

# ADHD in Adults: a 2024 Update

Craig B.H. Surman, MD

BA, Neuroscience  
Oberlin College

MD  
UMass Medical School

Psychiatry Resident  
Harvard Longwood Psychiatry Residency

Neuropsychiatry Fellow  
Brigham and Women's Hospital

Director, Clinical and Research Program  
in Adult ADHD,  
Massachusetts General Hospital

Craig B.H. Surman, MD Associate Professor of Psychiatry  
Harvard Medical School

Co-chair  
Professional Advisory Board  
Children and Adults with ADHD



# Craig Surman, 2 yr Disclosures

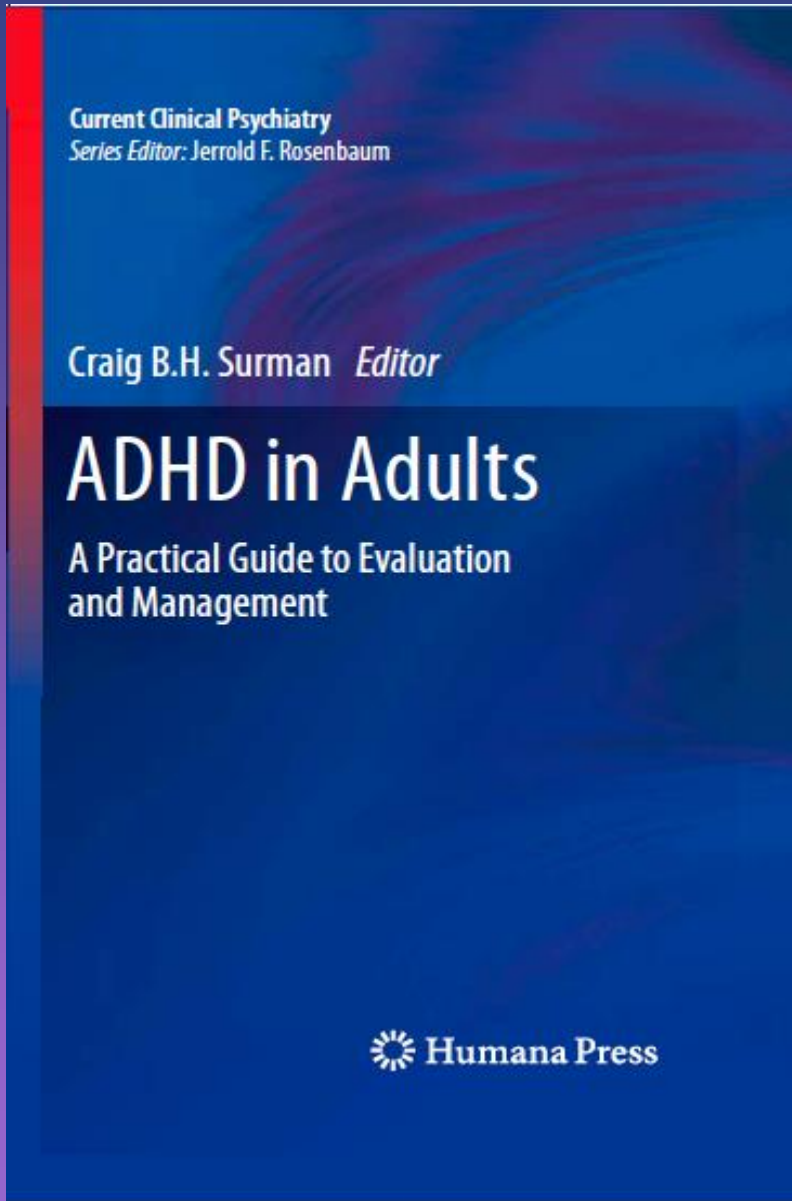
Consulting

Kayuna, Neurocentria, Otsuka, Supernus

Clinical research at Massachusetts General Hospital:

Jazz/Axsome

# Royalties from the following publications:



"[An] easy-to-read, yet sophisticated guide to what will help you most if you have ADHD... A superb book."—EDWARD HALLOWELL, coauthor of *Driven to Distraction*

# **FAST** **MINDS**

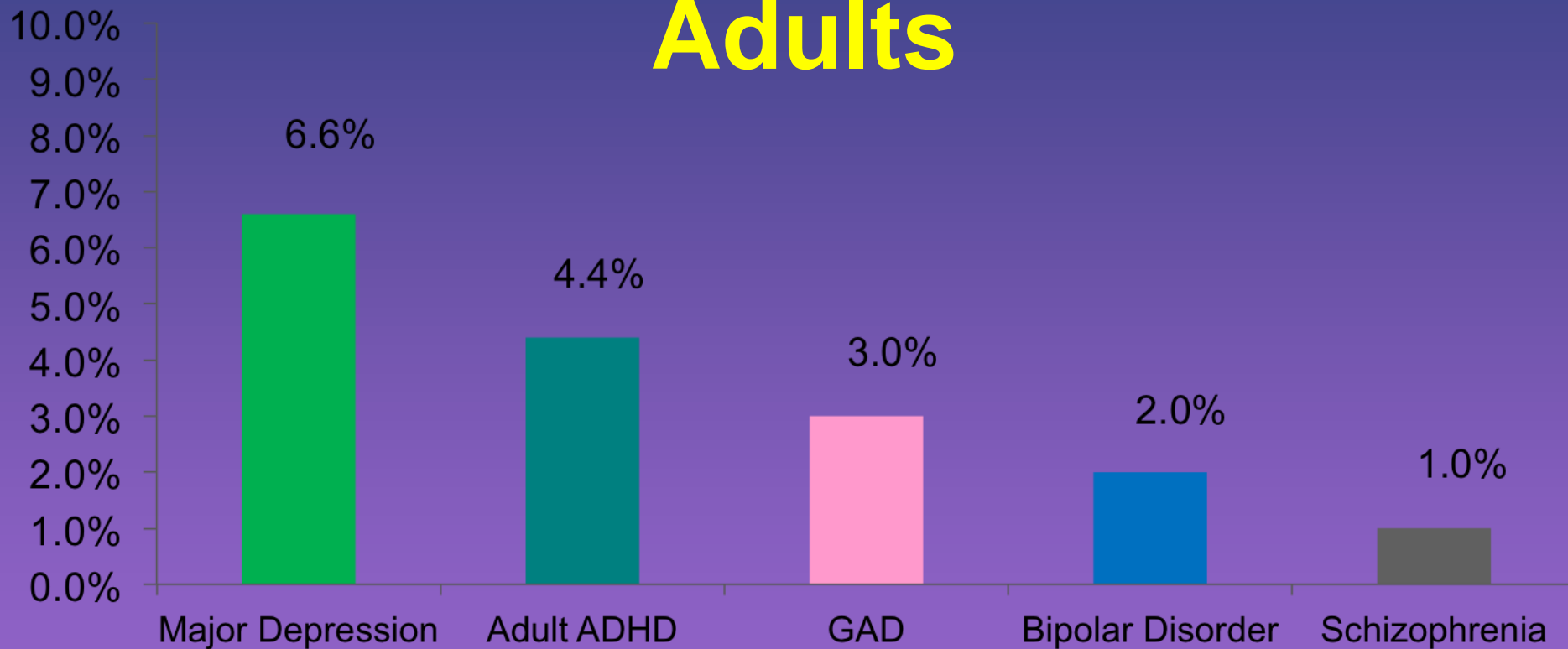
**How to Thrive If  
You Have ADHD**  
(Or Think You Might)

Craig Surman, M.D.  
Tim Bilkey, M.D.  
with Karen Weintraub

# Learning Objectives re Adult ADHD:

- Diagnosis of ADHD and common pitfalls
- Demographics of recent rise in stimulant Rx
- Age-groups at risk for stimulant misuse
- Evidence-based options for ADHD treatment
- Recent Rx cardiovascular risk of treatment
- Public health risks and benefits of treatment

# Prevalence Rates of Psychiatric Disorders in Adults



Kessler RC et al. *JAMA*. 2003. 18;278(23):3095-105.

Kessler RC et al. *Am J Psychiatry*. 2006;63(4):415-24.

Merikangas KR et al. *Arch Gen Psychiatry*. 2007;64(5):543-52.

# Triaging Assessment & Treatment Priorities



**Alcohol and substance abuse**

**Mood disorders**

Bipolar and MDD

**Anxiety disorders**

Obsessive-compulsive disorder,  
generalized anxiety disorder, panic

**ADHD**

Goodman D. 2005.

Order of treatment, justification of polypharmacy should consider the severity and inter-dependence of the concurrent disorders. Demoralization, learned vigilance, obsessiveness can be secondary to ADHD

# The 4 Tasks of Diagnosis

**DSM ADHD is identified by BEHAVIOR;  
There is no test or objective measure**

Are sufficient “presentation” SYMPTOMS met?

≥ 5 inattentive and / or

≥ 5 impulsive / hyperactive symptoms

over last six months

What is their longitudinal COURSE?

Onset by age 12

Are TWO OR MORE ROLES impaired?

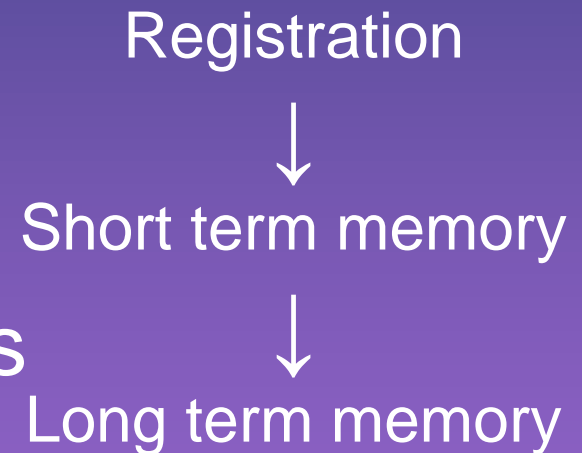
Is impairment due to ANOTHER CONDITION?



# DSM-IV Symptoms of Inattention

***6 of the following often apply:***

- Difficulty sustaining attention
- Easily distracted
- Poor listening
- Leaves tasks unfinished
- Careless mistakes
- Avoids sustained attention tasks
- Loses things
- Forgetful
- Difficulty organizing



# ADHD Screening

Identify recent challenges

- Focus patient on last / a typical week

Symptom frequency AND SETTING/ROLE –  
Interview, not just self-survey

- “How often? Several times a day? Once a week?”
- What situations/roles (MUST OVERALL BE IN 2+)  
Ask about non-complaint areas: self-care/ social life ?

Functional impact? Particularly on HEALTH?

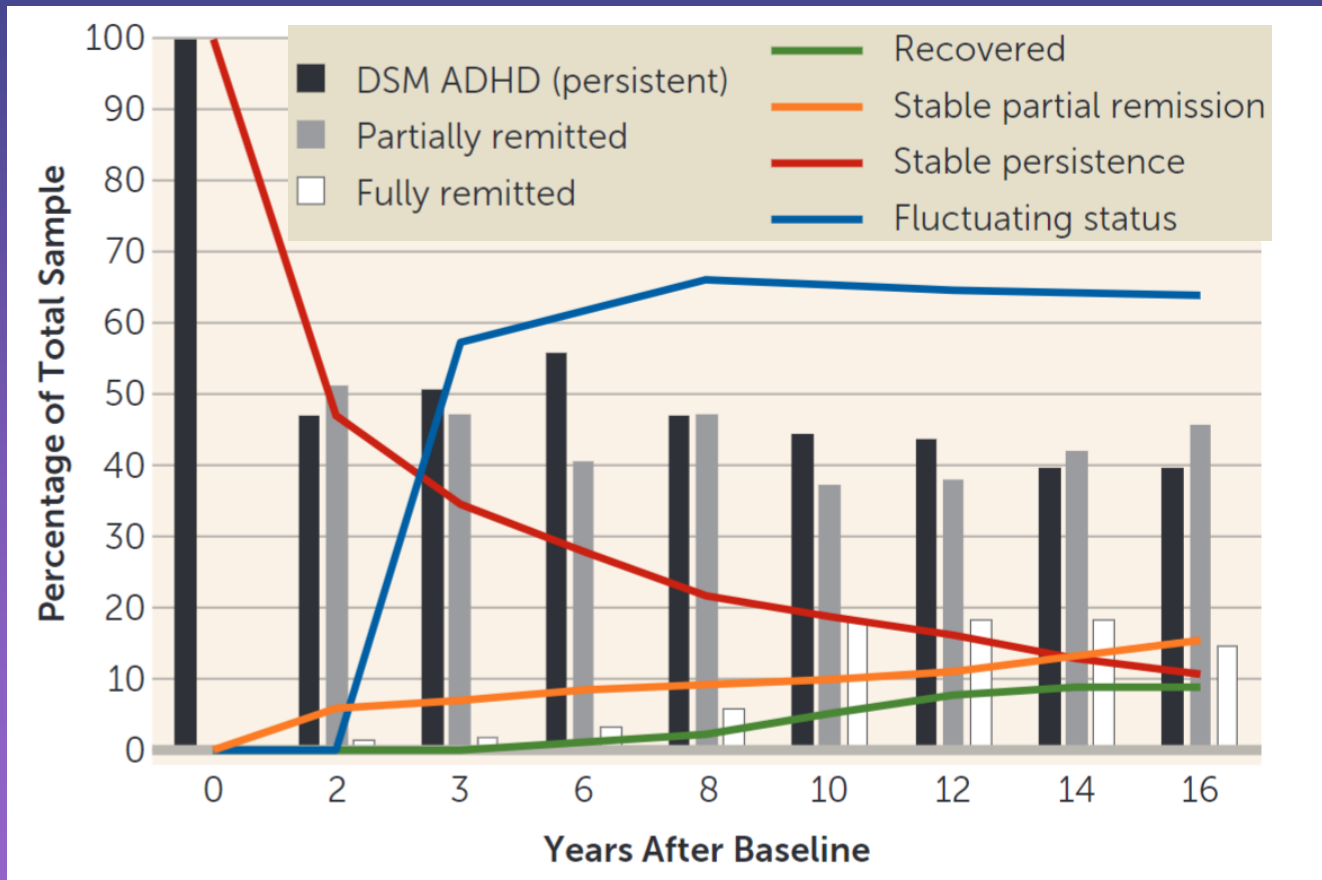
- Success at roles? (work, home, school)
- Missed/avoided opportunities?
- How do they compensate?

Pervasive since before age 12?

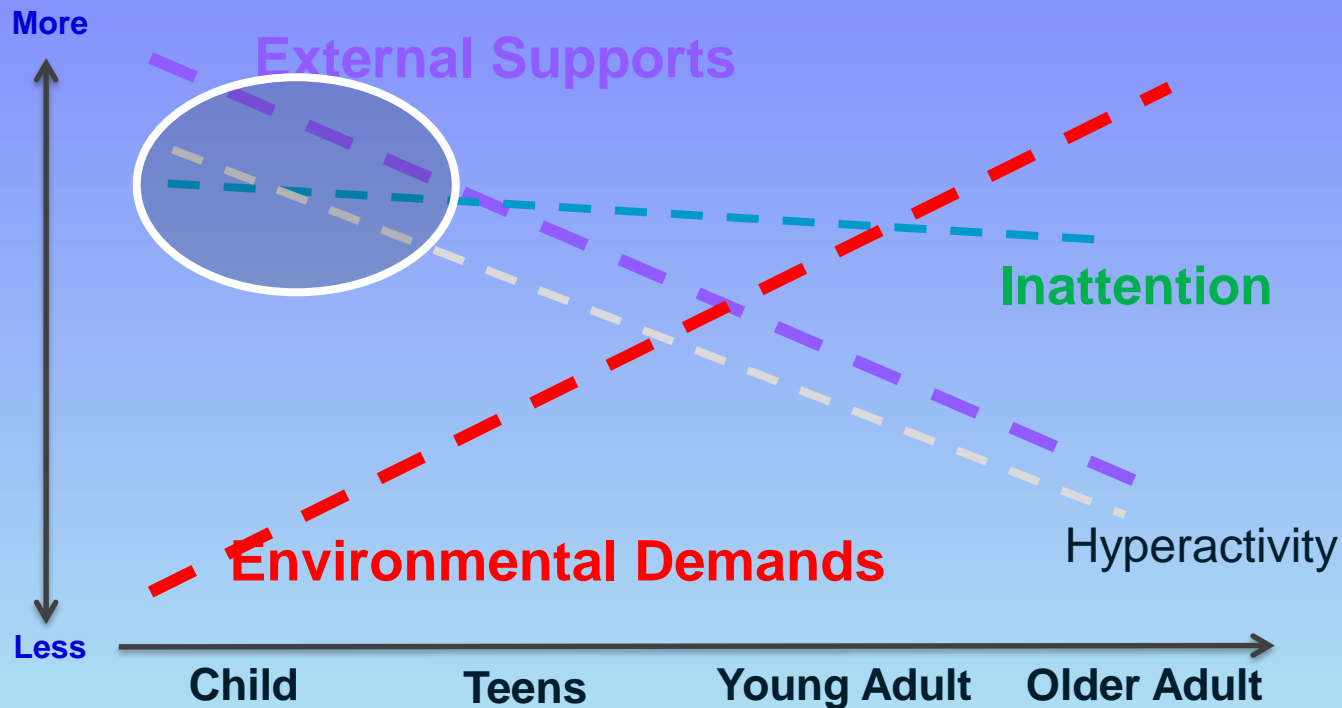
Independent of other factors?

Surman, Ed.  
A Practical Guide  
2013

# MTA 16-Year Follow-up (Ages 9 to 25)



# Why 'Fluctuating' ADHD makes sense: Age + Environmental factors Impact Severity



# Screening Adults for ADHD

- The first 6 questions from the **Adult ADHD Self-Report Scale (ASRS)** correlate highly with diagnosis of ADHD.
- Individuals who note 4 or more of these symptoms at the shaded frequency levels should undergo a comprehensive assessment for ADHD

## Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist

Patient Name			Today's Date							
Please answer the questions below, rating yourself on each of the criteria shown using the scale on the right side of the page. As you answer each question, place an X in the box that best describes how you have felt and conducted yourself over the past 6 months. Please give this completed checklist to your healthcare professional to discuss during today's appointment.					Never	Rarely	Sometimes	Often	Very Often	
1. How often do you have trouble wrapping up the final details of a project, once the challenging parts have been done?										
2. How often do you have difficulty getting things in order when you have to do a task that requires organization?										
3. How often do you have problems remembering appointments or obligations?										
4. When you have a task that requires a lot of thought, how often do you avoid or delay getting started?										
5. How often do you fidget or squirm with your hands or feet when you have to sit down for a long time?										
6. How often do you feel overly active and compelled to do things, like you were driven by a motor?										

Reprinted with permission, World Health Organization.

**TRACK Symptoms with 18 item ASRS: see [adhdinadults.com](http://adhdinadults.com)**

# Pitfalls in ADHD assessment

Retrospective chart review at Mayo Clinic Family Practice of individuals referred for ADHD evaluation

104 adults

- ASRS score interpreted as evidence of ADHD
- Incomplete exploration of full criteria
- Comorbidity addressed without addressing attention deficit
- 14% rate of prior eating disorders not documented
- Focus on stressor rather than diathesis

Wilfarht et al, Poster, APSARD Annual Meeting, 2023

# Peri-Covid Commercial Rx Trends

Publications  
March 30, 2023

Centers for Disease Control and Prevention  
**MMWR**  
Weekly / Vol. 72 / No. 13

Morbidity and Mortality Weekly Report  
March 31, 2023

## Trends in Stimulant Prescription Fills Among Commercially Insured Children and Adults — United States, 2016–2021

Melissa L. Danielson, MSPH<sup>1</sup>; Michele K. Bohm, MPH<sup>2</sup>; Kimberly Newsome, MPH<sup>1</sup>; Angelika H. Claussen, PhD<sup>1</sup>; Jennifer W. Kaminski, PhD<sup>2</sup>; Scott D. Grosse, PhD<sup>3</sup>; Lila Siwakoti, MPH<sup>2</sup>; Aziza Arifkhanova, PhD<sup>2</sup>; Rebecca H. Bitsko, PhD<sup>1</sup>; Lara R. Robinson, PhD<sup>1</sup>

Prescription stimulant use, primarily for the treatment of attention-deficit/hyperactivity disorder (ADHD), has increased States during recent decades, while among children and adolescents

fills, to calculate the annual percentages of persons continuously enrolled throughout the calendar year with one or more prescription stimulant<sup>†</sup> fills. All prescription stimulants were included in the analyses, regardless of whether the enrollee had any claims with an ADHD diagnosis code present. Percentages and annual percent change (APC) were calculated for enrollees

cial claims data were analyzed to in stimulant fills before and during  
[https://www.cdc.gov/mmwr/volumes/72/wr/mm7213a1.htm?s\\_cid=mm7213a1\\_w](https://www.cdc.gov/mmwr/volumes/72/wr/mm7213a1.htm?s_cid=mm7213a1_w)

Guest Editorial

### Sudden Increases in U.S. Stimulant Prescribing: Alarming or Not?

Margaret H. Sibley<sup>1</sup>, Stephen V. Faraone<sup>2</sup>,  
Joel T. Nigg<sup>3</sup>, and Craig B. H. Surman<sup>4</sup>

ADHD is a neurodevelopmental disorder with a prevalence of approximately 6% in children and 3% in adults (Song et al., 2021; Willcutt, 2012). ADHD impacts public health substantially as a potentially causal precursor to many psychiatric (e.g., depression, anxiety, addiction) and somatic conditions (e.g., obesity) (Faraone et al., 2021). It is costly due to educational, vocational, and financial impairments,

evidence suggest ADHD symptoms can wax and wane—did the pandemic exacerbate ADHD in some? Why did women seek treatment at higher rates than men? Did some individuals self-identify and self-advocate for ADHD treatment due to information or advertisements seen online? If so, was ADHD the right diagnosis? Adults driving upticks in stimulant treatment may be late-identified cases, who

<https://journals.sagepub.com/doi/10.1177/10870547231164155>

Journal of Attention Disorders  
1–4  
© The Author(s) 2023  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/10870547231164155  
journals.sagepub.com/home/jad  
SAGE

Report on enrollees aged 5–64 years in employer-sponsored health plans

# 2020-21 Abrupt Rise in Stimulant Rx

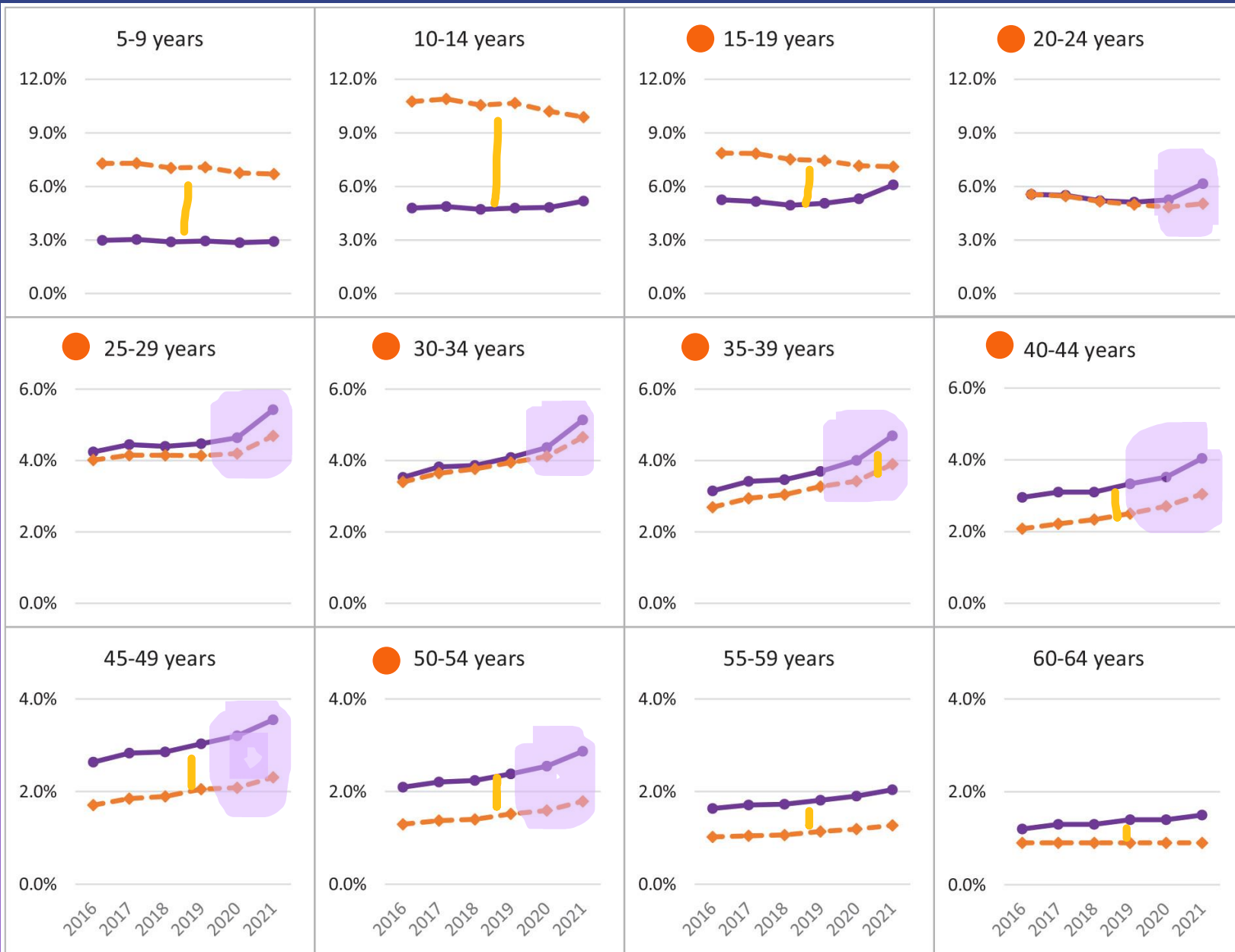
In a commercial prescription dataset, among those with a proxy definition of ADHD there was an Annual Percentage Change of > 10% in:

Women age 15–44, 50-54

Men aged 25–44, 50-54



# 2016-21 ≥ 1 stimulant Rx



● 10% increase '20-'21

Gender gap

Women d/dx notable

CDC, 2023

Female Male

## Healthy Interpretations

- Women and older/middle-aged adults with ADHD historically under-identified
- Stimulant prescription rates becoming less age- and sex-dependent
- Prescription rates came closer to ADHD's expected prevalence in adults

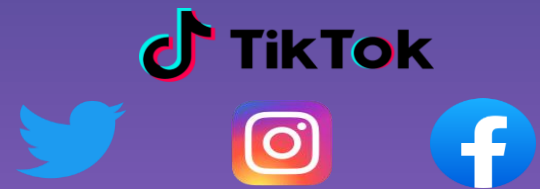
Sibley, Faraone, Nigg, and Surman  
Journal of Attention Disorders, 2023

## Care Environment Factors

- Community misinformation

Social media: 52% of Tiktoks misleading, and 71% misattribute transdiagnostic symptoms

(Yeung et al, 2022)



- No guidelines for ADHD Dx+Txt choices  
(In development by APSARD & CHADD)

- Telehealth / for profit care quality?

(DEA has waived Ryan-Haight in person care contingency for stimulants until 2025)

# Has Pseudo-ADHD been Exacerbated?



About as many adults ages 18 to 64 report severe cognitive issues as report trouble walking or taking the stairs,

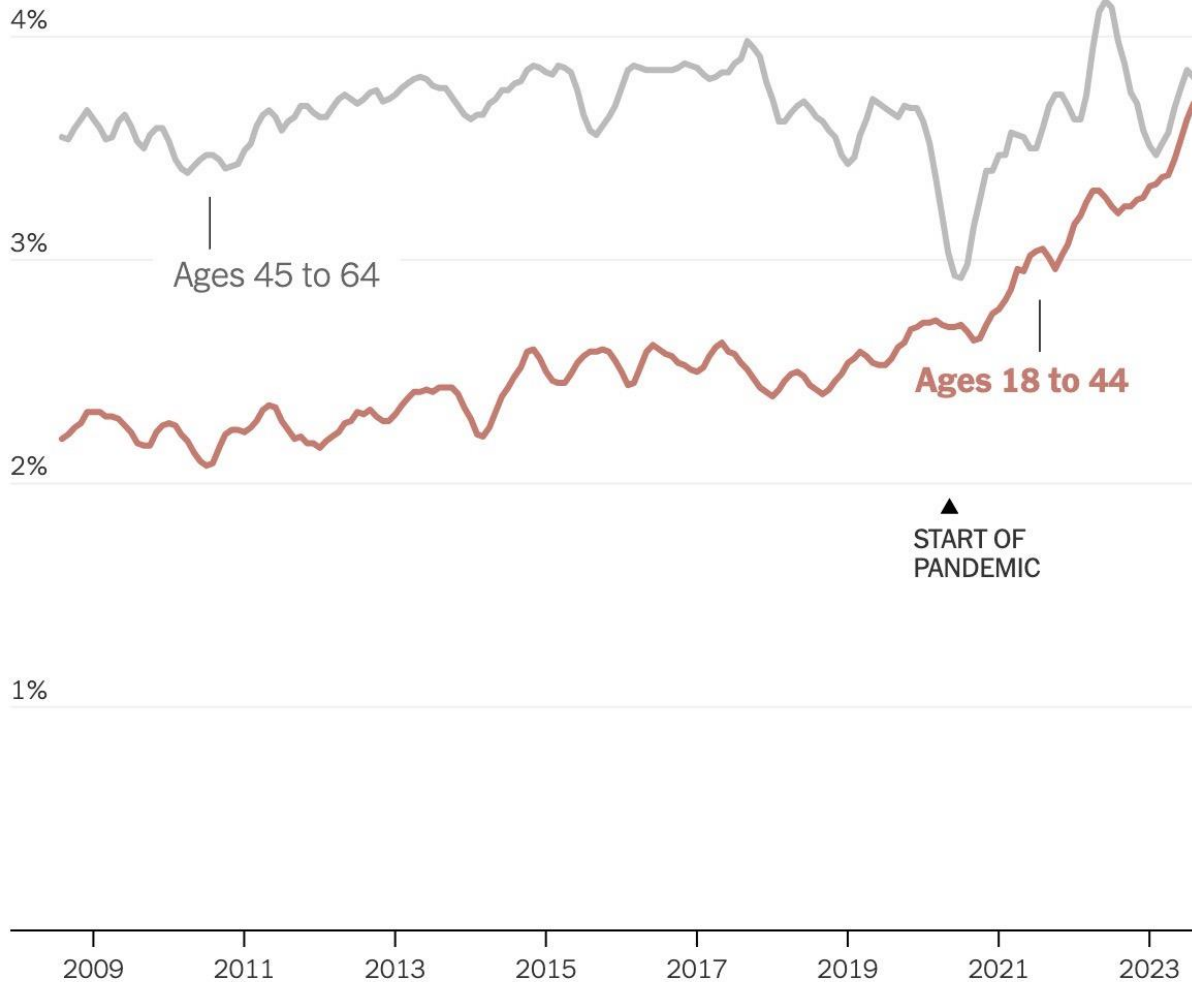
**Current  
Population  
Survey  
59000  
households**

Three-month rolling average. Includes people ages 18 to 64. Source: Current Population Survey via [IPUMS](#)

NYT, Nov 13

# 18-44 Age Group Answers Most Concerning...

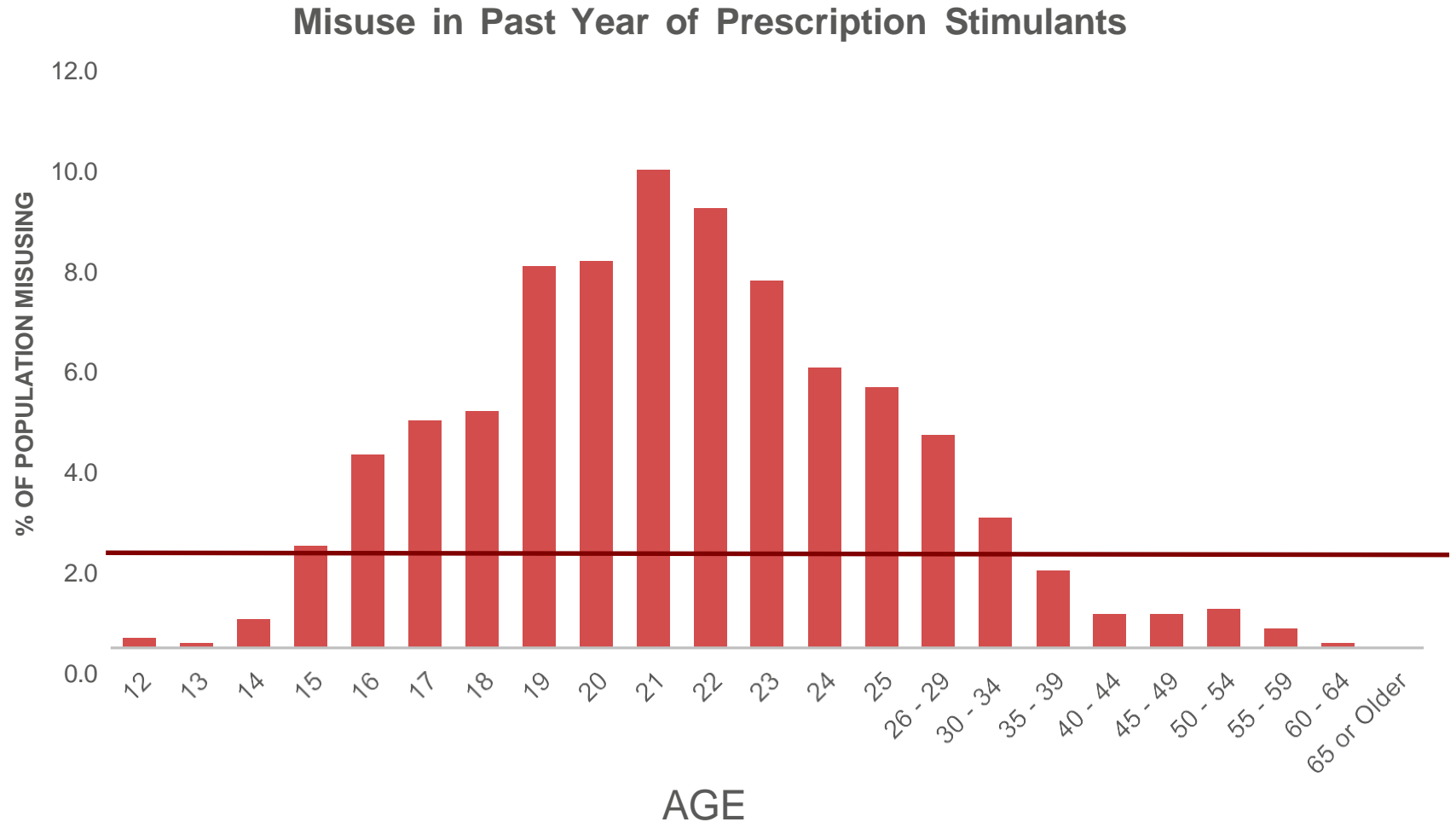
Percent of Americans who said they had “serious difficulty” remembering, concentrating or making decisions



Three-month rolling average. Source: Current Population Survey via IPUMS

# Stimulant Misuse Peaks at Age 21

## 10% of the Population Reporting Lifetime Stimulant Misuse



# Stimulant Misuse and Diversion

- **N > 120 studies; mostly survey studies in college students (80%)**
- **10% to 20% prevalence of nonmedical use of stimulants**
- **65% to 85% of stimulants diverted from “friends”**
  - **Majority not “scamming” local doctors**
  - **Not seen as potentially dangerous**

# 3 modes of support

- DA/NE boosting – Stimulants
- NE boosting – Nonstimulants:
  - DA salience / engagement thought/thing at hand  
“I’m not sidetracked moment to moment”
  - NE holding “mission in mind” / vigilance
- CBT type skill training + “coaching”
  - strategy toolkit for efficient planning
  - success depends on “homework,” habitualness
- ADA accommodations :
  - less distractions, chunk work, more checking/review, accountability
  - Employer in control of what is ‘reasonable’



# Adult Evidence-base Rx:

Stimulants Methylphenidate Amphetamine compounds	Large (up to 1) Effect size for ADHD <sup>&amp;</sup>
Atomoxetine	Medium ES for ADHD
Viloxazine	?Medium ES size for ADHD
Bupropion <sup>*†</sup>	
Guanfacine ER <sup>*‡</sup>	Pediatric FDA approval
Memantine <sup>*‡‡</sup>	1 small open, 1 small controlled adult study <sup>**</sup>
Modafanil <sup>‡‡‡</sup>	Pediatric pilot data; Adult pre-registration study negative
Desipramine <sup>*††</sup>	High QT prolongation risk, side effect profile less favorable

<sup>&</sup> Effect sizes from heterogeneously designed studies

<sup>\*</sup>Not FDA Approved, Limited pilot studies in adults

<sup>†</sup> Kuperman et al, 2001; Reimherr et al, 2005; Wilens et al, 2001, 2005; Hamed et al, 2014; <sup>††</sup> Wilens et al, 1996; <sup>‡</sup> Iwanami et al 2020; <sup>‡‡</sup> (Surman et al, 2013; Mohammadzadeh et al, 2019) <sup>‡‡‡</sup> Biederman et al, 2006, Arnold et al, 2014)

# Number of Individuals Exposed for Response

## Comparing FDA label studies

Most robust dose ,  $\geq 30\%$  improvement in symptoms

- Lisdexamfetamine Dimesylate) 70 mg: 3.3  
(Adler et al, 2008)

- Methylphenidate ER: 3.0  
(Medori et al, 2008)

Overall txt arm, Improvement “much” or “very much”

- Dexamethylphenidate ER: 4.8  
(Spencer et al., 2007)

- Amphetamine-Dextroamphetamine ER: 3.6  
(Weisler et al., 2006)

- Viloxazine: 9.4 (flexible dosing)  
(Nasser et al., 2022)

# Viloxazine

- Noradrenergic agent
- Probable antidepressant effects
- 100 mg start
  - Over 300 mg probably more cardiovascular side effects; range up to 600 mg,
- Titration principles (similar to atomoxetine)
  - 2 weeks long enough for a dose to have effect
  - up to six weeks for full effects

# Cardiovasc Meta of 19 studies

## ADHD Rx all ages

3,931,532 individuals on ADHD treatment, all ages

Median followup 1.5 years

(Data for long term effects weak)

Little data from atomoxetine, majority MPH/AMPH

No association with:

- CVD, specifically myocardial infarction, cardiac arrest, arrhythmias, or cerebrovascular disease

- CVD in females

- CVD in pre-existing CVD

Nonsignificant signal for modest increase in risk of cardiac arrest or tachyarrhythmias, risk in females

Zhang et al [JAMA Netw Open](#). 2022 Nov; 5(11): e2243597.

# Swedish ADHD Rx CV Impact

- 10,388 with CVD vs 51672 without, mean age 34.6 yo
- Over 14 yr followup, 4% greater risk of CVD (hypertension and arterial disease) with each year of use, AOR, 1.04 [95% CI, 1.03-1.05, largest in first 3 yrs (8%) (AOR, 1.08 [95% CI, 1.04-1.11
- Risk isolated to >
  - >45 mg per day for methylphenidate and lisdexamphetamine,
  - > 22.5 mg per day for amphetamines
  - > 120 mg per day for atomoxetine

Zhang et al, JAMA Psychiatry, 2024

# >65 yo: ? Greater CV risk from matched propensity studies

2017-2019, n=6457 on stimulant, 24,853 without  
Initiation of stimulant predicted

- First 30 days: 40% increase CV events
- At 180 days or 365 days, no increased risk

Tadrous et al, 2021 *MA Netw Open*.

13,233 adults over age 66, over 2 yrs

Amphetamine Rx associated with:

- higher blood pressure
- 3.31% absolute risk difference(OR 6.16) of cardiovascular events

Latronica, et al. J Am Board Fam Med 2021;34:1074–1081

# Safety Considerations

- Are sympathomimetic effects ok for patient?  
(HR, contractility, periph vasoconstriction)
  - Vigilance with cardiac “structural abnormality”  
Family hx of syncope / sudden death (long QT)
  - I recommend monitoring on vs. off as well as pre and 1-2 hours into stimulant dose
- Psychosis / mania precipitation/exacerbation
  - Amph > mph marginal psychosis risk  
(Moran et al, NEJM, 2019)

**Injuries and traumas**

- Dalsgaard et al., 2015 (39), Denmark
- Man et al., 2015 (41), Hong Kong
- Mikolajczyk et al., 2015 (43), Germany
- Raman et al., 2013 (44), United Kingdom

**Motor vehicle accidents**

- Chang et al., 2014 (49), Sweden. Males
- Females
- Chang et al., 2017 (50), United States. Males
- Females

**Criminality**

- Lichtenstein et al., 2012 (57), Sweden. Males
- Females

**Suicidality**

- Chen et al., 2014 (59), Sweden
- Man et al., 2017 (63), Hong Kong

**Substance use disorder**

- Chang et al., 2014 (64), Sweden
- Quinn et al., 2017 (66), United States. Males
- Females

**Depression**

- Chang et al., 2016 (67), Sweden

**Bipolar disorder and mania**

- Viktorin et al., 2017 (69), Sweden. Without mood stabilizers
- With mood stabilizers

**Psychosis**

- Man et al., 2016 (71), Hong Kong

**Seizures**

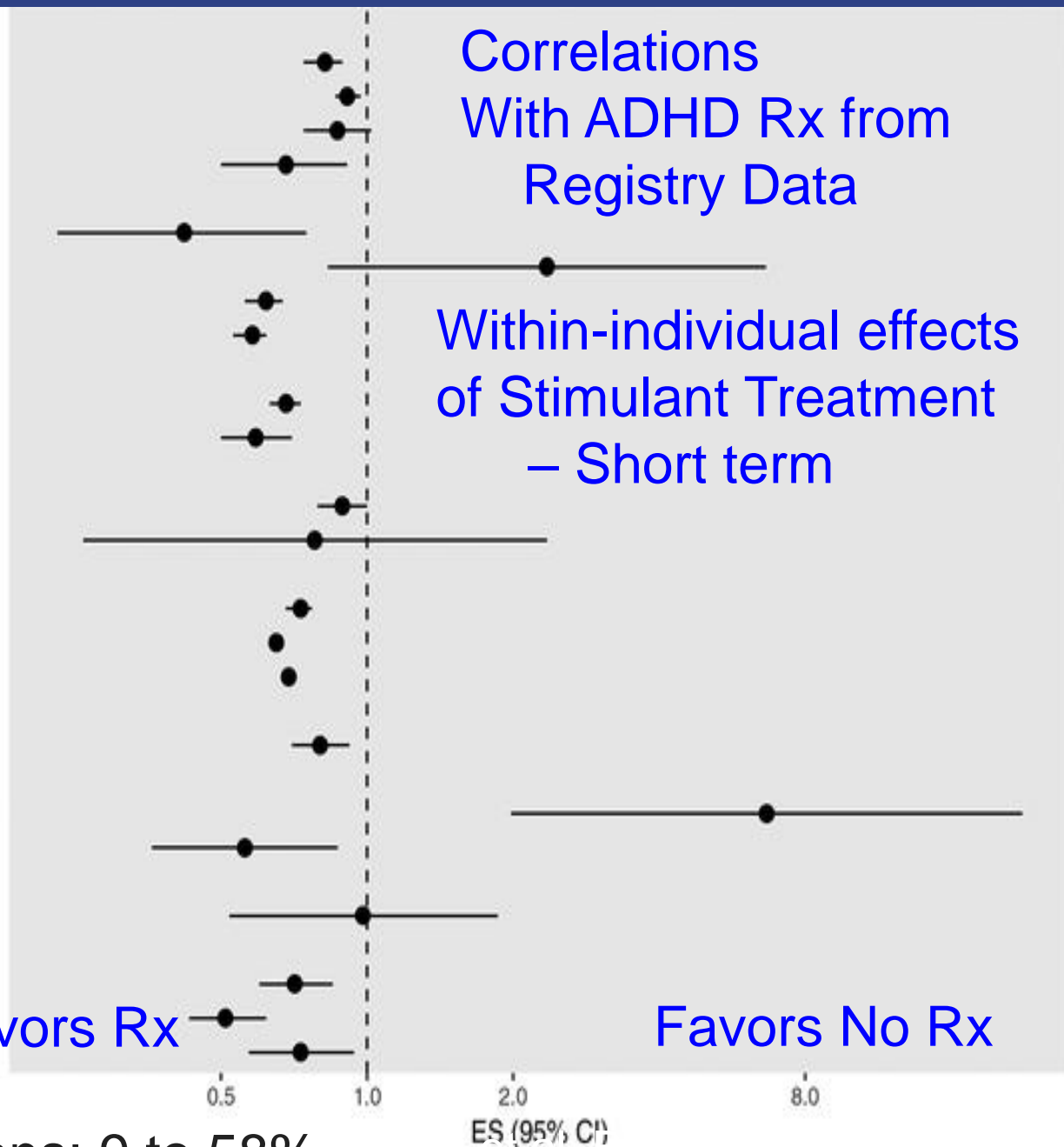
- Wiggs et al., 2018 (76), United States. Prior seizure
- No prior seizure
- Brikell et al., 2019 (77), Sweden

Correlations  
With ADHD Rx from  
Registry Data

Within-individual effects  
of Stimulant Treatment  
– Short term

Favors Rx

Favors No Rx



relative risk reductions: 9 to 58%

Favors no medication



# ADHD Rx in Sweden: Lower 2 year Causal Mortality

Target emulation national cohort trial  
148, 578 ADHD individuals, average age 17,

ADHD Rx initiation (stimulants, atomoxetine, guanfacine)  
CAUSAL 2 year mortality lower:

- all-cause (hazard ratio [HR], 0.79)  
(9 fewer deaths per 10,000 individuals)
- unnatural-cause (HR, 0.75)

Natural cause death not significant (HR, 0.86).

Li et al, JAMA, 2024

# What ADHD-specific symptoms are patient-trackable?

Article

## Personalized Remote Mobile Surveys of Adult ADHD Symptoms and Function: A Pilot Study of Usability and Utility for Pharmacology Monitoring

Craig Surman , Heidi Boland, Daniel Kaufman, and Maura DiSalvo

**Objective:** Validate the usability and treatment-sensitivity of a remote SMS-based ADHD monitoring method.

**Method:** 206 adults taking stimulants for ADHD participated. Participants selected ADHD symptoms and functional impairments that they anticipated to be stimulant-sensitive, which were rated via mobile messages up to 20 times over 10 days.

**Results:** A majority of participants found it only somewhat or not at all difficult to identify an ADHD symptom sensitive to presence of stimulant medication, and 79% responded to at least one survey message. As expected, a majority of participants endorsed it was “easy” to participate, and less burdensome than a paper diary. Surveys significantly discriminated between on and off medication states, both between days, and within the same day.

**Conclusion:** Our findings suggest SMS-based monitoring of patient-selected ADHD-related challenges is both feasible and sensitive to stimulant treatment. This remote assay method may be a meaningful adjunct to in-visit treatment monitoring

# What do our patients on stimulants track?

<b>ASRS Item (ADHD symptom self report)</b>	<b>Sample N=186</b>
	<b>N (%)</b>
avoid or delay getting started on tasks	35 (19)
keeping attention when doing boring or repetitive work?	23 (12)
getting things in order when you have a task that requires organization?	20 (11)
concentrating on what people say to you, even when they are speaking to you directly?	15 (8)
distracted by activity or noise around you?	15 (8)
<b>WFIRS Item (Role function problems)</b>	<b>Sample N=166</b>
	<b>N (%)</b>
work done efficiently (school=10, work=32)	42 (25)
keeping up with household chores	21 (13)
Feeling frustrated with yourself	11 (7)
working to your potential (school=4, work=6)	10 (6)
getting ready to leave the house	9 (5)

# Key Points – Adult ADHD

- Consider all dx criteria and differential
- ADHD-specific impact often contextual
- Comparative efficacy of treatments unclear
- Rx hypertension risk may be cumulative
- Treatment may allow lower causal mortality, adaptive outcomes
- ADHD and CV sensitive monitoring may optimize long term outcomes

# Some ADHD Resources

For consumers

[CHADD.org](http://CHADD.org)

[CADDAC.ca](http://CADDAC.ca)

For professionals:

[APSARD.com](http://APSARD.com)

[CADDRA.ca](http://CADDRA.ca)

Contact: [csurman@mgb.org](mailto:csurman@mgb.org)