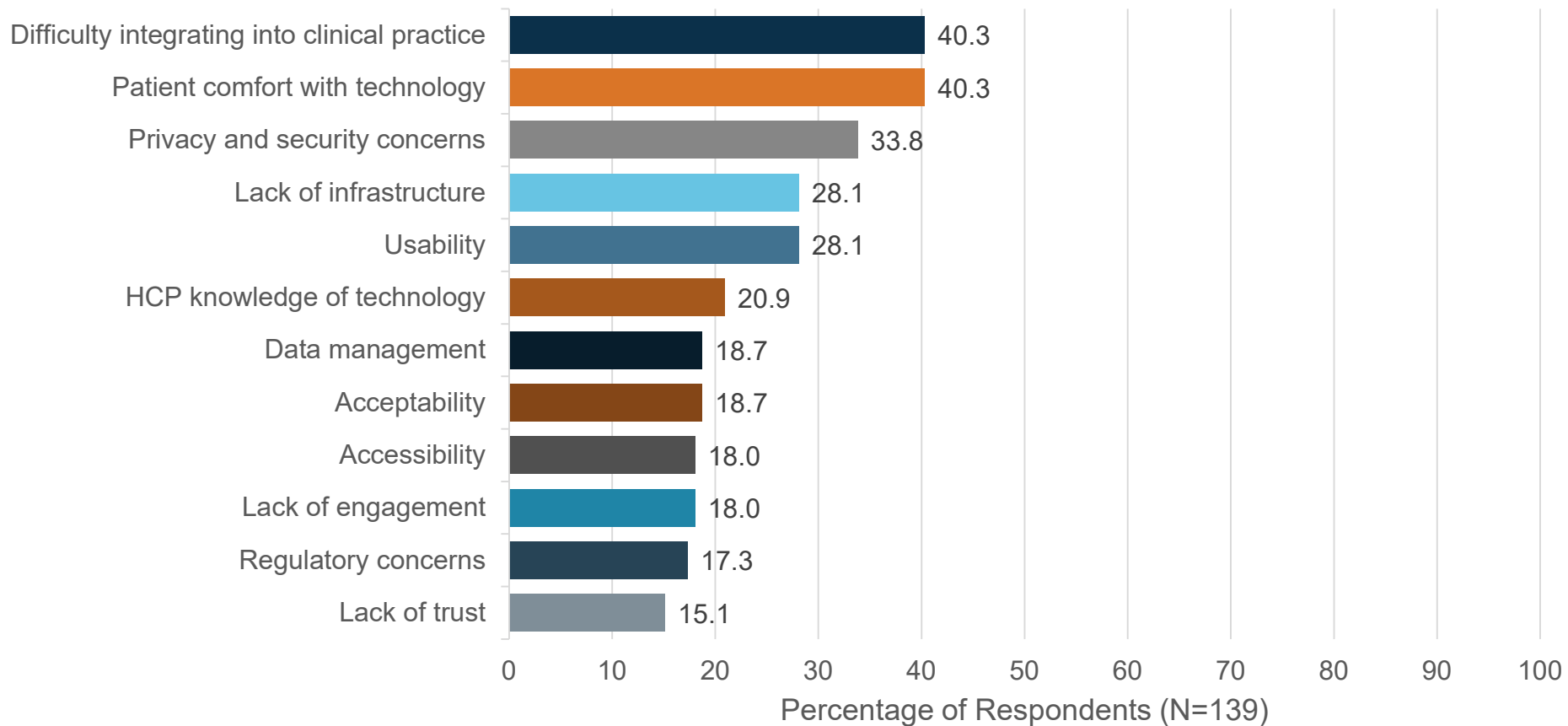
5. Ben-Zeev D et al. *Psychiatr Rehabil J*. 2013;36:289-2966.
6. AmeriSource Bergen. How Digital Transformation Can Help Patient Adherence. November 2017. <https://www.amerisourcebergen.com/abcnew/insights/pharmacies/how-digital-transformation-can-help-patient-adherence>. Accessed June 19, 2019.

Challenges in Using Digital Tools



Survey Results

What are the biggest barriers to implementing new digital health technology tools in your clinical practice? (Select up to 3)



HCP, health care provider.

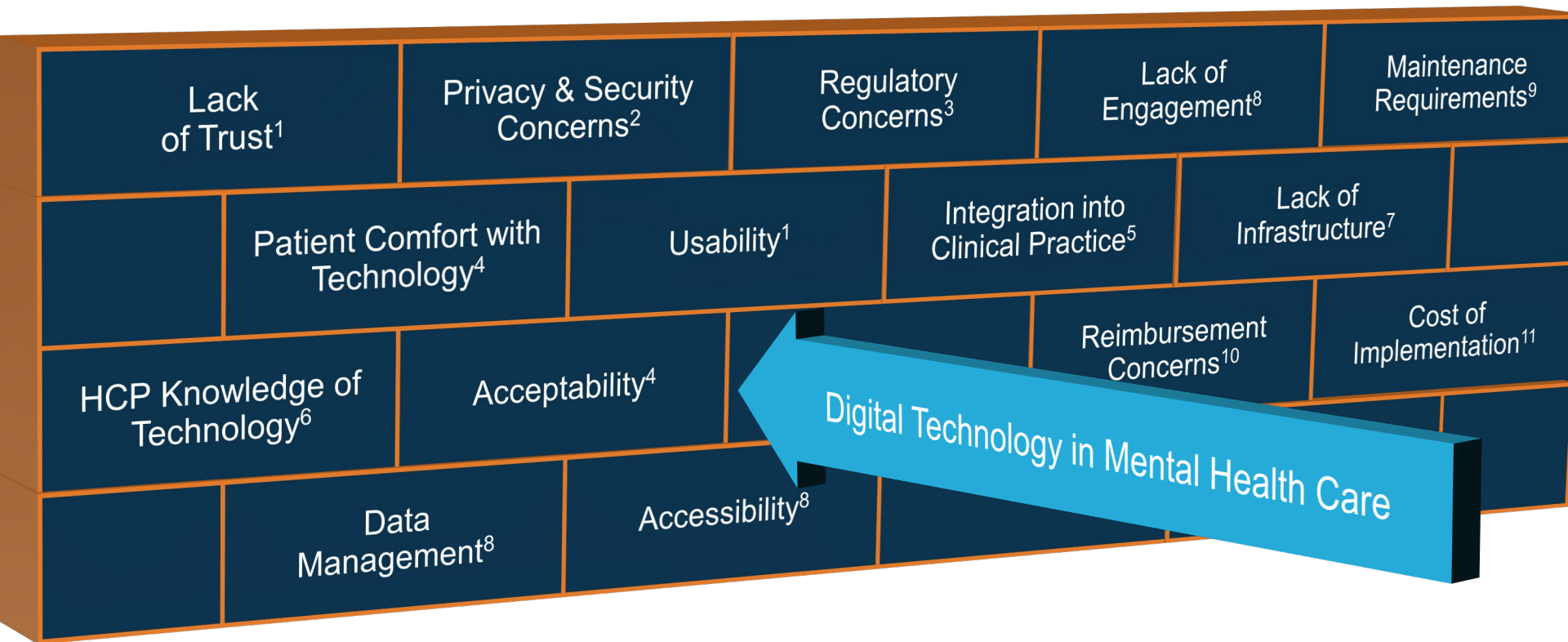
Explosion in Mobile Health Apps

- An estimated 97,000 to 325,000 health and fitness apps are available^{1,2}
- 10,000+ for mental health³
 - More are introduced daily



1. HealthWorksCollective. Mobile Medical Apps: A Game Changing Healthcare Innovation. <https://www.healthworkscollective.com/mobile-medical-apps-a-game-changing-healthcare-innovation>. August 12, 2018. Accessed June 19, 2019.
2. Research2Guidance. 325,000 mobile health apps available in 2017 – Android now the leading mHealth platform. <https://research2guidance.com/325000-mobile-health-apps-available-in-2017>. Accessed June 19, 2019.
3. Torous J et al. *JAMA Psychiatry*. 2017;74(5):437-438.

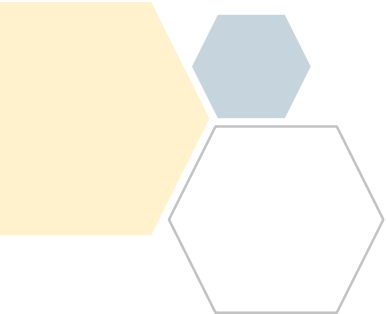
Selected Barriers to the Development and Adoption of Digital Technology in Mental Health Care



1. Torous J et al. *Digit Biomark*. 2017;1:87–91.
2. Kumar S et al. *Am J Prev Med*. 2013;45:228-236.
3. NIMH. Technology and the Future of Mental Health Treatment. Available at: <https://www.nimh.nih.gov/health/topics/technology-and-the-future-of-mental-health-treatment/index.shtml>. Accessed June 19, 2019.
4. Depp CA et al. *J Nerv Ment Dis*. 2010;198:715-721.
5. Palmier-Claus JE et al. *BMC Psychiatry*. 2013;13:34.

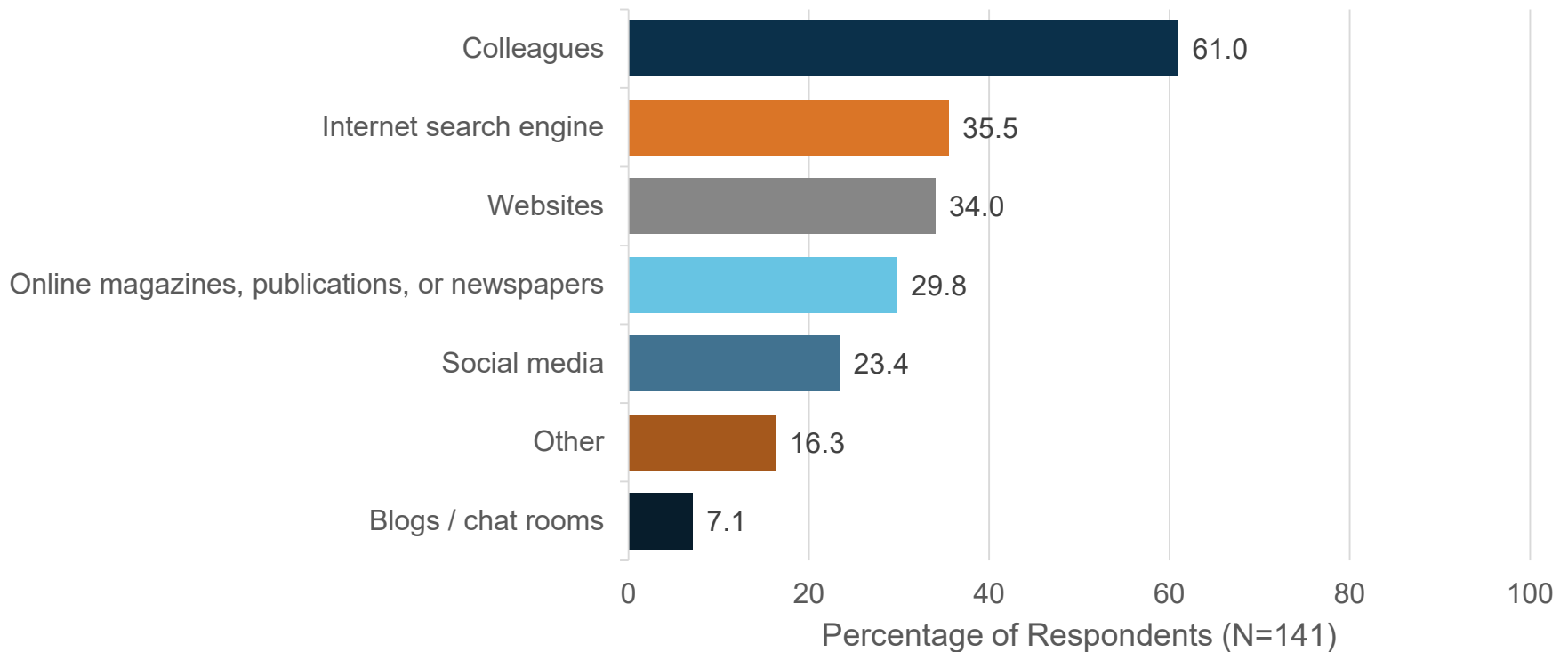
6. Gittlen S. NEJM Catalyst: Survey Snapshot: What Patient Engagement Technology is Good For. July 10, 2017. Available at: <https://catalyst.nejm.org/patient-engagement-technology-good-for/>. Accessed June 19, 2019.
7. Mardon R et al. Agency for Healthcare Research and Quality. 2014. Publication No. 14-0047-EF.
8. Mohr DC et al. *Gen Hosp Psychiatry*. 2013;35:332-338.
9. Wisniewski H et al. *Evid Based Mental Health*. 2019;22:4–9.
10. de Grood C et al. *J Multidisciplinary Healthcare*. 2016;9:335-344.
11. Puszka S et al. *JMIR Mental Health*. 2016;3(3):e43.

Resources



Survey Results

Where do you learn about new digital health information or technology?(Select all that apply)



Open-ended responses in the MSL/MML Survey included: meetings and symposia, email newsletters, professional organizations, and medical education websites.

Digital Health Technology Resources

FDA

Mobile Medical Applications Guidance Document¹

FDA's definition of and intentions to regulate mobile medical apps

APA

App Evaluation Model⁶

5-step process that identifies important information that should be considered when picking an app for use in mental health care

NIMH

Workgroup on Behavioral and Social Science Research Report on Digital Medicine²

Discussion and recommendations on developing digital technologies for mental health

AMA

Digital Health Implementation Playbook⁷

12-step guide to introducing a digital health service in a clinical setting

SAMHSA

Treatment Improvement Protocol 60³

Introduction to technology based treatment and provides guidance on implementation strategies

PsychU

Resource Library⁸

Collection of documents on mental health care developments, including market trends, research studies, decision support tools, treatment best practice guidelines, and more

Professional Organizations

Digital Therapeutics Alliance

2018 industry report defines digital therapeutics, core principles and industry wide best practices⁴

Digital Medicine Society

Professional society for the digital medicine community, with the goal of driving progress and acceptance⁵

JMIR

Family of open-access online journals focused on digital medicine and health care in the digital age, including *JMIR Mental Health*⁹

AMA, American Medical Association; APA, American Psychiatric Association; FDA, Food and Drug Administration; JMIR, *Journal of Medical Internet Research*; NIMH, National Institute for Mental Health; SAMHSA, Substance Abuse and Mental Health Services Administration.

1. U.S. Department of Health and Human Services, FDA. Center for Devices and Radiological Health. Mobile medical applications: guidance for industry. February 9, 2015. www.fda.gov/downloads/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/UCM263366.pdf. Accessed June 19, 2019.
2. NIMH. <https://www.nimh.nih.gov/about/advisory-boards-and-groups/namhc/reports/opportunities-and-challenges-of-developing-information-technologies-on-behavioral-and-social-science-clinical-research.shtml>. Accessed July 2, 2019.
3. SAMHSA. Using Technology-Based Therapeutic Tools in Behavioral Health Services. Treatment Improvement Protocol (TIP) Series 60. HHS Publication No. (SMA) 15-4924. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2015.

4. Digital Therapeutics Alliance. Digital Therapeutics: Combining Technology and Evidence-based Medicine to Transform Personalized Patient Care. 2019. https://www.dtxalliance.org/wp-content/uploads/2018/09/DTA-Report_DTx-Industry-Foundations.pdf. Accessed July 2, 2019.
5. Digital Medicine Society. 2019. <https://www.dimesociety.org>. Accessed July 2, 2019.
6. APA. App Evaluation Model. <https://www.psychiatry.org/psychiatrists/practice/mental-health-apps/app-evaluation-model>. Accessed May 9, 2019.
7. AMA. Digital Health Implementation Playbook. 2018. <https://www.ama-assn.org/system/files/2018-12/digital-health-implementation-playbook.pdf>. Accessed July 1, 2019.
8. PsychU. Resource Library. 2019. <https://www.psychu.org/resource-library>. Accessed July 2, 2019.
9. Journal of Medical Internet Research. 2019. <https://www.jmir.org>. Accessed July 2, 2019.

The APA's 5-Step App Evaluation Model

STEP 1

Gather background information

STEP 2

Evaluate risk, privacy, & security

STEP 3

Consider evidence of benefit

STEP 4

Gauge ease of use

STEP 5

Assess interoperability (when applicable)

APA, American Psychiatric Association.

American Psychiatric Association. App Evaluation Model. <https://www.psychiatry.org/psychiatrists/practice/mental-health-apps/app-evaluation-model>. Accessed May 9, 2019.

AMA Digital Health Implementation Playbook

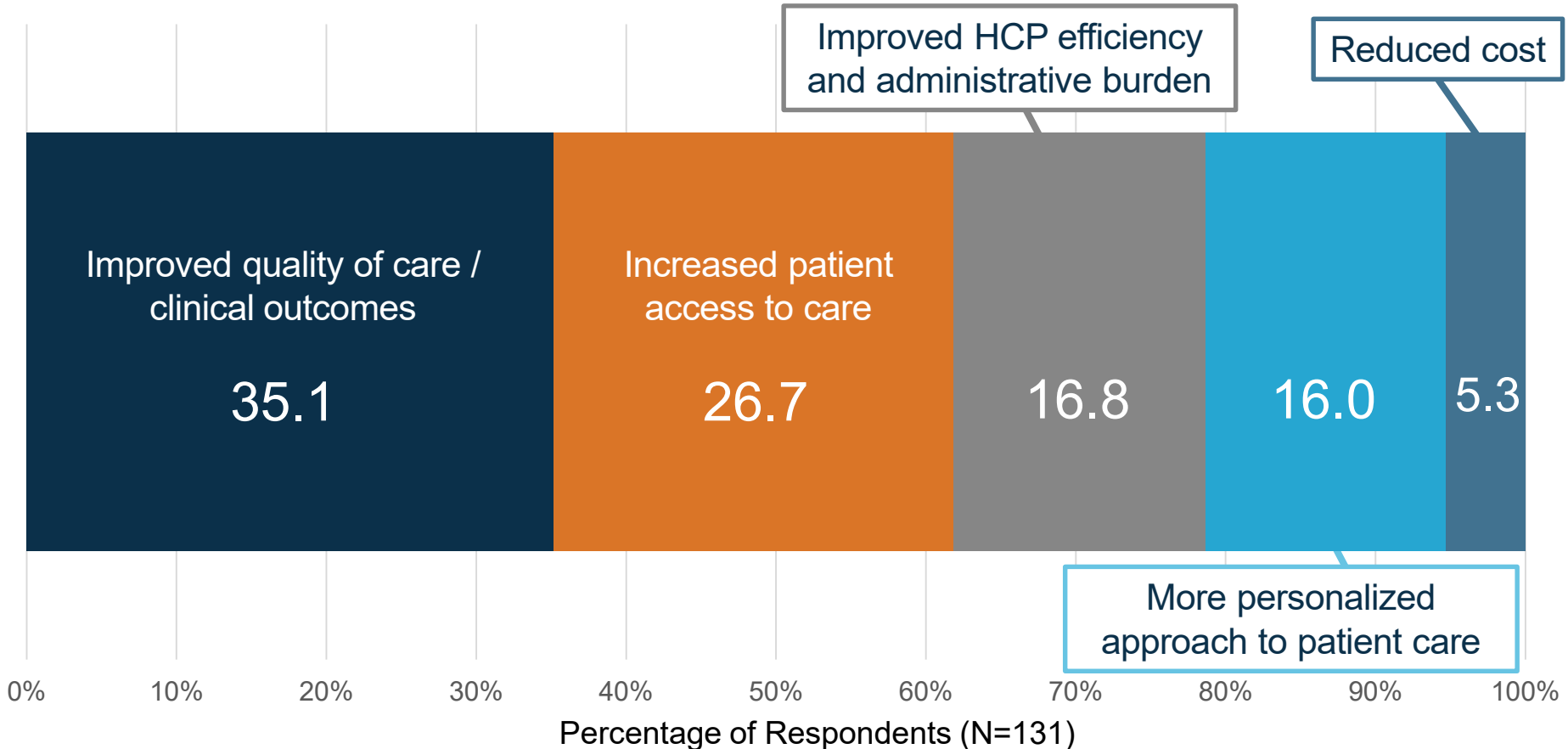


AMA, American Medical Association.

American Medical Association. Digital Health Implementation Playbook. 2018. <https://www.ama-assn.org/system/files/2018-12/digital-health-implementation-playbook.pdf>. Accessed July 1, 2019.

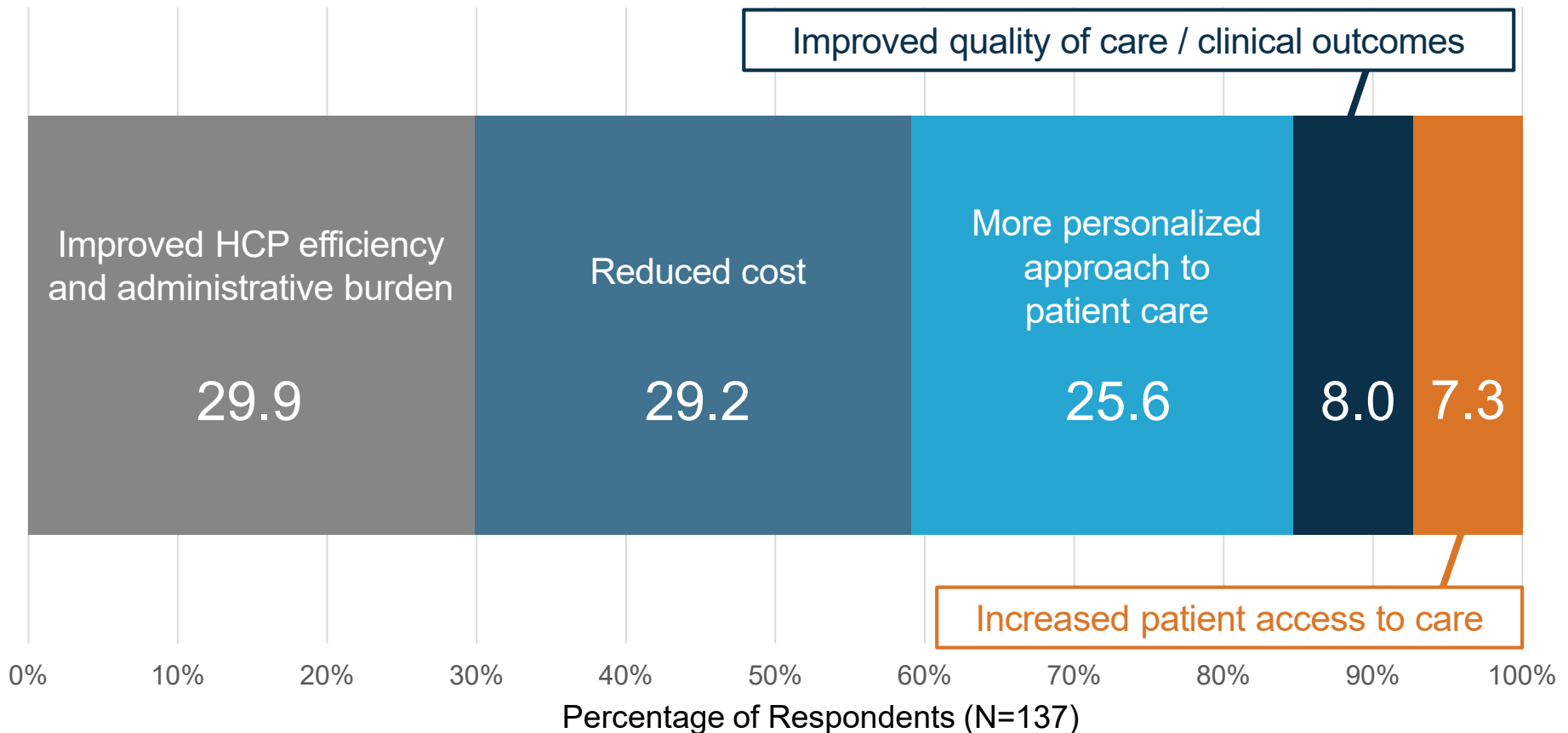
Survey Results

Which outcome do you believe can be most improved through the implementation of digital health technology?

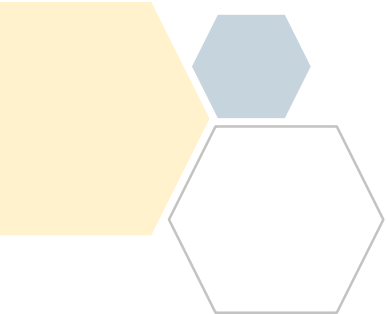


Survey Results

Which outcome do you believe can be least improved through the implementation of digital health technology?



The Path Forward



Reconceptualization No. 1

Old Idea

Mental health technologies are products

Technology is viewed as the
primary agent of change

Tools are developed without
understanding how they can fit in the
context of mental health services

Reconceptualization

Mental health technologies are technology-enabled services

Benefits are more consistently
achieved in the context of
human support

Goals, methods, and provider
qualifications for support must
be established

Mohr DC et al. *Psychiatric Services*. 2017;68(5):427-429.

Reconceptualization No. 2

Old Idea

Tools are designed by the researcher

Design has been top down with limited input from patients about goals needs or preferences

Researchers' own biases about how we like to receive and interact with information are incorporated into the design

Reconceptualization

Tools should be designed with input from the end-users

Design should include input from all key stakeholders

Technologies must be designed for the people who will use them

Tools must fit into and leverage daily behavioral patterns

Tools must offer a meaningful benefit and not just create more work to do

Mohr DC et al. *Psychiatric Services*. 2017;68(5):427-429.

Reconceptualization No. 3

Old Idea

Efficacy trials provide needed validation

Benefits seen in trials have rarely been replicated in practical settings

Trial recruitment favors people who are interested and likely to adhere to the technology

Reconceptualization

Technology should be evaluated where it will be deployed

From the start, implementation and sustainment should be built into the design

Tools should be evaluated with hybrid trial designs that test the intervention and implementation models

Information from trials should be used to optimize intervention and implementation

Recruitment challenges should be viewed as indications of failures in the design of the tool, the implementation, or both

Mohr DC et al. *Psychiatric Services*. 2017;68(5):427-429.

Reconceptualization No. 4

Old Idea

Mental health technologies are a new way to deliver psychotherapy

Tools are frequently viewed as a new method of delivering established evidence-based interventions

This may contribute to a stifling effect on the potential of transformative technologies in mental health care

Reconceptualization

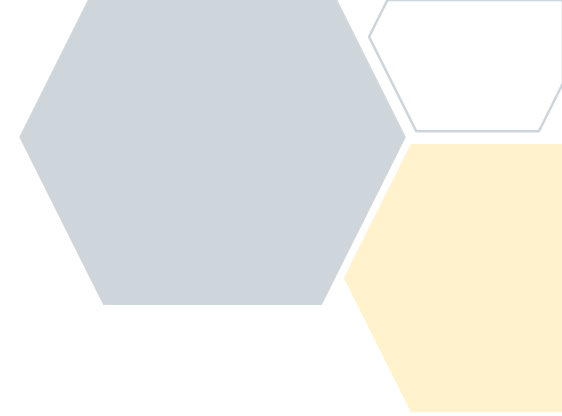
Mental health technologies are a means to revolutionize mental health care

New technologies and methods open pathways to fundamentally new intervention paradigms

Innovation will require new models of behavior change that incorporate a more granular understanding of the lives of patients and applications of these technologies

The assumptions and ideas of mental health experts will need to be challenged through collaborations across multiple disciplines

Mohr DC et al. *Psychiatric Services*. 2017;68(5):427-429.



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