



Recovery Capital: Rationale and Science

Aurora Recovery Center

May 2021



RECOVERY
RESEARCH
INSTITUTE



MASSACHUSETTS
GENERAL HOSPITAL



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Outline

Where have we come from? Where are we now? Where are we going? 50 years of Addiction Science, Practice, and Policy:

What is “recovery” and why is everyone talking about it?

Theory of addiction recovery: a biopsychosocial perspective

Services for Attaining and sustaining addiction remission and recovery

State of the Science and future directions

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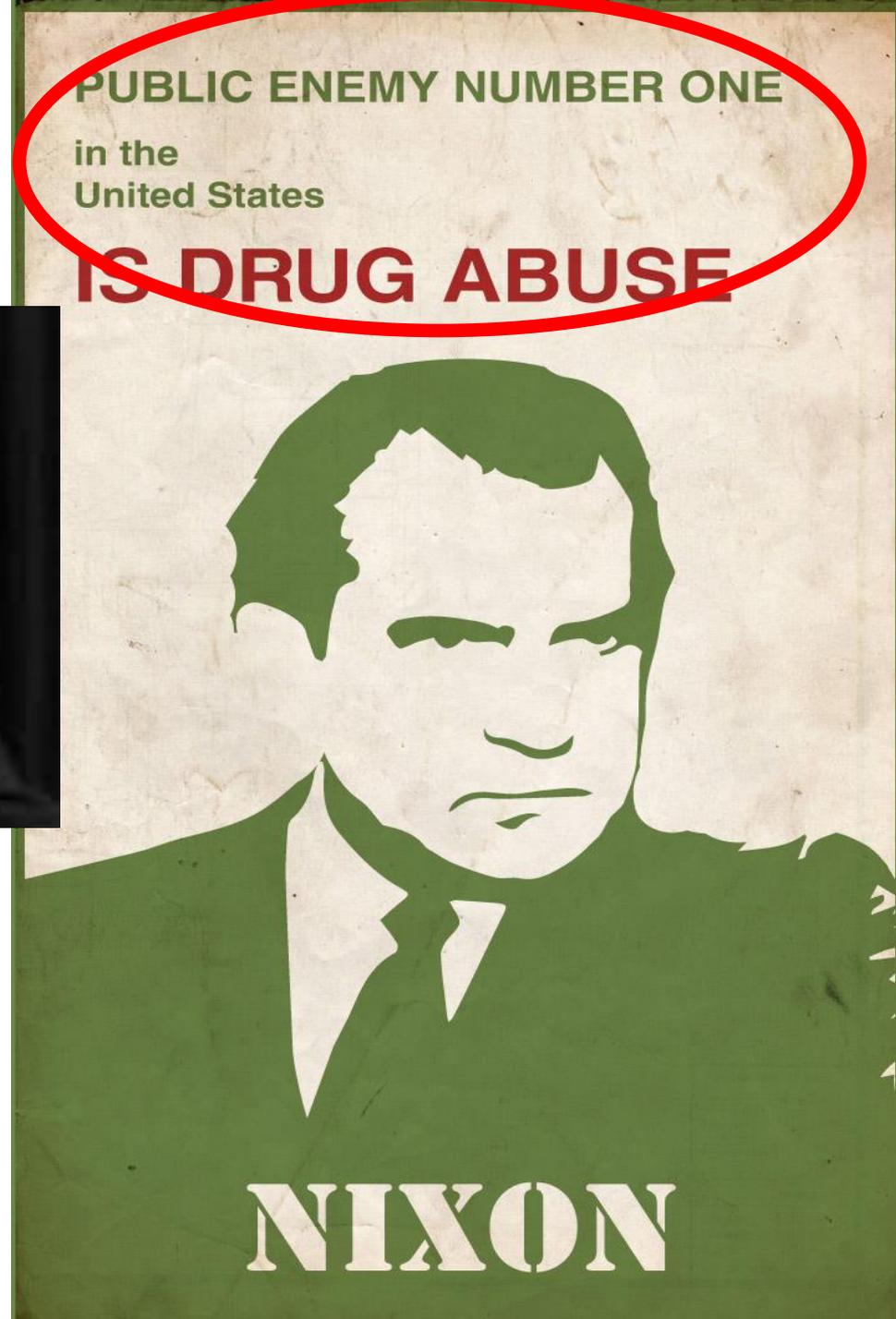
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1970



During the past 50 yrs since “War on Drugs” declared, we have moved from “Public Enemy No. 1” to “Public Health Problem No. 1”



The “war on drugs” was part of a national concerted effort to reduce “supply” but also “demand” that created treatment and public health oriented federal agencies..



NIDA

NATIONAL INSTITUTE

ON DRUG ABUSE



CSAT
Center for Substance
Abuse Treatment
SAMHSA

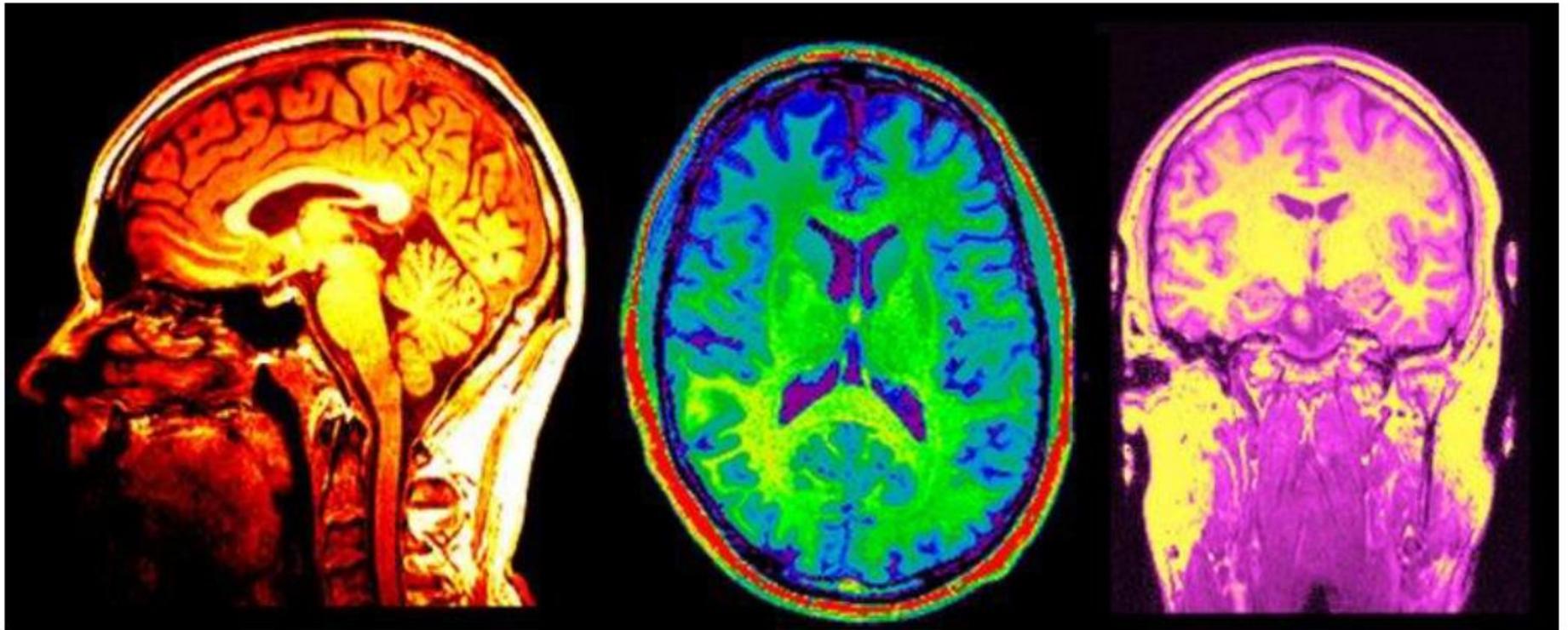


Paradigm Shifts

Genetics, Genomics, Pharmacogenetics

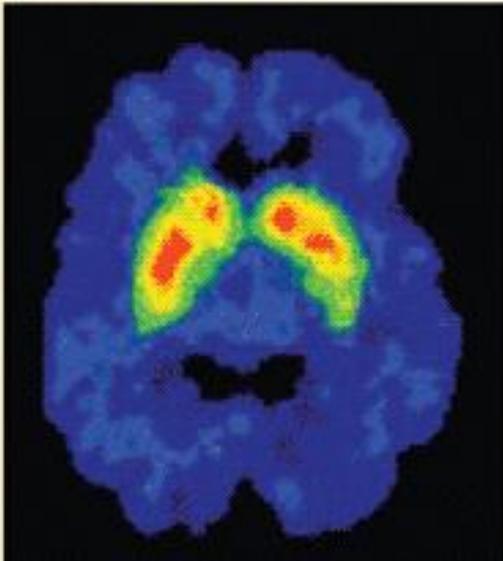


Neuroscience: Neural plasticity

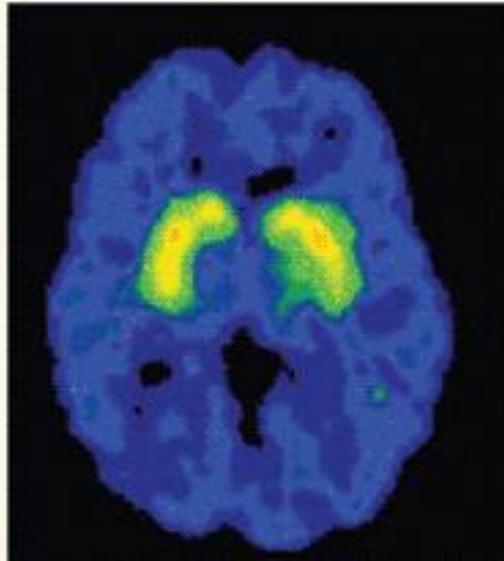


Changes in the brain in recovery

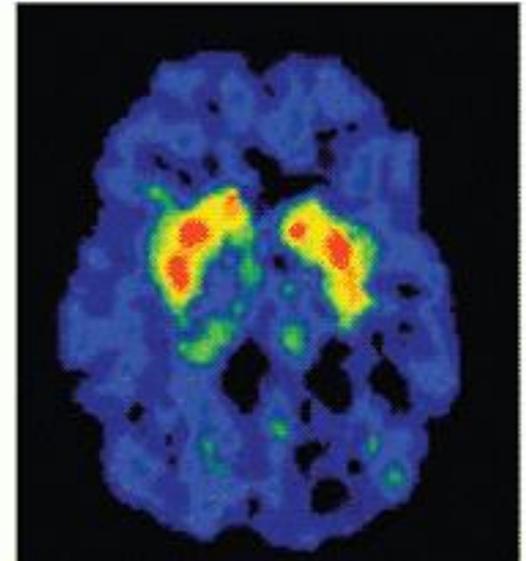
Healthy Person



Meth User: 1 month abstinence



Meth User: 14 months abstinence



STAGES OF CHANGE

RELATED TREATMENT & RECOVERY SUPPORT SERVICES

PRECONTEMPLATIVE

In this stage, individuals are not even thinking about changing their behavior. They do not see their addiction as a problem: they often think others who point out the problem are exaggerating.



CONTEMPLATIVE

In this stage people are more aware of the personal consequences of their addiction & spend time thinking about their problem. Although they are able to consider the possibility of changing, they tend to be ambivalent about it.



PREPARATION

In this stage, people have made a commitment to make a change. This stage involves information gathering about what they will need to change their behavior.



ACTION

In this stage, individuals believe they have the ability to change their behavior & actively take steps to change their behavior.

MAINTENANCE

In this stage, individuals maintain their sobriety, successfully avoiding temptations & relapse.



HARM REDUCTION

- * Emergency Services (i.e. Narcan)
- * Needle Exchanges
- * Supervised Injection Sites

SCREENING & FEEDBACK

- * Brief Advice
- * Motivational Interventions

SCREENING, BRIEF INTERVENTION, & REFERRAL TO TREATMENT (SBIRT)

CLINICAL INTERVENTION

- * Phases/Levels (e.g., inpatient, residential, outpatient)
- * Intervention Types
 - Psychosocial (e.g. Cognitive Behavioral Therapy)
 - Medications: Agonists (e.g. Buprenorphine, Methadone) & Antagonists (Naltrexone)

NON-CLINICAL INTERVENTION

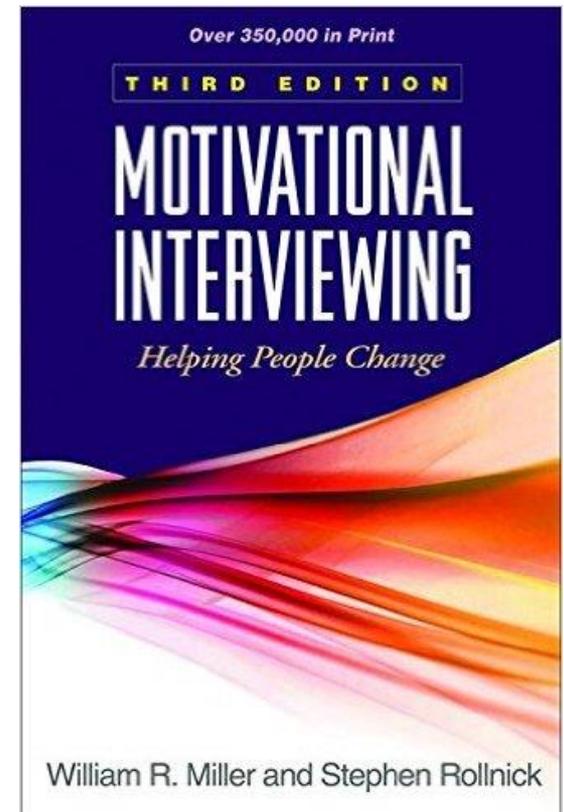
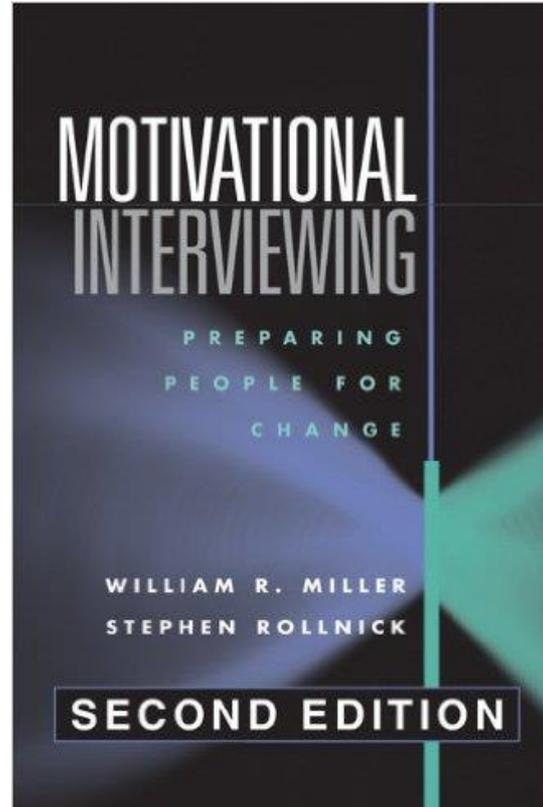
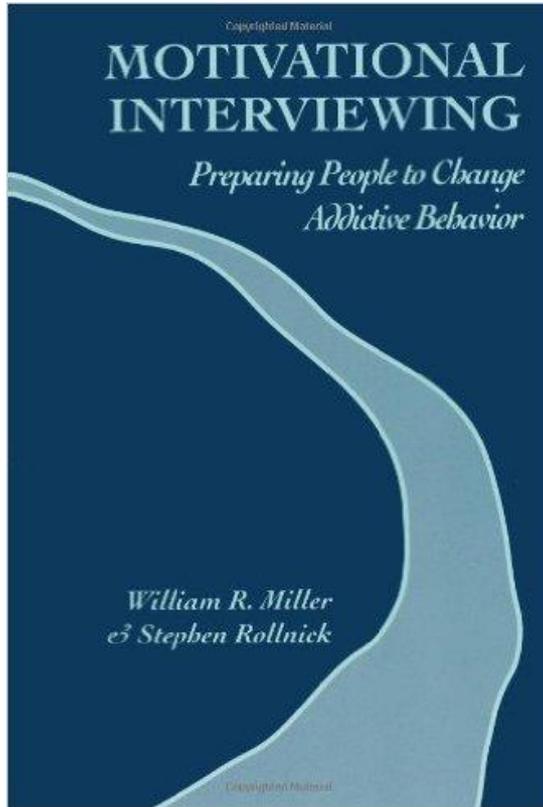
- * Self-Management/Natural Recovery (e.g. self-help books, online resources)
- * Mutual Help Organizations (e.g. Alcoholics Anonymous, SMART Recovery, Lifering Secular Recovery)
- * Community Support Services (e.g. Recovery Community Centers, Recovery Ministries, Recovery Employment Assistance)

CONTINUING CARE (3m- 1 year)

Recovery Management Checkups, Telephone Counseling, Mobile Applications, Text Message Interventions

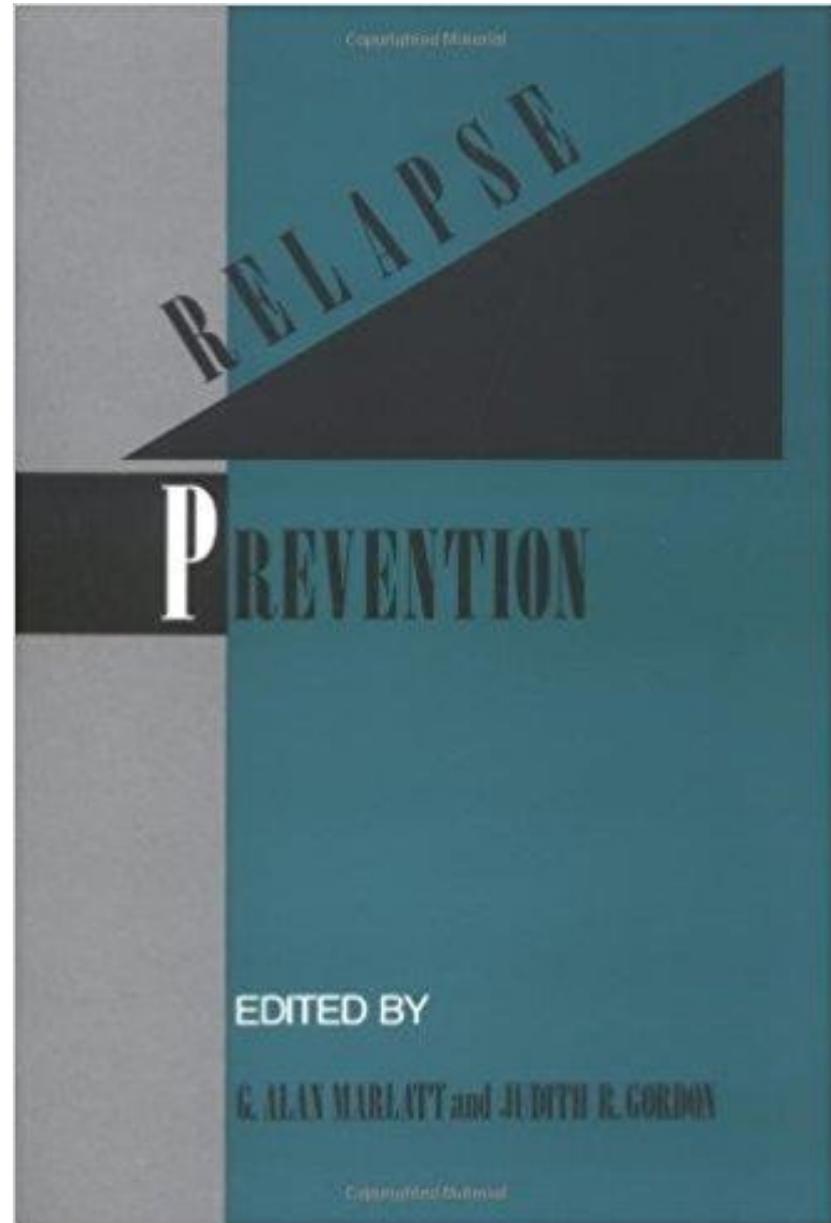
RECOVERY MONITORING (1-5+ yrs)

Continued Recovery Management Checkups, therapy visits, Primary Care Provider Visits

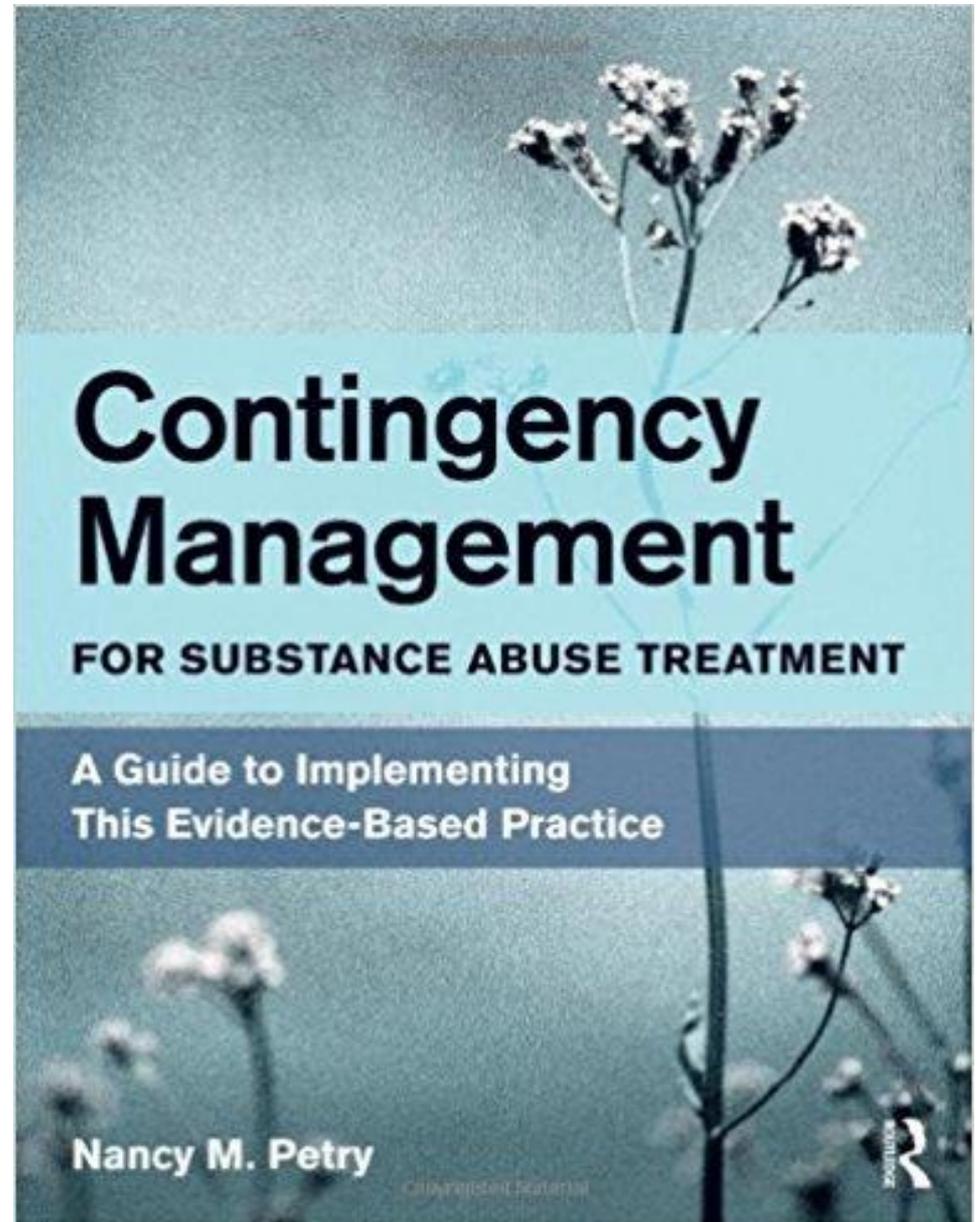


What people really need is a good listening to...

“Quitting
smoking is
easy, I’ve done
it dozens of
times” –Mark
Twain



Swift, certain,
modest,
consequences
shape
behavioral
choices...



Handbook of Methadone Prescribing and Buprenorphine Therapy

Ricardo A. Cruciani
Helena Knotkova
Editors



Vivitrol®

(naltrexone for extended-release injectable suspension)
One dose—all month long

Directions for Use
Instructional DVD

Also see enclosed full Prescribing Information including boxed warning.

NDC 12496-1208-1
1 sublingual film

8 mg/2 mg

Suboxone®
(buprenorphine and naloxone) sublingual film

Do not cut, chew or swallow sublingual film.

suboxone.com

Rx only
Children who accidentally take SUBOXONE will need emergency medical care. Keep SUBOXONE out of the reach of children.

glenmark
NDC 68462-435-18

**ACAMPROSATE CALCIUM
DELAYED-RELEASE
TABLETS**

333 mg

Rx Only 180 Tablets

Each enteric-coated tablet contains 333 mg of acamprosate calcium.
Keep this and all drugs out of the reach of children.
(Dispense in a tightly closed container as described in the USP.)
Store at 25°C (77°F); excursions permitted to 15° to 30°C (59° to 86°F) [see USP Controlled Room Temperature].
See package insert for dosing and full prescribing information.
Manufactured by:
Glenmark Generics Limited,
Covance-Bombay, Goa-403513, India
020/941028/9418
Manufactured for:
Glenmark Generics Inc., USA,
Millsboro, NJ 07963
2013

Lot No.

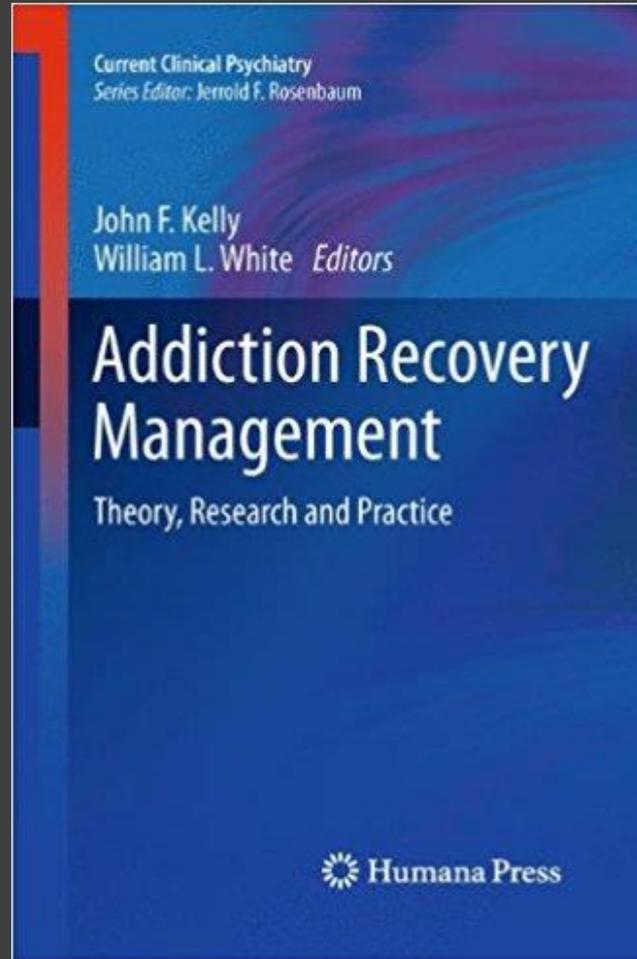
EQUIFINALITY: MULTIPLE PATHWAYS TO RECOVERY

- Acknowledges myriad ways in which individuals can recover:
- Clinical pathways (provided by a clinician or other medical professional – both medication and psychosocial interventions)
- Non-clinical pathways (services not involving clinicians like AA)
- Self-management pathways (recovery change processes that involve no formal services, sometimes referred to as “natural recovery”).

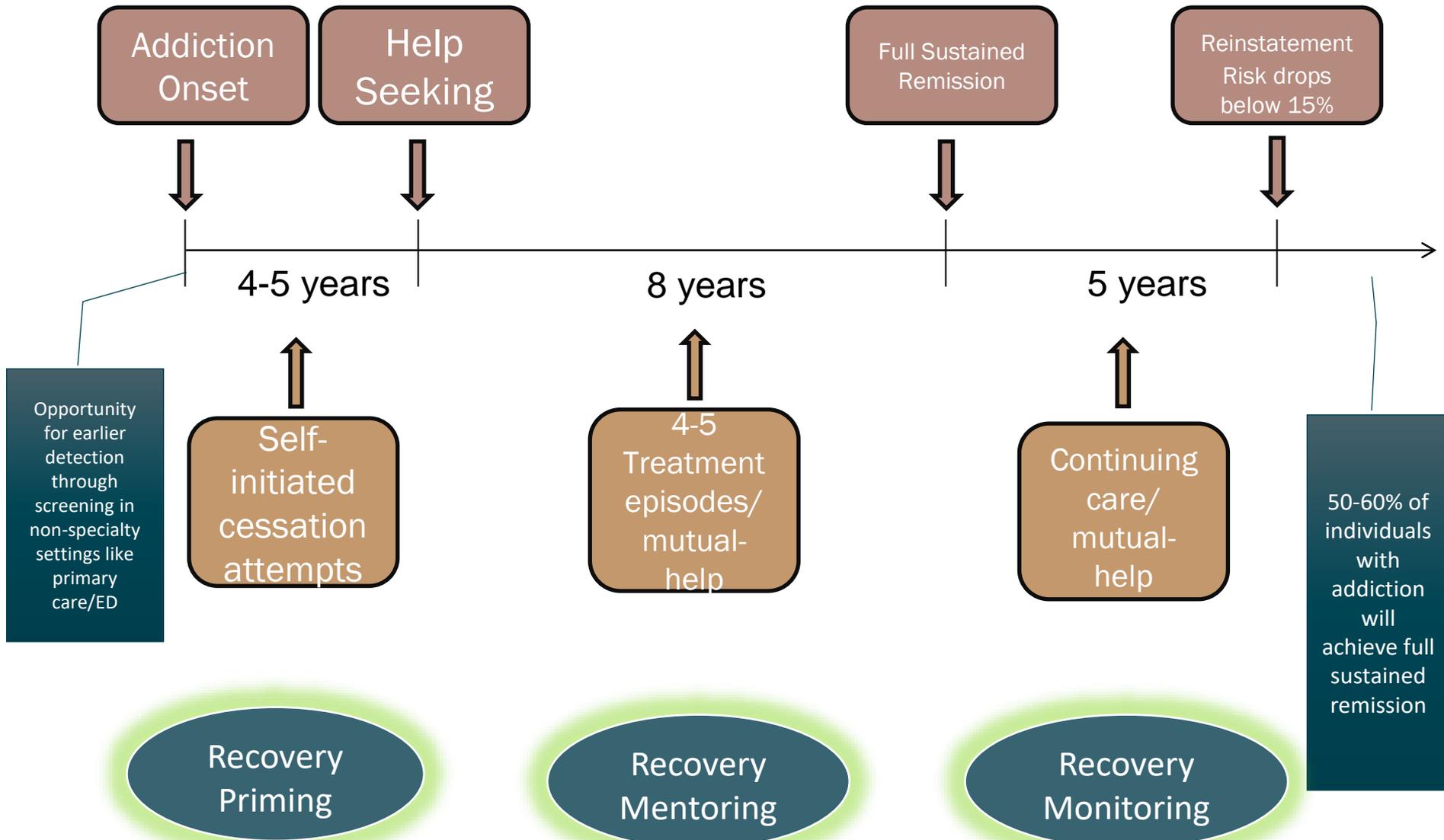


More recently, the first ever U.S. Surgeon General's Report on Alcohol, Drugs, and Health was published in 2016 describing the nature of addiction, treatment, and recovery based on 50 yrs of research and policy ...





So, why does establishing remission and stable recovery take such a long time?



Traditional addiction
treatment approach:
Burning building
analogy

- Putting out the fire -good job
- Preventing it from re-igniting (RP) - less emphasis
- Architectural planning (recovery plan) –neglected
- Re-building materials (recovery capital) –neglected
- Granting “rebuilding permits” - (removing barriers)

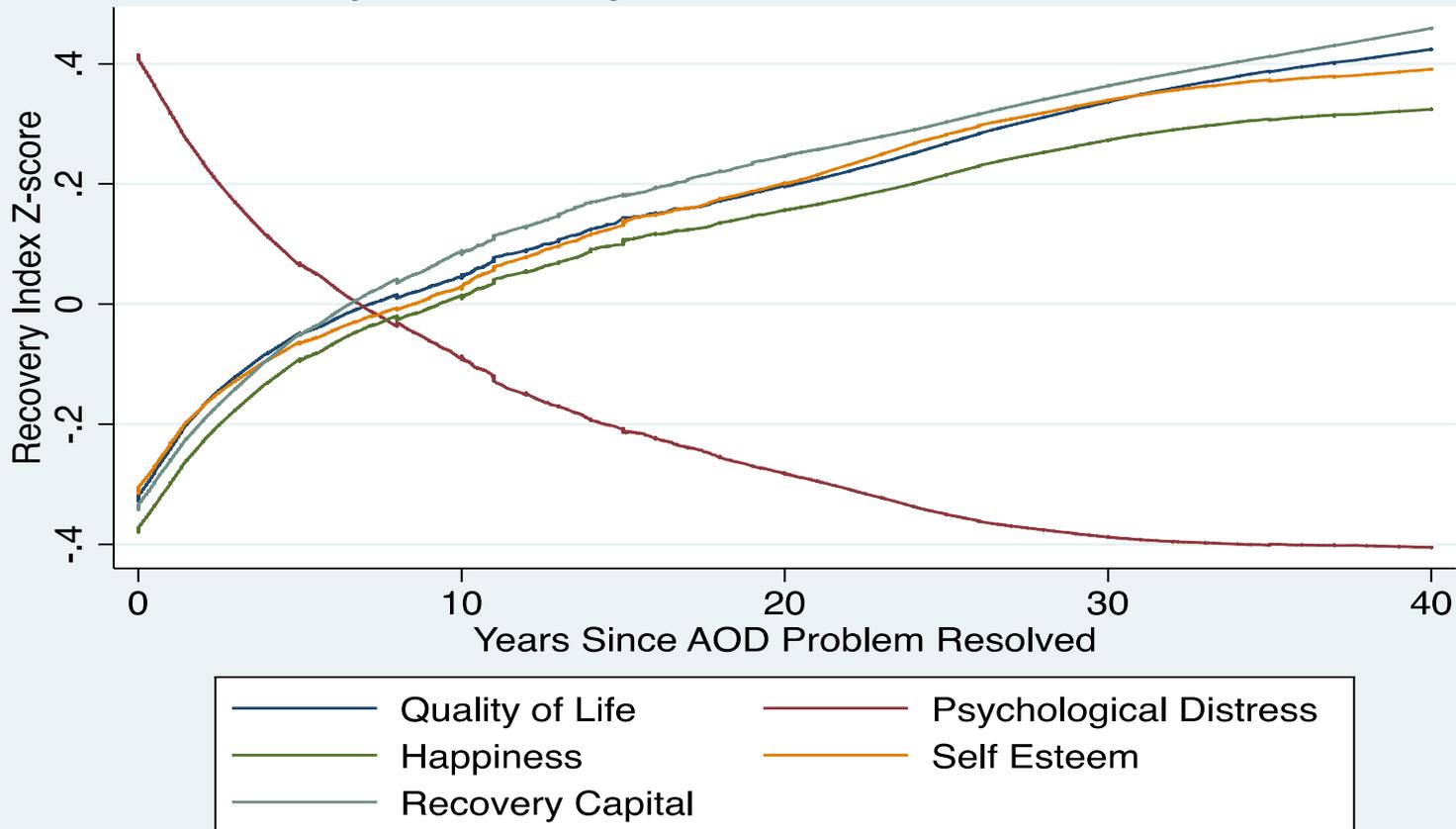


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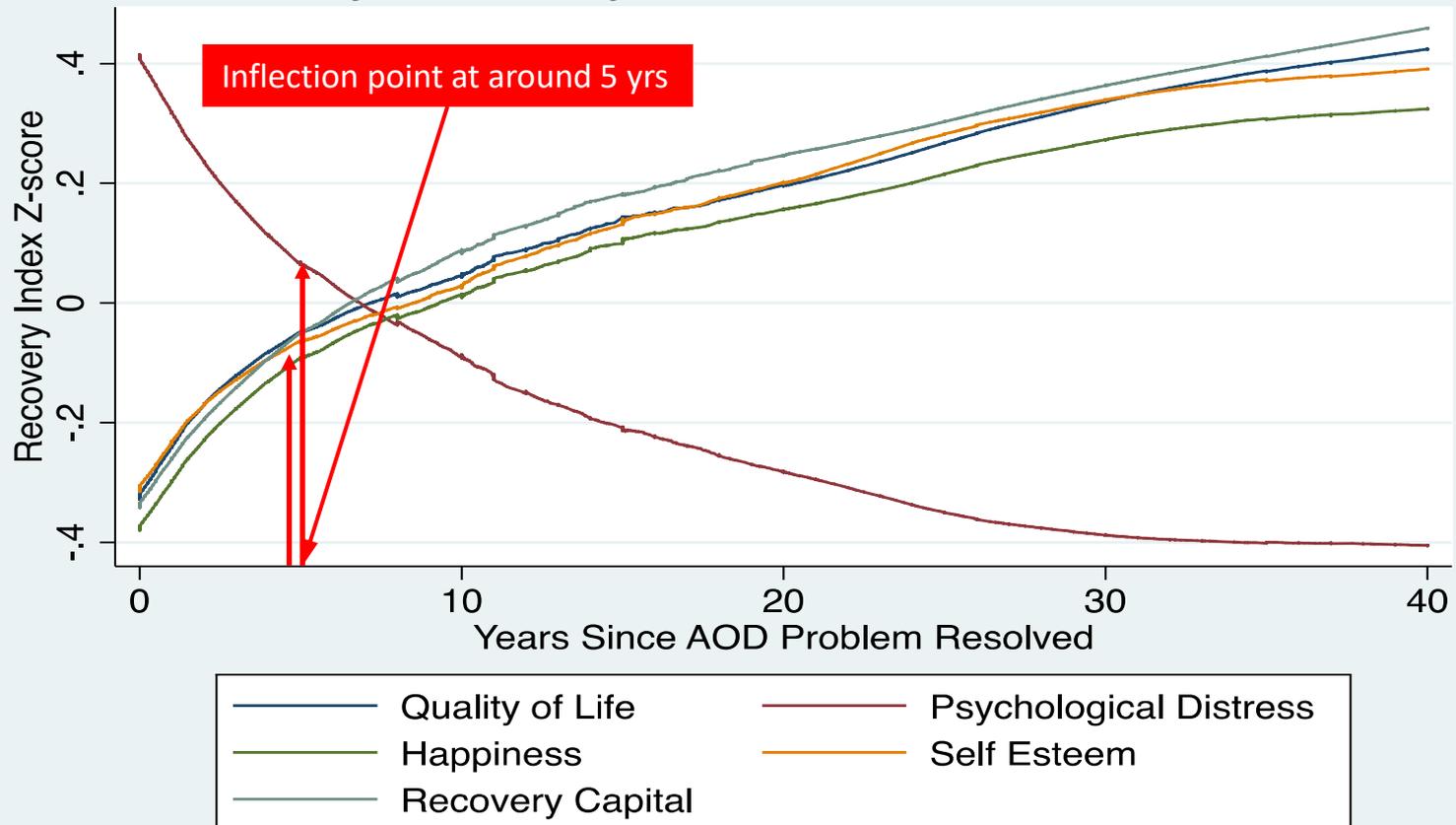
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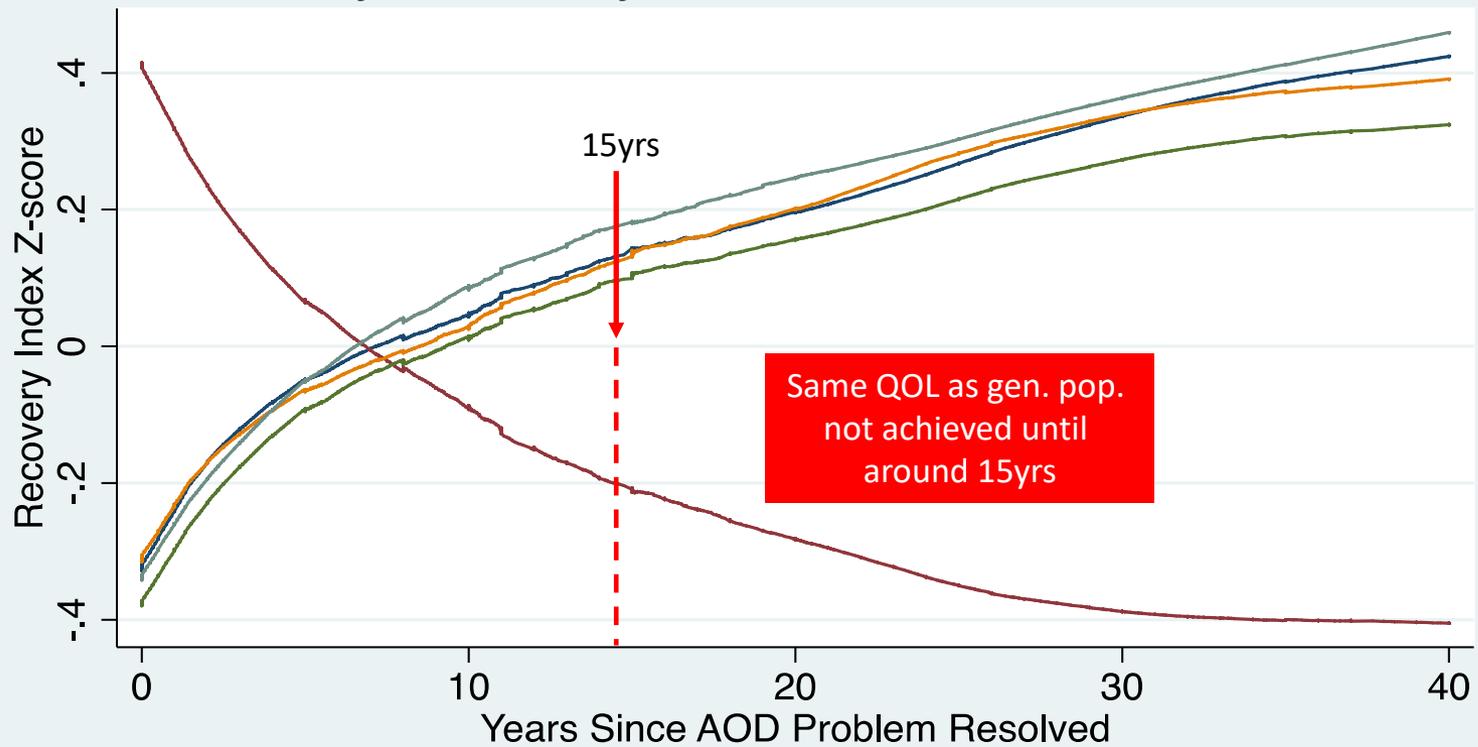
Recovery Indices by Years Since Problem Resolution



Recovery Indices by Years Since Problem Resolution



Recovery Indices by Years Since Problem Resolution



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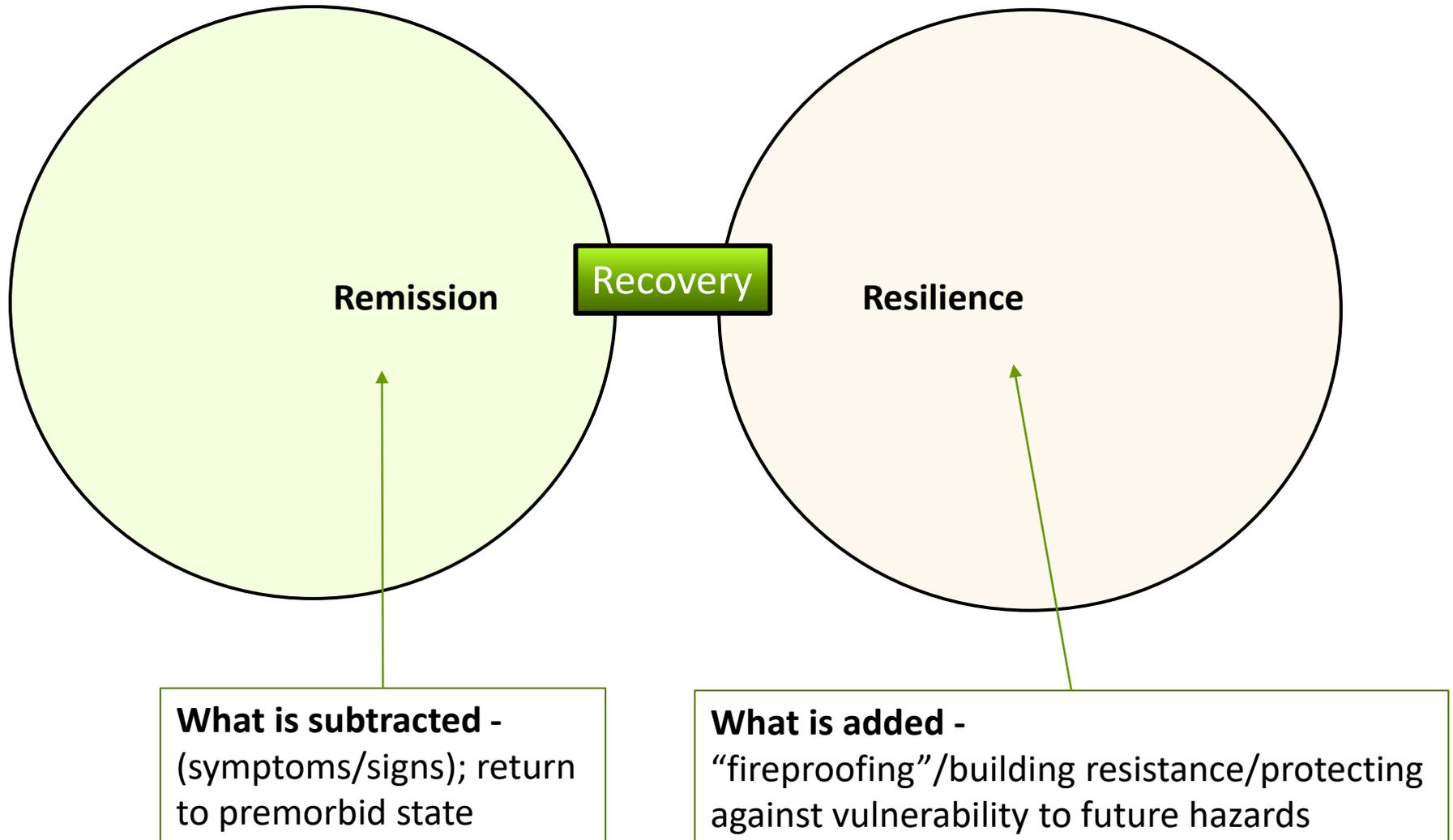
What is “Recovery”?

- Addiction “Recovery”, culturally, is both a process and an outcome...
- Process: Lots of definitions – most describe a process of adaptive change and enhanced functioning, resilience, and self-determination
- Outcome: Also an outcome – people describe themselves as “being in recovery” currently but did not previously - reflecting also a categorical endpoint



Recovery often goes beyond surviving to thriving

Contains both remission and resilience



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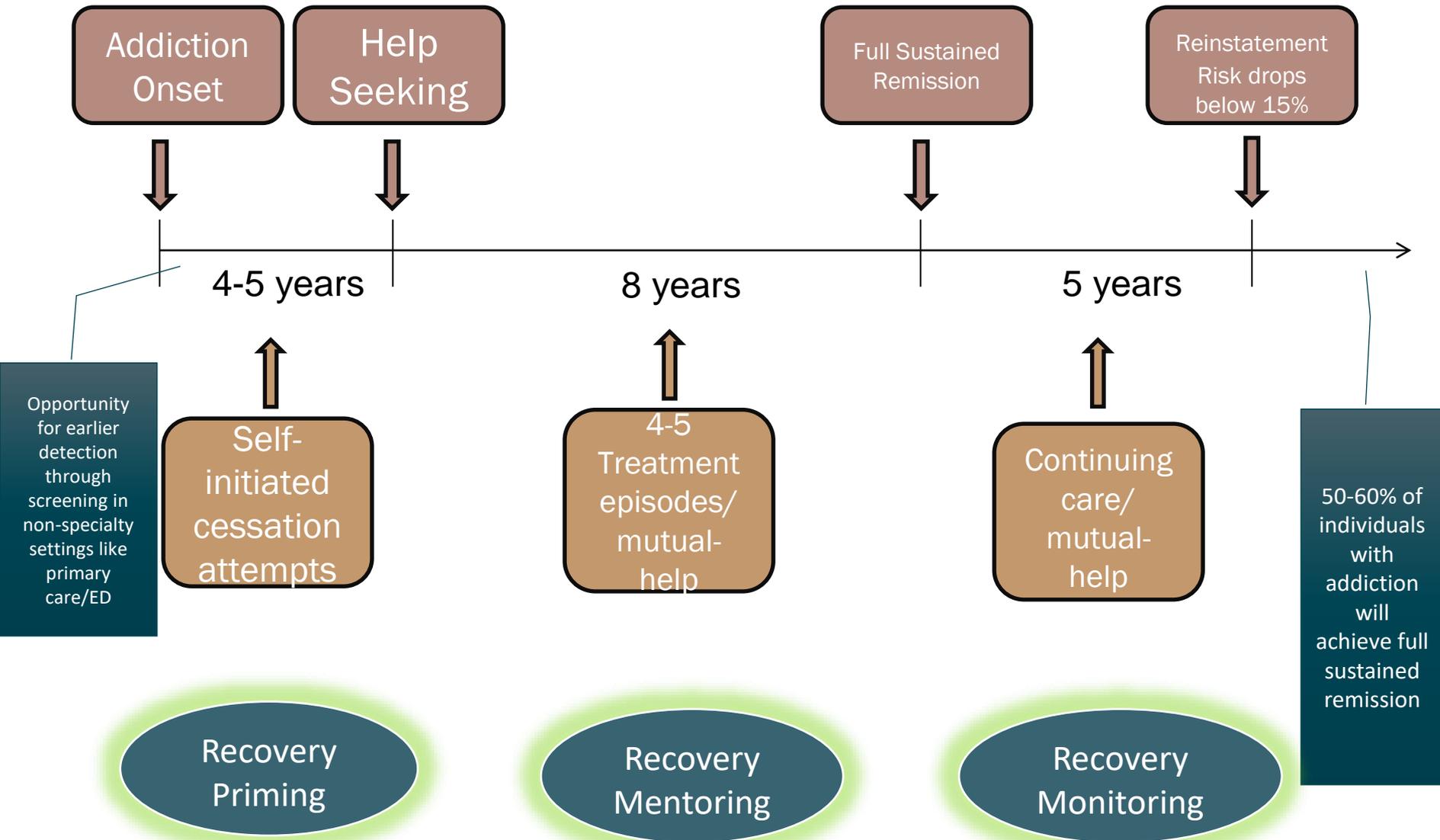
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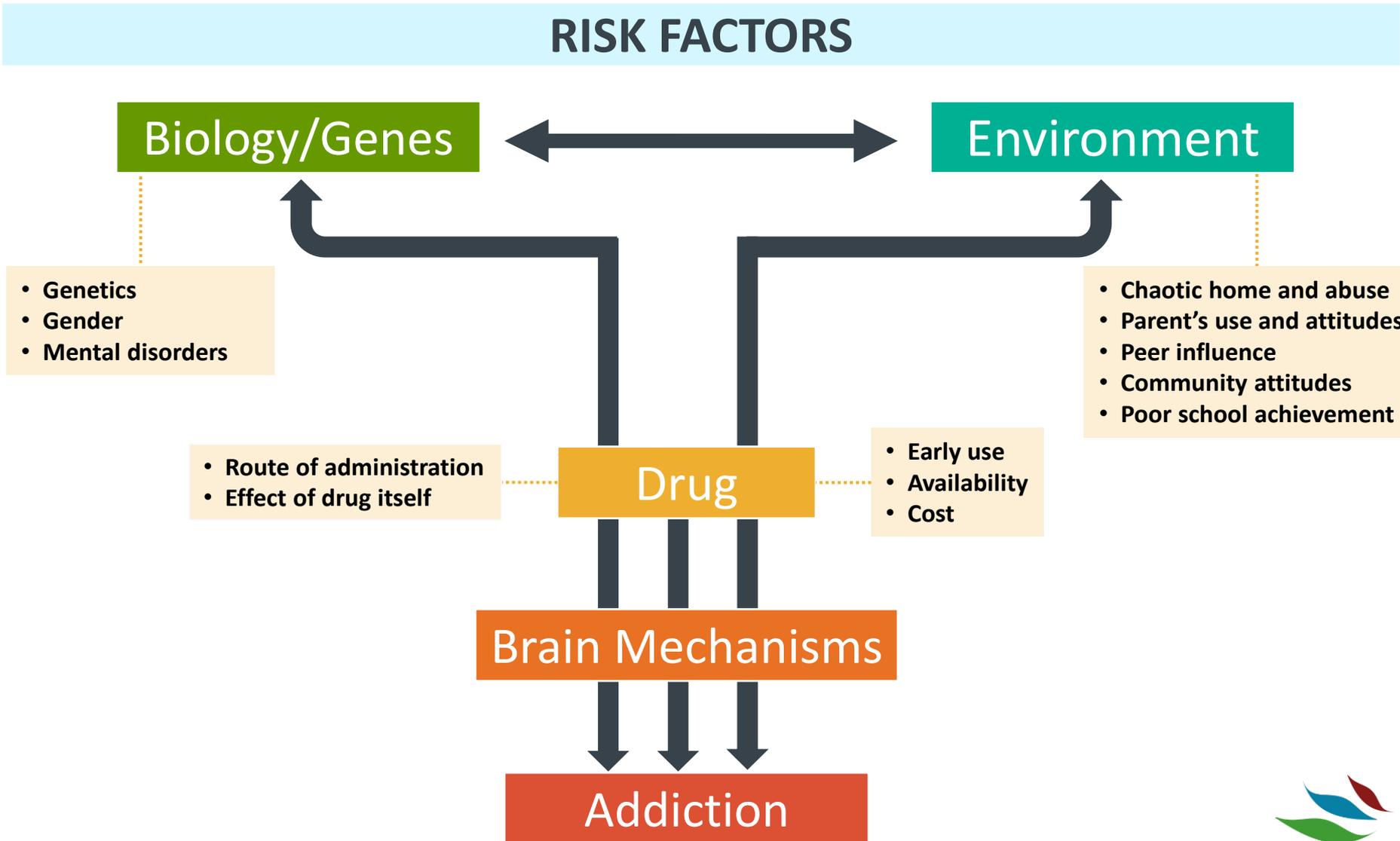
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So, why does establishing remission and stable recovery take such a long time?



ADDICTION IS A COMPLEX DISORDER



RECOVERY IS A COMPLEX PROCESS

RESILIENCE FACTORS

Biology/Genes

- Genetics
- Gender
- Other Mental Illness

Environment

- Treatment
- Stigma and discrimination
- Social support
- Cultural/Community attitudes

- Housing
- Employment
- Income
- Education
- Healthcare access/quality

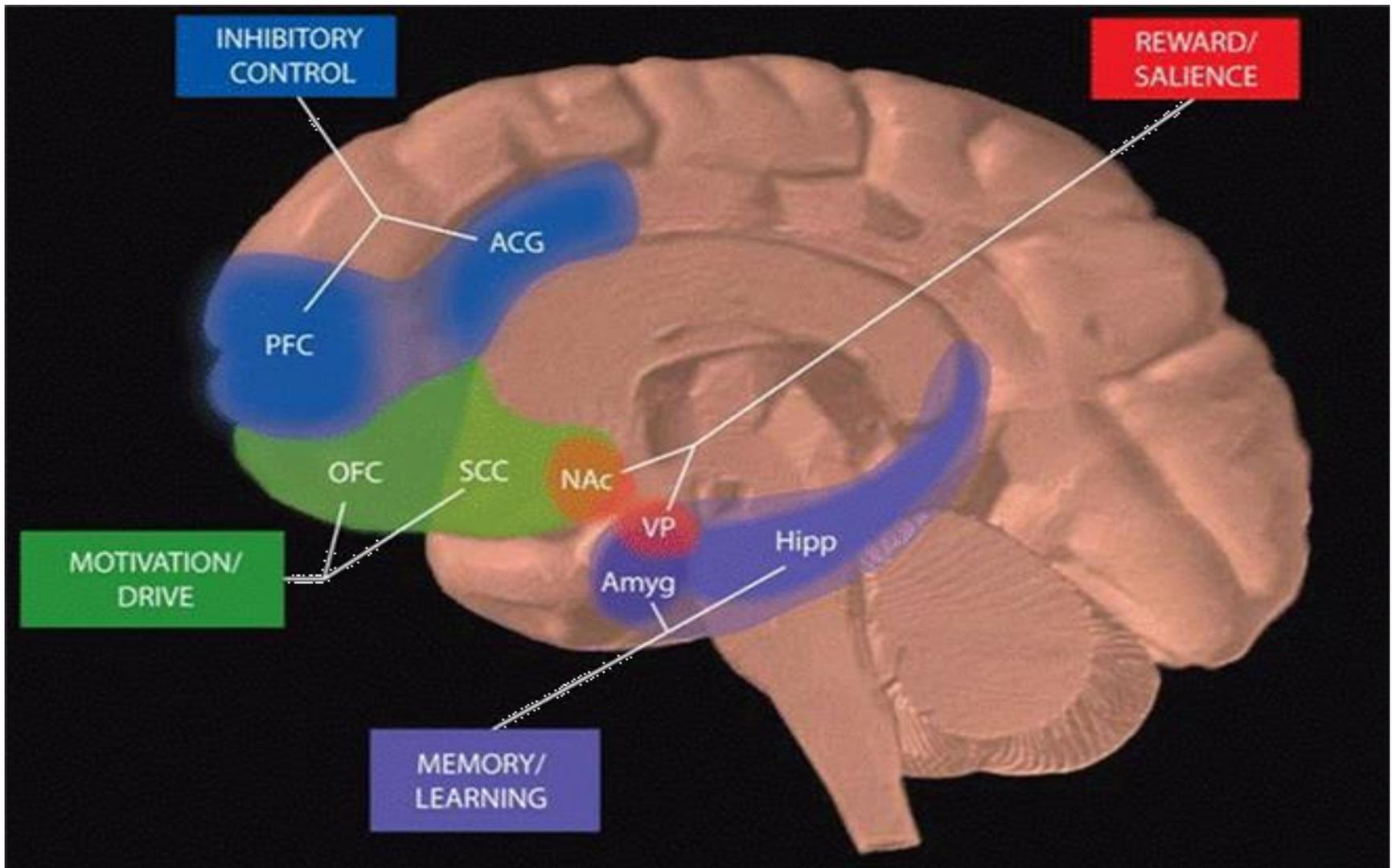
Recovery Capital

- Community
- Hope + Optimism
- Self-Esteem
- Meaning + Purpose
- Empowerment

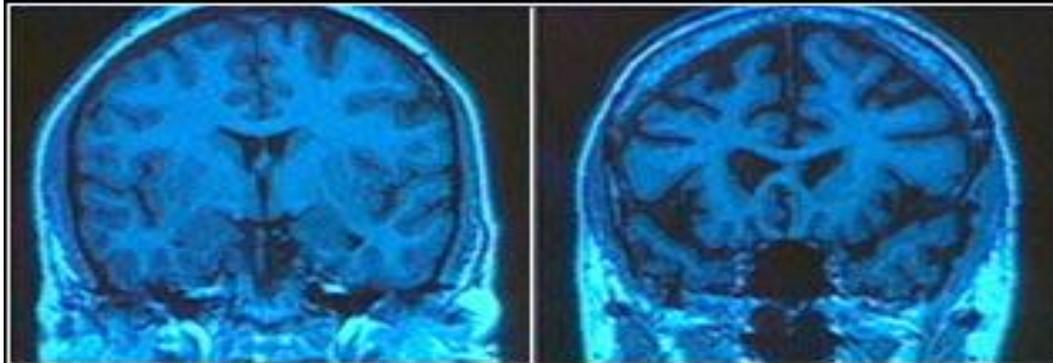
Brain Mechanisms

Recovery





All of these brain regions must be considered in developing strategies to effectively treat addiction.



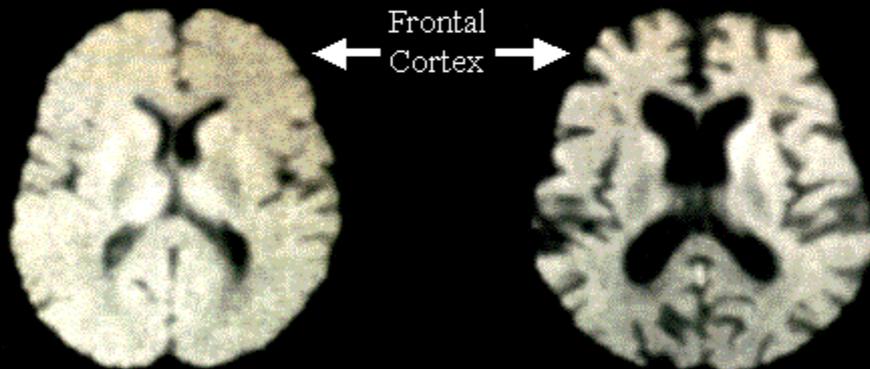
Normal
43-year-old

Alcoholic
43-year-old

HUMAN BRAIN IMAGES

Moderate Drinker

Alcoholic



Axial magnetic resonance images from a healthy 57-year-old man (left) and a 57-year-old man with a history of alcoholism (right). D. Pfefferbaum

Post-acute withdrawal effects

- More stress and lowered ability to experience normal pleasures

Increased sensitivity to stress via...

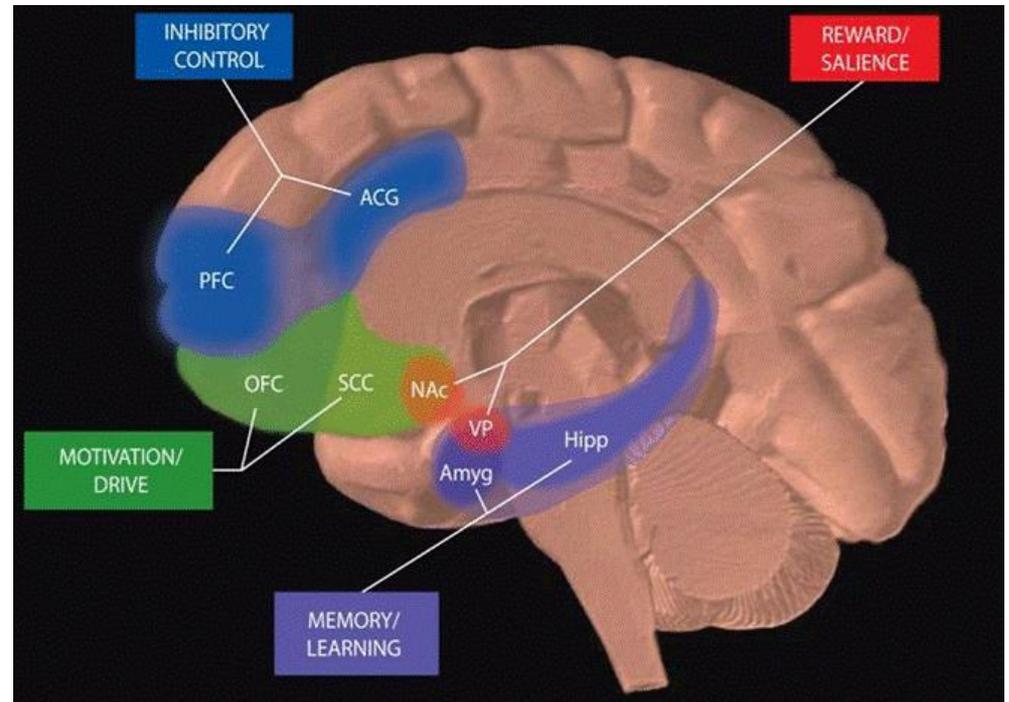
- Increased activity in hypothalamic-pituitary-adrenal axis (HPA-axis) and CRF/Cortisol release

Lowered capacity to experience normal levels of reward via...

- Down-regulated dopamine D2 receptor volume increasing risk of protracted dysphoria/anhedonia and relapse risk

Neuroscience of Recovery Capital

- If addiction is a disease of the brain could social factors, recovery housing, and employment, change the brain, mitigate stress, upregulate down-regulated receptor systems, and increase the chances of long-term remission?



Social Relationships and Mortality Risk: A Meta-analytic Review

Julianne Holt-Lunstad^{1,2*}, Timothy B. Smith^{2,3}, J. Bradley Layton³

1 Department of Psychology, Brigham Young University, Provo, Utah, United States of America, **2** Department of Counseling Psychology, Brigham Young University, Provo, Utah, United States of America, **3** Department of Epidemiology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, United States of America

Abstract

Background: The quality and quantity of individuals' social relationships has been linked not only to mental health but also to both morbidity and mortality.

Objectives: This meta-analytic review was conducted to determine the extent to which social relationships influence risk for mortality, which aspects of social relationships are most highly predictive, and which factors may moderate the risk.

Data Extraction: Data were extracted on several participant characteristics, including cause of mortality, initial health status, and pre-existing health conditions, as well as on study characteristics, including length of follow-up and type of assessment of social relationships.

Results: Across 148 studies (308,849 participants), the random effects weighted average effect size was OR = 1.50 (95% CI 1.42 to 1.59), indicating a 50% increased likelihood of survival for participants with stronger social relationships. This finding

Social factors influence both stress and reward ... as well as health and longevity

significant differences were not for complex measures of status (living alone versus

established risk factors for

Social Buffering

- Stress-buffering effects of social relationships—one of the major findings of past century
- Mechanisms of this poorly understood

Psychobiological Mechanisms Underlying the Social Buffering of the Hypothalamic–Pituitary–Adrenocortical Axis: A Review of Animal Models and Human Studies Across Development

Camelia E. Hostinar
University of Minnesota

Regina M. Sullivan
New York University Langone Medical Center

Megan R. Gunnar
University of Minnesota

Discovering the stress-buffering effects of social relationships has been one of the major findings in psychobiology in the last century. However, an understanding of the underlying neurobiological and psychological mechanisms of this buffering is only beginning to emerge. An important avenue of this research concerns the neurocircuitry that can regulate the activity of the hypothalamic–pituitary–adrenocortical (HPA) axis. The present review is a translational effort aimed at integrating animal models and human studies of the social regulation of the HPA axis from infancy to adulthood, specifically focusing on the process that has been named *social buffering*. This process has been noted across species and consists of a dampened HPA axis stress response to threat or challenge that occurs with the presence or assistance of a conspecific. We describe aspects of the relevant underlying neurobiology when enough information exists and expose major gaps in our understanding across all domains of the literatures we aimed to integrate. We provide a working conceptual model focused on the role of oxytocinergic systems and prefrontal neural networks as 2 of the putative biological mediators of this process, and propose that the role of early experiences is critical in shaping later social buffering effects. This synthesis points to both general future directions and specific experiments that need to be conducted to build a more comprehensive model of the HPA social buffering effect across the life span that incorporates multiple levels of analysis: neuroendocrine, behavioral, and social.

Keywords: stress, social support, early caregiving, oxytocin, prefrontal cortex

It is an empirical reality that some individuals succumb, whereas others thrive, when confronted with similar stressors. Having access to social support may be an important modulator of these widespread individual differences in responses to potentially stressful events. Indeed, some exciting experiments in humans (e.g., Heinrichs, Baumgartner, Kirschbaum, & Ehlert, 2003; Kirschbaum, Klauer, Filipp, & Hellhammer, 1995; Taylor et al., 2008) and animals (e.g., Hennessy, 1984, 1986; Vogt, Coe, & Levine, 1981) have identified a dampening of the hypothalamic–pituitary–adrenocortical (HPA) axis response to stressors by social

factors as one of the possible mechanisms underlying the benefits of social support. Longitudinal studies also reveal relations between social support and basal levels of stress hormones such as salivary cortisol (Rosal, King, Ma, & Reed, 2004). Understanding the social buffering processes affecting this neuroendocrine axis would allow the possibility of interventions that might have cascading positive effects across multiple biological and psychological systems. Despite the important implications of this knowledge, our understanding of the underlying neurobiology and relevant components of social interaction that permit these HPA activity-regulating effects remains vastly incomplete.

General Framework

RESPONDING TO STRESS: SOCIAL BUFFERING

...and researchers have started to examine possible neurobiological connections between social support and individual stress responses

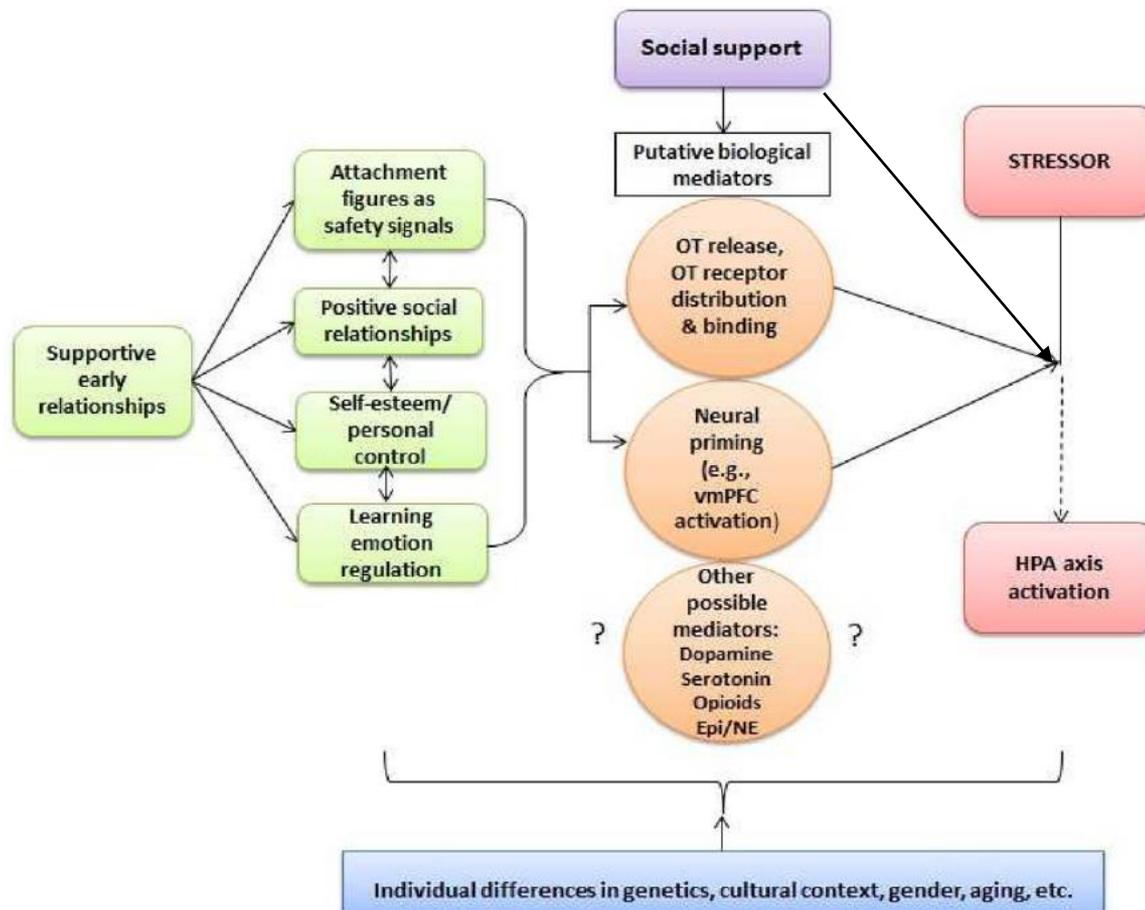


Figure 1. A Developmental Working Model of Social Buffering of the HPA Axis in Humans

OT = oxytocin, vmPFC = ventro-medial prefrontal cortex, Epi = epinephrine, NE = norepinephrine

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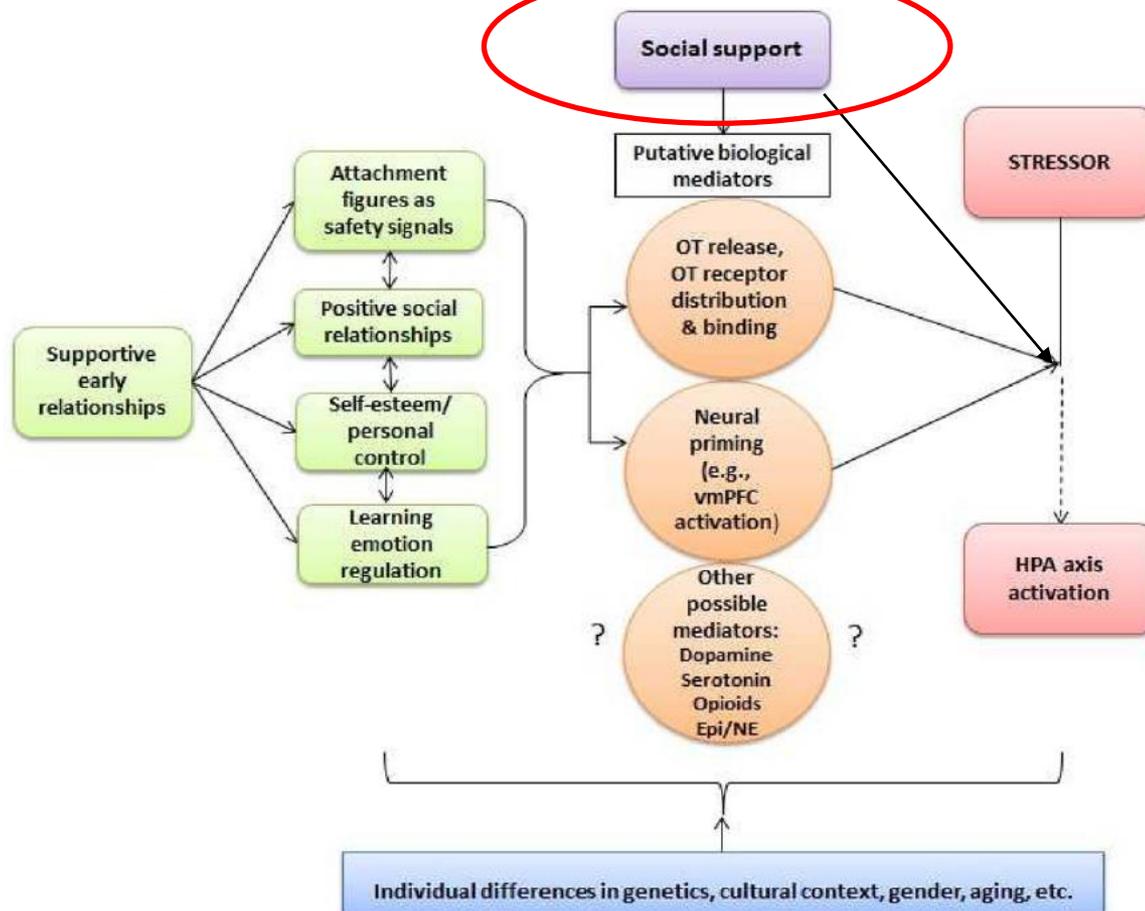


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Post-acute withdrawal effects

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Increased sensitivity to stress via...

- Increased activity in hypothalamic-pituitary-adrenal axis (HPA-axis) and CRF/Cortisol release

Lowered capacity to experience normal levels of reward via...

- Down-regulated dopamine D2 receptor volume increasing risk of protracted dysphoria/anhedonia and relapse risk

D2/D3 RECEPTOR BINDING & SOCIAL STATUS AND SUPPORT

AIM

Assess whether $D_{2/3}$ receptor levels correlate with social status and social support (particularly, to determine if low social status and low social support correlate with low $D_{2/3}$ receptor binding)

SAMPLE

N = 14 healthy participants (i.e., non-smoking with no Axis I disorders, significant medical conditions, or use of medications before the scan) who were scanned using positron emission tomography (PET) imaging to measure $D_{2/3}$ receptor binding potential (BP)

MEASURES

- Barratt Simplified Measure of Social Status (BMSSS) to measure social status
- Scale of Perceived Social Support (MSPSS) to measure social support
- [^{11}C]raclopride to measure $D_{2/3}$ receptor binding in the striatum

OUTCOMES

- Positive correlation between **$D_{2/3}$ receptor binding potential and social status**
- Positive correlation between **$D_{2/3}$ receptor binding potential and perceived social support**
- Results similar to prior studies of nonhuman primates, which show higher $D_{2/3}$ receptor levels in monkeys who are dominant in their social hierarchy, compared to those who are subordinate

BRIEF REPORTS

Dopamine Type 2/3 Receptor Availability in the Striatum and Social Status in Human Volunteers

Diana Martinez, Daria Orlowska, Rajesh Narendran, Mark Slifstein, Fei Liu, Dileep Kumar, Allegra Broft, Ronald Van Heertum, and Herbert D. Kleber

Background: Previous positron emission tomography (PET) imaging studies in nonhuman primates have shown that striatal dopamine type 2/3 ($D_{2/3}$) receptors correlate with social hierarchy in monkeys and that dominant animals exhibit higher levels of $D_{2/3}$ receptor binding. The goal of the present study was to examine this phenomena in human subjects using PET and the radiotracer [^{11}C]raclopride.

Methods: Fourteen healthy volunteers were scanned with [^{11}C]raclopride to measure $D_{2/3}$ receptor binding potential (BP). Social status was assessed using the Barratt Simplified Measure of Social Status. In addition, participants were asked to assess their level of social support using the Multidimensional Scale of Perceived Social Support (MSPSS).

Results: A correlation was seen between social status and dopamine $D_{2/3}$ receptors, where volunteers with the higher status had higher values for [^{11}C]raclopride BP. A similar correlation was seen with the perceived social support, where higher [^{11}C]raclopride BP correlated with higher scores on the MSPSS.

Conclusions: The results of this study support the hypothesis that social status and social support is correlated with $D_{2/3}$ receptor binding.

Key Words: [^{11}C]raclopride, dopamine 2/3 receptor, PET imaging, social status

Methods and Materials

Previous studies in animals have shown a correlation between dopamine transmission in the brain and social hierarchy (1). In monkeys, dominant and subordinate social rank are determined by physical and social triumph and defeat. Dominant animals win more physical confrontations and receive more social attention, such as grooming or huddling. Two positron emission tomography (PET) imaging studies have investigated the relationship between social status and $D_{2/3}$ receptors in the striatum in monkeys. Both showed that social dominance was associated with higher $D_{2/3}$ receptor binding compared with subordinate animals (2,3).

In humans, social hierarchy is a more subtle phenomenon that can be approximated by measuring social status and social support (4). Thus, the goal of the present study was to examine the correlation between these factors and dopamine $D_{2/3}$ receptor binding in human subjects. Given the known effect of disease states on striatal $D_{2/3}$ receptors, including substance dependence, schizophrenia, and anxiety disorders (5–7), only healthy control volunteers were included in this study. Social status was measured using the Barratt Simplified Measure of Social Status (BMSSS) (8) and social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS) (9). Our hypothesis was that low social status and low levels of social support would correlate with low $D_{2/3}$ receptor binding in the striatum measured with [^{11}C]raclopride.

The study was approved by the Institutional Review Board of the New York State Psychiatric Institute and all subjects provided written informed consent. Study participants were nonsmoking healthy control subjects and were required to have no DSM-IV Axis I disorder (including substance abuse or dependence), no significant medical conditions, and no use of medications before the scan (6 months for medications that could affect dopamine, 2 weeks for all others). Subjects (nine men and five women) were recruited from the New York City metropolitan area. Participant screening included a psychiatric assessment with the *Structured Clinical Interview for DSM-IV Axis I Disorders* (10), physical examination, electrocardiogram, and laboratory tests. All subjects were asked for data to complete the Barratt Simplified Measure of Social Status and to complete the Multidimensional Scale of Perceived Social Support. The scans performed on female subjects were not controlled for menstrual cycle phase.

[^{11}C]raclopride was prepared as previously described (11), and PET studies were acquired using a bolus injection of the radiotracer. The PET scans were obtained on the ECAT EXACT HR+ (Siemens/CTI, Knoxville, Tennessee) in three-dimensional (3-D) mode. Emission data were obtained as 15 frames of increasing duration up to 60 minutes. The PET images were reconstructed by filtered backprojection (Shepp 5 filter) with attenuation correction using the data from a 10-minute transmission scan.

All image analysis was performed in MEDx (Sensor Systems, Inc, Sterling, Virginia). Each subject underwent a transaxial T1 magnetic resonance imaging (MRI) scan, acquired on the GE Signa EXCITE 3 T/94 cm scanner (GE Medical Systems, Milwaukee, Wisconsin), for delineation of the regions of interest (ROIs). The regions of interest outlined on the MRI included the subdivisions of the striatum, which have been previously described (12). Briefly, these included the ventral striatum (VST), the dorsal caudate rostral to the anterior commissure (AC) (precommissural dorsal caudate [preDCAD]), the dorsal putamen rostral to the AC (precommissural dorsal putamen [preDPU]), the caudate caudal to the AC (postcommissural caudate [postCAL]), and the putamen caudal to the AC (postcommissural putamen [postPUT]).

From the Departments of Psychiatry (DM, DO, MS, FL, DK, AB, HDK) and Radiology (RVH), Columbia University, College of Physicians and Surgeons, New York, New York; and Department of Radiology (RN), University of Pittsburgh, Pittsburgh, Pennsylvania. Address correspondence to Diana Martinez, M.D., New York State Psychiatric Institute, 1051 Riverside Drive, Box #31, New York, NY 10032; E-mail: dm437@columbia.edu.

Received Dec 18, 2008; revised July 23, 2009; accepted July 28, 2009.

Martinez, D., Orlowska, D., Narendran, R., Slifstein, M., Liu, F., Kumar, D., . . . Kleber, H. D. (2010). Dopamine type 2/3 receptor availability in the striatum and social status in human volunteers. *Biological Psychiatry*, 67(3), 275–278. doi:10.1016/j.biopsych.2009.07.037

D2/D3 RECEPTOR BINDING & SOCIAL STATUS AND SUPPORT

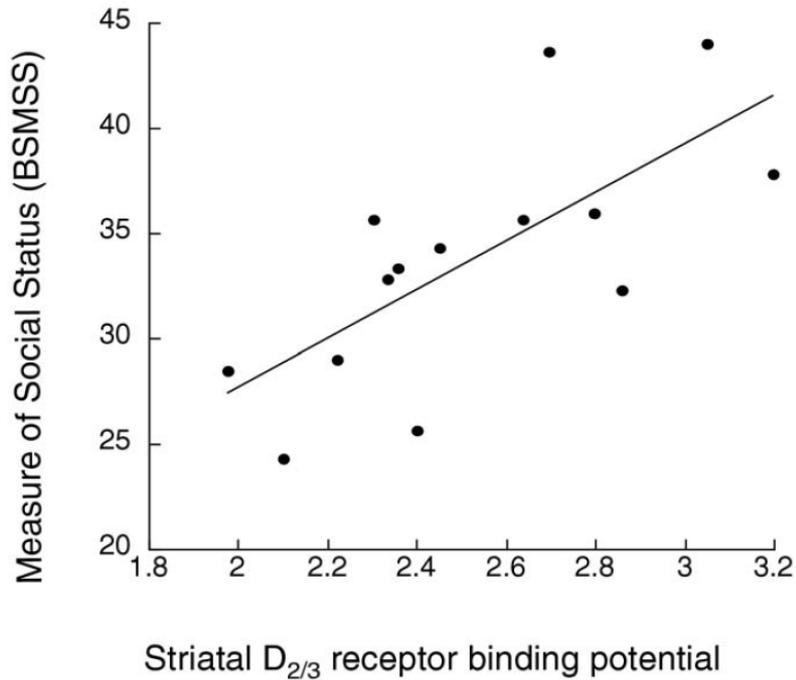


Figure 1. Correlation between [¹¹C]raclopride BP (x axis) and social status, measured with the Barratt Simplified Measure of Social Status (BSMSS). A positive correlation was seen, where higher BP correlated with higher BSMSS ($r = .71, p = .004, \text{age-corrected } p = .007$). BP, binding potential.

D_{2/3} receptor binding increases as **social status** increases.

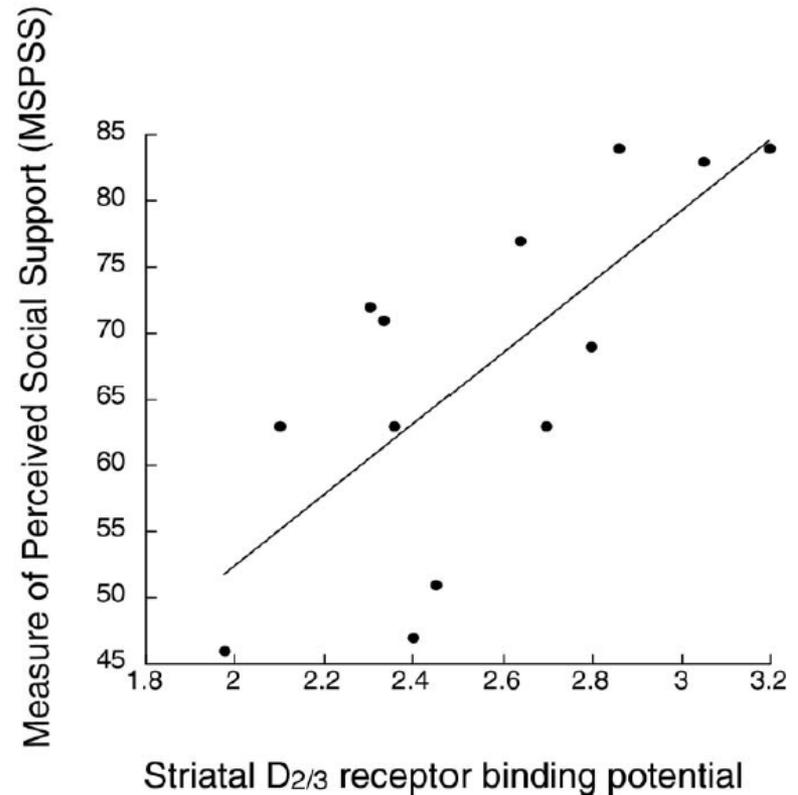


Figure 2. Correlation between [¹¹C]raclopride BP (x axis) and score on the Multidimensional Scale of Perceived Social Support (MSPSS). A positive correlation was seen, where higher BP correlated with higher score on the MSPSS ($r = .73, p = .005, \text{age-corrected } p = .02$). BP, binding potential.

D_{2/3} receptor binding increases as **social support** increases.

Social dominance in monkeys: dopamine D₂ receptors and cocaine self-administration

Drake Morgan¹, Kathleen A. Grant¹, H. Donald Gage², Robert H. Mach^{1,2}, Jay R. Kaplan³, Osric Prioleau¹, Susan H. Nader¹, Nancy Buchheimer², Richard L. Ehrenkauf² and Michael A. Nader^{1,2}

¹Department of Physiology and Pharmacology, ²Department of Radiology, ³Departments of Pathology (Comparative Medicine) and Anthropology, Wake Forest University, Winston-Salem, NC, USA

Correspondence

Published

Monkeys, like humans, love to be with each other, and also like cocaine...

Disruption of the dopaminergic system has been implicated in the etiology of many pathological conditions, including drug addiction. Here we used positron emission tomography (PET) imaging to study brain dopaminergic function in individually housed and in socially housed cynomolgus macaques ($n = 20$). Whereas the monkeys did not differ during individual housing, social housing increased the amount or availability of dopamine D₂ receptors in dominant monkeys and produced no change in subordinate monkeys. These neurobiological changes had an important behavioral influence as demonstrated by the finding that cocaine functioned as a reinforcer in subordinate but not dominant monkeys. These data demonstrate that alterations in an organism's environment can produce profound biological changes that have important behavioral associations, including vulnerability to cocaine addiction.

The importance of social context, control over environment, and relapse risk

- When all monkeys were individually housed no difference in DA D2 receptor volume
- After 3 months of social housing, dominant monkeys showed 22% increase in DA D2 volume; subordinate monkeys - no change
- Increase in DA D2 associated with lower likelihood of cocaine use
- “Dominance” defined as: **easy access to food and water, social mobility, and greater environmental control.**

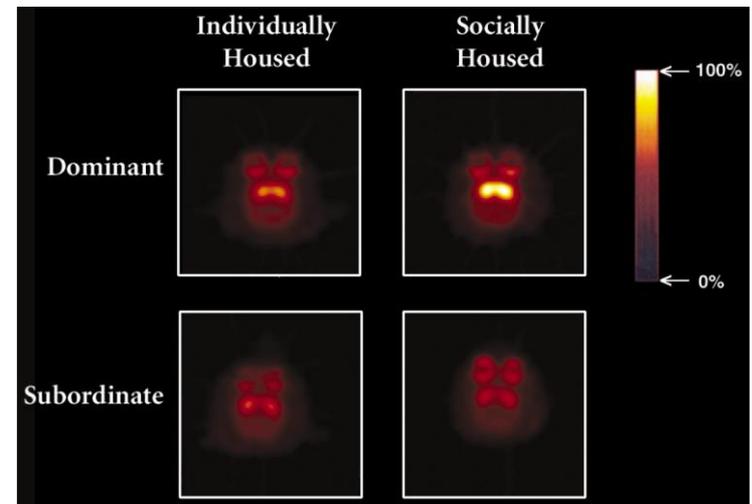


Table 1. Dopaminergic characteristics of monkeys.

Social rank ^a	[¹⁸ F]FCP distribution volume ratios		
	Individually housed	Socially housed	Percent change
1	2.49 ± 0.08	3.04 ± 0.23 ^{b,c}	+22.0 ± 8.8
2	2.58 ± 0.13	2.99 ± 0.13	+16.7 ± 6.0
3	2.58 ± 0.13	2.88 ± 0.30	+13.4 ± 15.3
4	2.40 ± 0.06	2.49 ± 0.10	+3.9 ± 5.3

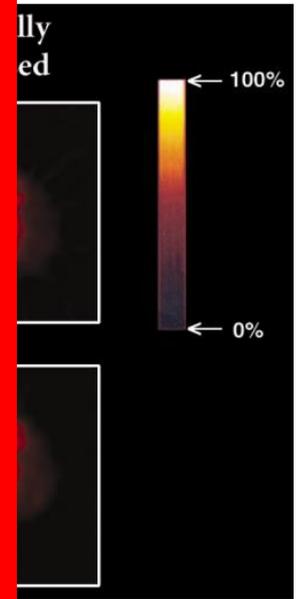
Mean ± s.e.m. [¹⁸F]FCP DVR as determined with PET imaging in male cynomolgus monkeys as a function of social rank while individually and socially housed. ^aFor individually housed scans, these numbers represent eventual social rank. ^bSignificantly higher than individually housed 'dominants.' ^cSignificantly higher than socially housed subordinates.

The importance of social context, control over environment, and relapse risk

Human Implications:

Facilitating greater access to and availability of recovery capital may instill hope, empower people, help them have more control over their environment, increase social contact and social mobility through the environment, and thereby induce neurochemical changes that reduces relapse risk

- When all monkeys were housed individually, there was no difference in relapse risk between the two groups.
- After 3 months of social housing, the socially housed monkeys showed a significant increase in relapse volume; subordinates showed a greater increase than dominants.
- Increase in relapse volume was associated with an increase in the likelihood of relapse.
- “Dominance and water, social environment”



monkeys.

the ratios

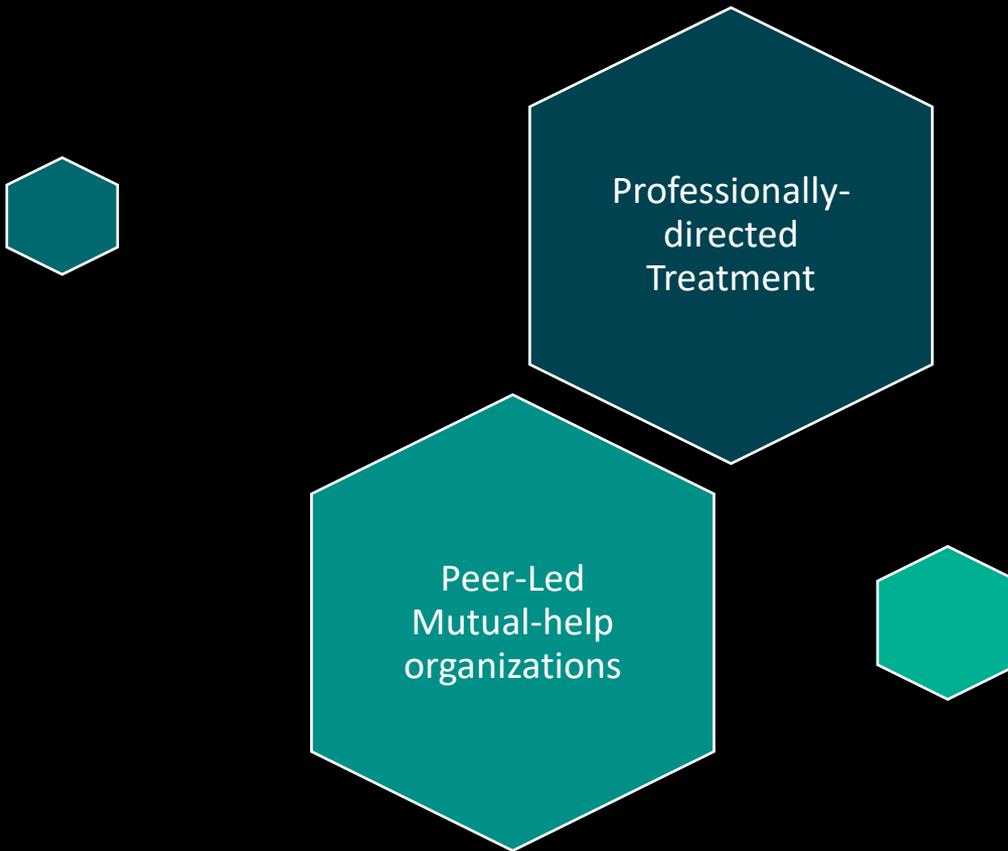
Percent change

+22.0 ± 8.8
+16.7 ± 6.0
+13.4 ± 15.3
+3.9 ± 5.3

PET imaging in male monkeys while individually and socially housed. The numbers represent the percent change in relapse volume in socially housed 'dominants' and 'subordinates'.

dominants.' ^cSignificantly higher than socially housed subordinates.

Historically, two major ways most societies have addressed endemic alcohol/drug problem...



Now, third wave of services emerging....to try to meet addiction needs of recovery capital...



In fact, the concept of SUD “treatment” is changing...

Components of Comprehensive Drug Addiction Treatment

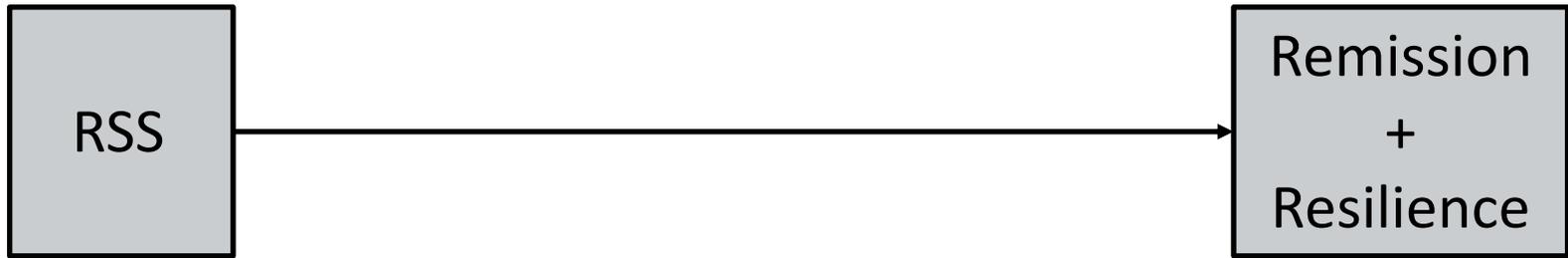


The best treatment programs provide a combination of therapies and other services to meet the needs of the individual patient.

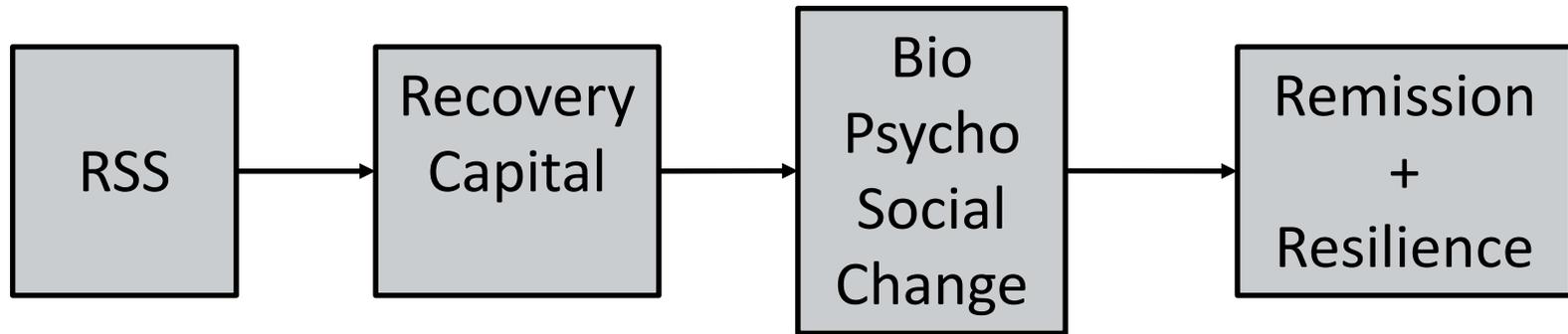
Cadre of Emerging and Growing Long-term Recovery Support Services now exist...



RSS Goal



RSS Mechanisms



Outline

Where have we come from? Where are we now? Where are we going? 50 years of Addiction Science, Practice, and Policy:

What is “recovery” and why is everyone talking about it?

Theory of addiction recovery: a biopsychosocial perspective

Services for Attaining and sustaining addiction remission and recovery

State of the Science and future directions



Recovery Support Services



RECOVERY
RESEARCH
INSTITUTE

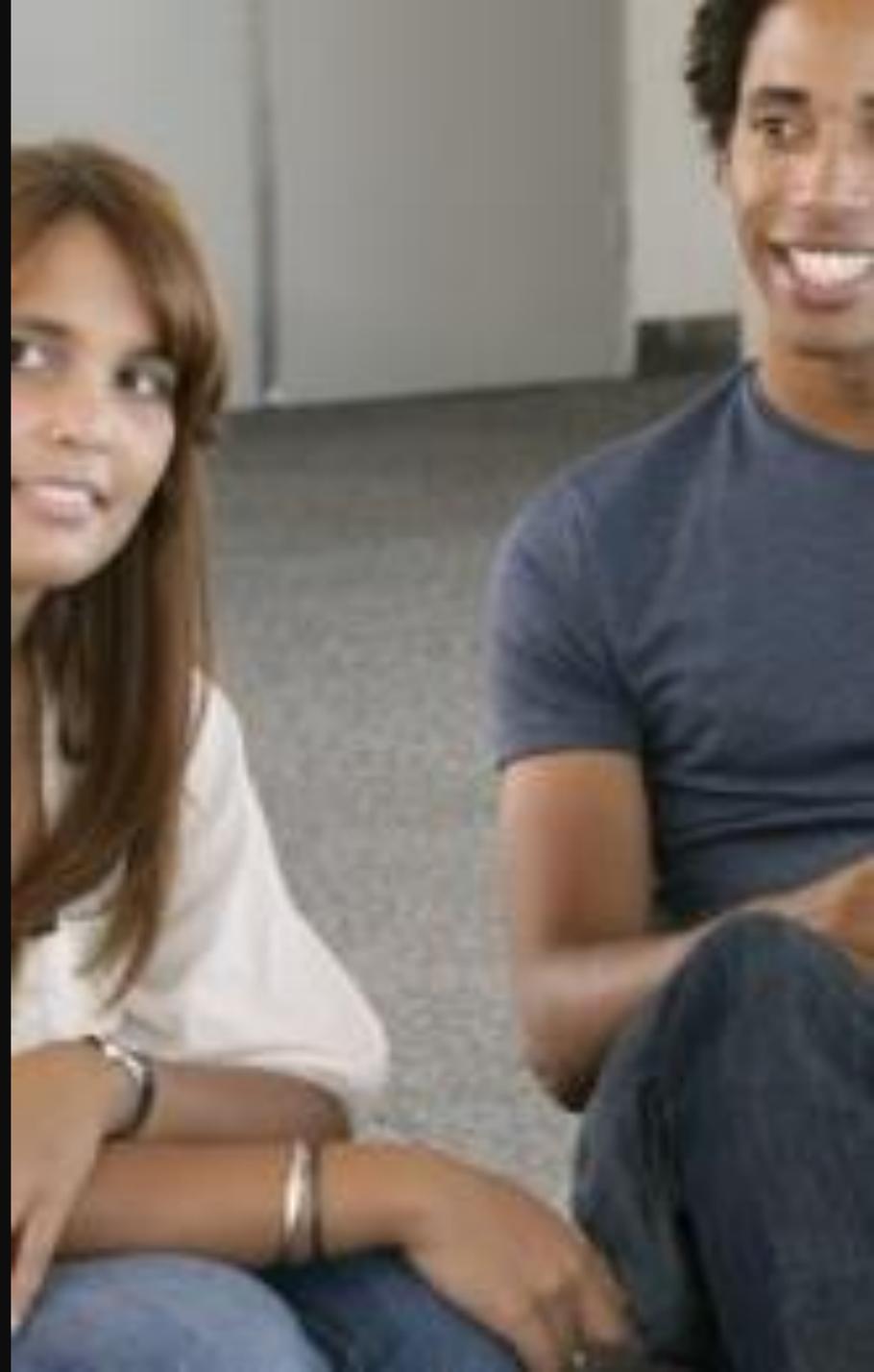
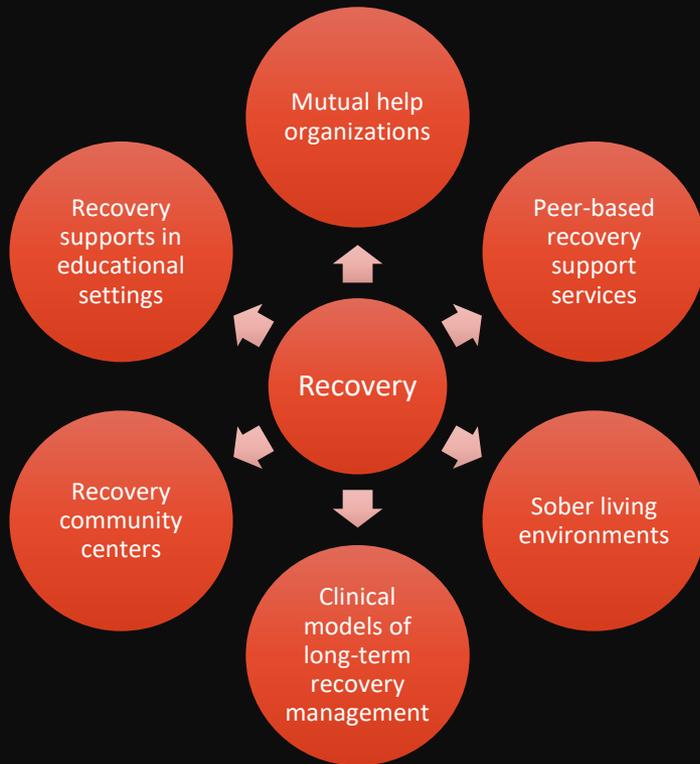


MASSACHUSETTS
GENERAL HOSPITAL



HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Mutual help Organizations



Substance Focused Mutual-help Groups

Name	Year of Origin	Number of groups in U.S.	Location of groups in U.S.
Alcoholics Anonymous (AA)	1935	65,000	all 50 States
Narcotics Anonymous (NA)	1940s	Approx. 32,000	all 50 States
Cocaine Anonymous (CA)	1982	Approx. 2000 groups	most States; 6 online meetings at www.ca-online.org
Methadone Anonymous (MA)	1990s	Approx. 100 groups	25 States; online meetings at http://methadone-anonymous.org/chat.html
Marijuana Anonymous (MA)	1989	Approx. 200 groups	24 States; online meetings at www.ma-online.org
Rational Recovery (RR)	1988	No group meetings or mutual helping; emphasis is on <i>individual</i> control and responsibility	-----
Self-Management and Recovery Training (S.M.A.R.T. Recovery)	1994	Approx. 3,000 groups	40 States; 19 online meetings at www.smartrecovery.org/meetings/olschedule.htm
Secular Organization for Sobriety, a.k.a. Save Ourselves (SOS)	1986	Approx. 500 groups	all 50 States; Online chat at www.sossobriety.org/sos/chat.htm
Women for Sobriety (WFS)	1976	150-300 groups	Online meetings at http://groups.msn.com/WomenforSobriety
Moderation Management (MM)	1994	Approx. 18 face-to-face meetings	12 States; Most meetings are online at www.angelfire.com/trek/mmchat/ ;

T
S
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TSF Delivery Modes

Stand alone
Independent therapy



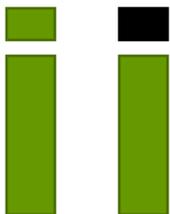
Integrated into an existing
therapy



Component of a treatment
package (e.g., an
additional group)



As Modular appendage
linkage component



In past 25 years, MHO research has gone from contemporaneous correlational research to rigorous RCTs and ...

Cochrane Systematic Review on AA/TSF (2020)

- Kelly, JF
- Humphreys, K
- Ferri, M



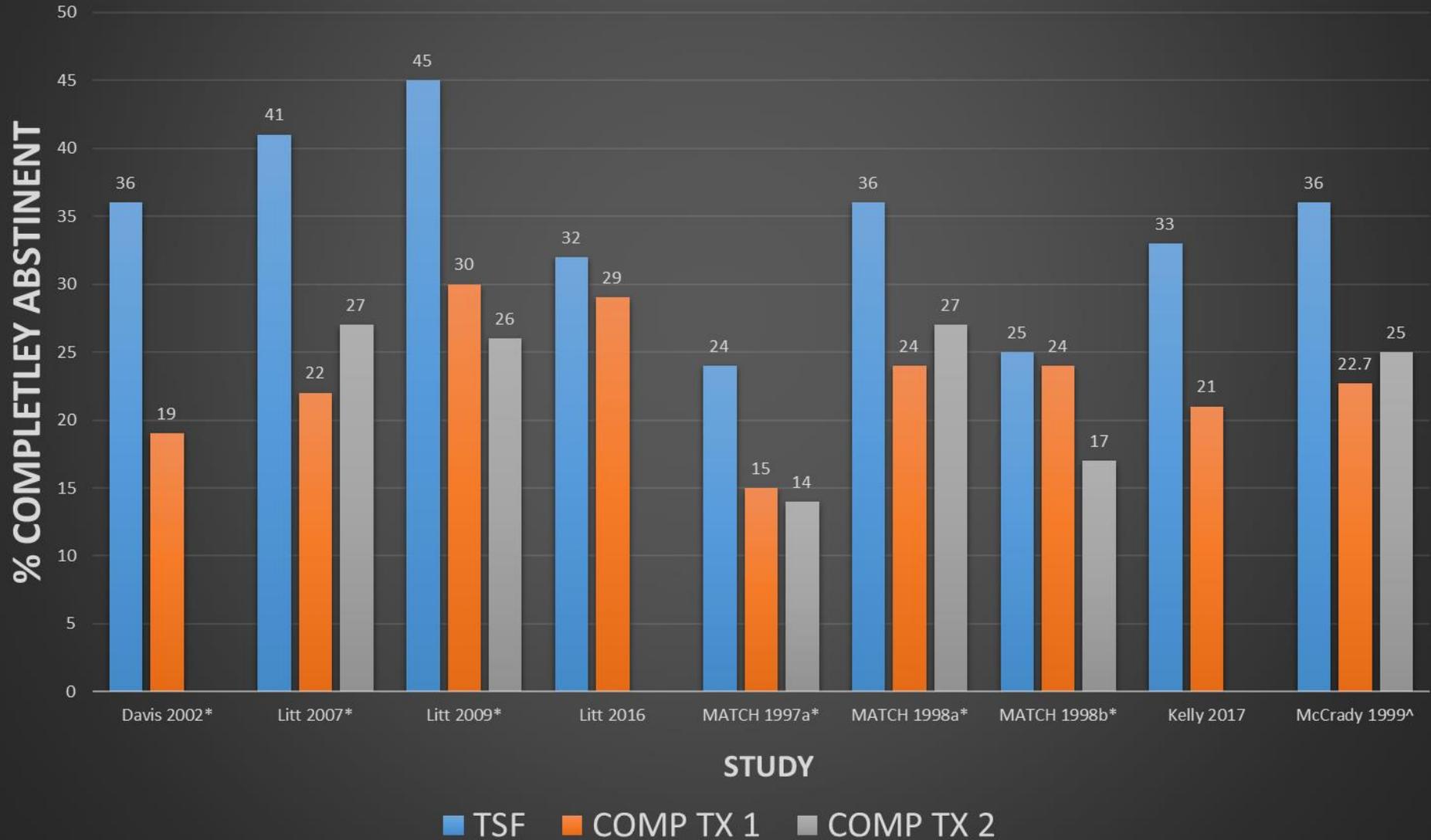
Cochrane Database of Systematic Reviews

Alcoholics Anonymous and other 12-step programs for alcohol use disorder (Review)

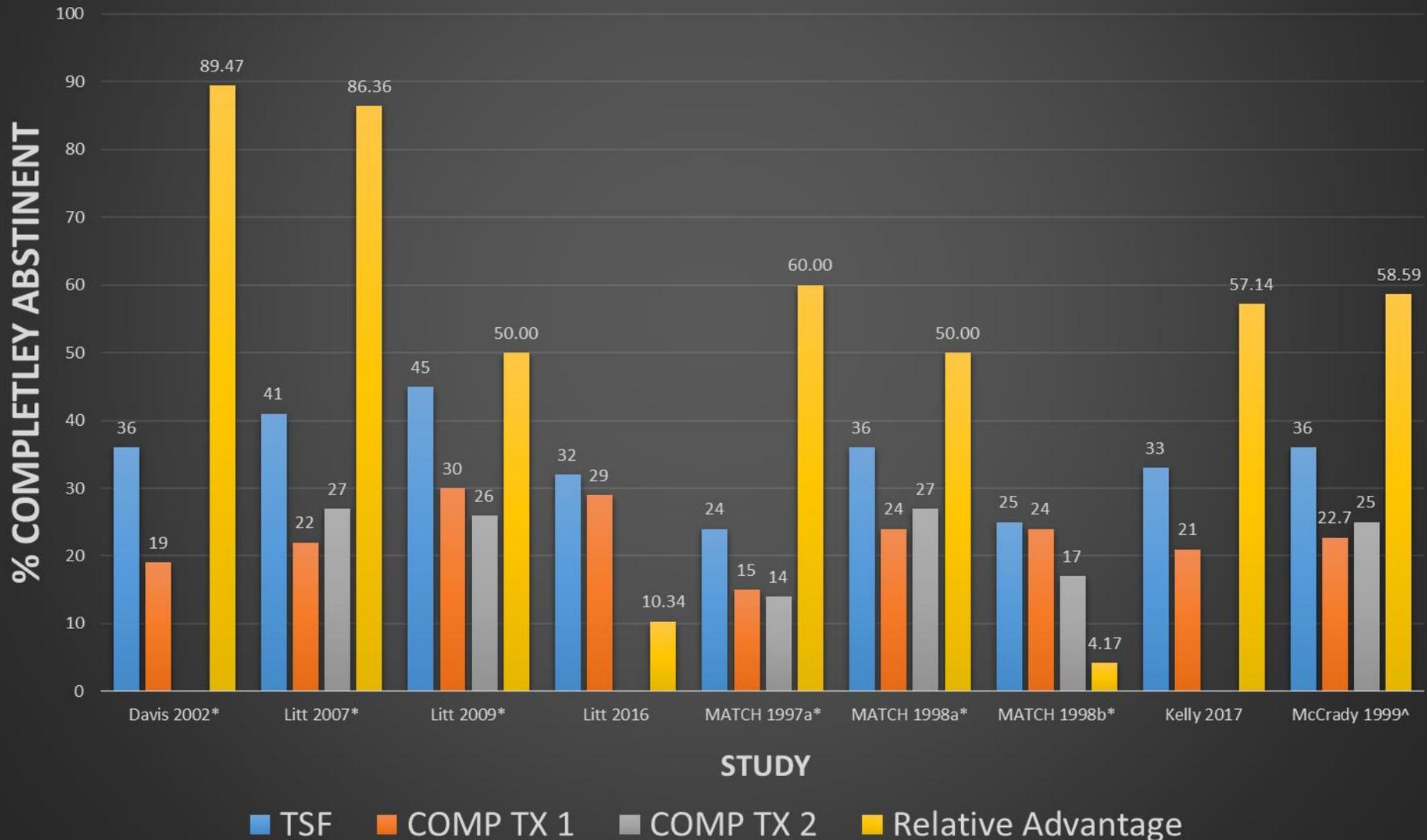
Kelly JF, Humphreys K, Ferri M

Kelly JF, Humphreys K, Ferri M.
Alcoholics Anonymous and other 12-step programs for alcohol use disorder.
Cochrane Database of Systematic Reviews 2020, Issue 3. Art. No.: CD012880.
DOI: [10.1002/14651858.CD012880.pub2](https://doi.org/10.1002/14651858.CD012880.pub2).

TSF Compared to Different Theoretical Orientation Treatments (RCTs all Manualized)



TSF Compared to Different Theoretical Orientation Treatments (RCTs all Manualized)



Economic Studies

Healthcare Cost Savings

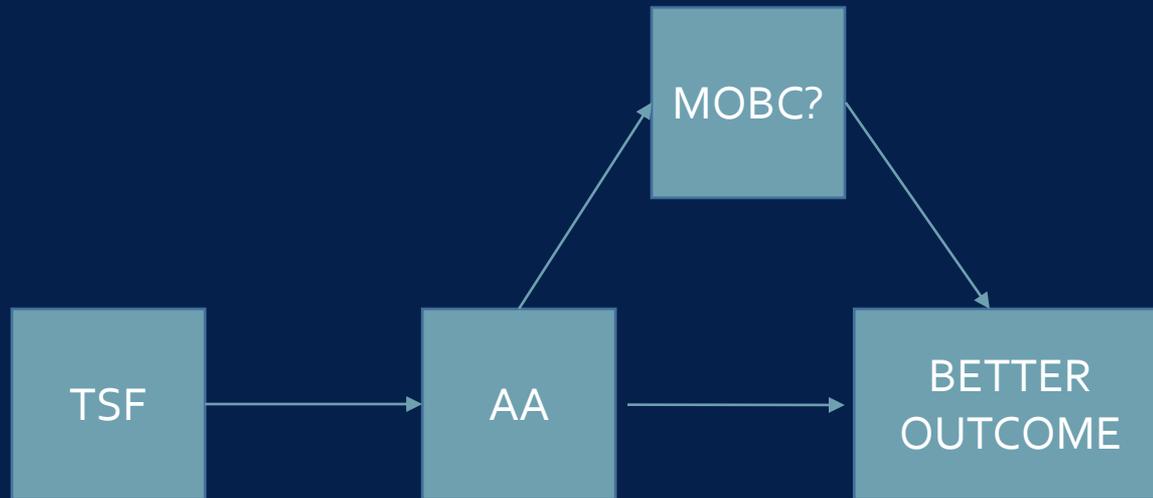
- 3/4 included studies in this category (n reports = 4/5; found sig. health care cost saving in favor of the AA/TSF condition).
- Economic analyses found benefits in favor of AA/TSF relative to outpatient treatment, and CBT interventions.
- Magnitude quite large. In addition to sig. increased abstinence, compared to CBT interventions delivered in residential VA, AA/TSF reduces mental health and substance use related healthcare costs over the next two years by over \$10,000 per patient (converted to 2018 U.S. dollars).
- More than 1M people treated for AUD in U.S. annually - reducing their health care costs by this amount would produce an large aggregate economic saving (e.g., >\$10 billion in the U.S. alone) as well as improving clinical outcomes.



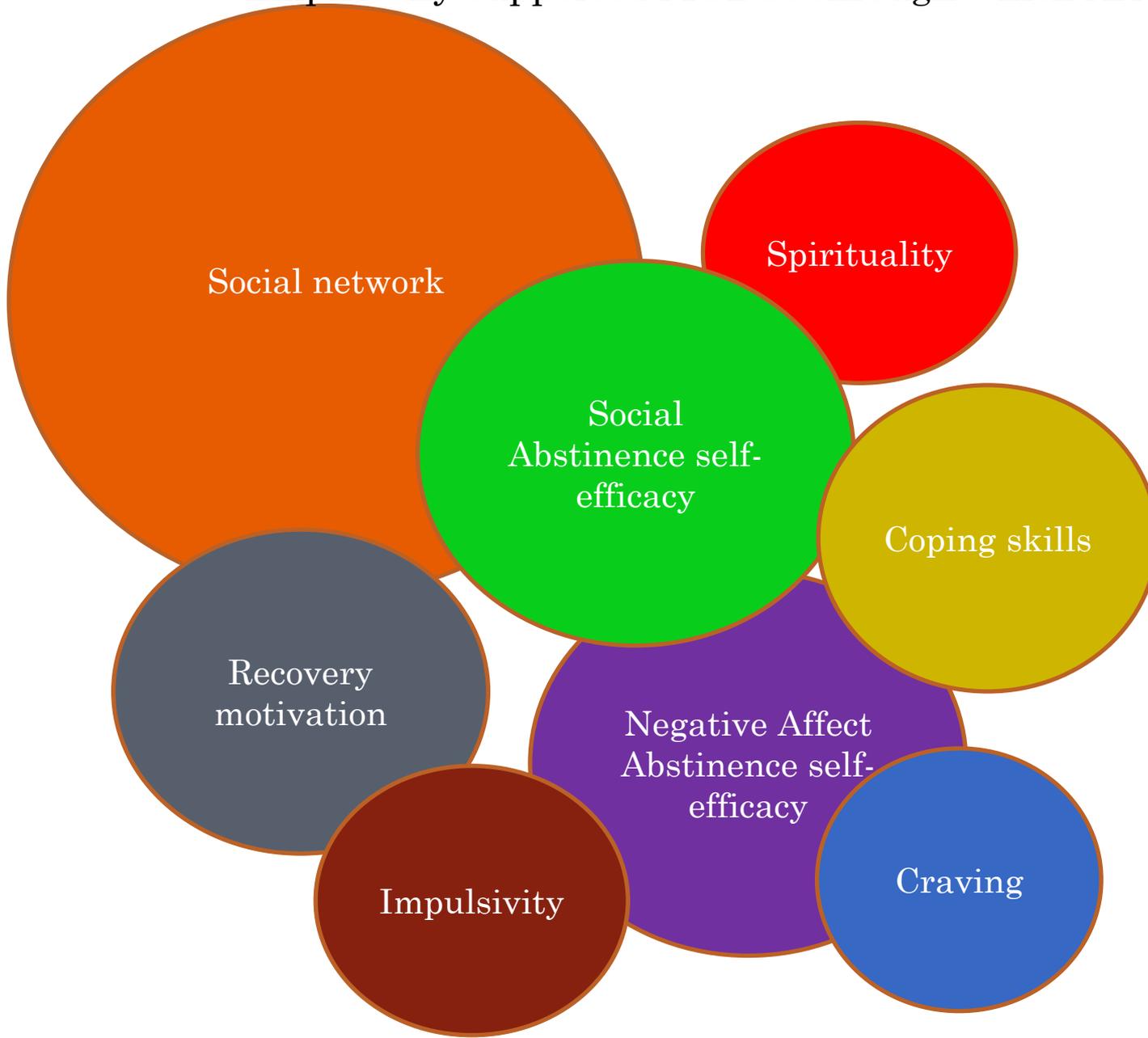
In Studies the conducted and reported
mediational analyses...AA/TSF Causal
chain supported...



What about support for causal chain of purported mobc of AA on outcomes?



Empirically-supported MOBCs through which AA confers benefit

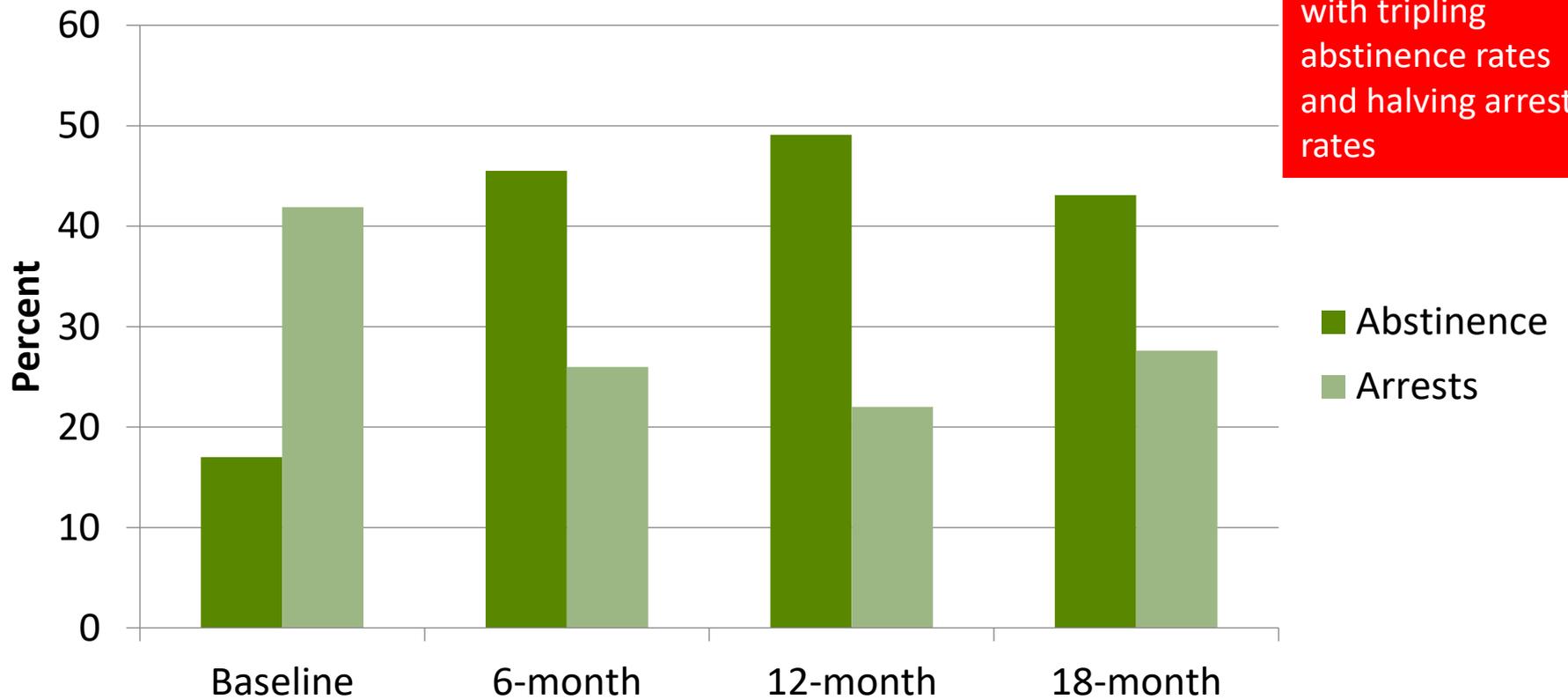


Sober Living Environments Peer Run/Self-Governing



Sober Living Homes

Outcomes for residents in free standing SLHs



Societal Benefits of Oxford Houses

- **Sample:** 150 individual completing treatment in the Chicago metropolitan area
- **Design:** Randomized controlled trial
- **Intervention:** Oxford House vs. community-based aftercare services (usual care)
- **Follow-up:** 2 years
- **Outcome:** Substance use, monthly income, incarceration rates



FIELD ACTION REPORT

Communal Housing Settings Enhance Substance Abuse Recovery

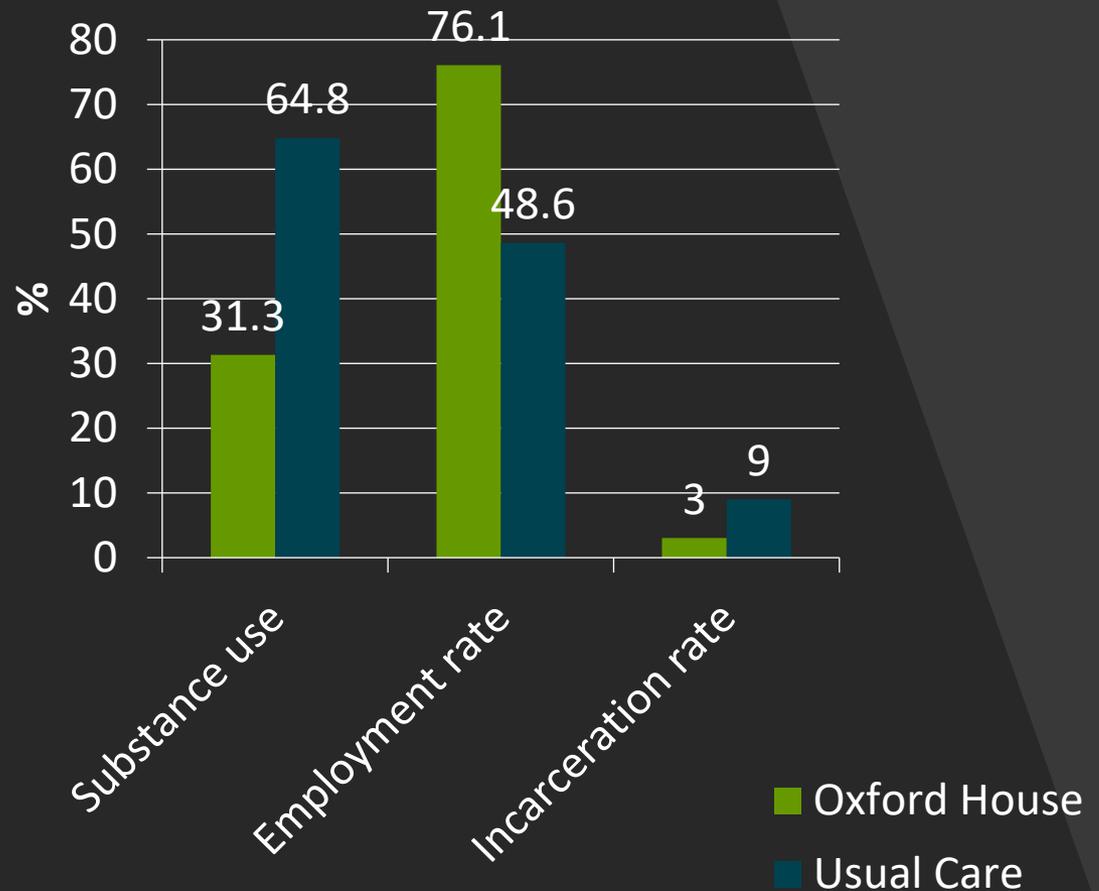
| Leonard A. Jason, PhD, Bradley D. Olson, PhD, Joseph R. Ferrari, PhD, and Anthony T. Lo Sasso, PhD

Oxford Houses are democratic, mutual help-oriented recovery homes for individuals with substance abuse histories. There are more than 1200 of these houses in the United States, and each home is operated independently by its residents, without help from professional staff.

In a recent experiment, 150 individuals in Illinois were randomly assigned to either an Oxford House or usual-care condition (i.e., outpatient treatment or self-help groups) after substance abuse treatment discharge. At the 24-month follow-up, those in the Oxford House condition compared with the usual-care condition had significantly lower substance use, significantly higher monthly income, and significantly lower incarceration rates. (*Am J Public Health*. 2006;96:1727–1729. doi:10.2105/AJPH.2005.070839)

Oxford House vs. Usual Care

- Sober living had –
- half as many persons using substances across 2 yr follow-up as usual care
- 50% more likely to be employed
- 1/3 re-incarceration rate



Cost-benefit analysis of the Oxford House Model

Evaluation and Program Planning 35 (2012) 47–53

Contents lists available at ScienceDirect



Evaluation and Program Planning

journal homepage: www.elsevier.com/locate/evalprogplan



Benefits and costs associated with mutual-help community-based recovery homes: The Oxford House model

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ABSTRACT

We used data from a randomized controlled study of *Oxford House* (OH), a self-run, self-supporting recovery home, to conduct a cost-benefit analysis of the program. Following substance abuse treatment, individuals that were assigned to an OH condition ($n = 68$) were compared to individuals assigned to a usual care condition ($n = 61$). Economic cost measures were derived from length of stay at an Oxford House residence, and derived from self-reported measures of inpatient and outpatient treatment utilization. Economic benefit measures were derived from self-reported information on monthly income, days participating in illegal activities, binary responses of alcohol and drug use, and incarceration. Results suggest that OH compared quite favorably to usual care: the net benefit of an OH stay was estimated to be roughly \$29,000 per person on average. Bootstrapped standard errors suggested that the net benefit was statistically significant. Costs were incrementally higher under OH, but the benefits in terms of reduced illegal activity, incarceration and substance use substantially outweighed the costs. The positive net benefit for Oxford House is primarily driven by a large difference in illegal activity between OH and usual care participants. Using sensitivity analyses, under more conservative assumptions we still arrived at a net benefit favorable to OH of \$17,830 per person.

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- **Sample:** 129 adults leaving substance use treatment between 2002 and 2005
- **Design:** Cost-benefit analysis using RCT data
- **Intervention:** Oxford House vs. usual continuing care
- **Follow-up:** 2 years
- **Outcome:** Substance use, monthly income, incarceration rates

Mean per-person societal benefits and costs



Bottom Line

- The costs associated with Oxford House treatment are returned nearly tenfold in the form of:
 - ↓ Reduced criminal activity
 - ↓ Reduced incarceration
 - ↓ Reduced drug and alcohol use
 - ↑ Increased earnings from employment

Clinical Models of Long-term Recovery Management



Recover Management Check-ups (RMC)

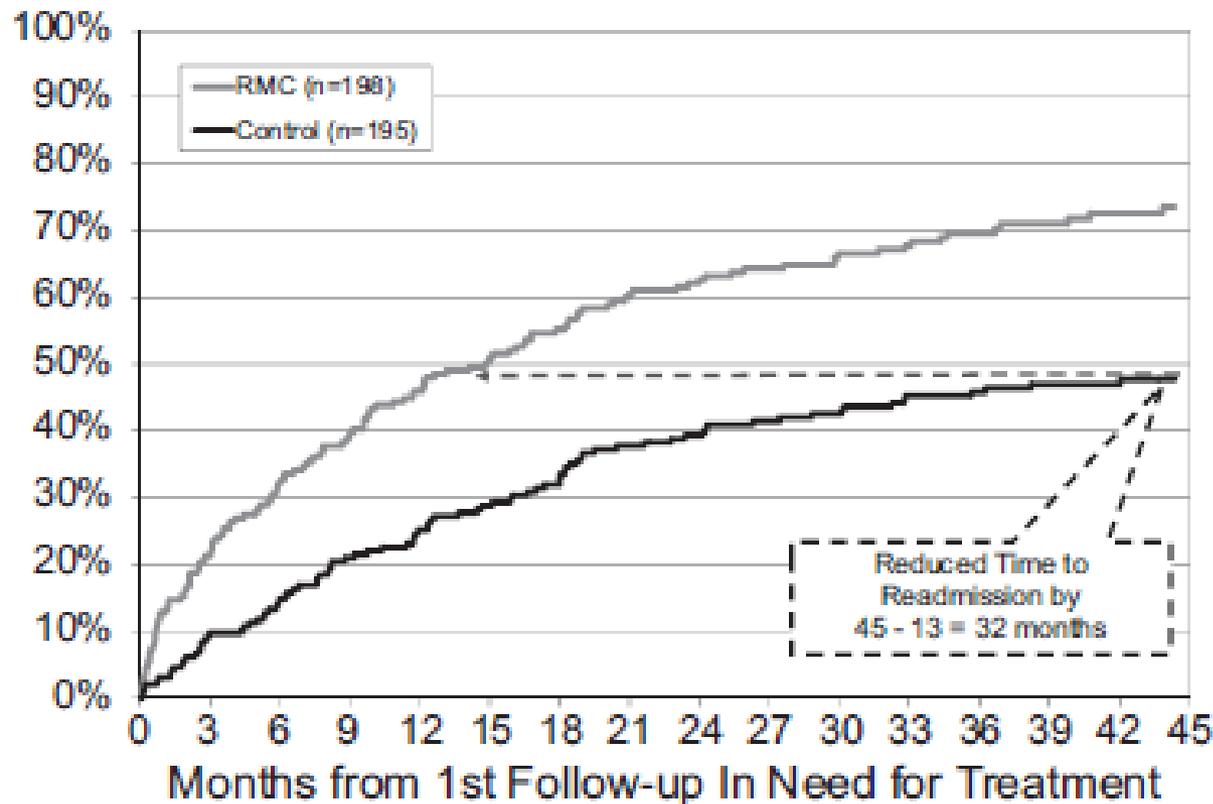
4-year outcomes from the Early Re-Intervention experiment using Recovery Management Checkups

- N=446 adults with SUD, mean age = 38, 54% male, 85% African-American
- randomly assigned to
 - quarterly outcome monitoring (OM) only
 - quarterly OM plus RMC
- Recovery Management Checkups
 - Linkage manager who used motivational interviewing to review the participant's substance use, discuss treatment barrier/solutions, schedule an appointment for treatment re-entry, and accompany participant through the intake
 - If participants reported no substance use in the previous quarter, the linkage manager reviewed how abstinence has changed their lives and what methods have worked to maintain abstinence

Results 1

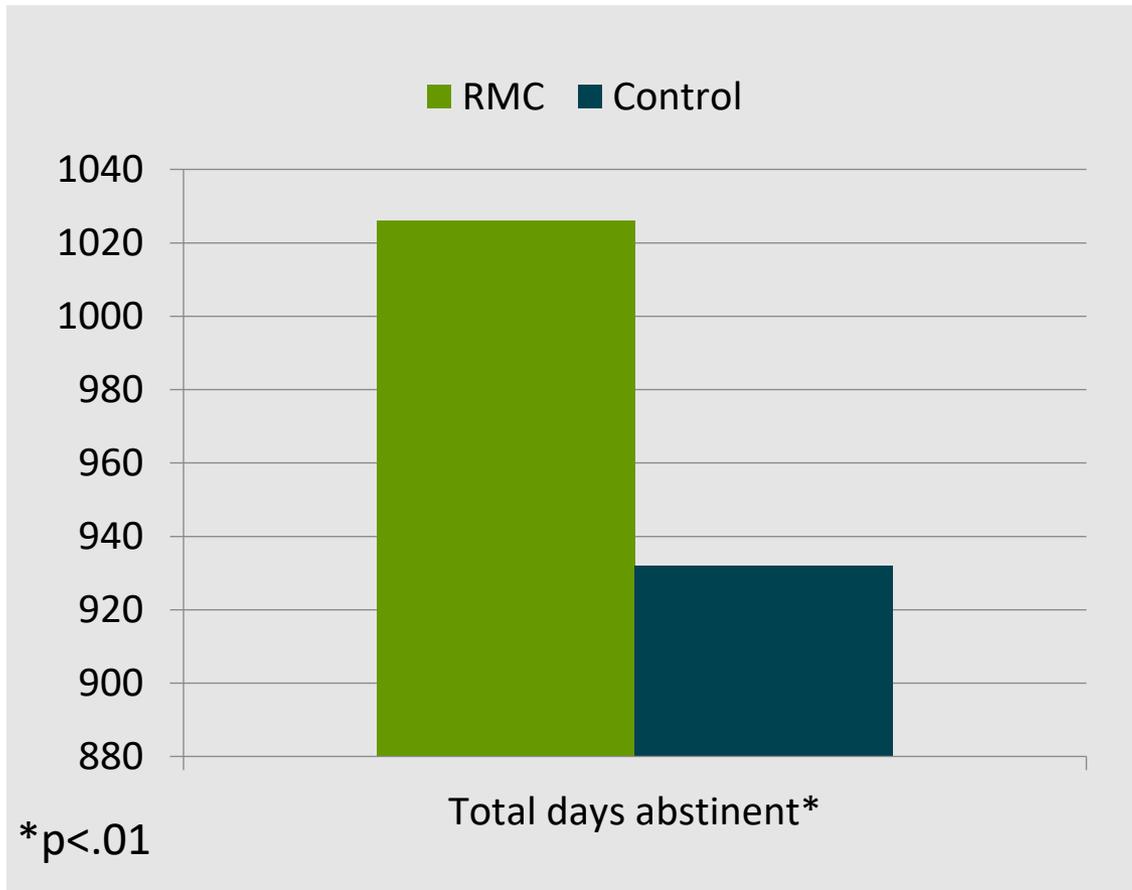
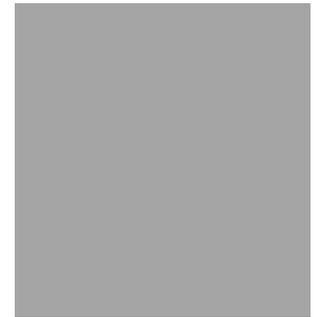
Return to treatment

- Participants in RMC condition sig. more likely to return to treatment sooner



Results 4

Days abstinent



Of 18 vars tested, the only variables that predicted return to treatment was the intervention

Cost-effectiveness analysis of Recovery Management Checkups (RMC)

- **Sample:** 446 patients with substance use disorders residing in Illinois
- **Design:** Cost-effectiveness analysis using RCT data
- **Intervention:** Outcome monitoring (OM) plus RMC vs. OM-only
- **Follow-up:** 4 years
- **Outcome:** Cost per participant, number of days of abstinence, number of substance use-related problems

Cost-effectiveness analysis of Recovery Management Checkups (RMC) for adults with chronic substance use disorders: evidence from a 4-year randomized trial

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Department of Public Health Sciences, Miller School of Medicine, University of Miami, Miami, FL, USA,¹ Department of Sociology, University of Miami, Coral Gables, FL, USA,² New York University, School of Medicine, New York, NY, USA,³ Chestnut Health Systems, Normal, IL, USA⁴ and Chestnut Health Systems, Chicago, IL, USA⁵

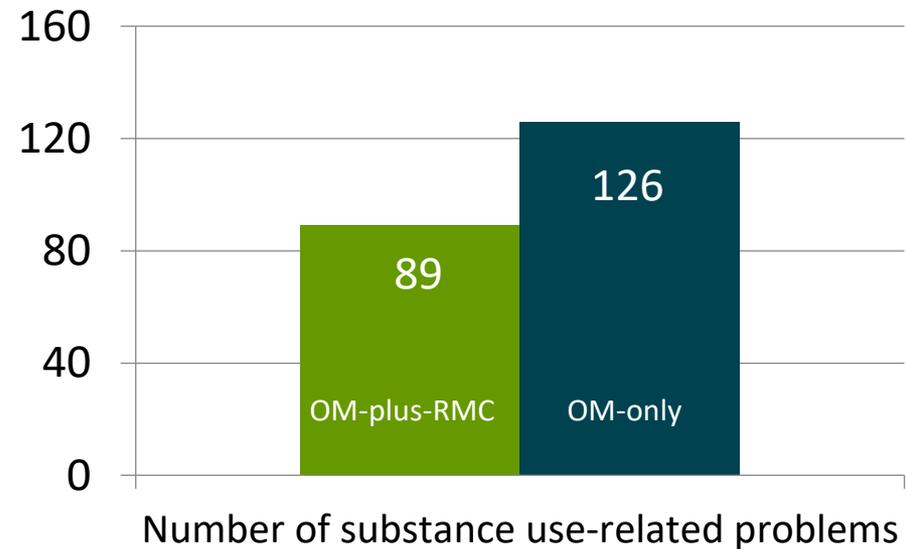
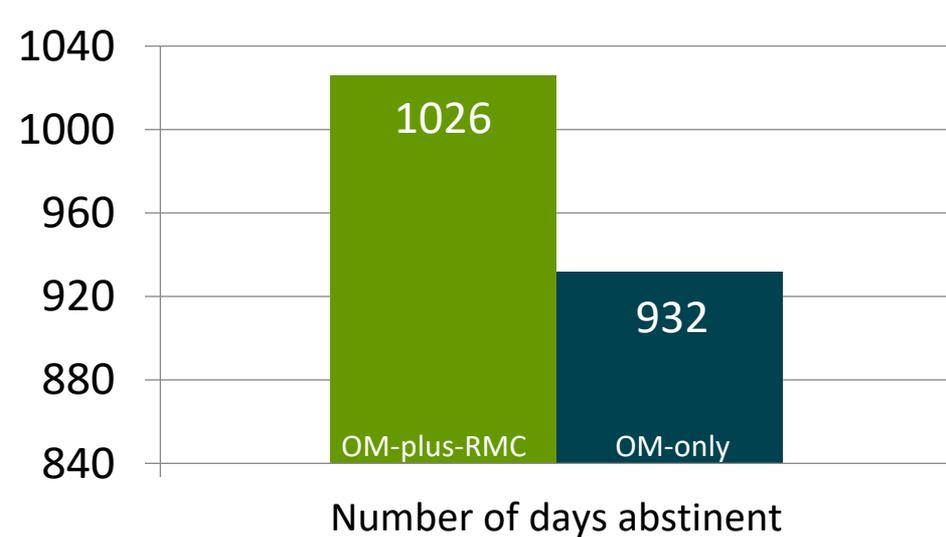
ABSTRACT

Aims This study performs the first cost-effectiveness analysis (CEA) of Recovery Management Checkups (RMC) for adults with chronic substance use disorders. **Design** Cost-effectiveness analysis of a randomized clinical trial of RMC. **Setting** Participants were recruited from the large central intake unit for substance abuse treatment in Chicago, Illinois, USA. **Participants** A total of 446 participants who were 38 years old on average, 54% male, and predominantly African American (85%). **Measurements** Data on the quarterly cost per participant come from a previous study of OM and RMC intervention costs. Effectiveness was measured as the number of days of abstinence and number of substance use-related problems. **Findings** Over the 4-year trial, OM-plus-RMC cost on average \$2184 more than OM-only ($P < 0.01$). Participants in OM-plus-RMC averaged 1026 days abstinent and had 89 substance use-related problems. OM-only averaged 932 days abstinent and reported 126 substance use-related problems. Mean differences for both effectiveness measures were statistically significant ($P < 0.01$). The incremental cost-effectiveness ratio for OM-plus-RMC was \$23.38 per day abstinent and \$59.51 per reduced substance-related problem. When additional costs to society were factored into the analysis, OM-plus-RMC was less costly and more effective than OM-only. **Conclusions** Recovery Management Checkups are a cost-effective and potentially cost-saving strategy for promoting abstinence and reducing substance use-related problems among chronic substance users.

Keywords Chronic substance use disorder, cost-effectiveness analysis, economic evaluation, Recovery Management Checkups.

Costs and Effectiveness Estimates

- Cost on average (per participant) to deliver:
 - OM-plus-RMC: \$4,889
 - OM-only: \$2,705



- Incremental effectiveness of OM-plus-RMC:
 - 94 additional days abstinent
 - 37 fewer substance use-related problems

Recovery Community Centers



Anchor

Recovery Community Center

Peer-to-peer support services



CONNECTICUT COMMUNITY

CCAR

FOR ADDICTION RECOVERY

Recovery Community Centers are...

Locatable sources of community-based recovery support beyond the clinical setting, helping members achieve sustained recovery by building and successfully mobilizing personal, social, environmental, and cultural resources.





New kid on the block: An investigation of the physical, operational, personnel, and service characteristics of recovery community centers in the United States



John F. Kelly^{a,*}, Nilofar Fallah-Sohy^a, Corrie Vilsaint^a, Lauren A. Hoffman^a, Leonard A. Jason^b, Robert L. Stout^c, Julie V. Cristello^c, Bettina B. Hoepfner^c

^a Recovery Research Institute, Massachusetts General Hospital and Harvard Medical School, Harvard Medical School, 151 Merrimac Street, Boston, MA 02114, United States of America

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ABSTRACT

Background: Professional treatment and non-professional mutual-help organizations (MHOs) play important roles in mitigating addiction relapse risk. More recently, a third tier of recovery support services has emerged that are neither treatment nor MHO that encompass an all-inclusive flexible approach combining professionals and volunteers. The most prominent of these is Recovery Community Centers (RCCs). RCC's goal is to provide an attractive central recovery hub facilitating the accrual of recovery capital by providing a variety of services (e.g., recovery coaching; medication assisted treatment [MAT] support, employment/educational linkages). Despite their growth, little is known formally about their structure and function. Greater knowledge would inform the field about their potential clinical and public health utility.

Method: On-site visits (2015–2016) to RCCs across the northeastern U.S. ($K = 32$) with semi-structured interviews conducted with RCC directors and online surveys with staff assessing RCCs' physicality and locality; operations and budgets; leadership and staffing; membership; and services.

Results: *Physicality and locality:* RCCs were mostly in urban/suburban locations (90%) with very good to excellent Walk Scores reflecting easy accessibility. Ratings of environmental quality indicated neighborhood/grounds/buildings were moderate-good attractiveness and quality. *Operations:* RCCs had been operating for an average of 8.5 years ($SD = 6.2$; range 1–33 years) with budgets (mostly state-funded) ranging from \$17,000–\$760,000/year, serving anywhere from a dozen to more than two thousand visitors/month. *Leadership and staffing:* Center directors were mostly female (55%) with primary drug histories of alcohol (62%), cocaine (19%), or opioids (19%). Most, but not all, directors (90%) and staff (84%) were in recovery. *Membership:* A large proportion of RCC-visitors were male (61%), White (72%), unemployed (50%), criminal-justice system-involved (43%) and reported opioids (35%) or alcohol (33%) as their primary substance. Roughly half were in their first year of recovery (49%), but about 20% had five or more years. *Services:* RCCs reported a range of services including social/recreational (100%), mutual-help (91%), recovery coaching (77%), and employment (83%) and education (63%) assistance. Medication-assisted treatment (MAT) support (43%) and overdose reversal training (57%) were less frequently offered, despite being rated as highly important by staff.

Conclusions: RCCs are easily accessible, attractive, mostly state-funded, recovery support hubs providing an array of services to individuals in various recovery stages. They appear to play a valued role in facilitating the accrual of social, employment, housing, and other recovery capital. Research is needed to understand the relative lack of opioid-specific support and to determine their broader impact in initiating and sustaining remission and cost-effectiveness.

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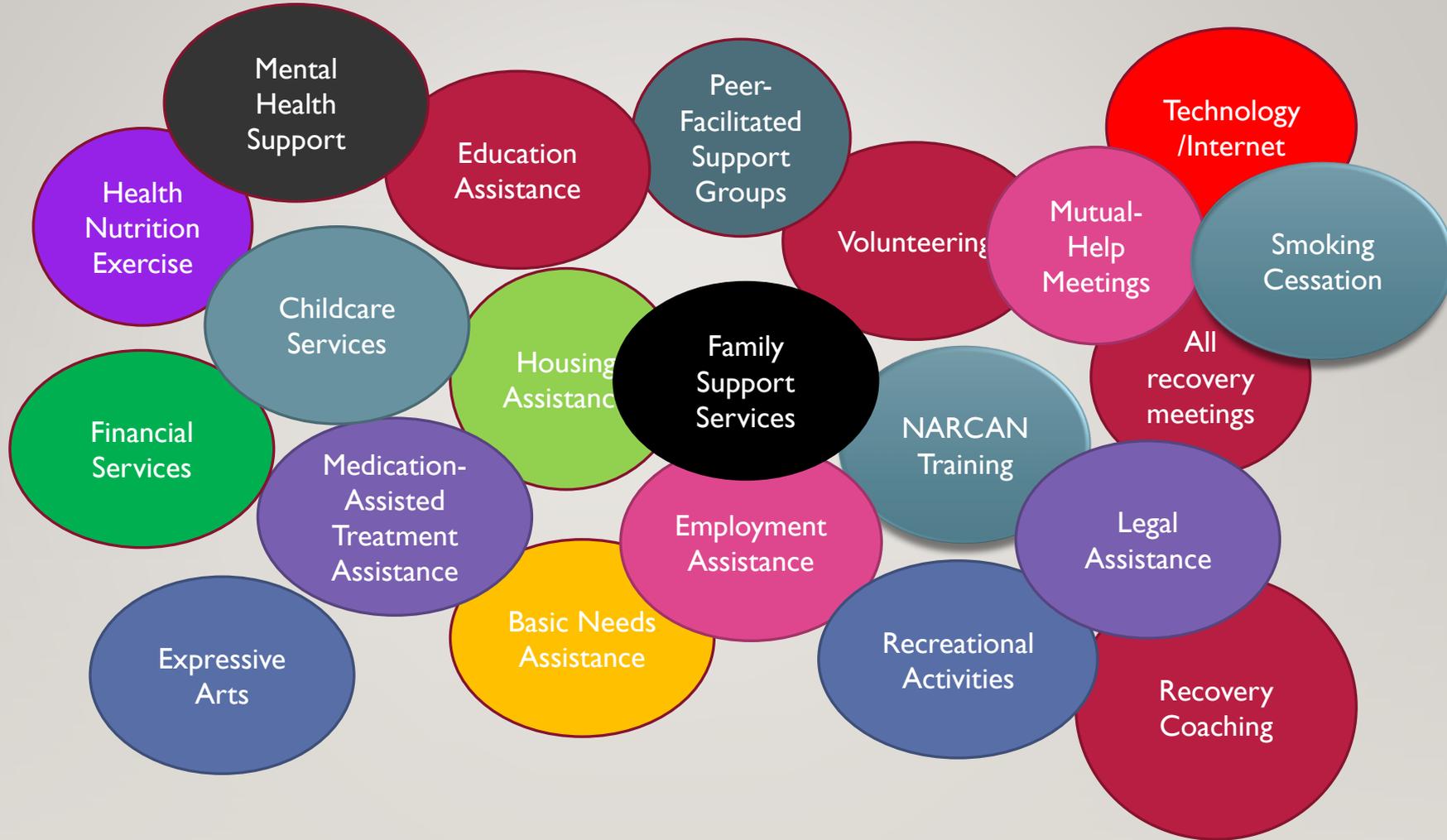
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WHAT DO RCCS OFFER?

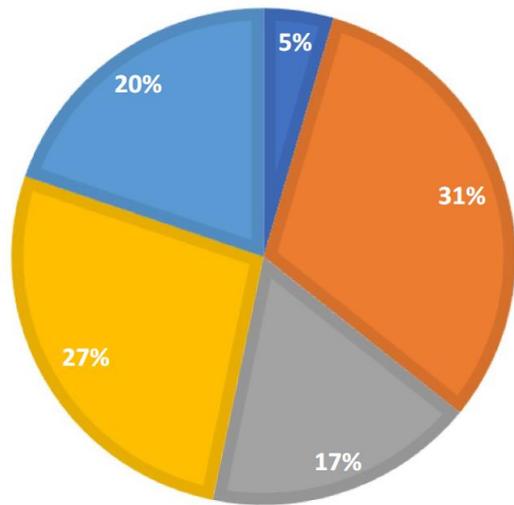


RESULTS

'New Kid On The Block'

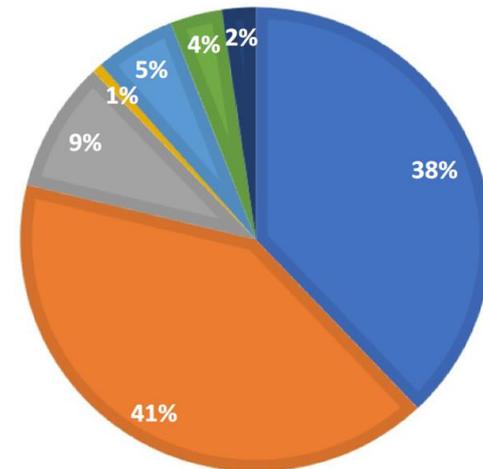
YEARS IN RECOVERY

■ Actively using ■ 0-6months ■ 6 months - 1yr ■ 1-5 yrs ■ 5+ yrs



PRIMARY SUBSTANCE

■ Alcohol ■ Opioids ■ Cocaine/Crack
■ Amphetamines/Meth ■ cannabis ■ Other
■ No drug problem



Recovery Indices by Years Since Problem Resolution

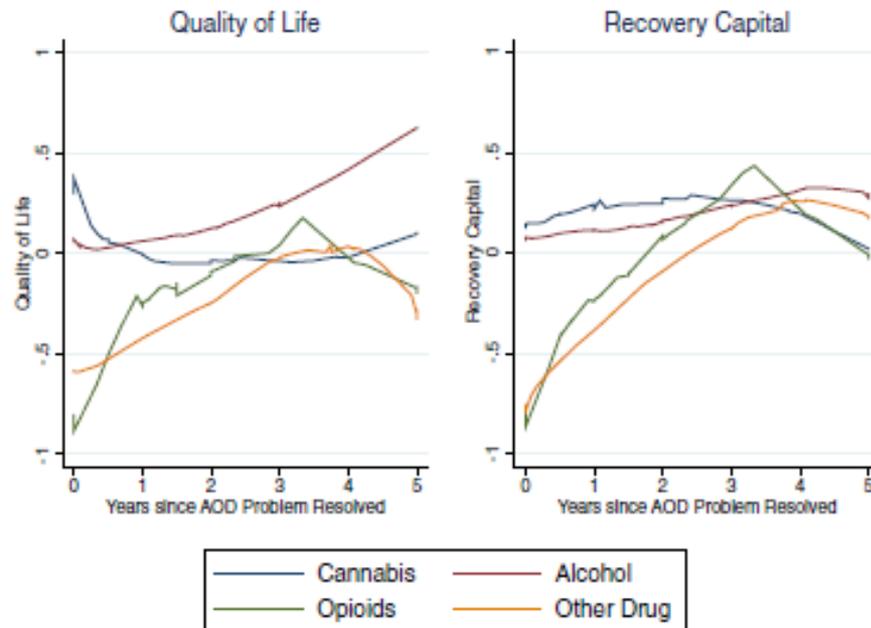


Fig. 5. Locally Weighted Scatterplot Smoothing (LOWESS) analysis of recovery indices by years since problem resolution stratified by primary substance.

One-Stop Shopping for Recovery: An Investigation of Participant Characteristics and Benefits Derived From U.S. Recovery Community Centers

John F. Kelly , Robert L. Stout, Leonard A. Jason, Nilofar Fallah-Sohy, Lauren A. Hoffman, and Bettina B. Hoepfner

Background: Recovery community centers (RCCs) are the “new kid on the block” in providing addiction recovery services, adding a third tier to the 2 existing tiers of formal treatment and mutual-help organizations (MHOs). RCCs are intended to be recovery hubs facilitating “one-stop shopping” in the accrual of recovery capital (e.g., recovery coaching; employment/educational linkages). Despite their growth, little is known about who uses RCCs, what they use, and how use relates to improvements in functioning and quality of life. Greater knowledge would inform the field about RCC’s potential clinical and public health utility.

Methods: Online survey conducted with participants ($N = 336$) attending RCCs ($k = 31$) in the northeastern United States. Substance use history, services used, and derived benefits (e.g., quality of life) were assessed. Systematic regression modeling tested a priori theorized relationships among variables.

Results: RCC members ($n = 336$) were on average 41.1 ± 12.4 years of age, 50% female, predominantly White (78.6%), with high school or lower education (48.8%), and limited income (45.2% < \$10,000 past-year household income). Most had either a primary opioid (32.7%) or alcohol (26.8%) problem. Just under half (48.5%) reported a lifetime psychiatric diagnosis. Participants had been attending RCCs for 2.6 ± 3.4 years, with many attending <1 year (35.4%). Most commonly used aspects were the socially oriented mutual-help/peer groups and volunteering, but technological assistance and employment assistance were also common. Conceptual model testing found RCCs associated with increased recovery capital, but not social support; both of these theorized proximal outcomes, however, were related to improvements in psychological distress, self-esteem, and quality of life.

Conclusions: RCCs are utilized by an array of individuals with few resources and primary opioid or alcohol histories. Whereas strong social supportive elements were common and highly rated, RCCs appear to play a more unique role not provided either by formal treatment or by MHOs in facilitating the acquisition of recovery capital and thereby enhancing functioning and quality of life.

Key Words: Recovery Community Centers, Recovery, Addiction, Support Services, Recovery Coaching, Addiction, Substance Use Disorder.

PROFESSIONAL TREATMENT SERVICES often play a vital role in addressing substance use disorders in the United States and around the world. Such clinical services can provide life-saving medically managed detoxification and stabilization as well as deliver medications and psychosocial interventions that can alleviate cravings and help prevent relapse. Extending the framework and benefits of these professional treatment efforts, peer-led mutual-help

organizations (MHOs), such as Alcoholics Anonymous (AA), Narcotics Anonymous (NA), SMART Recovery, and many others are commonly used to provide additional long-term free recovery support over time in the communities in which people live (Bog et al., 2017; Kelly, 2017; Kelly et al., 2017a). Adding to these resources in recent years has been a new dimension of recovery support services that are neither professional treatment nor MHOs. These new services (e.g., recovery community centers [RCCs], recovery residences, recovery coaching, recovery high schools, and collegiate recovery programs; Kelly et al., in press; White et al., 2012, 2012) combine voluntary, peer-led initiatives, with professional activities, and are intended to provide flexible community-based options to address the psychosocial barriers to sustained remission (White et al., 2012, 2012).

RCCs are one of the most common of these new additions to recovery support infrastructure and are growing rapidly

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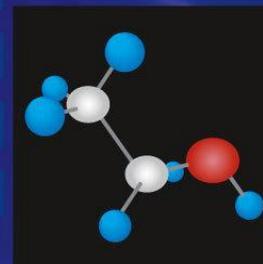
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ALCOHOLISM

CLINICAL & EXPERIMENTAL RESEARCH



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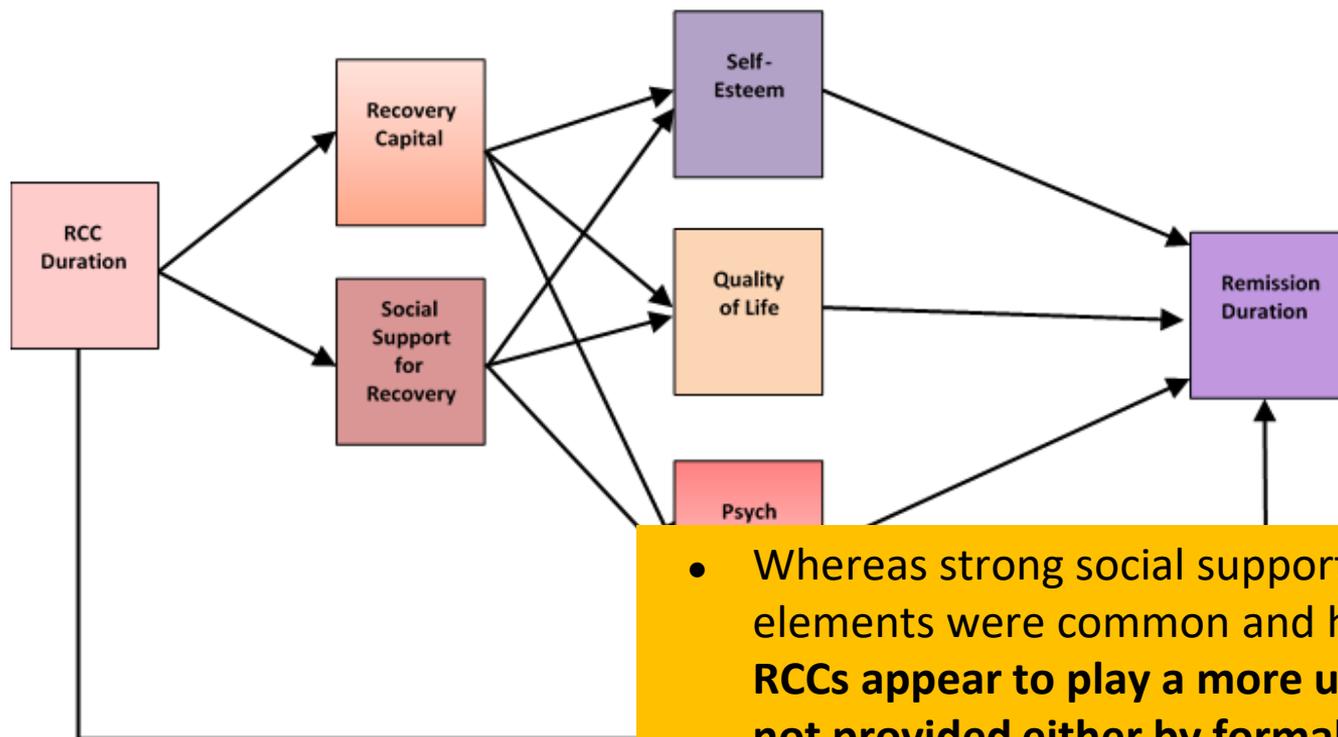
The Official Journal of the
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Research on Alcoholism



Founded in 1977 by the National Council on Alcoholism
(Now National Council on Alcoholism and Drug Dependence, Inc.)



Figure X. Model Testing Relationships among RCC Participation, Recovery Duration, and Theorized Mediators



- Whereas strong social supportive elements were common and highly rated, **RCCs appear to play a more unique role not provided either by formal treatment or by MHOs** in facilitating the acquisition of recovery capital and thereby enhancing functioning and quality of life.

Outline

Where have we come from? Where are we now? Where are we going? 50 years of Addiction Science, Practice, and Policy:

What is “recovery” and why is everyone talking about it?

Theory of addiction recovery: a biopsychosocial perspective

Services for Attaining and sustaining addiction remission and recovery

State of the Science and future directions

Quantity and Quality of Evidence for Recovery Support Services (2018)



Service	Quantity	Quality	Support for RS
1. Mutual help organizations	Large	Strong	Strong
2. Clinical models of long term recovery management	Large	Strong	Moderate-Strong
3. Peer-based recovery support services	Small-medium	Moderate	Moderate
4. Recovery Community Centers	Small	Weak-Moderate	Weak-Moderate
5. Recovery Residences	Medium	Moderate-Strong	Moderate-Strong
6. Education-Based Recovery Supports	Small	Weak-Moderate	Weak-Moderate

Summary: Key Points

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- Past 50 years since declaration of “War on Drugs” a lot learned on etiology, epidemiology, typology, prevention and acute care treatment models for addiction
 - New recognition of a need for a science on how individuals achieve and sustain full remission and long-term stable “recovery”
 - Recovery often used to describe both a personal growth process as well as an outcome
 - Recovery often used to imply not just surviving but thriving in spite of having suffered addiction –often because of it, invoking notion of resilience
 - Recovery theories of stable remission and long-term relapse are lacking; but existing conceptual models can be drawn upon to provide reasonable testable hypotheses
 - Both addiction and recovery can be viewed comprised of two major factors: degree of clinical pathology and availability of internal and external resources (“recovery capital”; aka “social determinants of health/recovery”)
 - An array of community-based recovery services and treatment-recovery service systems have emerged and are growing across the north America that have varying levels of supportive evidence
 - A new research agenda is emerging to more comprehensively address the needs of individuals and their families who suffer from serious alcohol/drug problems