

The Computerized Assessment & Referral System (**CARS**):

Identifying Mental Health Disorders among DUI Offenders



Sarah E. Nelson, Ph.D.

Harvard Medical School;

Division on Addiction, The Cambridge Health Alliance

Sources of Support

- The Foundation for Advancing Alcohol Responsibility (FAAR) is providing five years of support for the development and testing of *CARS*.
- The National Institute of Alcohol Abuse and Alcoholism provided support for the study of repeat DUI offenders through the grant, *Toward Evidence Based Treatments to Reduce DUI Relapse (R01 AA014710-01A1)*.

Objectives

- Why we need DUI treatment
- Mental health and DUI
- Barriers to screening
- Computerized Assessment & Referral System (**CARS**)
 - CARS Demo
 - CARS Usability and Implementation Trials
- CARS future directions
- Questions & Discussion

Why We Need DUI Treatment

On Driving

- 1904: *Quarterly Journal of Inebriety*

“**Twenty-five** fatal accidents occurring to automobile wagons...in **nineteen** of these accidents the drivers had used spirits within an hour...of the disaster.”

- **76%** rate of alcohol-related fatalities

DUI-related Costs

- 
- DUI is the second most common type of crime in the US. (FBI, 2014)
 - In 2013, 10,076 people died in alcohol-related motor-vehicle accidents, in which the driver had a BAC over .08. (NHTSA, 2014)
 - 31% of total motor vehicle fatalities in the US
 - Annual economic cost of \$49.8 billion (NHTSA, 2014)

Legal Initiatives to Reduce DUI

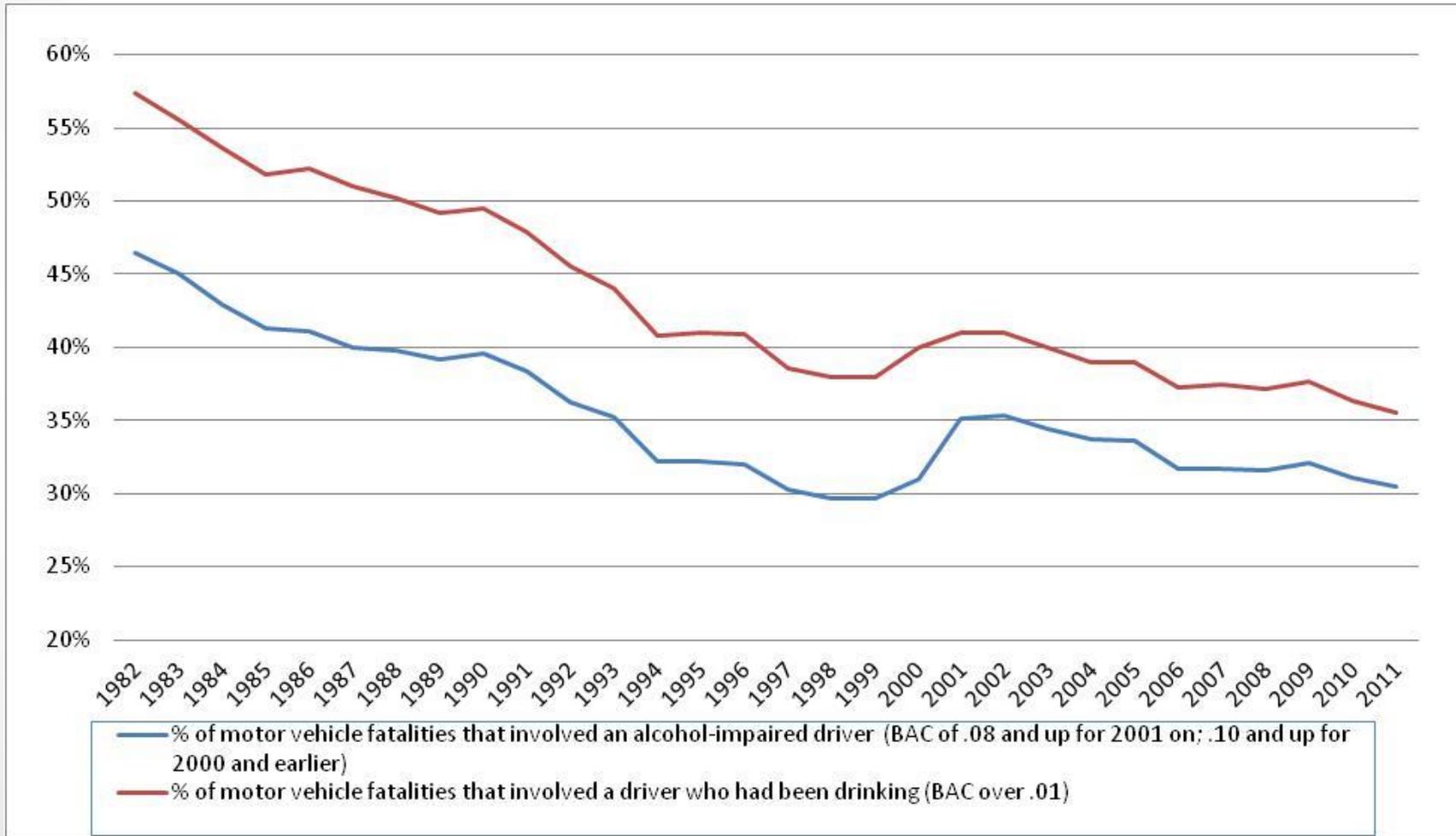
- Licensing Sanctions
- Vehicle Sanctions
- Ignition Interlock
- Mandatory Sentencing



Repeat DUI Offenders

During 2008, the NHTSA reported that reoffenders represent **33%** of those who are arrested for DUI (NHTSA, 2008).

Percent of Total Traffic Fatalities that are Alcohol-Related



Repeat DUI Offenders



Mental Health and DUI

Alcohol & Other Problems

“Treatment programs focusing exclusively on changing alcohol consumption behavior are not likely to reduce accident risk for some of the offender groups” (p. 443).

Wells-Parker, E., Cosby, P., & Landrum, J. (1986). A Typology for Drinking Driving Offenders: Methods for Classification and Policy Implications. *Accident Analysis and Prevention*, 18(6), 443-453.

When is Addiction Addiction?

**Syndrome
Disorder?**

**Other Unknown
Disorders**

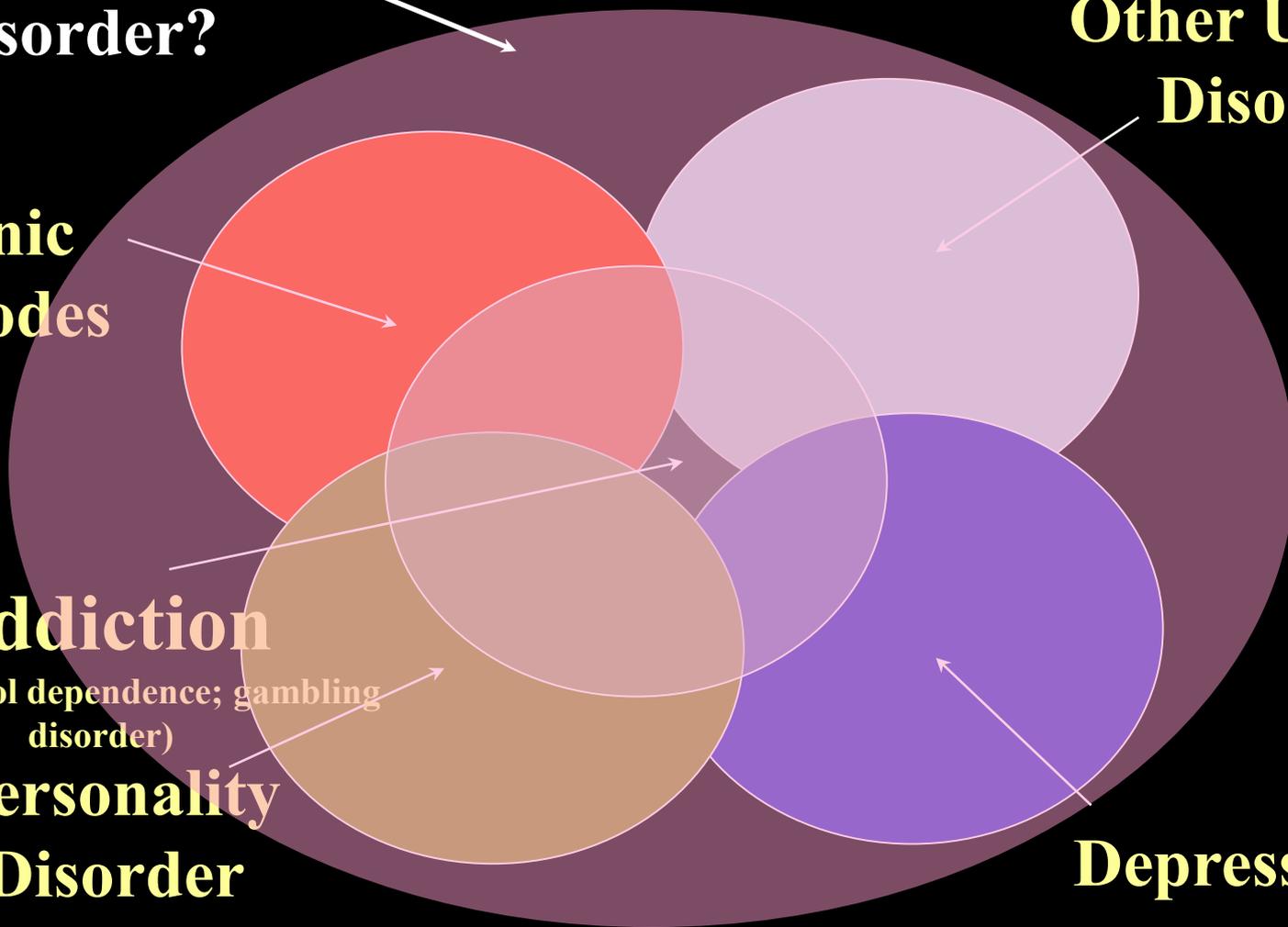
**Manic
Episodes**

Addiction

(e.g., alcohol dependence; gambling disorder)

**Personality
Disorder**

Depression

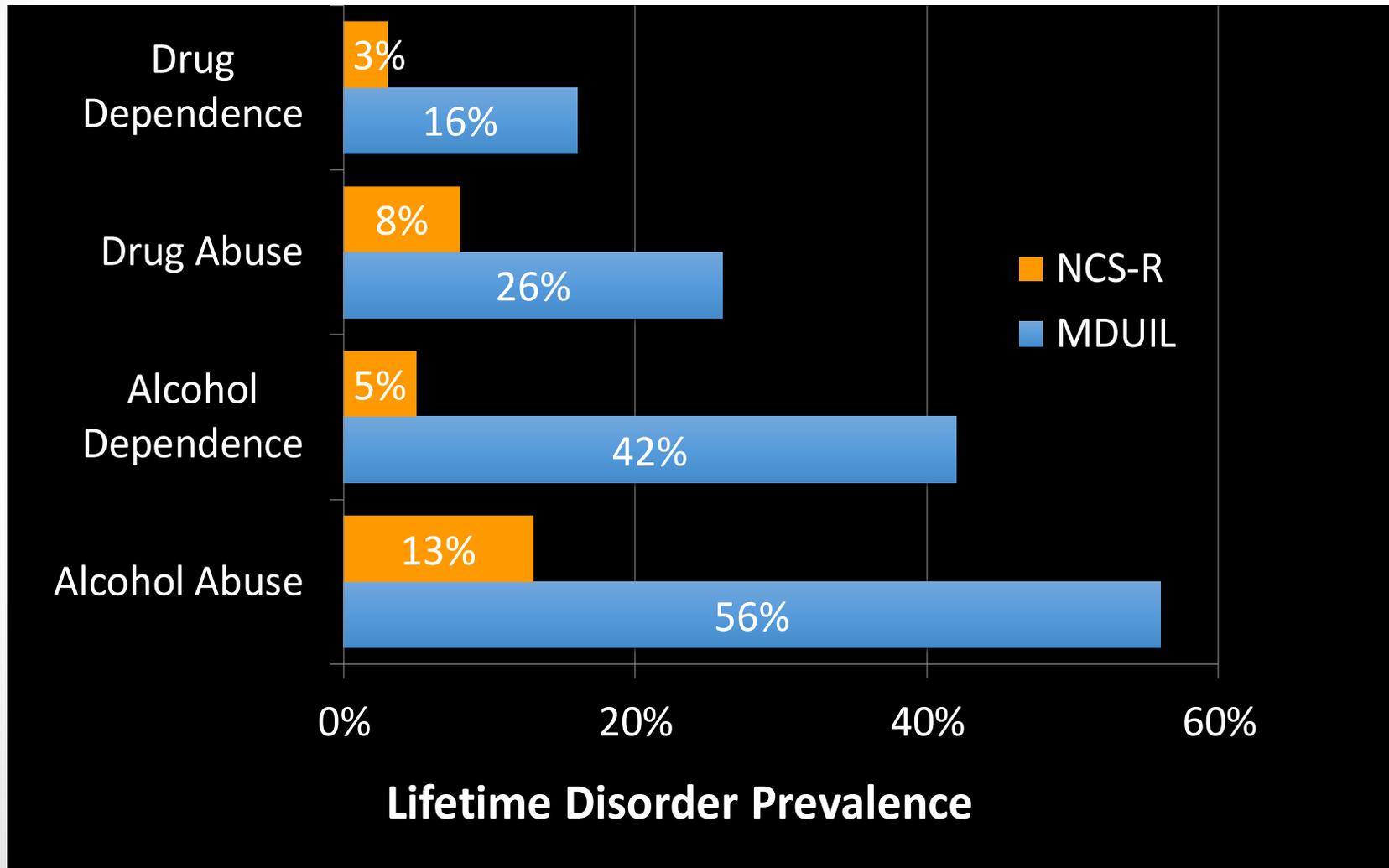


Repeat DUI & Psychiatric Comorbidity

Research at the Middlesex Driving Under the
Influence of Liquor (MDUIL) Program

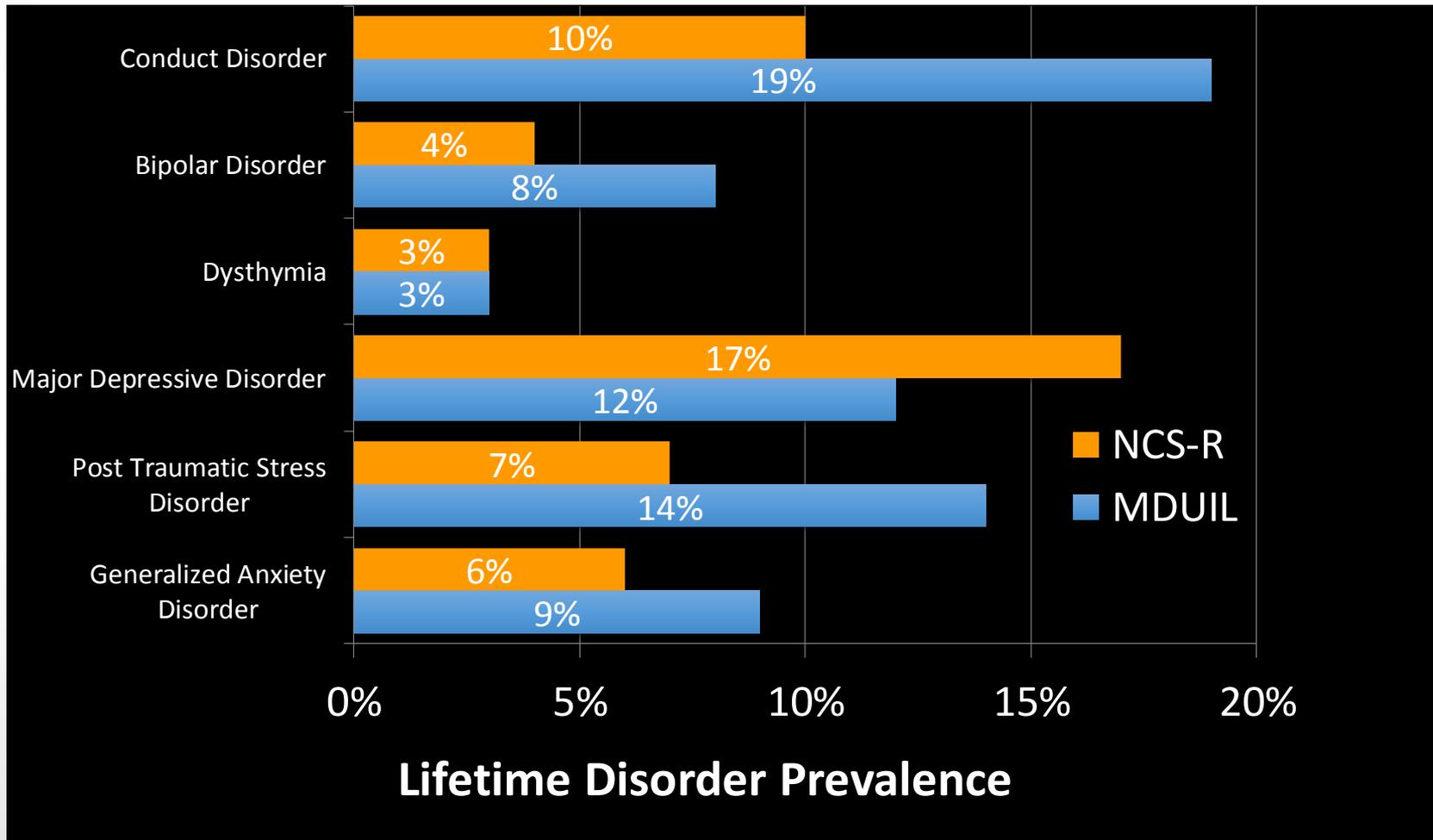
(Shaffer, Nelson, et al., 2007)

Lifetime Addiction Prevalence in MDUIL Sample & NCS-R (Kessler et al., 2005)

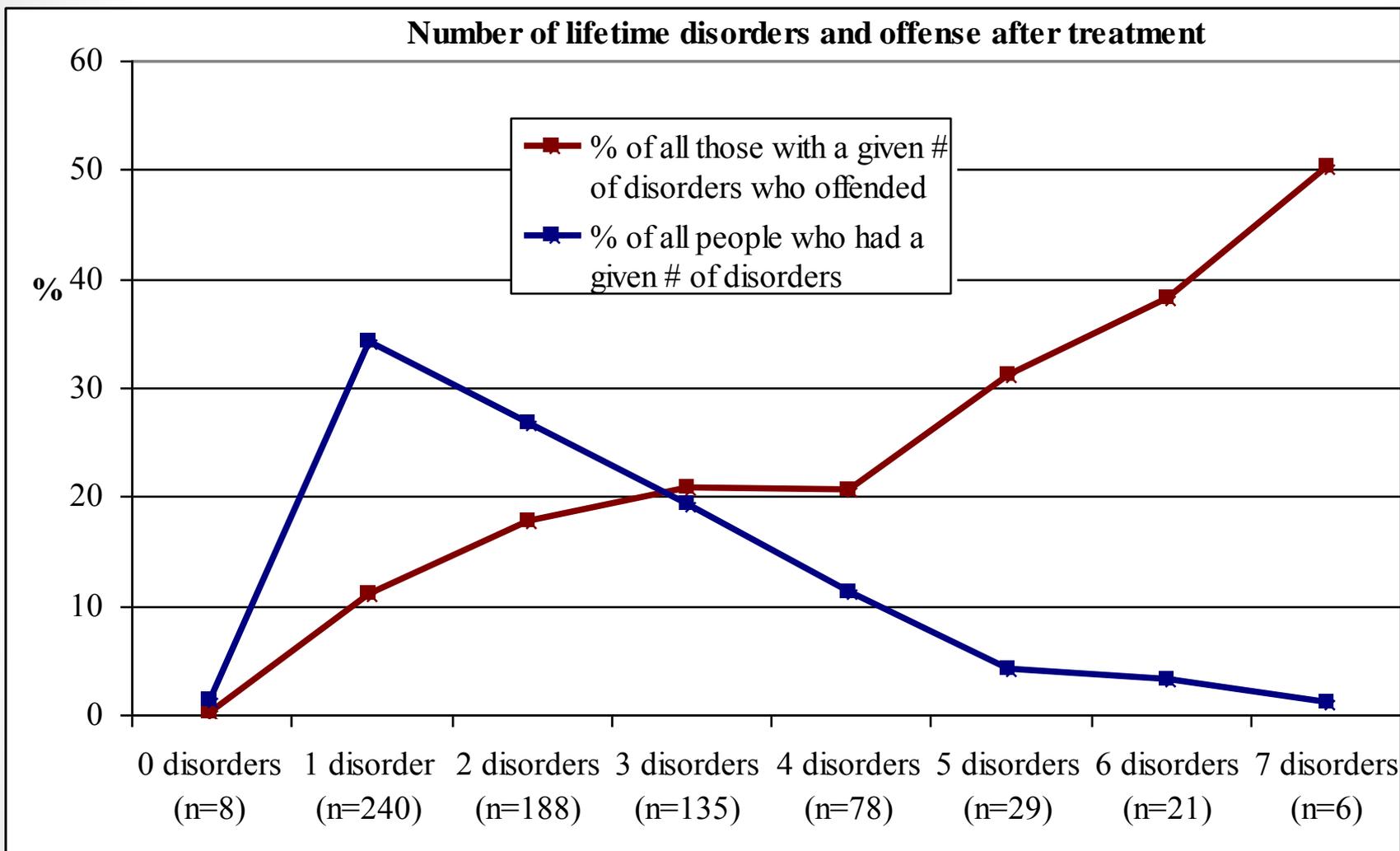


Lifetime Prevalence of Psychiatric Disorder among MDUIL Sample & NCS-R

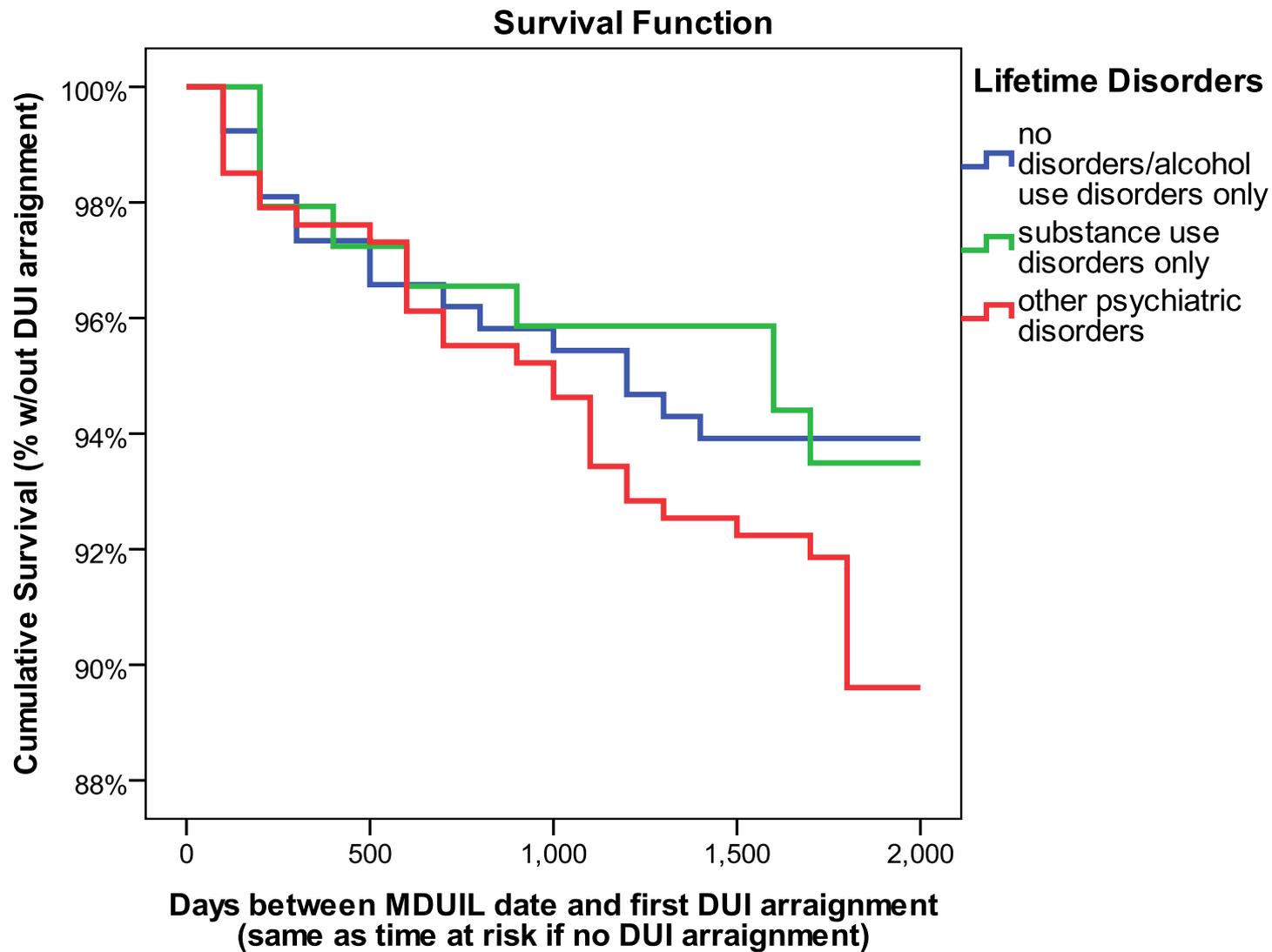
(Kessler et al., 2005)



Comorbidity & Criminal Offense



Comorbidity & DUI Recidivism



Barriers to Mental Health Screening

- Awareness
- Training
- Time / Resources
- Lack of Immediate Output

DUI treatment providers don't always have the training or resources to identify and address mental health issues in their clients.

A Comparison of Alcohol Treatment Program Diagnoses and CIDI Mental Health Diagnoses

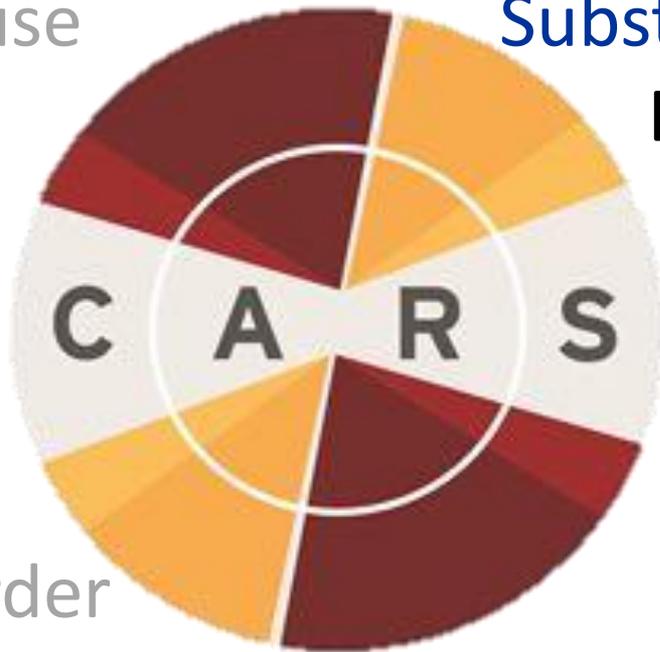
Diagnoses obtained through CIDI (composite international diagnostic interview) compared to diagnoses obtained at any time during mandatory alcohol treatment among 233 repeat DUI offenders.

- Bipolar Disorder
 - Provider Estimate: 0.9%
 - CIDI: 6.0%
- Depression
 - Provider Estimate: 10.3%
 - CIDI: 24.5%
- OCD
 - Provider Estimate: 0.0%
 - CIDI: 2.6%
- Drug Use Disorder
 - Provider Estimate: 27.0%
 - CIDI: 10.7%

The Need for CARS

- Psychiatric comorbidity in DUI populations
- Mental health issues linked to recidivism
- Screening for mental health issues beyond alcohol-use disorders is rare within DUI treatment programs
- DUI treatment providers rarely have the training or experience to identify mental health issues among their clients

Generalized Anxiety Disorder Major Depressive Disorder
 Disorder Dysthymia Bipolar I Disorder Bipolar II Disorder
 Disorder Panic Disorder Alcohol Abuse Alcohol Dependence
 Post Traumatic Stress Disorder Substance Abuse
 Substance Abuse Substance Dependence
 Personality Eating Disorders
 Tobacco Use DUI Behavior
 Oppositional Defiant Disorder Explosive Disorder
 Intermittent Disorder
 Disorder DUI Behavior
 Conduct Disorder Criminal History
 Personality Disorder Psychosocial Risks Peer Networks
 Networks Psychosis Gambling Disorder Obsessive Compulsive Disorder
 Attention Deficit Hyperactivity Disorder... and more





FOUNDATION FOR
ADVANCING ALCOHOL
RESPONSIBILITY.ORG



HARVARD
SCHOOL OF PUBLIC HEALTH



Cambridge Health Alliance



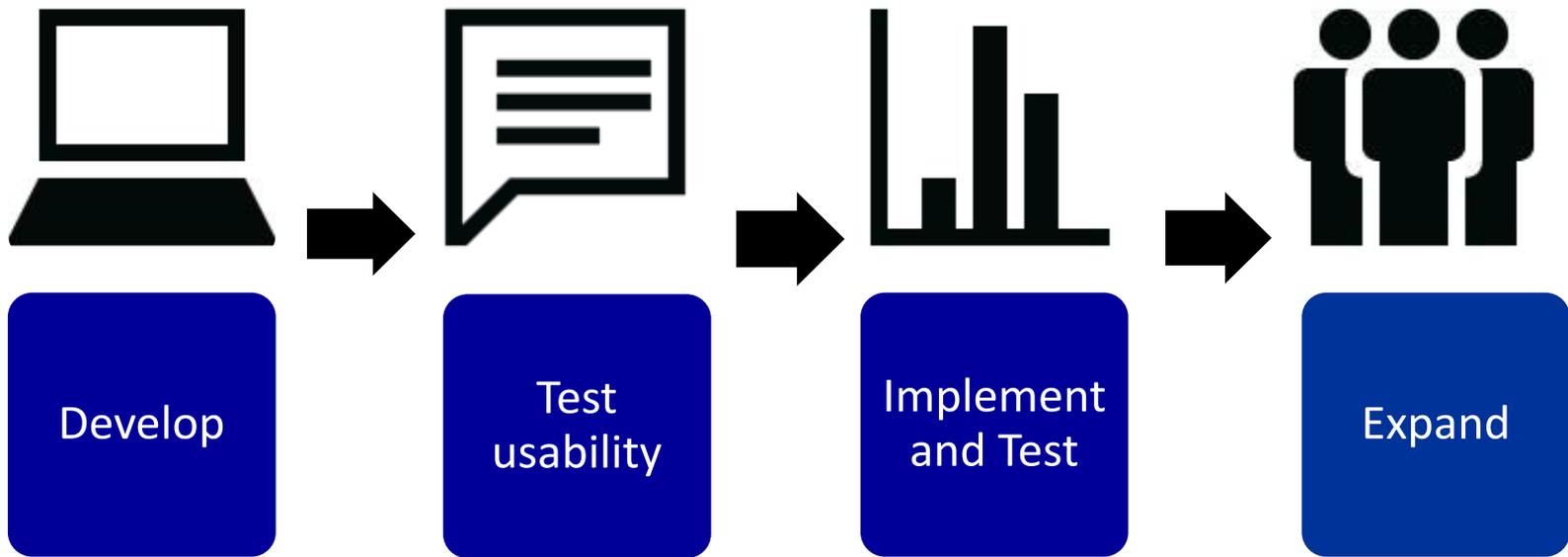
CARS: The Computerized Assessment and Referral System

- Standardized mental health assessment based on the Composite International Diagnostic Interview (CIDI)
- Diagnostic report generator that gives providers and clients:
 - Immediate diagnostic information for up to 20 DSM-IV Axis I disorders (onset, recency, persistence)
 - Geographically and individually targeted referrals based on individual diagnostic information and zip code

Implementing a Computerized Assessment & Referral System:

CARS Demo





Testing Usability



Test
usability

Method:

- 5 DUI programs
- 3 months
- Online surveys

Feedback:

- Average time = 1 hour
- Longer than counselors preferred
- Clients rated the report as the most useful part of the experience.

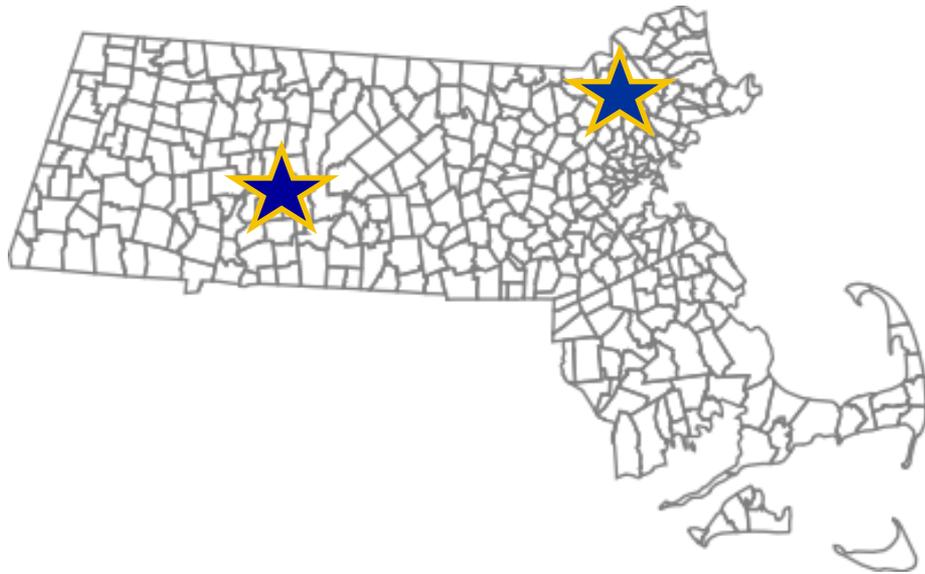
Screeener Enhancement

- Primary issue with CARS has been length
- Original screener could not stand alone
 - “Have you ever in your life had a period of time lasting several days or longer, when most of the day you felt sad, empty or depressed?”
- Used evidence from past study to add questions to the screener to increase diagnostic accuracy.
- Now offer a CARS Screener that takes 15-50 minutes to complete and offers good indication of diagnostic areas that need further assessment.

Implementation Trial



Implement
and Test



Implementation Trial

- Two MA programs
- Randomization w/in program
- CARS Screener vs. Comprehensive CARS
- Self-administered CARS Screener vs. Interviewer-Administered CARS Screener
- Follow-up Outcomes (6 months+)
 - Criminal record
 - RMV record
 - Ignition interlock data
 - Treatment records
 - Offender interviews

Implementation Trial: Preliminary Findings

- Trial still enrolling new participants
- **375** repeat DUI offenders enrolled (**51.6%** recruitment rate)
 - 86 full CARS
 - 86 CARS screener
 - 85 self-administered CARS screener
 - 79 intake as usual
 - 39 discharged prior to study activities
- **CARS** data available for **257** offenders

Implementation Trial:

Screening Findings (NOT definitive diagnoses)

- Positive screen indicates that further assessment is required, NOT that the respondent qualifies for the disorder.

Implementation Trial:

Screener Findings (NOT definitive diagnoses)

- **93.4%** screened positive for **alcohol use disorder**
 - 62.6% w/in past 12 months
- **36.6%** screened positive for **drug use disorder**
 - 14.8% w/in past 12 months
- **65.4%** screened positive for **tobacco dependence**
 - 55.6% w/in past 12 months
- **6.2%** screened positive for **gambling disorder**
 - 3.5% w/in past 12 months

Implementation Trial:

Screener Findings (NOT definitive diagnoses)

- **49.8%** screened positive for **panic disorder**
 - 28.8% w/in past 12 months
- **41.2%** screened positive for **generalized anxiety**
 - 31.5% w/in past 12 months
- **33.9%** screened positive for **post-traumatic stress**
 - 21.8% w/in past 12 months
- **30.0%** screened positive for **social phobia**
 - 15.6% w/in past 12 months

Implementation Trial: Screener Findings (NOT definitive diagnoses)

- **39.7%** screened positive for **depression**
 - (22.6% excluding positive mania screens)
 - 26.5% w/in past 12 months (14.4% excluding positive mania screens)
- **18.7%** indicated **suicidal ideation**
 - 8.6% w/in past 12 months
- **23.3%** screened positive for **mania/bipolar disorder**
 - 14.8% w/in past 12 months

Implementation Trial:

Screenener Findings (NOT definitive diagnoses)

- **47.9%** screened positive for **conduct disorder**
- **28.0%** screened positive for **oppositional defiant disorder**
- **29.2%** screened positive for **intermittent explosive disorder**
 - 11.3% w/in past 12 months
- **30.4%** screened positive for **attention deficit hyperactivity disorder**

Implementation Trial: Screener Findings (NOT definitive diagnoses)

- **23.7%** screened positive for obsessive compulsive disorder
 - 17.5% w/in past 12 months
- **15.2%** screened positive for **eating disorder**
 - 11.3% w/in past 12 months
- **6.6%** screened positive for **psychosis**
 - 3.9% w/in past 12 months

Implementation Trial:

Screening Findings (NOT definitive diagnoses)

- **Cluster A type Personality Disorders (schizotypal, schizoid, paranoid) [n=24]**
 - 45.8% non-cases
 - 45.8% possible cases
 - 8.3% probable cases
- **Borderline Personality Disorder [n=24]**
 - 20.8% non-cases
 - 50.0% possible cases
 - 29.2% probable cases

Implementation Trial:

Screeners Findings (NOT definitive diagnoses)

- **Cluster C type Personality Disorders (avoidant, dependent, obsessive-compulsive) [n=24]**
 - 41.7% non-cases
 - 58.3% possible cases
 - 0.0% probable cases
- **Antisocial Personality Disorder [n=24]**
 - 16.6% non-cases
 - 41.7% possible cases
 - 41.7% probable cases

MDUIL Implementation Trial: Screener Findings (NOT definitive diagnoses)

- Screening results did not differ significantly by condition, with one exception
 - DUI offenders were more likely to report symptoms qualifying them for **conduct disorder** in the self-administered condition than in other conditions
- Offenders in the self-administered condition tended to have more positive screens than others, but this result only approached significance ($p = .06-.09$)
 - Lifetime mania, social phobia, oppositional defiant disorder
 - Past year eating disorders, obsessive compulsive disorder, psychosis

MDUIL Implementation Trial: Full CARS

- Alcohol Use
 - 23 of 24 screened in lifetime
 - **17 of 24** screened in w/in past year
 - 17 qualified for past year alcohol abuse
 - 6 also qualified for both past year alcohol dependence
- Screener sensitivity (by definition) = 100.0%
- Screener specificity = $(24-17)/((24-17)+(17-17)) = 100.0\%$
- Positive predictive value = $17/(17+0) = 100\%$

MDUIL Implementation Trial: Full CARS

- Drug Use
 - 17 of 38 screened in lifetime
 - **8 of 38** screened in w/in past year
 - 6 qualified for past year drug abuse
 - 4 also qualified for both past year drug dependence
 - 2 qualified for only past year drug dependence
- Screener sensitivity (by definition) = 100.0%
- Screener specificity = $(38-8)/((38-8)+(8-8)) = 100.0\%$
- Positive predictive value = $8/(8+0) = 100\%$

MDUIL Implementation Trial: Full CARS

- Depression
 - 9 of 24 screened in lifetime
 - **5 of 24** screened in w/in past year
 - 2 qualified for past year major depressive episode
 - 1 also qualified for dysthymia
- Screener sensitivity (by definition) = 100.0%
- Screener specificity = $(24-5)/((24-5)+(5-2)) = 86.4\%$
- Positive predictive value = $2/(2+3) = 40\%$

MDUIL Implementation Trial: Full CARS

- Mania
 - 4 of 24 screened in lifetime
 - **2 of 24** screened in w/in past year
 - 1 qualified for past year mania
- Screener sensitivity (by definition) = 100.0%
- Screener specificity = $(24-2)/((24-2)+(2-1)) = 95.7\%$
- Positive predictive value = $1/(1+1) = 50\%$

MDUIL Implementation Trial: Full CARS

- Generalized Anxiety Disorder (GAD)
 - 22 of 48 screened in lifetime
 - **18 of 48** screened in w/in past year
 - Data available for 5 past year module entrants
 - 2 qualified for past year GAD
- Screener sensitivity (by definition) = 100.0%
- Screener specificity = $(13.3-5)/((13.3-5)+(5-2)) = 73.5\%$
- Positive predictive value = $2/(2+3) = 40\%$

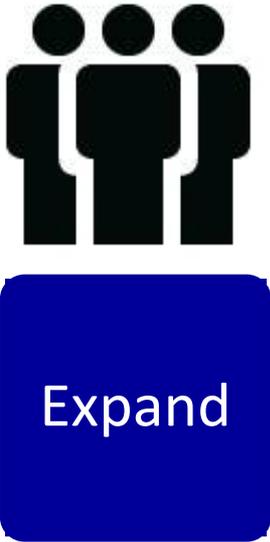
MDUIL Implementation Trial: Full CARS

- PTSD
 - 16 of 38 screened in
 - **12 of 38** screened in w/in past year
 - 2 of 12 qualified
- Screener sensitivity (by definition) = 100.0%
- Screener specificity = $(38-12)/((38-12)+(12-2)) = 72.2\%$
- Positive predictive value = $2/(2+10) = 16.7\%$

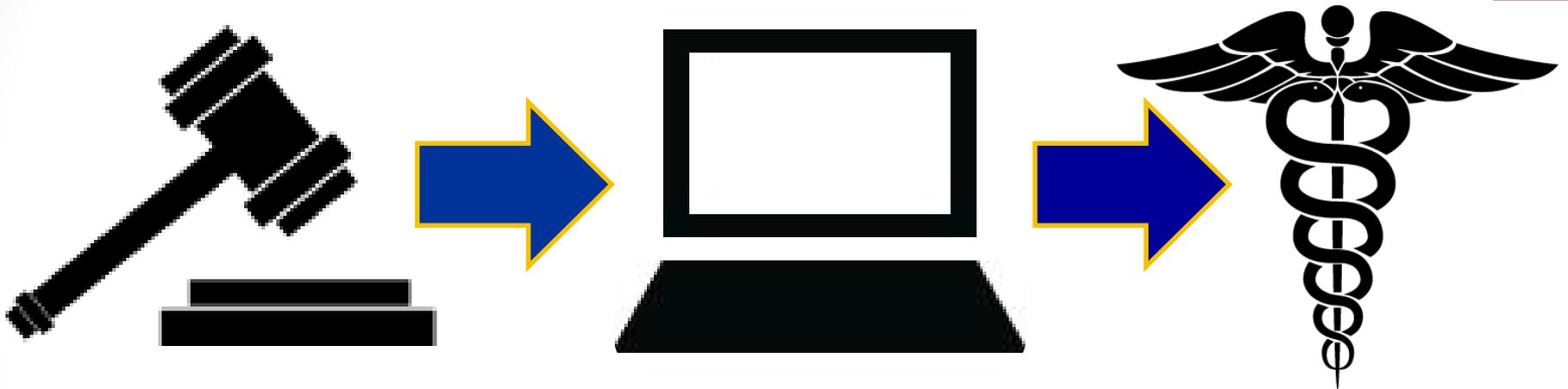
CARS: Follow-Up

- Conducting follow-up interviews with MDUIL offenders
- Key measures:
 - Alcohol and drug use
 - Treatment
 - Lapses and relapses
 - Probation violations
 - Behavioral changes
 - Mental health check-in

Expansion



- DUI programs in New England and beyond
- Intervention in corrections system
 - Pre-sentencing
 - Initial sentencing
 - Probation
 - Aftercare



- The time between sentencing and DUI treatment represents an opportunity for assessment for at-risk clients.

CARS: Future Impact

- To test the usability and efficacy of CARS, our initial studies are confined to New England.
- However, our intentions are to develop a tool that can be used by DUI programs across the country and, eventually, internationally.
- Our use of the CIDI and collaboration with the team that developed it allows us to offer a tool that utilizes an internationally-validated assessment, increasing its appeal.

Diagnosis and Treatment

Karl Menninger

- *“Treatment depends upon diagnosis, and even the matter of timing is often misunderstood. One does not complete a diagnosis and then begin treatment; the diagnostic process is also the start of treatment. Diagnostic assessment is treatment; it also enables further and more specific treatment.”*

The Computerized Assessment & Referral System:

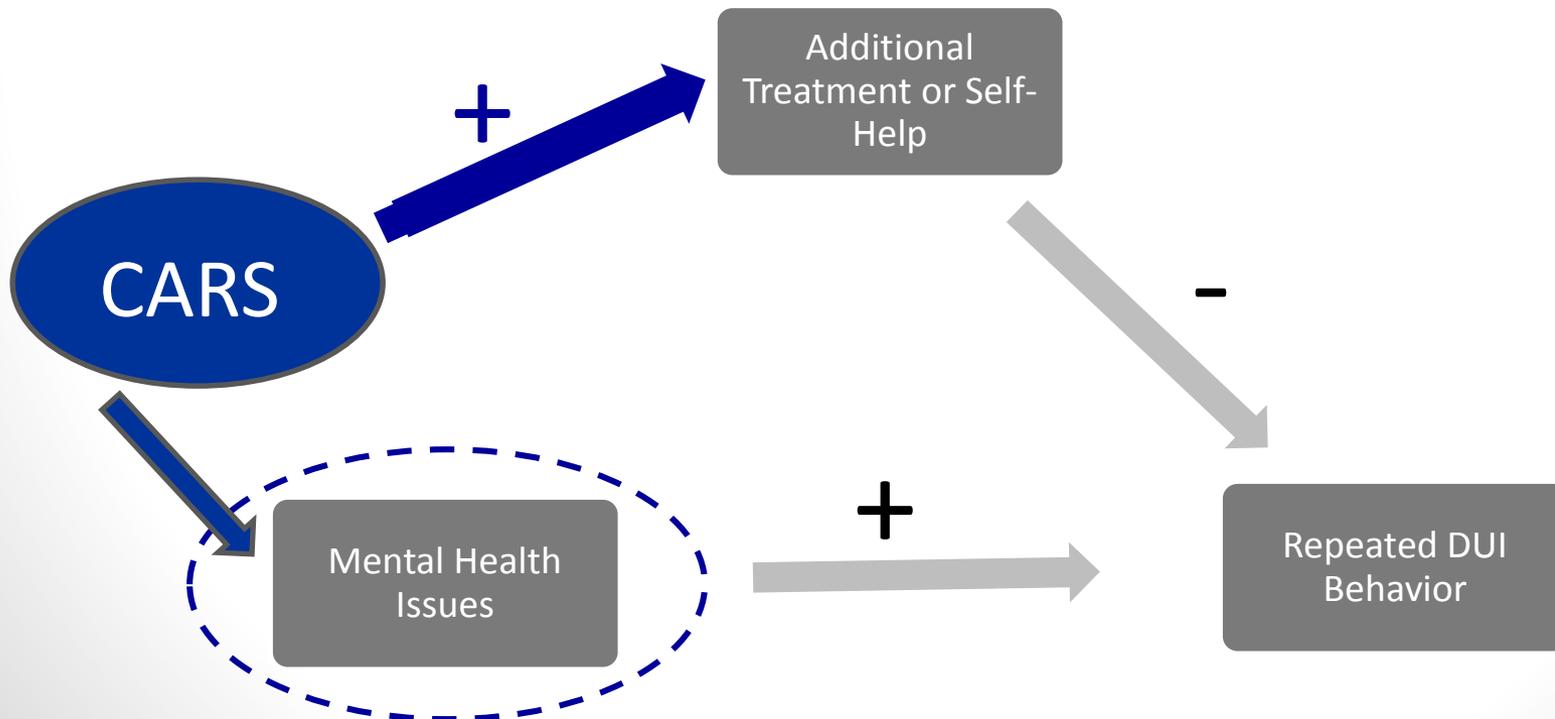
Q & A



- What is the purpose of **CARS**?
- How is **CARS** unique as a mental health assessment?
- Is **CARS** a risk/needs assessment?
- Can **CARS** predict DUI recidivism?
- Do I need to use full **CARS** or just the **CARS** screener?
- Can **CARS** measure change?
- How does **CARS** compare to the APPA's Impaired Driving Assessment?

What Is the purpose of CARS?

- CARS' primary purpose is to identify mental health issues in addition to substance use disorders that influence DUI behavior.
- Identification of these issues is a first step toward intervening to reduce their impact on DUI and improve offenders' chance of rehabilitation.



How is **CARS** unique as a mental health assessment?

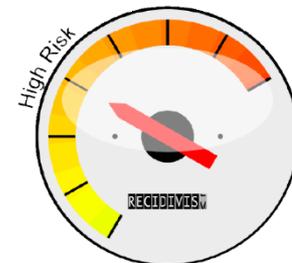
- **CARS** is adapted from an internationally validated diagnostic assessment, the Composite International Diagnostic Interview
- **CARS** can be used by non-clinicians to identify psychiatric disorders for which a client qualifies or is at risk.
- **CARS** generates user-friendly reports at the click of a button.
- **CARS** runs on free open source software.

Is **CARS** a risk/needs assessment?

- Not in the traditional sense.
- However, **CARS** identifies specific mental health disorders for which an offender is at-risk
- These identified mental health issues and the generated report in turn inform the user about the offender's treatment needs.

Can **CARS** predict DUI recidivism?

- The primary purpose of **CARS** is not to predict recidivism, but to identify mental health issues that might contribute to a DUI offender's DUI behavior and facilitate additional treatment for those issues.
- Currently, **CARS** identifies DUI risk based on known predictors from the research literature
- However, as we collect data from **CARS**, we will be able to modify and validate this DUI risk scale using empirical data and linking specific mental health profiles to recidivism risk.



Do I need to use full **CARS** or just the **CARS** screener?

- **CARS** is adapted from the Composite International Diagnostic Interview (CIDI). To generate full DSM-IV diagnostic level information consistent with the diagnoses generated by the CIDI, full **CARS** is necessary.
- The **CARS** screener identifies mental health risk areas and takes less time than full **CARS**. (The screener takes between 15-50 minutes to complete.)
- We are currently testing how well the screener performs compared to full **CARS** in identifying mental health risk areas.
- Which you use depends on your resources and goals.
- It is possible to use the screener and then follow-up at a later time or with select clients with further **CARS** modules.

Can **CARS** measure change?

- **CARS** asks about signs and symptoms of mental health issues both within the past year and lifetime.
- Therefore, the current version of **CARS** can be used in a past year timeframe to measure yearly change.
- In the future, we intend to create a follow-up module for **CARS** that can measure change on a more fine-grained level (e.g., past 30 days) and generate reports that specifically address changes across time.

How does **CARS** compare to the APPA Impaired Driving Assessment?

- The primary purpose of the APPA's tool is to predict DUI recidivism and match this to level of supervision. A secondary use is to identify possible service needs, one of which is mental health.
- The primary purpose of **CARS** is to identify mental health issues among DUI offenders and facilitate treatment referral for those issues. A secondary use will be to predict DUI recidivism risk from those mental health profiles.
- If resources are available, the two could be used in a complementary fashion.

Special Thanks

- Dr. Howard Shaffer
- Katerina Belkin
- Scarvel Harris
- Emily Shoov
- Jed Jeng
- Daniel Tao
- Melanie Mitchell
- Dr. Tauheed Zaman
- Dr. Debi LaPlante
- Dr. Heather Gray
- John Kleschinsky
- Dr. Ron Kessler
- Nancy Sampson
- Mark McKnight
- CARS Advisory Panel
- Staff and clients of:
 - Massachusetts Driving Under the Influence of Liquor Treatment Program
 - Advocates, Inc.
 - High Point
 - Lowell House
 - Behavioral Health Network

Additional Resources

- www.divisiononaddiction.org
 - Division on Addiction's main website
 - Current projects and publications
- www.basisonline.org
 - Brief science reviews and editorials on current issues in the field of addictions
 - Addiction resources available, including self-help tools
- snelson@hms.harvard.edu
 - Email me if you have any questions
- <https://www.facebook.com/divisiononaddiction>
 - The Division's facebook page
- [@DivAddiction](https://twitter.com/DivAddiction)
 - The Division's twitter account

References

- Argeriou, M., McCarty, D., & Blacker, E. (1985). Criminality among individuals arraigned for drinking and driving in Massachusetts. *Journal of Studies on Alcohol*, 46(6), 525-530.
- Evans, L. (1991). Traffic safety and the driver. Van Nostrand Reindel: New York, NY.
- Federal Bureau of Investigation. (2014). Crime in the United States: 2013. *Crime in the United States*.
- Kessler, R.C., Berglund, P.A., Demler, O., Jin, R., Merikangas, K.R., Walters, E.E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry*, 62(6), 593-602.
- Kessler, R.C., & Ustun, T.B. (2004). The World Mental Health (WMH) Survey Initiative Version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *The International Journal of Methods in Psychiatric Research*, 13(2), 93-121
- Lapham, S. C., C'De Baca, J., McMillan, G. P., & Lapidus, J. (2006). Psychiatric disorders in a sample of repeat impaired-driving offenders. *Journal of Studies on Alcohol*, 67(5), 707-713.
- Lapham, S. C., Smith, E., C'De Baca, J., Chang, I., Skipper, B. J., Baum, G., et al. (2001). Prevalence of psychiatric disorders among persons convicted of driving while impaired. *Archives of General Psychiatry*, 58(10), 943-949.
- National Highway Traffic Safety Administration. (2008). Traffic safety facts 2008: Laws: Repeat intoxicated driver laws.

References

- National Highway Traffic Safety Administration. (2007-2014). Traffic safety facts: Alcohol-impaired driving.
- National Highway Traffic Safety Administration. (1993-2006). Traffic safety facts: Alcohol.
- Nelson, S. E., & Tao, D. (2012). Driving under the influence: Epidemiology, etiology, prevention, policy, and treatment. In H. J. Shaffer, D. A. LaPlante & S. E. Nelson (Eds.), *The APA Addiction Syndrome Handbook (Vol. 2. Recovery, Prevention, and Other Issues, pp. 365-407)*. Washington, DC: American Psychological Association Press.
- Oslin, D. W., O'Brien, C. P., & Katz, I. R. (1999). The disabling nature of comorbid depression among older DUI recipients. *American Journal of Addiction, 8(2), 128-135*.
- Shaffer, H. J., LaPlante, D. A., LaBrie, R. A., Kidman, R. C., Donato, A. N., & Stanton, M. V. (2004). Toward a syndrome model of addiction: multiple expressions, common etiology. *Harv Rev Psychiatry, 12(6), 367-374*.
- Shaffer, H. J., Nelson, S. E., LaPlante, D. A., LaBrie, R. A., Albanese, M. J., & Caro, G. (2007). The epidemiology of psychiatric disorders among repeat DUI offenders accepting a treatment sentencing option *Journal of Consulting and Clinical Psychology, 75(5), 795-804*.
- Taylor, D., Miller, T. R., & Cox, K. L. (2002). Impaired driving in the United States: State alcohol cost fact sheets.
- Wells-Parker, E., Cosby, P. J., & Landrum, J. W. (1986). A typology for drinking driving offenders: Methods for classification and policy implications. *Accident Analysis and Prevention, 18(6), 443-453*.