Tobacco Use and Smoking Cessation Among People with Substance Use Disorders: A Summary of the State of the Science and New Evidence from Nevada

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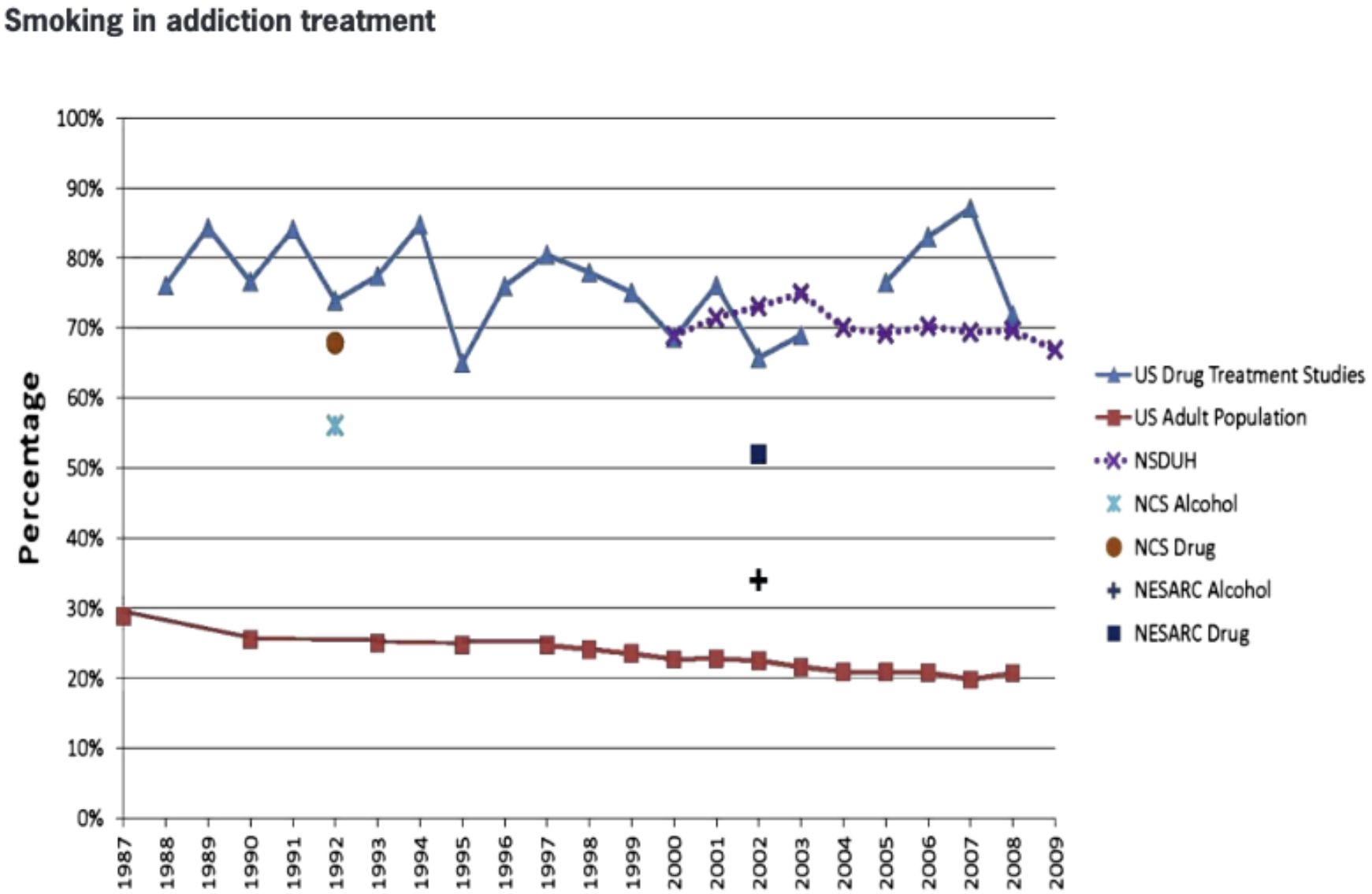
Topics for today's webinar

1) How many people with OUD/SUD smoke?
2) Consequences of smoking among people with OUD/SUD
3) State of the science: smoking cessation treatment for people with OUD/SUD
4) Harm minimization for cigarette smoking: what is it and when is it appropriate?
5) State of the science: e-cigarette use for harm minimization for people with OUD/SUD
6) Results from a recent smoking harm minimization study in Reno
7) Wrap-up and final questions

How many people with OUD/SUD smoke?

Smoking is very common among people with OUD/SUD



Guydish et al 2011

Smoking is very common among people with OUD/SUD

- Smoking prevalence estimates by treatment modality are:
  - 89% for those on methadone
  - 72% for those in outpatient treatment
- Smoking prevalence estimates by primary drug are:
  - 73 – 85% for opiates
  - 75% for alcohol

Guydish et al 2016; Guydish et al 2011

Cigarette smoking is being concentrated among people with SUD.

- In comparison, ~11% of US adults in the general population smoked in 2024
- Disparities are widening
  - Increase in prevalence of smoking among people with SUD
  - Decrease in prevalence of smoking among people without SUD

Weinberger et al 2018

People with SUDs have a harder time quitting and are more likely to relapse to smoking.

- People with lifetime or past-year SUDs less likely to quit smoking
  - For example -- 8.6% quit with SUD vs 16.3% quit without SUD
- People with past-year SUDs more likely to relapse to smoking after a quit, even after controlling for psychiatric disorders

Weinberger et al, 2013; Weinberger et al, 2016

Why do so many people with SUDs smoke?

- Common genetic and behavioral factors that increase the risk to find drugs reinforcing
- Common family and environmental factors that transmit risk for drug use (including nicotine use), such as adverse childhood events, living in a neighborhood with a lot of drugs & tobacco, etc
- Propensity to use drugs (including nicotine) to deal with negative feelings or to "self-medicate"
- Using nicotine to deal with withdrawal or other negative effects from other drug use
- Using nicotine may stimulate/increase craving for alcohol and other drugs
- Using nicotine "kicks the high" of current drug use
- …and many others

Kohut et al 2016

Consequences of smoking among people with OUD/SUD

Cigarette smoking remains the leading cause of preventable death in the USA

480,000 deaths/year

Mortality Following Inpatient Addictions Treatment

Role of Tobacco Use in a Community-Based Cohort

Richard D. Hurt, MD; Kenneth P. Offord, MS; Ivana T. Croghan, PhD; Leigh Gomez-Dahl; Thomas E. Kottke, MD; Robert M. Morse, MD; L. Joseph Melton III, MD

Among people admitted to inpatient treatment for primarily alcohol use disorder:

50.9% of deaths 10 years later were due to cigarette smoking

34.1% of deaths 10 years later were to alcohol use

Hurt et al 1996

PREVENTIVE MEDICINE 23, 61–69 (1994)

Tobacco Use as a Distal Predictor of Mortality among Long-Term Narcotics Addicts[1]

YIH-ING HSER, PH.D.,[2] WILLIAM J. MCCARTHY, PH.D., AND M. DOUGLAS ANGLIN, PH.D.

Neuropsychiatric Institute and Hospital, University of California, Los Angeles 90024-3511

In a 24-yr study of people who use drugs, death rate among cigarette smokers 4X that of non-smokers

Table 4. Tobacco-related deaths by gender for persons receiving mental health and/or substance abuse services in Oregon State, 1999–2005 (N = 148,761) *.

		All deaths (N = 148,761)	Tobacco-related deaths by age group (N = 46,209)				
		%	<50 %	50–59 %	60–69 %	70–79 %	> = 80 %
General population	Male	39.0	2.8	7.5	19.8	34.5	33.1
	Female	23.6	1.8	7.4	18.9	35.5	36.1
Mental health only	Male	37.7	9.2	17.6	20.1	27.4	25.4
	Female	24.8	7.8	17.3	21.7	27.4	25.6
Substance abuse only	Male	53.9	15.7	34.6	29.3	16.7	3.5
	Female	52.3	32.9	29.0	22.6	12.8	2.5
Dual services	Male	48.1	33.0	36.4	23.0	5.9	1.4
	Female	44.7	37.9	44.4	13.7	2.6	1.3

Banderia et al 2015

Conclusion: Cigarette dependence is a serious addiction with serious consequences for people with SUD.

State of the science: smoking cessation treatment for people with OUD/SUD

What are the major smoking cessation medications?

- Nicotine replacement therapy (gum, patch, lozenge, inhaler, nasal spray)
- Bupropion (Zyban)
- Varenicline (Chantix)
- New medication on the horizon: Cytisine

NRT: what is does, and pros and cons

Replaces nicotine from cigarettes & reduces withdrawal

Pros:

- Over-the-counter and thus easy to get
- Low cost with insurance – no cost sharing with Medicaid
- Reasonably effective – increases the odds of a quit by ~37%

Cons:

- Slow nicotine delivery
  - Using multiple NRT types can help address this
- People don't often like NRT
- Not as effective as other medications

Lindson et al 2023

Bupropion: what is does, and pros and cons

An antidepressant that helps reduce cravings and withdrawal symptoms.

It works on neurotransmitters in the brain to help reduce the desire to smoke.

Pros:

- Low cost with insurance not cost sharing on Medicaid
- More effective than NRT increases odds of a quit by ~43%
- Treats underlying depression as well!

Cons:

- Contraindications (as with any medication)
  - Bupropion is contraindicated in individuals undergoing abrupt withdrawal from alcohol or benzodiazepines due to the increased risk of seizures.

Varenicline: what is does, and pros and cons

Targets nicotine receptors in the brain to decrease cravings and withdrawal symptoms.

It partially stimulates these receptors, reducing the satisfaction derived from smoking.

Pros:

- Most effective cessation medication available in US – increases odds of quit by 200%
- Low cost with insurance – no cost sharing on Medicaid
- "Black box warning" removed by FDA

Cons:

- Side effects – mostly vivid dreams and nausea – particularly between Day 7-Day 14, increases non-adherence
- Contraindications (as with any medication)

New medication on the horizon… Cystisine

- Not new for many parts of the world – been on the market in Europe since the 1960s
- Available over-the-counter in Canada
- As effective as varenicline, but with fewer side effects
- Why don't we have it in the USA?
  - Generic – so profit motive not there
  - Little motivation for companies to go through costly FDA approval process
  - Fortunately, approval process underway….

Karnieg et al, 2018; Lindson et al, 2023

Do people in SUD/OUD treatment want to quit smoking?

- Yes!
- 44-80% of people in addiction treatment report wanting to quit smoking

Prochaska et al, 2004

Does smoking cessation jeopardize substance use treatment?

Nope.

- Smoking cessation treatment does not have a negative impact and often has a positive impact on substance use treatment outcomes
  - Improved substance use outcomes included decreased remission, decreased escalation of use post-treatment, increased likelihood of P30D abstinence from primary drug, etc
  - True even if relapsed to smoking
- No difference by forced quit attempt (e.g. smoke-free policy) or smoking cessation intervention type (e.g. brief advice to quit, motivational interviewing, and offering vs. not offering nicotine replacement)

McKelvey et al 2016; Prochaska et al 2004

Cigarette smoking is associated with increased risk of substance use disorder relapse: A nationally representative, prospective longitudinal investigation

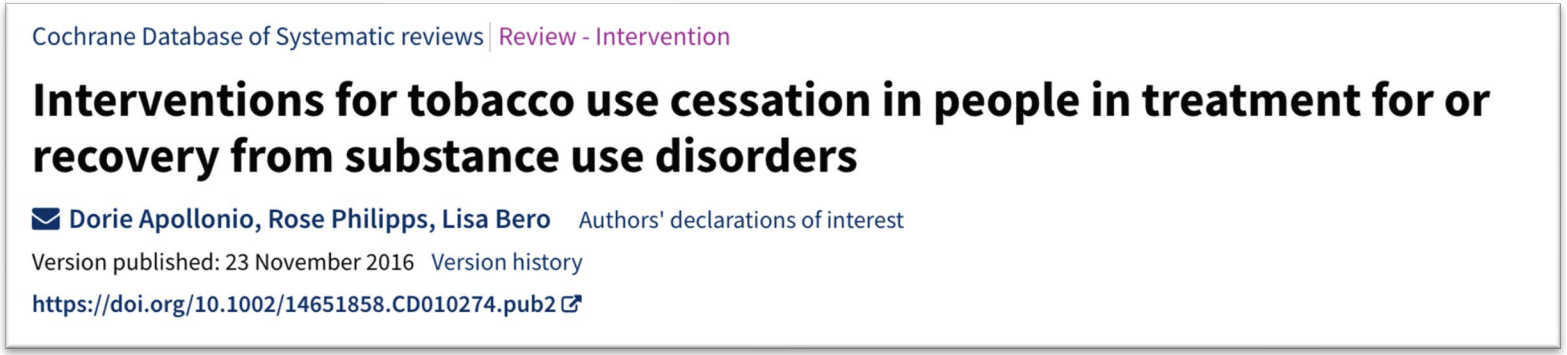
Andrea H. Weinberger, PhD[1,2], Jonathan Platt, MPH[3], Hannah Esan[1], Sandro Galea, MD, DrPH[4], Debra Erlich[5], and Renee D. Goodwin, PhD, MPH[3,5]

Continued smoking among smokers increases odds of SUD relapse 1 year later by 200%

Smoking initiation among non-smokers increases odds of SUD relapse by almost 500%

Weinberger et al 2017

Do smoking cessation interventions work for people with SUD?



Cochrane Database of Systematic reviews | Review - Intervention

Interventions for tobacco use cessation in people in treatment for or recovery from substance use disorders

Dorie Apollonio, Rose Philipps, Lisa Bero Authors' declarations of interest

Version published: 23 November 2016 Version history

https://doi.org/10.1002/14651858.CD010274.pub2

- Summarizing across 35 studies:
  - NRT or NRT + counseling was effective at increasing smoking cessation regardless of:
    - Primary drug used
    - Timing (when they were starting treatment or in recovery)
  - No evidence that other pharmacotherapies effective, but the quality of the studies was low (so take this with a grain of salt)
  - Counseling alone not effective

What about for people in recovery for OUD?

- Among patients receiving methadone:
  - Nicotine replacement therapy with and without behavioral therapy increased the odds of smoking cessation by a factor of 6
  - Varenicline had *suggestive* effects, but not statistically significant
    - Possibly due to few studies evaluating varenicline, possibly due to participants having a hard time adhering to varenicline treatment
  - Behavioral therapy without NRT did not increase cessation
  - All interventions reduced participants' cigarettes per day

SUBSTANCE USE & MISUSE
2018, VOL. 53, NO. 2, 276–285
https://doi.org/10.1080/10826084.2017.1342661

Taylor & Francis
Taylor & Francis Group

ORIGINAL ARTICLE

Check for updates

Smoking Cessation Among Methadone-Maintained Patients: A Meta-Analysis

Anne Yee[a], Moey Chee Hoong[a], Yong Chen Joyce[b], and Huai Seng Loh[b]

[a]University Malaya Center of Addiction Sciences, Department of Psychological Medicine, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia; [b]Clinical Academic Unit, Newcastle University Medicine Malaysia, Nusajaya, Johor, Malaysia

When should these interventions occur? During treatment or in recovery?

- Smoking cessation interventions are as effective when people are in active treatment as when they are in recovery
  - In other words, the effect sizes were the same
- However, higher cessation rates among people in recovery

Prochaska et al, 2004

Harm minimization for cigarette smoking: what is it and when is it appropriate?

An aside – let's define our terms

- Smoking = combusted tobacco use, like cigarette smoking, cigar smoking, cigarillo smoking, hookah smoking, little cigar smoking.
- Burnt tobacco produces smoke.
- E-cigarette use/ENDS use/vaping = using an e-cigarette/vape pen/vape/ENDS to consume nicotine.
- "Vaped" nicotine liquid produces an aerosol (commonly called "vapor").
- Tobacco product = product where you can see the tobacco leaf (like cigarettes or snus)
- Nicotine product = contains nicotine, but no tobacco leaf (like e-cigs or nicotine pouches)

Defining harm reduction in tobacco control

- **Harm reduction** – Idea is that any change in smoking behavior that results in a reduction in relative harm from a prior level, even a small reduction such as reducing smoking by one or two cigarettes per day.
  - Might translate to longer, healthier life…maybe…?
  - Long history of being used to keep smokers smoking by tobacco companies.

Fake harm reduction:
Marketing to the "concerned smoker"

RJ Reynolds Tobacco Company (RJR)

- 1970s: Real, RJR's "100% natural cigarette," had a "high chance of immediate success" due in part to its "healthful implications."
- 1980s: RJR proposed a "100% additive-free" cigarette to "reduce the perceived primary health concern" of smokers.
- 1990s: RJR documents described "additive-free" Winston cigarettes as appealing to "concerned smokers" worried about "ingredients, yield, [and] risk factors."

SEGMENT (PRIMARY MOTIVATOR OF CIGARETTE BRAND CHOICE) (WHY CHOOSE BRAND)	"PERSONAL RELEVANCY	GUILTY SMOKER	CONCERNED SMOKER
PSYCHOLOGICAL DESCRIPTORS (HOW TO EXECUTE)	INNER RECOGNITION/ MATCH OF SELF IMAGE (E.G., "KICK BACK/RELAX", INDEPENDENCE, EMPOWERMENT, SEEKING THE BEST)	- CARES ABOUT OTHERS - INNER RELIEF/ SOCIAL ACCEPTANCE	- PERSONAL SECURITY - INTELLIGENT CHOICE
RATIONAL/ TANGIBLE CUES (HOW TO EXECUTE)	SMOKING SATISFACTION (E.G., PROCESS, NAME, PACK)	PRODUCT DELIVERY/ CONFIGURATION (E.G., REDUCED SMELL, SMOKE, MESS)	PRODUCT INGREDIENT/ YIELDS
PRICE DRIVER (HOW TO EXECUTE) (Y/N)	NO	NO	NO
TARGET SKEWS (WHO TO EXECUTE AGAINST)	25+	- FEMALE 35+ - HIGHER EDUCATION	35+
MARKET SIZE (MASS/NICHE)	MASS	NICHE	MASS/NICHE
BRANDS	- MARLBORO - SELECT - PARLIAMENT - VANTAGE - MERIT - WINSTON NATURAL	- GTC - SALEM PREFERRED	- NOW - CARLTON - WINSTON NATURAL - EW

Bates Number : 519858916-519858920

Fake harm reduction:
Brands that made/make harm reduction claims

Kent: "Voice of Wisdom" (1955)

Quit or smoke True as equivalent options (1976)

Natural American Spirit "Made Different" (2020)

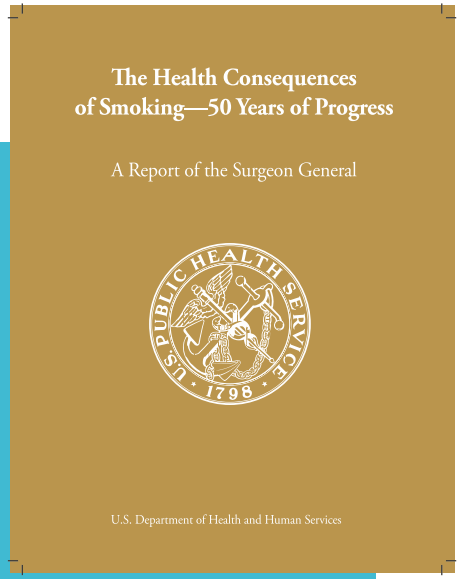
Defining harm reduction vs. harm minimization in tobacco control

- ~~**Harm reduction** – Goal is any change in smoking behavior that results in a reduction in relative harm from a prior level, even a small reduction such as reducing smoking by one or two cigarettes per day.~~
  - ~~Might translate to longer, healthier life…?~~
  - ~~Long history of being used to keep smokers smoking by tobacco companies.~~
- **Harm minimization –** Goal is to reduce harms to zero or as close to zero as possible. When a person who smokes does not want to stop all nicotine use, then harm minimization implies striving for the complete elimination of smoked tobacco by substituting it with less harmful non-combusted forms of nicotine
  - Patient-centered approach -- The ultimate goal is complete cessation, but this approach recognizes that nicotine abstinence is not every smokers' goal

How harmful are e-cigarettes overall?

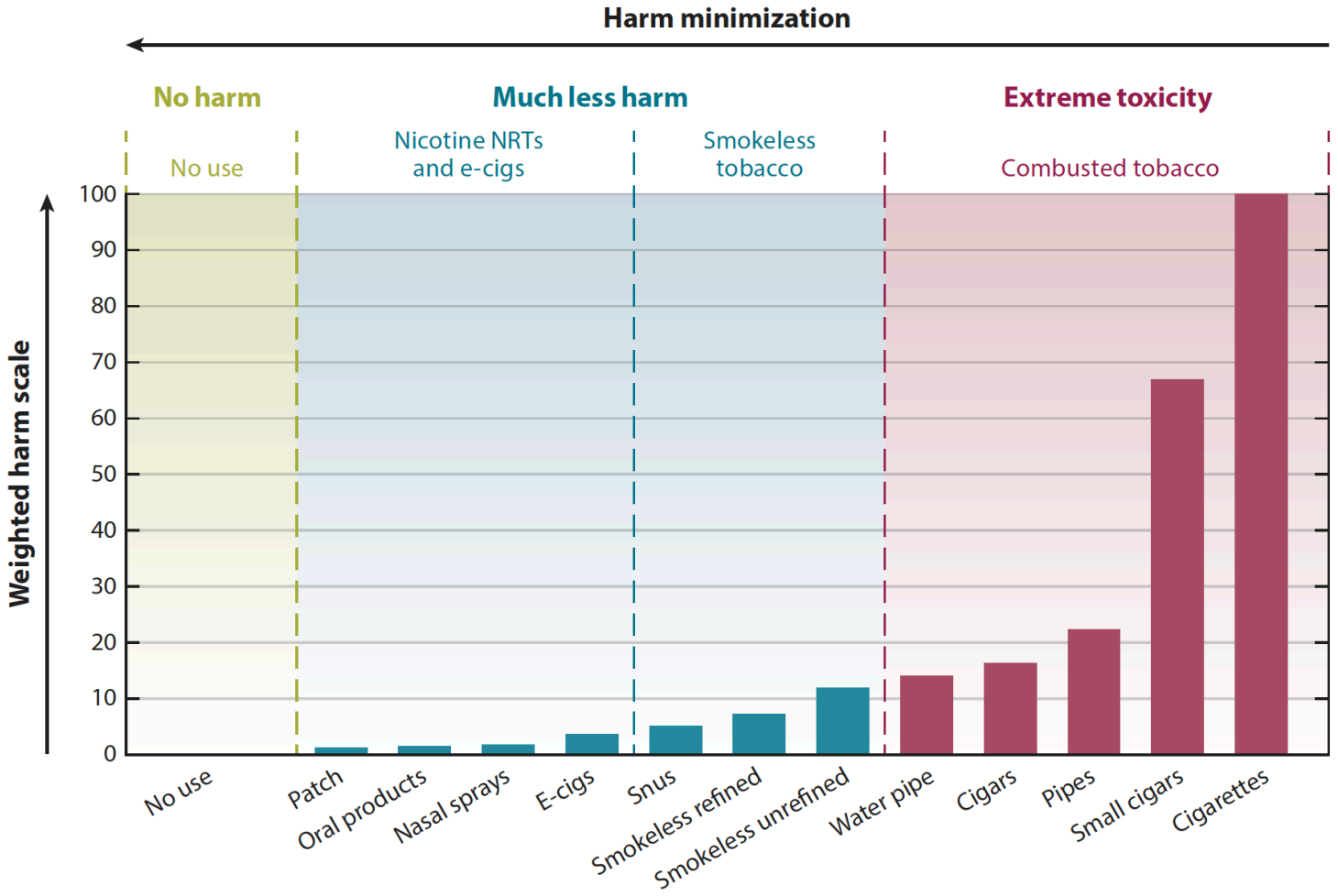
How harmful are they compared to cigarettes?

What do you know about the harmfulness of e-cigarettes?



Harm minimization: moving smokers down the harm continuum

"The burden of death and disease from tobacco use in the United States is **overwhelmingly caused by cigarettes and other combusted tobacco products**; rapid elimination of their use will dramatically reduce this burden."



Long term e-cigarette and NRT users' toxicant exposures look similar

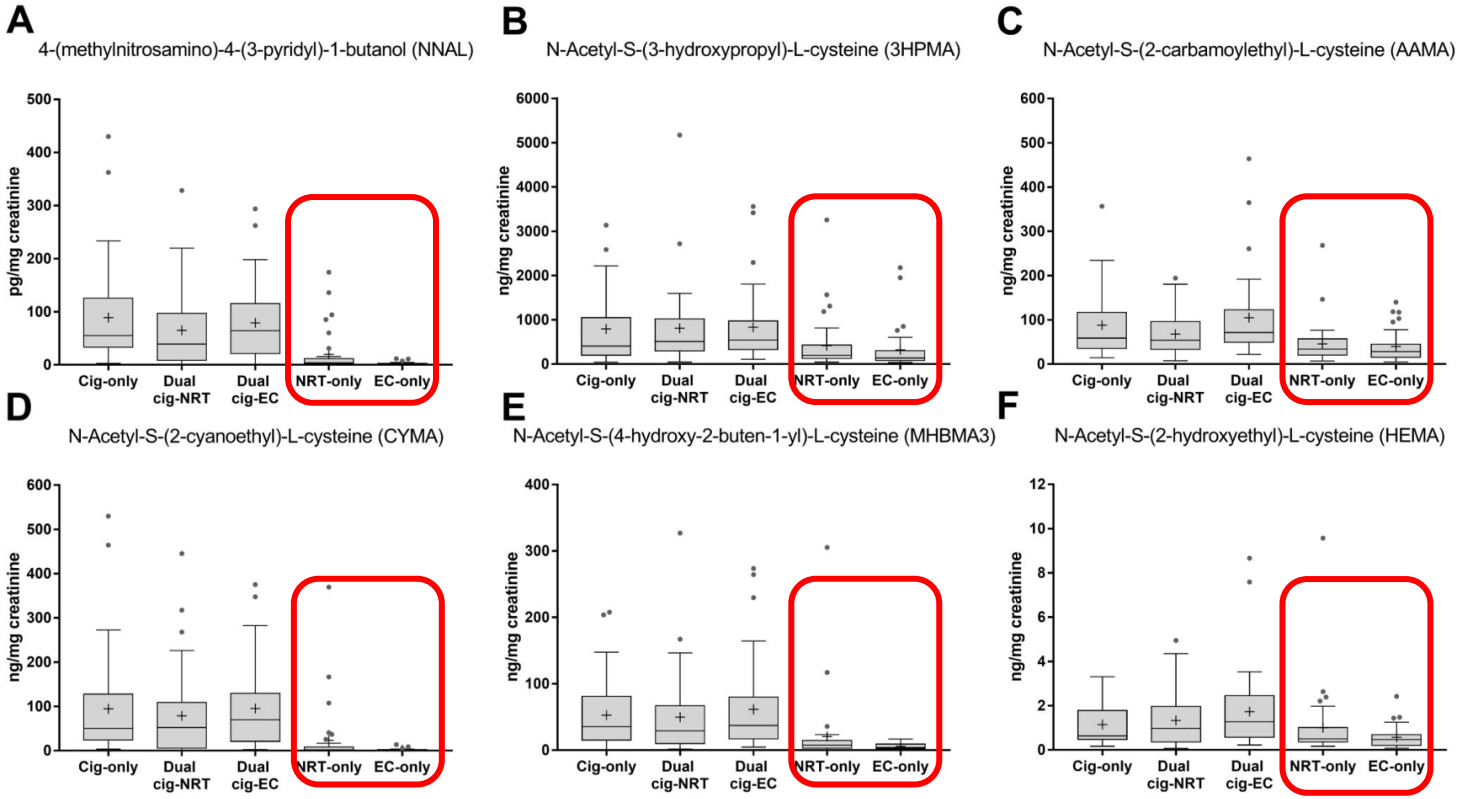


Figure 2. Urinary metabolite levels^ for selected toxicants by group*: (A) Tobacco- specific *N*-nitrosamine (NNK), (B) Acrolein, (C) Acrylamide, (D) Acrylonitrile, (E) 1,3-butadiene, (F) Ethylene oxide

Shahab et al 2017

Keep in mind

By its nature, harm minimization approach is only appropriate for **adult smokers**.

E-cigarette use, though significantly less harmful than cigarette smoking, **is harm elevating for people who don’t smoke.**

Ok, so when is a harm minimization approach appropriate for cigarette smoking

- For a smoker who does not want to give up nicotine
- For a smoker who has failed all other FDA-approved interventions (as a last-ditch attempt)

Any questions so far?

State of the science: e-cigarette use for harm minimization for people with OUD/SUD

Overall, can e-cigarettes help people quit smoking?

- Yes
- On average, across 16 studies, e-cigarette use increased the odds of smoking cessation by 237%

Lindson et al, 2023

What about for people with SUD/OUD?

- Hard to say because of a lack of quality data
- People with SUD are using e-cigarettes to quit more than people without SUD
- Pilot study results suggest e-cigarettes reduce smoking and may increase cessation, but jury is still out
  - Adherence was high to the e-cigarette interventions

Erinoso et al, 2024; Bonevsi et al 2021; Felicione et al 2019; Stein et al 2016

Is smoking reduction a worthwhile outcome?

- Definitely -- if it's a pitstop on the way to cessation
- *Maybe* – if it's a lifelong change
  - Clear dose-response relationship between risk of heart disease, lung cancer, chronic obstructive pulmonary disease (COPD), and how much one smokes
  - Does this translate to reduced risk for people who reduce but don't quit?
- However, no big change in exposures for dual cigarette/e-cigarette users

Begh et al 2015

Results from a recent smoking harm minimization study in Reno

Why this study?

- The **purpose** of this study was to examine the feasibility of providing a smoking harm reduction intervention featuring provision of e-cigarettes and tailored instructions to switch to people engaged in substance use dependence treatment who are uninterested in quitting nicotine altogether.
- **Goal**: collect enough feasibility and proof-of-concept data to convince NIH to give us more money for a larger study

Our pilot study – eligibility

- Enrolled 31 adult smokers who were:
  - Not interested in quitting nicotine
  - Interested in switching to e-cigarettes
  - Self-reported daily smoking with confirmed exhaled CO
  - Engaged in outpatient SUD treatment (any drug)
  - Had not used an e-cig to quit in the past 30D
  - Recruited at the Renown Stacie Mathewson Behavioral Health & Addiction Institute

Our pilot study – what we did

- Baseline survey
- Participants answered mini-surveys (multiple per day) assessing their cigarette smoking and e-cigarette use.
- Mini-surveys for 21 days:
  - Days 1-7: normal cigarette smoking
  - Day 8 (ish): provided e-cigarettes, advice to switch
  - Day 8-21: watched how their cigarette smoking changed as they used the e-cig
  - Day 21 (ish): in-depth interview to understand participants' experience switching

What we gave participants

NJOY Ace in classic and rich tobacco flavors; 5% nicotine

Has an FDA marketing order

Commercial version of a "research e-cigarette" developed by the National Institute on Drug Abuse

Relatively "clean," reliable, and easy to use

NJOY

MAKING SMOKING HISTORY™

Advice to switch

- You may have to plan ways to make it easier for you to only use your e-cig after midnight tonight – here are some suggestions:
  - Get rid of your cigarettes tonight so you are not tempted to use them tomorrow.
  - Remember that it won't be the same as a cigarette, but it will relieve the craving.
  - Use enough of the e-cig so that it satisfies your cravings for cigarettes.
  - Make sure you have your e-cig with you when you leave the house.
- We recognize that you might not be able to quit smoking immediately, but the goal is to replace as many cigarettes as possible with the e-cig. The quicker you get rid of the cigarettes, the quicker your sense of taste and smell will come back, and cigarettes will taste nasty to you, which will help you stay quit.

Whom did we enroll?

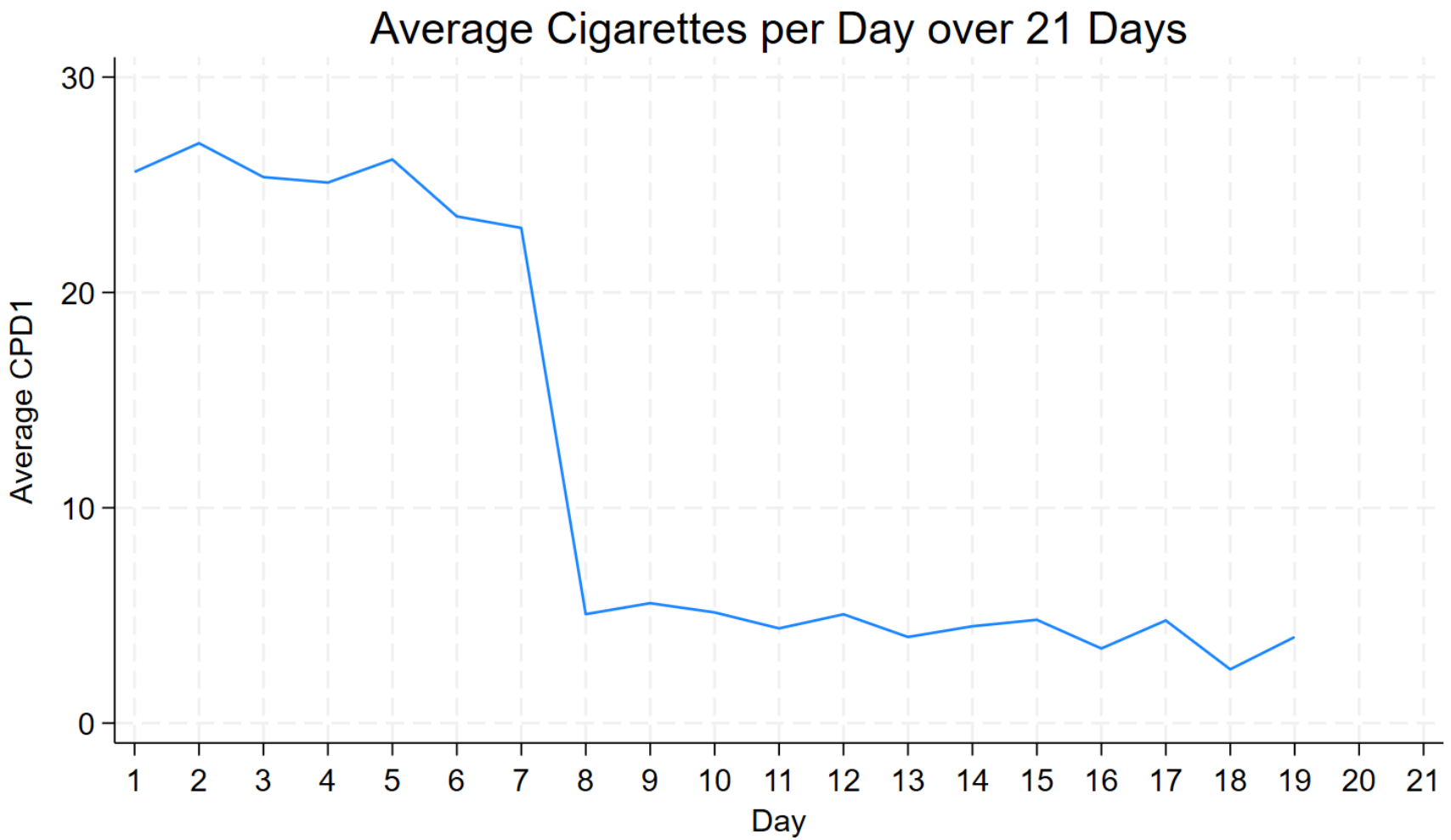
Sociodemographics

- Average age: 40
- 57% men
- 93% non-Hispanic White
- 57% high school or less
- 20% currently homeless

Substance use

- Average cigarettes per day: 15
- Average age of initiation: 14
- 57% smoked cigarettes within 30 min of waking
- 50% had used methamphetamine in the P30D
- 35% had used non-Rx opioids/fentanyl in the past 30D
- 28% had used heroin in the P30D

What did we find?



Following the switch to e-cigarettes on Day 8, average cigarettes per day reduced by 21 cigarettes.

24% of participants were smoke-free for at least 3 days by the end of the study.

Success!

- Marcus: *I wouldn't have been able to quit smoking without the e-cigarette... I feel like I've taken a big step forward.*
- Max: *It's a great aid in helping to reduce or quit smoking entirely... I'm optimistic that it would help me quit altogether.*
- Daniel: *As far as not smoking and switching to the e-cigarettes, it was no problem... It wasn't too hard to switch.*
- Isabella: *Actually, I quit smoking [cigarettes], but I barely vape now.*

E-cigarette use facilitators

- Convenient – no need for a lighter, no need for a long smoke break
- Hand-to-mouth motion vs. FDA-approved cessation aids
  - Paul: *I like it better because you still get to have that routine of smoking… the patch sucks… it's not the habit, so… your mind's still on it… with the vape you could do that too.*
- Cost savings

E-cigarette use facilitators

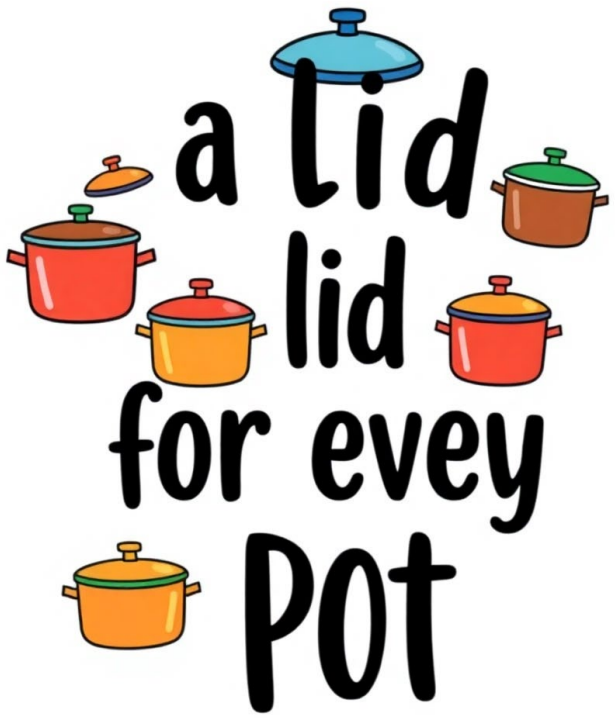
- Craving alleviation
- Noticing health improvements
- Feeling more social acceptance/less shame around e-cigarette use vs. smoking
  - Isabella: My daughter told me how she was proud of me... she doesn't like smelling like cigarettes... I'm not even doing that no more.
- Gradual switch as a good fit
  - Max: I'm excited … how it [e-cigarettes] tapers you down, it's a gradual as opposed to going abruptly or cold turkey.
  - Alex: My therapist loved the idea... we talked about triggers, just the same with substance abuse triggers … we've come up with a game plan of having small wins... progressively work down [*cigarette consumption*] as compared to just quitting altogether.

How did switching to an e-cigarette fit with your treatment?

- One thing at a time
  - Chloe: *Yeah, one thing at a time. Don't overdo it... I wanna get rid of the methadone first … I already know that cigarettes are gonna kill me... I figured they're better than the drugs that were killing me... pick one thing at a time.*
- Switching and substance use treatment go together:
  - Mildred: I feel good... it's just like quitting something else [*apart from tobacco*], which makes you kind of proud of yourself... quitting cigarettes feels good.
  - Max: … it helps in, in many ways reduces stress. It allows me to focus more on, uh, groups and therapy without, you know, having to take the time to go smoke a cigarette ... So yeah, it helps.
  - Karl: When I use the e-cigarette, I even cut back on my drug use. It made me cut back on use of meth.

Success for some, but not for all: Switching to e-cigarettes barriers

- E-cigarette did not fully alleviate cravings and wasn't satisfying
  - Shannon: *You don't get that full satisfaction… You're constantly vaping.*
  - Grace: *I feel like I wasn't getting enough pull, just the whole satisfaction of holding it in your hand, you know, … the whole thing you go through. I just don't satisfy myself with the, the e-cigarette … you know, smoking a cigarette, getting that pack, unpacking it and lighting it up. It's satisfying.*
- E-cigarettes inadequate replacements for "key" cigarettes: first thing in the morning, after a meal, or during stressful moments
  - David: *Anytime I started getting under stress, I'd just start smoking again.*



So, what should we conclude?

People in treatment and recovery should be offered the best possible smoking cessation treatment without concern that it will impede treatment/recovery

The best time to offer treatment is now

Nicotine replacement therapy has the best quality evidence to support it, but that might be because there aren't a lot of studies with varenicline in this population

E-cigarettes show promise as a harm minimization intervention for people who fail FDA-approved medications OR for people who are not ready to quit nicotine.

Any questions?

Thanks for your attention!

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