

# Technology-based Strategies for Adolescent Substance Abuse Prevention

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# Disclosures

- I have no commercial relationships to disclose
- I will not be discussing any unapproved uses of pharmaceuticals or devices
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# Presentation Overview

- Review major types of technology-based prevention strategies tested in substance abuse prevention
  - Focus on those used in primary care - used by patients, not just providers
- Brief review of evidence base

# Spectrum of Prevention Strategies

- **Universal prevention:** targets entire population, regardless of risk level
- **Selective prevention:** targets at-risk subgroups prior to initiation (e.g., those with risky families or peers)
- **Indicated prevention:** targets those in early stages of risk behavior to prevent further progression (early intervention)

# Technology-Based Strategies Explored

Within the clinic setting

- Pre-encounter:
  - Screening (computer tablet/kiosk, phone-based interactive response)
  - Tailored computerized feedback and psychoeducation



# Technology-Based Strategies, cont'd

- During encounter:
  - Clinician decision support: computer report of results; suggested guidance; follow-up recommendation
  - Clinician extender: computerized brief intervention



# Technology-Based Strategy Types, cont'd

Beyond clinic setting (Clinician Extenders)

- Web-based education/intervention programs
- Text-messaging interventions
- Smartphone apps

Emerging strategies...

- Wearables/sensors
- Social media/networking sites

# Recent review:

## Technology-based Interventions for Preventing and Treating Substance Use Among Youth



Lisa A. Marsch, PhD\*, Jacob T. Borodovsky, BA

### KEYWORDS

• Youth • Substance use disorders • Prevention • Treatment • Technology

### KEY POINTS

- Technology-based interventions are effective for preventing and treating substance use disorders.
- Technology is particularly suited to youth.
- Technology-based interventions are relevant at any stage in the development of a substance use disorder.
- Technology-based interventions provide solutions to extant problems of traditional interventions.

# Computer-facilitated Screening and Brief Intervention (C-SBI)

- Marsch & Borodovsky (2016) found two published trials (Harris et al., 2012; Walton et al., 2013) of technology-based prevention strategies tested among adolescent primary care patients (more among college students)
- Used within clinic setting
- Could be universal or selective prevention (based on screen results)
- Both found significant reductions in use *initiation* during 12-months follow-up

# Computer-facilitated Screening and Brief Advice (cSBA)

(Harris SK et al., Pediatrics, 2012)

- 5-minute tablet computer program with:
  - CRAFFT screener
  - Immediate feedback about score and risk-level
  - 10 interactive psychoeducational pages on health risks of substance use and related riding/driving risk
- Provider Report with screen results and 'talking points' to guide 2-3 minute discussion with teen

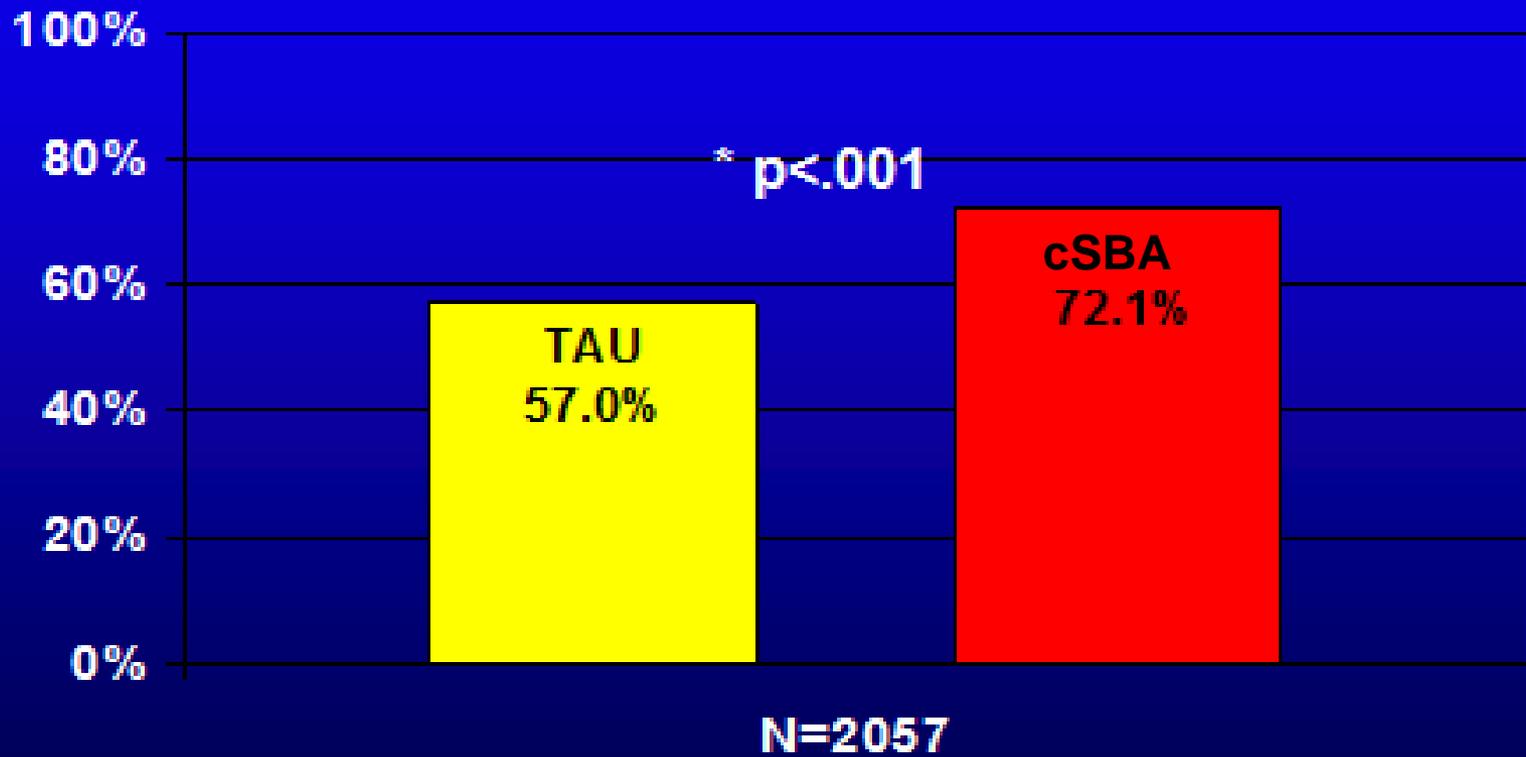
# cSBA Efficacy

- Tested in >2000 12-18 yr-old patients arriving for routine care at 9 clinic sites
- Compared to Treatment-as-Usual control, cSBA had...
  - Significantly lower overall self-reported alcohol use rates at 3 and 12 months follow-up
  - *Initiation* of alcohol use among baseline non-users reduced by 34% over 12 months

These technology-based systems  
also have potential to increase  
patient ratings of care...

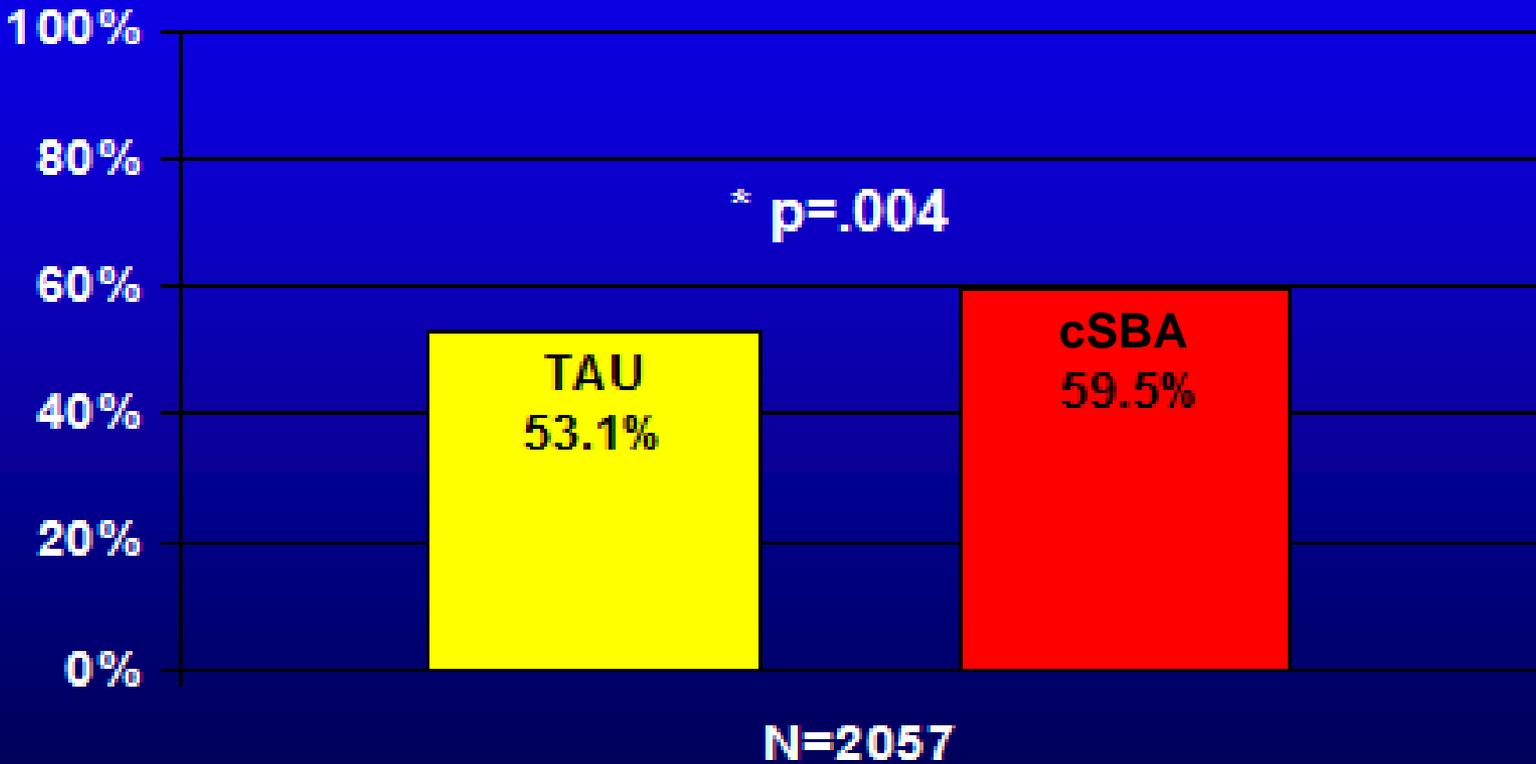
# % Rating their Provider Excellent/Very Good

Computerized Screening, Brief Intervention, and Referral to Treatment (cSBIRT) vs. Treatment as Usual (TAU)



# % Very Likely to Follow Provider's Advice

Computerized Screening, Brief Intervention, and Referral to Treatment (cSBIRT) vs. Treatment as Usual (TAU)



# Computerized Brief Intervention for Preventing Cannabis Use

(Walton MA et al., *Addiction*, 2013)

- Project Chill: self-administered interactive tablet computer program
- Animated with audio (headphones), delivered by a virtual “therapist” (avg. time  $33 \pm 13$  min)
- Motivational Interviewing-based: identifying values/goals, personalized feedback, pros/cons of use, alternate activities, role-plays, summary of responses, community resource list

# Project Chill Efficacy

- RCT conducted among 12-18 yr-old patients at 7 FQHC's
- Compared to “brochure” control, Project Chill...
  - Increased perceived risk of harm and refusal self-efficacy pre/immediate post
  - Reduced cannabis use initiation by 30% during 12-mo follow-up

# Technology-Based Prevention Strategies for Substance Abuse – What do we know?

Addictive Behaviors 38 (2013) 1747–1756



ELSEVIER

Contents lists available at SciVerse ScienceDirect

Addictive Behaviors



Computer and mobile technology-based interventions for substance use disorders:  
An organizing framework

Erika B. Litvin\*, Ana M. Abrantes, Richard A. Brown

*Department of Psychiatry and Human Behavior, Alpert Medical School of Brown University, Butler Hospital, 345 Blackstone Blvd., Providence, RI 02906, United States*

# Review findings

(Litvin et al., 2013)

- Research to date mostly on offline computer-based/text-messaging interventions; web-based and mobile intervention research still in infancy; almost none in social media/networks
- Few studies with teens (evidence stronger for adults, college students)
- Significantly better than minimal control conditions, but not other active in-person interventions
- Human Contact: some contact better than none
- On-site better than off-site

# A Good Resource



Center for **Technology**  
and **Behavioral Health**  
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Focusing on the development, evaluation, and implementation of technology-based therapeutic tools targeting behavioral health and health behavior

[www.c4tbh.org](http://www.c4tbh.org)

# Gamification

- Uses game-design elements to leverage developmental opportunities in adolescence
- Focus on intrinsic motivation of narrative, participant agency & personalized experience
- Building competence through vicarious learning as well as mastery experiences re: knowledge, self-efficacy & skills

# ***Intelligent Narrative System for Patient-Individualized Reflective Exploration***

- **Designing a self-adaptive personalized behavior change system for adolescent preventive health – focus on preventing & reducing risky alcohol use**
- **Integrates Social Cognitive Theory with artificial intelligence planning techniques & game technologies**

# **Narrative Centered Behavior Change System for Adolescent Preventive Health**

- Designed to link with primary care for prevention opportunities – communication with provider – “clinician extender”**
- Series of primarily home based narrative episodes with character interactions & virtual worlds**
- Iterative development with adolescents**
- Multi-platform deployments**