

Modeling to Learn

Test. Don't guess.



Northwestern Prevention Science Methodology
Group

10/12/2021

Lindsey Zimmerman, PhD

Office of Mental Health and Suicide Prevention
National Center for PTSD, Dissemination & Training
Division

Created by



I will tell three implementation stories:

Story 1: VA Wait Times

Story 2: Platypus

Story 3: Physics

Story 1:

The VA Wait Time story cautions us that we can do more harm than good.

**Our implementation climate is intense
public scrutiny with the biggest headline
about time.**

VA WAITING ROOM



Despite the press, many Veterans describe profound benefits from their VA care.



https://mtl.how/sketches_of_recovery

What would motivate keeping separate books?

Epidemic of VA Mismanagement

On April 23, CNN aired an interview with retired VA physician Dr. Sam Poole, who made allegations about scheduling practices, delayed care and patient deaths in the Phoenix VA system. More whistleblowers came forward across the country and it soon became apparent that VA's problems went far beyond Phoenix.

1 Phoenix, Ariz.

APRIL 2014

Multiple whistle blowers in the Phoenix VA Health Care System step forward with allegations of two separate waiting lists, the public electronic list, and an offline secret list maintained to enable falsifying the electronic results to keep patients wait times within VA's acceptable guidelines.

As many as 40 veterans or more may have died while waiting to receive care.

MAY 2, 2014

In the aftermath of allegations, two VA employees are motivated to move to secure documents alleging that there was a systematic effort underway at the hospital to shred documents to eliminate evidence of the waiting list cover-up.

PHOENIX VA - BY THE NUMBERS

1,400 Phoenix VA patients included on the Electronic Wait List, but no primary care appointment scheduled.

1,700 Phoenix VA patients never entered into the Electronic Wait List (EWL).

1,100 newly enrolled patients in the Phoenix New Enrollee Appointment Request (NEAR) tracking report who requested a primary care appointment. As of April 28, 2014, these patients were not included on the EWL and did not have appointments.

400 newly enrolled veterans who called the Phoenix Helpline and requested a primary care appointment. As of April 28, 2014, these patients were not included on the EWL and did not have appointments.

200 Phoenix VA patients who, as of April 2014, were not included on the EWL and did not have appointments after being given a "Schedule an Appointment Consult" from emergency department physicians, urgent services, or mental health providers.

\$9,345 Bonus received in 2013 by Phoenix VA Director Sharon Helms for a "highly successful rating," which included "significant improvements in ensuring ease of the access concerns, the long waits, moving to the electronic wait list," according to The Wall Street Journal. Helms is currently on administrative leave.

4 Cheyenne, Wyo.

MAY 9, 2014

A VA employee is put on leave when an email surfaces on CBS News detailing specific instructions for "gaming the system" to "get off the bad boys list." The employee is placed on suspension in May, when the story breaks, but another whistle blower in the Cheyenne office notes VA's Office of the Special Counsel was informed of the situation in December 2013, five months before VA response to the accusations.

2 Fort Collins, Colo.

MAY 2014

As mentioned in the Texas allegations, employees in Fort Collins, Colo., were directed to manipulate the books to conceal evidence of lengthy wait times for appointments.

9 Albuquerque, N.M.

MAY 18, 2014

According to a doctor at the center, veterans with serious heart conditions, gangrene and even brain tumors waited months for care at the Raymond G. Murphy VA Medical Center.

3 Austin and San Antonio, Texas

MAY 8, 2014

A former staff member for VA is quoted in the Austin American Statesman accusing supervisors of forcing concealment of long wait times by manipulating the scheduling system. The alleged fabrication is said to have occurred in locations in Austin and the Central Texas Veterans Health Care System in San Antonio.

Construction and resource allocation concerns

In addition to preventable patient deaths, The American Legion has voiced concerns over other mismanagement issues. In Orlando, Fla., New Orleans, Denver and Las Vegas, massive management of construction contracts result in four major projects that were \$1.5 billion over budget and were delayed an average of 36 months. Once completed, the Las Vegas Veterans Affairs is an ambitious key for their Emergency Room, requiring an additional \$16-25 million in funding to repair the grievous oversight.

In Hot Springs, Ark., The American Legion supports local veterans' protests against the shutdown of a VA medical facility which would require patients in rural areas to travel a distant facility for care.

6 St. Louis

May 12, 2014

In an interview with AP, former St. Louis VA chief of psychiatry alleges that he was demoted for trying to improve productivity, prompting an investigation.

7 Chicago

May 13, 2014

A VA social worker details on CBS News how scheduling wait times are manipulated in order to protect pay bonuses.

8 Burlington, Vt.

May 14, 2014

Veterans suffering from PTSD died in incident with son after long struggle to receive care from VA, frustrated by being shuttled between multiple counselors with maddening wait times.

Pittsburgh

November 2013, SWS site visit

Persistent management failures led to a deadly Legionella outbreak that kills at least 6 veterans and harms over 20 more. The manager in charge of oversight escapes discipline and collects a \$63,000 bonus over Legion protests.

10 Charleston, W.Va.

May 19

A doctor employed at the Huntington VAMC from 2008 to 2010 claims she was told to put patients seeking treatment off for months on end - and that at least two of them committed suicide.

5 Durham, N.C.

MAY 12, 2014

Two Durham VA Medical Center employees are put on administrative leave pending review of "inappropriate scheduling practices" sometime between 2009 and 2012.

Augusta, Ga.

March 2014,

SWS site visit

Delayed gastrointestinal consults result in at least seven veterans adversely affected by the delays in care.

Columbia, S.C.

April 2014, SWS site visit

Six patient deaths linked to delayed screenings for colorectal cancer; investigation revealed the facility had only used ¼ of the \$1 million in funding they had been given specifically to eliminate the backlog in screenings over the course of the year.

The VA Claims Backlog

VA reports a backlog of 271,740 disability benefit claims that exceed 125 days for adjudication. The types of claims that VA includes in this backlog statistic are initial claims for service-connected disability, pension or claims for surviving dependents. The claims not included in that statistic are:

- Award adjustments such as dependent claims - 396,798
- Pension program reviews - 24,844
- Program Reviews - 53,416
- Other pension reviews - 2,314
- Appeal - 275,181
- Pension adjustments - 17,281

When VA's acknowledged numbers are combined with the unreported claims awaiting adjudication, the true backlog number comes to 1,080,361. While they may have made improvements to a portion of the backlog, VA only reports on about 25% of the actual backlog.

#NotJustPhoenix



THE AMERICAN LEGION

http://www.legion.org/documents/legion/pdf/va_epidemic.pdf

"...do no harm."

“The physician must be able to tell the antecedents, know the present, and foretell the future – must mediate these things, and have two special objects in view with regard to disease, namely, to do good or to do no harm.”

- Hippocrates, *Of the Epidemics*

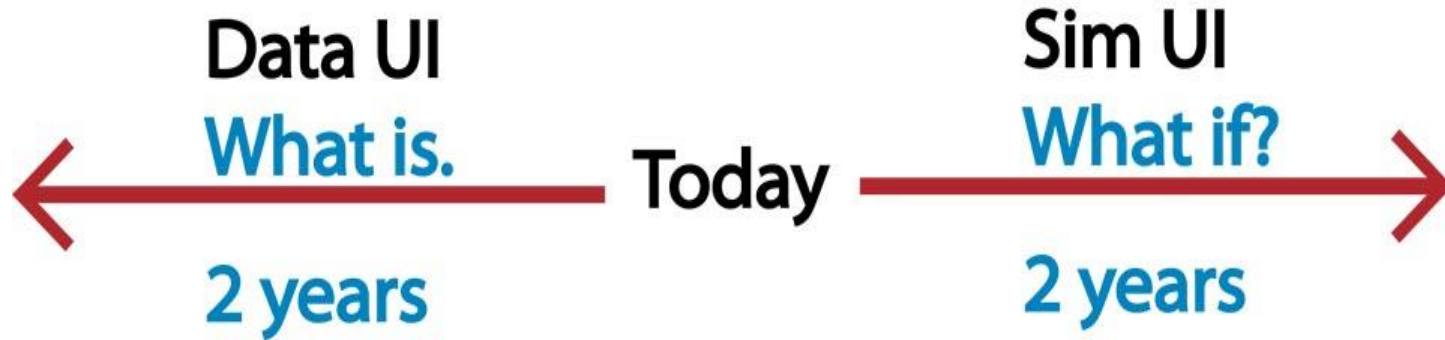
Modeling to Learn



Test. Don't guess.

Modeling to Learn provides participatory infrastructure for frontline healthcare teams to interact with data and system dynamics simulation modeling to improve local care decision-making.

Modeling to Learn helps teams look backward and forward to improve care.



We strive for more just, inclusive, equitable processes to co-produce more valid, useful knowledge.

Balazs, C.L., & Morello-Frosch, R. (2013)

Level of Engagement



CBPR

from Study Participants to Partners in Inquiry

Investigator Driven
Research Participants

*Risk: Extractive
unequal benefit*

Community Driven
Research Partners

*Benefit: Rigor, Relevance
& Reach*

We are a nationally distributed, multidisciplinary team of scientists and partners. (PI: Zimmerman)



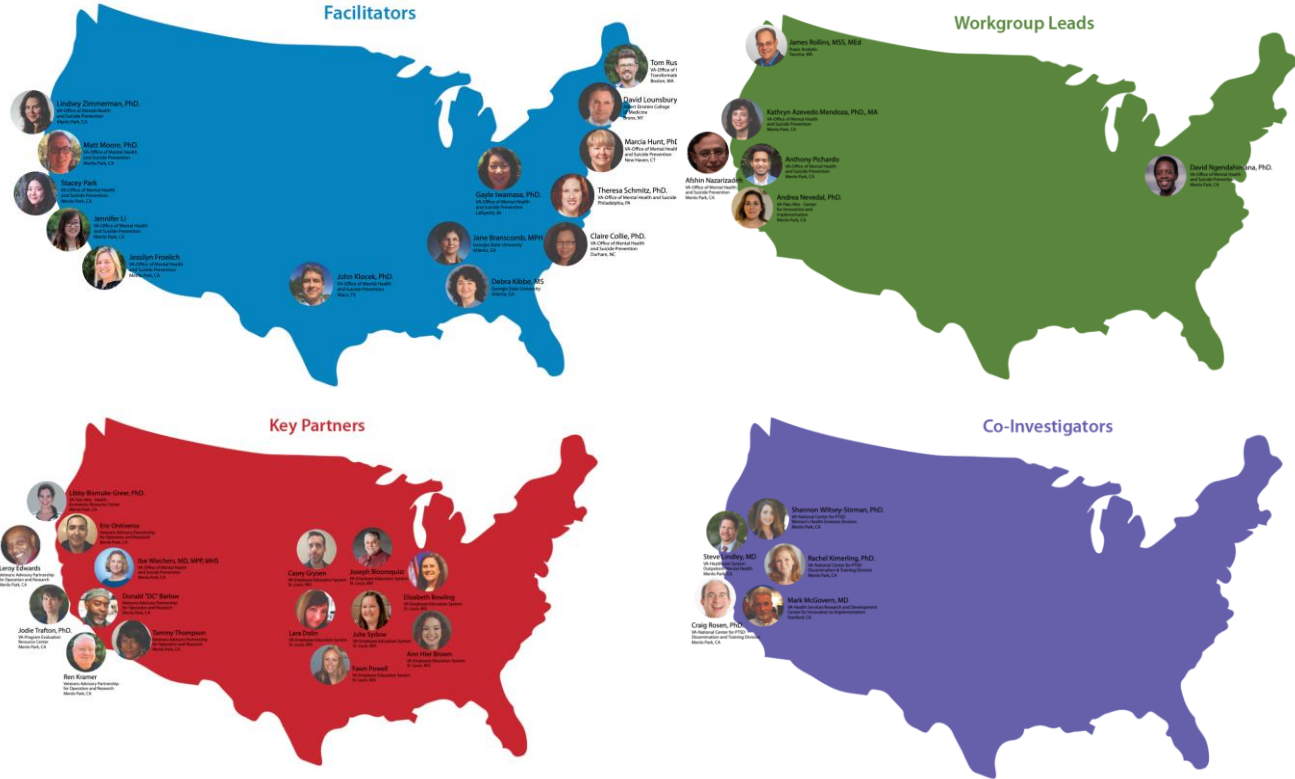
6 Research Employees & 5 Mentees at National Center for PTSD
~500 sq ft; 12 workstations

Nationally Distributed Workgroups

- Facilitators
- Qualitative Methods
- Quantitative Methods
- Simulation User Interface
- System Dynamics Models

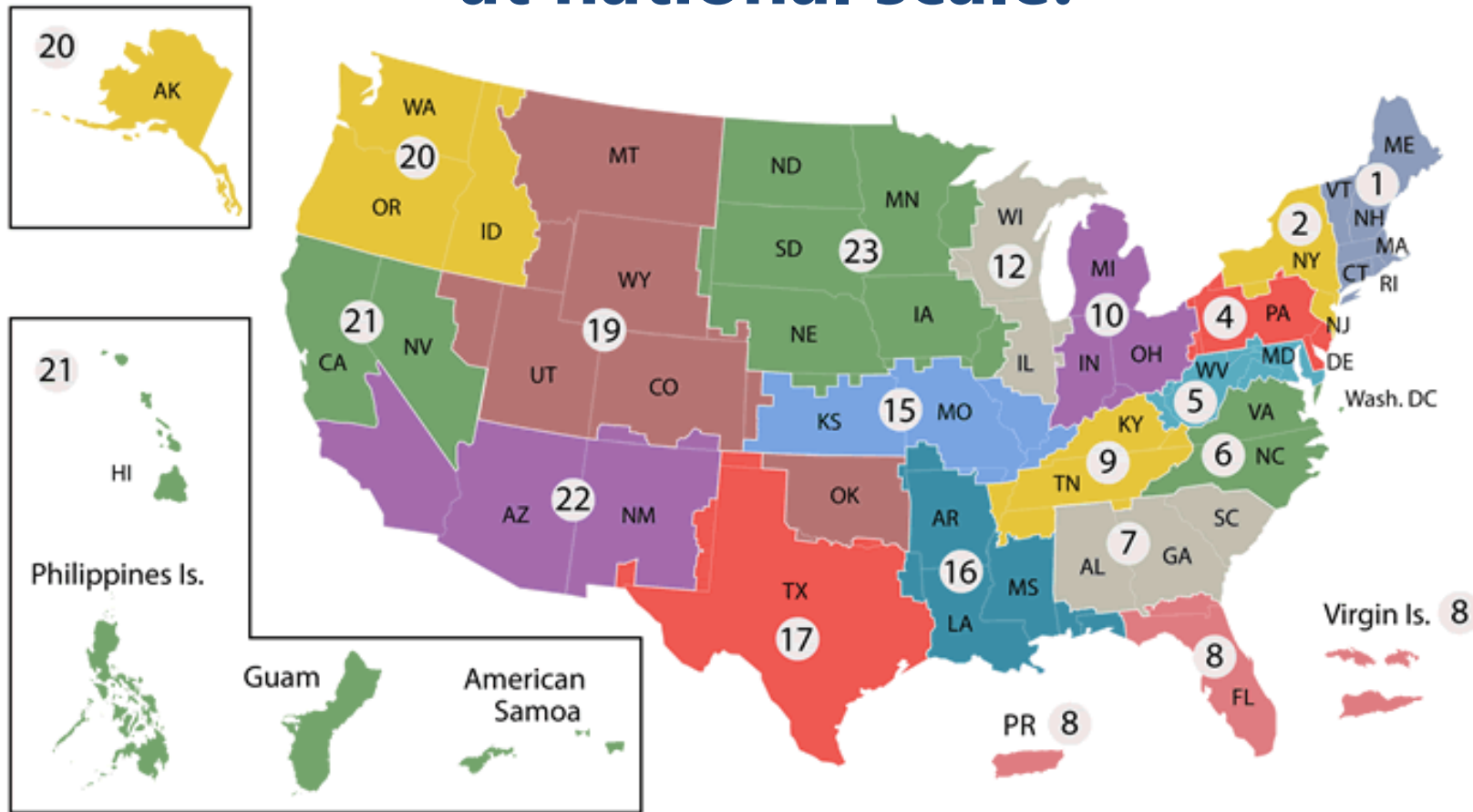
Key VA Partners

- Office of Mental Health and Suicide Prevention (OMHSP)
- Veterans Affairs Partnership for Operations & Research (VAPOR)
- Employee Education Services (EES)
- Office of Information Technology (OIT)
- National Pain Management, Opioid Safety and Specialty Care
- Office of Health Equity



Find out more about who we are and what we do at mtl.how/team.

We needed feasible local strategies at national scale.



Target State: Lean SMART Goal

By April 2015, 40% of patients newly seen in outpatient mental health at Menlo Park for depression, PTSD, or anxiety disorders will have two psychotherapy visits completed within 28 days from time of intake assessment.

Specific.
Measurable.

Actionable: if never achieved morale may suffer.

Realistic: with the available resources.

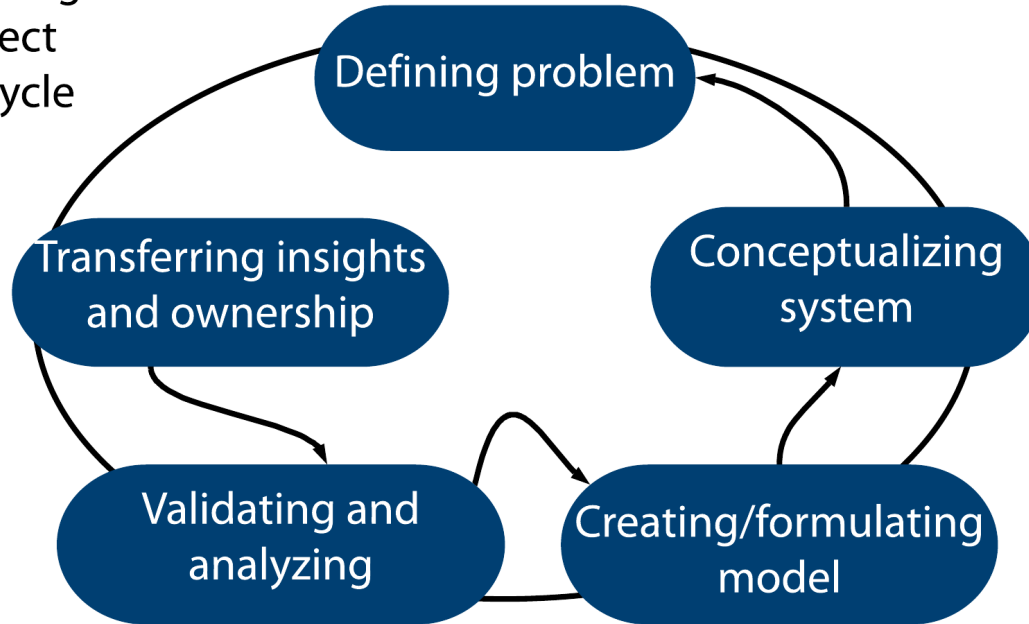
Time frame: A due date.

Story 2:

The platypus encourages a more inclusive, equitable scientific processes to transcend our current understandings.

Our paradigm is not a single model or project.

Modeling
Project
LifeCycle



Sterman, J.D. (2000). *Business Dynamics*.

This initial project is too static to be useful.

Adm Policy Ment Health
DOI 10.1007/s10488-016-0754-1



ORIGINAL PAPER

Participatory System Dynamics Modeling: Increasing Stakeholder Engagement and Precision to Improve Implementation Planning in Systems

Lindsey Zimmerman^{1,2} · David W. Lounsbury³ · Craig S. Rosen^{1,4} · Rachel Kimerling¹ · Jodie A. Trafton^{4,5} · Steven E. Lindley^{4,6}

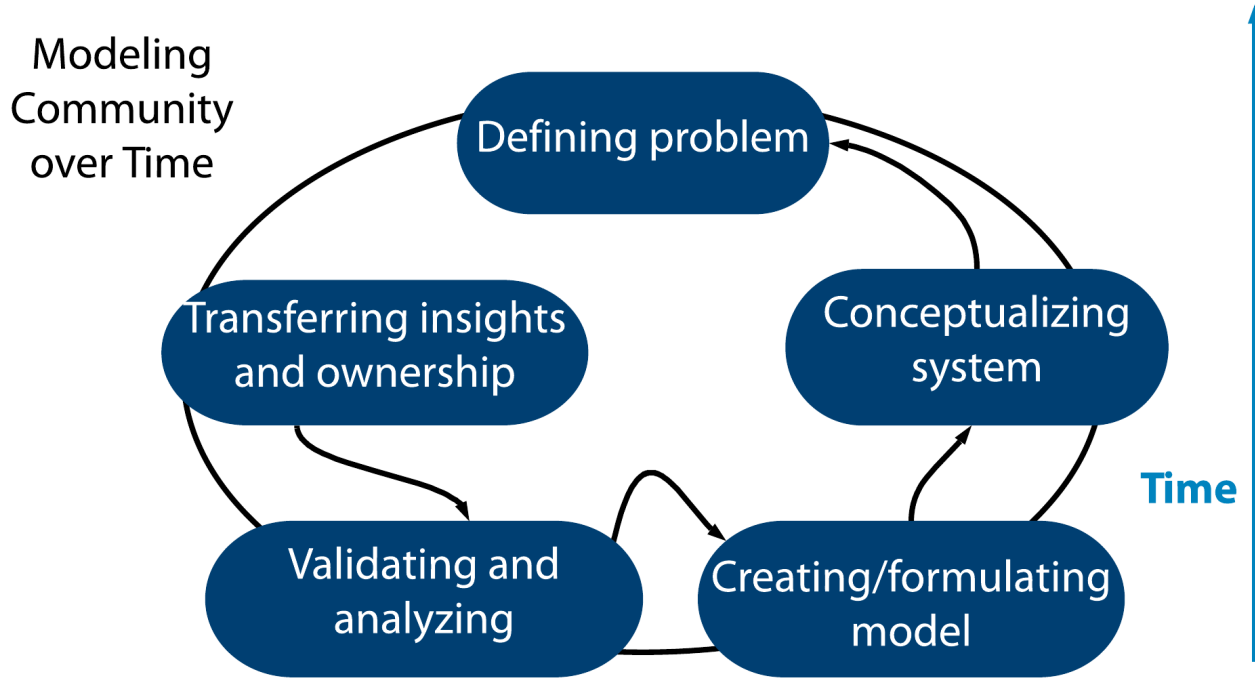


Volume 63 • Number 5 • September 2016

Staff Priority Experiments

- Patients' needs/preferences
- Reduce extra stops for Veterans
- Initiating a specific treatment
- Allocations of time (not enough time)
- Actual time (what we really do)
- Misunderstanding provider functions
- Morale & burnout
- Staff turnover

We are modeling to learn over time.



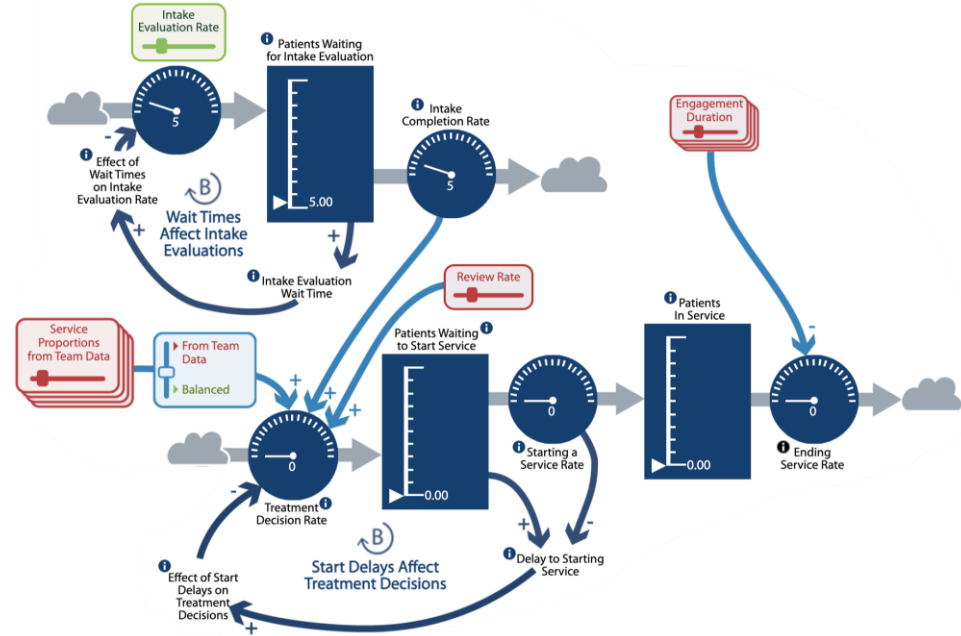
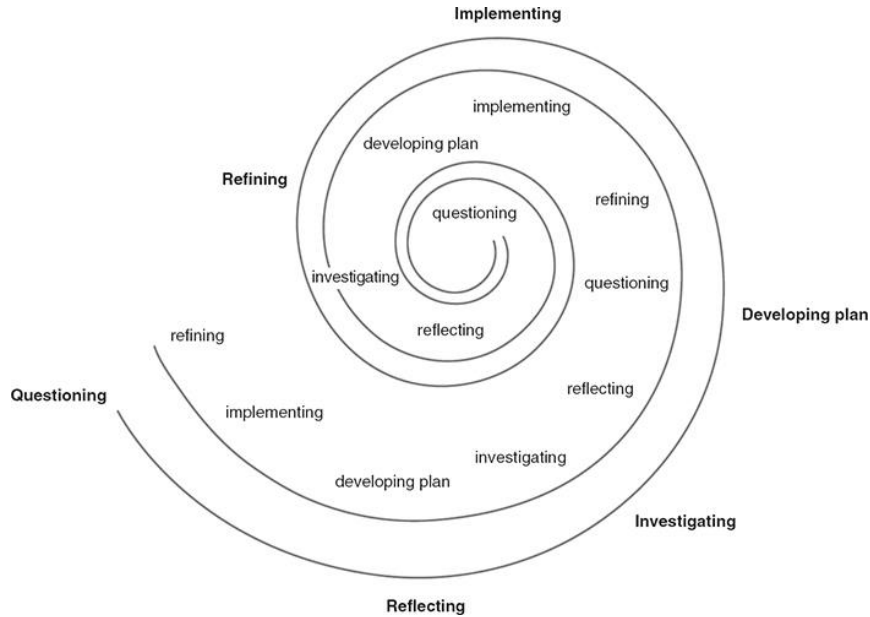
Hovmand, P. (2014). *Community Based System Dynamics*.

Close your eyes and picture a platypus.



Not 'beaver' or 'duck' but platypus.

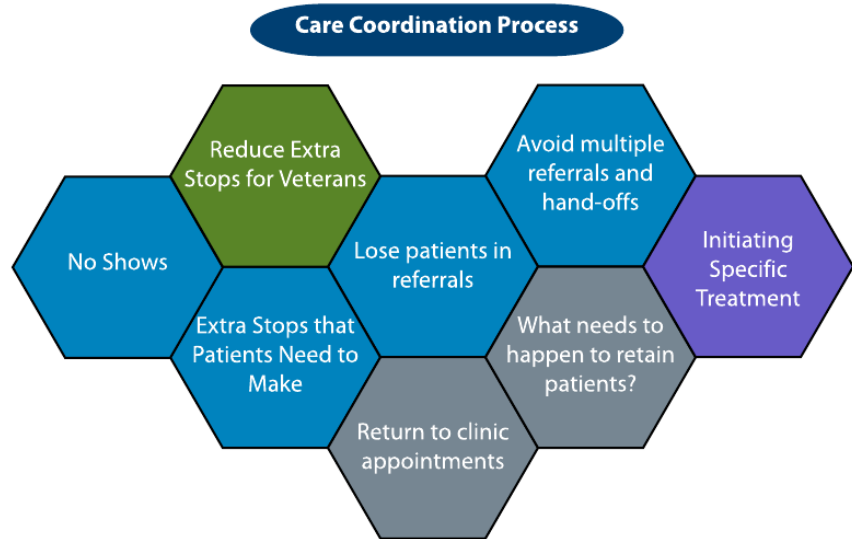
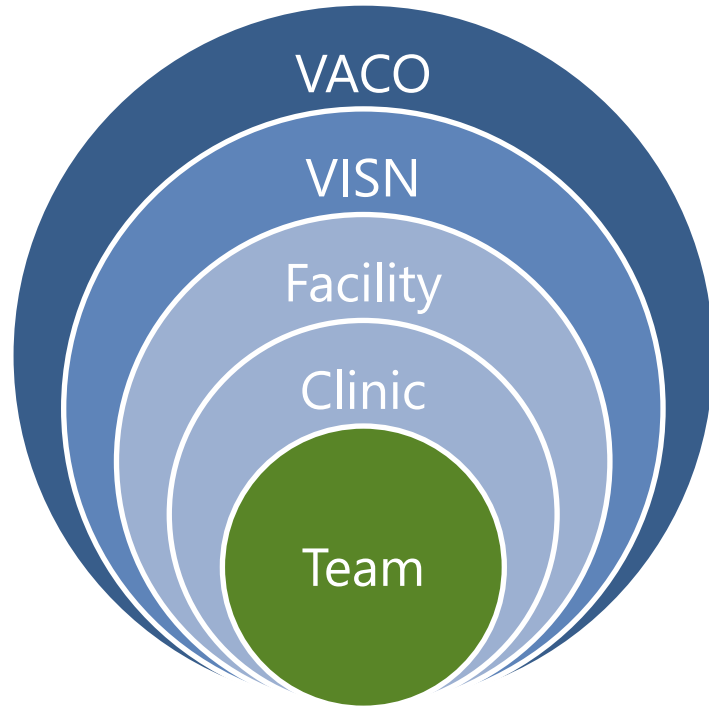
Now picture a participatory system dynamics



Is your mental model keying in on 'participatory' or with 'system dynamics?'

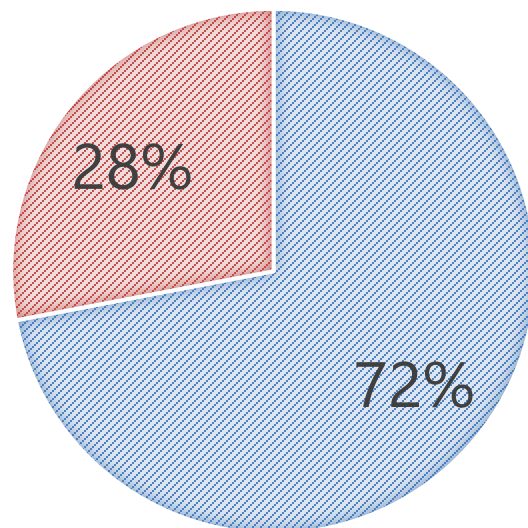
McIntyre, A. (2008). *Participatory Action Research*

We are embedded in the VA community and have established infrastructure for participatory learning from modeling.



We focus on teams to address policy resistance: How can we reach more patients with our highest quality care?

■ Other services ■ Evidence-based practices



Source: VA Strategic Analytics for Improvement and Learning, FY 2017



Veterans Health Administration

Model of a US National Health Care System

American J. Public Health 97, 2007

1. VA innovates with national dissemination efforts to train providers in evidence-based mental health practices.
2. Enterprise-wide quality measures.
3. Clinical practice guidelines and mandates for evidence-based care.
4. National electronic health information system.
5. Mental health care coordinated in multidisciplinary teams.

We focus on improving implementation of evidence-based psychotherapy for depression and PTSD.

Depression	Posttraumatic Stress Disorder
Cognitive Behavioral Therapy (CBT)	Prolonged Exposure (PE)
Acceptance and Commitment Therapy (ACT)	Cognitive Processing Therapy (CPT)
Interpersonal Processing Therapy (IPT)	

And, evidence-based pharmacotherapy for alcohol use disorder (AUD), depression, and OUD.

Alcohol Use Disorder	Depression	Opioid Use Disorder
Acamprosate	Anti-depressant medications	Buprenorphine
Disulfiram		Methadone
Naltrexone		Naltrexone
Topiramate		

VAPOR

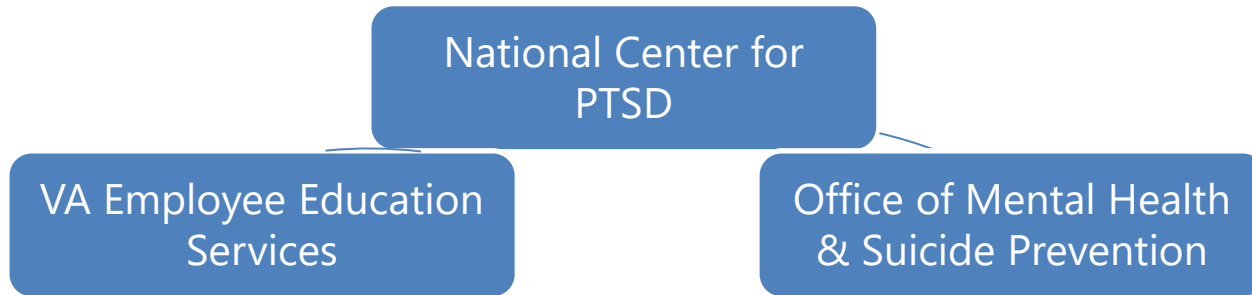
Veterans Affairs Partnership

Our first step was to co-establish an ongoing Veteran advisory board comprised of certified peer support specialists.

"So, when I meet veterans in crisis, veterans in need, I'm always offering some information to them and I love to provide resources, I love because again that disconnect is something I experienced. After 26 years, things didn't fit right, so I find myself instead of isolating, I would look for other alternatives that would fill those voids until I got what I needed."

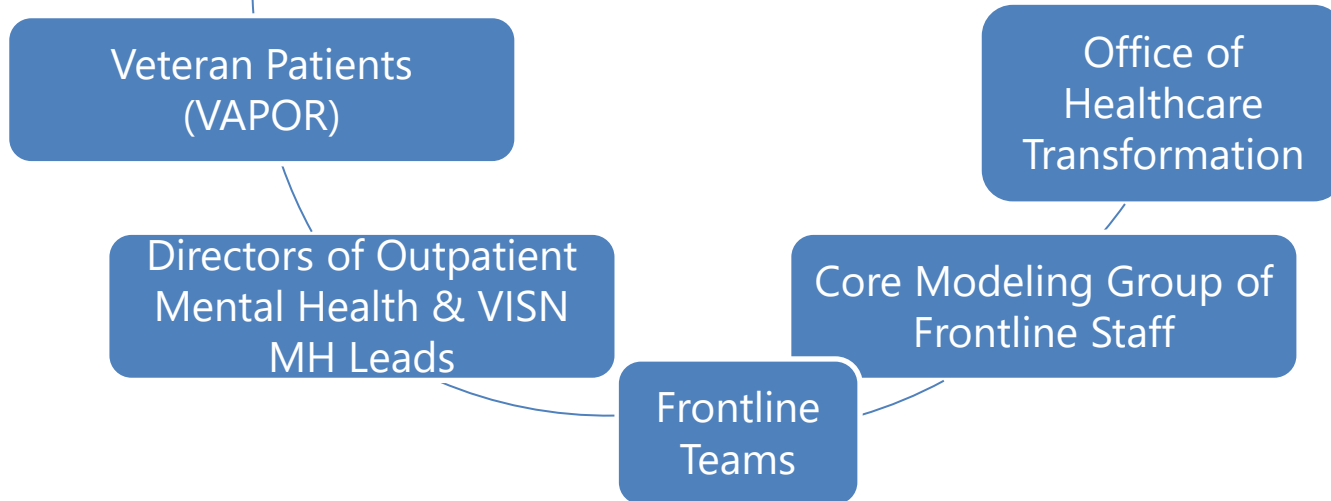


<https://mtl.how/videos>

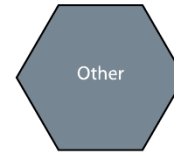
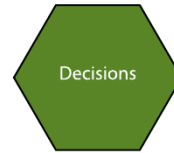
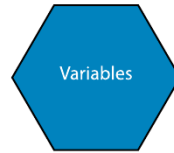
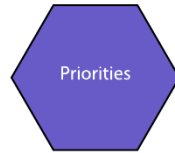


OUR STAKEHOLDERS

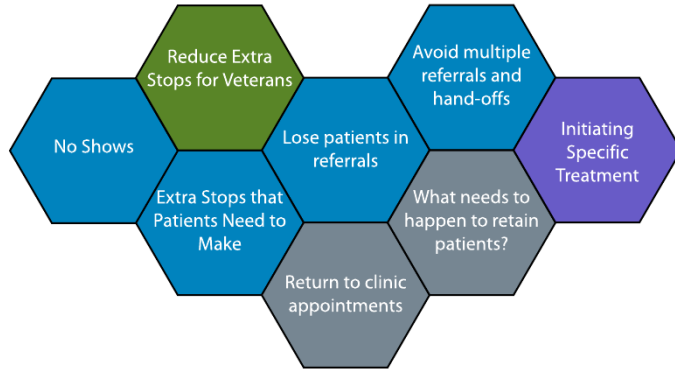
VA policy-makers, patients, and providers from psychiatry, psychology, social work, nursing & certified peer support specialists



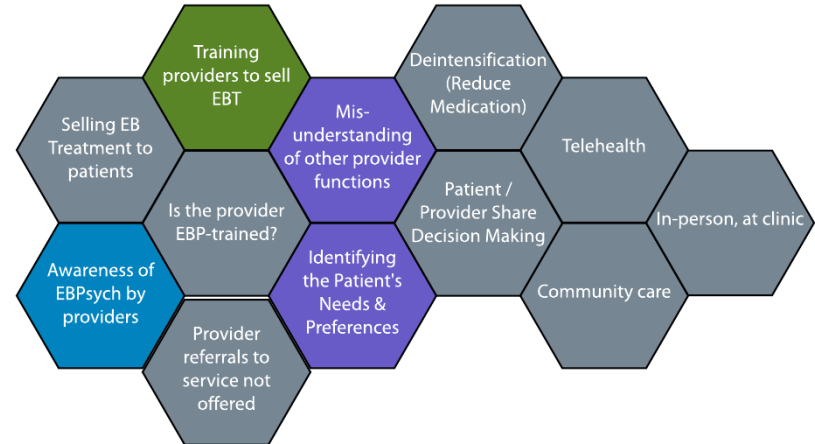
We used the hexagons exercise to explore stakeholder convergence & divergence.



Care Coordination Process



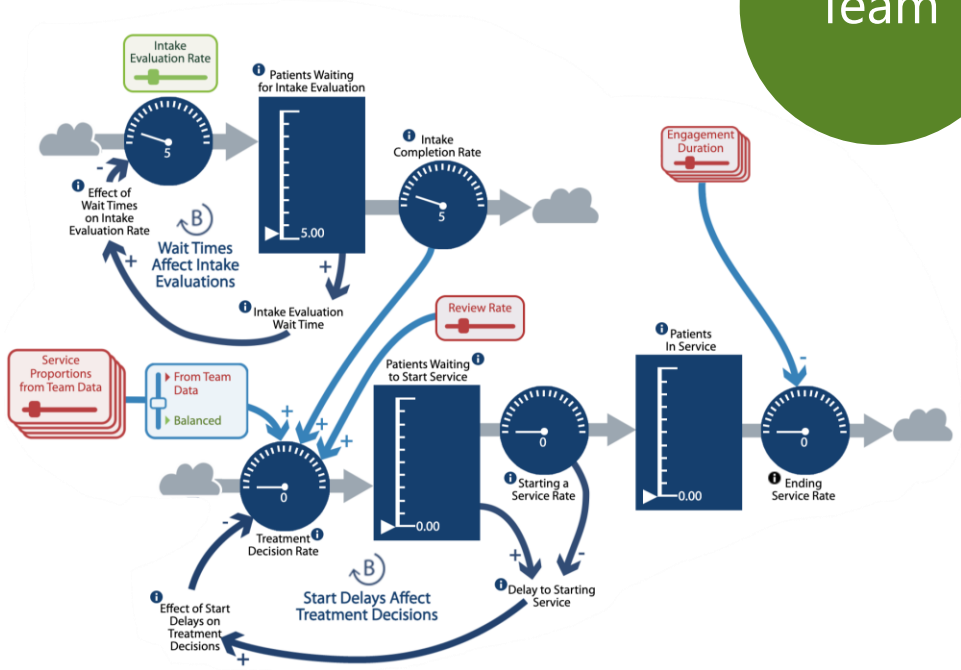
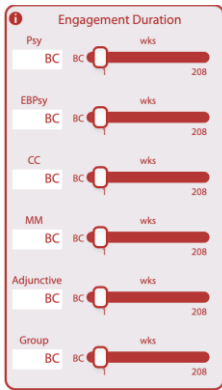
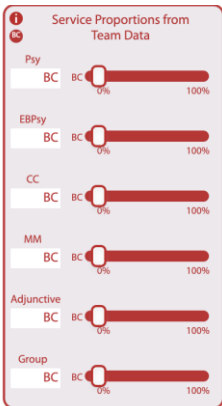
Provider Capacities and Constraints



Participatory infrastructure supports the decision-makers least supported before this work.



Team Data			
New Patient Start Rate (mean)			24.27 (pts/wk)
Appointment Supply (median) (Psy)			41 (hrs/wk)
Appointment Supply (median) (EBPsy)			16 (hrs/wk)
Appointment Supply (median) (CC)			2 (hrs/wk)
Appointment Supply (median) (MM)			12 (hrs/wk)
Appointment Supply (median) (Adjunctive)			13 (hrs/wk)
Appointment Supply (median) (Group)			1 (hrs/wk)
Appointment Supply (median) (Intake)			5 (hrs/wk)
Appointment Supply (Total)			90 (hrs/wk)
True Missed Appointment %	Return Visit Interval (median) (wks)	Engagement Duration (median)(wks)	Service Proportions from Team Data %
Psy	16	107	43
EBPsy	1	15	13
CC	11	44	13
MM	20	119	35
Adjunctive	14	38	40
Group	2	14	8



Local clinic strategies are needed to address local differences.

Clinic 1	Clinic 2
3548 unique patients/year	2043 unique patients/year
Lower caseload per provider	Higher caseload per provider
Rare wait for initial appointment	Occasional waitlist to get into clinic
5.2 psychiatrists per 9 EBPsy providers	3.0 psychiatrists per 4 EBPsy providers
Higher EBPsy providers/MD ratio	Lower EBPsy provider/MD ratio
Higher EBPsy base rate	Higher EBPharm base rate
Providers often self refer for EBPs	Referrals to other providers by necessity
Multiple on-site specialty programs	Only telehealth specialty care
Training program site multiple disciplines	No trainees providing care
Most groups "open" (ongoing enrollment)	Most groups "closed" (infrequent opening)
Shorter time to next available appointment	Longer time to next available appointment

“What data sources are standard across settings?”

Team Data			
Appointment Supply (75th percentile) (appt/wk)	49		
New Patient Start Rate (pts/wk)	2.96		
AUD within 3 Months %	0	PTSD within 3 Months %	93
DEP within 3 Months %	3	OUD within 3 Months %	0

First 3 Months			
Patient Flow		Engagement Duration (wks)	Return-To-Clinic Visit Interval (wks)
Starters who Initiate %	79	Always 1 week	N/A
Starters who Return Later %	11	See table below	See table below
Starters who Quit %	10	Always 1 week	N/A
Initiators who Complete %	40	9	1
Initiators who Return Later %	44	See table below	See table below
Initiators who Quit Early %	16	2	2
Completers who Graduate %	4	2	1
Completers who Return %	96	See table below	See table below

Red =

- Read in from existing team data
- Standardized

We developed a secure website for reviewing team trends over time.



BISL

PTSD_OMHO

[Drill Down To Your Team](#)

[Request New Team Folder](#)

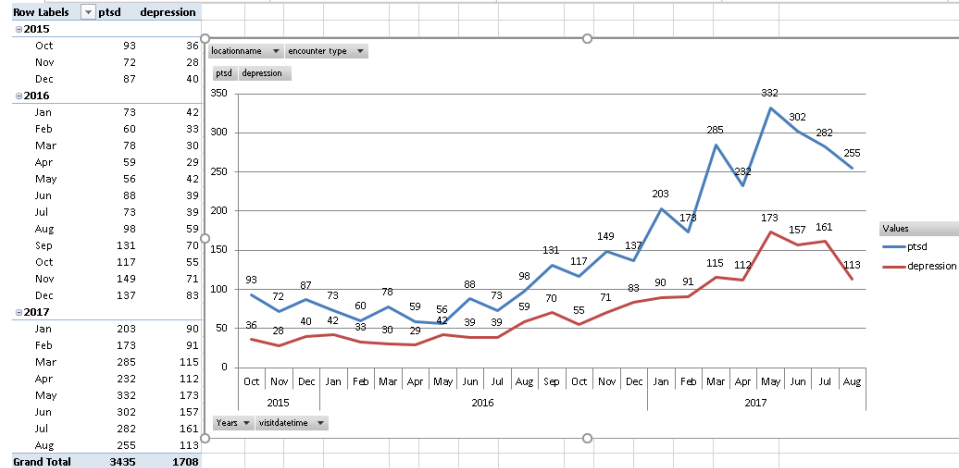
[Request Team Membership Change](#)

PTSD_OMHO

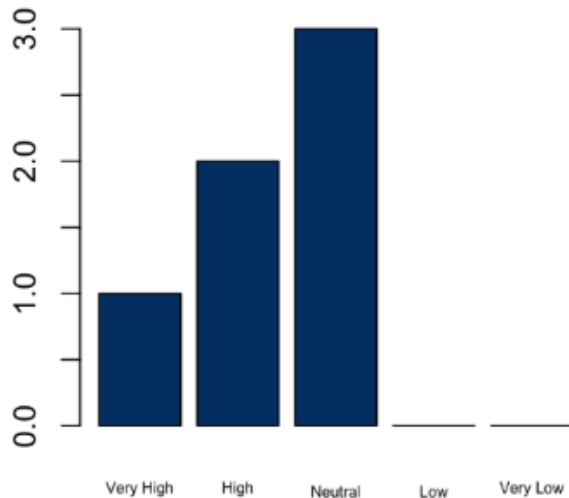
- Pages
- Administrative
- User Guide
- Contact Us
- Site Contents

Select Your VISN

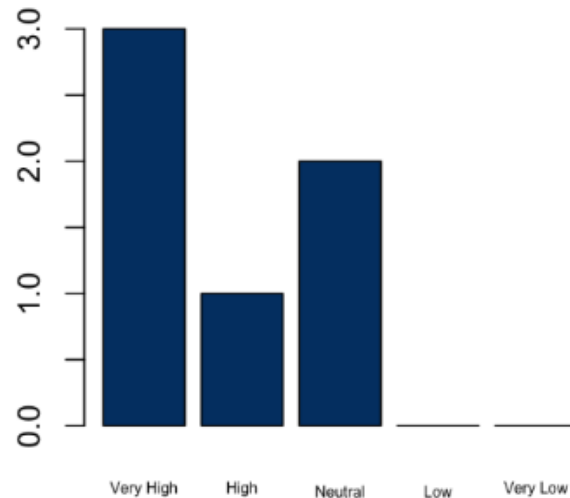
VISN 1	VISN 2	VISN 4	VISN 5	VISN 6
VISN 8	VISN 9	VISN 10	VISN 12	VISN 15
VISN 17	VISN 19	VISN 20	VISN 21	VISN 22



Suicide Prevention - How to manage high risk patients.



Stepped Care - How to decide when to step patients up to specialty care.



 **Session**

Join Current Session

Suicide Prevention -- Week 104
583ge_wl_bhip2_2019_04_14.xlsx

 **Play**

Start a New Session

- Care Coordination
- Medication Management
- Psychotherapy
- Aggregate
- Suicide Prevention

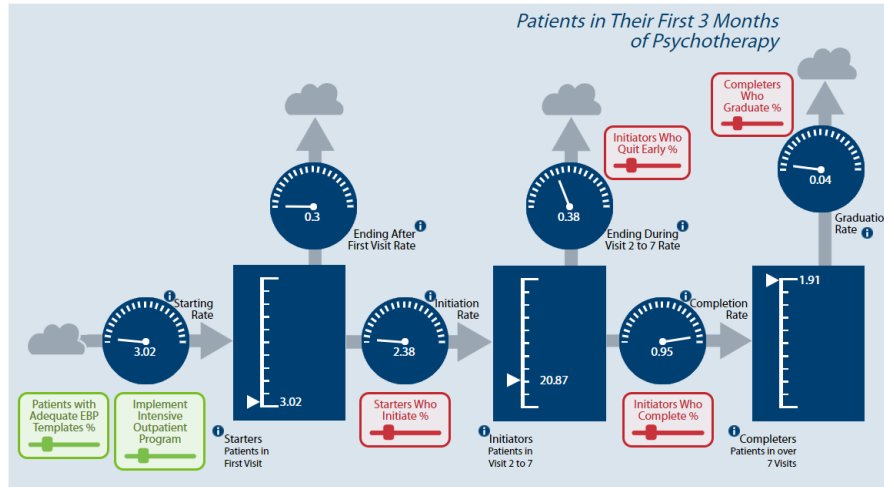
Stakeholders typically converge and diverge in their understandings of the implementation problem.

Red =

- Read in from existing team data
- Standardized

Team Data			
Appointment Supply (75th percentile) (appt/wk)	49		
New Patient Start Rate (pts/wk)	2.96		
AUD within 3 Months %	0	PTSD within 3 Months %	93
DEP within 3 Months %	3	QUID within 3 Months %	0

First 3 Months			
Patient Flow	Engagement Duration (wks)	Return-To-Clinic Visit Interval (wks)	
Starters who Initiate %	79	Always 1 week	N/A
Starters who Return Later %	11	See table below	See table below
Starters who Quit %	10	Always 1 week	N/A
Initiators who Complete %	40	9	1
Initiators who Return Later %	44	See table below	See table below
Initiators who Quit Early %	16	2	2
Completers who Graduate %	4	2	1
Completers who Return %	96	See table below	See table below



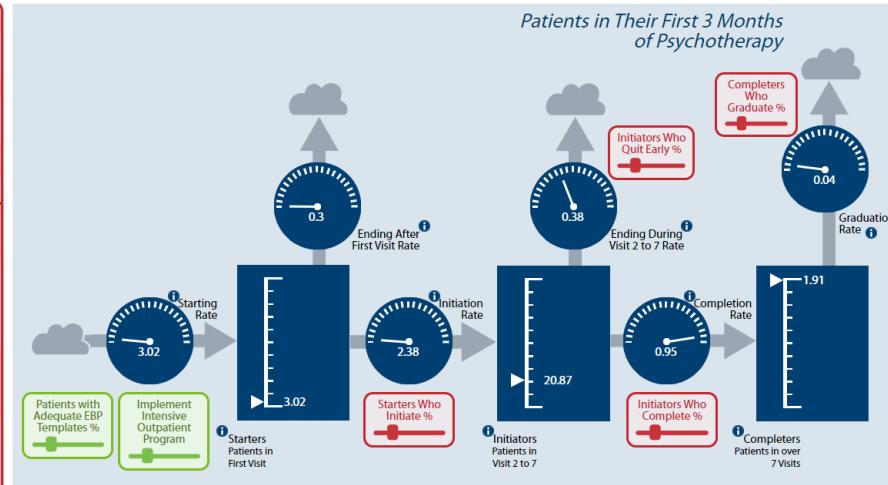
Team Question: How can we get more patients through a full course of high-quality psychotherapy *when they start*?

Red =

- Read in from existing team data
- Standardized

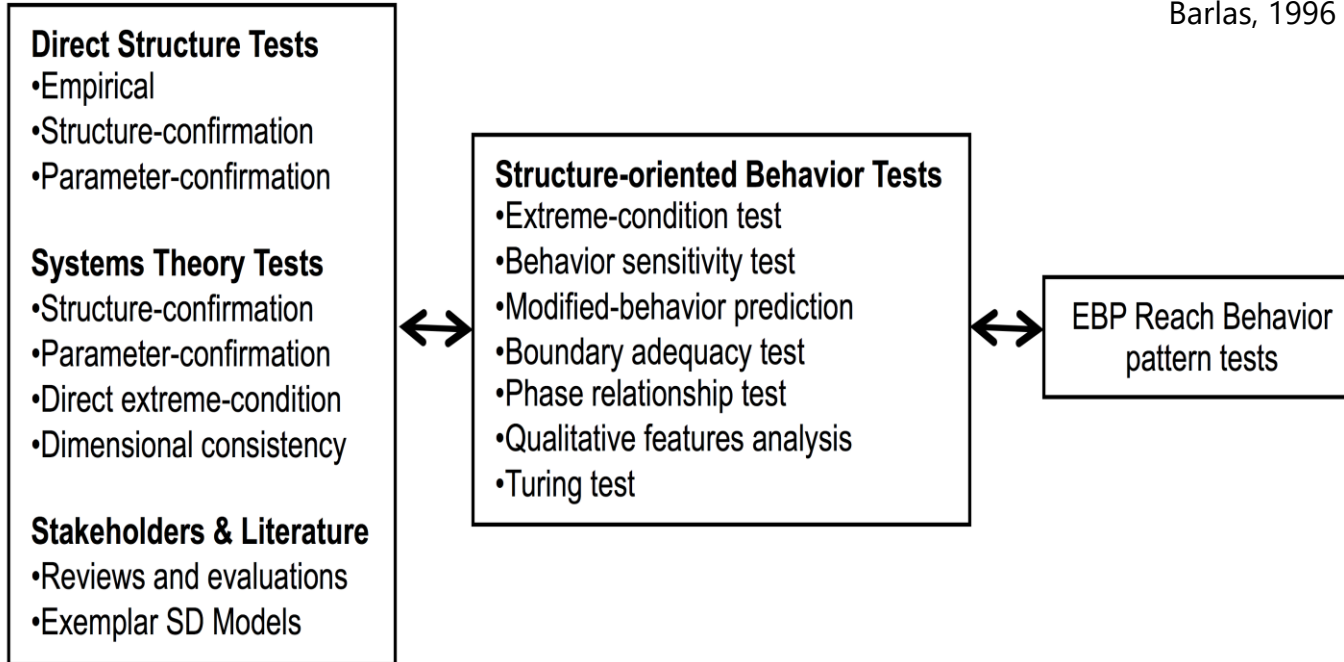
Team Data			
Appointment Supply (75th percentile) (appt/wk)	49		
New Patient Start Rate (pts/wk)	2.96		
AUD within 3 Months %	0	PTSD within 3 Months %	93
DEP within 3 Months %	3	QUID within 3 Months %	0

First 3 Months			
Patient Flow	Engagement Duration (wks)	Return-To-Clinic Visit Interval (wks)	
Starters who Initiate %	79	Always 1 week	N/A
Starters who Return Later %	11	See table below	See table below
Starters who Quit %	10	Always 1 week	N/A
Initiators who Complete %	40	9	1
Initiators who Return Later %	44	See table below	See table below
Initiators who Quit Early %	16	2	2
Completers who Graduate %	4	2	1
Completers who Return %	96	See table below	See table below



We achieved saturation during structural behavioral validity testing.

Barlas, 1996



STRUCTURE

BEHAVIOR

We co-developed a national quality improvement initiative that enlists point of care participatory learning from system dynamics simulations.

NIH R21 DA042198
(PI Zimmerman)

Modeling to Learn

Test. Don't guess.

Virtual Facilitation

Transparent
Local Data

Real-time
Simulation

1. Equitable access to resources.
2. Mutual learning.
3. Shared decision-making.

Modeling to Learn offers FREE licensure credit for psychiatry, psychology, social work and nursing & certified peer support specialists.

For papers, slide decks, videos and a demonstration simulation go to mtl.how/demo.

Free and open science guides to the *Modeling to Learn* program are available at mtl.how.



Participatory Learning to develop Systems Thinking.

mtl.how

MTL Fidelity Checklist for 12-session Plan

Session Summaries across MTL Modules

tt
Partner

session 01. Today we're *modeling to learn* how to align our **team vision**.

session 02. Today we're *modeling to learn* how to check our **patient data** and **team trends**.

session 03. Today we're *modeling to learn* how to produce **team data** for simulation.

session 04. Today we're *modeling to learn* how to prioritize **team needs**.

session 05. Today we're *modeling to learn* how to log-in to our **team world**.

tt
Build

session 06. Today we're *modeling to learn* how to tell a **systems story**.

session 07. Today we're *modeling to learn* how to evaluate our **base case** of no new decisions.

session 08. Today we're *modeling to learn* how to test a **dynamic hypothesis**.

tt
Apply

session 09. Today we're *modeling to learn* how to **compare alternatives**.

session 10. Today we're *modeling to learn* how to use **systems thinking**.

session 11. Today we're *modeling to learn* how to make future **team decisions**.

session 12. Today we're *modeling to learn* how to turn **team learning** into a **team plan**.

Accredited session videos are available at mtl.how.

mtl.how

tt

Partner

tt

Build

tt

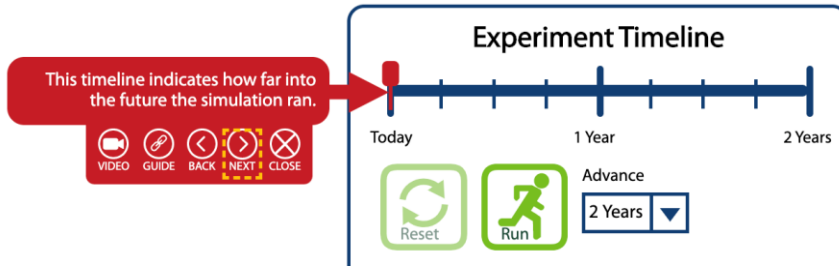
Apply



Modeling to Learn 2.0 – Scaling community resources.

MTL Tutor

MTL Community of Practice



- I have an idea
- I like something
- I have a question

[privacy statement](#)



Modeling to Learn

Test. Don't guess.

Modeling to Learn is a Community.
Join us to participate as a learner,
designer or researcher.

[Join Us](#)



MTL Live Session 06

Today we're modeling to learn how to tell a systems story.

Done and Do (15 minutes)

The screenshot shows two side-by-side panels. The left panel is titled 'Done' and shows a system diagram with the text: 'mtl how/sim We logged in to mtl.how/sim and reviewed the "I" information in the Model Diagram and Experiments section. mtl how/sim We logged in to mtl.how/sim and reviewed the "I" information in the Model Diagram and Experiments section. MTL 2.0. For MTL 1.7, click here'. The right panel is titled 'Do' and shows a similar system diagram with the text: 'mtl how/sim We will tell a systems story about the team's top priority using the Model Diagram in the sim UI. mtl how/sim We will tell a systems story about the team's top priority using the Model Diagram in the sim UI. MTL 2.0. For MTL 1.7, click here'.

What issue would you like to report?

Refreshing text for experiments....

I have a screenshot

[Submit](#)

**Innovative wisdom with a copyleft, free and open license.
Modeling to Learn (VHA OGC Invention #2020-130)**



Look before you leap.



Measure twice cut once.



Story 3:

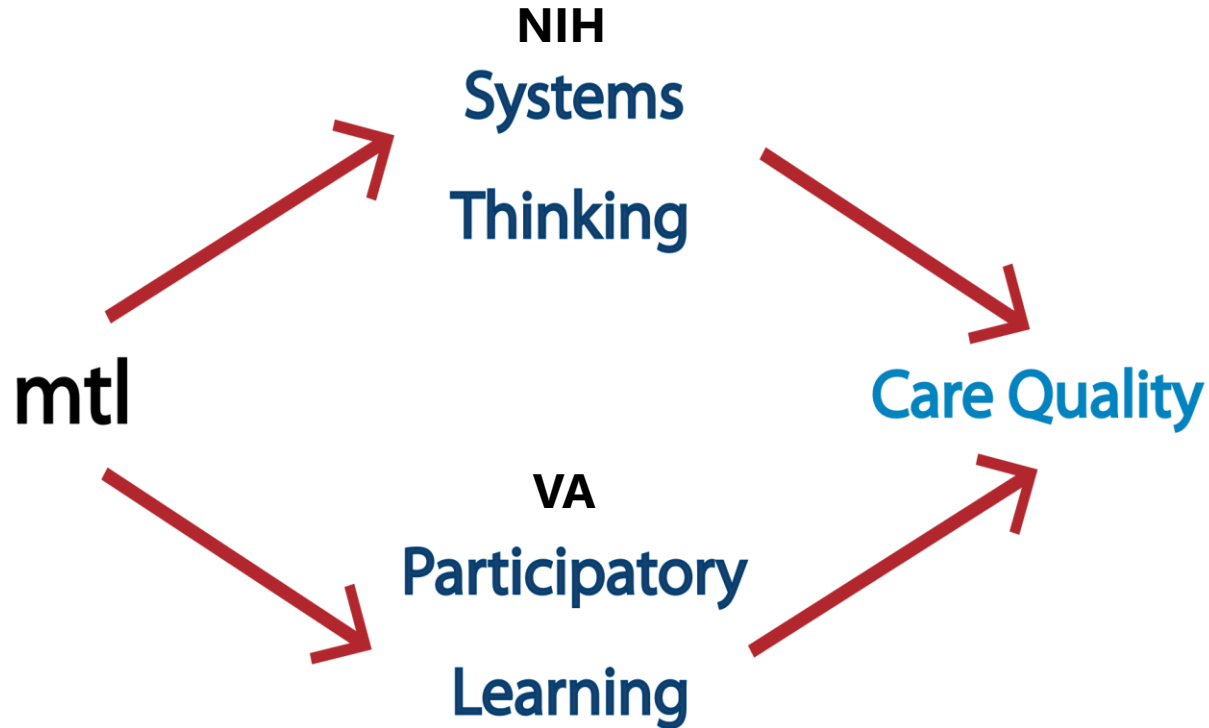
The physics problem: Upgrading our mental models is hard, because our problems change over time.

“The task...in an interdisciplinary team working on the thematic universe revealed by their investigation is to “re-present” that universe to the people from whom [they] first received it – and “re-present” it not as a lecture, but as a problem.”

- Paulo Freire, *Pedagogy of the Oppressed*

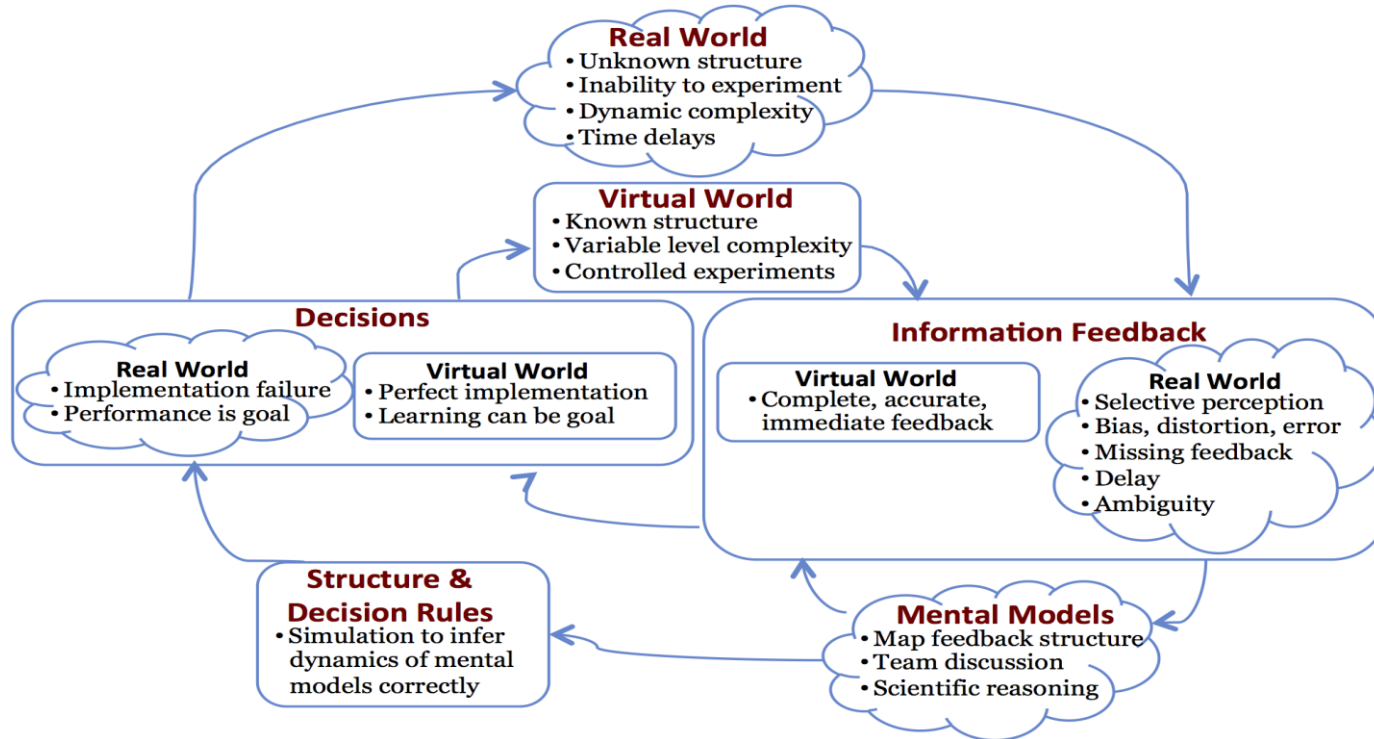
Modeling to Learn

Theory of Change



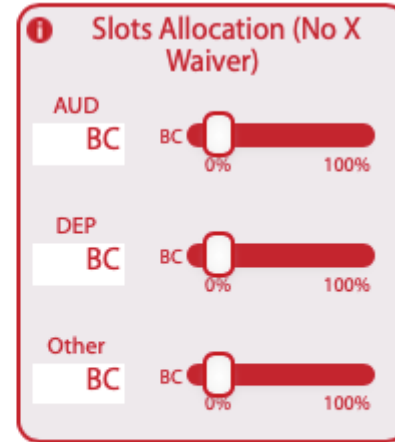
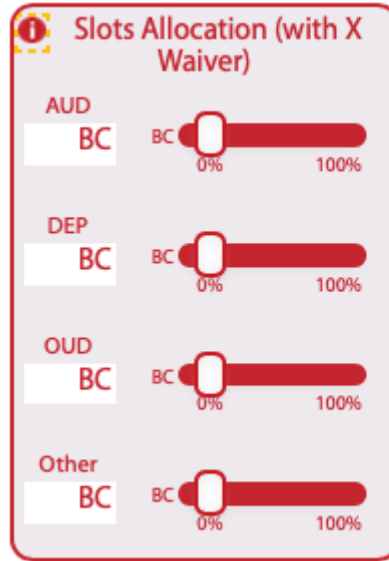
Why is Modeling to Learn effective?

Two Causal Theories: Systems and Decision Science



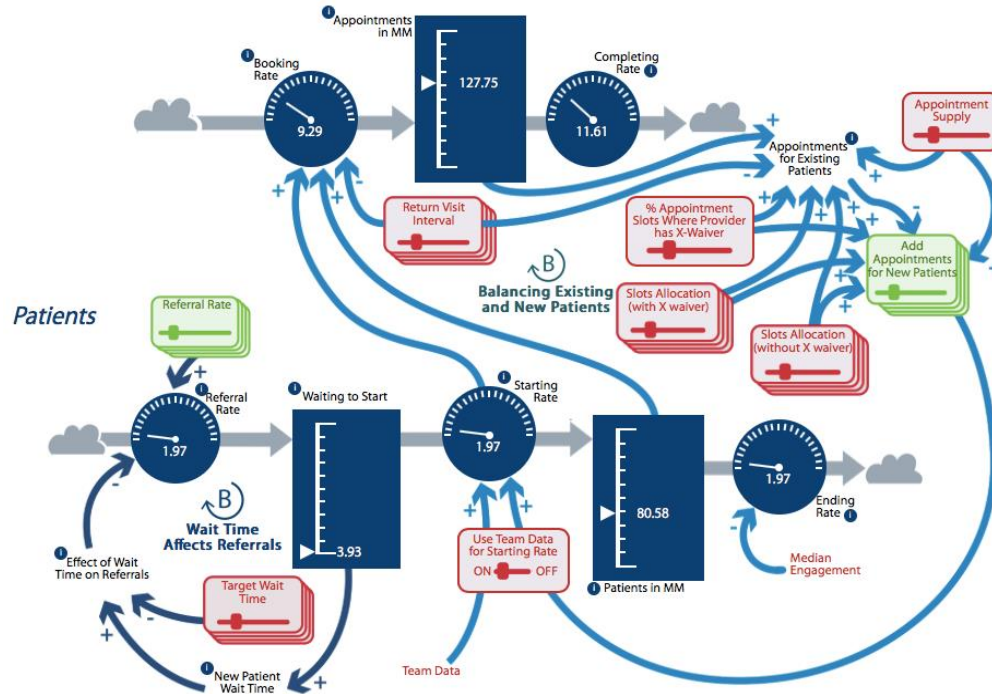
Modeling to Learn facilitates participatory learning and improves systems thinking about complexity, feedback, and change over time.

Not all medication management staff resources are the same.



Hypothesis about Re-allocating X-waiver slots:

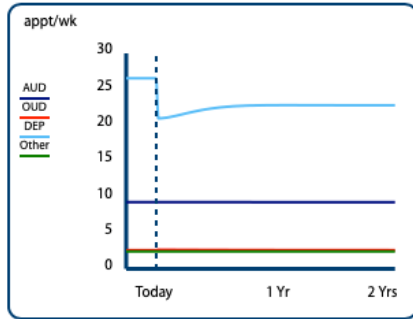
- we could start more patients with OUD on EBPharm
- but we expect more patients with depression and AUD will be waiting to start than in the base case.



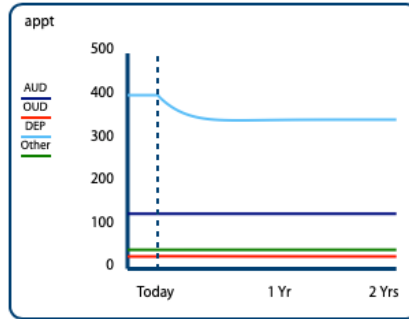
Red =

- Read in from existing team data
- Standardized

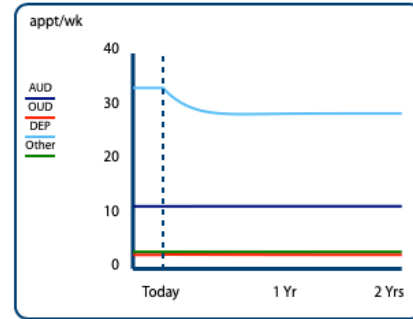
Re-allocating 20% of x-waivered slots from patients w/depression to patients w/OUD levels out over time.



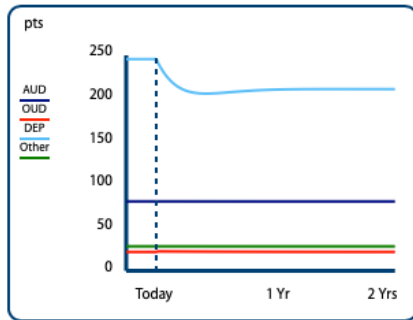
Booking Rate



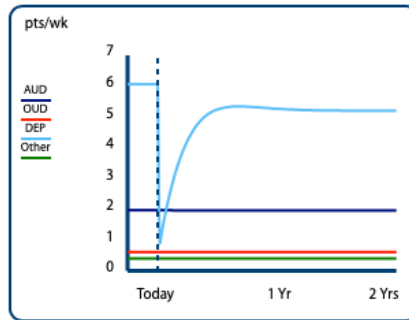
Appointments in MM



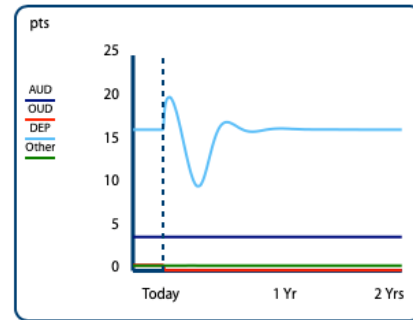
Completing Rate



Patients in MM

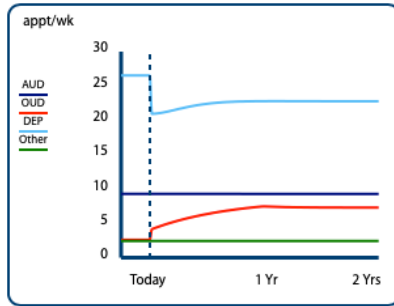


Start Rate

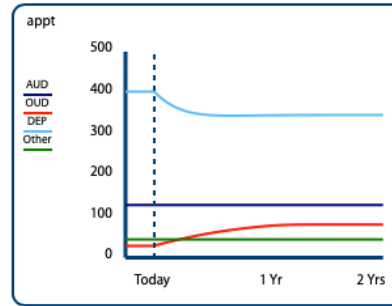


Waiting to Start

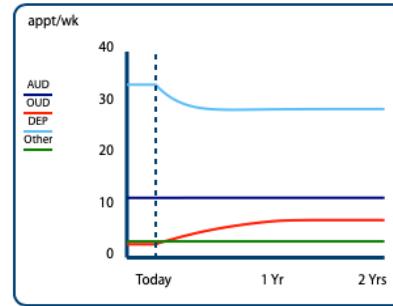
With two new referrals each week we can triple the number of patients with OUD in our team who receive EBPharm over the next two years.



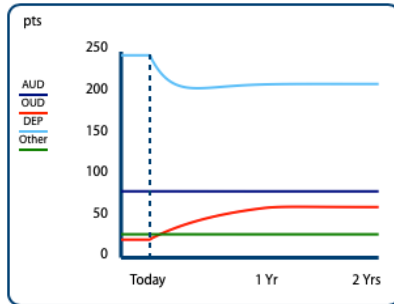
▼ Booking Rate



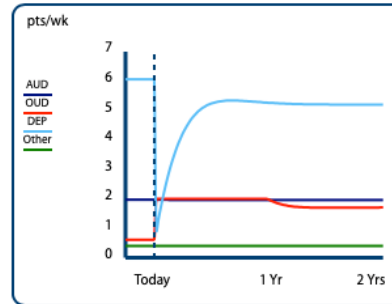
▼ Appointments in MM



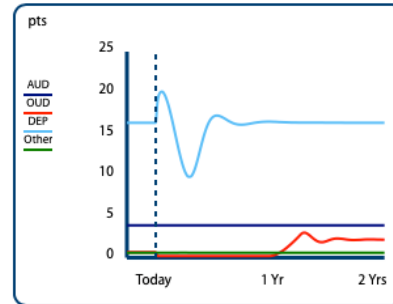
▼ Completing Rate



▼ Patients in MM



▼ Start Rate



▼ Waiting to Start

***MTL* focuses on learning among frontline teams making EBP-related care decisions.**

Drawn from Hovmand 2014 & Scaccia et al., 2015

Scientific Model	Problem	Why problems persist
General Capacity	Learning	Stakeholders cannot or do not learn and adapt to their situation.
	Coordination	Conflict or lack of stakeholder consensus.
EBP Specific Capacity	Analysis	Policies are inconsistent with the real system constraints.
	Restructuring	The underlying structure of the system prevents workable solutions.

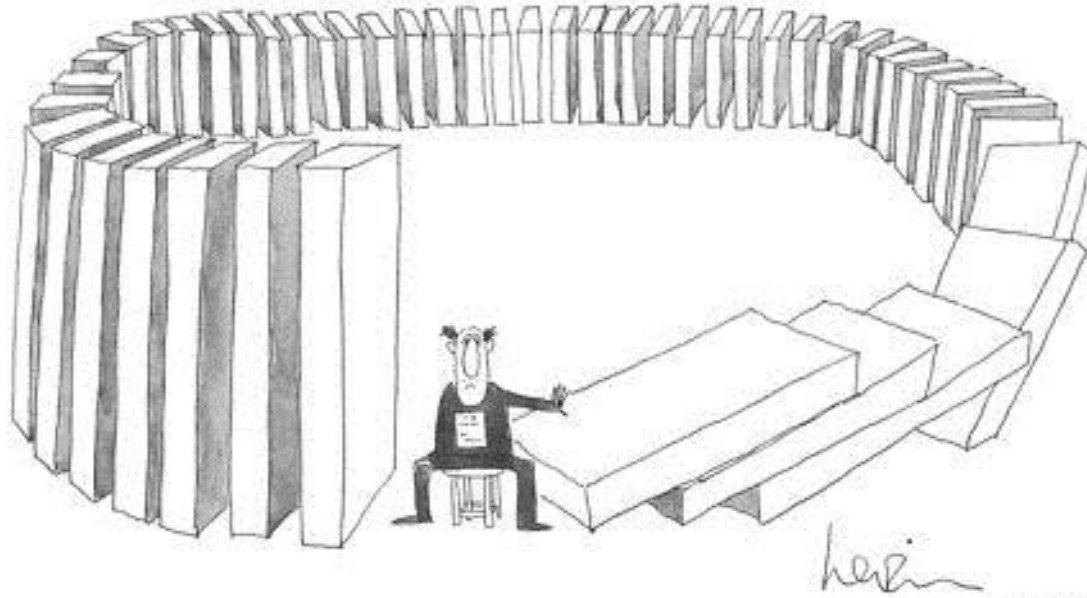


Consider the physics of your problem:

Our models conserve staff time a common constraint that changes locally over time.

Decisions based on *Modeling to Learn* experiments:

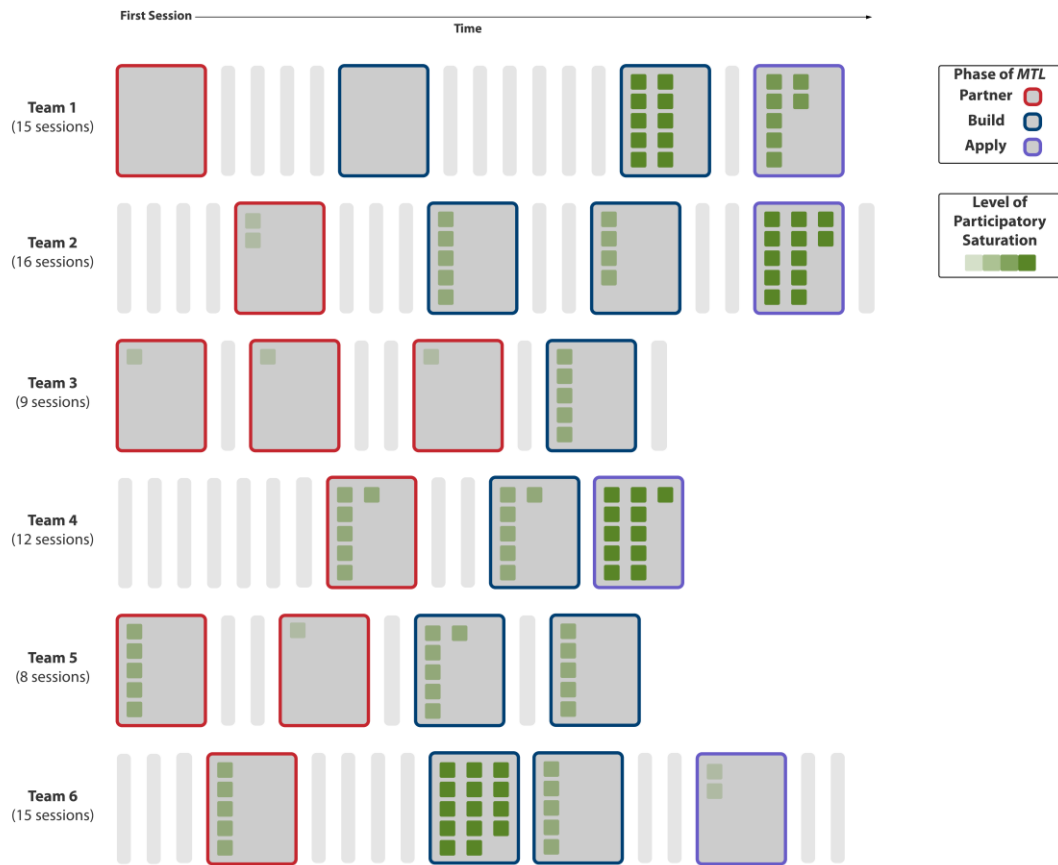
Something that we think is outside of our control may actually be the accumulated result of our own decisions.



MTL fidelity to increasing participatory learning among frontline teams making care decisions.

Clear Engagement	Establish relationships, build trust, and create processes for action.
Partner for Change	Recognize the need to partner to create change and improvement.
Transparency	Be clear about the purposes or goals of this improvement effort.
Local Control	Make VHA data resources in this effort transparent. Support greater understanding and local team control over use of VHA data.
Build Capacities Strengths	Seek to support the team's existing capabilities to best use local team resources and make local decisions.
Shared Decision Making	Support shared team decisions in this project.
Local Synergy	Recognize local challenges for this team and identify good solutions.
Shared Understanding	Are clear and share understanding of the problems they are trying to address.
Team Priority	Project is emphasizing what is important to this team.
Consensus Building	Even though the team did not have total agreement, they did reach a kind of consensus that they all accept.
Workable Solutions	Co-develop strategies likely to work for this team. Oetzel et al., 2018 ⁵³

R21 team notes: Participatory constructs per team meeting over the partner, build, and apply phases.



MTL fidelity to increasing systems thinking among frontline teams making care decisions.

Systems Thinking	Definition
Complex	Forest not trees. Relationships among two or more variables (wait times, improvement rate), or two or more settings (primary care, general mental health).
Feedback	Loop not line. Not simple cause and effect. The end of the story often influences the beginning, and is strengthened (reinforcing) or reduced (balancing) around the loop.
System Behavior	Movie not snapshot. Trends over time. Systems cause their own behavior through feedback.
Time	Short <i>and</i> long term. Better understanding of change over time (e.g., worse before better, better before worse).

R21 team notes: Level of systems thinking observed among frontline teams while modeling.



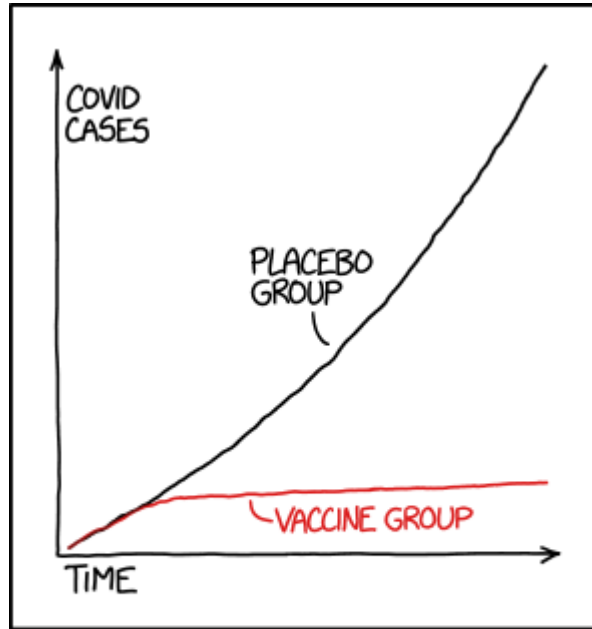
Why Participatory System Dynamics?

Story 1: We can do more harm than good.

Story 2: We must transcend our current minds through participatory learning.

Story 3: Under constant change mental upgrades may be facilitated by participatory modeling

What works to improve evidence-based practice reach?



xkcd.com

STATISTICS TIP: ALWAYS TRY TO GET DATA THAT'S GOOD ENOUGH THAT YOU DON'T NEED TO DO STATISTICS ON IT

Figure 1. VA Palo Alto Health Care System quality improvement p-charts (2015-2019): Evidence-based psychotherapy templates (%) among unique patients who had a clinic outpatient mental health visit each month.

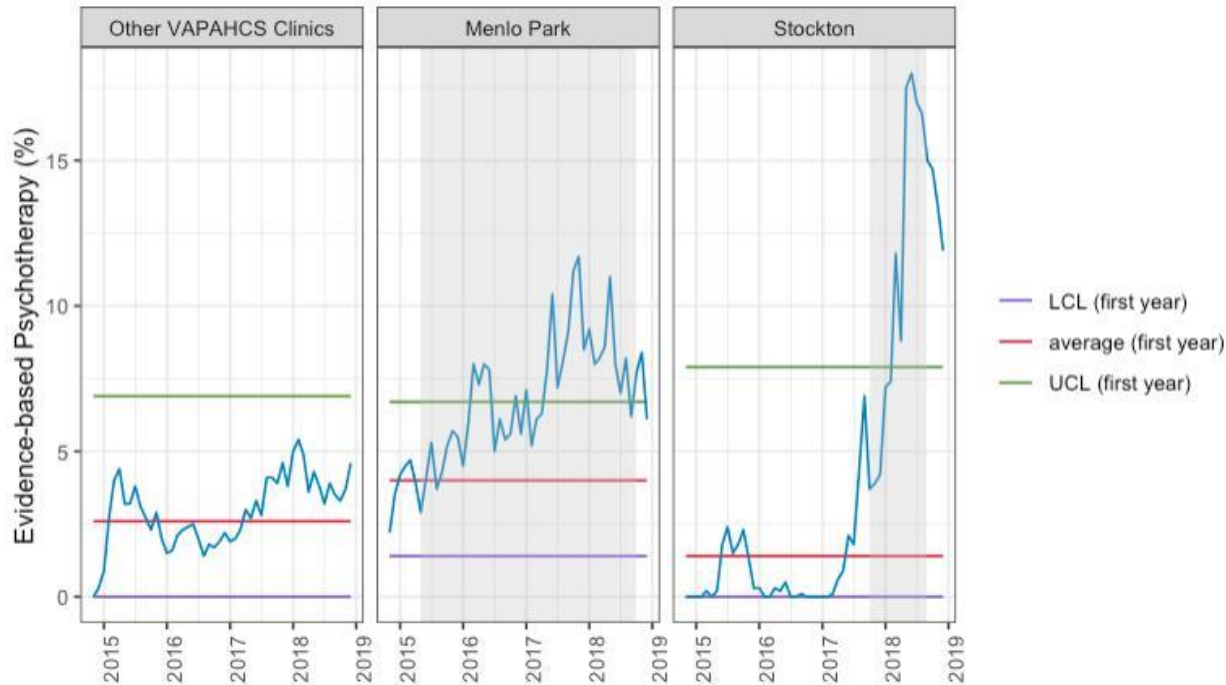
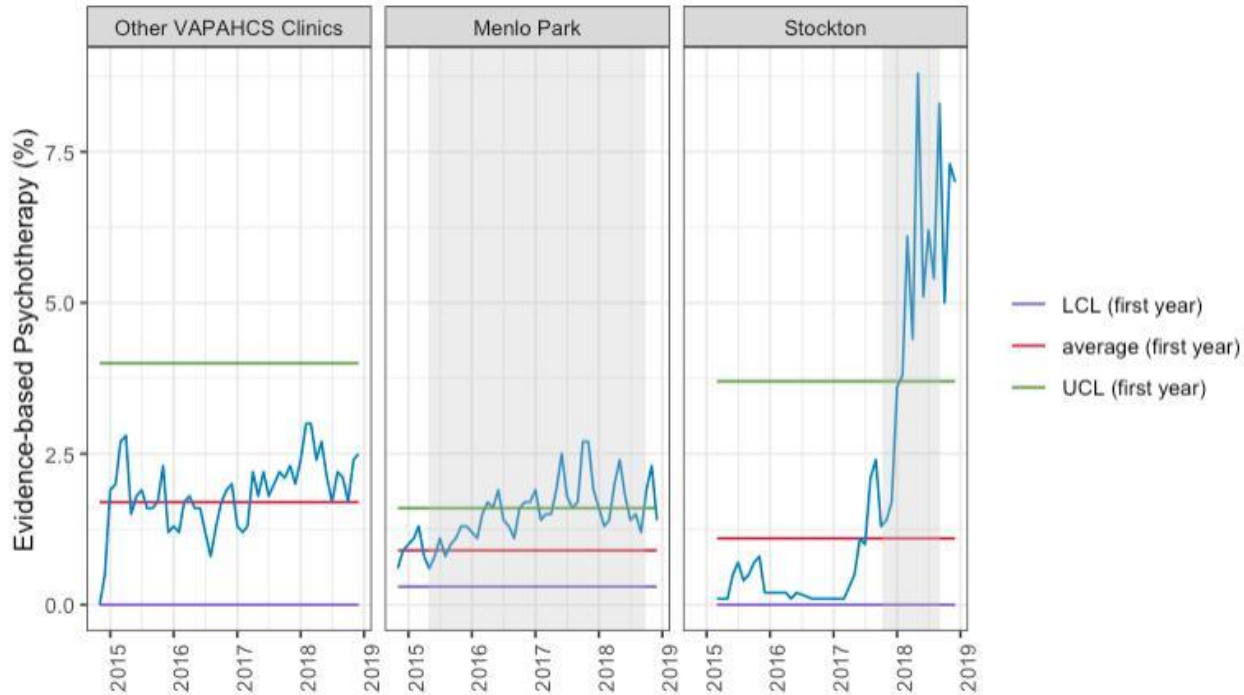


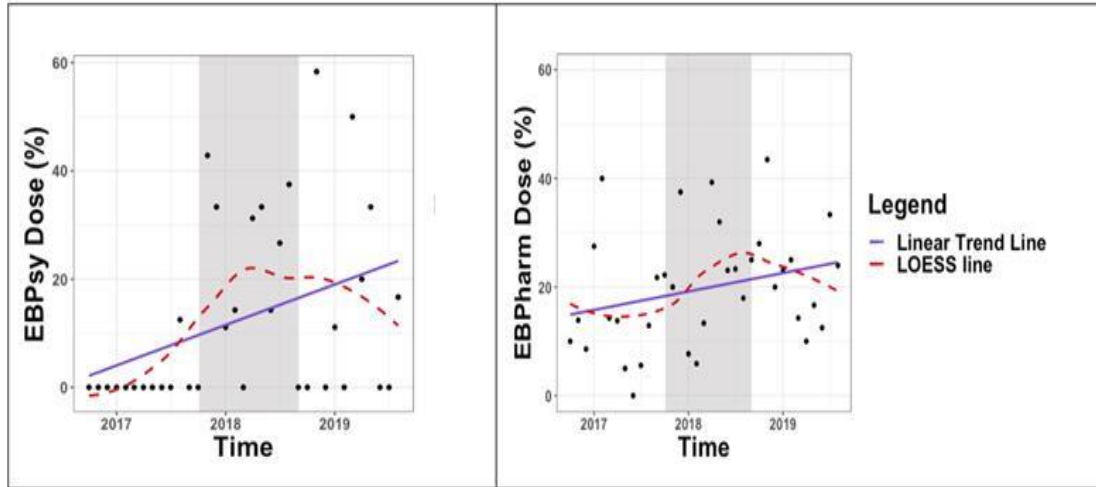
Figure 2. VA Palo Alto Health Care System quality improvement p-charts (2015-2019): Evidence-based psychotherapy templates (%) out of the total clinic mental health visits each month.



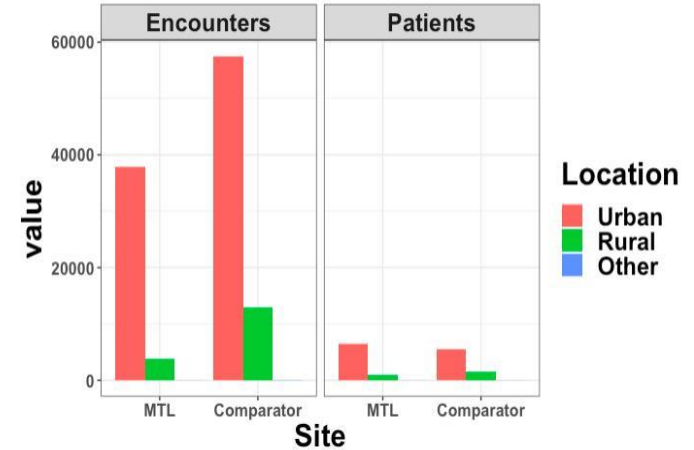
EBP Reach: *MTL* improved the therapeutic course/dose of both EBPsy and EBPharm over time.

EBPsy

EBPharm



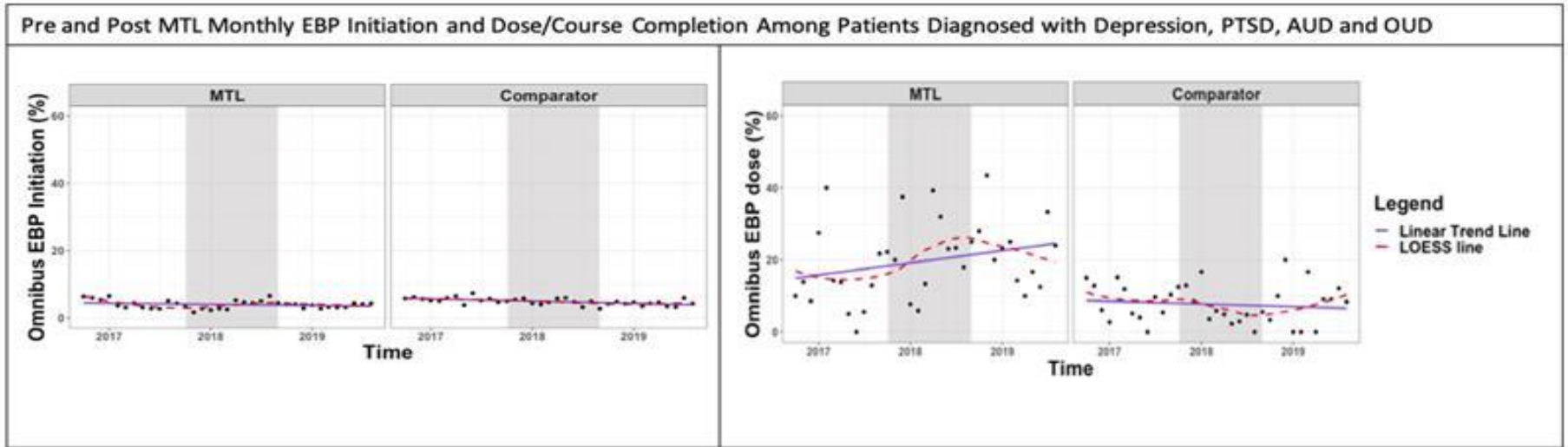
Urban/Rural



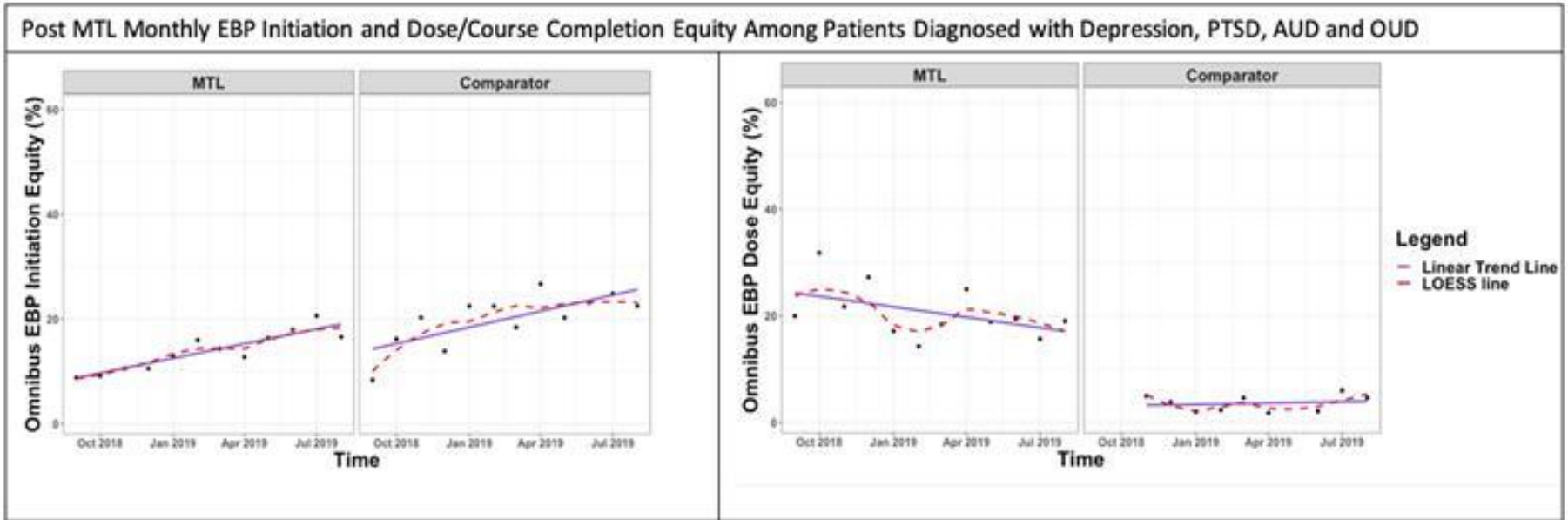
EBP Tradeoffs: Omnibus EBP Dose (EBPsy and EBPharm) improved with *Modeling to Learn* without compromising EBP initiation.

EBP Initiation

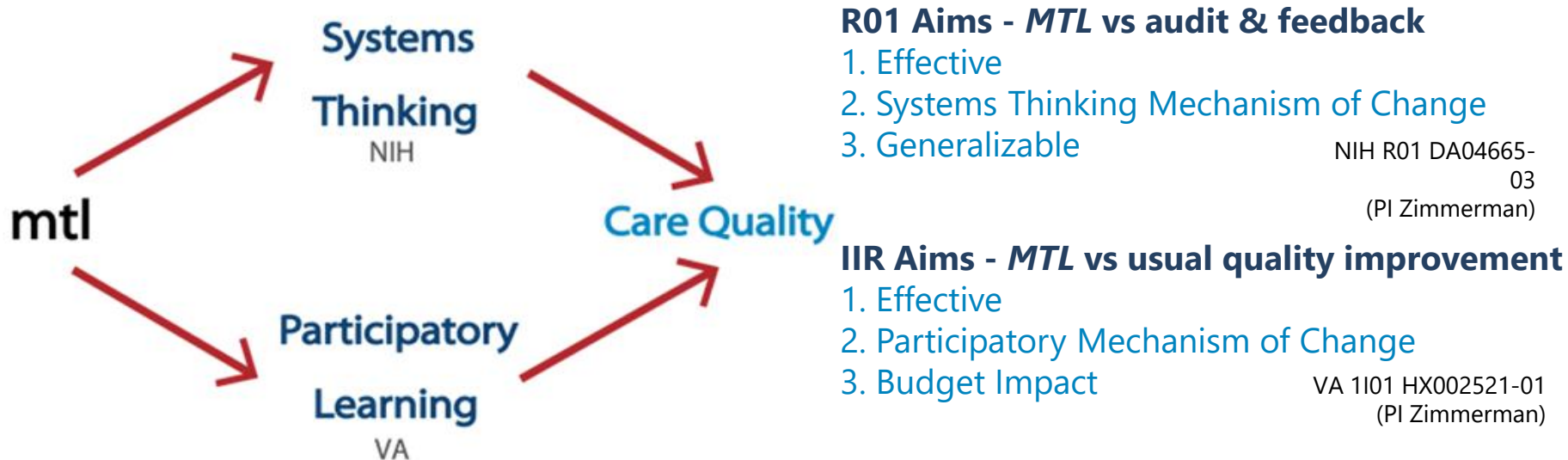
EBP Dose



EBP Equity: Omnibus EBP Dose was significantly higher among women Veterans, and Veterans of Color (EBP Equity) in our *Modeling to Learn* clinic as compared to our statistically matched comparator clinic.



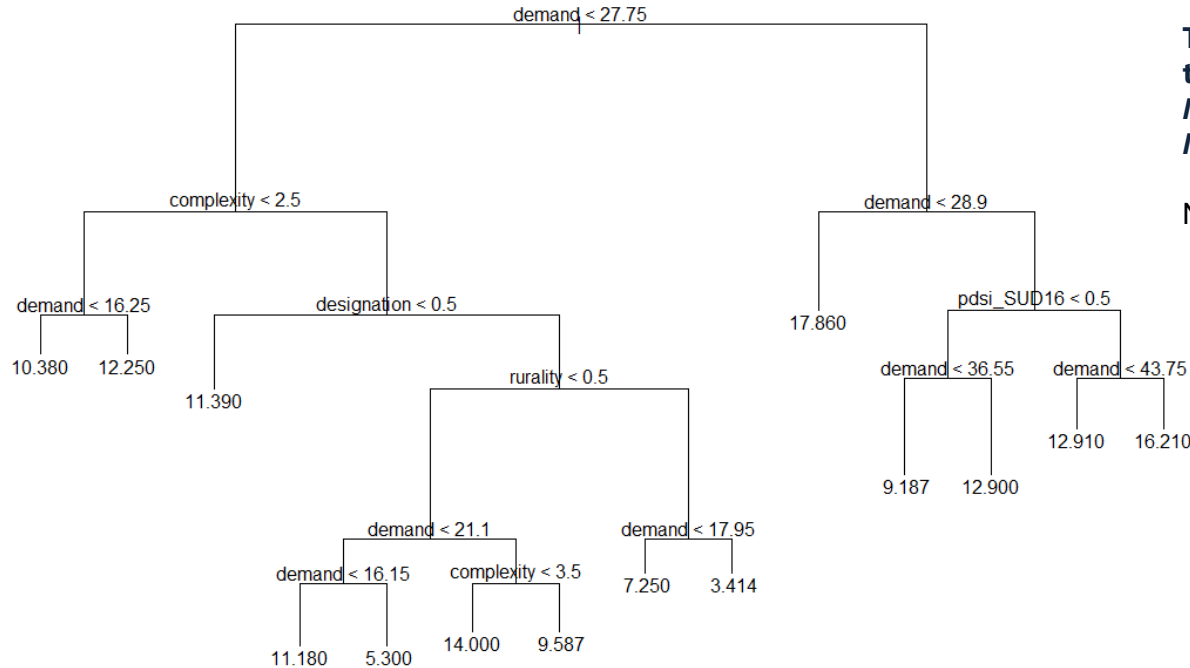
We lead large national multi-site cluster randomized trials of addiction and mental health care quality improvement.



We are replicating our *MTL* quality improvement approach with Hawaii Dept of Health.

SAMSHA 1H79 SM082961-01
(Consortium PI Zimmerman)

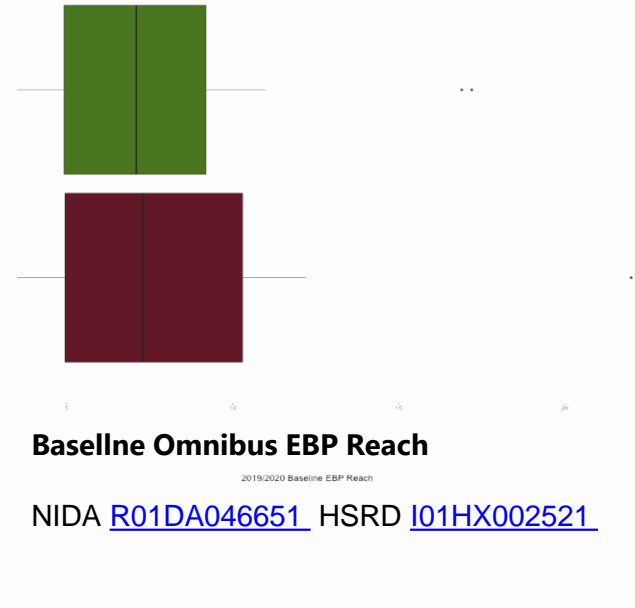
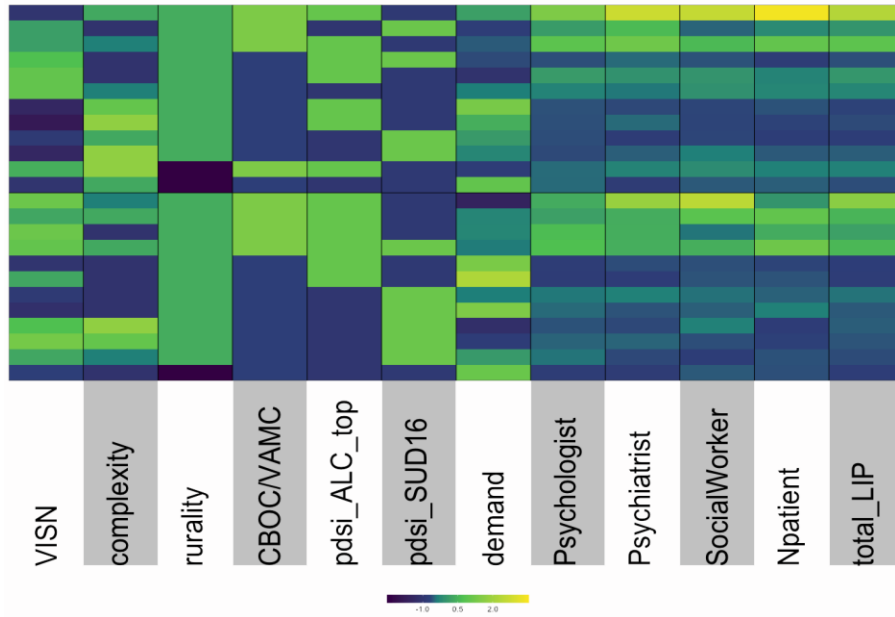
We used a random forest machine learning approach to evaluate baseline covariates and EBP reach. CBOC staff size and VAMC unique patient size to be the most important sampling and blocking.



Two phase III superiority cluster randomized trials.
MTL vs. Audit and Feedback (24 VAs)
MTL vs. Usual Quality Improvement (24 VAs).

NIDA [R01DA046651](#) HSRD [I01HX002521](#)

We used a modified stratified proportional sampling frame with a 2:1 Community Based Outpatient Clinic to VA Medical Center Ratio. We used stratified block randomization to parallel arms.



How we do participatory system dynamics?



How do my roles inform one another?

Lindsey Zimmerman, PhD, leads the Veterans Health Administration (VA) national quality improvement initiative, *Modeling to Learn*.

Lindsey Zimmerman, PhD, is Principal Investigator of NIH, VA and SAMSHA funded research that evaluates *Modeling to Learn* for increasing the reach of evidence-based health care among patient populations.

We strive to integrate Participatory Action and Research Cycles to avoid learning without action and innovation without inquiry.

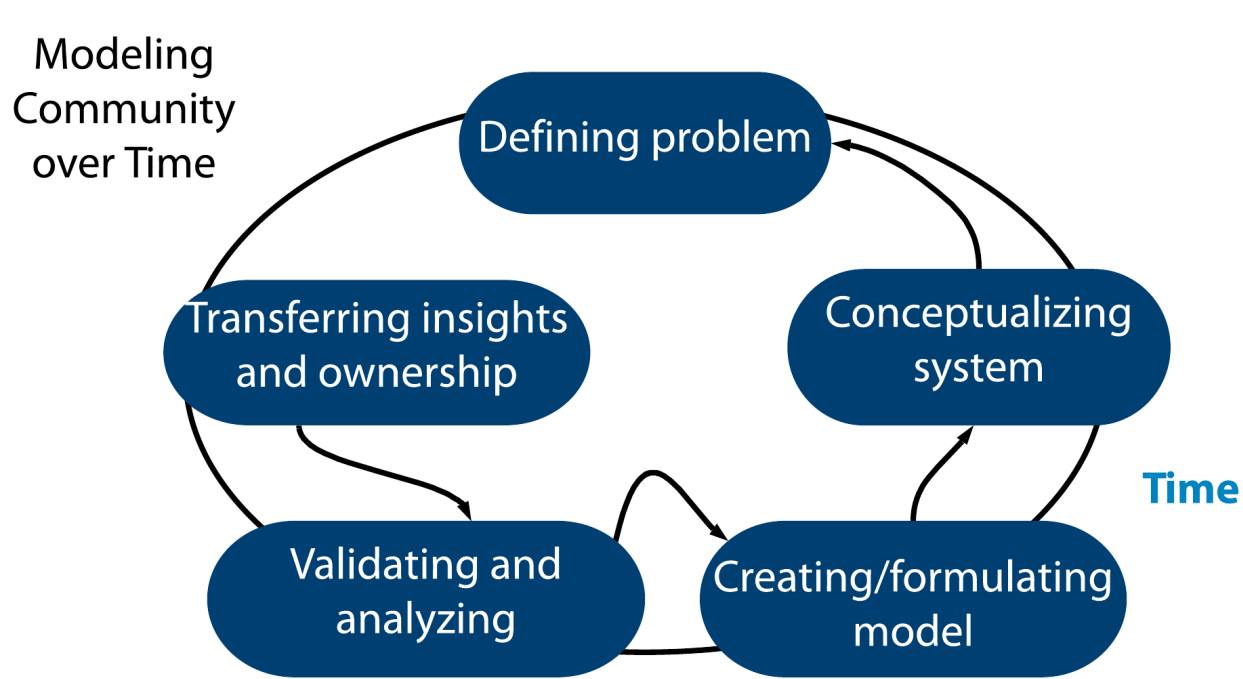
Action

1. Identify problems to solve and other opportunities, causal factors, environmental constraints and relevant practice.
2. Formulate proposed changes and the implementation plan.
3. Initiate changes in targeted areas.
4. Assess changes and implementation.
5. Deepen, institutionalize and diffuse change.

Research

1. Identify topic to study and review relevant knowledge.
2. Operationalize hypotheses.
3. Select sample to observe.
4. Select other research methods, gather data, and generate findings.
5. Derive and disseminate implications for theory and practice.

We are modeling to learn over time.



Hovmand, P. (2014). *Community Based System Dynamics*.

We locate our VHA implementation efforts in the following Implementation Science Frameworks.

	Framework	Construct(s)
Phase	EPIS Aarons et al. 2011	Implementation & Sustainment
Determinants	CFIR Damschroder et al., 2009	Process & Inner Context
Strategy	ERIC Powell et al., 2015	Multicomponent: External Facilitation, Data Review, Participatory Learning from Simulation
Mechanism	TMF Nilsen, 2015	Basic Theory: Decision Science & Systems Science
Outcome	Proctor et al., 2011 & Glasgow et al., 1999	Penetration or Reach (tradeoffs & time)

We locate our philosophy of science in the following epistemologies & methods.

	Scientific Tradition	Process/Method/Design
Epistemology		
Process	PAR Lewin, 1934 CBPR Wallerstein et al. 2018	Praxis of learning and reflection from creating change with communities.
Design	Empiricism & Experimentation	Quasi-Experimental, Cluster Randomized Trial
Method		
Data Collection & Analysis	Mixed Methods Creswell & Plano-Clark, 2018	Core designs for integrating QUAL + QUAN data
Data Collection & Analysis	System Dynamics, Sterman 2000 Group Model Building, 1996 Vennix Community Based System Dynamics, 2014	Establish structural behavioral validity of models through iterative modeling with stakeholders.

Anyone can go review and use all of *Modeling to Learn* models, guides and videos.



 **@LZPhD**

Lindsey Zimmerman, PhD

Office of Mental Health and Suicide Prevention

National Center for PTSD, Dissemination & Training Division

mtl.info@va.gov

mtl

mtl.how/demo

Course Code:
northwestern_psmg_2021

We use monthly agile design sprints coordinated across workgroups via GitHub/ZenHub to manage the scale of our project.

Team PSD Manual at mtl.how/teampsd_manual.

Team PSD Control Charts mtl.how/teampsd.

Chapter 3 Standard Operations

3.1 Team PSD

Team

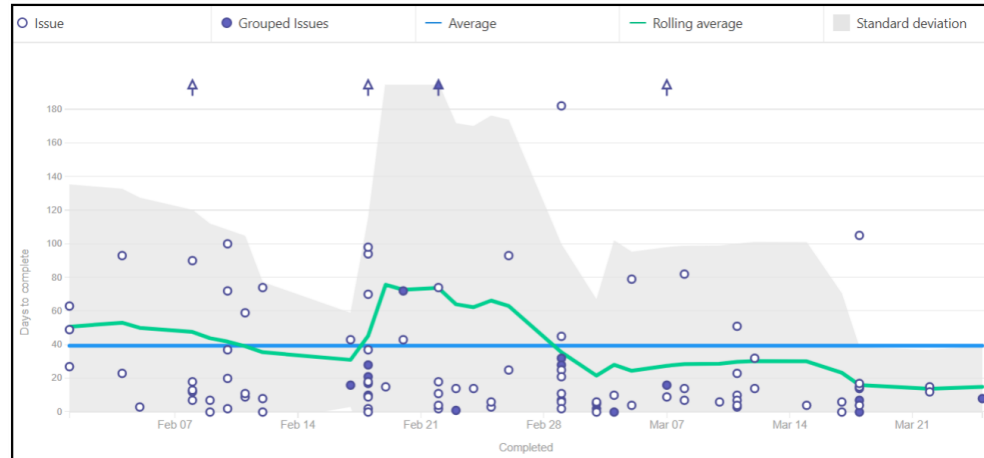
Participatory System Dynamics

Meet the members and partners of Team Participatory Systems Dynamics at mtl.how/team.

3.2 Scientific Values

Team PSD Scientific Values guide additional **Participatory** and **Open Science** principles:

- **Participatory Research** encourages us to **co-create our scientific research**. Therefore...
- We **share decisions**, which requires a high level of **documentation**.
- We seek greater **equity** among partners in how collaborate, which requires **responsive pivots** with new stakeholder inputs.
- We strive use **transparent** and **accessible** processes and platforms, and develop **transparent, accessible resources**.



We use standard workgroup schedules with dedicated focus blocks. Many team members work flex or compressed schedules.

We iterate and integrate our work consistent with Scaled Agile Framework.

Weekly iteration across workgroups

Headquarters
Facilitators
QUANT Operations
Simulation/Modeling
Support

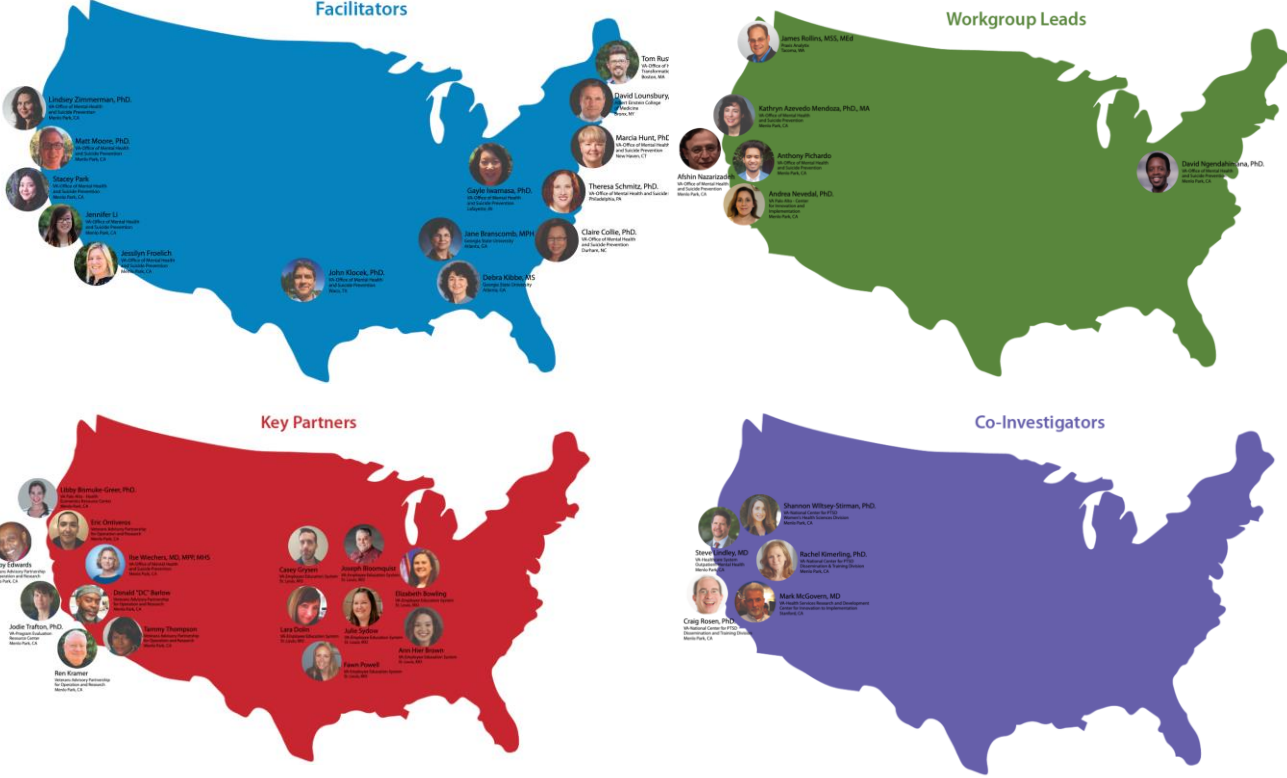
Headquarters
Team Meetings
Local Co-planning

Headquarters
VAPOR
QUAL
QUANT Research
Co- Investigators
Mentees

Monthly integration.

Team PSD 2.0	<i>Research and Operations Workflows</i>			
	Mon	Tue	Wed	Thu
Week 1 Hypotheses	<i>Weekly iteration across workgroups</i>			
Week 2 MVPs				
Week 3 Feedback				
Week 4 Integration			<i>Monthly integration.</i>	

We created an authorship app for co-authoring across our partners these last seven years.





Participatory System Dynamics

Co-Investigators

David Lounsbury, PhD, Craig Rosen, PhD, Craig Rosen, PhD, Jodie Trafton, PhD, Steven Lindley, MD, PhD, Shannon Wiltsey Stirman, PhD, Mark McGovern, PhD

Project Support

Stacey Park, McKenzie Javorka, MS, Dan Wang, PhD, Savet Hong, PhD, Kathryn Azevedo, PhD, Savet Hong, PhD

Team PSD Mentees

Cora Bernard, PhD, Jessilyn Froelich, MS, Swap Mushiana, MS, Joyce Yang, PhD

VAPOR (Veteran VA Consumer) Board

DC Barlow, Ren Kramer & Erik Ontiveros

Georgia Health Policy Center

Jane Branscomb, MPH Debra Kibbe, MS
Ursula Davis, MA, Amanda Martinez, MPH

Praxis Analytix

Col. (Ret.) James Rollins, MEd

NIDA [R01DA046651](#) and [R21DA042198](#)
HSRD [I01HX002521](#) PI: [Zimmerman](#)

Key Partners

VA Palo Alto Mental Health Staff Ann LeFevre, LCSW, PhD, Maya Kopsell, MD, Trisha Vinatieri, PsyD, Bruce Linenberg, PhD, Pompa Malakar, RN, Rosemarie Geiser, RN, Sarah Walls, LCSW, Gigi Fernandez, LCSW, Emily Hugo, PhD, Martha Losch, MD Jessica Cuellar, PhD, Alka Mathur, MD, Erin Sakai, PhD, Kesha Diodato, LCSW, Nathaniel Mendelssohn, MD, Nina Yi, MD, Lisa Giovanetti, LMFT, Joan Smith, LCSW, Darryl Silva, LCSW, Karen Wall, RN, EdD, and Smita Das, MD.

Office of Mental Health and Suicide Prevention (10NC5)

Jay Cohen, PhD, Claire Collie, PhD, Marcia Hunt, PhD, Gayle Iwamasa, PhD, John Klocek, PhD, Matt Moore, PhD, Theresa Schmitz, PhD, Matthew Neuman, PhD, Matthew Boden, PhD, Hugo Solares, PhD, Shalini Gupta, PhD, David Wright, PhD, Susanna Martins, PhD, Eric Schmidt, PhD, Amy Robinson, PharmD, Ilse Wiechers, MD, PhD.

Office of Healthcare Transformation (10A5)

Tom Rust, PhD, Andrew Holbrook, BS, Liz May, BS

VA Employee Education Services (EES)

Elizabeth Bowling, MA, RD/LD, Correy Mathews, Ann Hier, MS, Fawn Powell, MHA, Justin Spears, MBA, Ed Caldwell MEd, Amy Jones, MEd, Julie Sydow MA, Cate Wright, and Lara Dolin

References

Balazs, C.L., & Morello-Frosch, R. (2013). The Three R's: How Community Based Participatory Research Strengthens the Rigor, Relevance and Reach of Science. *Environmental justice*, 6 1.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3832061/pdf/nihms524103.pdf>

Barlas, Y. (1996). Formal aspects of model validity and validation in system dynamics. *System Dynamics Review*, 12(3), 183–210. First published: Autumn (Fall) 1996 [https://doi.org/10.1002/\(SICI\)1099-1727\(199623\)12:3<183::AID-SDR103>3.0.CO;2-4](https://doi.org/10.1002/(SICI)1099-1727(199623)12:3<183::AID-SDR103>3.0.CO;2-4)

Bendoly, E. (2014). System dynamics understanding in projects: Information sharing, psychological safety, and performance effects. *Production and Operations Management*, 23(8), 1352–1369.

<https://doi.org/10.1111/poms.12024>

Hovmand, P. S. (2014). *Community Based System Dynamics*. Retrieved from <http://link.springer.com/10.1007/978-1-4614-8763-0>

References

- Ingoglia, S., Lo Coco, A., & Albiero, P.** (2016). Development of a Brief Form of the Interpersonal Reactivity Index (B-IRI). *Journal of Personality Assessment*, 98(5), 461–471. <https://doi.org/10.1080/00223891.2016.114985>
- Nilsen, P.** (2015). Making sense of implementation theories, models and frameworks. *Implementation Science*, 10(1). <https://doi.org/10.1186/s13012-015-0242-0>
- Oetzel, J. G., Wallerstein, N., Duran, B., Sanchez-Youngman, S., Nguyen, T., Woo, K., ... Alegria, M.** (2018). Impact of Participatory Health Research: A Test of the Community-Based Participatory Research Conceptual Model. *BioMed Research International*, 2018, 1–12. <https://doi.org/10.1155/2018/7281405>
- Scaccia, J. P., Cook, B. S., Lamont, A., Wandersman, A., Castellow, J., Katz, J., & Beidas, R. S.** (2015). A practical implementation science heuristic for organizational readiness: R = MC. *Journal of Community Psychology*, 43(4), 484–501. <https://doi.org/10.1002/jcop.21698>

References

- Sterman, J. D.** (2000). *Business Dynamics: Systems Thinking and Modeling for a Complex World*. McGraw-Hill Education.
- Sterman, J. D.** (2006). Learning from evidence in a complex world. *American Journal of Public Health, 96*(3), 505–514.
<https://doi.org/10.2105/AJPH.2005.066043>
- Zimmerman, L., Lounsbury, D. W., Rosen, C. S., Kimerling, R., Trafton, J. A., & Lindley, S. E.** (2016). Participatory System Dynamics Modeling: Increasing Stakeholder Engagement and Precision to Improve Implementation Planning in Systems. *Administration and Policy in Mental Health and Mental Health Services Research, 43*(6), 834–849. <https://doi.org/10.1007/s10488-016-0754-1>