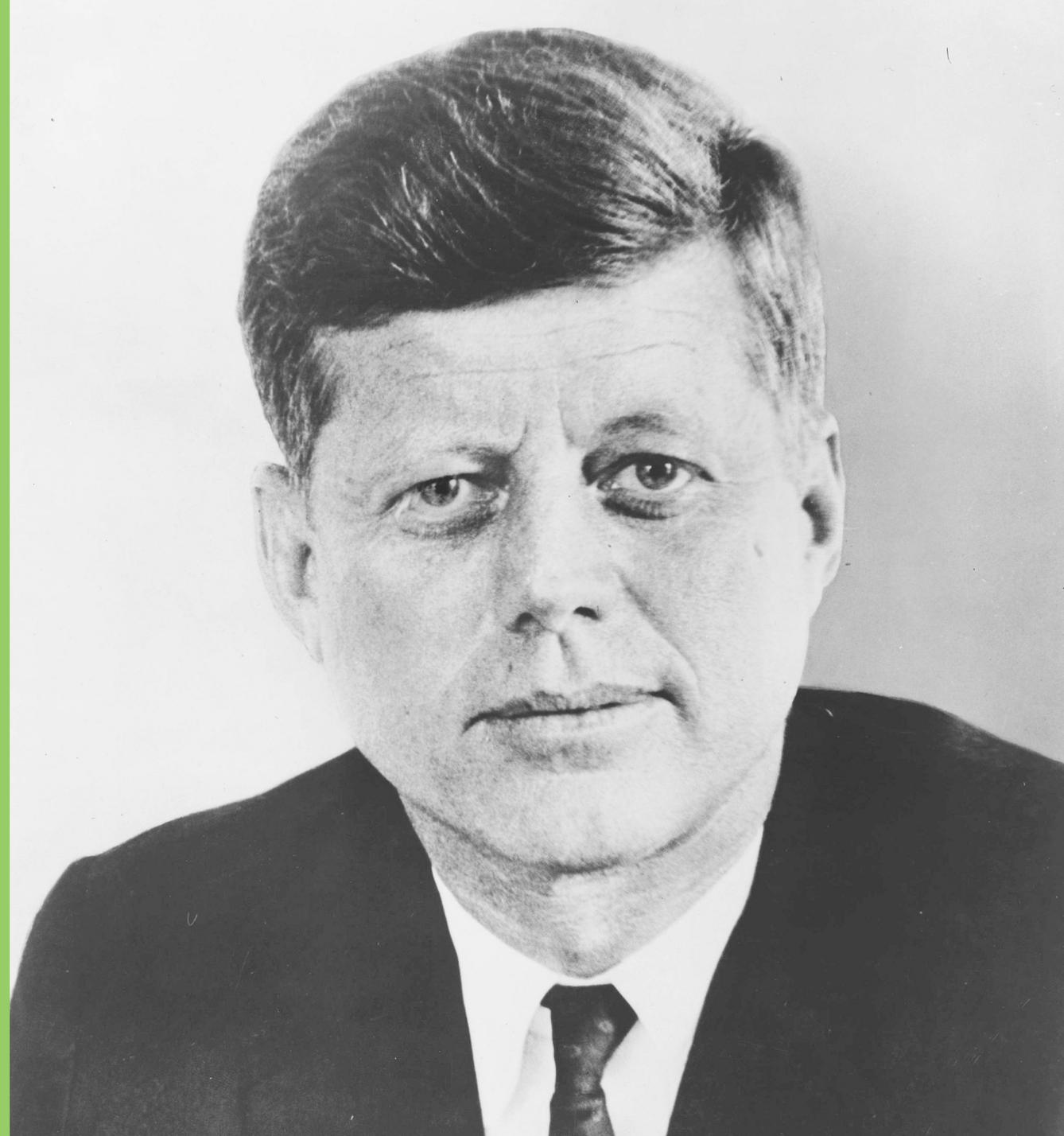


Thank you for your purchase of Healing. This pdf provides figures and tables to accompany the text. Many of these were edited out of the printed version of the book but I provide them here because they were helpful to me in writing the book and I hope will be of interest to you as you read the text or listen to the audiobook. Please let me know what you think at thomasinselmd.com.

Thomas R. Insel, MD

It was said, in an earlier age, that the mind of a man is a far country which can neither be approached nor explored. But, today, under present conditions of scientific achievement, it will be possible for a nation as rich in human and material resources as ours to make the remote reaches of the mind accessible. The mentally ill ... need no longer be alien to our affections or beyond the help of our communities.

—John F Kennedy, On signing the Community Mental Health Act, Oct 31, 1963



Healing Chapter One: Our Problem

Disability Adjusted Life Years - 2019 Non-Communicable Diseases - US All Ages

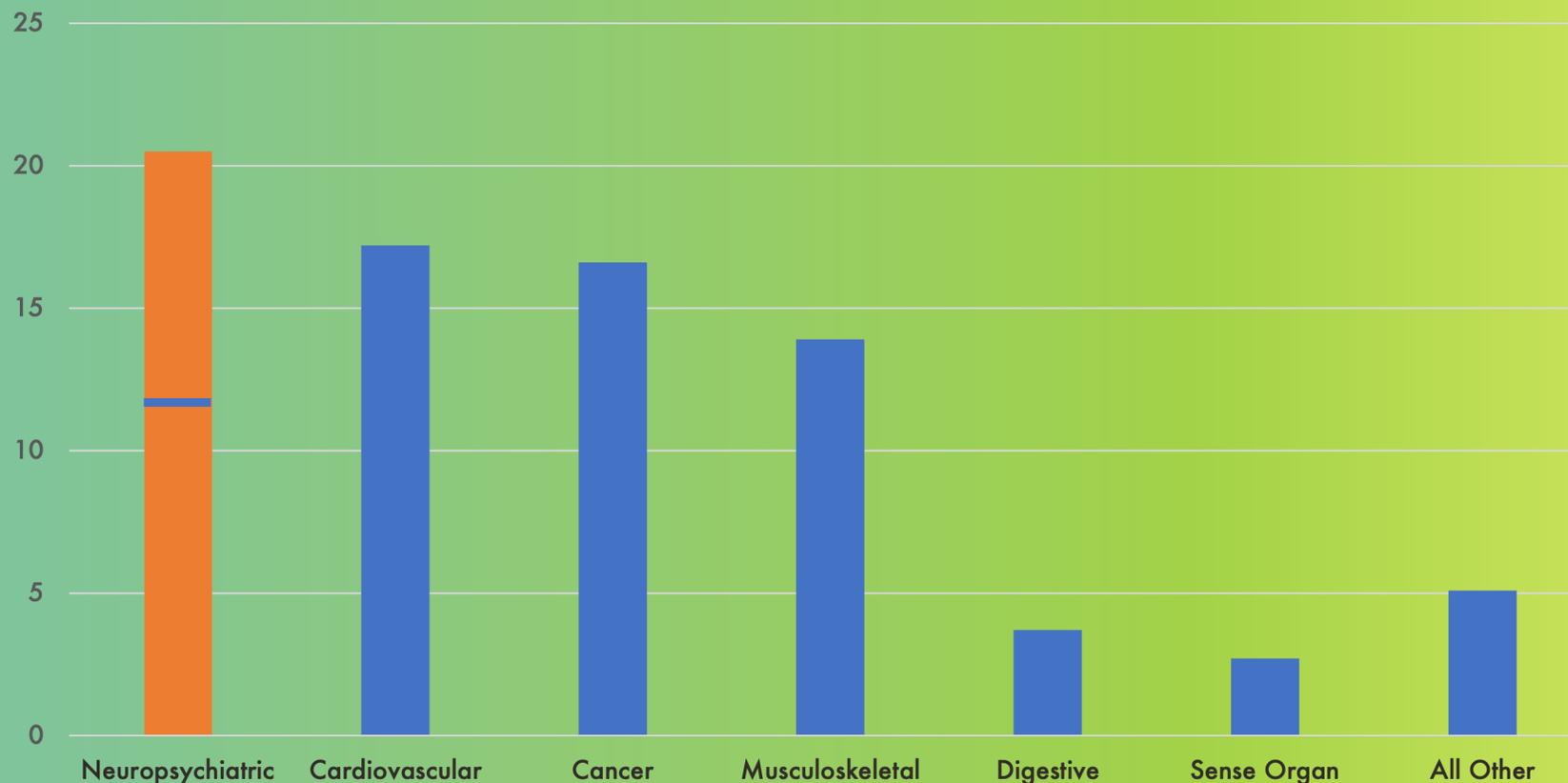


Fig 1.1 Disability adjusted life years (DALYs) yield a single number that combines years lost to premature death and chronic disability. The y-axis represents DALYs (in millions) for non-communicable (non-infectious) diseases in the U.S. in 2019. Neuropsychiatric combines mental disorders, substance use disorders, and neurological disorders. The line on this bar represents mental disorders and substance use disorders together. Data from Institute of Health Metrics and Evaluation. <https://vizhub.healthdata.org/gbd-compare/>

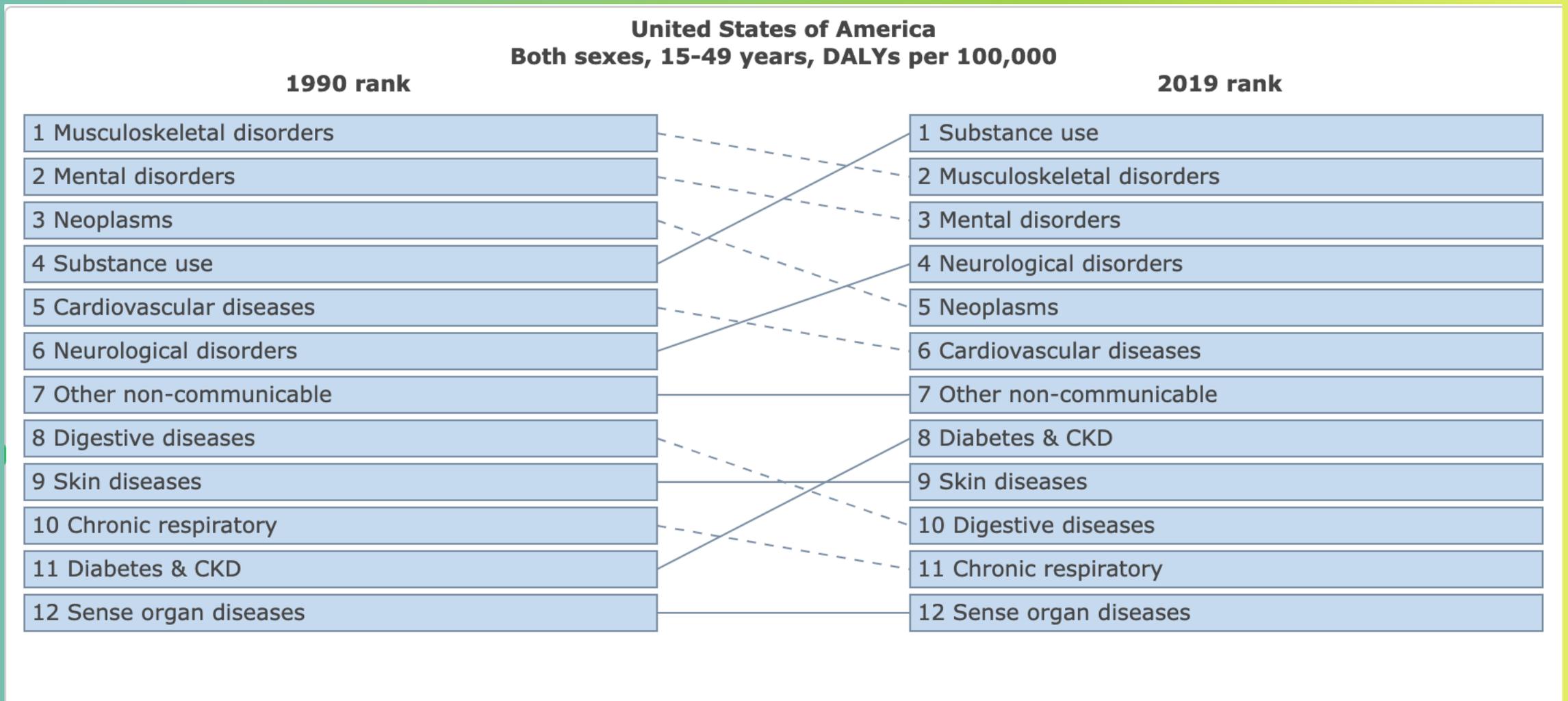


Fig 1.2 Disability adjusted life years (DALYs) represent a single number combining years lost to premature death and chronic disability. Figure shows rankings of DALYs from 1990 and 2019 across non-communicable diseases in the US for people from ages 15 – 49. Note the trend for neuropsychiatric diseases, representing 3 of the top 5 sources in 2019. Preliminary data from the Covid-19 pandemic suggest surge in mental disorders in 2020-2021. Data from Institute of Health Metrics and Evaluation. <https://vizhub.healthdata.org/gbd-compare/>

Suicide Deaths Have Increased Over 30% in the U.S.

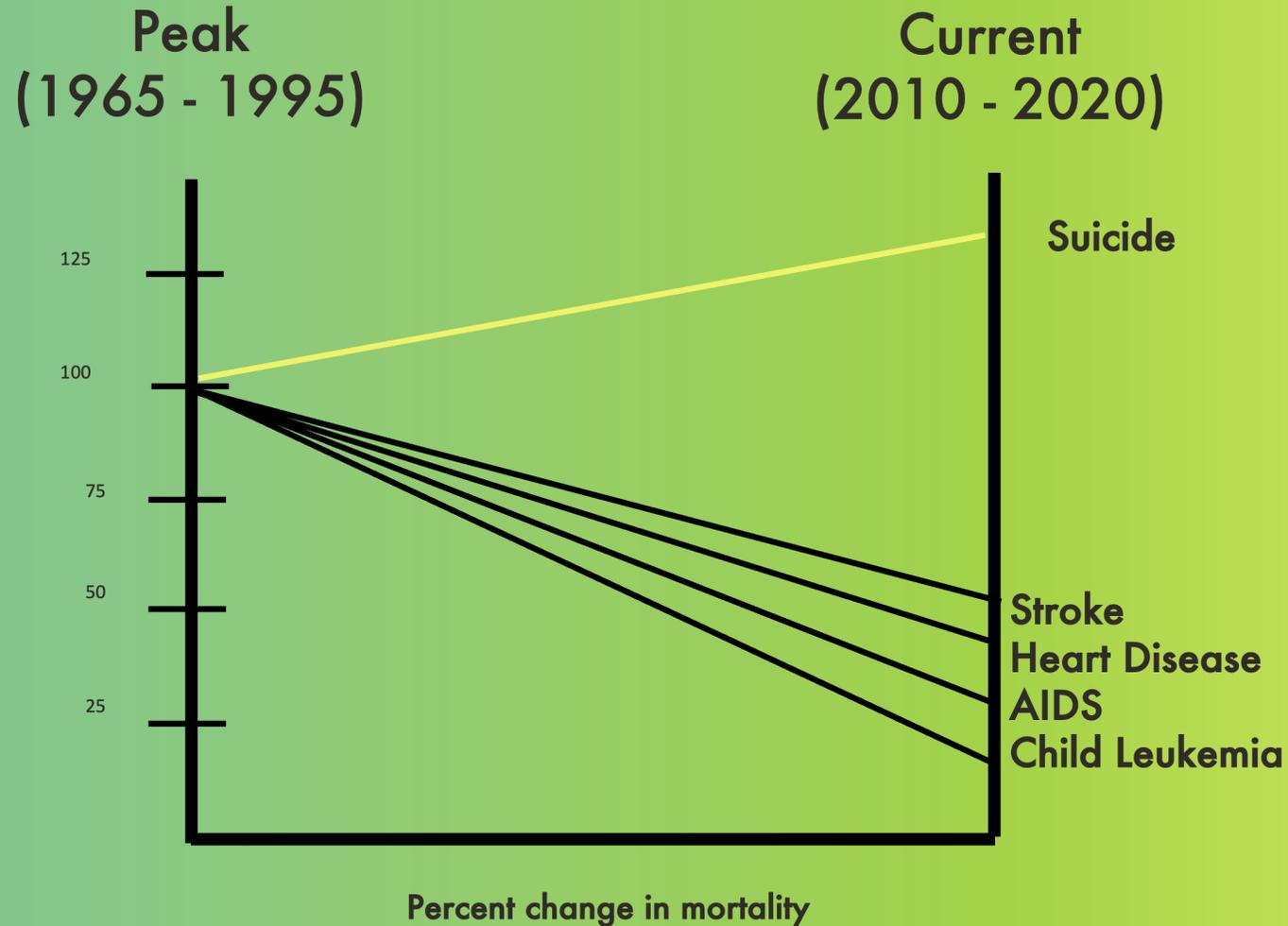
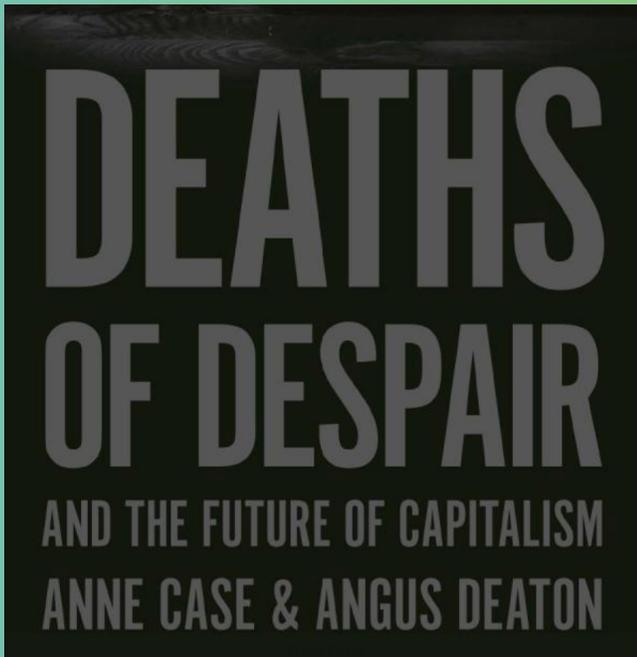


Figure 1.3 Mortality as estimated from specific medical causes comparing reports over the past decade with peak rates of mortality in the 1965 -1995 era in the U.S.. The profound progress for several medical disorders has not been matched by reductions in suicide which have increased 33% since 2000. Not shown are marked increases in drug overdose deaths and reductions in homicides and auto fatalities relative to 1965-1995. (source CDC)

Deaths of Despair – Lowering Life Expectancy in America (before Covid-19)



	<u>2000</u>	<u>2019</u>	<u>2021*</u>
Suicide:	29,350	47,511	45,855
Drug OD:	17,415	70,630	100,306
Alcohol:	19,627	39,000	95,000**
TOTAL	66,392	157,141	241,161

Fig 1.4 Case and Deaton report on “deaths of despair” combining mortality from suicide, drug overdoses, and alcohol addiction. Increase (in the U.S) is largely among rural whites without a college degree. Data from CDC NVSS. * estimates up to May 2021, ** data not comparable due to changes in criteria for alcohol-related deaths.

Engagement

The 40-40-33 Rule

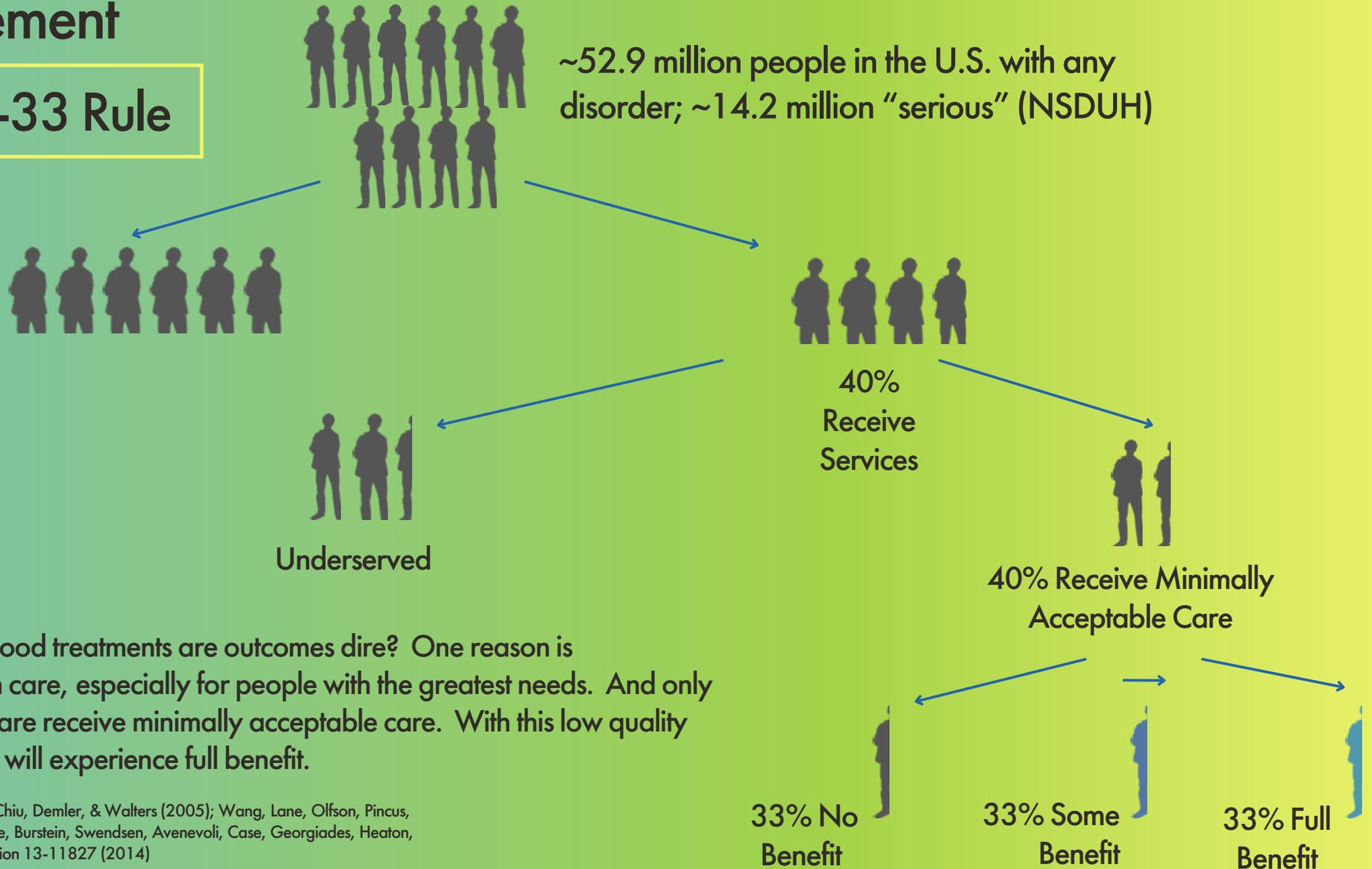


Figure 1.6 Why with good treatments are outcomes dire? One reason is the low engagement in care, especially for people with the greatest needs. And only 40% who engage in care receive minimally acceptable care. With this low quality of care, only one-third will experience full benefit.

SOURCES: NSDUH (2021); Kessler, Chiu, Demler, & Walters (2005); Wang, Lane, Olfson, Pincus, Wells, Kessler (2005); Merikangas, He, Burstein, Swendsen, Avenevoli, Case, Georgiades, Heaton, Swanson, Olfson (2011), SSA Publication 13-11827 (2014)

Healing Chapter Two: Alien to Our Affections

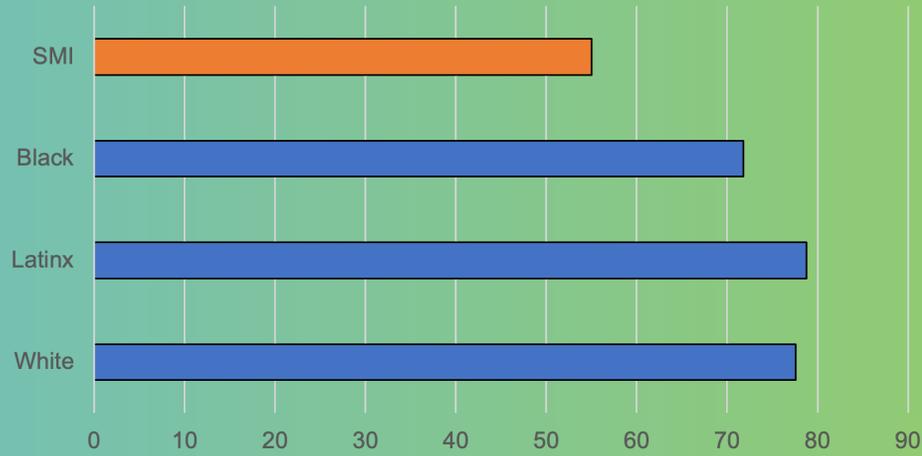


Figure 2.1 The Kennedy family circa 1936. Joseph P. Kennedy, Sr. is in the center, surrounded by, from the bottom left (clockwise): Robert, Eunice, John, Kathleen, Joe Jr., Rosemary, Rose (wife of Joe Sr. and mother of eight), Teddy, Pat, and Jean. Rosemary was institutionalized for most of her adult life. (<https://www.forbes.com/sites/carlodonnell/2014/07/08/how-the-1-billion-kennedy-family-fortune-defies-death-and-taxes-3/?sh=12e00a434e4a>)



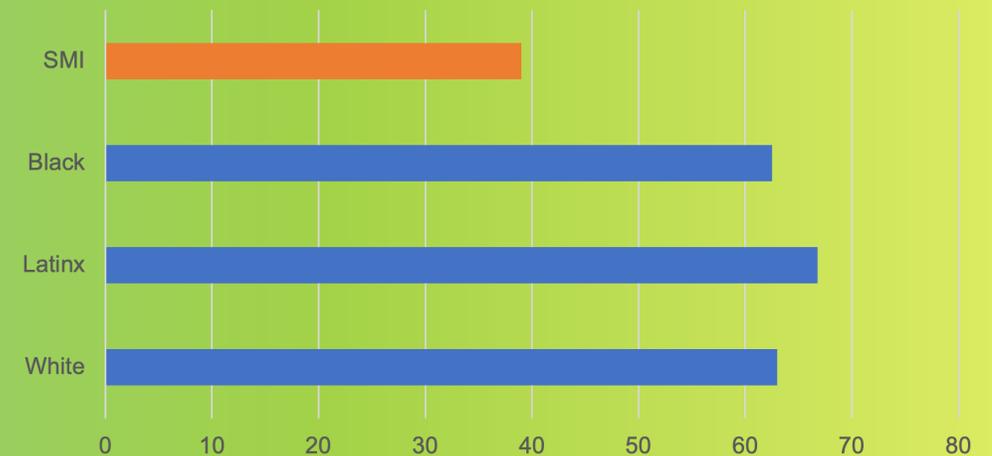
Figure 2.2 First Lady Rosalynn Carter presents Volume 1 of the report of the President's Commission on Mental Health to her husband President Jimmy Carter in 1978. This report documented the failures of the Community Mental Health program and led to the Mental Health Systems Act of 1980 which called for a renewed commitment to community services, a focus on prevention, and a patient's bill of rights. This initiative was gutted in 1981 by the incoming Reagan administration that returned mental health services back to the states.

Life Expectancy



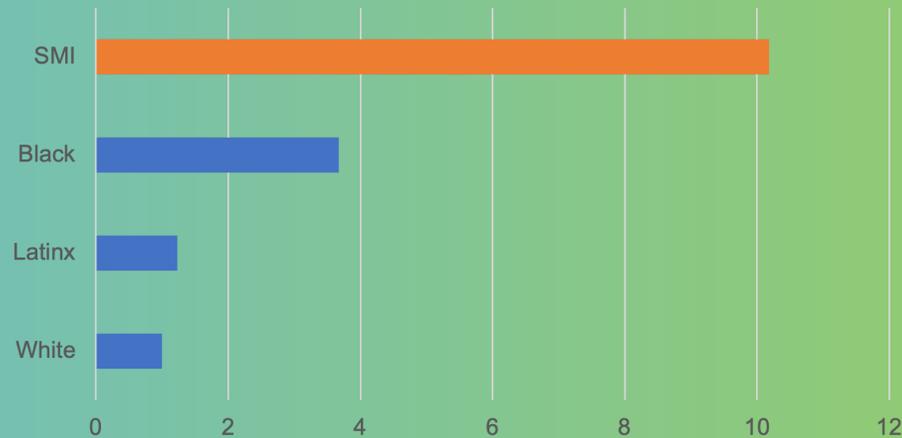
<https://www.cdc.gov/nchs/data/vsrr/vsrr015-508.pdf>

Employment - 2019



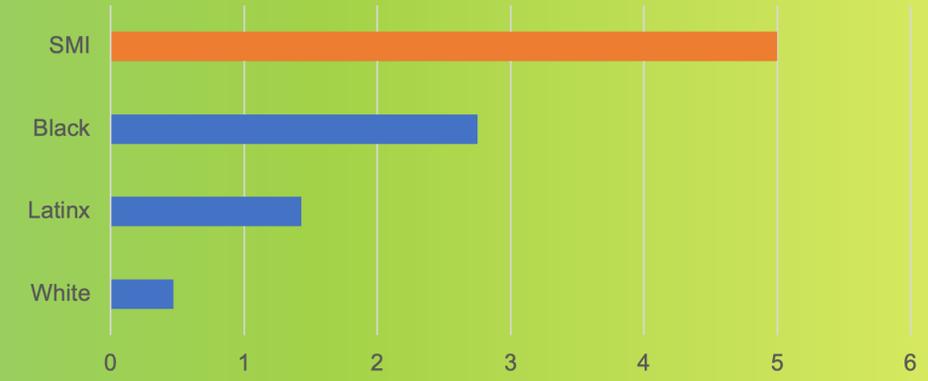
<https://www.bls.gov/opub/reports/race-and-ethnicity/2019/pdf/home.pdf>

Relative Risk Police Use of Force



Laniyonu and Goff BMC Psychiatry (2021) 21:500

Relative Risk Incarceration (Prison)



<https://www.pewresearch.org/fact-tank/2020/05/06/share-of-black-white-hispanic-americans-in-prison-2018-vs-2006/>

Figure 2.3 Nearly 60 years after President Kennedy pledged that people with mental illness should “no longer be alien to our affections”, the lack of equity is arguably worse than in 1963. If people with serious mental illness (SMI) were a race or ethnicity they would appear to be America’s “untouchables”.

And people of color with SMI face double jeopardy on each of these measures.

Healing Chapter Three: Treatments Work

Abilify (aripiprazole) – schizophrenia
 Cymbalta (duloxetine) – depression
 Nexium (esomeprazole) – heartburn
 Humira (adalimumab) – arthritis
 Crestor (rosuvastatin) – high cholesterol
 Advair Diskus (fluticasone prop) - asthma
 Enbrel (etanercept) – psoriasis
 Remicade (infliximab) – Crohn’s disease
 Copaxone (glatiramer acetate) – mult. scler.
 Neulasta (pegfilgrastim) - neutropenia

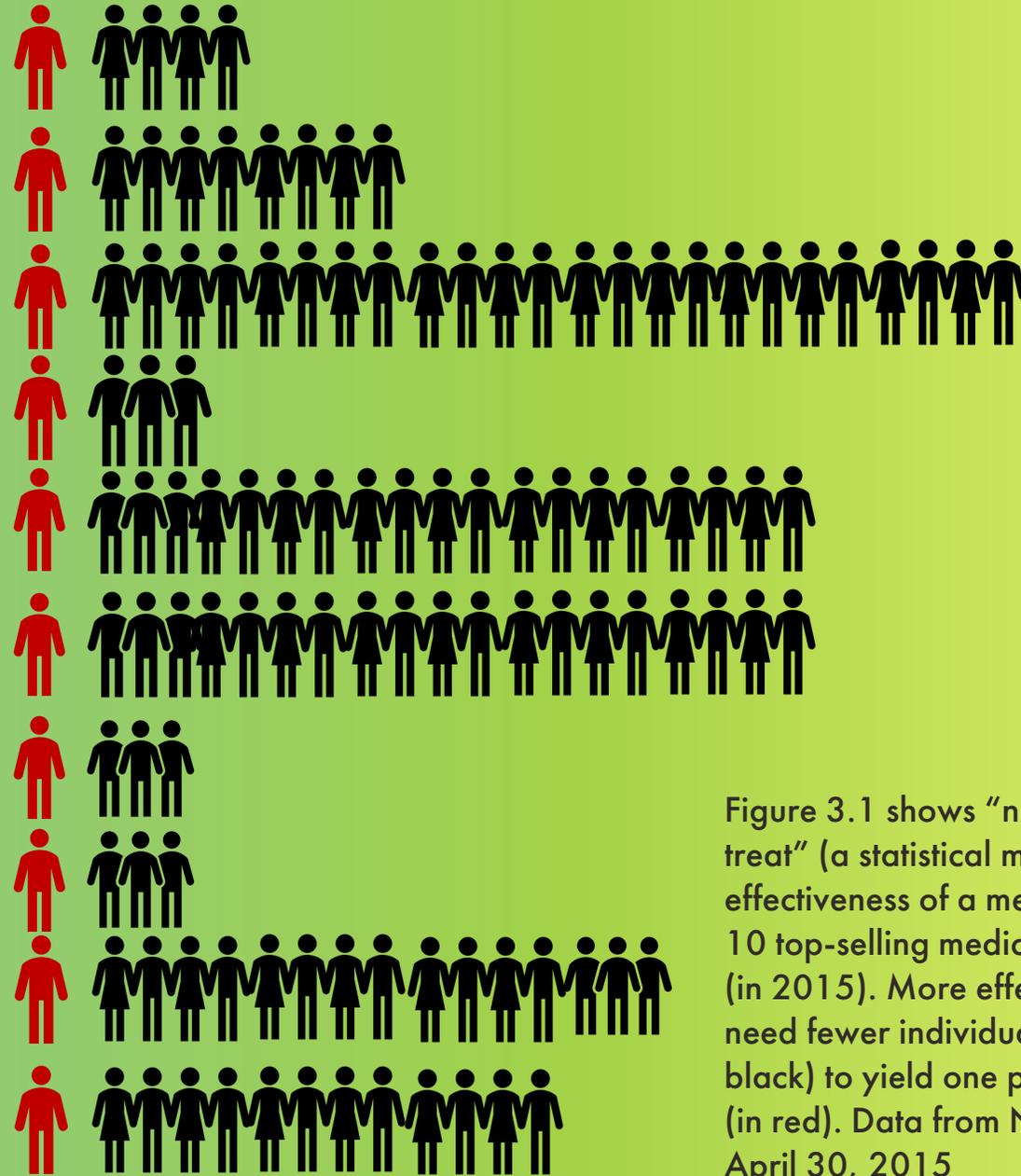


Figure 3.1 shows “number needed to treat” (a statistical measure of the effectiveness of a medication) for the 10 top-selling medications in the U.S. (in 2015). More effective medications need fewer individuals treated (in black) to yield one person responding (in red). Data from N. J. Shork, Nature, April 30, 2015

Psychological Interventions Recommended by the WHO

<u>Example of Intervention</u>	<u>Recommended for</u>
Behavioral Activation	DEP
Relaxation Training	DEP
Problem Solving Treatment	DEP
Cognitive Behavioral Therapy (CBT)	DEP, CMH, SUB, PSY
Contingency Management Therapy	SUB
Family Counseling or Therapy	PSY, SUB
Interpersonal Therapy (IPT)	DEP
Motivational Enhancement Therapy	SUB
Parent Skills Training	CMH

Figure 3.3 The World Health Organization (WHO) in their mhGAP Intervention Guide recommend several psychological interventions for scaling up in low and middle income countries. These are equally useful in the U.S. DEP (depression), CMH (child mental health), SUB (substance use disorder), PSY (psychotic disorders). This list is not comprehensive but it makes the point that there are several evidence-based psychological treatments.

<https://www.who.int/publications/i/item/9789241549790>

The Landscape of Interventions for Mental Illness

<u>Medications</u> Antipsychotics (>20) Antidepressants (>30) Anxiolytics (>10) Mood Stabilizers (7) ADHD meds (6)	<u>Psychological Treatments</u> Cognitive Behavior Therapy Problem Solving Therapy Family Interventions Interpersonal Therapy Behavioral Activation
<u>Neuromod. Treatments</u> Transcranial Mag. Stim. (TMS)* Electroconvulsive Rx (ECT)* Deep Brain Stimulation (DBS) Transcran. Dir. Curr. Stim. (DCS) Vagal Nerve Stimulation (VNS)*	<u>Rehabilitative Interventions</u> Assertive Community Treatment Supp. Employment/Academics Supportive Housing Family Psychoeducation Clubhouse

Figure 3.4 There is a wide range of effective treatments available for mental illness. This list is not comprehensive but it makes the point that research has documented an abundance of treatments with efficacy and effectiveness. Unfortunately, these treatments are rarely given early, adequately, or in combination. For neuromodulatory treatments, * represents FDA approval.

Healing Chapter Four: Fixing Crisis Care

U.S. Capacity for Inpatient Care of People with Mental Illness

<u>Facility.</u>	<u># Beds</u>	<u>% Total Beds</u>	<u># / 100,000</u>
State and County Psychiatric Hospitals	39,907	23%	12.6
Private Psychiatric Hospitals	28,461	17%	9
General Hospital with Psychiatric Unit	31,453	18%	9.9
VA Medical Centers	7,010	4%	2.2
Residential Treatment Centers	42,930	25%	13.5
<u>Other Specialty Inpt/Res Providers</u>	<u>20,439</u>	<u>12%</u>	<u>6.4</u>
TOTAL	170,200	100%	53.6

Table 4-1. The Number of Inpatients in hospital and residential care in the US in 2014. Data from Trends in Psychiatric Inpatient Capacity, United States and Each State, 1970 – 2014, National Association of State Mental Health Program Directors.

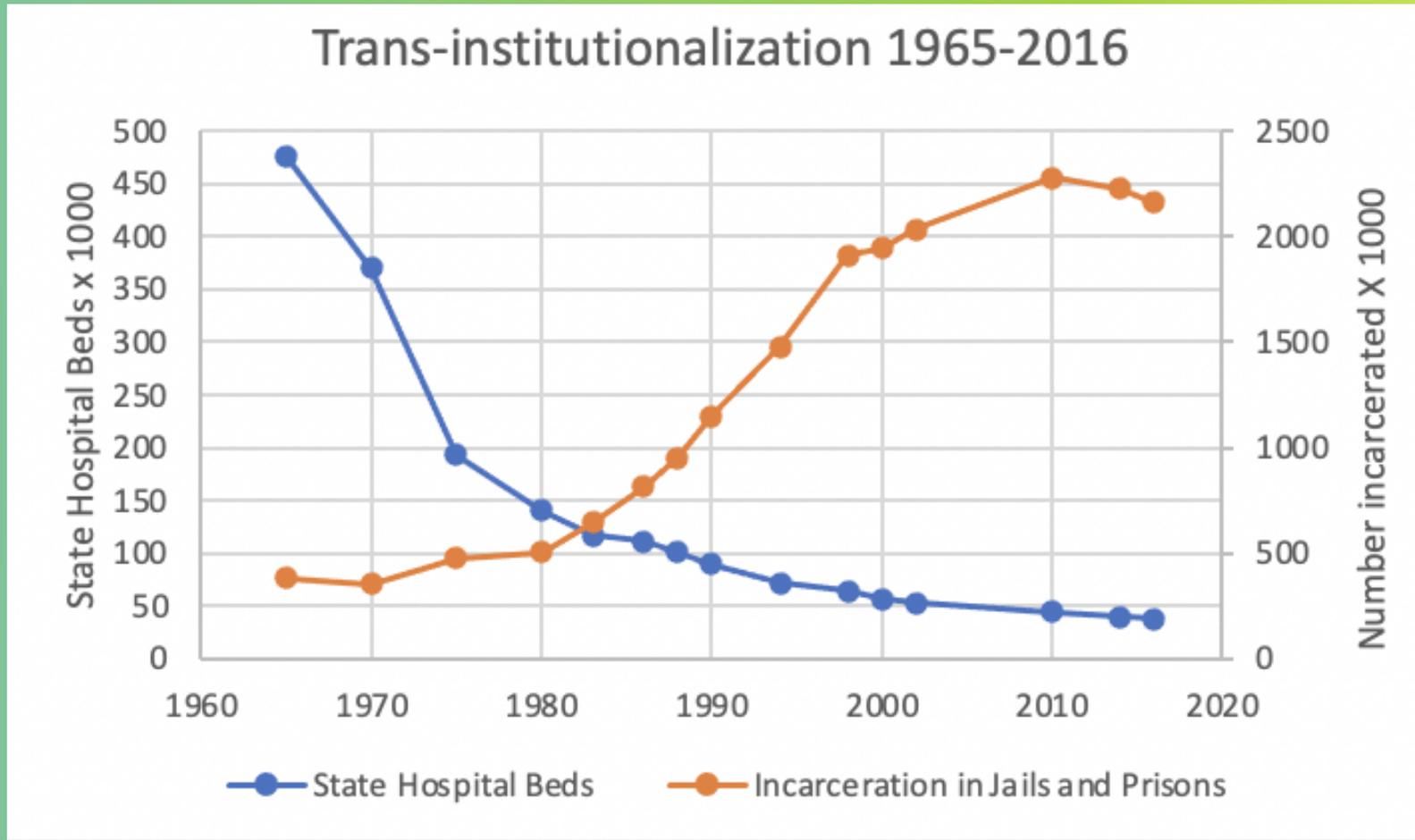


Figure 4.1 Trends in number of state hospital beds versus number of individuals in jails and prisons from 1965– 2016 in the U.S. Data for state hospital beds from the National Association of State Mental Health Program Directors. Data for incarceration from Bureau of Justice Statistics includes state and federal jails and prisons. Note incarceration numbers for 1965– 1975 are estimates based on historical rates for jail incarceration, as BJS data prior to 1980 were for prisons only.

Crisis Response Continuum of Care

Outreach & engagement of people at risk



Many people in the early stages of crisis need referral to appropriate services and supports.

Crisis call center hubs



Evidence suggests that most crises can be resolved by skilled telecommunications responders.

Mobile crisis teams



Mobile crisis teams are able to resolve the majority of crises in the community.

Crisis stabilization options



Those requiring a higher level of care should have multiple options, such as crisis stabilization or hospitalization, corresponding to their level of need.

Post-crisis, community-based support



With appropriate care and support, most are able to remain stable in their communities post-crisis.



Crisis Hotline

SEVEN CRITICAL PILLARS



Early Identification and Prevention



Emergency and Crisis Response



Equity



Integration



Parity



Standards



Workforce

Figure 4.2 Transforming crisis care will begin with a new crisis response line – 988. Beyond this new number to call, transformed crisis care requires someone to come and someplace to go. Figure from <https://wellbeingtrust.org/wp-content/uploads/2021/11/988-Crisis-Response-Report-November-FINAL.pdf>

Healing Chapter Five: Crossing the Quality Chasm

The U.S. Mental Health Workforce

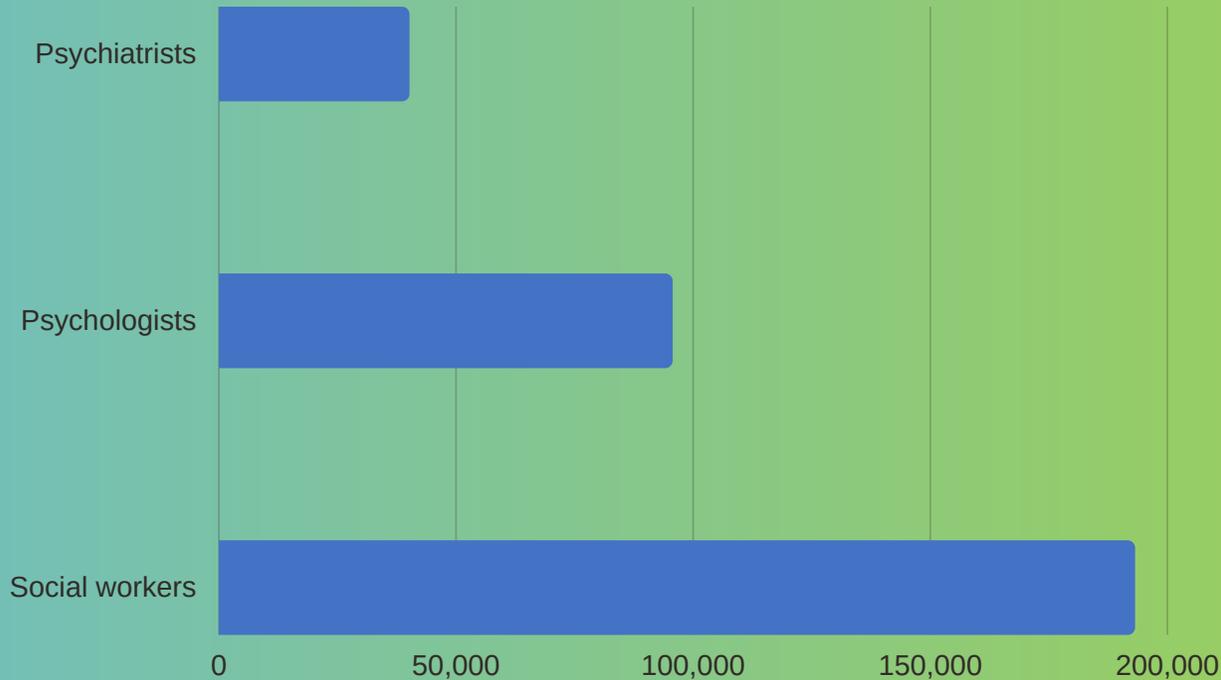
Clinical Title	Degree	Supervised Trng	Number/US	Number/100K
Psychiatrists	MD	4 yrs residency	33,650	10.3
Child Psychiatrists	MD	6 yrs residency	8,090	2.5
Psychologists	PhD/PsyD	2 yrs (1 post grad)	91,440	28.1
Lic. Clin. Soc. Workers	MSW/PhD	2 yrs	239,410	73.6
Psych Nurse Pract.	RN/MA/PhD	Not specified	10,450	3.2
Marr. Fam. Therapists	MA/PhD	2 yrs	53,080	16.3
Lic. MH Counselors	MA/PhD	2 yrs	140,760	43.3
School Counselors	BA	Varies by state	<u>116,080</u>	<u>35.6</u>
Total			692,960	213.2

Table 5.1 The U.S. mental health workforce is vast and varied. Data from HRSA Report, Dec 15, 2020.

<https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/data-research/bh-workforce-projections-fact-sheet.pdf>

Is the Mental Health Workforce Trained to Provide the Treatments that Work?

A. Number of Practitioners in US



B. Percent of Programs Lacking Training in Any EBT

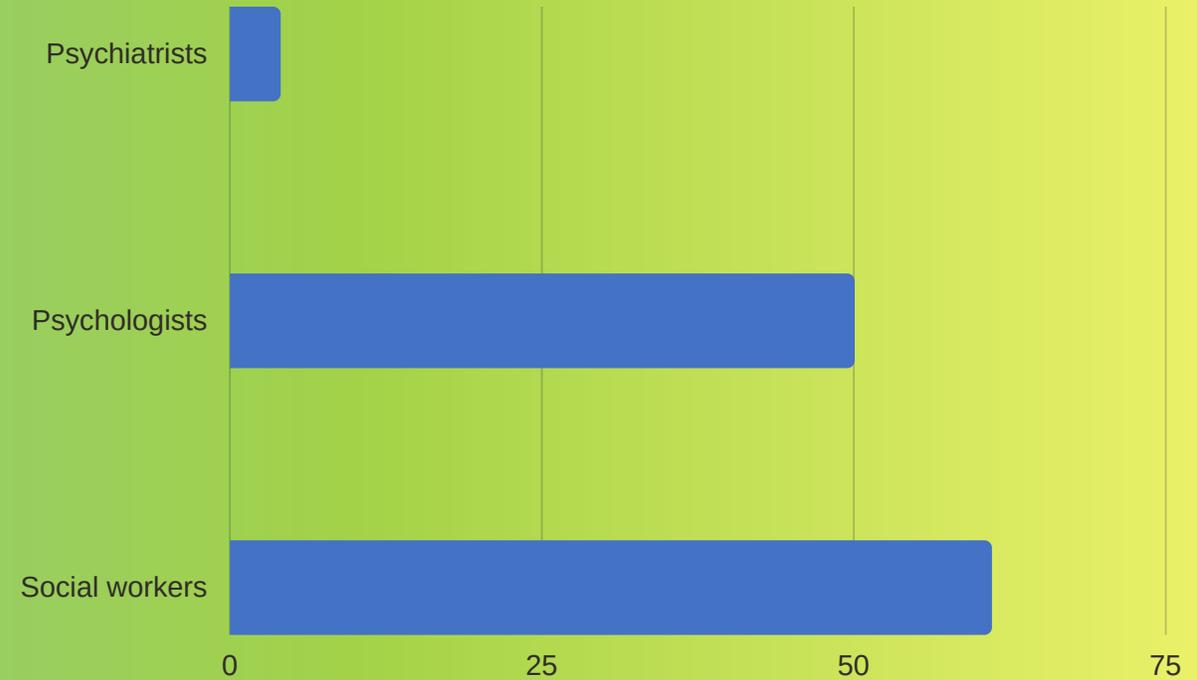


Figure 5.1 (A) The number of practitioners for social work, psychology, and psychiatry in the US, estimated in 2006. In (B) the percentage of programs for these practitioners lacking training in psychological therapies considered evidence-based treatments (EBT). (Data adapted from Weissman et al, Arch Gen Psych 2006)

Percent Meeting Quality Standard: Mental Health vs Cardiovascular 2005 - 2016

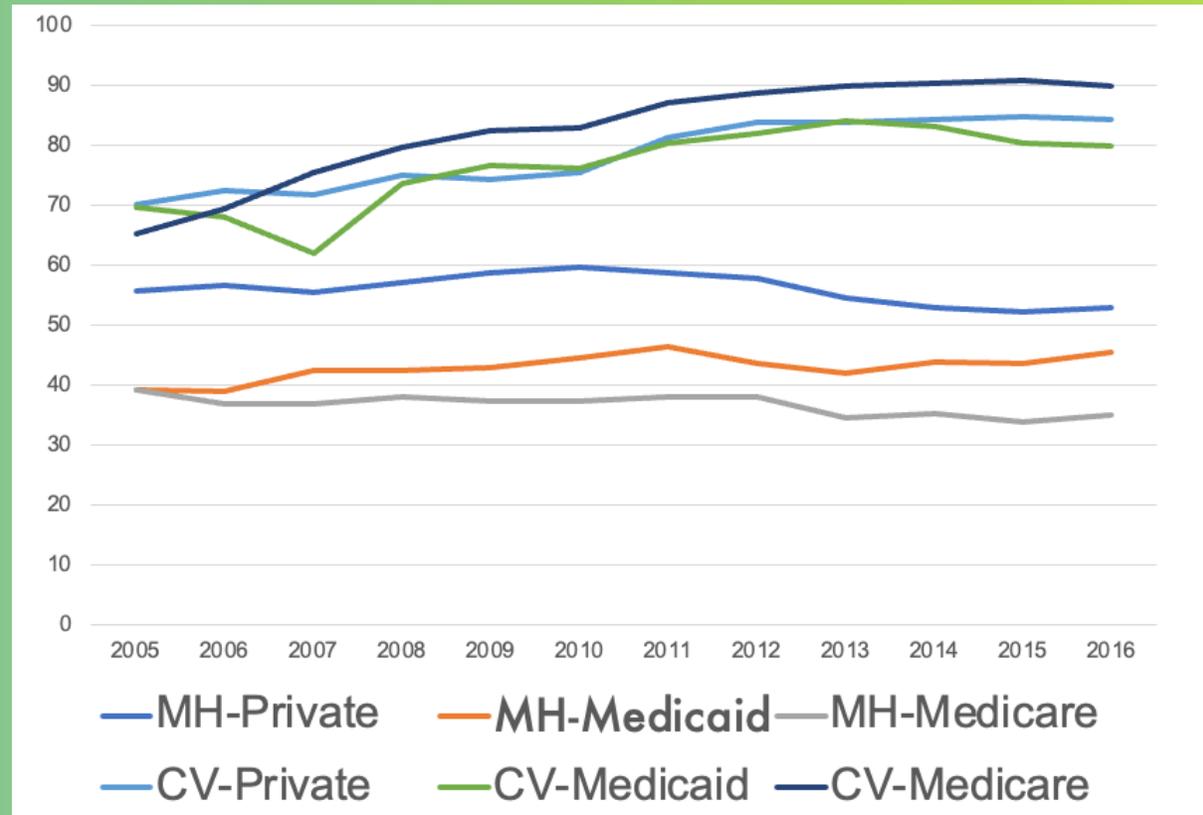


Figure 5.2. Mental health vs cardiovascular quality scores 2005-2016. Data show percentage of population meeting quality standard for a mental health (MH) measure (outpatient follow-up within seven days of hospital discharge) compared to a cardiovascular (CV) measure (persistence of beta-blocker treatment for six months after hospitalization for a heart attack) in patients with private insurance, Medicaid, or Medicare. Improvements across time are evident in cardiovascular care but not psychiatric care.

Quality of Mental Health Care Based on HEDIS Measures - 2019

Topic	Measure	Performance Scores (2016)
Screening	Depression screening and follow-up	NA
Monitoring	PHQ-9 to monitor depression symptoms	NA
Medication	Adherence to antipsychotics	59.2
Management	Antidepressant medication management	53.1 (3 mos); 38.0 (6 mos.)
Psychosocial Care	Use of first-line psychosocial care for children and adolescents on antipsychotics	60.2
Care Coordination	Follow up after emergency department care	39.5 (30 days)
	Follow up after hospital discharge	45.5 (7 days); 63.8 (30 days)
	Follow up care - children on ADHD meds	ADHD: 44.5 (1 visit/30 days); 54.5 (2 visits/9 mos.)
Overuse	Multiple antipsychotics in children/adolescents	2.4
Integration with Medical Care	Diabetes screening for adults using antipsychotics	80.7
	Metabolic monitoring for children/adolescents on antipsychotics	33.3
Outcomes	Depression remission or response	NA

Figure 5-2. 2019 HEDIS Measures for Mental Health. Scores shown for Medicaid population from 2016 report card, the most recent performance data available. Range is 0 – 100. NA indicates “not available” data as measures added since 2016.

Healing Chapter Six: Precision Medicine

Heritability of Major Mental Illnesses

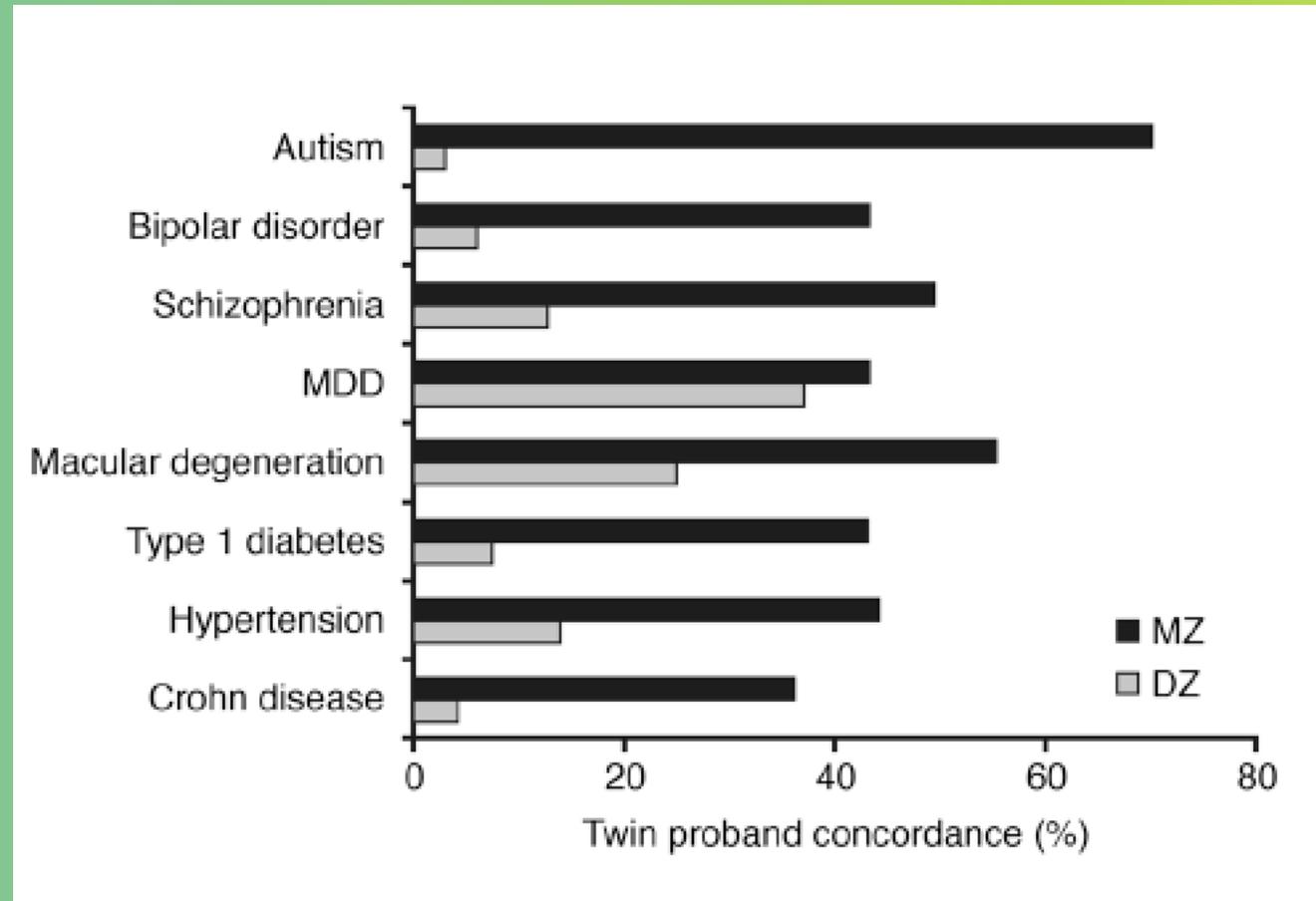


Figure 6.2 Heritability based on twin studies comparing concordance (ie. co-occurrence of diagnosis) in identical or monozygotic (MZ) and fraternal or dizygotic (DZ) twins. These results suggest the likelihood of finding genetic factors for autism, bipolar disorder, and schizophrenia but perhaps not MDD (major depressive disorder). Data from TR Insel, Journal Clinical Investigation, April, 2009. <https://www.jci.org/articles/view/38832>

Precision Medicine for Mental Illness

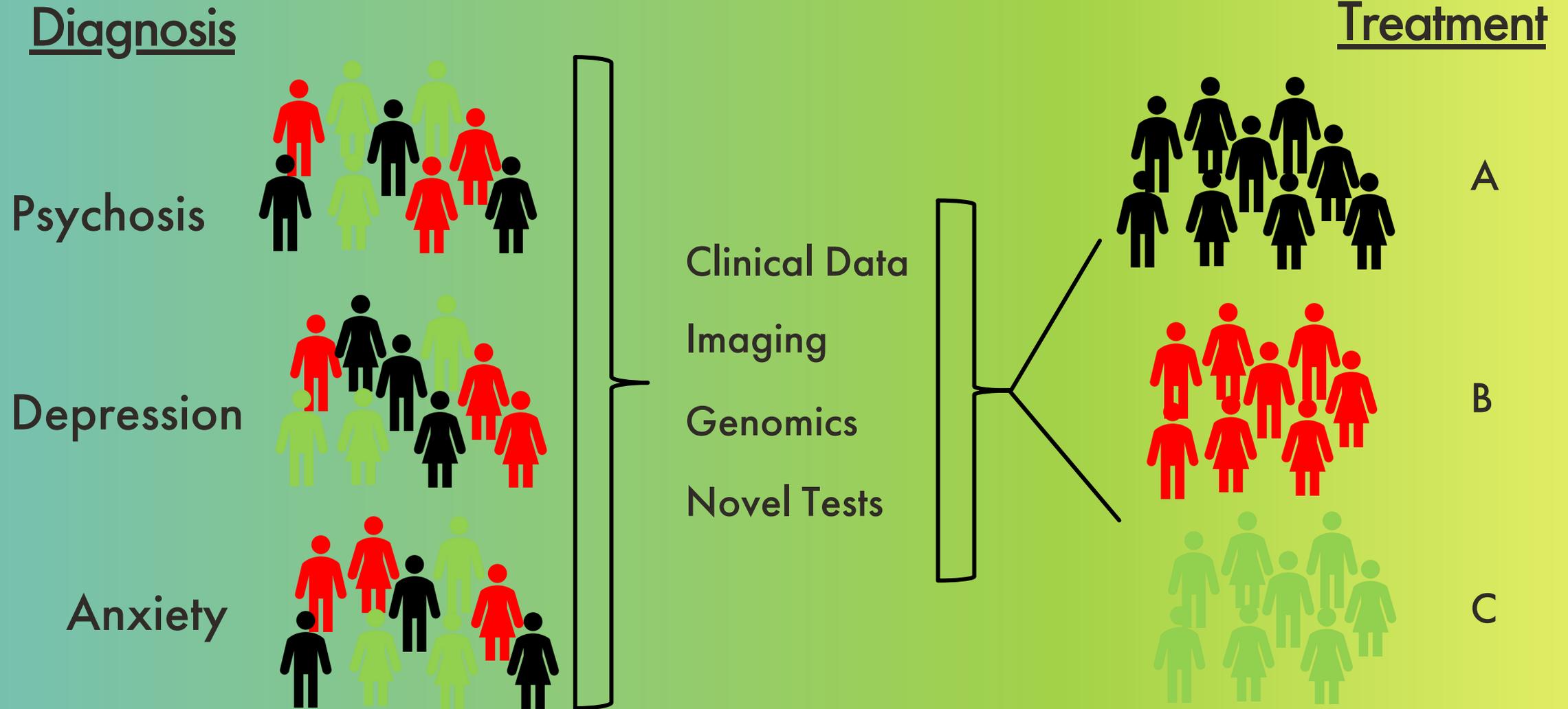


Figure 6.4 The vision for precision psychiatry deconstructs the current heterogeneous diagnostic categories to create more homogeneous groups that match with treatments, ensuring more personalized and effective care.

Healing Chapter Seven: Beyond Stigma

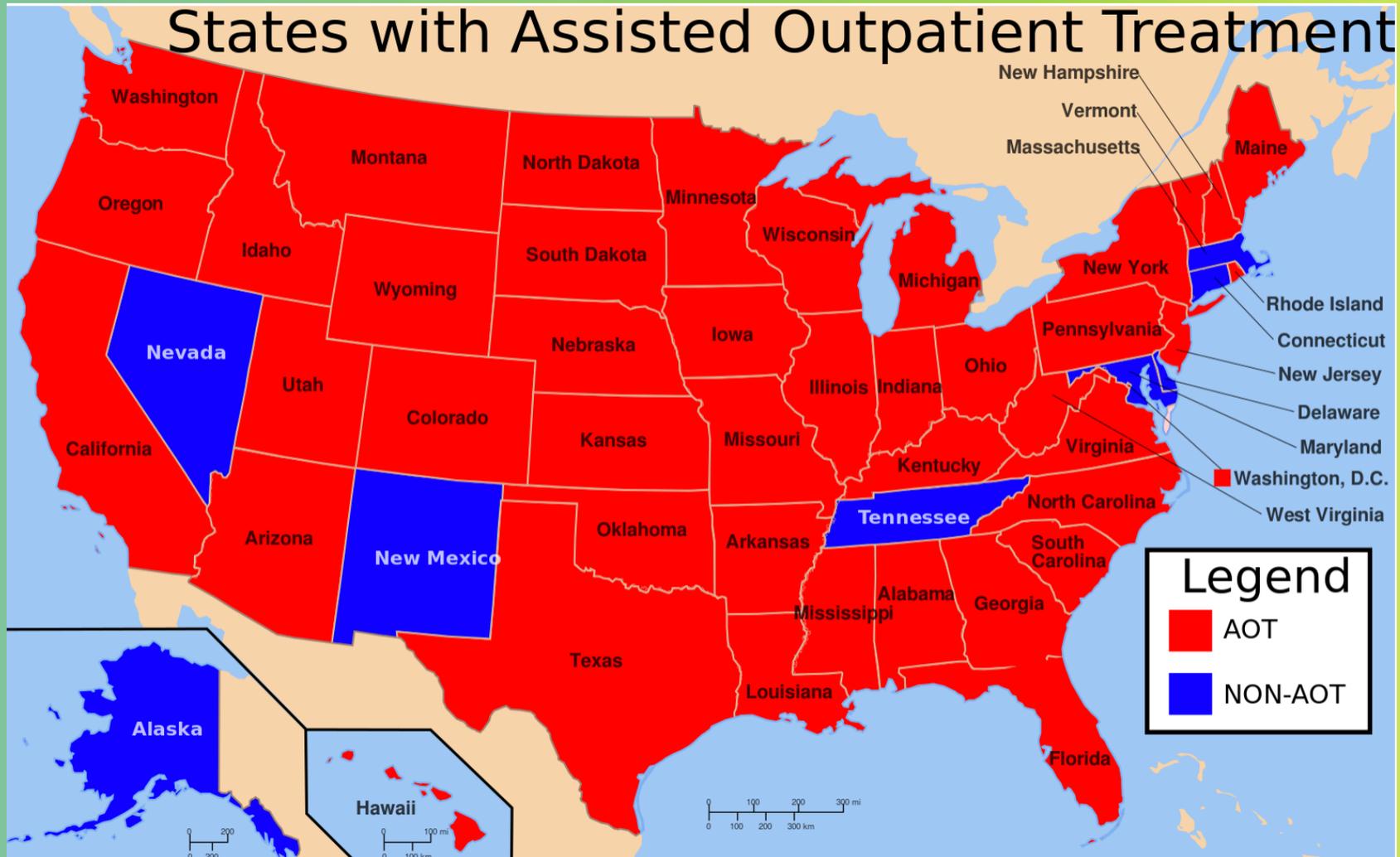


Figure 7.1 Assisted Outpatient Treatment (AOT) has been adopted in most states to provide care even to people who may lack insight about their illness. Map shows adoption as of 2013. Source : https://en.wikipedia.org/wiki/Outpatient_commitment

Healing Chapter Eight: Recovery

Fountain House

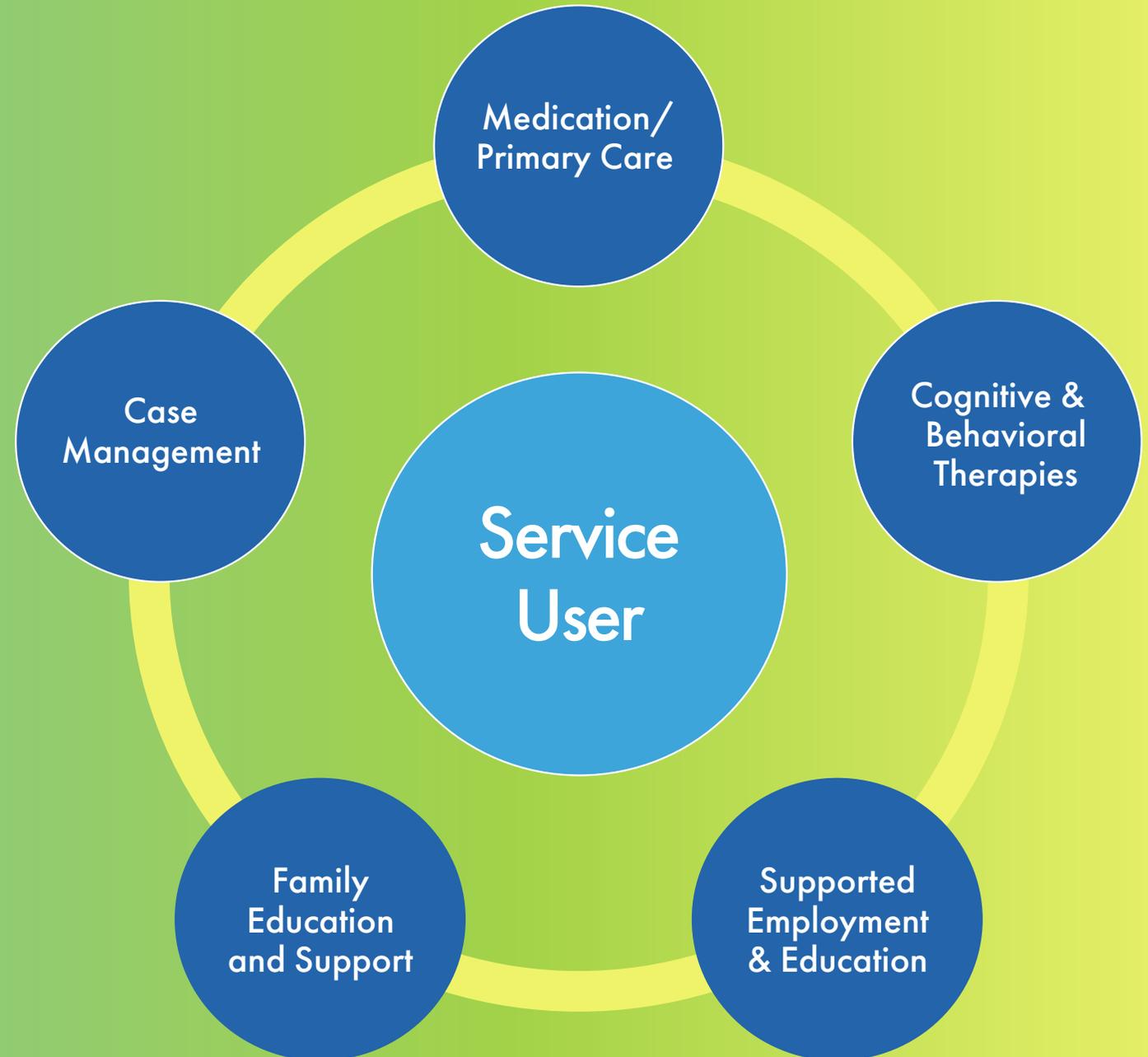


Figure 8.2 Fountain House in New York City is an intentional community that provides people, place, and purpose to members with serious mental illness in a setting that is both welcoming and elegant. Photo courtesy of Fountain House.

Healing Chapter Nine: Simpler Solutions

Coordinated Specialty Care

Figure 9.1 Coordinated Specialty Care (CSC) is a service package for people experiencing a first episode of psychosis. Rather than assuming that a single intervention will suffice, CSC provides an array of services to ensure recovery and prevent relapsed. An important part of the model is shared decision making with the service user. And results have been best when the program is continued for at least a year. <https://www.nimh.nih.gov/health/topics/schizophrenia/raise/what-is-coordinated-specialty-care-csc>



Impact of Missouri Health Home on Medical Status of Patients with SMI

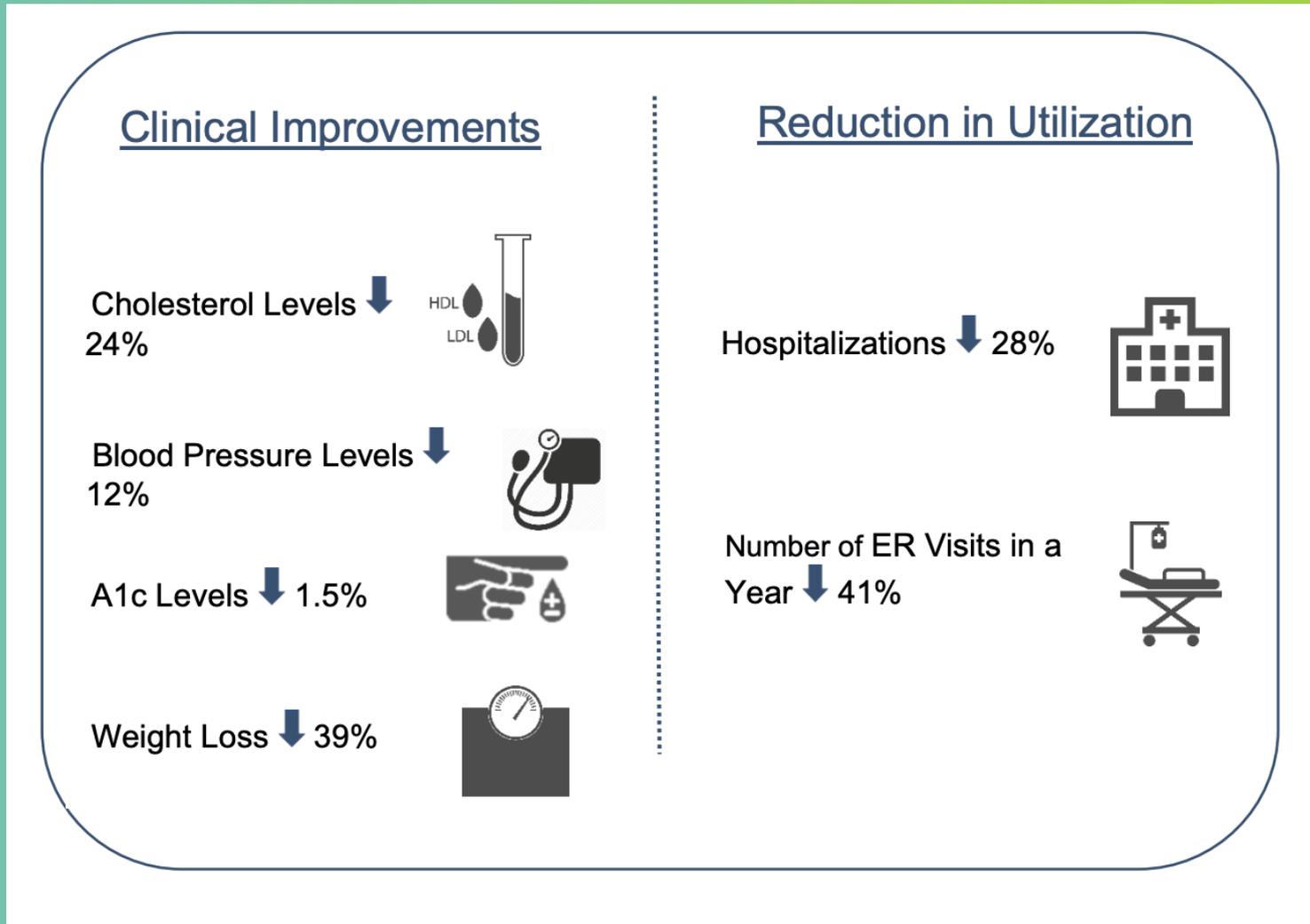


Figure 9.2 Health Home impact on medical outcomes in people with SMI.

Certified Community Behavioral Health Centers

Status of Participation in the CCBHC Model

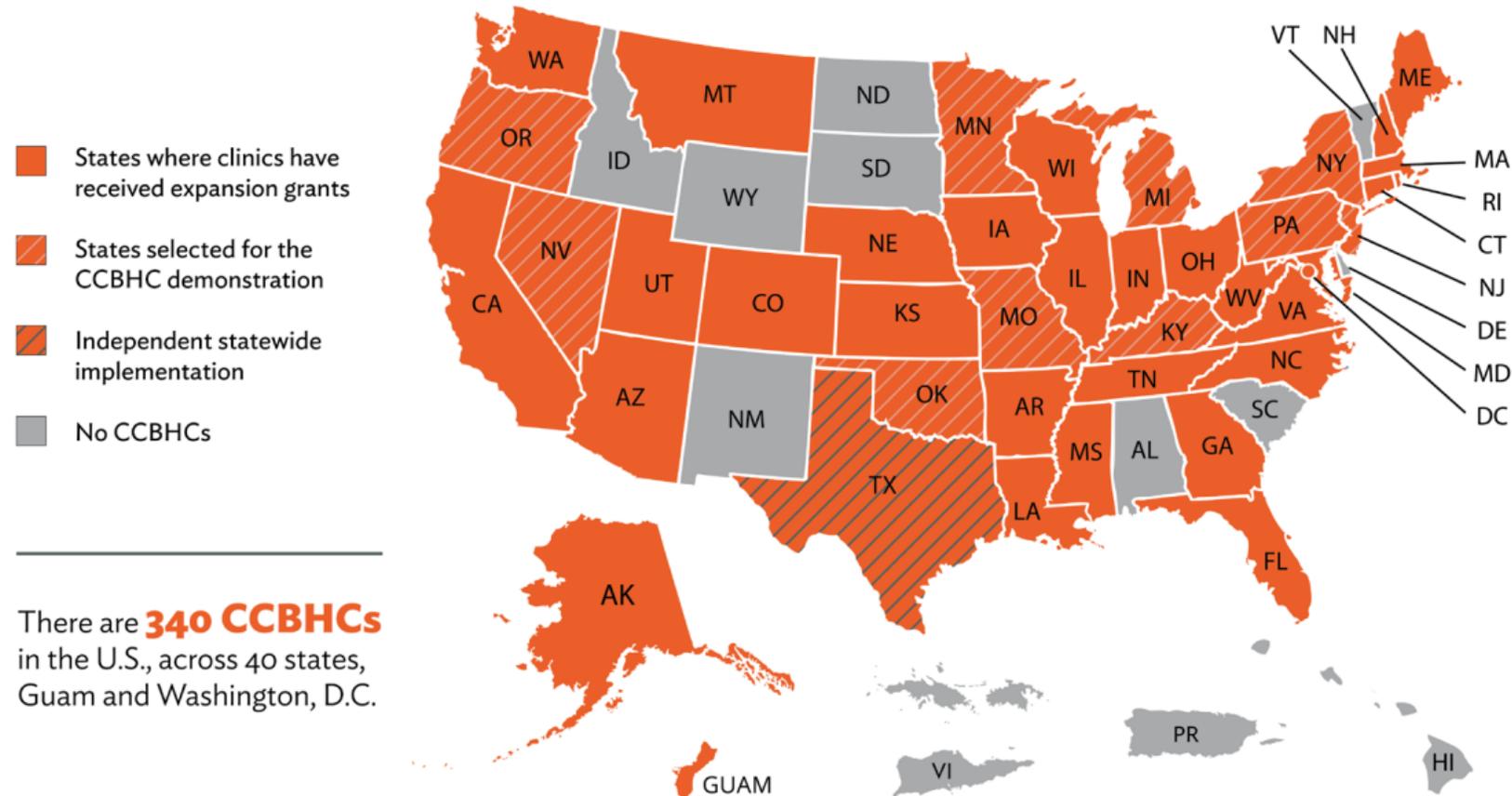


Figure 9-4. As of May 2021, there were 340 CCBHCs across 40 states. This model provides comprehensive “whole person care” that in many states is supported via an alternative payment model.

https://www.thenationalcouncil.org/wp-content/uploads/2021/05/052421_CCBHC_ImpactReport_DataHighlights_2021.pdf?daf=375ateTbd56

Healing Chapter Ten: Innovation

Technology Solutions for Mental Health Care

Problems

Lack of Engagement

Lack of Quality

Lack of Accountability



Solutions

Person-centered online care

Training, Coordinated,
connected care

Measurement and Value
Based Care

Figure 10.1 Technology, especially social media, has been viewed as part of the problem but can also be part of the solution. Three of the major problems in mental health care can be solved by innovative tools.

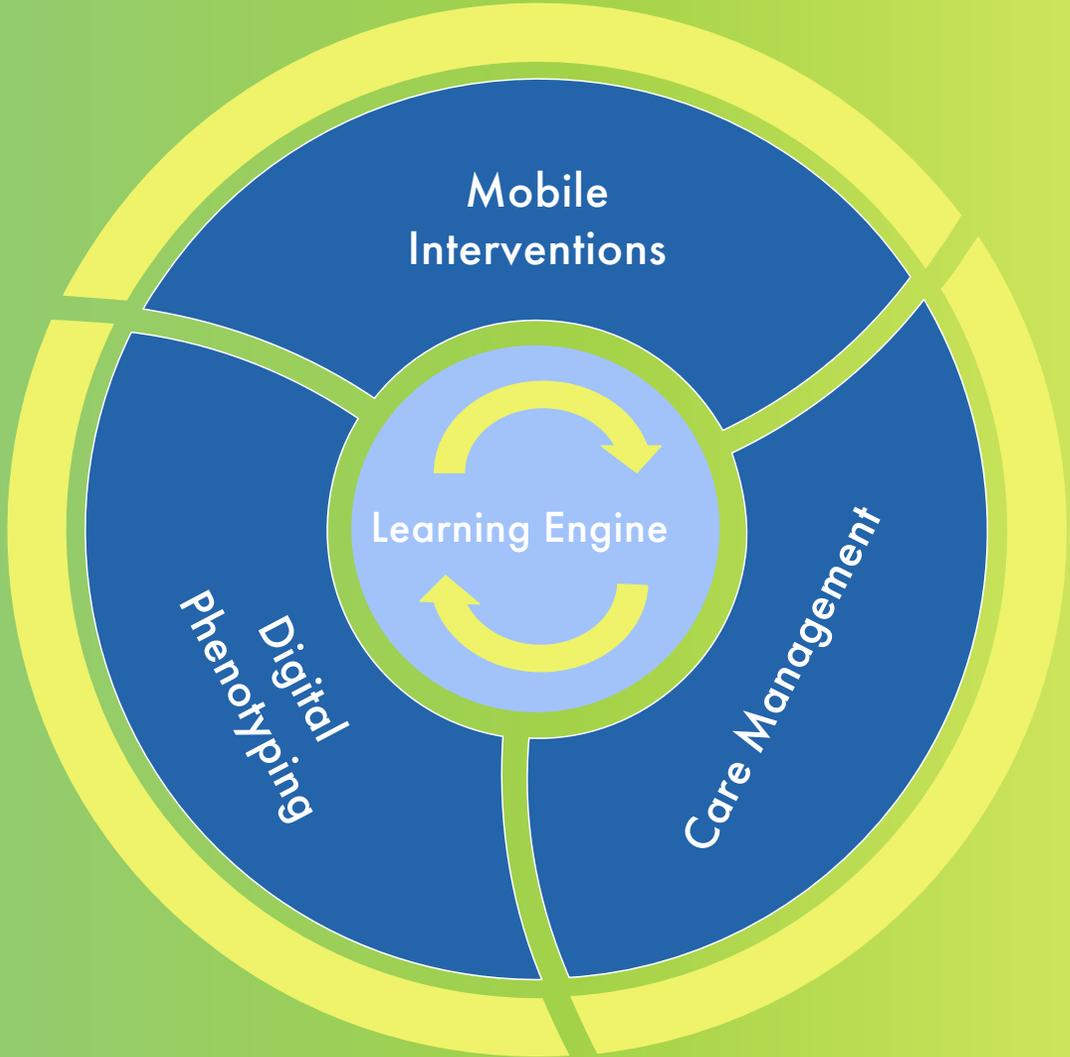
The Digital Health Landscape

Figure 10.2 The promise of digital innovation for mental health care is not an app or a point solution. It will be the combination of tools to improve measurement, interventions, and care management that together can create a learning engine, where feedback from continuous measurement improves the interventions that feeds into better care.

See TR Insel, *Am J Public Health*, 2019.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6595506/>

- Sensors
- HCI
- Voice
- Sociality

- CBT, DBT, IPT; Coaching; Peer Support; Crisis Intervention



- Coordination
- Data Capture
- Quality Metrics
- Feedback

Healing Chapter Eleven: Prevention

Health \neq Health Care

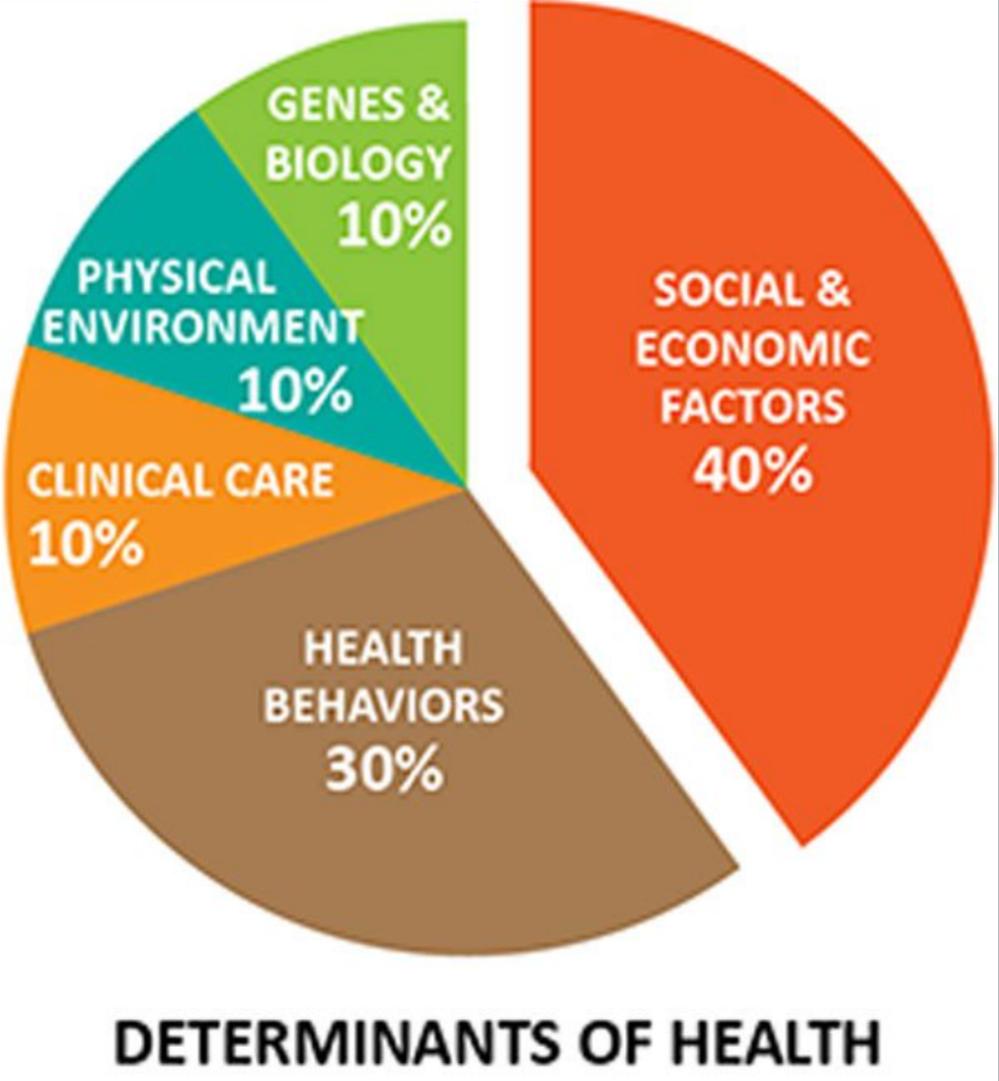
Figure 11.1 The DC Metro map provides a useful template for understanding health disparities. Sir Michael Marmot reminds us that the 17 mile journey from inner-city Washington DC to suburban Maryland (shaded area) is associated with a 20 year increase in longevity. This cannot be explained simply by better health care. Treatment with statins, one of our most powerful preventive interventions, increases longevity by 12.6 days. (Hansen et al, J Gen Intern Med, 2019)



Health ≠ Healthcare

10% related to clinical care

US annual = \$3.2T



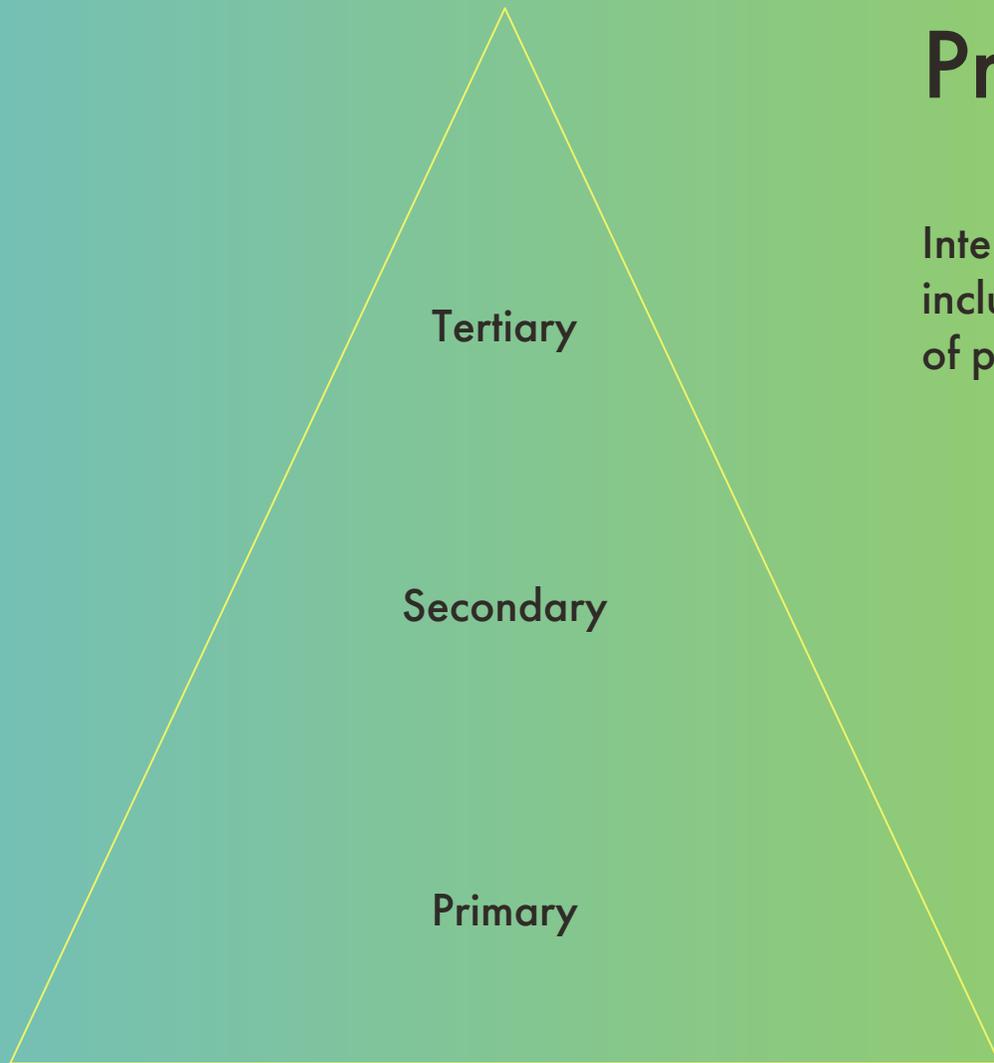
70% related to social factors and health behaviors

US annual = ?

Figure 11.2 Explaining the variance in health outcomes is difficult. Social, economic, and behavioral factors appear more significant than clinical care. Our current expenditures overvalue clinical care and undervalue other factors.

Source: WHO

Prevention in Mental Health



Interventions following onset (i.e., aspirin after a heart attack) include treatments to prevent relapse following a first episode of psychosis or postvention following a suicide attempt.

Interventions for people at risk (i.e., statins) include treatments to prevent depression in postpartum women, psychosis in prodromal youth, and PTSD following a traumatic event.

Universal interventions (i.e., vaccinations, seat belts) include policies that support families, increase firearm safety, educate children about social and emotional skills.

Figure 11.3 The three stages of prevention for mental health. Scientific research supports each of these as effective but these are underutilized in a health care system focused on crisis services.