

**\*\*DRAFT – DO NOT DISTRIBUTE\*\***  
**Trainer Guide**

## National Core Curriculum

# Stimulants and their Impact on Brain and Behavior: Best Practices and Approaches for Effective Treatment and Recovery

First Edition – July 2020  
Developed by the ATTC Stimulant Workgroup



**SAMHSA**  
Substance Abuse and Mental Health  
Services Administration



**ATTC**

Addiction Technology Transfer Center Network  
Funded by Substance Abuse and Mental Health Services Administration



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## Background Information

The purpose of this daylong introductory level training is to provide information about central nervous system stimulants and their impact on brain, body, and behavior. The day begins with a review of the latest data on the patterns and trends of stimulant use and availability in the United States and beyond, followed by a review of the mental and physical health consequences and cognitive impact of stimulant use. The training then explores the differential rates and impact of stimulant use on several populations and the relationship between stimulant use and HIV risk. The training concludes with a discussion of how to implement effective behavioral treatment interventions and recovery approaches when providing services to people with a stimulant use disorder.

Specific topics will include (1) the scope of stimulant use in the United States and beyond; (2) stimulants and the brain and impact of use on cognition; (3) stimulant use and psychosis; (4) short- and long-term physical and mental health consequences of stimulant use and considerations for unique populations; (5) the intersection of stimulant use and HIV risk; and (6) effective evidence-based behavioral treatment interventions and recovery supports for people with a stimulant use disorder.

At the conclusion of the daylong Stimulant 101 training, participants will be able to:

1. Identify three specific national patterns and trends in stimulant use.
2. Recall at least three short-term and three long-term physical or psychological effects of stimulant use.
3. Specify two examples of the cognitive impact of stimulant use.
4. Catalog the differential patterns of stimulant use in at least three populations.
5. Interpret at least three links between stimulant use and the behaviors that may put an individual at increased risk of becoming infected with HIV or other sexually transmitted infections.
6. Apply at least two specific behavioral treatment interventions and two recovery approaches that have been proven effective in treating people with a stimulant use disorder.

The daylong curriculum features a series of group discussions, an evolving case study, and interactive activities to encourage ongoing dialogue among the training participants, and to illustrate how the information presented can be used clinically.


The daylong curriculum was developed to compile the latest science-based information pertaining to the impact of central nervous stimulants on brain, body, and behavior, with a focus on the implications for the provision of effective treatment and recovery approaches. Each slide in this curriculum contains detailed notes for the trainer to provide guidance, as necessary. References are included in the notes for each slide, where appropriate. In addition, the daylong curriculum comes with a companion trainer guide and full reference list to guide trainers in effectively presenting the content and facilitating the interactive activities. Regional ATTCs are encouraged to adapt the



curriculum content to include local or regional prevalence data or other information tailored to further contextualize the regional impact of stimulant use.

## What Does the Stimulant 101 National Core Curriculum Training Package Contain?

- **Face-to-Face Daylong Curriculum:** *Stimulants and their Impact on Brain and Behavior – Best Practices and Approaches for Effective Treatment and Recovery*
  - PowerPoint Training Slides (with detailed notes)
  - Trainer Guide with detailed notes and instructions for conveying the information and conducting the interactive activities; and Appendices that include participant handouts for the interactive activities that appear on **slide 164, slide 178, and slide 210**, and specific instructions for facilitating two recommended optional group activities featured in the three-hour virtual overview (should the trainer wish to utilize the activities in the daylong training, as well)
  - Reference List
- **Live Virtual Three-Hour Condensed Curriculum:** Three-part overview of *Stimulants and their Impact on Brain and Behavior – Best Practices and Approaches for Effective Treatment and Recovery*
  - PowerPoint Training Slides (with detailed notes)
    - **Part 1: Stimulants – What are they and who uses them?**
    - **Part 2: Impact of Stimulant Use on the Brain and Body**
    - **Part 3: Effective Treatment Approaches and Recovery Supports**
  - NOTE: The Trainer Guide for the daylong curriculum includes shading to denote the slides that are included in the three-part live virtual overview, with recommended optional group activities featured in the Appendix; if you wish to print out a trainer guide that includes only the slides and trainer notes that appear in each of the three parts of the condensed virtual overview, you can select the “print Notes Pages” option in PowerPoint

- 
- **Conference Keynote Presentation:** 70-minute presentation entitled *Stimulant Use: Current Trends, Impact on the Brain and Body, and Implications for Treatment*
    - PowerPoint Slides (with detailed notes)
    - MP4 Keynote Recording
  - **Series of One-Hour Supplemental Modules:** Topics include child welfare issues; gender differences; stimulant use in the context of polysubstance use; rural vs. urban differences in stimulant use; stimulants and HIV; and recovery approaches
    - PowerPoint Training Slides (with detailed notes)
    - MP4 Module Recording
    - Reference List
  - **Series of One-Hour Cultural Modules:** Stimulant Use among African American; American Indian/Alaska Native; and Latinx Populations
    - PowerPoint Training Slides (with detailed notes)
    - MP4 Module Recording
    - Reference List


## What Does the Daylong Curriculum Trainer Guide Contain?

- Slide-by-slide notes designed to help the trainer effectively convey the content of the slides themselves
- Supplemental information for select content to enhance the quality of instruction
- Suggestions for facilitating questions, group discussions, and interactive activities

## How is the Trainer Guide Organized?

For this guide, text that is shown in bold italics is a “***Note to the Trainer.***” Text that is shown in normal font relates to the “Trainer’s Script” for the slide.

It is important to note that several slides throughout the PowerPoint presentation contain animation, some of which is complicated to navigate. Animations are used to call attention to particular aspects of the information or to present the information in a stepwise fashion



to facilitate both the presentation of information and participant understanding. Becoming acquainted with the slides, and practicing delivering the content of the presentation are essential steps for ensuring a successful, live training experience.

## General Information about Conducting the Training

The training is designed to be conducted in medium- to large-sized groups (25-50 people). It is possible to use these materials with larger groups, but the trainer may have to adapt the group activities and discussions to ensure that there is adequate time to cover all of the content.






## Materials Needed to Conduct the Training

- Computer with PowerPoint software installed (MS Office 2013 or higher version recommended) and LCD projector to show the PowerPoint training slides.
- When making photocopies of the PowerPoint presentation to provide as a handout to training participants, it is recommended that you print the slides three slides per page with lines for notes. Select “**pure black and white**” as the color option. This will ensure that all text, graphs, tables, and images print clearly.
- Flip chart paper and easel/white board, and markers/pens to write down relevant information, including group activity de-brief and key discussion points.

## Overall Trainer Notes


It is critical that prior to conducting the actual training, the trainer practice using this guide while showing the slide presentation in Slideshow Mode in order to be prepared to use the slides in the most effective manner.

## Icon Key

	Note to Trainer		Reference
	Group Activity		Video
	Photo Credit		Slide included in live virtual condensed version of curriculum

## Slide-by-Slide Trainer Notes

The notes below contain information that can be presented with each slide. This information is designed as a guidepost and can be adapted to meet the needs of the local training situation. Information can be added or deleted at the discretion of the trainer(s).

	<p><b>Slide #1</b></p> <p><b>National Core Curriculum – Stimulants and their Impact on Brain and Behavior: Best Practices and Approaches for Effective Treatment and Recovery</b></p> <p>This daylong curriculum entitled, <i>Stimulants and their Impact on Brain and Behavior: Best Practices and Approaches for Effective Treatment and Recovery</i>, is a component of the Stimulant 101 National Core Curriculum Training Package, developed in 2020 by the ATTC Stimulant Workgroup.</p> <p>The daylong curriculum was developed to compile the latest science-based information pertaining to the impact of central nervous stimulants on brain and behavior, with a focus on the implications for treatment and recovery. Each slide in this curriculum contains detailed notes for the trainer to provide guidance, as necessary. References are included in the notes for each slide, where appropriate. In addition, the daylong curriculum comes with a companion trainer guide and full reference list to guide trainers in effectively presenting the content and facilitating the interactive activities.</p> <p><b>Date Last Updated: July 24, 2020</b></p>
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Module 1

## Curriculum Overview and Introductions



### About the ATTC Network

- The ATTC Network is an international, multidisciplinary resource for professionals in the addictions treatment and recovery services field.
- Established in 1993 by the Substance Abuse and Mental Health Services Administration (SAMHSA), the ATTC Network is comprised of 10 U.S.-based Centers, 6 International HIV Centers (funded by PEPFAR), 2 National Focus Area Centers, and a Network Coordinating Office.
- Together the Network serves the 50 U.S. states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and the Pacific Islands of Guam, American Samoa, Palau, the Marshall Islands, Micronesia, and the Mariana Islands. The International HIV ATTCs serve Vietnam, Southeast Asia, South Africa, and Ukraine.

### The U.S.-Based TTC Network



## Slide #2

### Module 1: Curriculum Overview and Introductions

Module 1 provides an overview of the TTC Network, ATTC Stimulant Workgroup, Stimulant 101 National Core Curriculum Training Package components, and educational objectives and a recommended agenda.

## Slide #3

### About the ATTC Network

This slide contains information about the ATTC Network, one of three networks funded by the Substance Abuse and Mental Health Services Administration. Additional information about the ATTC Network is available at <https://attcnetwork.org/>.

## Slide #4

### The U.S.-Based TTC Network

This slide features a map of the broader U.S.-based TTC Network. Additional information about the ATTC Network is available at <https://attcnetwork.org/>; additional information about the MHTTC Network is available at <https://mhttcnetwork.org/>; and additional information about the PTTC Network is available at <https://pttcnetwork.org/>.

## ATTC Stimulant Workgroup Members

### Co-Chairs

- Thomas E. Freese, Region 9
- Jeanne Pulvermacher, Region 5
- Beth A. Rutkowski, Region 9

### Members

- James Campbell, Region 4
- Bryan Hartzler, Region 10
- Holly Ireland, Region 3
- Laurie Krom, Lena Marceno, and Viannella Halsall, ATTC NCO
- Mary McCarty-Arias, Region 2
- Maureen Nichols, Region 6
- Nancy Roget, Region 8

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## Slide #5

### ATTC Stimulant Workgroup Members

The ATTC Stimulant Workgroup was established in 2019, and includes membership from several ATTC regional centers and the ATTC Network Coordinating Office. The slide lists the full roster of workgroup members.

## Slide #6

### Stimulant 101 National Curriculum

#### Stimulant 101 National Curriculum

- Core Daylong Curriculum
- Condensed Three-Hour Virtual Overview
- Supplemental Modules
  - Child welfare issues, gender differences, stimulant use in the context of polysubstance use, rural vs. urban differences, stimulants and HIV, and recovery approaches
- Culture Modules
  - African American, American Indian/Alaska Native, and Latinx Populations

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The ATTC Stimulant Workgroup was charged with developing a Stimulant 101 National Curriculum. The initial effort resulted in a multi-faceted training package that includes (1) a daylong core curriculum and fully articulated trainer guide (6 hours of content); (2) a condensed three-hour virtual overview; (3) a series of one-hour supplemental modules on a variety of topical issues (e.g., child welfare issues, gender differences in stimulant use, rural vs. urban differences in stimulant use, stimulant use in the context of polysubstance use, recovery approaches for people who use stimulants, and stimulant use and HIV); and (4) a series of one-hour modules on the impact of stimulant use on African American, American Indian and Alaska Native, and Latinx populations. All components of the training package will be available at: <https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>.

### Curriculum Authors

- **Beth Rutkowski, MPH**, Co-Director, Pacific Southwest Addiction Technology Transfer Center, HHS Region 9
- **Thomas E. Freese, PhD**, Co-Director, Pacific Southwest Addiction Technology Transfer Center, HHS Region 9
- **Jeanne Pulvermacher, MS**, Co-Director, Great Lakes Addiction Technology Transfer Center, HHS Region 5

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### Slide #7

#### Curriculum Authors

This slide lists the authors for the module.

### Special Acknowledgements

- **Jane C. Maxwell, PhD**  
Steve Hicks School of Social Work,  
University of Texas at Austin
- **Richard Rawson, PhD**  
University of California, Los Angeles, Integrated  
Substance Abuse Programs  
Center for Behavior and Health, Department of  
Psychiatry, University of Vermont, Burlington  
Vermont
- **UCLA Integrated Substance Abuse  
Programs Training Department**

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### Slide #8

#### Special Acknowledgements

This slide features special acknowledgement of additional contributors to the daylong curriculum.

### Daylong Curriculum Outline

- **Module 1:** Curriculum Overview and Introductions
- **Module 2:** The Scope of Stimulant Use in the United States and Beyond
- **Module 3:** Impact of Stimulant Use on the Brain and Body
- **Module 4:** Stimulant Use among Populations with Unique Concerns
- **Module 5:** Stimulants and HIV
- **Module 6:** Treatment Considerations for People who Use Stimulants
- **Module 7:** Long-Term Recovery Supports

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### Slide #9

#### Daylong Curriculum Outline

The daylong core curriculum is divided into several modules. This slide provides a listing of each module.

### Educational Objectives (1)

At the end of the daylong Stimulant 101 training, participants will be able to:

1. Identify three specific national patterns and trends in stimulant use.
2. Recall at least three short-term and three long-term physical or psychological effects of stimulant use.
3. Specify two examples of the cognitive impact of stimulant use.

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### Slide #10

#### Educational Objectives (1)

This slide details educational objectives #1-3 for the core curriculum.

## Educational Objectives (2)

- At the end of the daylong Stimulant 101 training, participants will be able to:
4. Catalog the differential patterns of stimulant use in at least three populations.
  5. Interpret at least three links between stimulant use and the behaviors that may put a person at increased risk of becoming infected with HIV or other sexually transmitted infections.
  6. Apply at least two specific behavioral treatment interventions and two recovery approaches that have been proven effective in treating people with a stimulant use disorder.

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## Slide #11

### Educational Objectives (2)

This slide details educational objectives #4-6 for the core curriculum.

## Recommended Agenda

- Six hours of content delivery time
- Schedule allows for a one-hour lunch break and two 15-minute breaks (one in AM and a second in PM)
- Morning (9:00am-12:30pm)
  - Modules 1-3
- Afternoon (1:30-5:00pm)
  - Modules 4-7

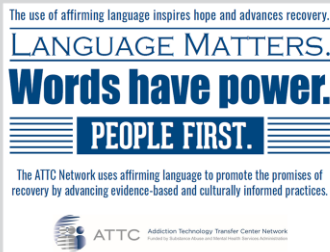
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## Slide #12

### Recommended Agenda

This is a recommended agenda for the core curriculum. Trainers can feel free to adjust the agenda, as needed, if the training will be delivered in multiple shorter duration sessions.

## Language Matters



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## Slide #13

### Language Matters

The curriculum developers have utilized person first and other non-stigmatizing language throughout this daylong training. This highlights the power of words in shaping how we think about the people who need our services. So rather than saying “addict” for instance, we say “a person with a substance use disorder.” In this way, we recognize the person receiving the services, rather than the specific disease for which we are helping them. It is inherently more respectful and less stigmatizing.

(Notes for Slide #13,  
continued)

**Slide #13**  
**Language Matters**

It is important to note, however, that some of the data and research findings featured throughout the curriculum were gathered or conducted prior to the shift to the use of person-first language. Therefore, to keep with the integrity of the research, the original terms are included in graphs and images, and the learner is encouraged to think about the concepts through a lens of inclusive and affirmative language, and avoid using pejorative terms or stigmatizing language in their interactions with patients and clients.

This slide features the graphic from a *Language Matters Awareness Card* that was developed by the Mid-America ATTC in conjunction with the ATTC Network's initiative for reducing stigma and discrimination through the use of appropriate language when talking about substance use disorders or persons who have this disease. A 2-page info card is designed to be printed front and back and can be downloaded from:

[https://attcnetwork.org/sites/default/files/5-Language Matters 9-18-17.pdf](https://attcnetwork.org/sites/default/files/5-Language%20Matters%209-18-17.pdf).

### (Notes for Slide #13, continued)

### Slide #13 Language Matters



#### REFERENCE:

Mid-America Addiction Technology Transfer Center. (2017). *Language Matters: Using Affirmative Language to Inspire Hope and Advance Recovery*. Kansas City, MO: Collaborative to Advance Health Services, School of Nursing and Health Studies, University of Missouri-Kansas City.

### Let's Get to Know One Another

- Name
- Agency
- Position
- Experience Working with People who Use Stimulants



### Slide #14

### Let's Get to Know One Another



#### INSTRUCTIONS:

***In an effort to break the ice and encourage group interaction, take a few minutes to ask training participants to briefly share the answers to these four prompts. You can ask for several volunteers to share their responses, if the size of your audience prevents all participants from sharing.***

(Notes for Slide #14,  
continued)

## Slide #14

### Let's Get to Know One Another



#### INSTRUCTIONS, continued:

*If the group is too large for formal introductions, the trainer can quickly ask participants the following two questions to gauge their work setting and professional training:*

- 1. How many [case managers, LMFTs or LCSWs, counselors, administrators, psychologists, physicians, PAs, nurse practitioners, nurses, medical assistants, dentists, etc.] are in the room? Did I miss anyone? {elicit responses}*
- 2. How many people work in a [HIV/infectious disease, substance use disorder, mental health, primary care, integrated treatment] setting? Did I miss any settings? {elicit responses}*



#### IMAGE CREDIT:

Purchased Image, Adobe Stock, 2019.

### Now Let's Meet Angela



- 32 year-old Caucasian woman living in a small rural town outside of Sacramento, CA
- Single mom of three children ranging in age from three to 12
- Works two part-time jobs (one as a bartender and one as a house cleaner)
- History of alcohol and marijuana use since she was a teenager
- Started using methamphetamine 2 years ago to lose a little weight to feel more attractive while dating

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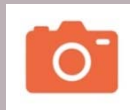
## Slide #15

### Now Let's Meet Angela



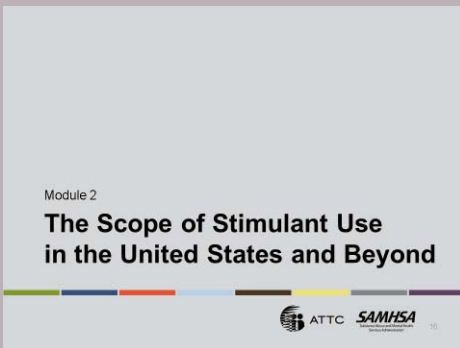
#### INSTRUCTIONS:

***This is the first time that Angela is being introduced to training participants. Orient participants to the information contained on the slide, but do not engage in an in-depth conversation just yet. Participants should keep Angela in mind (and all the people with whom she may be using stimulants) as you present more content on the impact of stimulant use. Refer to the “Angela Case Study” for the full description of Angela’s story. Refrain from handing out the full case study until later in the afternoon when you engage the training participants in an activity to discuss Angela’s needs in more detail.***



#### IMAGE CREDIT:

Purchased Image, Adobe Stock, 2019.



## Slide #16

### Module 2: The Scope of Stimulant Use in the United States and Beyond

Module 2 provides a detailed look at the scope of stimulant use in the United States and beyond.



***A supplemental module on Polysubstance Use among Stimulant Users\*: Course, Complications, and the Clinical Picture is available for viewing at:***

***<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>.***

***\*NOTE: The issue of “language matters” and the importance of using person-first language was introduced a few slides ago. It is challenging to make this transition and mistakes are to be expected. As an example, even though this entire set of materials was reviewed many times by many people, everyone missed the use of the words “Stimulant User” rather than “Persons Who Use Stimulants” in the title of the Polysubstance Use module mentioned above. Our call is to continually strive to do better, and to help each other to do better, not to be overly harsh when mistakes are made. We acknowledge the mistake here and will strive to do better.***

### What we know...globally

- Amphetamine-type stimulants (ATS) constitute the 3rd most widely used illicit drug category in the world, following cannabis and opioids
- The type of ATS used varies by region
  - Amphetamines in Europe and the Middle East
  - Methamphetamine in the US, Australia, and SE Asia
- Different precursors used in the manufacturing process

SOURCE: UNODC, 2020

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## Slide #17

### What we know...globally

The broad term that is utilized in international publications to describe central nervous stimulants that are used for their psychoactive properties is “amphetamine-type stimulants” or ATS for short. According to the 2020 UNODC World Drug Report, in 2018, amphetamines and prescription stimulants are the third most widely used type of illicit drug (with 27 million people using worldwide), following cannabis (192 million worldwide people using) and opioids (58 million worldwide people). The type of ATS that is used varies by region. In places like Europe and the Middle East, prescription amphetamines are most widely used. But in the US, Australia, and Southeast Asia, methamphetamine (and cocaine) is most widely used. As you will see in a few slides, the types of precursors used in the manufacturing process have shifted over time.



### REFERENCE:

United Nations Office of Drugs and Crime. (2020). *World Drug Report 2020*. Vienna, Austria: United Nations.

### Types of Stimulant Drugs: ATS

- Approximately 27 million people use stimulants worldwide
- **Methamphetamine**
  - Powder: inhaled, smoked, injected
  - Crystal/ice: smoked
  - Tablets: orally, crushed and inhaled, smoked, injected (e.g., Captagon)
- **Amphetamine**
  - Powder, Tablets, Liquid: orally, injected, smoked
- **Major regions of use:**
  - Eastern and SE Asia
  - Australia and Oceania
  - North America
  - Increases in Central, Eastern and Northern Europe
  - Increases in Middle East
  - Increases in South Africa

SOURCES: Rawson, 2019;  
UNODC, 2020

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## Slide #18

### Types of Stimulant Drugs: ATS

This slide details the use of amphetamine type stimulants (ATS) from a worldwide perspective, including the number of people who use, mode of administration, and major regions of use. Included in the estimate of 27 million people is those who use methamphetamine, amphetamines, ecstasy, and other ATS.



#### REFERENCES:

Rawson, R. (2019, November 19). Types of Stimulant Drugs: Amphetamine Type Stimulants (ATS). [Slide]. In: *The Re-Emergence of Cocaine and Methamphetamine in the 21<sup>st</sup> Century*. [PowerPoint Presentation]. Burlington, VT: Vermont Center on Behavior and Health, University of Vermont.

United Nations Office of Drugs and Crime. (2020). *World Drug Report 2020*. Vienna, Austria: United Nations.

### Types of Stimulant Drugs: Cocaine

- Approximately 19 million people use cocaine worldwide
- Cocaine Powder (sniffed, injected, smoked)
- "Crack" (smoked)
- Major regions of use:
  - South America
  - North America (predominantly major urban centers disproportionately impacts African American community)
  - Increases in Central and Western Europe
  - Increases in South and Western Africa

SOURCES: Rawson, 2019;  
UNODC, 2020

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## Slide #19

### Types of Stimulant Drugs: Cocaine

This slide details cocaine and crack use from a worldwide perspective, including the number of people who use, mode of administration, and major regions of use. According to the US Drug Enforcement Administration, the average retail price of cocaine in the US per pure gram has decreased by 50% (2012-2017) and average gram purity is 85.5% in 2019.

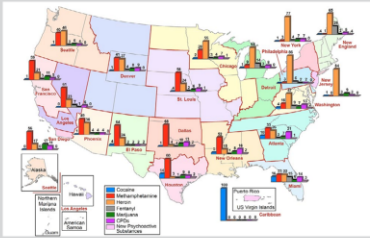


### REFERENCES:

Rawson, R. (2019, November 19). Types of Stimulant Drugs: Amphetamine Type Stimulants (ATS). [Slide]. In: *The Re-Emergence of Cocaine and Methamphetamine in the 21<sup>st</sup> Century*. [PowerPoint Presentation]. Burlington, VT: Vermont Center on Behavior and Health, University of Vermont.

United Nations Office of Drugs and Crime. (2020). *World Drug Report 2020*. Vienna, Austria: United Nations.

Greatest Drug Threat by Field Division as Reported by State and Local Agencies: 2017



SOURCE: U.S. DEA, 2017

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## Slide #20

### Greatest Drug Threat by Field Divisions as Reported by State and Local Agencies: 2017

Data from a variety of sources, including methamphetamine seizures, survey data, price and purity data, and law enforcement reporting indicate methamphetamine continues to be readily available throughout the United States. This map shows the regional patterns and the greatest drug threat, as reported by state and local agencies between 2013 and 2015. Methamphetamine was the greatest drug threat in the Pacific, Southwest, West Central, and Florida/Caribbean regions. Later in the training, you will learn more about shifts in the production of methamphetamine.



***A supplemental module on Stimulant Use in Rural and Remote Areas: Considerations for Treatment and Recovery Support Providers is available for viewing at:***

***<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>.***

**Key:**

CPD = Controlled Prescription Drugs

(Notes for Slide #20,  
continued)

## Slide #20

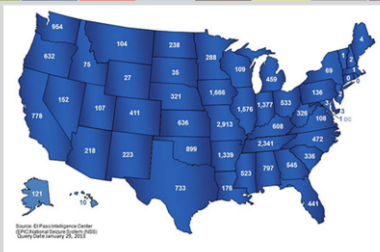
### Greatest Drug Threat by Field Divisions as Reported by State and Local Agencies: 2017



#### REFERENCE:

U.S. Drug Enforcement Administration  
(2017). *2017 National Drug Threat  
Assessment*. Washington, DC: Author.  
Retrieved June 2, 2020, from  
[https://www.dea.gov/sites/default/files/2018-07/DIR-040-17\\_2017-NDTA.pdf](https://www.dea.gov/sites/default/files/2018-07/DIR-040-17_2017-NDTA.pdf).

U.S. Methamphetamine Lab Incidents:  
2004 vs. 2017



SOURCE: U.S. DEA, 2017

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## Slide #21

### U.S. Methamphetamine Lab Incidents: 2004 vs. 2017



#### \*\*ANIMATIONS\*\*

*This slide contains animations. Trainers should practice presenting this information so they can see the timing of the animations and how new content appears on the slide. This slide includes two graphs – one showing 2004 lab incidents, and a second showing 2017 incidents. The 2004 map appears automatically. To show the 2017 map, click once, and the 2004 map will disappear and the 2017 map will appear in its place.*

(Notes for Slide #21,  
continued)

### Slide #21

#### U.S. Methamphetamine Lab Incidents: 2004 vs. 2017

This map shows the number of methamphetamine lab incidents reported to the Drug Enforcement Administration, including laboratories, dumpsites, or chemical, glass, and equipment seizures. As a matter of comparison, there were nearly 15,000 more incidents in 2004 as compared to 2014. The overall number of lab incidents west of the Mississippi River decreased dramatically, as did seizures in the southern United States. The number of lab incidents in the Great Lake region of the country increased, as did incidents in many New England states. Missouri has led the country in methamphetamine lab incidents for nearly the entire 11-year period, followed by states such as Indiana, Mississippi, Kentucky, and Oklahoma. The Combat Methamphetamine Epidemic Act was passed in 2005, and since then, there has been a trend away from domestic “super lab” large scale methamphetamine production to the “shake and bake” method, a crude cooking method that requires pseudoephedrine and a handful of common household ingredients, such as ether, ammonia nitrate, and lithium. Drug cartels continue to meet much of the demand by manufacturing large quantities of methamphetamine in Mexico and smuggling it over the US/Mexico border.

(Notes for Slide #21,  
continued)

Environmental Effects of Methamphetamine

- Methamphetamine production leaves behind **5 to 6 pounds** of toxic waste per pound of meth produced.
- Toxic by-products contaminate production sites, posing serious health and environmental hazards to those who live and work nearby.
- The estimated cost to clean up 1 meth lab often **exceeds \$4,000**.



SOURCE: CDPHE, 2007

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Slide #21

U.S. Methamphetamine Lab Incidents:  
2004 vs. 2017



REFERENCE:

U.S. Drug Enforcement Administration. (2017). Methamphetamine Lab Incidents, 2004-2017, reported by El Paso Intelligence Center (EPIC). Retrieved June 2, 2020, from <https://www.dea.gov/clan-lab>.

Slide #22

Environmental Effects of  
Methamphetamine

For each pound of meth produced, there are five to six pounds of toxic waste. Those toxic wastes are often dumped down household drains, in fields and yards, or on rural roads, which has the potential of contaminating the drinking water supplies, soils, and air. Toxic by-products contaminate sites where meth is produced, posing serious health and environmental hazards to those nearby. Think of the children who live in homes where meth is being produced. There has not been enough research done on those children to know the long-term health effects they may suffer. In addition, the cost to clean up one meth lab often exceeds \$4,000. Federal, state, and local taxpayers pay this cost.

(Notes for Slide #22,  
continued)

## Slide #22

### Environmental Effects of Methamphetamine



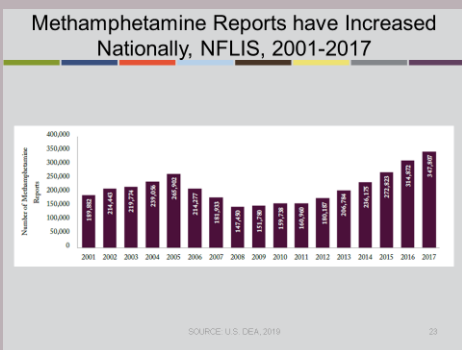
#### REFERENCE:

Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division. (2007). *Cleanup of Clandestine Methamphetamine Labs Guidance Document*. Denver, CO: Colorado Department of Public Health and Environment.



#### IMAGE CREDIT:

Purchased image, Fotolia, 2017.



## Slide #23

### Methamphetamine Reports have Increased Nationally, NFLIS, 2001-2017

This graph denotes national estimates of methamphetamine reports that were submitted to state and local laboratories from January 2001 to December 2017 and were analyzed within three months of each calendar year reporting period. From 2001 to 2017, there was an 83% increase. And from 2011 to 2017, reports increased between 10% and 16% annually.

(Notes for Slide #23,  
continued)

**Slide #23**

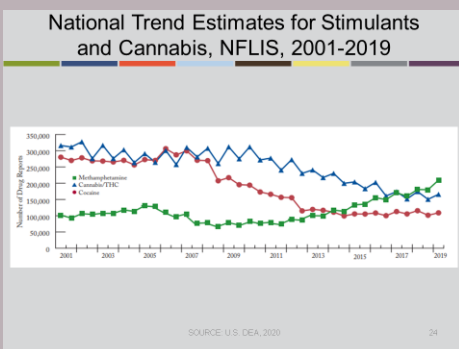
**Methamphetamine Reports have Increased Nationally, NFLIS, 2001-2017**

According to more recent data from NFLIS (mid-year 2019), methamphetamine was the most frequently reported drug in the West (47%), Midwest (28%), and South (27%) regions, while cannabis/THC was the most frequently reported drug in the Northeast (25%) region.



**REFERENCE:**

U.S. Drug Enforcement Administration, Diversion Control Division. (2019). *NFLIS-Drug Special Report: Methamphetamine Reported in NFLIS, 2001–2017*. Springfield, VA: U.S. Drug Enforcement Administration.



**Slide #24**

**National Trend Estimates for Stimulants and Cannabis, NFLIS, 2001-2019**

This line graph presents national trends in the reports of methamphetamine, cannabis/THC, and cocaine from 2001 through 2019. Methamphetamine reports increased from 2001 through 2005, decreased from 2005 to 2010, and then increased consistently since 2011. Cocaine reports decreased from 2001 to 2004, then gradually increased from 2004 to 2007. This upward tick was followed by a significant decrease through 2014. Cocaine reports have remained relatively stable from 2014 through 2019.

(Notes for Slide #24,  
continued)

## Slide #24

### National Trend Estimates for Stimulants and Cannabis, NFLIS, 2001-2019



#### REFERENCE:

U.S. Drug Enforcement Administration,  
Diversion Control Division. (2020).  
*National Forensic Laboratory Information  
System: NFLIS-Drug 2019 Midyear  
Report*. Springfield, VA: U.S. Drug  
Enforcement Administration.

## Slide #25

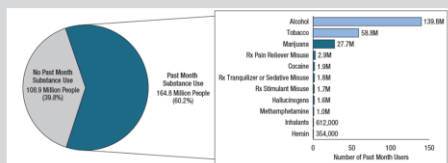
### Top Drug Offenses, by State



According to a 2016 article in Business Insider, the U.S. Sentencing Commission reported that nearly 50% of all inmates in federal prisons throughout the U.S. are serving a sentence for a drug-related offense. Methamphetamine was the top drug offense in 27 of 50 states, including the majority of western, Midwest, and southern states. Powder cocaine resulted in the most drug offenses (or tied for the most) in six states plus Washington, D.C. And despite the fact that marijuana is the most widely illicit substance in the U.S., but was only responsible for the highest number of drug offenses in four states.

(Notes for Slide #25,  
continued)

Numbers of People Using Illicit Drugs in Past Month among People Aged 12 or Older: 2018



SOURCES: McCance-Katz, 2019; SAMHSA, 2019

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## Slide #25

### Top Drug Offenses, by State



#### REFERENCE:

Abadi, M. (2016). This graphic shows just how widespread meth is in the United States. *Business Insider*. Retrieved March 8, 2017, from

<https://www.businessinsider.com/>.

## Slide #26

### Numbers of People Using Illicit Drugs in Past Month among People Aged 12 and Older: 2018

The following series of four (4) slides are adapted from a webcast that Dr. Elinore F. McCance-Katz, Assistant Secretary for Mental Health and Substance Use at the Substance Abuse and Mental Health Services Administration, presented on select results of the 2018 National Survey on Drug Use and Health (NSDUH). The NSDUH is a comprehensive household survey of substance use, substance use disorders, mental health, and the receipt of treatment services for these disorders in the United States. This bar graph portrays past year use of methamphetamine among individuals aged 12 and older, broken down by age group.

(Notes for Slide #26,  
continued)

### Slide #26

#### Numbers of People Using Illicit Drugs in Past Month among People Aged 12 and Older: 2018

On the left of the slide is a pie chart that depicts the number of NSDUH respondents who reported past month use of substances. Approximately 60% of respondents (164.8 million) reported past month substance use. On the right of the slide is a bar graph that details the specific substances that were used by NSDUH respondents. The most prevalent substance was alcohol (use reported by nearly 140 million individuals aged 12 and older), followed by tobacco (58.8 million), marijuana (27.7 million), and misuse of prescription pain relievers (2.9 million). Past month use of cocaine was reported by 1.9 million people aged 12 and older, past month misuse of prescription stimulants was reported by 1.7 million people, and past month use of methamphetamine was reported by 1 million people.

The entire presentation can be viewed and downloaded from:

<https://www.samhsa.gov/newsroom/speeches-presentations>.

(Notes for Slide #26,  
continued)

**Slide #26**

**Numbers of People Using Illicit Drugs in  
Past Month among People Aged 12 and  
Older: 2018**



**REFERENCES:**

McCance-Katz, E. F., (2019, August 20).  
*SAMHSA's 2018 National Survey on Drug  
Use and Health (NSDUH)*. U.S.  
Department of Health and Human  
Services, Substance Abuse Mental Health  
Services Administration. [Webcast].  
Available at:  
<https://www.samhsa.gov/newsroom/speeches-presentations>.

Substance Abuse and Mental Health  
Services Administration. (2019). *Key  
Substance Use and Mental Health  
Indicators in the United States: Results  
from the 2018 National Survey on Drug  
Use and Health* (HHS Publication No. PEP  
19-5068, NSDUH Series H-54). Rockville,  
MD: Center for Behavioral Health Statistics  
and Quality, Substance Abuse and Mental  
Health Services Administration.

**Slide #27**

**Trends in Past Year Use of Cocaine:  
Significant Decrease in Young Adults  
(18-25)**

NSDUH data on past year use of cocaine  
shows a significant decrease in use among  
young adults aged 18 to 25.

Trends in Past Year Use of Cocaine:  
Significant Decrease in Young Adults (18-25)



SOURCES: McCance-Katz, 2019; SAMHSA, 2019

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(Notes for Slide #27,  
continued)

### Slide #27

#### Trends in Past Year Use of Cocaine: Significant Decrease in Young Adults (18-25)

In 2015, 580,000 individuals aged 18-25 reported past year use of cocaine. By 2018, the number had decreased to 524,000.



***NOTE: The + symbol denotes that the difference between this estimate and the 2018 estimate is statistically significant at the 0.05 level.***

The entire presentation can be viewed and downloaded from:

<https://www.samhsa.gov/newsroom/speeches-presentations>.



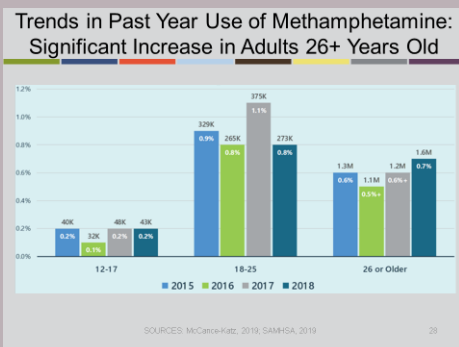
#### REFERENCES:

McCance-Katz, E. F., (2019, August 20). *SAMHSA's 2018 National Survey on Drug Use and Health (NSDUH)*. U.S. Department of Health and Human Services, Substance Abuse Mental Health Services Administration. [Webcast].

Available at:

<https://www.samhsa.gov/newsroom/speeches-presentations>.

(Notes for Slide #27,  
continued)



## Slide #27

### Trends in Past Year Use of Cocaine: Significant Decrease in Young Adults (18-25)



#### REFERENCES:

Substance Abuse and Mental Health Services Administration. (2019). *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health* (HHS Publication No. PEP 19-5068, NSDUH Series H-54). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration.

## Slide #28

### Trends in Past Year Use of Methamphetamine: Significant Increase in Adults 26+ Years Old

The picture, however, looks different with the past year use of methamphetamine. A significant increase was seen among adults aged 26 and older. Among 18-25 year olds, however, past year use is on the decline (though not statistically significant).



**NOTE: The + symbol denotes that the difference between this estimate and the 2018 estimate is statistically significant at the 0.05 level.**

(Notes for Slide #28,  
continued)

## Slide #28

### Trends in Past Year Use of Methamphetamine: Significant Increase in Adults 26+ Years Old

The entire presentation can be viewed and  
downloaded from:

<https://www.samhsa.gov/newsroom/speeches-presentations>.

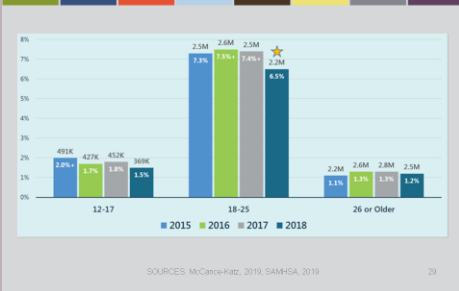


#### REFERENCES:

McCance-Katz, E. F., (2019, August 20).  
*SAMHSA's 2018 National Survey on Drug  
Use and Health (NSDUH)*. U.S.  
Department of Health and Human  
Services, Substance Abuse Mental Health  
Services Administration. [Webcast].  
Available at:  
<https://www.samhsa.gov/newsroom/speeches-presentations>.

Substance Abuse and Mental Health  
Services Administration. (2019). *Key  
Substance Use and Mental Health  
Indicators in the United States: Results  
from the 2018 National Survey on Drug  
Use and Health* (HHS Publication No. PEP  
19-5068, NSDUH Series H-54). Rockville,  
MD: Center for Behavioral Health Statistics  
and Quality, Substance Abuse and Mental  
Health Services Administration.

Trends in Past Year Misuse of Prescription Stimulants:  
Significant Decrease in Young Adults (18-25)



## Slide #29

### Trends in Past Year Misuse of Prescription Stimulants: Significant Decrease in Young Adults (18-25)

NSDUH data on past year misuse of prescription stimulants shows a significant decrease in use among young adults aged 18 to 25. In 2015, 2.5 million individuals aged 18-25 reported past year misuse of prescription stimulants. By 2018, the number had decreased to 2.2 million.



**NOTE:** The + symbol denotes that the difference between this estimate and the 2018 estimate is statistically significant at the 0.05 level.

The entire presentation can be viewed and downloaded from:

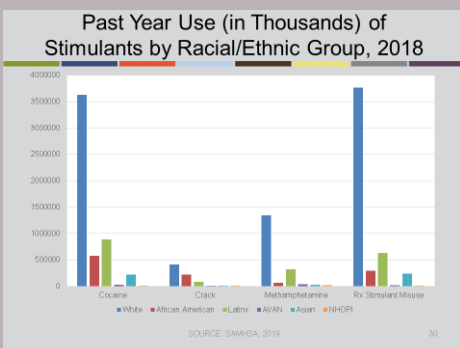
<https://www.samhsa.gov/newsroom/speeches-presentations>.



### REFERENCES:

McCance-Katz, E. F., (2019, August 20). SAMHSA's 2018 National Survey on Drug Use and Health (NSDUH). U.S. Department of Health and Human Services, Substance Abuse Mental Health Services Administration. [Webcast]. Available at: <https://www.samhsa.gov/newsroom/speeches-presentations>.

(Notes for Slide #29,  
continued)



## Slide #29

### Trends in Past Year Misuse of Prescription Stimulants: Significant Decrease in Young Adults (18-25)



#### REFERENCES:

Substance Abuse and Mental Health Services Administration. (2019). *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health* (HHS Publication No. PEP 19-5068, NSDUH Series H-54). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration.

## Slide #30

### Past Year Use (in Thousands) of Stimulants by Racial/Ethnic Group, 2018

The next two (2) slides feature NSDUH data, as well, and examine the racial/ethnic breakdown of past year use of stimulants reported in 2018.

This slide includes the raw number people who have used stimulants in the past year, broken down by race/ethnicity. In all cases, the raw number of White people who use stimulants far eclipses use among other racial/ethnic groups. If you were to only look at the raw numbers, you would be missing part of the story. The next slide provides a different look at the data.

(Notes for Slide #30,  
continued)

### Slide #30

#### Past Year Use (in Thousands) of Stimulants by Racial/Ethnic Group, 2018

**Key:**

AI/AN=American Indian and Alaska Native  
NHOPI=Native Hawaiian and Other Pacific  
Islander

With regards to use of any stimulant (data not shown here), the total numbers by racial/ethnic group (from greatest to least) are as follows: 13,258,000 Whites, 2,299,000 Latinx, 1,371,000 African Americans, 511,000 Asians, 88,000 American Indians/Alaska Natives; and 37,000 Native Hawaiians and Other Pacific Islanders.



***Three supplemental culture modules on stimulant use among African American, American Indian and Alaska Native, and Latinx Populations are under development and will be available for viewing at:***

***<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>***.

(Notes for Slide #30,  
continued)

**Slide #30**

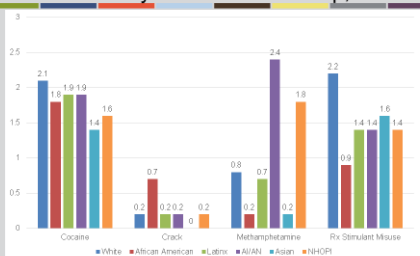
**Past Year Use (in Thousands) of  
Stimulants by Racial/Ethnic Group,  
2018**



**REFERENCE:**

Substance Abuse and Mental Health Services Administration. (2019). *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health* (HHS Publication No. PEP 19-5068, NSDUH Series H-54). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration.

Past Year Use (as Percentages) of  
Stimulants by Racial/Ethnic Group, 2018



SOURCE: SAMHSA, 2019

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**Slide #31**

**Past Year Use (as Percentages) of  
Stimulants by Racial/Ethnic Group,  
2018**

This slide features past year use of various stimulants, broken down by the percentages of persons in each racial/ethnic population that responded affirmatively to the cluster of stimulant use questions. For cocaine and prescription stimulant misuse, the highest percentage is seen among Whites (2.1% for cocaine and 2.2% for prescription stimulant misuse). For crack, the highest percentage is seen among African Americans (0.7%).

(Notes for Slide #31,  
continued)

### Slide #31

#### Past Year Use (as Percentages) of Stimulants by Racial/Ethnic Group, 2018

And for methamphetamine, the highest percentages are seen among American Indians/Alaska Natives (2.4%) and Native Hawaiians and Other Pacific Islanders (1.8%).

#### Key:

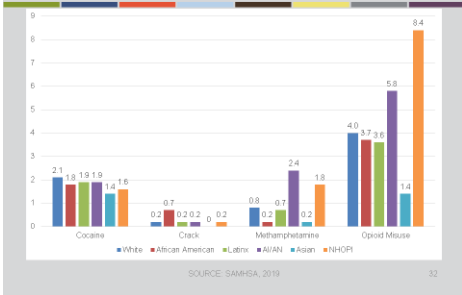
AI/AN=American Indian and Alaska Native  
NHOPI=Native Hawaiian and Other Pacific  
Islander



#### REFERENCE:

Substance Abuse and Mental Health Services Administration. (2019). *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health* (HHS Publication No. PEP 19-5068, NSDUH Series H-54). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration.

What Happens if you Layer in Past Year Misuse of Opioids (as Percentages)? (2018)



## Slide #32

### What Happens if you Layer in Past Year Misuse of Opioids (as Percentages)? (2018)

This slide layers in a look at the percentage of persons in each racial/ethnic population that responded affirmatively to the question about past year misuse of opioids, as compared to the percentages from the previous slide for cocaine, crack, and methamphetamine. For past year misuse of opioids, the highest percentage is seen among Native Hawaiians and Other Pacific Islanders (8.4%), followed by American Indians/Alaska Natives (5.8%), and Whites (4.0%). Lower percentages were seen for African Americans, Latinx individuals, and Asians.



#### REFERENCE:

Substance Abuse and Mental Health Services Administration. (2019). *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health* (HHS Publication No. PEP 19-5068, NSDUH Series H-54). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration.



(Notes for Slide #33,  
continued)

### Slide #33

#### Past Year Use of Methamphetamine by State, 2016-2017



***States could fall into one of five groups according to their ranking by quintiles. Because 51 states were ranked for each measure, the middle quintile was assigned to 11 states, and the remaining quintiles were assigned 10 states each. In some cases, a "quintile" could have more or fewer states than desired because two (or more) states had the same estimate (to two decimal places). When such ties occurred at the "boundary" between two quintiles, all the states with the same estimate were conservatively assigned to the lower quintile.***

The entire presentation can be viewed and downloaded from:

<https://www.samhsa.gov/newsroom/speeches-presentations>.



***A supplemental module on Stimulant Use in Rural and Remote Areas: Considerations for Treatment and Recovery Support Providers is available for viewing at:***

<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>.

(Notes for Slide #33,  
continued)

**Slide #33**

**Past Year Use of Methamphetamine by  
State, 2016-2017**



**REFERENCES:**

McCance-Katz, E. F., (2019, August 20).  
*SAMHSA's 2018 National Survey on Drug  
Use and Health (NSDUH)*. U.S.

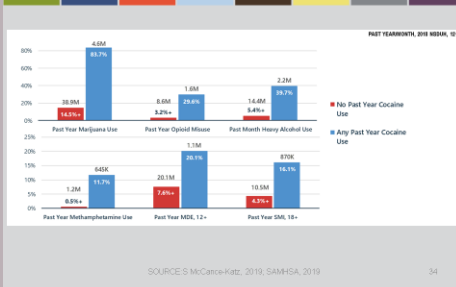
Department of Health and Human  
Services, Substance Abuse Mental Health  
Services Administration. [Webcast].

Available at:

<https://www.samhsa.gov/newsroom/speeches-presentations>.

Substance Abuse and Mental Health  
Services Administration. (2019). *Key  
Substance Use and Mental Health  
Indicators in the United States: Results  
from the 2018 National Survey on Drug  
Use and Health* (HHS Publication No. PEP  
19-5068, NSDUH Series H-54). Rockville,  
MD: Center for Behavioral Health Statistics  
and Quality, Substance Abuse and Mental  
Health Services Administration.

Cocaine Use Related to Other Substance Use,  
Depression, and Serious Mental Illness



**Slide #34**

**Cocaine Use Related to Other  
Substance Use, Depression, and  
Serious Mental Illness**

The NSDUH also examines the prevalence  
of health disorders, including major  
depressive episode and serious mental  
illness and its prevalence with current and  
past year use of alcohol, tobacco, and  
other drugs.

(Notes for Slide #34,  
continued)

#### Slide #34

### Cocaine Use Related to Other Substance Use, Depression, and Serious Mental Illness

These bar graphs portray the use of cocaine related to past month heavy alcohol use, past year use of other drugs, and past year prevalence of major depressive episode and serious mental illness. In all instances, those NSDUH respondents who indicated past year use of cocaine had a significantly higher rates of other substance use or mental health issues than those who did not report past year use of cocaine.

Those who reported past year use of cocaine were significantly more likely (than those who did not report past year cocaine use) to report:

- Past month heavy use of alcohol (39.7% vs. 5.4%)
- Past year use of marijuana (83.7% vs. 14.5%)
- Past year misuse of opioids (29.6% vs. 3.2%)
- Past year use of methamphetamine (11.7% vs. 0.5%)
- Past year major depressive disorder (MDE; 20.1% vs. 7.6%)
- Past year serious mental illness (SMI; 16.1% vs. 4.3%)

The entire presentation can be viewed and downloaded from:

<https://www.samhsa.gov/newsroom/speeches-presentations>.

(Notes for Slide #34,  
continued)

### Slide #34

## Cocaine Use Related to Other Substance Use, Depression, and Serious Mental Illness



### REFERENCES:

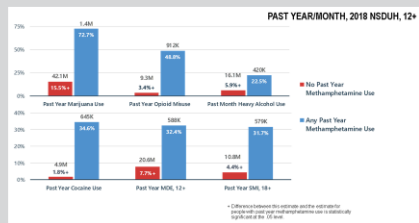
McCance-Katz, E. F., (2019, August 20). *SAMHSA's 2018 National Survey on Drug Use and Health (NSDUH)*. U.S. Department of Health and Human Services, Substance Abuse Mental Health Services Administration. [Webcast].

Available at:

<https://www.samhsa.gov/newsroom/speeches-presentations>.

Substance Abuse and Mental Health Services Administration. (2019). *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health* (HHS Publication No. PEP 19-5068, NSDUH Series H-54). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration.

### Methamphetamine Use Related to Other Substance Use, Depression, and Serious Mental Illness



SOURCE: S. McCance-Katz, 2019, SAMHSA, 2019

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## Slide #35

### Methamphetamine Use Related to Other Substance Use, Depression, and Serious Mental Illness

These bar graphs portray the use of methamphetamine related to past month heavy alcohol use, past year use of other drugs, and past year prevalence of major depressive episode and serious mental illness. As with what was seen with cocaine, in all instances, those NSDUH respondents who indicated past year use of methamphetamine had a significantly higher rates of other substance use or mental health issues than those who did not report past year use of methamphetamine.

Those who reported past year use of methamphetamine were significantly more likely (than those who did not report past year methamphetamine use) to report:

- Past month heavy use of alcohol (22.5% vs. 5.9%)
- Past year use of marijuana (72.7% vs. 15.5%)
- Past year misuse of opioids (48.8% vs. 3.4%)
- Past year use of cocaine (34.6% vs. 1.8%)
- Past year major depressive disorder (MDE; 32.4% vs. 7.7%)
- Past year serious mental illness (SMI; 31.7% vs. 4.4%)

(Notes for Slide #35,  
continued)

### Slide #35

## Methamphetamine Use Related to Other Substance Use, Depression, and Serious Mental Illness

The entire presentation can be viewed and downloaded from:

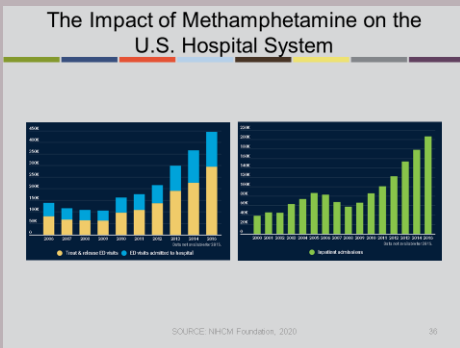
<https://www.samhsa.gov/newsroom/speeches-presentations>.



### REFERENCES:

McCance-Katz, E. F., (2019, August 20). *SAMHSA's 2018 National Survey on Drug Use and Health (NSDUH)*. U.S. Department of Health and Human Services, Substance Abuse Mental Health Services Administration. [Webcast]. Available at: <https://www.samhsa.gov/newsroom/speeches-presentations>.

Substance Abuse and Mental Health Services Administration. (2019). *Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health* (HHS Publication No. PEP 19-5068, NSDUH Series H-54). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration.



## Slide #36

### The Impact of Methamphetamine on the U.S. Hospital System

This is the first of a series of data slides that originate from a recent *Data Insights* report released by the National Institute for Health Care Management (NIHCM) Foundation. The data that appears on the two bar graphs featured here examines the impact that methamphetamine has on the U.S. hospital system. On the left side of the slide is a bar graph that features long-term trends in the number of treat and release emergency department (ED) visits associated with the use of methamphetamine (yellow bars), and the number of ED visits that were admitted into the hospital (blue bars). Both numbers have increased consistently since 2010. More specifically between 2006 and 2016, the total number of ED visits related to methamphetamine increased from 107,544 to 445,416 (yellow and blue bars combined). Of the ED visits, the number of cases who were treated in the ED and then released to home or to another health care setting increased more quickly than the cases who were admitted to the hospital after an initial evaluation in the ED.

On the right side of the slide is a bar graph (green bars) that features long-term trends in the number of inpatient admissions associated with the use of methamphetamine.

## (Notes for Slide #36, continued)

### Slide #36

#### The Impact of Methamphetamine on the U.S. Hospital System

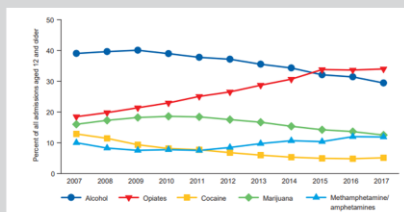
You see an initial period of growth between 2000 and 2005, followed by a shifting pattern of decreased admissions between 2005 and 2008. Then, from 2008 to 2016, you see a steady increase in the number of admissions, from 57,331 in 2008 to 206,265 in 2016.



#### REFERENCE:

National Institute for Health Care Management Foundation. (2020, May). *Beyond Opioids: Rapid Increase in Drug Deaths Involving Stimulants*. Retrieved June 3, 2020, from <https://www.nihcm.org/categories/beyond-opioids-rapid-increase-in-drug-deaths-involving-stimulants>.

Primary Substance of Abuse at Admission, 2007-2017



SOURCE: SAMHSA, 2019

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### Slide #37

#### Primary Substance of Abuse at Admission, 2007-2017

The Treatment Episode Data Set (TEDS) is managed by SAMHSA and includes national- and state-level data for admissions and discharges. It summarizes demographic information and the characteristics and outcomes of treatment for alcohol and or drug use among clients aged 12 and older in treatment facilities that report to individual state data systems.

(Notes for Slide #37,  
continued)

### Slide #37

#### Primary Substance of Abuse at Admission, 2007-2017

TEDS records represent a treatment episode, and not necessarily individuals. In other words, if a single individual is admitted into a treatment program twice in the same calendar year, he/she is counted twice.

This line graph shows the primary substance reported at admission to publicly funded treatment programs located across the United States. The most frequently reported primary substances among 2017 admissions were opiates (34%), alcohol (29%), marijuana/hashish (13%), methamphetamine/amphetamines (12%), and cocaine (5%). These five categories of psychoactive substances accounted for the vast majority (93%) of all admissions among people aged 12 and older. With regards to long term trends, primary opiate admissions have been climbing consistently, and primary methamphetamine/amphetamine admissions are on the rise, as well, since the mid-2000s. Primary cocaine admissions, however, have been trending downward for the past several years.

(Notes for Slide #37,  
continued)

## Slide #37

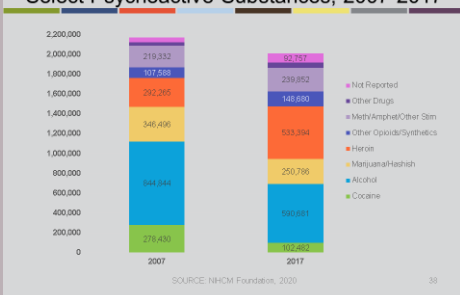
### Primary Substance of Abuse at Admission, 2007-2017



#### REFERENCE:

Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. (2019). *Treatment Episode Data Set (TEDS): 2017. Admissions to and Discharges from Publicly-Funded Substance Use Treatment*. Rockville, MD: Substance Abuse and Mental Health Services Administration.

Increases in Treatment Admissions Seen for Select Psychoactive Substances, 2007-2017



## Slide #38

### Increases in Treatment Admissions Seen for Select Psychoactive Substances, 2007-2017

This stacked bar graph compares the number of admissions (from TEDS) for each of the major drug categories in 2007 and in 2017. The total number of admissions to publicly funded substance use disorder treatment programs decreased between 2007 and 2017. The largest declines were seen with alcohol (blue bar; a reduction of 844,544 to 590,681), marijuana/hashish (yellow bar; a reduction of 346,496 to 250,786), and cocaine (green bar; a reduction of 278,430 to 102,482). In contrast, in 2017, the number of admissions for primary heroin, other opiates, and methamphetamine use all increased.

## (Notes for Slide #38, continued)

### Slide #38

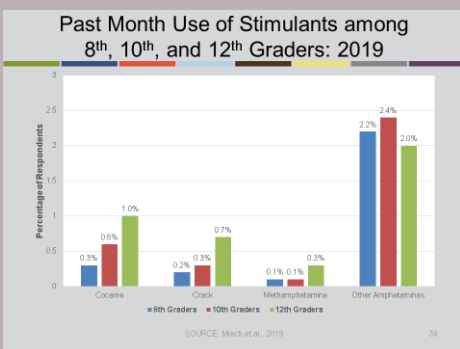
#### Increases in Treatment Admissions Seen for Select Psychoactive Substances, 2007-2017

The largest increase was seen for primary heroin admissions. Primary methamphetamine/amphetamine/other stimulants (light purple bar) increased from 219,332 in 2007 to 239,852 in 2017. This data slide originates from a recent *Data Insights* report released by the National Institute for Health Care Management (NIHCM) Foundation.



#### REFERENCE:

National Institute for Health Care Management Foundation. (2020, May). *Beyond Opioids: Rapid Increase in Drug Deaths Involving Stimulants*. Retrieved June 3, 2020, from <https://www.nihcm.org/categories/beyond-opioids-rapid-increase-in-drug-deaths-involving-stimulants>.



### Slide #39

#### Past Month Use of Stimulants among 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> Graders: 2019

The Monitoring the Future (MTF) Survey is an ongoing annual survey of the behaviors, attitudes, and values of Americans from adolescence through adulthood.

(Notes for Slide #39,  
continued)

### Slide #39

#### **Past Month Use of Stimulants among 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> Graders: 2019**

The MTF is funded by the National Institute on Drug Abuse and conducted at the Survey Research Center in the Institute for Social Research at the University of Michigan.

Each year, the survey is completed by approximately 50,000 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> grade students. A secondary element of the MTF is an annual follow-up questionnaire that is mailed to a sample of each graduating class following their initial participation.

This bar graph features survey findings related to the past month use of cocaine, crack, methamphetamine, and other amphetamines among 8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> graders in 2019. As you see, the rate of past month use of other amphetamines is highest (2.0-2.4%), followed by cocaine (0.3-1.0%), crack (0.2-.07%), and finally methamphetamine (0.1-0.3%). In most cases, the percentage of use is highest among 12<sup>th</sup> graders, followed by 10<sup>th</sup> graders, and then 8<sup>th</sup> graders. The exception is the past month use of other amphetamines, where self-reported use was highest among 10<sup>th</sup> graders (2.4%).

(Notes for Slide #39,  
continued)

**Slide #39**

**Past Month Use of Stimulants among  
8<sup>th</sup>, 10<sup>th</sup>, and 12<sup>th</sup> Graders: 2019**



**REFERENCE:**

Miech, R. A., Schulenberg, J. E., Johnston, L. D., Bachman, J. G., O'Malley, P. M., & Patrick, M. E. (2019, December 19).

*National Adolescent Drug Trends in 2019: Findings Released Monitoring the Future.*

Ann Arbor, MI: University of Michigan.

Retrieved June 11, 2020, from

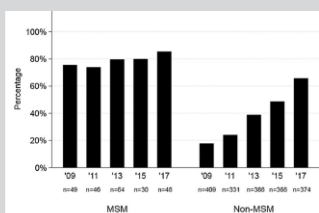
<http://monitoringthefuture.org/data/19data.html#2019data-drugs>.

**Slide #40**

**Increasing Injection of  
Methamphetamine among Non-MSM  
who Inject Drugs**

In 2018, Glick and colleagues published a study focused on injection of methamphetamine among non-men who have sex with men (MSM) who inject drugs. The study was conducted in King County, Washington, where the prevalence of HIV among MSM who inject methamphetamine is high, while it is low among other people who inject drugs (PWID). Local drug problem indicators suggest that methamphetamine use is increasing.

Increasing Injection of Methamphetamine  
among Non-MSM who Inject Drugs



SOURCE: Glick et al., 2018

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(Notes for Slide #40,  
continued)

#### Slide #40

### **Increasing Injection of Methamphetamine among Non-MSM who Inject Drugs**

The extent to which this increase affects MSM and non-MSM, and whether MSM and non-MSM networks are connected through injection equipment sharing, is unknown. The study team used data from two serial cross-sectional surveys of PWID including five biannual surveys of Public Health–Seattle and King County Needle and Syringe Exchange Program clients (NSEP, N =2135, 2009–2017) and three National HIV Behavioral Surveillance IDU surveys (NHBS, N =1709, 2009–2015).

**The proportion of non-MSM PWID reporting any recent injection of methamphetamine increased significantly from approximately 20% in 2009 to 65% in 2017.** Most of this increase was attributable to injecting methamphetamine in combination with heroin (goofballs).

**PWID who injected goofballs were more likely to be younger, homeless or unstably housed, report daily injection, and self-report an opioid overdose in the past year** than other PWID. The majority of PWID who injected methamphetamine reported sharing any injection equipment. Among these PWID, 43% of MSM had last shared injection equipment with a non-MSM.

(Notes for Slide #40,  
continued)

Slide #40

**Increasing Injection of  
Methamphetamine among Non-MSM  
who Inject Drugs**

Eight percent of non-MSM men and 15% of women had last shared equipment with an MSM.

The study team concluded that given non-trivial rates of sharing injection equipment with methamphetamine-using MSM, **a population with an HIV prevalence of 40%, non-MSM who inject methamphetamine could be an emerging population at risk for acquiring HIV.**



**REFERENCE:**

Glick, S. N., Burt, R., Kummer, K., Tinsley, J., Banta-Green, C. J., & Golden, M. R. (2018). Increasing methamphetamine injection among non-MSM who inject drugs in King County, Washington. *Drug and Alcohol Dependence*, 182, 86–92.

Slide #41

**Methamphetamine and Opioid Co-  
Injection – What are the Issues?**

People generally use two substance together because one offsets the effects of the other (e.g., using depressants after a stimulant helps to make the uncomfortable agitation from stimulants go away), or because they prefer the combined effect over the effect of either substance alone.

Methamphetamine and Opioid Co-  
Injection – What are the Issues?

- A **synergistic effect occurs** when using meth and an opioid together (i.e., the result of using both is greater than either alone)
- The stimulant effect counterbalances the depressant effect, thus **increasing overdose risk** (respiratory depression AND cardiac arrest)
- The **most potent effect** seems to be in the **first 90 minutes** of co-ingestion

SOURCES: Meacham et al., 2016;  
Trujillo et al., 2011

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(Notes for Slide #41,  
continued)

#### Slide #41

### Methamphetamine and Opioid Co-Injection – What are the Issues?

When people take methamphetamine and opioids together, there is a synergistic effect, meaning that together they produce an effect that is better and/or different than can be achieved with either substance alone. When taken together the stimulant effect from methamphetamine and the depressant effect of the opioids counterbalance either other, making both feel more pleasant. However, a person may not be able to recognize that they have overused one or both of the substances, thereby increasing the risk of overdose, from respiratory suppression (opioids) and/or from cardiac arrest (methamphetamine).

This risk seems most pronounced during the first 90 minutes of taking both substances.



#### REFERENCES:

Meacham, M. C., Strathdee, S. A., Rangel, G., Armenta, R. F., Gaines, T. L., & Garfein, R. S. (2016). Prevalence and correlates of heroin-methamphetamine co-injection among persons who inject drugs in San Diego, California, and Tijuana, Baja California, Mexico. *J. Stud. Alcohol Drugs*, 77, 774–781.

## (Notes for Slide #41, continued)

### Slide #41

## Methamphetamine and Opioid Co-Injection – What are the Issues?



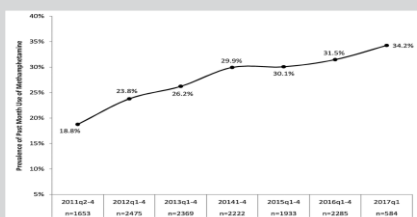
### REFERENCES:

Trujillo, K. A., Smith, M. L., & Guaderrama, M. M. (2011). Powerful behavioral interactions between methamphetamine and morphine. *Pharmacology, Biochemistry, and Behavior*, 99, 451–458.

### Slide #42

## Past Month Use of Methamphetamine among People Seeking Treatment for an Opioid Use Disorder

Past Month Use of Methamphetamine among People Seeking Treatment for an Opioid Use Disorder



SOURCE: Ellis et al., 2018

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In 2018, Ellis and colleagues published a study that examined the past month use of methamphetamine among people who were seeking treatment for an opioid use disorder. The study comprised more than 13,000 individuals entering a substance use disorder treatment program across the United States. Data was collected through an anonymous survey of drug use patterns between 2011 and 2017. A smaller subset of 300 respondents also participated in a more in depth interview with the study team.

The key finding was that past month use of methamphetamine increased significantly among people who were seeking treatment for their opioid use disorder, from approximately 19% in 2011 to more than 34% in 2017 (+82.6%,  $p < .001$ ).

(Notes for Slide #42,  
continued)

**Slide #42**

**Past Month Use of Methamphetamine among People Seeking Treatment for an Opioid Use Disorder**

According to the authors, the qualitative data that was collected during the patient interviews indicated that “methamphetamine served as an opioid substitute, provided a synergistic high, and balanced out the effects of opioids so one could function ‘normally.’”



**REFERENCE:**

Ellis, M. Kasper, A., & Cicero, T. (2018). Twin epidemics: The surging rise of methamphetamine use in chronic opioid users. *Drug and Alcohol Dependence*, 193, 14–20.

**Slide #43**

**What are Some Treatment Implications for Methamphetamine and Opioid Co-Ingestion?**

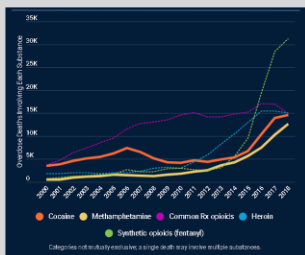
With increasing rates of fentanyl mixed into samples of methamphetamine (and cocaine), people who use stimulants are at much higher risk for overdose death due to their lack of tolerance for opioids. People who use stimulants should be educated about the dangers of fentanyl and offered naloxone kits to have on hand in case of opioid overdose. This slide features a few additional practical treatment implications to consider.

What are Some Treatment Implications for Methamphetamine and Opioid Co-Ingestion?

- Make sure you have sufficient **naloxone kits** available for overdoses
  - Because of the interaction effect, it may require more than one dose to counteract the effects of meth and heroin
- Combine **medication-assisted treatment for heroin with contingency management for meth**
  - It may be better to use buprenorphine rather than methadone, since methadone and meth would still have a potent interaction (for people who relapse on meth during treatment)
- **Exercise may help to reduce methamphetamine use and reduce depression and anxiety symptoms**

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#### An Emerging Pattern of Increased Deaths Involving Stimulants



#### Slide #44

### An Emerging Pattern of Increased Deaths Involving Stimulants

The United States is in the midst of a nationwide opioid crisis, which, in some areas of the country, is being fueled by the increased prevalence of synthetic opioids, more specifically fentanyl. This line graph shows the long-term pattern of drug-involved deaths between 2000 and 2018. The number of deaths involving synthetic opioids, indicated by the dashed green line, have increased drastically since 2013. Deaths involving heroin (dashed blue line) have increased as well, though the increase is not as steep as it was with synthetic opioids, and heroin-involved deaths have begun to taper off and remain relatively stable since 2016. Deaths involving other commonly used prescription opioids (dashed purple line) increased between 2000 to 2015, and have leveled off and were on the decline in 2017-2018.

While much attention has been focused on opioid-involved deaths, a second troubling trend has been emerging in the area of stimulant-involved deaths. Cocaine-involved deaths (solid orange line) peaked initially in 2006, and then decreased through 2015. Deaths involving cocaine, however, more than doubled between 2015 and 2018 (from 6,775 to 14,652). Deaths involving methamphetamine have been climbing steadily since 2008, and also more than doubled between 2015 and 2018 (from 5,697 to 12,649).

(Notes for Slide #44,  
continued)

#### Slide #44

### An Emerging Pattern of Increased Deaths Involving Stimulants



**NOTE:** *It is important to mention, as a point of context that a single drug-involved death may involve multiple substances.*

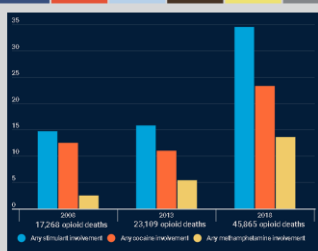
This data slide originates from a recent *Data Insights* report released by the National Institute for Health Care Management (NIHCM) Foundation.



#### REFERENCE:

National Institute for Health Care Management Foundation. (2020, May). *Beyond Opioids: Rapid Increase in Drug Deaths Involving Stimulants*. Retrieved June 3, 2020, from <https://www.nihcm.org/categories/beyond-opioids-rapid-increase-in-drug-deaths-involving-stimulants>.

A Growing Percentage of Opioid-Related Deaths also Involve Stimulants



SOURCE: NIHCM Foundation, 2020

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#### Slide #45

### A Growing Percentage of Opioid-Related Deaths also Involve Stimulants

Stimulants have increasingly become involved in heroin-related deaths since 2008, and by 2018, 35% of opioid-related deaths also involved one or more stimulants (blue bars; up from 15% in 2008).

(Notes for Slide #45,  
continued)

### Slide #45

## A Growing Percentage of Opioid-Related Deaths also Involve Stimulants

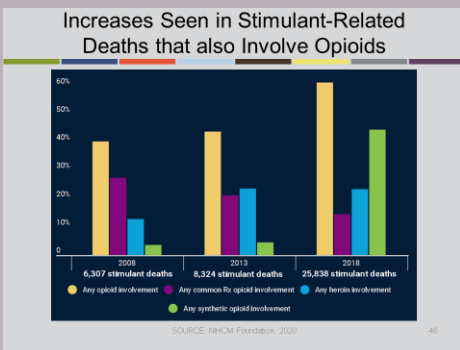
Between 2008 and 2018, cocaine (orange bars) was more likely to be involved in opioid-related deaths than methamphetamine (yellow bars). It is important to note, however, that the proportion of opioid-related deaths that also involved methamphetamine experienced more rapid growth compared to cocaine involvement. In 2008, 2.5% of all opioid-related deaths also involved methamphetamine. By 2018, 13.6% of all opioid-related deaths also involved methamphetamine.

This data slide originates from a recent *Data Insights* report released by the National Institute for Health Care Management (NIHCM) Foundation.



### REFERENCE:

National Institute for Health Care Management Foundation. (2020, May). *Beyond Opioids: Rapid Increase in Drug Deaths Involving Stimulants*. Retrieved June 3, 2020, from <https://www.nihcm.org/categories/beyond-opioids-rapid-increase-in-drug-deaths-involving-stimulants>.

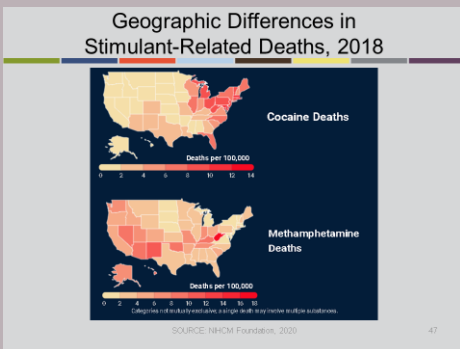


## Slide #46

### Increases Seen in Stimulant-Related Deaths that also Involve Opioids

The increasing co-involvement of stimulants and opioids in drug-involved overdose deaths can also be examined by looking at the percentage of stimulant-involved deaths that also involve opioids. Between 2008 and 2018, as the number of stimulant-involved overdose deaths increased four-fold from 6,307 to 25,838, the proportion of these deaths that also involved one or more opioids increased, as well, from 40% in 2008 to 61% in 2018 (yellow bars). The three waves of the opioid epidemic can be visualized in this data, as well. Wave 1 (circa 2008) focused on overdose deaths involving prescription opioids (purple bars), the proportion of which has declined in more recent years (e.g., involved in 27.4% of stimulant deaths in 2008 vs. 14.5% in 2018). Wave 2 (circa 2013) focused on an increase in heroin-involved overdose deaths (blue bars), the proportion of which increased from being involved in 12.8% of stimulant deaths in 2008 to 23.4% in 2018. Lastly, wave 3 (circa 2018) focuses on a rapid increase in synthetic opioids-involved deaths. Synthetic opioids such as fentanyl were (green bars) largely absent from the data in 2008 and 2013 involved in 3.6% and 4.5% of stimulant deaths, respectively). But more recently, they have increased exponentially, and in 2018 were involved in 44.5% of stimulant-involved deaths.

(Notes for Slide #46,  
continued)



**Slide #46**

**Increases Seen in Stimulant-Related Deaths that also Involve Opioids**

This data slide originates from a recent *Data Insights* report released by the National Institute for Health Care Management (NIHCM) Foundation.



**REFERENCE:**

National Institute for Health Care Management Foundation. (2020, May). *Beyond Opioids: Rapid Increase in Drug Deaths Involving Stimulants*. Retrieved June 3, 2020, from <https://www.nihcm.org/categories/beyond-opioids-rapid-increase-in-drug-deaths-involving-stimulants>.

**Slide #47**

**Geographic Differences in Stimulant-Related Deaths, 2018**

Stimulant-involved overdose deaths are differentially impacting different geographic regions of the United States. In this figure, darker shades of orange/red indicate higher population-adjusted stimulant-involved overdose death rates. Lighter shades, on the other hand, indicate lower population-adjusted stimulant-involved overdose death rates. For cocaine, higher death rates were seen in Florida up along the East Coast into New England. In contrast, for methamphetamine, higher death rates were seen in the Western United States.

(Notes for Slide #47,  
continued)

### Slide #47

## Geographic Differences in Stimulant-Related Deaths, 2018

This data slide originates from a recent *Data Insights* report released by the National Institute for Health Care Management (NIHCM) Foundation.



### REFERENCE:

National Institute for Health Care Management Foundation. (2020, May). *Beyond Opioids: Rapid Increase in Drug Deaths Involving Stimulants*. Retrieved June 3, 2020, from <https://www.nihcm.org/categories/beyond-opioids-rapid-increase-in-drug-deaths-involving-stimulants>.

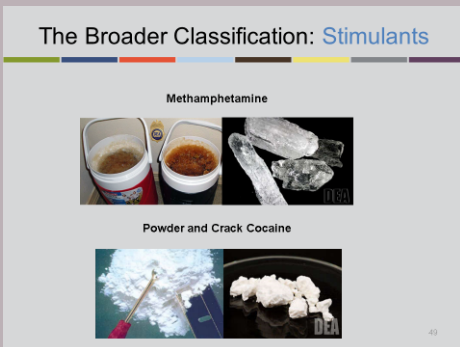
### Slide #48

## Stimulants: What are We Talking About?

The next section of Module 2 describes, in detail, cocaine and methamphetamine. Topics include a description of the different types of central nervous system stimulants, methamphetamine manufacturing processes, and key differences between cocaine and methamphetamine.

Stimulants:  
What are We Talking About?

(Notes for Slide #48,  
continued)



### Slide #48

#### Stimulants: What are We Talking About?

In this section we will show images of methamphetamine and cocaine and the way that they affect the brain and body. The decision was made to show these images because they help to describe the various forms of stimulants and the impact they have on the person who uses them. We recognize that many people who work with people who use substances are in recovery themselves. For some, images may be triggering. It is important to take care of yourself if you feel triggered by the images. Feel free to look down or away, to close your eyes, to get up and move to another part of the room, or to take a break and leave the room if you need to.

### Slide #49

#### The Broader Classification: Stimulants

The main types of stimulants are methamphetamine, amphetamines (not pictured), crack cocaine, and powder cocaine. Stimulants increase alertness and arousal by stimulating the central nervous system.

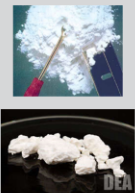


#### IMAGE CREDITS:

U.S. Drug Enforcement Administration website, various publications.

### Forms of Cocaine

- Powder cocaine (Hydrochloride salt)
- Smokable cocaine (Crack, rock, freebase)
- Cocaine half-life: ~1-2 hours



SOURCE: NIDA, 2018

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## Slide #50

### Forms of Cocaine

The powdered hydrochloride salt form of cocaine can be snorted or dissolved in water and injected. Powder cocaine is most often snorted. Crack is the form of cocaine that has not been neutralized by an acid to make the hydrochloride salt. This form of cocaine comes in a rock crystal that can be heated and its vapours smoked. Crack may be smoked in a pipe bowl containing 50-100 mg or in a cigarette with as much as 300 mg. The term "crack" refers to the crackling sound heard when the mixture is smoked (heated). The cocaine high is most intense if you smoke or inject cocaine. Smoking crack bypasses the vasoconstriction that results when cocaine is snorted; therefore, the effects are similar to taking cocaine intravenously.

Common street names can differ by region. Ask the audience to offer additional street names. Many other street names exist for crack, and the popularity of these names varies by geographic region of the U.S. Additional street names include: 24-7; Badrock; Beat; Candy; Chemical; Cloud; Cookies; Crumbs; Crunch & munch; Devil drug; Dice; Electric Kool-Aid; Fat bags; French fries; Glo; Gravel; Grit; Hail; Hard ball; Hard rock; Hotcakes; Ice cube; Jelly beans; Nuggets; Paste; Piece; Prime time; Product; Raw; Rock(s); Scrabble; Sleet; Snow coke; Tornado; and Troop.

(Notes for Slide #50,  
continued)

## **Slide #50**

### **Forms of Cocaine**

#### **Additional Information for the Trainer:**

The half-life of cocaine depends on the route of administration. The following table summarizes the duration of effects and half-life, by route of administration.

#### **Smoking:**

- **Onset:** 7 seconds
- **Peak Effect (min):** 1-5 minutes
- **Duration (min):** 20 minutes
- **Half-Life (min):** 40-60 minutes

#### **Injection:**

- **Onset:** 15 seconds
- **Peak Effect (min):** 3-5 minutes
- **Duration (min):** 20-30 minutes
- **Half-Life (min):** 40-60 minutes

#### **Nasal/Inhalation:**

- **Onset:** 3 minutes
- **Peak Effect (min):** 15 minutes
- **Duration (min):** 45-90 minutes
- **Half-Life (min):** 60-90 minutes

#### **Oral:**

- **Onset:** 10 minutes
- **Peak Effect (min):** 60 minutes
- **Duration (min):** 60 minutes
- **Half-Life (min):** 60-90 minutes

## (Notes for Slide #50, continued)

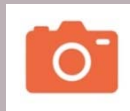
## Slide #50 Forms of Cocaine



### REFERENCE:

National Institute on Drug Abuse. (2018, July 13). *Cocaine*. Retrieved May 8, 2020, from

<https://www.drugabuse.gov/publications/drugfacts/cocaine>.




### IMAGE CREDITS:

U.S. Drug Enforcement Administration website, various publications.

## Slide #51 Crack in More Detail

**Crack in More Detail**

- The **freebase form** of cocaine that has been processed from the powdered cocaine hydrochloride form to a substance that can be **smoked**.
- Processed with **ammonia** or **sodium bicarbonate** (baking soda) and **water**, and **heated** to remove the hydrochloride.
- **High experienced** in less than 10 seconds.
- **Inexpensive** both to produce and to buy.



SOURCES: NIDA, 2016; CSAT, 1999

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Crack can be administered in many ways, but is most often smoked. Crack is widely available in various geographic regions. The crack high is quick, intense, and short term, and requires the use of more crack almost immediately to maintain the high. The intensity and duration of cocaine's effects—which include increased energy, reduced fatigue, and mental alertness—depend on the route of drug administration. The faster cocaine is absorbed into the bloodstream and delivered to the brain, the more intense the high.

## (Notes for Slide #51, continued)

## Slide #51 Crack in More Detail



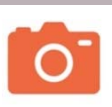
### REFERENCES:

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from

<https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.

Center for Substance Abuse Treatment. (1999). *Treatment for Stimulant Use Disorders. Treatment Improvement Protocol (TIP) Series, No. 33*. Rockville, Maryland: Substance Abuse and Mental Health Services Administration Retrieved July 7, 2020, from

<https://www.ncbi.nlm.nih.gov/books/NBK64323/table/A59093/>.




### IMAGE CREDIT:

U.S. Drug Enforcement Administration, NIDA website, 2016.

## Slide #52 Methamphetamine

Methamphetamine is commonly found in a few forms – methamphetamine powder, base/paste methamphetamine, and crystal methamphetamine. The information on this slide is provided to describe the differences between each form of methamphetamine.

**Methamphetamine**



**Methamphetamine Powder**  
*Description: Beige/yellowy/ off-white powder*

**Base / Paste Methamphetamine**  
*Description: 'Oily', 'gunky', 'gluggy' gel, moist, waxy*

**Crystalline Methamphetamine**  
*Description: White/clear crystals/rocks; 'crushed glass' / 'rock salt'*

SOURCE: NIDA, 2019

## (Notes for Slide #52, continued)

## Slide #52 Methamphetamine



### REFERENCE:

National Institute on Drug Abuse. (2019, May 16). *Methamphetamine*. Retrieved May 12, 2020, from <https://www.drugabuse.gov/publications/drugfacts/methamphetamine>.



### IMAGE CREDIT:

U.S. Drug Enforcement Administration, 2017.

## Slide #53

### Types of Stimulants: Methamphetamine

Methamphetamine is an addictive stimulant drug that strongly activates certain systems in the brain. Methamphetamine is chemically related to amphetamine, but the effects of methamphetamine on the central nervous system are greater. Both drugs have some limited therapeutic uses, primarily in the treatment of obesity. Methamphetamine is made in illegal laboratories and has a high potential for misuse.

Methamphetamine is taken orally or intranasally (snorting the powder), by intravenous injection, rectal insertion, and by smoking.

#### Types of Stimulants: Methamphetamine

##### Amphetamine Type Stimulants (ATS)

- Methamphetamine
  - Speed, crystal, ice, yaba, shabu, tina
- Amphetamine
- Pharmaceutical products used for ADD and ADHD

Methamphetamine half-life: 8-10 hours

- 50% of drug is removed from the body within 8 hours

SOURCE: NDA, 2019

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(Notes for Slide #53,  
continued)

### Slide #53

#### Types of Stimulants: Methamphetamine

Immediately after smoking or intravenous injection, the individual experiences an intense sensation, called a “rush” or “flash,” that lasts only a few minutes and is described as extremely pleasurable. Rectal insertion causes a similar rush sensation, and done in association with sexual activity. Oral or intranasal use produces euphoria—a high, but not a rush. People who use methamphetamine may develop a stimulant use disorder and use the drug with increasing frequency and in increasing doses.

#### Abbreviations on this slide:

ADD – Attention Deficit Disorder

ADHD-Attention Deficit and Hyperactivity Disorder



#### REFERENCE:

National Institute on Drug Abuse. (2019, May 16). *Methamphetamine*. Retrieved May 12, 2020, from

<https://www.drugabuse.gov/publications/drugfacts/methamphetamine>.

#### Methamphetamine: Patterns of Use

- Either **smoking or injecting** causes an immediate, intense “rush” which lasts a few minutes
- Snorting or oral ingestion produces euphoria—a high, but not an intense rush.
  - Snorting** produces effects **within 3 to 5 minutes**
  - Oral ingestion** produces effects within **15 to 20 minutes**
- Often abused in “binge & crash” pattern
  - “Run”: foregoing food and sleep while continuing to take the drug for up to several days

SOURCE: NIDA, 2019

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## Slide #54

### Methamphetamine: Patterns of Use

People can administer methamphetamine in a variety of ways, including smoking, swallowing, snorting, or injecting powder that has been dissolved in a liquid such as water or alcohol. The onset of effects differ by route of administration. Oftentimes, people who use methamphetamine use it in a “binge and crash” pattern, or more specifically in a “run.”



#### REFERENCE:

National Institute on Drug Abuse. (2019, May 16). *Methamphetamine*. Retrieved May 12, 2020, from <https://www.drugabuse.gov/publications/drugfacts/methamphetamine>.

#### Types of Stimulants: Prescription Stimulants

- Stimulant medications (e.g., amphetamines) are often prescribed to treat individuals diagnosed with attention-deficit hyperactivity disorder (ADHD)
- Stimulants enhance alertness and concentration
- May be diverted from medical use to non-prescription use
- Amphetamines increase wakefulness and have been misused by:
  - military, pilots, truck drivers, and other workers to keep functioning past their normal limits

SOURCE: NIDA, 2019

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## Slide #55

### Types of Stimulants: Prescription Stimulants

Prescription stimulants are medications that can increase alertness, attention, energy, blood pressure, heart rate, and breathing rate. Common prescription stimulants include Dexedrine (d-amphetamine), Ritalin, and Adderall (dl-amphetamine).

(Notes for Slide #55,  
continued)

## Slide #55

### Types of Stimulants: Prescription Stimulants



#### REFERENCE:

National Institute on Drug Abuse. (2018, December 13). *Misuse of Prescription Drugs*. Retrieved May 12, 2020, from <https://www.drugabuse.gov/publications/misuse-prescription-drugs/overview>.

#### Street Names for Stimulants

- |                        |                  |
|------------------------|------------------|
| • Dex                  | • Tina           |
| • Dexamphetamine       | • Snow           |
| • Bennies, Minibennies | • Uppers         |
| • Dexies               | • Wake Ups       |
| • Copilots             | • Black Beauties |
| • Crank                | • Whizz          |
| • Eye Openers          | • Ups            |
| • Blow                 | • Pep Pills      |
| • Rock                 | • Lid Poppers    |

SOURCE: NIDA, 2020

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## Slide #56

### Street Names for Stimulants

This slide lists some of the most commonly used street names for central nervous system stimulants. Slang terms or street names can differ by geographic area and among specific sub-populations. The National Institute on Drug Abuse publishes *Commonly Abused Drugs Charts* that include street names for many drugs, including cocaine, methamphetamine, and prescription stimulants.



#### REFERENCE:

National Institute on Drug Abuse. (2020, March 26). *Commonly Used Drugs Charts*. Retrieved May 12, 2020, from <https://www.drugabuse.gov/drugs-abuse/commonly-used-drugs-charts>.

### Methamphetamine Manufacturing Processes – Three Methods

1. **Ephedrine/Pseudoephedrine Based**  
"Nazi Method"—lithium, anhydrous ammonia  
Cold method—red phosphorus, iodine crystals  
"One Pot" and "Shake and Bake" cooking using dry ammonia nitrite and cough syrup rather than liquid anhydrous ammonia
2. **P2P/Phenylacetone** (Illegal in US-Schedule II, precursors legal in Mexico). Now cooked in large laboratories in Mexico with expert chemists
3. **New synthetic method** emerging with P2P precursor and phenylacetic acid as pre-precursor—nitro styrene

SOURCE: Maxwell, 2019

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## Slide #57

### Methamphetamine Manufacturing Processes – Three Methods



#### **\*\*ANIMATIONS\*\***

***This slide contains animations. Trainers should practice presenting this information so they can see the timing of the animations and how new content appears on the slide. This slide includes Three Number headings, each describing a different manufacturing method. To show each method, click once. The numbered header and description will appear. Click again and the next numbered header and description will appear.***

This slide explains the different processes used to manufacture methamphetamine. The new synthetic profile from Mexico (#3 above) is beginning to show up along the U.S.-Mexico border and in states along the Mississippi River.



#### **REFERENCE:**

Maxwell, J. C. (2019, November 9). Methamphetamine Manufacturing Processes. [Slide]. In: *Methamphetamine and the Effectiveness of Various Solutions: It's a Confusing Picture*. [PowerPoint Presentation]. Austin, TX: Addiction Research Institute, University of Texas at Austin.

### A Quick History of Methamphetamine

- Before 1970: Amphetamine could be purchased over the counter
- 1970-1980: Meth made using the P2P phenyl propanone method. Bikers carried the product in their "crank cases"
- 1980: P2P becomes schedule II in the US but is still legal in Mexico. Meth in US is made from pseudoephedrine (PSE)
- 2005: PSE regulated by CMEA in US and banned in Mexico
- 2009: Significant shift from PSE to P2P as precursor
- 2014: New alternative P2P recipe (nitro styrene)

SOURCE: Maxwell, 2019

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## Slide #58

### A Quick History of Methamphetamine

This slide depicts a brief history of the methods used to produce methamphetamine, both domestically and internationally.

#### Abbreviations on this slide:

PSE = Pseudoephedrine

CMEA = The Combat Methamphetamine Epidemic Act of 2005



#### REFERENCE:

Maxwell, J. C. (2019, November 9). Methamphetamine Manufacturing Processes. [Slide]. In: *Methamphetamine and the Effectiveness of Various Solutions: It's a Confusing Picture*. [PowerPoint Presentation]. Austin, TX: Addiction Research Institute, University of Texas at Austin.

## Slide #59

### Reduction of Methamphetamine Availability

This slide discusses the Combat Methamphetamine Epidemic Act (CMEA), the passing of which resulted in significant reductions in the domestic production of methamphetamine. Production of methamphetamine moved south of the border to Mexico, and the method of production switched to the P2P method.

### Reduction of Methamphetamine Availability

- In 2005, Congress passed the Combat Methamphetamine Epidemic Act (CMEA), which put pseudoephedrine products behind the counter.
- Although some meth makers tried "smurfing," meth cases plummeted.
- With no more meth lab explosions on the nightly news, the public forgot about the drug.
- Mexican drug cartels stepped in improving production using the P2P Method with higher potency and lower price (\$2,000 per pound)

SOURCES: NIDA, 2020  
Ransohoff, 2019

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(Notes for Slide #59,  
continued)

### Slide #59

## Reduction of Methamphetamine Availability

This method of manufacturing methamphetamine resulted in a higher potency and cheaper final product. Additional details about the CMEA are available at:

<https://www.deadiversion.usdoj.gov/meth/cma2005.htm>.



### REFERENCES:

National Institute on Drug Abuse. (2020, April 8). *How is Methamphetamine Manufactured?* Retrieved July 6, 2020, from

<https://www.drugabuse.gov/publications/research-reports/methamphetamine/how-methamphetamine-manufactured>.

Rawson, R. (2019, November 19). Methamphetamine Availability Reduces 2006. [Slide]. In: *The Re-Emergence of Cocaine and Methamphetamine in the 21<sup>st</sup> Century*. [PowerPoint Presentation]. Burlington, VT: Vermont Center on Behavior and Health, University of Vermont.

Purity vs. Potency

- **Purity** is a measure of the amount of an illicit substance compared to other substances such as adulterants or solvents.
- **Potency** is the measure of drug activity in terms of the dosage required to exert an effect on the body.
- Methamphetamine has 2 isomers:
  - The ***l*-isomer** form is sold over-the-counter and exhibits vasoconstrictive effects (Vicks inhaler).
  - The ***d*-isomer** form is 3-5 times stronger on the central nervous system activity. Crystal meth is associated with increased incidence of dependence.

SOURCES: Maxwell, 2019; Ciccarone, 2011; McKetin et al., 2006

## Slide #60

### Purity vs. Potency



#### **\*\*ANIMATIONS\*\***

***This slide contains animations. Trainers should practice presenting this information so they can see the timing of the animations and how new content appears on the slide. This slide includes primary bullets, each describing purity or potency. To show each bullet, click once, and the bullet and description will appear. Click again and the bullet and description will appear.***

This slide provides the definition of purity and potency.

With regards to the two isomers of methamphetamine, the key message is this: **If drug is 100% potent, it's all *d*-form. If 0% potent, is all *l*-form.** The *d*-isomer form is 3-5 times stronger on the central nervous system activity. Crystalline meth is highly purified for smoking and associated with increased incidence of dependence as the *l*-isomer and releases dopamine (McKetin et al., 2006).

(Notes for Slide #60,  
continued)

**Slide #60**  
**Purity vs. Potency**

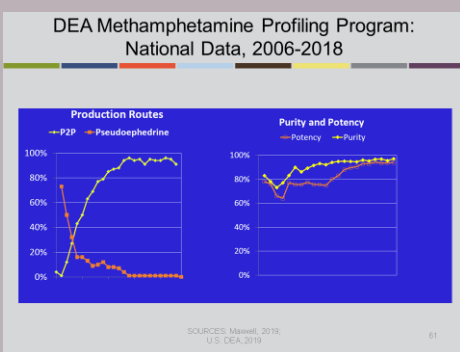


**REFERENCES:**

Maxwell, J. C. (2019, November 9). Purity vs. Potency. [Slide]. In: *Methamphetamine and the Effectiveness of Various Solutions: It's a Confusing Picture*. [PowerPoint Presentation]. Austin, TX: Addiction Research Institute, University of Texas at Austin.

Ciccarone, D. (2011). Stimulant abuse: Pharmacology, cocaine, methamphetamine, treatment, attempts at pharmacology. *Primary Care*, 28(1), 41–58.

McKetin, R., McLaren, J., Lubman, D. I., & Hides, L. (2006). The prevalence of psychotic symptoms among methamphetamine users. *Addiction*, 101(10), 1473–1478.



**Slide #61**  
**DEA Methamphetamine Profiling  
Program: National Data, 2006-2018**

This slide depicts data from the U.S. Drug Enforcement Administration regarding the different manufacturing processes and the purity and potency of the methamphetamine that was seized by law enforcement between 2006 and 2018.

(Notes for Slide #61,  
continued)

### Slide #61

#### DEA Methamphetamine Profiling Program: National Data, 2006-2018

On the left side is the production data. The prevalence of the P2P method of manufacturing has increased across the past several years to upwards of 90%+, while the prevalence of the pseudoephedrine method has decreased drastically to nearly 0%. On the right side is the purity and potency data. The trend has been towards an increase in both purity and potency to upwards of nearly 100%.



#### REFERENCES:

Maxwell, J. C. (2019, October 3). DEA Methamphetamine Profiling Program: National Data 2006-2018. [Slide]. In: *Heroin, Meth, and Poly-Substance Abuse: Where We Are Now*. [PowerPoint Presentation]. Austin, TX: Addiction Research Institute, University of Texas at Austin.

U.S. Drug Enforcement Administration. (2019). *2019 National Drug Threat Assessment*, DEA-DCT-DIR-007-20. Washington, D.C.: Author. Available at: [https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020\\_Low\\_Web-DIR-007-20\\_2019.pdf](https://www.dea.gov/sites/default/files/2020-01/2019-NDTA-final-01-14-2020_Low_Web-DIR-007-20_2019.pdf).

### Cocaine vs. Methamphetamine

#### Methamphetamine

- Stimulant
- Man-made
- Smoking produces a long-lasting high
- 50% of drug is removed from body in 12 hours
- Increases dopamine release and blocks dopamine re-uptake
- Limited medical use

#### Cocaine

- Stimulant and local anesthetic
- Plant-derived
- Smoking produces a brief high
- 50% of drug is removed from body in 1 hour
- Blocks dopamine re-uptake
- Limited use as a local anesthetic (surgical)

SOURCE: NIDA, 2019

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## Slide #62

### Cocaine vs. Methamphetamine

Methamphetamine is structurally similar to amphetamine, but it is quite different from cocaine. Although these stimulants have similar behavioral and physiological effects, there are some major differences in their basic mechanisms of action. In contrast to cocaine, which is quickly removed and almost completely metabolized in the body, methamphetamine has a much longer duration of action and a larger percentage of the drug remains unchanged in the body. This results in methamphetamine being present in the brain longer, which ultimately leads to prolonged stimulant effects. The half-life of methamphetamine is about 10 hours, vs. a half-life of cocaine of approximately 2 hours.

Although both methamphetamine and cocaine increase levels of the brain chemical dopamine, animal studies reveal much higher levels of dopamine following administration of methamphetamine due to the different mechanisms of action within nerve cells in response to these drugs. Cocaine prolongs dopamine's action in the brain by blocking dopamine re-uptake. While at low doses, methamphetamine blocks dopamine re-uptake, methamphetamine also increases the release of dopamine, leading to much higher concentrations in the synapse, which can be toxic to nerve terminals.

## (Notes for Slide #62, continued)

### Slide #62

#### Cocaine vs. Methamphetamine

Methamphetamine is neurotoxic, but cocaine does not appear to be neurotoxic. Methamphetamine-induced paranoia can last as long as 7 to 14 days (or longer), whereas cocaine paranoia usually subsides within about 4-8 hours following drug cessation.



#### REFERENCE:

National Institute on Drug Abuse. (2019, May 16). *Methamphetamine*. Retrieved May 12, 2020, from <https://www.drugabuse.gov/publications/drugfacts/methamphetamine>.

### Slide #63

#### Differences in Patterns of Use: Methamphetamine vs. Cocaine

Dr. Sara Simon and colleagues conducted a study of sample of 120 people who use methamphetamine and 63 who use cocaine to determine patterns of stimulant use. According to Dr. Simon, “the typical methamphetamine abuser [currently we would say person with MUD] reported using the drug when he or she first got up in the morning, then using approximately every 2 to 4 hours during their waking day. Most of the descriptions of use more closely resembled taking a medication than using a drug for pleasure.”

Differences in Patterns of Use: Methamphetamine vs. Cocaine	
People who Use Methamphetamine	People who Use Cocaine
<ul style="list-style-type: none"><li>Take the drug at the <b>beginning of the day</b> and take additional doses at <b>2 to 4 hour intervals</b> throughout day</li></ul>	<ul style="list-style-type: none"><li>Take the drug in the <b>evening</b> and take additional doses <b>continuously over a period of several hours</b></li></ul>
<small>SOURCE: Simon et al., 2002</small>	

(Notes for Slide #63,  
continued)

**Slide #63**

**Differences in Patterns of Use:  
Methamphetamine vs. Cocaine**

“...Cocaine abusers [currently we would say person with CUD] reported patterns that fit a picture of recreational use: They began in the evening and continued until all the cocaine on hand had been used.” These differing patterns of use may be a result in the differential impacts the individual drugs have on the brain and body. Understanding the differing patterns of use may help treatment providers and patients identify the circumstances (triggers, different times of the day or places) that may lead to relapse.



**REFERENCE:**

Simon, S. L., Richardson, K., Dacey, J., Glynn, S., Domier, C. P., Rawson, R.A., & Ling, W. (2002). A comparison of patterns of methamphetamine and cocaine use. *Journal of Addictive Diseases*, 21(1), 35–44.

**Slide #64**

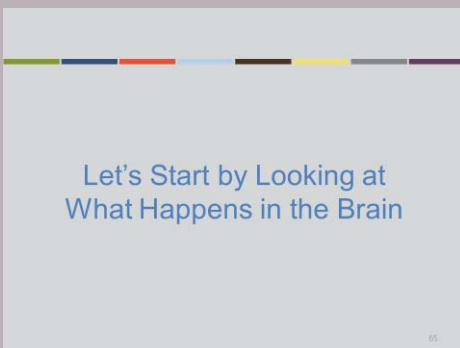
**Module 3: The Impact of Stimulants on  
the Brain and Body**

Module 3 discusses the impact of central nervous stimulants on the brain and body.

Module 3

**The Impact of Stimulants  
on the Brain and Body**

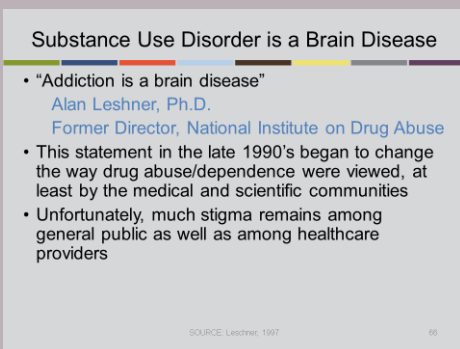




### Slide #65

## Let's Start by Looking at What Happens in the Brain

First, let's look at what happens in a person's brain when they use cocaine or methamphetamine.



### Slide #66

## Substance Use Disorder is a Brain Disease

In the late 1990s, Dr. Alan Leschner, former Director of the National Institute on Drug Abuse (NIDA), conducted a comprehensive review of the research of substance-related conditions and began an education campaign about substance use disorders, demonstrating that, based on the best science, substance use disorders were best characterized as a brain disease. In this articles he demonstrated that like other chronic diseases (e.g., diabetes, hypertension), this chronic brain diseases needed ongoing care and support.



### REFERENCE:

Leschner, A. (1997). Addiction is a brain disease, and it matters. *Science*, 278(5335), 45–47.

#### A Quick Primer on the Human Brain - Neurons

- Primary **information processors**
- Communicate by sending **electrical impulses** down axon to dendrites
- Rate of firing on average is about 150 miles per hour
- Transmitting neuron communicates with receiving neuron by **releasing neurotransmitters**
- Neurotransmitters fit into receptors on receiving neuron and then are taken back into transmitting neuron to be used again (**reuptake**)

SOURCE: SAMHSA, 05/01/2016

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### Slide #67

## A Quick Primer on the Human Brain – Neurons

The human brain includes approximately 86 billion nerve cells (neurons). Each neuron contains three main structures – a cell body, an axon, and a dendrite. Neurons communicate with other nearby neurons through chemical messengers called neurotransmitters. Neurotransmitters will be discussed in more detail in just a few slides.



### REFERENCE:

Substance Abuse and Mental Health Services Administration, Office of the Surgeon General. (2016). *Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health*. Washington, DC: U.S. Department of Health and Human Services.

#### A Quick Primer on the Human Brain - Regions

- Frontal Lobe ( Cerebral Cortex )
  - Judgment and reason**
- Mid brain ( Limbic )
  - Emotions and reward sites**
- Hind brain ( Stem )
  - Bodily functions/involuntary behavior i.e. breathing**

SOURCE: SAMHSA, 05/01/2016

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### Slide #68

## A Quick Primer on the Human Brain – Regions

The brain contains several sub-regions that are interconnected with one another, and each of which play a role in one or more specific functions, such as language, reward, perception, emotion, and movement. This slide lists the three global regions of the brain – the frontal lobe (cerebral cortex), mid-brain (limbic system), and hind brain (brain stem).

(Notes for Slide #68,  
continued)

## Slide #68

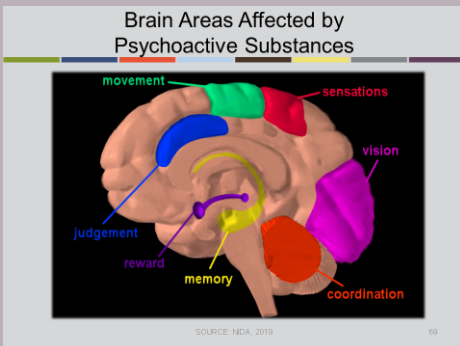
### A Quick Primer on the Human Brain – Regions

Included under each section of the brain is the major functions controlled in each region.



#### REFERENCE:

Substance Abuse and Mental Health Services Administration, Office of the Surgeon General. (2016). *Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health*. Washington, DC: U.S. Department of Health and Human Services.



## Slide #69

### Brain Areas Affected by Psychoactive Substances

This slide depicts a cartoon image of the human brain. The prefrontal cortex is associated with our judgement/executive level decision making. The **nucleus accumbens** is associated with our cognitive processing of aversion, motivation, pleasure, reward, and reinforcement learning. The Limbic system is associated with our center of emotions, learning, and memory; cingulate gyri, hypothalamus, **amygdala** (emotional reactions), and **hippocampus** (memory). The **cerebellum** is associated with coordination.

(Notes for Slide #69,  
continued)

### Slide #69

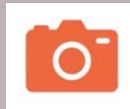
## Brain Areas Affected by Psychoactive Substances

Included under each section of the brain is the major functions controlled in each region.



### REFERENCE:

National Institute on Drug Abuse. (2019, February 11). *Understanding Drug Abuse and Addiction: What Science Says: 3: Brain Regions and Their Functions*. Retrieved January 23, 2020, from <https://www.drugabuse.gov/publications/teaching-packets/understanding-drug-abuse-addiction/section-i/3-brain-regions-their-functions>.



### IMAGE CREDIT:

NIDA website.

### Slide #70

## Neurotransmitters

A neurotransmitter is a chemical substance that is released at the end of a nerve fiber by the arrival of a nerve impulse and, by diffusing across the synapse or junction, causes the transfer of the impulse to another nerve fiber, a muscle fiber, or some other structure.

### Neurotransmitters

- Neurotransmitters can be categorized into two broad categories:

#### –Excitatory

- Move body toward state of arousal

#### –Inhibitory

- Move body toward state of relaxation

SOURCE: Lexico, 2020

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## (Notes for Slide #70, continued)

### Slide #70 Neurotransmitters

Excitatory neurotransmitters move the body towards a state of arousal (increase likelihood that a neuron will fire an action potential), whereas inhibitory neurotransmitters move the body toward a state of relaxation (decrease likelihood that a neuron will fire an action). Both types of neurotransmitters are involved in the psychoactive effects that a person experiences when using alcohol and other drugs, though the specific neurotransmitters implicated differ across specific psychoactive substances.



#### REFERENCE:

Lexico. (2020). *Neurotransmitter*. Retrieved January 23, 2020, from <https://www.lexico.com/en/definition/neurotransmitter>.

#### Major Neurotransmitters Involved in SUD

- **Serotonin**
  - Plays role in mood function, sleep, and dreams - probably how LSD works; is increased slightly by the use of cocaine and amphetamines
- **Dopamine**
  - Affects motor movement; is central “pleasure-inducing” neurotransmitter; related to psychosis. Primary mechanism of action for stimulants
- **Norepinephrine**
  - Increases heart rate, blood pressure, and sweating; dilates pupils and constricts blood vessels

SOURCE: NIDA, 2017

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### Slide #71 Major Neurotransmitters Involved in SUD

An individual’s experience when using a psychoactive substance such as cocaine, heroin, or alcohol is due to the functional role of one or more neurotransmitters disrupted by use of the substance. This is the first of two slides that lists the major neurotransmitters involved in substance use disorders.

## (Notes for Slide #71, continued)

### Slide #71

## Major Neurotransmitters Involved in SUD

Under each neurotransmitter is a summary statement of how each neurotransmitter works in the brain.



### REFERENCE:

National Institute on Drug Abuse. (2017, March 9). *Impacts of Drugs on Neurotransmission*. Retrieved May 15, 2020, from <https://www.drugabuse.gov/news-events/nida-notes/2017/03/impacts-drugs-neurotransmission>.

### Slide #72

## Major Neurotransmitters, continued

This is the second of two slides that lists the major neurotransmitters involved in substance use disorders. Under each neurotransmitter is a summary statement of how each neurotransmitter works in the brain.

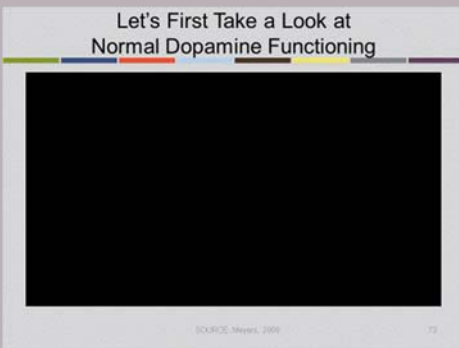
### Major Neurotransmitters, continued

- **GABA (gamma-aminobutyric acid)**
  - Inhibits cells from firing; many of the following drugs produce their effects by agonizing release of this neurotransmitter - alcohol, barbiturates, and benzodiazepines
- **Acetylcholine (ach)**
  - Ubiquitous presence in nervous system – some in every neuron; nicotine seems to work through this neurotransmitter
- **Endorphins**
  - Body's natural pain killers, or endogenous opioids

SOURCE: NIDA, 2017

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(Notes for Slide #72,  
continued)



## Slide #72

### Major Neurotransmitters, continued



#### REFERENCE:

National Institute on Drug Abuse. (2017, March 9). *Impacts of Drugs on Neurotransmission*. Retrieved May 15, 2020, from <https://www.drugabuse.gov/news-events/nida-notes/2017/03/impacts-drugs-neurotransmission>.

## Slide #73

### Let's First Take a Look at Normal Dopamine Functioning



#### INSTRUCTIONS:

***This slide contains a movie clip that will play automatically when the trainer clicks on the black box. In order for this to work, the connection between the PowerPoint presentation and the video file must be maintained. When moving the PowerPoint file to another location on your computer or to another computer, make sure to always move the video file along with it. If the link becomes broken, the video will need to be reinserted. Delete the black box. From the insert menu in PowerPoint, select "movie." Select the video file that was included for this training.***

(Notes for Slide #73,  
continued)

### Slide #73

## Let's First Take a Look at Normal Dopamine Functioning



### INSTRUCTIONS, continued:

***When asked, indicate that the movie should play automatically. It will appear as a black box on the screen. The video should play when the slide show is being viewed when the trainer clicks on the black box.***

Video Length: 1 minute, 19 seconds.

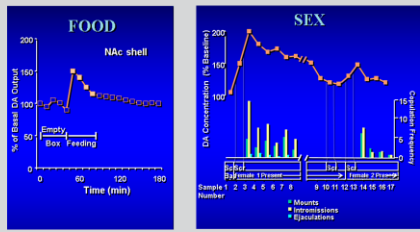
In order to understand the impact of central nervous stimulants on the brain, you first need to understand the way that the brain works normally (in the absence of these substances). It is then possible to see how stimulants like crack or methamphetamine change this functioning. A movie will play here depicting the normal dopamine transmission process.



### VIDEO SOURCE:

Meyers, E. (Director). (2008). *Meth Inside Out: Normal Dopamine Functioning*. [Film]. Los Angeles, CA: Eyes of the World Media Group. Available at:  
<https://vimeo.com/uclaisap>.

## Natural Rewards Elevate Dopamine Levels



SOURCES: Bassareo & Di Ciano, 1999;  
Fitzroy & Phillips, 1997

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## Slide #74

### Natural Rewards Elevate Dopamine Levels

One of the neurotransmitters affected by cocaine and methamphetamine, and by most psychoactive drugs, is dopamine. The release of dopamine within the reward or pleasure circuits in the brain produces immediate feelings of pleasure and elation. Anything that causes you to feel pleasure will cause a spike in your dopamine levels. Even things like food and sex cause dopamine spikes.

In these graphs, dopamine is being measured inside the brains of animals. Its increase is shown in response to food or sex cues. This basic mechanism of controlled dopamine release and reuptake has been carefully shaped and calibrated by evolution to reward normal activities critical for our survival. The **figure on the left illustrates what happens when a food-deprived rat is given food**. When the food is introduced to the rat in the feeding box, the rat's dopamine level increases from a baseline of about 100 to a high of about 150.

The **figure on the right illustrates what happens when a sex-deprived male rat is introduced to a female rat**. When the rats are brought together to do what sex deprived rats will do, their dopamine level increases from that same baseline level of about 100 to a high of 200 (which indicates that sex has a bigger effect on dopamine levels than food).

## (Notes for Slide #74, continued)

### Slide #74

## Natural Rewards Elevate Dopamine Levels



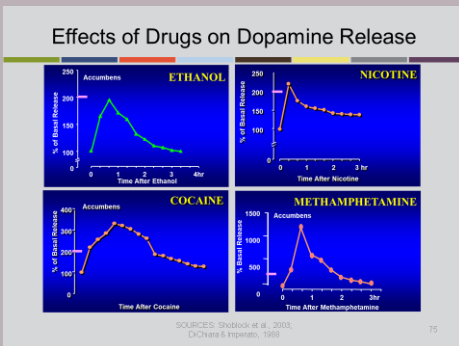
### REFERENCES:

Bassareo, V., & Di Chiara, G. (1999). Differential responsiveness of dopamine transmission to food-stimuli in nucleus accumbens shell/core compartments. *Neuroscience*, 89(3), 637–641.

Fiorino, D. F., & Phillips, A. G. (1997). Dynamic changes in nucleus accumbens dopamine efflux during the Coolidge effect in male rats. *Journal of Neuroscience*, 17(12), 4849–4855.

### Slide #75

## Effects of Drugs on Dopamine Release



When scientists looked at the impact of drugs used by humans on dopamine output in rats, they found that all of them had a direct impact. The same phenomenon of dopamine release can be seen with alcohol and other psychoactive drugs that was seen with food and sex, but in some cases, to an even larger extent. Alcohol (ethanol) increases dopamine levels to 125, nicotine increases dopamine levels to 225, and cocaine causes a spike in dopamine to about 350.

(Notes for Slide #75,  
continued)

## Slide #75

### Effects of Drugs on Dopamine Release

With methamphetamine, however, you see an unparalleled spike in dopamine to a level of about 1,300. Nothing that exists in nature can have as large an impact on dopamine levels than methamphetamine.



#### REFERENCES:

Shoblock, J. R., Sullivan, E. B., Maisonneuve, I. M., & Glick, S. D. (2003). Neurochemical and behavioral differences between d-methamphetamine and d-amphetamine in rats.

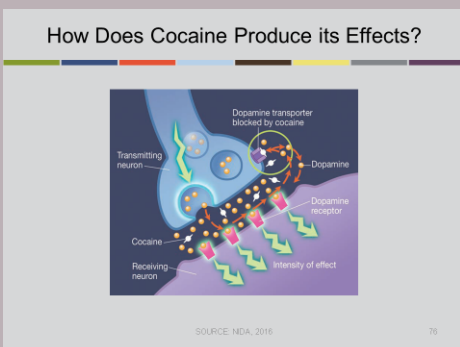
*Psychopharmacology (Berl)*, 165(4), 359–369.

Di Chiara, G., & Imperato, A. (1988). Drugs abused by humans preferentially increase synaptic dopamine concentrations in the mesolimbic system of freely moving rats. *Proc Natl Acad Sci U.S.A.*, 85(14), 5274–5278.

## Slide #76

### How Does Cocaine Produce its Effects?

The most extensively studied effect of cocaine on the central nervous system is the blockage of the dopamine transporter protein. In the normal communication process, dopamine is released by a neuron into the synapse, where it can bind to dopamine receptors on neighboring neurons.



(Notes for Slide #76,  
continued)

## Slide #76

### How Does Cocaine Produce its Effects?

Normally, dopamine is then recycled back into the transmitting neuron by a specialized protein called the dopamine transporter. Cocaine acts by preventing the dopamine from being recycled, causing excessive amounts of the neurotransmitter to build up, amplifying the message to and response of the receiving neuron, and ultimately disrupting normal communication. It is this excess of dopamine that is responsible for cocaine's euphoric effects.

With repeated use, cocaine can cause long-term changes in the brain's reward system and in other brain systems as well, which may eventually lead to development of a cocaine use disorder. With repeated use, tolerance to the cocaine high also often develops. Many people who use cocaine report that they seek but fail to achieve as much pleasure as they did from their first exposure. Some people will increase their dose in an attempt to intensify and prolong the euphoria, but this can also increase the risk of adverse psychological or physiological effects.

Dopamine-rich brain regions such as the ventral tegmental area, nucleus accumbens, and prefrontal cortex are frequent targets of cocaine research.

(Notes for Slide #76,  
continued)



## Slide #76

### How Does Cocaine Produce its Effects?



#### REFERENCE:

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from

<https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.



#### IMAGE CREDIT:

NIDA website, 2020.

## Slide #77

### How the Brain Responds to Cocaine



#### INSTRUCTIONS:

***This slide contains a movie clip that will play automatically when the trainer clicks on the static video image. In order for this to work, the connection between the PowerPoint presentation and the video file must be maintained. When moving the PowerPoint file to another location on your computer or to another computer, make sure to always move the video file along with it. If the link becomes broken, the video will need to be reinserted. Delete the static image.***

(Notes for Slide #77,  
continued)

## Slide #77

### How the Brain Responds to Cocaine



#### INSTRUCTIONS, continued:

***From the insert menu in PowerPoint, select “movie.” Select the video file that was included for this training. When asked, indicate that the movie should play automatically. It will appear as a static image on the screen. The video should play when the slide show is being viewed when the trainer clicks on the static image.***

Video Length: 43 seconds.

As was previously stated, normally, dopamine is recycled back into the transmitting neuron by a specialized protein called the dopamine transporter. Cocaine acts by preventing the dopamine from being recycled, causing excessive amounts of the neurotransmitter to build up, amplifying the message to and response of the receiving neuron, and ultimately disrupting normal communication. It is this excess of dopamine that is responsible for cocaine’s euphoric effects. With repeated use, cocaine can cause long-term changes in the brain’s reward system and in other brain systems as well, which may eventually lead to a cocaine use disorder.

## (Notes for Slide #77, continued)

### Slide #77

#### How the Brain Responds to Cocaine

With repeated use, tolerance to the cocaine high also often develops. Many people who use cocaine report that they seek but fail to achieve as much pleasure as they did from their first exposure. Some will increase their dose in an attempt to intensify and prolong the euphoria, but this can also increase the risk of adverse psychological or physiological effects.



#### VIDEO SOURCE:

National Institute on Drug Abuse. (2016). *The Reward Circuit: How the Brain Responds to Cocaine*. [Film]. Available at: <https://vimeo.com/uclaisap>.

#### How Does Methamphetamine Produce its Effects?

- Causes release of dopamine, norepinephrine, serotonin release
- Prevents reuptake of dopamine
- Inhibiting metabolism of dopamine
- Action of DAT system is reversed, i.e. DA is pumped out of neuronal dendrites, rather than being “vacuumed up” by them and recycled by the transmitting neuron
- Degree of biochemical impairment appears related to duration of use



### Slide #78

#### How Does Methamphetamine Produce its Effects?

The mechanism of action of methamphetamine is complex and involves multiple pathways. It directly affects the limbic system, or pleasure center, of the brain, which, as you learned previously, is the part of the brain that rewards a person for various activities and behaviors. As was shown previously, methamphetamine is capable of producing a dopamine release that is significantly higher than that seen with food, nicotine, morphine, and even cocaine.

(Notes for Slide #78,  
continued)

### Slide #78

#### How Does Methamphetamine Produce its Effects?

In summary, when methamphetamine is used, it causes the release of several neurotransmitters in the brain, most notably dopamine. This slide summarizes what occurs inside of the brain when methamphetamine is introduced. The video on the next slide will illustrate this process in more detail.

#### Abbreviations on this slide:

DA: Dopamine

DAT: Dopamine transporter



#### IMAGE CREDIT:

Terminology and Information on Drugs  
(United Nations publication, Sales No.  
E.16.XI.8).



### Slide #79

#### How the Brain Responds to Methamphetamine



#### INSTRUCTIONS:

***This slide contains a movie clip that will play automatically when the trainer clicks on the black box. In order for this to work, the connection between the PowerPoint presentation and the video file must be maintained.***

(Notes for Slide #79,  
continued)

## Slide #79

### How the Brain Responds to Methamphetamine



#### INSTRUCTIONS, continued:

***If the link becomes broken, the video will need to be reinserted. Delete the black box. From the insert menu in PowerPoint, select “movie.” Select the video file that was included for this training. When asked, indicate that the movie should play automatically. It will appear as a black box on the screen. The video should play when the slide show is being viewed when the trainer clicks on the black box.***

Video Length: 48 seconds.

As you will see from this video clip, the effects of methamphetamine on the brain are different than what we see from other stimulants such as cocaine. While the methamphetamine molecule is structurally similar to amphetamine and to the neurotransmitter dopamine, it is quite different from cocaine. Although these stimulants have similar behavioral and physiological effects, there are some major differences in the basic mechanisms of how they work.

(Notes for Slide #79,  
continued)

### Slide #79

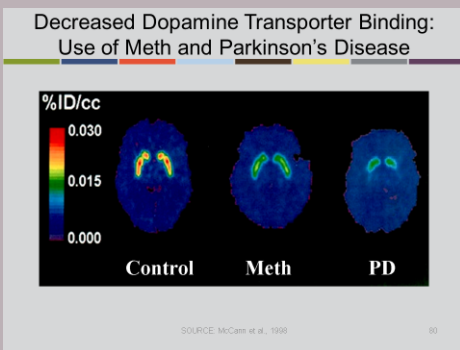
## How the Brain Responds to Methamphetamine

According to NIDA, “in contrast to cocaine, which is quickly removed from and almost completely metabolized in the body, methamphetamine has a **much longer duration of action**, and a larger percentage of the drug **remains unchanged in the body**.

Methamphetamine therefore **remains in the brain longer**, which ultimately leads to prolonged stimulant effects.

Although both methamphetamine and cocaine increase levels of dopamine, **administration of methamphetamine in animal studies leads to much higher levels of dopamine**, because nerve cells respond differently to the two drugs. Cocaine prolongs dopamine actions in the brain by blocking the re-absorption (re-uptake) of the neurotransmitter by signaling nerve cells. **At low doses, methamphetamine also blocks the re-uptake of dopamine, but it also increases the release of dopamine**, leading to much higher concentrations in the synapse (the gap between neurons), which can be toxic to nerve terminals.”

(Notes for Slide #79,  
continued)



**Slide #79**

**How the Brain Responds to  
Methamphetamine**



**VIDEO SOURCE:**

Meyers, E. (Director). (2008). *Meth Inside Out: How the Brain Responds to Methamphetamine*. [Film]. Los Angeles, CA: Eyes of the World Media Group. Available at: <https://vimeo.com/uclaisap>.

**Slide #80**

**Decreased Dopamine Transporter  
Binding: Use of Meth and Parkinson's  
Disease**

We have known for many years that methamphetamine impacts dopamine transporters (DAT), resulting in effects that resemble what happens to a person with Parkinson's Disease. This led to suspicions that individuals who use methamphetamine may be at a greater risk of developing Parkinson's Disease.

In the late 1990s, McCann and colleagues conducted an imaging study using positron emission tomography and a dopamine transporter ligand (an ion or molecule attached to a metal atom by coordinate bonding) to see whether there would be long term negative effects on the functioning of the DAT system in the brain of individuals with a history of methamphetamine use.

(Notes for Slide #80,  
continued)

## Slide #80

### Decreased Dopamine Transporter Binding: Use of Meth and Parkinson's Disease

The small study involved 10 control subjects, six people who were abstinent from methamphetamine use, four people who were abstinent from methcathinone use, and three patients with Parkinson's disease (PD). The results of the PET studies showed that the people who use methamphetamine or methcathinone had significant reductions in DAT density in a couple of different parts of the brain. DAT density was decreased in the patients with PD, as well.

According to the findings, “neither methamphetamine nor methcathinone users [currently we would say person with a stimulant use disorder, or StUD] showed clinical signs of parkinsonism. Persistent reductions of DAT density in methamphetamine and methcathinone users are suggestive of loss of DAT or loss of DA terminals and raise the possibility that as these individuals age, they may be at increased risk for the development of parkinsonism or neuropsychiatric conditions in which brain DA neurons have been implicated.”

## (Notes for Slide #80, continued)

### Slide #80

#### Decreased Dopamine Transporter Binding: Use of Meth and Parkinson's Disease

The increased presence of bright colors (red, orange, yellow) in the brain image on the far left side of the slide (control) indicate more efficient dopamine transporter binding in the brain (or in other words, higher DAT density) than what is seen in the brain image in the middle (methamphetamine/methcathinone use disorder) and far right (patient with Parkinson's Disease).



#### REFERENCE:

McCann, U. D., Wong, D. F., Yokoi, F., Villemagne, V., Dannals, R. F., & Ricaurte, G. A. (1998). Reduced striatal dopamine transporter density in abstinent methamphetamine and methcathinone users: Evidence from positron emission tomography studies with [ $^{11}\text{C}$ ]WIN-35,428. *Journal of Neuroscience*, 18(20), 8417–8422.

### Slide #81

#### What Do Newer Research Studies Say?

Results from two more recent studies, once in 2011 and a second in 2015, confirm earlier suspicions. Heavy use of methamphetamine will put an individual at much greater risk of developing Parkinson's Disease.

#### What Do Newer Research Studies Say?

- A 2011 study examined 300,000 hospital records spanning 16 years and found that patients with methamphetamine use disorders were **75% more likely** to develop Parkinson's disease.
- A 2015 study in Utah found that people who use methamphetamine were **300% more likely** to develop Parkinson's disease compared to those who did not use drugs or those who used cocaine.
  - Study also found that risk may be higher for females.
- A 2018 study concluded that methamphetamine use, along with other risk factors that a person may have, **may be an initiating event** in the development of Parkinson's Disease.

SOURCES: Lippin et al., 2010; Curtis et al., 2015; Callaghan et al., 2011

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(Notes for Slide #81,  
continued)

## Slide #81

### What Do Newer Research Studies Say?

In the most recent study, the subjects who used methamphetamine were 300% more likely to develop PD compared to those subjects who did not use drugs or used cocaine. The good news, which you will hear more about later in this training, is that the brain can recover if abstinence is achieved and maintained. And a 2018 study concluded that meth use, when combined with other risk factors may be an initiating event in the development of Parkinson's Disease.



#### REFERENCES:

Lappin, J. M., Darke, S., & Farrell, M. (2018). Methamphetamine use and future risk for Parkinson's disease: Evidence and clinical implications. *Drug and Alcohol Dependence*, 187, 134–140.

Curtin, K., Fleckenstein, A. E., Robison, R. J., Crookston, M. J., Smith, K. R., & Hanson, G. R. (2015). Methamphetamine/amphetamine abuse and risk of Parkinson's disease in Utah: A population-based assessment. *Drug and Alcohol Dependence*, 146, 30–38.

(Notes for Slide #81,  
continued)

**Slide #81**

**What Do Newer Research Studies Say?**



**REFERENCES:**

Callaghan, R. C., Cunningham, J. K., Sykes, J., & Kish, S. J. (2011). Increased risk of Parkinson's disease in individuals hospitalized with conditions related to the use of methamphetamine or other amphetamine-type drugs. *Drug and Alcohol Dependence*, 120, 35–40.

Acute and Chronic  
Effects of Cocaine

**Slide #82**

**Acute and Chronic Effects of Cocaine**

The next portion of Module 3 examines the acute and chronic effects of cocaine.

Acute Effects of Crack/Cocaine

- Euphoria or affective blunting
- Changes in sociability
- Hypervigilance
- Interpersonal sensitivity
- Anxiety, tension, or anger
- Impaired judgment
- Impaired social or occupational functioning

SOURCES: NIDA, 2016; Gold & Miller, 1997

**Slide #83**

**Acute Effects of Crack/Cocaine**

Acute intoxication with stimulants resembles hyper mania or a manic state. In low doses, libido is stimulated and sexual performance is enhanced. In high doses, spontaneous ejaculation and orgasm can occur. With increasing doses comes poor judgment, indiscretions, sexual acting-out, and other bizarre behaviors or mental alterations.

(Notes for Slide #83,  
continued)

### Slide #83

#### Acute Effects of Crack/Cocaine

Acute stimulant intoxication can result in seizures, confusion, respiratory depression, chest pain, or cardiac arrhythmias (Gold & Miller, 1997). The acute physical effects of **cocaine intoxication** include constricted blood vessels, dilated pupils, and increased temperature, heart rate, and blood pressure.

The duration of cocaine's immediate euphoric effects, which include hyperstimulation, reduced fatigue, and mental alertness, depends on the route of administration. The faster the absorption, the more intense the high. On the other hand, the faster the absorption, the shorter the duration of action. The high from snorting may last 15 to 30 minutes, while that from smoking may last 5 to 10 minutes. Increased use can reduce the period of time a person feels high and increases the risk of developing a cocaine use disorder.

Taken in small amounts, cocaine usually makes the individual feel euphoric, energetic, talkative, and mentally alert, especially to the sensations of sight, sound, and touch. Cocaine can also temporarily decrease the need for food and sleep. Some people find that the drug helps them perform simple physical and intellectual tasks more quickly, while others experience the opposite effect.

(Notes for Slide #83,  
continued)

### Slide #83

#### Acute Effects of Crack/Cocaine

Acute effects of cocaine are similar to other stimulants, such as methamphetamine. Cocaine use causes hypervigilance, although people generally report that initially they feel as if their thinking is 'clear and focused.'

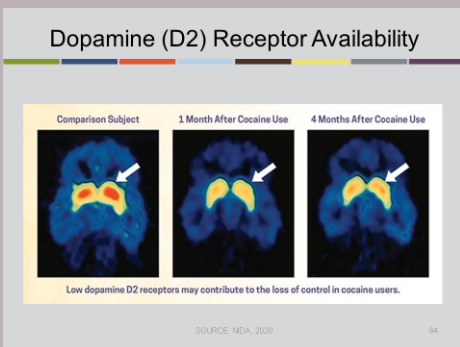


#### REFERENCES:

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from

<https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.

Gold, M.S., & Miller, N. S. (1997). Cocaine (and crack): Neurobiology. In: Lowinson, J. H., Ruiz, P., Millman, R. B., & Langrod, J. G., Eds. *Substance Abuse: A Comprehensive Textbook, 3<sup>rd</sup> Edition*. Baltimore, MD: Williams & Wilkins.



### Slide #84

#### Dopamine (D2) Receptor Availability

This slide features brain images from PET scans showing decreased dopamine (D2) receptors in the brain of a person with a cocaine use disorder versus D2 receptors in the brain of person who does not use drugs.

(Notes for Slide #84,  
continued)

#### Slide #84

#### Dopamine (D2) Receptor Availability

The dopamine system is important for conditioning and motivation, and alterations such as this are likely responsible, in part, for the diminished sensitivity to natural rewards often seen in individuals with a stimulant use disorder.

The scan on the far left side of the screen depicts the brain of a comparison subject who does not have a history of current or past cocaine use. Notice the bright colors (red and orange) in the reward center (the egg-shaped areas towards the top of the scan). Bright colors indicate that there is a lot of activity occurring in the brain of the individual's reward center.

The scans in the middle and right side of the screen depict the brain of a person with a history of cocaine use who had been matched to the comparison subject in terms of age, race, etc. Notice that there are no bright red and orange colors in the reward center in either of these images. Essentially, you see virtually no dopamine activity in the reward centers of the brain of someone who uses cocaine, suggesting very severe disruption of the dopamine neurons. If you were to apply emotions to the brain of person who uses cocaine, how would he/she be feeling? He/she would feel depressed, sad, distraught, etc.

(Notes for Slide #84,  
continued)

## Slide #84

### Dopamine (D2) Receptor Availability



#### Additional Video Resources for the Trainer(s):

*Why do people lose control over their cocaine use?* [Video]:

<https://www.youtube.com/watch?v=UsBXtJi5t4M>

*The reward circuit: how the brain responds to cocaine* [Video]:

<https://www.youtube.com/watch?v=yeAN26kJuTQ>



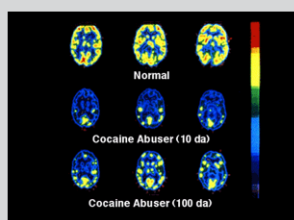
#### REFERENCE:

National Institute on Drug Abuse. (2020, May 29). *Drug Misuse and Addiction*.

Retrieved July 6, 2020, from

<https://www.drugabuse.gov/sites/default/files/soa.pdf>.

### Long-Term Impact of Cocaine Use



SOURCES: NIDA, 2019; Volkow et al., 1990; Volkow et al., 1992

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## Slide #85

### Long-Term Impact of Cocaine Use

This set of PET scan images shows how the brain is affected by long term use of a stimulant drug such as cocaine. In the set of scans, the level of brain function is indicated in the appearance of bright colors, such as yellow.

(Notes for Slide #85,  
continued)

## Slide #85

### Long-Term Impact of Cocaine Use

The **top row** shows a normal-functioning brain without drugs. You can see a lot of brain activity. In other words, there is a lot of yellow color. The **middle row** shows a “cocaine abuser” [currently we would say person with CUD] brain after 10 days without any cocaine use. *Less yellow* means *less normal activity* occurring in the brain - even after they have abstained from the drug for 10 days. The **bottom row** shows the same person’s brain after 100 days without any cocaine. You can see a little more yellow, so there is some improvement, or more brain activity, as this state of early recovery. But the person’s brain is *still* not back to a normal level of functioning more than 3 months later. Scientists are concerned that there may be areas in the brain that may never fully recover from a stimulant use disorder.



***A Note about Language: This study was done when the DSM-IV was the most up-to-date diagnostic tool, hence the use of the term “cocaine abuser” in the label for the middle and bottom images. With the implementation of the DSM-5, the word abuse is no longer used. Instead, you would label the middle and bottom images as “individual with a cocaine use disorder.”***

(Notes for Slide #85,  
continued)

## Slide #85

### Long-Term Impact of Cocaine Use



#### REFERENCES:

National Institute on Drug Abuse. (2019, February 11). *Teaching Addiction Science*. Retrieved June 9, 2020, from <https://www.drugabuse.gov/publications/teaching-addiction-science/bringing-power-science-to-bear-drug-abuse-addiction>.

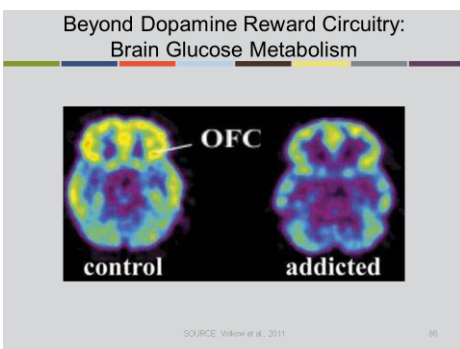
Volkow, N. D., Fowler, J. S., Wang, G.-J., Hitzemann, R., Logan, J., Schlyer, D., ... Wolf, A. P. (1993). Decreased dopamine D2 receptor availability is associated with reduced frontal metabolism in cocaine abusers. *Synapse*, 14, 169–177.

Volkow, N. D., Hitzemann, R., Wang, G.-J., Fowler, J. S., Wolf, A. P., & Dewey, S. L. (1992). Long-term frontal brain metabolic changes in cocaine abusers. *Synapse* 11, 184–190.

## Slide #86

### Beyond Dopamine Reward Circuitry: Brain Glucose Metabolism

Chronic use of cocaine impacts more than the dopamine reward system.



(Notes for Slide #86,  
continued)

### Slide #86

#### Beyond Dopamine Reward Circuitry: Brain Glucose Metabolism

According to a study by Dr. Nora Volkow and colleagues, they found that research subjects (in this case animals) who were “addicted” (currently we would say had CUD) to cocaine had decreased glucose metabolism in the orbitofrontal cortex (OFC), an indicator of reduced activity. In this brain image, the brain of a control subject is on the left side, and the brain of an animal addicted to cocaine is on the right. Poor decision-making, an inability to adapt to negative consequences of drug use, and a lack of self-insight all appear to be related to diminished functioning in the OFC. The increased presence of bright colors (red, orange, yellow) in the brain image on the left side of the slide indicate more efficient metabolism of glucose in the brain than what is seen in the brain image on the right.



***A Note about Language: This study was done when the DSM-IV was the most up-to-date diagnostic tool, and “addict” was a common descriptor for people with a substance use disorder. The study used the labels on the slide when it was published. With the implementation of the DSM-5, the word abuse is no longer used.***

(Notes for Slide #86,  
continued)

## Slide #86

### Beyond Dopamine Reward Circuitry: Brain Glucose Metabolism



***Instead, you would label the image on right as “individual with a cocaine use disorder.”***



#### REFERENCE:

Volkow, N. D., Want, G.- J., Fowler, J. S., Tomasi, D., & Teland, F. (2011). Addiction: Beyond dopamine reward circuitry. *Proc Natl Acad Sci USA*, 108(37), 15037–15042.

## Slide #87

### Long-Term Effects of Cocaine/Crack

As a result of long-term use of cocaine, an appreciable tolerance to cocaine’s high may develop, with many individuals reporting that they seek but fail to achieve as much pleasure as they did from their first experience. Some people will frequently increase their doses to intensify and prolong the euphoric effects. While tolerance to the high can occur, some may also become more sensitive (sensitization) to cocaine’s anesthetic and convulsing effects, without increasing the dose taken. This increased sensitivity may explain some deaths occurring after apparently low doses of cocaine.

Long-Term Effects of Crack/Cocaine

- Development of a Cocaine Use Disorder
- Irritability and mood disturbances
- Restlessness
- Paranoia
- Auditory hallucinations

SOURCE: NIDA, 2016

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**(Notes for Slide #87,  
continued)**

Medical Consequences of Crack/Cocaine

- Cardiovascular effects
  - Disturbances in heart rhythm; heart attacks
- Respiratory effects
  - Chest pain; respiratory failure
- Neurological effects
  - Strokes; seizures; headaches
- Gastrointestinal complications
  - Abdominal pain; nausea
- Paranoia

SOURCE: NIDA, 2016

**Slide #87**

**Long-Term Effects of Cocaine/Crack**

Long-term effects can lead to long-term mental health problems, legal problems, and problems with SUD and HIV



**REFERENCE:**

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from <https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.

**Slide #88**

**Medical Consequences of Crack/Cocaine**

Cocaine is a powerful stimulant that causes the heart to work harder and strains the vascular system. Chronic use can cause heart attacks and strokes. Cocaine increases blood pressure, and has other medical impacts as described on this slide.



**REFERENCE:**

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from <https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.

Adverse Effects of Cocaine Differ by  
Route of Administration

- **Snorting:** leads to loss of the sense of smell, nosebleeds, problems with swallowing, hoarseness, and a chronically runny nose.
- **Orally ingesting:** can cause severe bowel gangrene due to reduced blood flow.
- **Injecting:** can cause severe allergic reactions and, as with all people who inject, cocaine injection increases risk for contracting HIV and other blood-borne diseases.

SOURCE: NIDA, 2016

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## Slide #89

### Adverse Effects of Cocaine Differ by Route of Administration

Different methods of administering cocaine can produce different adverse effects.

Regular intranasal use (snorting) of cocaine, for example, can lead to loss of the sense of smell; nosebleeds; problems with swallowing; hoarseness; and a chronically runny nose. Ingesting cocaine can cause severe stomach problems, including bowel gangrene as a result of reduced blood flow. Injecting cocaine can bring about severe allergic reactions and increased risk for contracting HIV/AIDS and other blood-borne diseases. Binge-patterned cocaine use may lead to irritability, restlessness, and anxiety.

People who use cocaine can also experience severe paranoia—a temporary state of full-blown paranoid psychosis—in which they lose touch with reality and experience auditory hallucinations.

Snorting can cause short term and long term adverse affects on nose/lungs.

Injection increases the risk of HIV and other infectious diseases.



#### REFERENCE:

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from

<https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.

#### Effects of Cocaine Use During Pregnancy



- Maternal migraines and seizures
- Premature membrane rupture
- Separation of placental lining from uterus prior to delivery
- High blood pressure
- Edema and seizures
- Spontaneous miscarriage
- Preterm labor
- Difficult delivery

SOURCES: Smid et al., 2019; NIDA, 2016; Cain et al., 2013; Volkow, 2005

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## Slide #90

### Effects of Cocaine Use During Pregnancy

This slide details the effect that cocaine use may have during pregnancy. Possible effects found in the few human studies that exist include increased rates of premature delivery, placental abruption (early separation of a normal placenta from the wall of the uterus), retarded fetal growth, and cardiac and brain abnormalities. Cain and colleagues estimate that there are approximately 750,000 cocaine-exposed pregnancies each year. Cocaine is found in breastmilk, and cocaine is considered a contraindication to breastfeeding.



***The effects of methamphetamine use during pregnancy will be described later in this module. A supplemental module on Child Welfare Issues and Stimulant Use is available for viewing at:***

***<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>***



#### REFERENCES:

Smid, M. C., Metz, T. D., & Gordon, A. J. (2019). Stimulant use in pregnancy – an under-recognized epidemic among pregnant women. *Clinical Obstetrics and Gynecology*, 62(1), 168–184.

(Notes for Slide #90,  
continued)

Slide #90

Effects of Cocaine Use During  
Pregnancy



REFERENCES:

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from <https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.

Cain, M. A., Bornick, P., & Whiteman, V. (2013). The maternal, fetal, and neonatal effects of cocaine exposure in pregnancy. *Clinical Obstetrics and Gynecology*, 56(1), 124–132.

Volkow, N. (2005, April 21). Testimony before the Subcommittee on Labor, Health, and Human Services; Education; and Related Agencies. Committee on Appropriations, U.S. Senate.

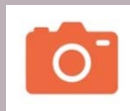


IMAGE CREDIT:

NIDA website, 2017.

A Long-Term Research Study  
Debunks the “Crack Baby” Myth

- A large-scale, 25-year study of the “crack baby” epidemic reveals **no statistically significant differences** in long-term health and life outcomes between full-term babies exposed to cocaine in-utero vs. those who were not exposed
- **Poverty**, not drugs, **is a key determining factor** in how children who were exposed to cocaine perform later in life

SOURCE: Betancourt et al., 2011

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Slide #91

A Long-Term Research Study Debunks  
the “Crack Baby” Myth

Very little is known about postpartum outcomes among women with prenatal cocaine use.

(Notes for Slide #91,  
continued)

### Slide #91

## A Long-Term Research Study Debunks the “Crack Baby” Myth

Betancourt and colleagues studied children who were exposed to cocaine in utero to determine if prenatal cocaine exposure has latent effects on neurocognitive outcomes that do not usually manifest themselves until adolescence or young adulthood. The research team examined neurocognitive function using five tasks designed to tap into inhibitory control, working memory, receptive language, and incidental memory. They found that there was no evidence on latent effects of gestational cocaine exposure on inhibitory control, working memory, or receptive language.

While the cocaine-exposed children and control group performed about the same on the tests, both groups lagged on developmental and intellectual measures compared to the norm. The research team began to think the factor affecting long-term outcomes was poverty. As time went on, the research team conducted several evaluations in an attempt to determine if environmental factors could be responsible for affecting their development.

(Notes for Slide #91,  
continued)

### Slide #91

## A Long-Term Research Study Debunks the “Crack Baby” Myth

What they found is that children who were in a nurturing home, with caregiver warmth, affection, and language stimulation, did better than those in a less nurturing home. With regards to crime and exposure to violence, those children who were exposed to high levels of violence were more likely to show signs of depression and anxiety and had lower self-esteem.



### REFERENCE:

Betancourt, L. M., Yang, W., Brodsky, N. L., Gallagher, P. R., Malmud, E. K., Giannetta, J. M., ... Hurt, H. (2011). Adolescents with and without gestational cocaine exposure: Longitudinal analysis of inhibitory control, memory and receptive language. *Neurotoxicol Teratol*, 22(1), 33–46.

### Slide #92

## A Long-Term Research Study Debunks the “Crack Baby” Myth

The next portion of Module 3 examines the acute and chronic effects of methamphetamine.

Acute and Chronic  
Effects of Methamphetamine

#### Acute Physical Effects of Methamphetamine

##### Increases

- Heart rate
- Blood pressure
- Pupil size
- Respiration
- Sensory acuity
- Energy

##### Decreases

- Appetite
- Sleep
- Reaction Time

SOURCE: NIDA, 2019

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### Slide #93

## Acute Physical Effects of Methamphetamine

At the outset, methamphetamine is a seductive drug because its effects during the early stages of use are mostly pleasurable and have positive effects such as reduced appetite and fatigue. People take the drug to help them work longer hours, lose weight, study longer, become more athletic, and have more and better sex. When a person uses methamphetamine, heart rate and blood pressure increase, as do pupil size, sensory acuity, and energy. Concomitantly, it decreases appetite, sleep, and reaction time. People find these effects useful.



### REFERENCE:

National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.

#### Acute Psychological Effects of Methamphetamine

##### Increases

- Confidence
- Alertness
- Mood
- Sex drive
- Energy
- Talkativeness

##### Decreases

- Boredom
- Loneliness
- Timidity

SOURCE: NIDA, 2019

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### Slide #94

## Acute Psychological Effects of Methamphetamine

Similar to the initial medical effects of methamphetamine, the initial psychological effects are also generally pleasant.

**Medical Risks Associated with Use of Methamphetamine**

- Norepinephrine release causes constriction of blood vessels, elevated blood pressure and rapid heart rate
- Increased activity levels
- Elevated body temperatures
- Increased risk of seizures
- Potentially fatal arrhythmias, heart attack, or stroke

SOURCE: NIDA, 2019

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## Slide #95

### Medical Risks Associated with Use of Methamphetamine

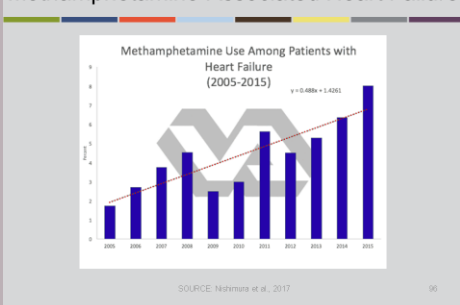
Methamphetamine is associated with a variety of medical risks, such as elevated body temperature, elevated blood pressure, and seizures. In addition, the use of methamphetamine can cause an **arrhythmia**, which is a problem with the rate or rhythm of a person's heartbeat. It means that the heart beats too quickly, too slowly, or with an irregular pattern. When the heart beats faster than normal, it is called tachycardia.



#### REFERENCE:

National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.

### Methamphetamine-Associated Heart Failure



## Slide #96

### Methamphetamine-Associated Heart Failure

Methamphetamine is one of the most commonly used illegal substances in the United States. Heart failure due to methamphetamine use (MethHF) is a poorly characterized disease entity that appears to be on the rise.

(Notes for Slide #96,  
continued)

## Slide #96

### Methamphetamine-Associated Heart Failure

In 2017, Nishimura and colleagues published a study in which they hypothesized that in a Veteran's Administration patient population over a 15-year period, there would be an increased prevalence of MethHF in admitted patients, along with a unique phenotype (a specific presentation not seen in people who do not use methamphetamine). Among **9,588 patients with diagnosis of heart failure** treated at San Diego VA Medical Center in between 2005-2015, 480 were identified to have history of methamphetamine abuse as determined by ICD-9 diagnosis code and/or urine toxicology screen as well as a diagnosis code of heart failure. Demographic, diagnostic, and clinical characteristics of MethHF and heart failure patients without methamphetamine use (HF) were compared. Clinical outcomes of time to emergency room (ER) visit, all-cause readmission, and all-cause mortality were compared using Kaplan-Meier curves. From 2005-2015, the prevalence of methamphetamine usage among patients with heart failure **increased linearly** (see graph). A preliminary cohort comparison demonstrated MethHF had similar ejection fraction and BNP levels but trends toward increased troponin levels, more atrial fibrillation, and a higher GFR.

(Notes for Slide #96,  
continued)

## Slide #96

### Methamphetamine-Associated Heart Failure

MethHF patients had a greater risk of ER visits (2.3 per year vs 0.5 per year,  $p=0.01$ ) and a trend towards a greater risk of all-cause hospital readmission (1.3 per year vs 0.6 per year,  $p=0.09$ ). The study team concluded that **heart failure due to methamphetamine use - or MethHF- is increasing in prevalence and appears to be a new phenotype of heart failure. MethHF and HF differ in multiple domains, including healthcare utilization.**



#### REFERENCE:

Nishimura, M., Ma, J., Thomas, I. C., Fox, S., Toomu, A., Mojaver, S., ... Maisel, A. (2017). Methamphetamine associated heart failure, a new epidemic. *Circulation*, 136(Suppl\_1), A14066–A14066.

#### Acute Methamphetamine-Related Overdose

##### With acute overdose:

- Severe hyperthermia
- Convulsions
- Severe dehydration
- Rhabdomyolysis (too much myoglobin being filtered by the kidneys) → acute renal failure
- Stroke
- Myocardial infarction

SOURCE: NDA, 2019

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## Slide #97

### Acute Methamphetamine-Related Overdose

Acute overdose from use of methamphetamine is associated with a variety of medical complications.

**Hyperthermia** refers to a group of heat-related conditions characterized by an abnormally high body temperature — in other words, the opposite of hypothermia.

(Notes for Slide #97,  
continued)

### Slide #97

## Acute Methamphetamine-Related Overdose

The condition occurs when the body's heat-regulation system becomes overwhelmed by outside factors, causing a person's internal temperature to rise. A **convulsion** is a medical condition where body muscles contract and relax rapidly and repeatedly, resulting in uncontrolled actions of the body. Because epileptic seizures typically include **convulsions**, the term **convulsion** is sometimes used as a synonym for seizure. **Myocardial Infarction** is another name for a heart attack.



### REFERENCE:


National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.

### Slide #98

## Cardiovascular Problems

In simple terms, if you have an organ system, the use of methamphetamine will impact it in a variety of negative ways. With regards to cardiovascular impacts, the use of methamphetamine can increase a person's heart rate and cause thickening of the valves.

Cardiovascular Problems



- ↑ heart rate
- Palpitations
- Tachycardia
- Arrhythmia
- ↑ blood pressure
- Chest Pain
- Valve thickening

SOURCE: NIDA, 2019

98

(Notes for Slide #98,  
continued)

## Slide #98 Cardiovascular Problems

**Palpitations** are a noticeably rapid, strong, or irregular heartbeat due to agitation, exertion, or illness. **Tachycardia** is a condition that makes your heart beat more than 100 times per minute. This happens when the electrical signals in the organ's upper chambers misfire and cause the heart rate to speed up. It beats so fast that it can't fill with blood before it contracts.



### REFERENCE:

National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.



### IMAGE CREDIT:

Purchased Image, Adobe Stock, 2019.

**Exercise Training also Improves Heart Rate Variability after Methamphetamine Dependency**

- Heart rate variability (HRV) reflects a healthy autonomic nervous system and is increased with physical training
- Methamphetamine dependence causes autonomic dysfunction and diminished HRV.
- Physical training yielded a marked increase in HRV, representing increased vagal modulation or improved autonomic balance

SOURCE: Delgado, et al., 2014

## Slide #99

### Exercise Training also Improves Heart Rate Variability after Methamphetamine Dependency

Dr. Richard Rawson and colleagues conducted a National Institute on Drug Abuse-funded randomized controlled clinical trial to study an exercise intervention for reducing methamphetamine dependence. As part of the study, investigators investigated recently abstinent people with a methamphetamine use disorder who were receiving treatment at a residential care facility and tested the hypothesis that (1) methamphetamine dependent individuals had impaired (e.g., lower) heart rate variability (HRV) when compared with age-matched, drug-free, sedentary male controls and (2) that HRV improved with eight weeks of supervised endurance and resistance training compared to no training.

HRV reflects a healthy autonomic nervous system (ANS), and generally, a healthy ANS is reliant on dominant vagal modulation. By contrast, the effect of chronic, excessive sympathetic stimulation and/or diminished vagal modulation from illness causes ANS dysfunction and sympathovagal imbalance.

(Notes for Slide #99,  
continued)

### Slide #99

## Exercise Training also Improves Heart Rate Variability after Methamphetamine Dependency

The study team found that HRV was, in fact, diminished among recently abstinent, methamphetamine dependent individuals, and that physical training resulted in a marked increase of HRV (as represented by increased vagal modulation or improved autonomic balance).



### REFERENCE:


Dolezal, B. A., Chudzynski, J., Dickerson, D., Mooney, L., Rawson, R. A., Garfinkel, A., & Cooper, C. B. (2014). Exercise training improves heart rate variability after methamphetamine dependency. *Medicine and Science in Sports and Exercise*, 46(6), 1057–1066.

### Slide #100

## Respiratory Problems

Use of methamphetamine is associated with a variety of respiratory problems, including increased respirations and pulmonary hypertension. **Dyspnea** is shortness of breath, or painful breathing. **Pleuritic chest pain** is inflammation of pleura (the lining of cavity surrounding lungs).

Respiratory Problems



- ↑ Respirations
- Dyspnea
  - Shortness of breath
- Pulmonary hypertension
- Pleuritic chest pain
  - Inflammation of pleura
- ↓ Lung capacity, especially if smoked

SOURCE: NIDA, 2019

100

(Notes for Slide #100,  
continued)

## Slide #100 Respiratory Problems



### REFERENCE:


National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.



### IMAGE CREDIT:

Adobe Stock, purchased image, 2019.

Neurological Problems



- Seizures
- Stroke
- Cerebral hemorrhage
- Cerebral vasculitis
  - Inflammation of neural blood vessels
- Mydriasis
  - Excessive pupil dilation

SOURCE: NIDA, 2019

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## Slide #101 Neurological Problems

Use of methamphetamine is also associated with neurological problems, including seizures, strokes and cerebral hemorrhage. **Cerebral vasculitis** is inflammation or damage to blood vessels in brain. **Mydriasis** is excessive pupil dilation.

(Notes for Slide #101,  
continued)

## Slide #101 Neurological Problems



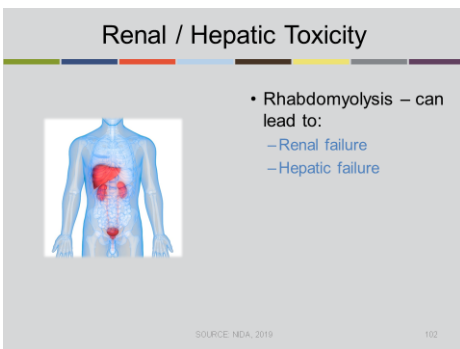
### REFERENCE:

National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.



### IMAGE CREDIT:

Adobe Stock, purchased image, 2019.



## Slide #102 Renal / Hepatic Toxicity

Use of methamphetamine can cause **rhabdomyolysis**, which is the breakdown of damaged skeletal muscle. Muscle breakdown causes the release of myoglobin into the bloodstream. Myoglobin is the protein that stores oxygen in your muscles. If you have too much myoglobin in your blood, it can cause kidney damage. This can lead to renal and/or kidney failure.

(Notes for Slide #102,  
continued)

## Slide #102 Renal / Hepatic Toxicity



### REFERENCE:


National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.



### IMAGE CREDIT:

Adobe Stock, purchased image, 2019.

Other Problems



- Eye ulcers
- Over-heating
- Obstetric complications
- Anorexia / weight loss
- Tooth wear, cavities
- "Speed bumps"

– WARNING: Explicit image on next slide

SOURCE: NIDA, 2019

## Slide #103 Other Problems

This slide details a host of other problems that may arise as a result of using methamphetamine.



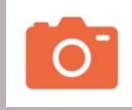
### REFERENCE:

National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.

(Notes for Slide #103,  
continued)



### Slide #103 Other Problems



#### IMAGE CREDIT:

Adobe Stock, purchased image, 2019.

### Slide #104 Did I Mention Skin Problems

The use of methamphetamine is associated with a variety of skin problems, including a grayish leathery texture to the skin, increased sweating (known as **hyperhidrosis**), repetitive or compulsive skin picking (known as **speed bumps**), which may cause cuts, scabs, and bleeding ulcers, and rare allergic reactions. The phenomenon that may be responsible for the compulsive skin picking is **formication**, or the sensation that resembles that of small insects crawling on or under the skin, or electricity pulsing under the skin.

(Notes for Slide #104,  
continued)

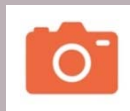
## Slide #104

### Did I Mention Skin Problems



#### REFERENCE:

Richards, J. R., & Laurin, E. G. (2019, November 14). *Methamphetamine Toxicity*. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. Retrieved June 11, 2020, from <https://www.ncbi.nlm.nih.gov/books/NBK430895/>.



#### IMAGE CREDIT:

DermNet website, Creative Commons Attribution-NonCommercial-NoDerivs 3.0 (New Zealand) at <https://creativecommons.org/licenses/by-nc-nd/3.0/nz/legalcode>.

#### Chronic Physical Effects of Methamphetamine

- |                   |                          |
|-------------------|--------------------------|
| • Tremor          | • Sweating               |
| • Weakness        | • Burned lips; sore nose |
| • Dry mouth       | • Oily skin/complexion   |
| • Weight loss     | • Headaches              |
| • Cough           | • Diarrhea               |
| • Sinus infection | • Anorexia               |
| • Dental Problems |                          |

– WARNING: Explicit  
image on next slide

SOURCE: NIDA, 2019

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## Slide #105

### Chronic Physical Effects of Methamphetamine

Over time, the effects of methamphetamine change. As methamphetamine is repeatedly applied to the brain, it changes brain chemistry, structure, and function. Some structures of the brain develop tolerance to the drug's effects and require an increased dosage to produce the desired effects.

(Notes for Slide #105,  
continued)

### **Slide #105**

## **Chronic Physical Effects of Methamphetamine**

However, other areas of the brain become sensitized to the effects of methamphetamine, causing even small doses to produce very powerful reactions. Simply put, over time, part of the brain reacts to the drug by needing more of it, while other parts of the brain respond in exactly the opposite manner.

Methamphetamine is a powerful stimulant that causes the heart to work harder and strains the vascular system. Chronic use can cause heart attacks and strokes. It increases blood pressure and thickens heart valves.

Methamphetamine constricts blood vessels on the skin surface, causing the skin to feel tingly. People who use stimulants will frequently vigorously scratch their skin in response to this sensation (meth bugs, speed bumps). Some of the effects listed in the right column of the slide are due to the method in which individuals administer methamphetamine (smoking, snorting). And what started as a weight loss of a few pounds ends up being an uncontrollable level of weight loss.

Infective Endocarditis (i.e., staphylococcus aureus) is frequent among people who inject drugs (PWID). About 8-16% of hospital admissions for PWIDs are accounted for by infective endocarditis.

(Notes for Slide #105,  
continued)

## Slide #105

### Chronic Physical Effects of Methamphetamine

Essentially, an organism colonizes the heart (mostly the right side). Most common symptoms of endocarditis are chest pain, cough, fever, chills, and arthralgia. The condition can be treated with antibiotics or surgery.


One specific effect that has received a lot of media attention is the phenomenon of “meth mouth,” a dental complication that will be described in more detail on the next slide.



#### REFERENCE:

National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.

Use of Methamphetamine Leads to Severe Tooth Decay



- “Meth mouth” is characterized by severe tooth decay and gum disease
- Teeth often break or fall out

SOURCE: American Dental Association, 2017

## Slide #106

### Use of Methamphetamine Leads to Severe Tooth Decay

The phenomenon of “meth mouth” has received substantial attention by the media because the dental problems associated with methamphetamine use are severe, and photographs of the dental disease experienced as a result of methamphetamine use are quite dramatic and unsightly.

(Notes for Slide #106,  
continued)

### Slide #106

## Use of Methamphetamine Leads to Severe Tooth Decay

The constriction of blood vessels caused by methamphetamine reduces the blood flow to the gums and teeth. Over time, this restriction of blood flow can result in inadequate nourishment reaching the gums and teeth, causing tooth death. Methamphetamine also causes a decrease in saliva output. Lack of saliva, along with the almost universal poor dental hygiene while using methamphetamine, can promote the formation of cavities. Further, methamphetamine use causes bruxism (teeth grinding). This phenomenon can also substantially damage the enamel on the teeth and cause serious dental wear. For those who smoke meth, some research suggests that the direct effects of the meth vapor that is drawn into the mouth via smoking may also have direct damaging effects on the teeth.



### REFERENCE:

American Dental Association. (2017). *Oral Health Topics: Methamphetamine*. Retrieved October 1, 2019, from <https://www.ada.org/en/member-center/oral-health-topics/methamphetamine>.

(Notes for Slide #106,  
continued)

### Slide #106

## Use of Methamphetamine Leads to Severe Tooth Decay



### IMAGE CREDIT:

American Dental Association website,  
2017.

### Chronic Psychological Effects of Methamphetamine

- Confusion
- Concentration
- Hallucinations
- Fatigue
- Memory loss
- Insomnia
- Irritability
- Paranoia
- Panic reactions
- Depression
- Anger
- Psychosis

SOURCE: NIDA, 2019

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### Slide #107

## Chronic Psychological Effects of Methamphetamine

As dramatic as the chronic physical effects of methamphetamine are, the chronic psychological effects are even more profound. During initial stages of use, methamphetamine produces feelings of optimism, enthusiasm, and sociability. Over time, however, these positive effects are replaced with much more troublesome and pathological symptoms. In fact, the major presenting problems associated with methamphetamine use are psychological symptoms such as confusion, depression, anxiety, delusions, paranoid reactions, hallucinations, and suicidal ideation. Anhedonia, or the inability to feel pleasure, is a significant chronic effect of prolonged use of methamphetamine.

(Notes for Slide #107,  
continued)

**Social Risks**

• Financial problems	• Criminal behavior
• Employment	• Victim of violence
• Risky and unsafe sexual behaviors	• Relationship problems
• Impulsive behavior	• Family breakdown
	• Impaired driving

SOURCE: Matua Raki National Addiction Workforce Development, 2010

### Slide #107

## Chronic Psychological Effects of Methamphetamine



### REFERENCE:

National Institute on Drug Abuse. (2019, October 16). *Methamphetamine*. Retrieved June 11, 2020, from <https://www.drugabuse.gov/publications/research-reports/methamphetamine/overview>.

### Slide #108

## Social Risks

This slide details the potential social risks associated with the use of methamphetamine.



### REFERENCE:

Matua Raki National Addiction Workforce Development. (2010). *Consumer and Peer Roles in the Addiction Sector*. Wellington, New Zealand: Author.

### Effects of Maternal Methamphetamine Use



- Placental abruption
- Increased rates of premature delivery
- Small size and lethargy
- Cardiac and brain abnormalities
- Fetal death
- Neurological problems
  - Decreased arousal
  - Increased stress
  - Attention impairments

SOURCES: Srid et al., 2019; American Congress of Obstetricians and Gynecologists, 2017

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## Slide #109

### Effects of Maternal Methamphetamine Use

According to the American College of Obstetricians and Gynecologists (ACOG), Committee on Health Care for Underserved Women, as is the case with cocaine, the use of methamphetamine during pregnancy can endanger the health of the mother, and increase the risk of low birth weight and small for gestational age babies, and may also increase the risk for neurodevelopmental problems in children. This slide lists the specific effects of maternal use of methamphetamine. Methamphetamine is neurotoxic, making prenatal exposure particularly concerning for fetal brain development. As is the case with cocaine, methamphetamine is excreted in breastmilk, and methamphetamine use is a contraindication to breastfeeding.



***A supplemental module on Child Welfare Issues and Stimulant Use is available for viewing at:***

***<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>***

(Notes for Slide #109,  
continued)

## Slide #109

### Effects of Maternal Methamphetamine Use



#### REFERENCES:

Smid, M. C., Metz, T. D., & Gordon, A. J. (2019). Stimulant use in pregnancy – an under-recognized epidemic among pregnant women. *Clinical Obstetrics and Gynecology*, 62(1), 168–184.

American College of Obstetricians and Gynecologists Committee on Health Care for Underserved Women. (2011, reaffirmed 2017). *Committee Opinion No. 479: Methamphetamine abuse in women of reproductive age. Obstetrics and Gynecology*, 117(3), 751–755.



#### IMAGE CREDIT:

Purchased image, Fotolia, 2017.

#### Infant Development, Environment, and Lifestyle Study (IDEAL)

- Multi-site study involved more than 1,600 research subjects at four clinical centers (84 exposed to methamphetamine and 1,534 who were not)
- Methamphetamine-exposed children were **3.5 times more likely to be small for gestational age**
  - For comparison, mothers who used tobacco during pregnancy were **2 times more likely to have a small infant**
- Less maternal weight gain during pregnancy was more likely to result in a small infant
- Prenatal methamphetamine exposure is associated with **fetal growth restrictions**



SOURCE: Smith et al., 2006

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## Slide #110

### Infant Development, Environment, and Lifestyle Study (IDEAL)

The Infant Development, Environment, and Lifestyle Study (IDEAL) was a longitudinal, multi-site research study that examined the neonatal growth effects of babies prenatally exposed to methamphetamine.

(Notes for Slide #110,  
continued)

### Slide #110

## Infant Development, Environment, and Lifestyle Study (IDEAL)

This slide outlines the key findings related to small-for-gestational age infants. The four study sites were Los Angeles, California, Des Moines, Iowa, Tulsa, Oklahoma, and Honolulu, Hawaii. The bulleted information details the study population and key study findings.



### REFERENCE:

Smith, L. M., LaGasse, L. L., Derauf, C., Grant, P., Shah, R., Arria, A., ... Liu, J. (2006). The infant development, environment, and lifestyle study: effects of prenatal methamphetamine exposure, polydrug exposure, and poverty on intrauterine growth. *Pediatrics*, 118(3), 1149–1156.



### IMAGE CREDIT:

Purchased image, Fotolia, 2017.

### IDEAL Follow-up Study School-Aged Outcomes

- 7.5-year follow-up study involved 290 children originally enrolled in IDEAL
- Key finding – a supportive home environment may reduce behavioral and emotional issues among methamphetamine-exposed children
- Poverty and continued drug use by parent contributes to issues
- Strong relationship seen between pre-natal methamphetamine exposure and rule-breaking and aggressive behavior
- Other early adverse conditions associated with behavioral problems included changes in primary care giver, sexual abuse of the caregiver, and maternal depression

SOURCE: Eze et al., 2016

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### Slide #111

## IDEAL Follow-up Study School-Aged Outcomes

In the IDEAL follow-up study, the research team followed methamphetamine-exposed children to seven and one-half years of age.

## (Notes for Slide #111, continued)

### Slide #111

#### IDEAL Follow-up Study School-Aged Outcomes

They found that while prenatal exposure may lead to targeted behavioral problems, a more supportive home environment could make a difference in the children's behavioral and emotional control, decreasing the severity and risk of such issues. The slide details other factors that may contribute to behavioral and emotional problems among the methamphetamine-exposed children.



#### REFERENCE:

Eze, N., Smith, L. M., LaGasse, L. L., Derauf, C., Newman, E., Arria, A., ... Lester, B. M. (2016). School-aged outcomes following prenatal methamphetamine exposure: 7.5-year follow-up from the infant development, environment, and lifestyle study. *The Journal of Pediatrics*, 170, 34–38.

Stimulant Intoxication and Withdrawal Syndromes (DSM-5)	
Intoxication (2 or more)	Withdrawal (**plus 2)
<ul style="list-style-type: none"><li>• Tachycardia or bradycardia</li><li>• Pupillary dilation</li><li>• Elevated or lowered blood pressure</li><li>• Perspiration or chills</li><li>• Nausea or vomiting</li><li>• Evidence of weight loss</li><li>• Psychomotor agitation or retardation</li><li>• Muscular weakness, respiratory depression, chest pain or cardiac arrhythmias</li><li>• Confusion, seizures, dyskinesias, dystonias, or coma</li></ul>	<ul style="list-style-type: none"><li>• Dysphoric Mood**</li><li>• Cessation (or reduction in) prolonged use</li><li>• Fatigue</li><li>• Vivid/unpleasant dreams</li><li>• Insomnia or hypersomnia</li><li>• Increased appetite</li><li>• Psychomotor retardation or agitation</li></ul>

SOURCE: Benbow, 2017

### Slide #112

#### Stimulant Intoxication and Withdrawal Syndromes (DSM-5)

Stimulant withdrawal is not medically life threatening and, unlike alcohol or barbiturate withdrawal, does not require pharmacological intervention.

(Notes for Slide #112,  
continued)

## Slide #112 Stimulant Intoxication and Withdrawal Syndromes (DSM-5)

A characteristic withdrawal-type syndrome usually develops within hours to days after cessation of prolonged and heavy stimulant use. Stimulant withdrawal symptoms seem to be most severe in the initial days following cessation of use (Miller et al., 1997; Cornish and O'Brien, 1996). Stimulant intoxication is characterized by the presence of two or more symptoms listed in the left column. Stimulant withdrawal often has no visible physical symptoms, like the vomiting and shaking that accompanies withdrawal from heroin or alcohol. Dysphoric mood must **ALWAYS** be present when assessing for stimulant withdrawal, plus at least 2 of the other withdrawal symptoms listed in the right column.

The level of craving, irritability, delayed depression, and other symptoms produced by stimulant withdrawal rivals or exceeds that felt with other withdrawal syndromes. A common symptom of stimulant withdrawal is the “crash,” which is sleepiness, lethargy, and the craving for another dose. Other common withdrawal symptoms include fatigue, depression, restless behavior, and a feeling of anxiety or paranoia. During withdrawal, individuals may also experience a period of malaise when they just do not feel like doing anything at all.

(Notes for Slide #112,  
continued)

## Slide #112

### Stimulant Intoxication and Withdrawal Syndromes (DSM-5)

Many individuals who have experienced cocaine withdrawal report very unpleasant and vivid dreams.

DSM-5 criteria for stimulant intoxication are (1) recent use of an amphetamine-type substance, cocaine, or other stimulant; (2) clinically significant problematic behavioral or psychological changes that develop during, or shortly after, use of a stimulant; and (3) two or more signs or symptoms (left hand side of table) developing during, or shortly after, stimulant use.

DSM-5 criteria for stimulant withdrawal are (1) cessation or (or reduction in) prolonged amphetamine-type substance, cocaine, or other stimulant use; (2) dysphoric mood and two (or more) physiologic changes developing within a few hours to several days (right hand side of table).



#### Additional Reading:

Miller, N., Gold, M., & Smith, D. (1997). *Manual of Therapeutics for Addictions*. New York, NY: Wiley.

Cornish, J. W., & O'Brien, C. P. (1996). Crack cocaine abuse: An epidemic with many public health consequences. *Annual Review of Public Health*, 17, 259-273.

(Notes for Slide #112,  
continued)

**Slide #112**

**Stimulant Intoxication and Withdrawal  
Syndromes (DSM-5)**



**Additional Reading:**

Cornish, J. W., & O'Brien, C. P. (1996). Crack cocaine abuse: An epidemic with many public health consequences. *Annual Review of Public Health*, 17, 259-273. Many individuals who have experienced cocaine withdrawal report very unpleasant and vivid dreams.



**REFERENCE:**

Barnhorst, A. (2017, September 12). *Amphetamine-Related Psychiatric Disorders Clinical Presentation*. Retrieved June 11, 2020, from <http://emedicine.medscape.com/article/289973-clinical>.

**Slide #113**

**Stimulant Withdrawal in More Detail**

Stimulant withdrawal symptoms occur along a spectrum of severity that is dependent on how much a person has been using, how long they have been using, and how they have been using, with smoking and intravenous use associated with greater severity.

Stimulant Withdrawal in More Detail	
<ul style="list-style-type: none"><li>• Dysphoric mood</li><li>• Significant depression</li><li>• Mood swings and tearfulness</li><li>• Diarrhea</li><li>• Inability to enjoy life</li><li>• Lethargy, fatigue, tiredness, and low energy levels</li><li>• Irritability, reactivity, or anger</li><li>• Increased appetite</li></ul>	<ul style="list-style-type: none"><li>• Anxiety</li><li>• Agitation</li><li>• Aches and pains</li><li>• Disturbed sleep patterns; insomnia; vivid/unpleasant dreams</li><li>• Poor concentration and memory</li><li>• Cravings</li><li>• Paranoid thoughts and behaviors</li><li>• Psychosis</li></ul>

SOURCE: Medline Plus National Medlineplus  
Workforce Development, 2010

(Notes for Slide #113,  
continued)

### Slide #113

#### Stimulant Withdrawal in More Detail

Personality differences and pre-existing conditions can impact on the severity of withdrawal. Generally withdrawal is not life threatening or physically risky. After stopping use many people who use stimulants 'crash,' sleeping long hours and feeling fatigued and restless when awake. The 'crash' can last for up to three days. Providing a quiet, safe and calm environment during this time can assist the person to recover. If their home environment is not suitable referral to a community social detoxification facility is recommended.



#### REFERENCE:

Matua Raki National Addiction Workforce Development. (2010). *Consumer and Peer Roles in the Addiction Sector*. Wellington, New Zealand: Author.

### Slide #114

#### Time Course of Methamphetamine Withdrawal – Initial Symptoms

This slide details the time course of methamphetamine withdrawal, with initial symptoms that can occur 1-10 days since last use. Note that withdrawal begins two days after last use and can extend for about eight days.

Time Course of Methamphetamine Withdrawal – Initial Symptoms	
Days Since Last Use	Symptoms
1-3 Days	<b>Crash</b> <ul style="list-style-type: none"><li>• Exhaustion</li><li>• Many hours sleeping</li><li>• Low mood/depression</li></ul>
2-10 Days	<b>Withdrawal</b> <ul style="list-style-type: none"><li>• Strong urges to use – cravings</li><li>• Mood swings, anxiety, irritability, feeling flat, drained</li><li>• Agitation</li><li>• Tearfulness</li><li>• Sleep problems</li><li>• Poor concentration</li><li>• Diarrhea</li><li>• Aches, pains, and headaches</li><li>• Hunger</li></ul>

SOURCE: Matua Raki National Addiction Workforce Development, 2010

(Notes for Slide #114,  
continued)

Time Course of Methamphetamine Withdrawal – Protracted Symptoms	
Days Since Last Use	Symptoms
2-10 Days	Withdrawal, continued <ul style="list-style-type: none"><li>• Paranoia</li><li>• Hallucinations</li></ul>
7-28 Days	Physical and Neurological Recovery <ul style="list-style-type: none"><li>• Mood swings</li><li>• Depression</li><li>• Sleep problems</li><li>• Cravings</li></ul>
1-3 Months	Protracted <ul style="list-style-type: none"><li>• Sleep patterns improve</li><li>• Energy levels get better</li><li>• Mood settles</li><li>• Slowly resolving anhedonia</li></ul>

SOURCE: Matua Raki National Addiction Workforce Development, 2010

## Slide #114

### Time Course of Methamphetamine Withdrawal – Initial Symptoms



#### REFERENCE:

Matua Raki National Addiction Workforce Development. (2010). *Consumer and Peer Roles in the Addiction Sector*. Wellington, New Zealand: Author.

## Slide #115

### Time Course of Methamphetamine Withdrawal – Protracted Symptoms

This slide details the time course of methamphetamine withdrawal, with the protracted symptoms, and associated recovery from symptoms that can occur 7-28 days since last use. Also included on the slide is a couple of initial withdrawal symptoms that may occur 2-10 since last use. Note that physical and neurological recovery can occur from 7-28 days from last use and it can take upwards of three months before sleep patterns improve, energy levels get better, mood settles, and anhedonia slowly resolves. Cocaine withdrawal follows a similar pattern, but may be somewhat shorter depending on the individual's pattern of use.

(Notes for Slide #115,  
continued)

## Slide #115

### Time Course of Methamphetamine Withdrawal – Protracted Symptoms



#### ADDITIONAL VIDEO RESOURCE:


Meyers, E. (Director). (2008). *Meth Inside Out: Methamphetamine and Anhedonia*. [Film]. Los Angeles, CA: Eyes of the World Media Group. Available at: <https://vimeo.com/uclaisap>.



#### REFERENCE:

Matua Raki National Addiction Workforce Development. (2010). *Consumer and Peer Roles in the Addiction Sector*. Wellington, New Zealand: Author.

Let's Revisit Angela



- Angela's methamphetamine use has escalated in the last 6-months after she began dating John, a local drug dealer
- Angela has lost a significant amount of weight and experiences bouts of severe depression and anxiety
- She's estranged from her mom, who in the past was a constant source of support for her and her three children
- Angela was fired from her bartending job, and is having trouble making ends meet with her housekeeping job as the sole source of income

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## Slide #116

### Let's Revisit Angela



#### INSTRUCTIONS:

***This is the second time that Angela is mentioned in today's training. Read the bulleted information, or ask for a volunteer to read the information, and remind participants to keep Angela in mind as you continue with the training.***

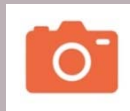
(Notes for Slide #116,  
continued)

## Slide #116 Let's Revisit Angela



### INSTRUCTIONS, continued:

***Refer to the “Angela Case Study” for the full description of Angela’s story. Refrain from handing out the full case study until later in the afternoon when you engage the training participants in an activity to discuss Angela’s needs in more detail.***



### IMAGE CREDIT:

Purchased Image, Adobe Stock, 2019.

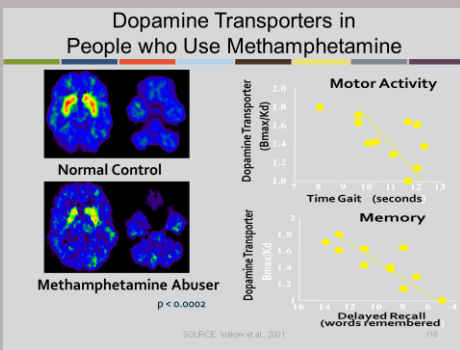
## Slide #117 Cognitive and Memory Effects of Stimulant Use

Cognitive and  
Memory Effects of  
Stimulant Use



The next section of Module 3 examines the cognitive and memory effects of stimulant use in more detail. Chronic use of central nervous system stimulants produce profound disruption of cognitive functions. Neurocognitive deficits are common, even among people who use stimulants for only a short-term, sometimes persisting for many months. Impaired cognitive processes include: verbal and working memory, response inhibition, perceptual speed, attention, and fluency.

(Notes for Slide #117,  
continued)



Slide #117

Cognitive and Memory Effects of  
Stimulant Use



IMAGE CREDIT:

Purchased Image, Adobe Stock, 2020.

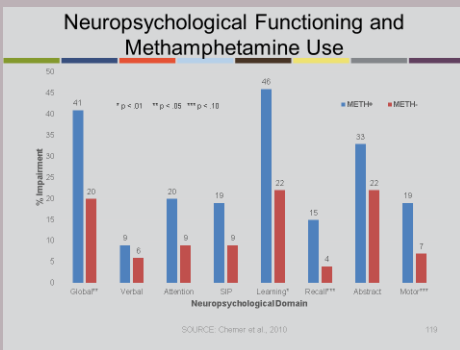
Slide #118

Dopamine Transporters in People who  
Use Methamphetamine

Methamphetamine use decreases dopamine transporter activity and compromises mental function. The brain image at the top left is a PET image from a normal control subject. The striatum is brightly lit in red and yellow, indicating the presence of many dopamine *transporters*, which contrasts with the brain of a person who uses methamphetamine (bottom left). What does this mean functionally?

The graphs on the right show the relationship between performance on a motor (upper right) and a memory task (lower right) and methamphetamine-driven decreases in dopamine transporters. The magnitude of the decline in the dopamine transporter binding is positively correlated with the extent of motor and memory impairment; thus the greater the decline, the greater the impairment in memory and motor reaction time.

(Notes for Slide #118,  
continued)



Slide #118

Dopamine Transporters in People who Use Methamphetamine



REFERENCE:

Volkow, N. D., Chang, L., Wang, G. J., Fowler, J.S., Leonido-Yee, M., Franceschi, D., .... Miller, E. N. (2001). Association of dopamine transporter reduction with psychomotor impairment in methamphetamine abusers. *American Journal of Psychiatry*, 158, 377–382.

Slide #119

Neuropsychological Functioning and Methamphetamine Use

Cherner and colleagues examined motor and cognitive impairment in 54 currently abstinent methamphetamine-dependent (DSM IV) individuals (METH+) with 46 demographically matched controls (METH-). The METH+ group showed higher rates of neuropsychological impairment across all domains tested when compared to controls (significant differences or approaching significance for Global, Learning, Recall, and Motor). However, when they examined those who had deficits versus those who did not in the METH+, an interesting finding was observed.

(Notes for Slide #119,  
continued)

**Slide #119**

**Neuropsychological Functioning and  
Methamphetamine Use**

**KEY:**

Global = Global Functioning

Verbal = Verbal Fluency

Attention = Attention/Working Memory

SIP = Speed of Information Processing

Abstract = Abstraction/Executive  
functioning



**REFERENCE:**

Cherner, M., Suarez, P., Casey, C., Deiss, R., Letendre, S., Marcotte, T., ... HNRC Group (2010). Methamphetamine use parameters do not predict neuropsychological impairment in currently abstinent dependent adults. *Drug and Alcohol Dependence*, 106(2-3), 154–163.

**Slide #120**

**Motor and Cognitive Impairment  
Associated with Methamphetamine Use**

In the METH+ group, those with deficits in motor functioning had higher rates of methamphetamine exposure than those who did not have deficits. However, results were different for cognitive deficits.

Presence or absence of cognitive deficits was unrelated to level of meth exposure in the METH+ group. Other investigators (Hall and colleagues), conducted a meta analysis of studies examining cognitive deficits associated with methamphetamine use.

**Motor and Cognitive Impairment Associated  
with Methamphetamine Use**

- Those METH+ participants with motor impairments were found to have higher rates of meth use.
- For METH+ with cognitive impairment (vs those without) showed no difference in meth exposure.
- A meta analysis also found significant difference across studies, but poor controls for confounding variables.
- Investigators also noted that while difference existed between those who had used meth and controls, the meth group was still within normal ranges. Perhaps the differences are of little clinical significance.
- There is a great need to study individual differences in vulnerability to methamphetamine-associated neurotoxicity, and meth use alone does not explain it.

SOURCES: Hall et al., 2012;  
Cherner et al., 2010

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(Notes for Slide #120,  
continued)

### Slide #120

#### **Motor and Cognitive Impairment Associated with Methamphetamine Use**

They confirmed that meth use was associated with more cognitive deficits compared to non-exposed controls across these studies. However, they also noted poor controls for possibly confounding variables (amount of use of other substances, environment, etc.).

Additionally, these investigators noted that while increased deficits were found among those who use meth, most studies showed that people exposed to methamphetamine still fell within the normal ranges on their test scores. The authors therefore questioned the level of clinical significance of these findings.

Taken together, these studies indicate that cognitive difference do exist between the groups. However, cognitive findings should be interpreted cautiously to determine level of clinical significance. Additionally, more research is need to study individual difference in vulnerability to methamphetamine-related neurocognitive issues.

The meta analysis study also suggests that people who use methamphetamine may benefit more from interventions like cognitive behavioral therapy than previously thought, since, for the most part, they tend to function within normal limits on neuropsychological measures.

(Notes for Slide #120,  
continued)

## Slide #120

### Motor and Cognitive Impairment Associated with Methamphetamine Use

It is important to look at the specific cognitive processes that are being measured, the differences between people who use methamphetamine and those who do not, and the meaning of the scores (within or outside of normal limits) in order to determine the relevance of the results. Newer research continues to be conducted and continues to find meaningful differences by group for some cognitive processes.



#### REFERENCES:


Hart, C. L., Marvin, C. B., Silver, R., & Smith, E. E. (2012). Is cognitive functioning impaired in methamphetamine users? A critical review.

*Neuropsychopharmacology: Official publication of the American College of Neuropsychopharmacology*, 37(3), 586–608.

Cherner, M., Suarez, P., Casey, C., Deiss, R., Letendre, S., Marcotte, T., ... HNRC Group (2010). Methamphetamine use parameters do not predict neuropsychological impairment in currently abstinent dependent adults. *Drug and Alcohol Dependence*, 106(2-3), 154–163.

### Cognitive Deficits in Methamphetamine Use Disorder

- Compared 108 methamphetamine treatment seekers and 50 matched controls.
- Methamphetamine use was associated with impulsive decision making and disinhibition.
- Greater disinhibition associated with longer durations of methamphetamine use.



SOURCE: Fitzpatrick et al., 2020

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## Slide #121

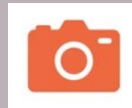
### Cognitive Deficits in Methamphetamine Use Disorder

According to findings from a new research study published in 2020 by Fitzpatrick and colleagues, methamphetamine use was associated with impulsive decision making and disinhibition. Further, greater disinhibition was associated with longer durations of methamphetamine use.



#### REFERENCE:


Fitzpatrick, R. E., Rubenis, A. J., Lubman, D. I., & Verdejo-Garcia, A. (2020). Cognitive deficits in methamphetamine addiction: Independent contributions of dependence and intelligence. *Drug and Alcohol Dependence*, 209, (1 April), 107891.



#### IMAGE CREDIT:

Adobe Stock, purchased image, 2020.

### Labeling of Emotion



What did their brains show?

Which of the two bottom pictures matches the emotion shown on top?

SOURCE: Payer et al., 2005

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## Slide #122

### Labeling of Emotion



#### \*\*ANIMATIONS\*\*

***This slide contains animations of a series of images. Practice presenting the information before teaching others.***

(Notes for Slide #122,  
continued)

## Slide #122 Labeling of Emotion

In 2005, Payer and colleagues presented a scientific paper at the Society for Neuroscience 35<sup>th</sup> Annual Meeting. The paper featured the findings from a small study in which eight (8) methamphetamine dependent subjects and eight (8) controls completed a facial emotion task using fMRI imaging. The task required study participants to match a target face (top image in each set of images) displaying a sad or angry expression, to one of the two bottom images expressing the same emotion. The control task was matching of blobs (not pictured on this slide). Their brains were scanned as they completed the task. The key findings appear on the next slide.

### IMAGE KEY:

- Image Set #1: Bottom left image matches emotion in top image
- Image Set #2: Bottom left image matches emotion in top image
- Image Set #3: Bottom right image matches emotion in top image
- Image Set #4: Bottom right image matches emotion in top image

(Notes for Slide #122,  
continued)

## Slide #122 Labeling of Emotion

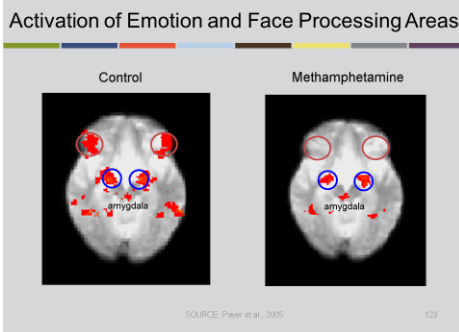


### REFERENCE:

Payer, D., Albisetegui-DuBois, R., Xu, J., & Monterosso, J., Fong, T., Cohen, M., ... London, E. (2005, January 1). *Deficits in Cortical Activation Associated with Emotion Processing in Methamphetamine Abusers*. [Conference Presentation Abstract]. Society of Neuroscience 35<sup>th</sup> Annual Meeting.

## Slide #123

### Activation of Emotion and Face Processing Areas



When the brain scans of the controls and methamphetamine dependent study participants were compared, two key findings emerged.

- First, if you look at the areas circled in blue – the amygdala – the task-related activity was comparable (fully activated) in the scans of the brains of controls and those who were methamphetamine dependent.
- Next, if you look at the areas circled in red – the pre-frontal cortex – the comparative scans showed greater activity in the brains of the controls than in the brains of the individuals who were methamphetamine dependent.

(Notes for Slide #123,  
continued)

### Slide #123

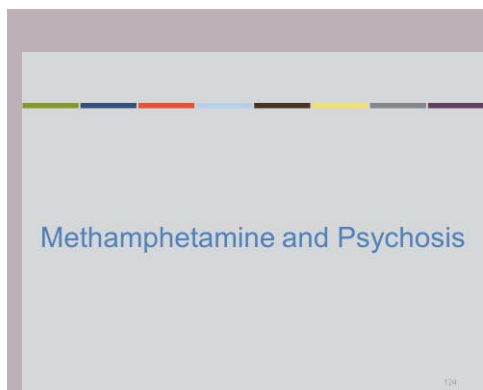
#### Activation of Emotion and Face Processing Areas

If you think about what occurs in each part of these brains – high-level decision making occurs in the pre-frontal cortex and emotional processing occurs in the amygdala, you can see that in those individuals who were dependent on methamphetamine, their emotions normally activated, but they are unable to activate good judgment or decision making. This finding has practical implications, both when a person is still actively using methamphetamine and also when they first enter into treatment, and their brain has not yet had a chance to heal. They are emotionally reactive and unable to make good decisions.



#### REFERENCE:

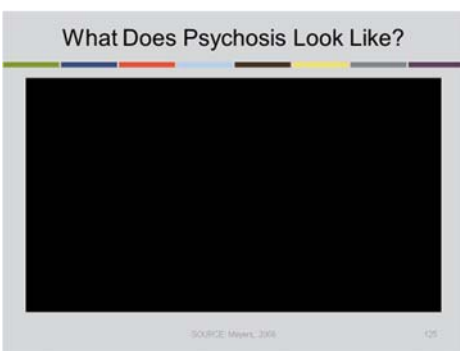
Payer, D., Albisetegui-DuBois, R., Xu, J., & Monterosso, J., Fong, T., Cohen, M., ... London, E. (2005, January 1). *Deficits in Cortical Activation Associated with Emotion Processing in Methamphetamine Abusers*. [Conference Presentation Abstract]. Society of Neuroscience 35<sup>th</sup> Annual Meeting.



### Slide #124

## Methamphetamine and Psychosis

The last section of Module 3 examines methamphetamine and psychosis in more detail.



### Slide #125

## What Does Psychosis Look Like?



### INSTRUCTIONS:

***This slide contains a movie clip that will play automatically when the trainer clicks on the black box. In order for this to work, the connection between the PowerPoint presentation and the video file must be maintained. When moving the PowerPoint file to another location on your computer or to another computer, make sure to always move the video file along with it. If the link becomes broken, the video will need to be reinserted. Delete the black box. From the insert menu in PowerPoint, select “movie.” Select the video file that was included for this training. When asked, indicate that the movie should play automatically. It will appear as a black box on the screen. The video should play when the slide show is being viewed when the trainer clicks on the black box.***

(Notes for Slide #125,  
continued)

## Slide #125

### What Does Psychosis Look Like?

Video Length: 28 seconds.

This short video clip shows the emotional impact of methamphetamine use, more specifically the symptoms of psychosis that occur in some individuals.



#### VIDEO SOURCE:

Meyers, E. (Director). (2008). *Meth Inside Out: Methamphetamine Psychosis*. [Film]. Los Angeles, CA: Eyes of the World Media Group. Available at:  
<https://vimeo.com/uclaisap>.



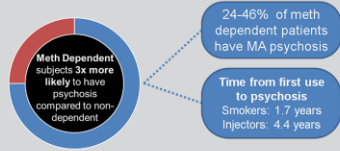
#### ADDITIONAL VIDEO RESOURCES:

Meyers, E. (Director). (2008). *Meth Inside Out: Methamphetamine and Anhedonia*. [Film]. Los Angeles, CA: Eyes of the World Media Group. Available at:  
<https://vimeo.com/uclaisap>.

Meyers, E. (Director). (2008). *Meth Inside Out: Methamphetamine and Aggression*. [Film]. Los Angeles, CA: Eyes of the World Media Group. Available at:  
<https://vimeo.com/uclaisap>.

## Methamphetamine and Psychosis

- A strong association exists between methamphetamine and psychosis, even after controlling for history of schizophrenia and other psychotic disorders



SOURCE: Glasner-Edwards & Mooney, 2014

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## Slide #126

### Methamphetamine and Psychosis

In a 2014 study by Glasner-Edwards & Mooney, the investigators found that there was a strong association between methamphetamine and psychosis, even when controlling for a history of schizophrenia or other psychiatric disorders. As you see in the figure, those subjects who were dependent on methamphetamine were three times more likely to have psychosis compared to the non-dependent subjects. The time from first use to psychosis differed based upon route of administration, meaning those who smoked methamphetamine showed psychotic symptoms more quickly than those who injected methamphetamine.



### REFERENCE:

Glasner-Edwards, S., & Mooney, L. J. (2014). Methamphetamine psychosis: Epidemiology and management. *CNS Drugs*, 28(12), 1115–1126.

## Treatment for Methamphetamine Psychosis

- Use of methamphetamine produces **positive symptoms of psychosis** and affective disorder, with no evidence of negative symptoms
- No large randomized clinical trials have been conducted; **no evidence-based clinical recommendations**
- Clinical experience and the limited data suggest that **using medications to treat symptoms** is helpful
- Couple with **behavioral interventions to reduce use**

SOURCES: McKetin et al., 2016;  
Glasner-Edwards & Mooney, 2014

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## Slide #127

### Treatment for Methamphetamine Psychosis

This slide features a few implications for treating psychosis among people who use methamphetamine, and the limitations of existing research.

(Notes for Slide #127,  
continued)

### Slide #127

## Treatment for Methamphetamine Psychosis

Because no large randomized controlled clinical trials have been conducted, treatment recommendations are based upon clinical experience rather than an evidence-based model. Both clinical experience and the limited data that does exist suggest that using medications to treat the symptoms that exist is helpful, coupled with behavioral interventions to reduce further use of methamphetamine.

Psychosis and affective disorders such as schizophrenia are associated with both positive and negative symptoms. Positive symptoms include the presence of, such as: hallucinations (sensory experiences that are not real), delusions (beliefs that cannot be real), and repetitive movements that are hard to control. Negative symptoms, on the other hand, take away or are characterized by absence or loss of experience, and include: a decrease in ability to emotionally respond to people, events, etc., a decrease in speaking, or difficulty sticking with activities and tasks.

(Notes for Slide #127,  
continued)

## Slide #127

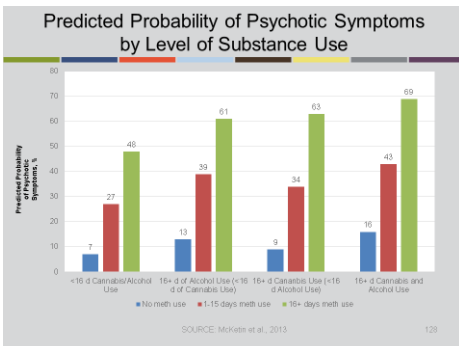
### Treatment for Methamphetamine Psychosis



#### REFERENCES:

McKetin, R., Dawe, S., Burns, R. A., Hides, L., Kavanagh, D. J., Teesson, M., ... Saunders, J. B. (2016). The profile of psychiatric symptoms exacerbated by methamphetamine use. *Drug and Alcohol Dependence*, 161, 104–109.

Glasner-Edwards, S., & Mooney, L. J. (2014). Methamphetamine psychosis: Epidemiology and management. *CNS Drugs*, 28(12), 1115–1126.



## Slide #128

### Predicted Probability of Psychotic Symptoms by Level of Substance Use

In 2013, McKetin and colleagues published a longitudinal prospective study in Australia that examined the association of methamphetamine use and psychosis to determine if there is a change in the likelihood of psychotic symptoms occurring during periods of methamphetamine use. A total of 278 individuals participated in the study; all participants met the DSM-IV criteria for methamphetamine dependence but did not meet DSM-IV criteria for lifetime schizophrenia or mania.

(Notes for Slide #128,  
continued)

### Slide #128

## Predicted Probability of Psychotic Symptoms by Level of Substance Use

Data was gathering across four 1-month observation periods to see if the risk of developing psychotic symptoms changed over time.

The bar graph features the predicted probability of psychotic symptoms (%) by level of cannabis and/or alcohol use, stratified by presence or absence of methamphetamine use (no use, 1-15 days of use, 16+ days of use). Among people who use methamphetamine, the risk of experiencing psychotic symptoms increased from a low baseline level (7%) during months of methamphetamine abstinence to 48% when participants were heavily using (16+ days of methamphetamine use). This risk was further elevated with frequent (16+ days over 4 weeks) cannabis and/or alcohol use to between 61% and 69%.

The likelihood of experiencing psychotic symptoms is five (5) times higher during periods of methamphetamine use than during periods of no use. Evidence of a strong dose-response effect was found between number of days of methamphetamine use and psychotic symptoms.

(Notes for Slide #128,  
continued)

**Slide #128**

**Predicted Probability of Psychotic  
Symptoms by Level of Substance Use**



**REFERENCE:**

McKetin, R., Lubman, D. I., Baker, A. L., Dawe, S., & Ali, R. L. (2013). Dose-related psychotic symptoms in chronic methamphetamine users: evidence from a prospective longitudinal study. *JAMA Psychiatry*, 70(3), 319–324.

Symptoms of Amphetamine-Induced Psychosis

- Persecutory delusions
- Ideas of reference
- Hallucinations (visual, auditory, olfactory, tactile)
- Stereotypical and compulsive acts
- Blunt affect, poverty of speech
- Prone to excited delirium and violence

SOURCE: Bramness et al., 2012

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**Slide #129**

**Symptoms of Amphetamine-Induced  
Psychosis**

This slide lists the various symptoms of psychosis that may be induced by the use of amphetamines. As a practical treatment implication, it is critical to treat the symptoms, regardless of whether they are amphetamine-induced or primary psychosis.



**REFERENCE:**

Bramness, J. G., Gundersen, O. H., Gusteram, J., Rognli, E. B., Konstenius, M., Loberg, E.-M., ... Franck, J. (2012). Amphetamine-induced psychosis – A separate diagnostic entity or primary psychosis triggered in the vulnerable? *BMC Psychiatry*, 12(221), 1–7.

### Methamphetamine Use and Violence

- Compared to no use, amphetamines use was associated with a 2-fold increase in the odds of hostility or violence
- Frequent use increases the risk of violent behavior
- Other risk factors included: psychotic symptoms, alcohol or other drug use, psychosocial problems, and impulsivity



SOURCE: Foulds et al., 2020

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## Slide #130

### Methamphetamine Use and Violence

Foulds and colleagues conducted a longitudinal birth cohort study to examine the link between the use of methamphetamine and perpetration of violence. Twenty eight percent of study participants reported using methamphetamine between the ages of 18-35. The researchers found a 2-fold increase in the odds of hostility or violence among people who used amphetamines (vs. those who did not use amphetamines). Further, frequent use increased the risk of violent behavior. Other risk factors included psychotic symptoms, use of alcohol or other drugs, psychosocial problems, and impulsivity.



#### REFERENCE:

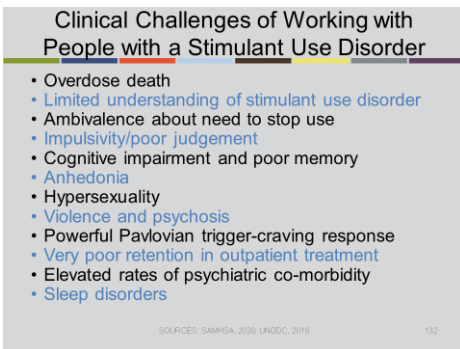
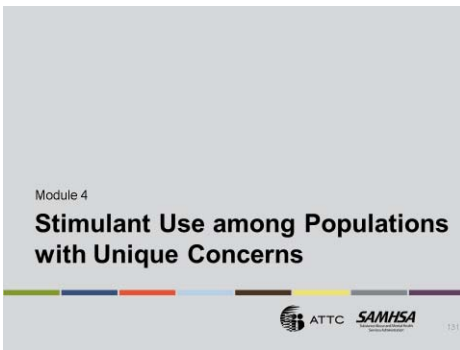
Foulds, J. A., Boden, J. M., McKetin, R., & Newton-Howes, G. (2020).

Methamphetamine use and violence: Findings from a longitudinal birth cohort. *Drug and Alcohol Dependence*, 207, 107826.



#### IMAGE CREDIT:

Purchased Image, Adobe Stock, 2020.



## Slide #131

### Module 4: Stimulant Use among Populations with Unique Concerns

Module 4 examines stimulant use among populations with a variety of unique concerns.

## Slide #132

### Clinical Challenges of Working with People with a Stimulant Use Disorder

This slide details the multiple clinical challenges that one must consider when working with individuals who have a stimulant use disorder (StUD).



## REFERENCES:

Substance Abuse Mental Health Services Administration. (2020). *Evidence-based Resource Guide Series: Treatment of Stimulant Use Disorders*. Publication No. PEP20-06-01-001. Rockville, MD: SAMHSA. Available at:

[https://store.samhsa.gov/sites/default/files/SAMHSA\\_Digital\\_Download/PEP20-06-01-001.pdf](https://store.samhsa.gov/sites/default/files/SAMHSA_Digital_Download/PEP20-06-01-001.pdf).

(Notes for Slide #132,  
continued)

**Slide #132**

**Clinical Challenges of Working with  
People with a Stimulant Use Disorder**



**REFERENCES:**

United Nations Office of Drugs and Crime.  
(2019). *Treatment of Stimulant Use  
Disorders: Current Practices and  
Promising Perspectives*. Vienna, Austria:  
UNODC. Available at:  
[https://www.unodc.org/documents/drug-  
prevention-and-  
treatment/Treatment of PSUD for website  
24.05.19.pdf](https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment_of_PSUD_for_website_24.05.19.pdf).

**Slide #133**

**Special Treatment Considerations  
Should be Made for the Following Sub-  
Groups**

This slide details the groups of individuals  
who may need special treatment  
considerations. Additional details for  
several sub-groups of people who use  
stimulants will follow on subsequent slides.

**Special Treatment Consideration Should Be  
Made for the Following Sub-Groups**

- People who use stimulants by injection
- Those who take stimulants daily or in very high doses
- Women
- Homeless, chronically mentally ill and/or individuals with high levels of psychiatric symptoms at admission
- Men who have sex with men (MSM)
- Those under the age of 21
- Individuals receiving medication for an opioid use disorder

SOURCES: SAMHSA, 2020; UNODC, 2019

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(Notes for Slide #133,  
continued)

### Slide #133

## Special Treatment Considerations Should be Made for the Following Sub- Groups



### REFERENCES:

Substance Abuse Mental Health Services Administration. (2020). *Evidence-based Resource Guide Series: Treatment of Stimulant Use Disorders*. Publication No. PEP20-06-01-001. Rockville, MD: SAMHSA. Available at:

[https://store.samhsa.gov/sites/default/files/SAMHSA\\_Digital\\_Download/PEP20-06-01-001.pdf](https://store.samhsa.gov/sites/default/files/SAMHSA_Digital_Download/PEP20-06-01-001.pdf).

United Nations Office of Drugs and Crime. (2019). *Treatment of Stimulant Use Disorders: Current Practices and Promising Perspectives*. Vienna, Austria: UNODC. Available at:

[https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment\\_of\\_PSUD\\_for\\_website\\_24.05.19.pdf](https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment_of_PSUD_for_website_24.05.19.pdf).

### People Who Inject Stimulants

#### People who inject stimulants report:

- More severe craving
- Higher rates of depression
- And other psychological symptoms before, during, and after treatment
- Higher rates of drug use in treatment and higher drop out rates from treatment
- Higher rates of HIV and hepatitis C

SOURCES: SAMHSA, 2020; UNODC, 2019

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### Slide #134

## People Who Inject Stimulants

This slide details the issues that can occur when someone uses stimulants by injection, including but not limited to: increased risk for becoming infected with HIV and/or hepatitis C, higher rates of treatment discontinuation, and higher rates of mental health issues such as depression.

(Notes for Slide #134,  
continued)

## Slide #134

### People Who Inject Stimulants



#### REFERENCES:

Substance Abuse Mental Health Services Administration. (2020). *Evidence-based Resource Guide Series: Treatment of Stimulant Use Disorders*. Publication No. PEP20-06-01-001. Rockville, MD: SAMHSA. Available at:

[https://store.samhsa.gov/sites/default/files/SAMHSA\\_Digital\\_Download/PEP20-06-01-001.pdf](https://store.samhsa.gov/sites/default/files/SAMHSA_Digital_Download/PEP20-06-01-001.pdf).

United Nations Office of Drugs and Crime. (2019). *Treatment of Stimulant Use Disorders: Current Practices and Promising Perspectives*. Vienna, Austria: UNODC. Available at:

[https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment of PSUD for website 24.05.19.pdf](https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment_of_PSUD_for_website_24.05.19.pdf).

Crystal Methamphetamine Use Increases Risk of Injecting Drugs	
Characteristic	Adjusted Hazard Ratio
Recent Use of Crystal Methamphetamine*	1.93
Recent Use of Heroin*	1.73
Male Sex	0.90
Age (per year older)	0.81
White Ethnicity	0.24

SOURCE: Werb et al., 2013

## Slide #135

### Crystal Methamphetamine Use Increases Risk of Injecting Drugs

A team of researchers from Canada examined crystal methamphetamine use and initiation of drug use by injection among street-involved youth. Between October 2005 and November 2010, a total of 395 drug injection-naïve, street-involved Canadian youth were observed.

(Notes for Slide #135,  
continued)

### Slide #135

## Crystal Methamphetamine Use Increases Risk of Injecting Drugs

A total of 64 (16.2%) of the participants initiated drug use by injection during the follow-up period for a cumulative incidence of about 22% per 100 person-years. The table features the adjusted hazard ratio (HR) for a variety of sociodemographic and drug use characteristics.

A hazard ratio is a measure of an effect of an intervention on an outcome of interest over time.

The recent non-injection use of methamphetamine was positively associated over time with subsequent initiation of drug use by injection (adjusted hazard ratio (HR)=1.93). The drug of first injection was most frequently reported as crystal methamphetamine. In addition, recent non-injection use of heroin was also associated with increased risk of injection initiation (HR=1.73). Being older and white were negatively associated with risk of injection initiation (HR=0.81 and 0.24, respectively).



***\*NOTE: Drug use variables refer to non-injection use of drug in the preceding six months.***

(Notes for Slide #135,  
continued)

**Slide #135**

**Crystal Methamphetamine Use  
Increases Risk of Injecting Drugs**



**REFERENCE:**

Werb, D., Kerr, T., Buxton, J., Shoveller, J., Richardson, C., Montaner, J., & Wood, E. (2013). Crystal methamphetamine and initiation of injection drug use among street-involved youth in a Canadian setting. *Canadian Medical Association Journal*, 185(18), 1569–1575.

**Slide #136**

**Men Who Have Sex With Men (MSM)**

A variety of research studies have shown that the use of methamphetamine is intricately connected to both sexual identity and sexual expression in many gay-identified men who have sex with men (MSM). Changes in sexual behaviors and changes in decision-making processes present extreme HIV risks, especially when methamphetamine is involved.

**Men Who Have Sex With Men (MSM)**

- Methamphetamine is closely connected to sexual identity and sexual expression for many gay-identified MSM
- Sexual behaviors associated with meth use present extreme HIV risks
  - Changes in sexual behaviors
  - Changes in decision-making processes
- Non gay-identified MSM may have less exposure to prevention messages, placing both themselves and their sex partners at extreme risk

SOURCES: Hoare et al., 2016; Shoptaw & Reback, 2007; Sample et al., 2002

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(Notes for Slide #136,  
continued)

**Slide #136**

**Men Who Have Sex With Men (MSM)**

Rates of HIV sero-prevalence have been reported to be threefold higher among MSM who use amphetamines than among MSM who do not use. CDC reports that the connection between amphetamine use, high-risk sexual behavior, and HIV transmission in MSM communities poses a major threat of high rates of HIV infection among MSM.



**REFERENCES:**

Hoenigl, M., Chaillon, A., Moore, D. J., Morris, S. R., Smith, D. M., & Little, S. J. (2016). Clear links between starting methamphetamine and increasing sexual risk behavior: A cohort study among men who have sex with men. *Journal of Acquired Immunodeficiency Syndrome*, 71(5), 551–557.

Shoptaw, S., & Reback, C. J. (2007). Methamphetamine use and infectious disease-related behaviors in men who have sex with men: Implications for interventions. *Addiction*, 102(Suppl. 1), 130–135.

Semple, S. J., Patterson, T. L., & Grant, I. (2002). Motivations associated with methamphetamine use among HIV+ men who have sex with men. *Journal of Substance Abuse Treatment*, 22, 149–156.

Women

- In the United States, rates of amphetamine use among women **approach the rates** among men.
- Women frequently use amphetamine for **weight loss** and to control symptoms of **depression**.
- Women tend to begin using methamphetamine at an **earlier age** than do men.
- Women are also **less likely to switch** to another drug when they lack access to methamphetamine.

SOURCE: NIDA, 2000

## Slide #137

### Women

An additional risk factor for women that we alluded to earlier is that women generally begin using methamphetamine at a younger age than men. Due to brain the lack of maturity (myelination), an earlier age of first use increases the risk of the person developing a stimulant use disorder over the course of their lifetime. Additionally, women are also less likely to switch to another drug when they lack access to methamphetamine.



***A supplemental module on Gender Differences and Stimulant Use is available for viewing at:***

***<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>***



### REFERENCE:

National Institute on Drug Abuse. (2000). *Gender Differences in Drug Abuse Risks and Treatment*. Retrieved May 1, 2020, from <https://archives.drugabuse.gov/news-events/nida-notes/2000/09/gender-differences-in-drug-abuse-risks-treatment>.

Top 5 Risk Factors for Men and Women Who Recently Entered Treatment for Meth (1)	
MEN	WOMEN
<ul style="list-style-type: none"> <li>• Ever diagnosed with liver problem or hepatitis (OR=4.05)</li> <li>• Ever used needle to inject drugs (OR=3.47)</li> <li>• Lived with a person with alcohol, drug, or psychiatric problem (OR=1.99)</li> <li>• Had relatives with drug problems (OR=1.53)</li> <li>• Arrested in last 12 months (OR=1.10)</li> </ul>	<ul style="list-style-type: none"> <li>• Ever sexually mistreated, abused, or raped as adult (OR=10.46)</li> <li>• Ever lived with partner who sold drugs (OR=3.04)</li> <li>• Ever lived with partner who spent time in jail or prison (OR=2.95)</li> <li>• Had relatives with alcohol problem (OR=1.65)</li> <li>• Severity of dependence scale (OR=1.04)</li> </ul>

SOURCE: Maxwell, 2016; Maxwell, 2014

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## Slide #138

### Top 5 Risk Factors for Men and Women Who Recently Entered Treatment for Meth (1)

It is important to remember as we look at the next three slides that correlation and causation are not the same. Most of the risk factors associated with methamphetamine use are both psychosocial and physical in nature. For example, when temperatures increase in summer, the number of drownings generally increases. No one, however, is suggesting that warmer temperatures are causing the drownings. Likewise, some of the risk factors listed here are correlated but do not necessarily cause a person to develop a stimulant use disorder.

In this slide the abbreviation OR stands for Odds Ratio. Odds Ratios indicate how likely something is to occur given that the other condition is present. This slide features a re-analysis of data conducted by Dr. Maxwell after the 2014 article was published. This analysis shows that men and women self-report different risk factors for problematic use of methamphetamine, leading to treatment.

(Notes for Slide #138,  
continued)

### Slide #138

#### Top 5 Risk Factors for Men and Women Who Recently Entered Treatment for Meth (1)

To understand ORs, let's look at an example. If a male has ever been diagnosed with a liver problem or hepatitis, the odds of their entering treatment for methamphetamine has an Odds Ratio of 4.05, which means men are four times more likely to enter treatment for use of methamphetamine if they have ever been diagnosed with a liver problem or hepatitis.

Among men, the first two items on the list are likely correlated, with injection of methamphetamine serving as a risk factor for hepatitis. Likewise, arrests are likely correlated with use rather than being use being derived from it. The two remaining factors for methamphetamine for men, having a relative with drug problems or living with a person with alcohol, drug, or psychiatric problems, would relate more to social factors that contribute to substance use disorders.

For women, the social dynamic related to methamphetamine use can also be readily seen. In addition, traumatic experiences such as sexual, mistreatment, abuse, or rape are more likely to be present. It is notable that women who self-report a history of sexual mistreatment, abuse, or rape as an adult, are over 10 times more likely to enter treatment for their use of methamphetamine than women without this history.

## (Notes for Slide #138, continued)

### Slide #138

#### Top 5 Risk Factors for Men and Women Who Recently Entered Treatment for Meth (1)

The genetic and social learning factors can also be noted as evidenced by the correlation between having relatives who used alcohol serving as a risk factor, as well.

The next slide portrays the same data in graph form.



#### REFERENCES:

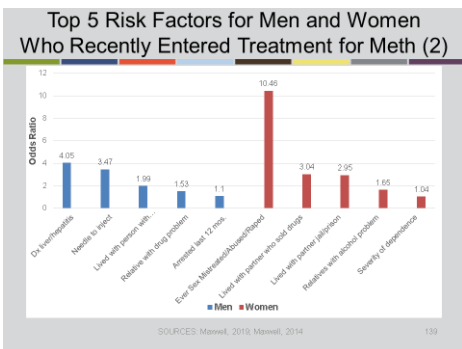
Maxwell. J. C. (Personal Communication October 3, 2019). Reanalysis of methamphetamine survey data.

Maxwell, J.C. (2014). A new survey of methamphetamine users in treatment: Who they are, why they like “meth,” and why they need additional services. *Substance Use and Misuse*, 49(6), 639–644.

### Slide #139

#### Top 5 Risk Factors for Men and Women Who Recently Entered Treatment for Meth (2)

Although the general risk factors indicative of a likelihood of methamphetamine use are important to note, the disparity in what those are illustrated clearly here.



(Notes for Slide #139,  
continued)

### Slide #139

#### Top 5 Risk Factors for Men and Women Who Recently Entered Treatment for Meth (2)

Perhaps most notable is the strong correlation between a history of sexually mistreatment, abuse, or rape among females and methamphetamine use. It should be noted here that this category may include individuals who had a traumatic event occur to them and used methamphetamine thereafter, as well as individuals who may have had these horrific events happen to them during the period in which they were actively using methamphetamine.

We have considered some of the notable risk factors related to methamphetamine use. Let's begin now to consider some attitudinal aspects that may contribute to stimulant use, as well.



#### REFERENCES:

Maxwell. J. C. (Personal Communication October 3, 2019). Reanalysis of methamphetamine survey data.

Maxwell, J.C. (2014). A new survey of methamphetamine users in treatment: Who they are, why they like “meth,” and why they need additional services. *Substance Use and Misuse*, 49(6), 639–644.

Perceived Risks and Benefits of Methamphetamine Use	
RISKS	BENEFITS
<ul style="list-style-type: none"> <li>• Cognitive impairment (74.8%)</li> <li>• Addiction/Dependence (38.3%)</li> <li>• Paranoia (37.9%)</li> <li>• Depression (35.1%)</li> <li>• Arrested in last 12 months (35.1%)</li> </ul>	<ul style="list-style-type: none"> <li>• Increased energy/stay awake (57.1%)</li> <li>• Enhanced sexual experience (43.3%)</li> <li>• The high (40.0%)</li> <li>• Fun/good time (34.3%)</li> <li>• Enhanced mood/euphoria (28.6%)</li> </ul>
<small>SOURCES: Maxwell, 2019; Maxwell, 2014</small>	

## Slide #140

### Perceived Risks and Benefits of Methamphetamine Use

As we have seen, the perception of risk likely plays an important role in whether an individual uses a stimulant. Just as there are differing perceptions of risks related to stimulants, there are also distinctions in the perceived benefits. Here we can see some of the perceived benefits and risks associated with methamphetamine use in particular. Just as we noted in the previous slide, these perceptions likely have a significant impact on individuals who do ultimately use as well as those who do not. The information above is based on a study of 222 individuals who use methamphetamine who were entering a treatment program with surveys administered in 2010 and 2011.



***NOTE: Addiction/Dependence is the language used in Dr. Maxwell's study and therefore is preserved here.***



#### REFERENCES:

Maxwell. J. C. (Personal Communication October 3, 2019). Reanalysis of methamphetamine survey data.

(Notes for Slide #140,  
continued)

**Slide #140**

**Perceived Risks and Benefits of  
Methamphetamine Use**



**REFERENCES:**

Maxwell, J.C. (2014). A new survey of methamphetamine users in treatment: Who they are, why they like “meth,” and why they need additional services. *Substance Use and Misuse*, 49(6), 639–644.

**Slide #141**

**Adolescents**

In 2015, Buck & Siegel published an article on the effects of adolescent methamphetamine exposure. This slide details several issues associated with use of methamphetamine specifically during adolescence. The authors note that relatively few studies have examined the effects of adolescent use of methamphetamine compared to use among adults.



**REFERENCE:**

Buck, J. M., & Siegel, J. A. (2015). The effects of adolescent methamphetamine exposure. *Frontiers in Neuroscience*, 9(151), 1–5.

**Adolescents**

- Adolescents in treatment for methamphetamine use have increased rates of:
  - History of treatment for a mental health disorder
  - Family history of drug misuse
  - Depression and suicidal ideation
  - Previous treatment for drug use
- Adolescents who use methamphetamine are more likely to be **female**
- Adolescent use of methamphetamine is associated with increased rates of **risky sexual behavior**, adolescent **pregnancy**, and **anti-social behaviors**

SOURCE: Buck & Siegel, 2015

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### People Who have Experienced Trauma

- Childhood sexual abuse associated with more severe methamphetamine use and depression symptoms
- History of family substance use and of childhood physical abuse predict age of first methamphetamine use (younger).

SOURCES: Berg et al., 2017; Svingen, 2016

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## Slide #142

### People Who have Experienced Trauma


This slide features the key findings from two studies conducted in 2016 and 2017 that examined the impact of a history of trauma on the age of first use of methamphetamine and the relationship between methamphetamine use severity and depression.



### REFERENCES:

Berg, M. K., Hobkirk, A. L., Joska, J. A., & Meade, C. S. (2017). The role of substance use coping in the relation between childhood sexual abuse and depression among methamphetamine users in South Africa. *Psychological Trauma: Theory, Research, Practice, and Policy*, 9(4), 493–499.

Svingen, L., Dykstra, R. E., Simpson, J. L., Jaffe, A. E., Bevins, R. A., Carlo, G., ... Grant, K. M. (2016). Associations between family history of substance use, childhood trauma, and age of first drug use in persons with methamphetamine dependence. *Journal of Addiction Medicine*, 10(4), 269–273.




**Sexual Behavior**

- A strong association exists between stimulant use and sexual behavior
- Common concerns that may be experienced in during the early months of recovery from stimulant use include:
  - Decreased libido
  - Inability to function sexually
  - Loss of sexual pleasure
  - Reduced frequency of sexual activity

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Module 5

**Stimulants and HIV**



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## Slide #143

### Sexual Behavior

This slide discusses the importance of discussing sexual behaviors with patients who use stimulants, especially methamphetamine.

## Slide #144

### Module 5: Stimulants and HIV

Module 5 reviews the relationship between stimulants and HIV.



***A supplemental module on Methamphetamine Use and HIV among Men Who Have Sex with Men is available for viewing at:***

***<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>. If you feel that you are running low on time, and will not be able to present Modules 6-7 in their entirety, you may skip slides 144-162 (or condense the Stimulants and HIV content into fewer slides) and refer training participants to the recorded supplemental module for more detailed information on this topic.***

(Notes for Slide #144,  
continued)

## Slide #144

### Module 5: Stimulants and HIV



#### INSTRUCTIONS:

If time permits, engage the audience in a brief group discussion. Ask this question to the group, “*Why is it important that we know about the HIV & STD risk behavior of our patients?*”

Touch on any reasons they may have missed.

#### Possible discussion points include:

- The prevalence of HIV
- Medical comorbidities/complications
- Risk of infecting others with HIV
- The importance of connecting patients with resources
- Many of our patients are infected with HIV and it is our job to help them

## Slide #145

### Substance Use and HIV Risk

The use of alcohol and other drugs can impair a person’s decision making ability and compromise judgement. When this happens, the person may put him/her/them at risk for risky sexual behaviors, which may include trading sex for drugs, sharing needles, and having unprotected sexual intercourse.

#### Substance Use and HIV Risk

- Alcohol and drug intoxication may affect **mental status and judgment** and increases the likelihood that they will engage in **high-risk sexual behavior**
- Substance use increases possible **exposure to unprotected sex** as a means to obtain drugs
- Physiological consequences of substance use may alter **susceptibility to infection and interact with HIV medications**

SOURCE: NIDA, 2016

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## (Notes for Slide #145, continued)

Mental Illness and HIV Risk	
<ul style="list-style-type: none"><li>– Lack of precise knowledge about HIV methods of transmission</li><li>– Difficulty with judgment as a result of mental ill health</li><li>– Impaired impulse control</li><li>– Lack of interpersonal skills to negotiate safer sex behaviors</li></ul>	<ul style="list-style-type: none"><li>– Poor motivation to take risk reduction strategies</li><li>– Unprotected sex with strangers</li><li>– Alcohol and drug abuse</li><li>– Trading sex for money or housing</li><li>– Cognitive deficits</li><li>– Low SES, poor housing accommodations</li></ul>
<small>SOURCES: Choi et al., 2016; Elser et al., 2011; Ogino, 2009; Weaver et al., 2008; Bostrom et al., 2007; Grassi et al., 1999</small>	

## Slide #145

### Substance Use and HIV Risk



#### REFERENCE:

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from <https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.

## Slide #146

### Mental Illness and HIV Risk

Individuals who experience mental illness have higher rates of HIV than those who have not been diagnosed with a mental health disorder. Further, people who experience chronic mental illness are at considerable risk of becoming infected with HIV. This slide summarizes several factors that may contribute to increased HIV risk among individuals who experience mental illness.



#### REFERENCES:

Choi, S. K. Y., Boyle, E., Cairney, J., Gardner, S., Collins, E. J., Bacon, J., ... OHTN Cohort Study Group. (2016). Adequacy of mental health services for HIV-positive patients with depression: Ontario HIV Treatment Network Cohort Study. *PLoS One*, 11(6), e0156652.

(Notes for Slide #146,  
continued)

## Slide #146

### Mental Illness and HIV Risk



#### REFERENCES:

Blair, J. M., McNaghten, A. D., Frazier, E. L., Skarbinski, J., Huang, P., & Heffelfinger, J. D. (2011). Clinical and behavioral characteristics of adults receiving medical care for HIV infection: Medical Monitoring Project, United States, 2007. *Morbidity and Mortality Weekly Report*, 60(11), 1–20.

Oggins, J. (2009). Engaging minority men at HIV risk in integrated mental health and drug treatment. *Journal of Psychoactive Drugs*, 41(2), 163–71.

Weaver, M. R., Conover, C. J., Proescholdbell, R. J., Arno, P. S., Ang, A., Ettner, S. L., & Cost Subcommittee of the HIV/AIDS Treatment Adherence, Health Outcomes, and Cost Study Group. (2008). Utilization of mental health and substance abuse care for people living with HIV/AIDS, chronic mental illness, and substance abuse disorders. *Journal of Acquired Immunodeficiency Syndrome*, 47(4), 449–458.

Berkman, A., Pilowsky, D. J., Zybert, P. A., Herman, D. B., Conover, S., Lemelle, S., Susser, E. (2007). HIV prevention with severely mental ill men: A randomised controlled trial. *AIDS Care*, 19, 579–588.

## (Notes for Slide #146, continued)

**Transgender Individuals at Risk (1)**

- Meta-analysis (2008) estimated 28% HIV seroprevalence (infection) in transgender women, with extremely high seroprevalence (56%) in African American transgender women.
- Meta-analysis of self-report data estimated 12% HIV and 21% prevalence of any other sexually transmitted infection (STI) in transgender women (gonorrhea, chlamydia, herpes, syphilis, trichomoniasis, and hepatitis B and C).
- Risk behaviors for transgender women include:
  - Multiple partners
  - Unprotected receptive anal intercourse
  - Commercial sex
  - Sex under the influence of alcohol and drugs
  - Needle use for injecting drugs and gender-related hormones or silicone

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## Slide #146 Mental Illness and HIV Risk



### REFERENCES:

Grassi, L., Pavanati, M., Cardelli, R., & Ferri, S. (1999). HIV-risk behaviour and knowledge about HIV/AIDS among patients with schizophrenia. *Psychological Medicine*, 29(1), 171–179.

## Slide #147 Transgender Individuals at Risk (1)

Most of the research that is done on the transgender population is focused specifically on transgender women. This slide summarizes some of the research on HIV risk among transgender individuals.



### REFERENCES:

Operario, D., & Nemoto, T. (2010). HIV in transgender communities: Syndemic dynamics and a need for multicomponent interventions. *Journal of Acquired Immunodeficiency Syndromes*, 55(Suppl. 2), S91–S93.

(Notes for Slide #147,  
continued)

Transgender Individuals at Risk (2)

- African American and Hispanic transgender women report greater risk behaviors compared with white and Asian and Pacific Islander transgender women
- High rates of depression, emotional distress, loneliness, and social isolation
- High rates of alcohol and drug use including use by injection
- Increased risk for violence and victimization, including physical and sexual abuse
- High levels of poverty, unemployment, and unstable housing in transgender women and men

SOURCES: Fernández-Rouco et al., 2019;  
Gather et al., 2018; Operario & Nemoto, 2010

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Slide #147

Transgender Individuals at Risk (1)



REFERENCES:

Herbst, J. H., Jacobs, E. D., Finlayson, T. J., McKleroy, V., S., Spink Neumann, M., Crepaz, N., & HIV/AIDS Prevention Research Synthesis Team. (2008). Estimating HIV prevalence and risk behaviors of transgender persons in the United States: A systematic review. *AIDS Behavior*, 12, 1–17.

Slide #148

Transgender Individuals at Risk (2)

This slide summarizes additional research findings as they relate to the risk of HIV among transgender individuals.



REFERENCES:

Fernández-Rouco, N., Carcedo, R., Lopez, F., & Begona Orgaz, M. (2019). Mental health and proximal stressors in transgender men and women. *Journal of Clinical Medicine*, 8(3), 413.

(Notes for Slide #148,  
continued)

**Slide #148**

**Transgender Individuals at Risk (2)**



**REFERENCES:**

Garthe, R. C., Hildago, M. A., Hereth, J., Garafalo, R., Reisner, S. L., Mimiaga, M. J., & Kuhns, L. (2018). Prevalence and risk correlates of intimate partner violence among a multisite cohort of young transgender women. *LGBT Health*, 5(6), 333–340.

Operario, D., & Nemoto, T. (2010). HIV in transgender communities: Syndemic dynamics and a need for multicomponent interventions. *Journal of Acquired Immunodeficiency Syndromes*, 55(Suppl. 2), S91–S93.


**Slide #149**

**Cocaine/Crack Use and Access to Medical Care**

Many individuals who use crack or cocaine and are living with HIV live in disadvantaged and impoverished communities, which can present a multitude of health care barriers, including limitations to regular primary and HIV-related medical care.

Crack/Cocaine Use and Access to Medical Care

- People living with HIV who use crack are:
  - More likely than their HIV-negative counterparts to have **never been in HIV primary care**
  - Less likely to have **access to basic medical services**
  - Less likely to have a **regular healthcare provider**
  - Less likely to **initiate medical care and treatment**



SOURCES: Metich et al., 2009; Cunningham et al., 2008

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(Notes for Slide #149,  
continued)

## Slide #149

### Cocaine/Crack Use and Access to Medical Care



#### REFERENCES:

Metsch, L. R., Bell, C., Pereyra, M., Cardenas, G., Sullivan, T., Rodriguez, A., ... del Rio, C. (2009). Hospitalized HIV-infected patients in the era of highly active antiretroviral therapy. *American Journal of Public Health*, 99(6), 1045–1049.

Cunningham, C. O., Sohler, N. L., Berg, K. M., Shapiro, S., & Heller, D. (2006). Type of substance use and access to HIV-related health care. *AIDS Patient Care and STDs*, 20, 399–407.



#### IMAGE CREDIT:

Purchased image, Fotolia, 2017.

## Slide #150

### Cocaine and Its Impact on HIV Infection and Disease Progression

Numerous research studies have been conducted to better understand the impact that cocaine use has on HIV infection and disease progression. This slide lists several of the key findings. In the 2<sup>nd</sup> to last bullet, HIV-related neurological conditions include memory loss, movement problems, and vision impairment.

Cocaine and Its Impact on HIV Infection and Disease Progression

Cocaine use:

- Accelerates HIV infection
- Impairs immune cell function
- Promotes replication of the HIV virus
- Potentiates the damaging effects of HIV on cells in the brain and spinal cord
- Accelerates the development of HIV-related neurological conditions
- Increases the risk for hepatitis C co-infection

SOURCE: NIDA, 2018 190

(Notes for Slide #150,  
continued)

### Slide #150

## Cocaine and Its Impact on HIV Infection and Disease Progression

Individuals who use cocaine and are living with HIV disease often have advanced progression of the disease, including increased viral load and accelerated decreases in CD4+ cell counts. In addition, being infected with HIV can increase a person's risk for co-infection with hepatitis C. This co-infection can lead to a variety of serious illnesses, including immune system, neurological, and liver complications.



### REFERENCE:

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from

<https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.

### Slide #151

## Cocaine Use and Immune System Disruption

According to an animal study conducted at the University of California, Los Angeles by Kim and colleagues, further evidence was compiled that cocaine use disrupts the immune system, making people who use the drug more likely to become infected with HIV, because cocaine blunts the potency of the body's defense against the virus.

### Cocaine Use and Immune System Disruption

- Using cocaine makes people more susceptible to becoming infected with HIV
- Cocaine mediates its effects directly, inducing minimal changes in the physiology of T-cells
- Cocaine use increases the pool of CD4 T-cells in the human body
  - Increases the odds for productive infection
  - Increase the viral reservoir

SOURCE: Kim et al., 2011

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## (Notes for Slide #151, continued)

### Slide #151 Cocaine Use and Immune System Disruption

The next stage of Kim's research will be to determine how cocaine abuse might affect HIV transmission in mucosal membranes; how pre- and post-exposure prophylaxis (PrEP and PEP) can be affected by cocaine exposure; how cocaine might affect viral latency; and how cocaine may alter the body's immune defenses from other viral infections.



#### REFERENCE:

Kim, S. G., Lowe, E. L., Dixit, D., Youn, C. S., Kim, I. J., Jung, J. B., ... Vatakis, D. N. (2015). Cocaine-mediated impact on HIV infection in humanized BLT mice. *Scientific Reports*, 5(10010), 1–11.

### Slide #152 Cocaine Use a Significant Risk Factor for Teens

This study is one of the first to look at the link between crack and powder cocaine use and HIV risk behaviors in adolescents. Teens with a history of crack or powder cocaine use are significantly more likely to engage in unprotected sex than youth who have never used these drugs, putting themselves at increased risk for being infected with HIV.

#### Cocaine Use a Significant Risk Factor for Teens

- Teens with a history of crack or powder cocaine use are significantly **more likely to engage in unprotected sex** than youth who have never used these drugs, putting themselves at increased risk for HIV.
- Teens who used crack and/or powder cocaine at least once were **SIX TIMES more likely** to use condoms inconsistently.
- Crack cocaine appears to have **more of an influence on risky teen behaviors** than other factors, like alcohol and marijuana use.

SOURCE: Tobin-Shenoy et al., 2010

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(Notes for Slide #152,  
continued)

Methamphetamine and Its Impact on HIV Infection and Disease Progression

Methamphetamine use:

- Lowers sexual inhibitions, impairs judgment, and provides energy and confidence to engage in sexual activity for long periods of time
- Causes erectile dysfunction
- Causes mucosal dryness
- Decreases adherence to HIV treatment and medical follow-up
- Increases HIV replication
- Accelerates progress of HIV-related dementia

SOURCE: Yen & Abbrecht, 2007 153

**Slide #152**

**Cocaine Use a Significant Risk Factor for Teens**



**REFERENCE:**

Tolou-Shams, M., Feldstein Ewing, S. W., Tarantino, N., & Brown, L. K. (2010). Crack and cocaine use among adolescents in psychiatric treatment: Associations with HIV risk. *Journal of Child and Adolescent Substance Abuse*, 19(2), 122–134.

**Slide #153**

**Methamphetamine and Its Impact on HIV Infection and Disease Progression**

The connection between methamphetamine use and HIV transmission has been well established by researchers. Individuals who use methamphetamine are more likely to become infected with HIV and transmit the virus to others. Studies have also documented more substantial brain damage and cognitive impairment among people who use methamphetamine and are infected with HIV, as compared to people living with HIV who do not use methamphetamine.

(Notes for Slide #153,  
continued)

Methamphetamine Use May Accelerate HIV Reproduction

- In test tube studies, when methamphetamine is added to immune cells, it significantly **increased HIV replication**
  - Particularly in CD4 cells and monocytes
- In mouse models, methamphetamine activated a portion of the HIV genetic code (long terminal repeat – LPR), prompting cells to release a protein tied to **more rapid HIV disease progression**

SOURCE: TOUSSI ET AL., 2009

**Slide #153**

**Methamphetamine and Its Impact on HIV Infection and Disease Progression**



**REFERENCE:**

Yeon, P. A., & Albrecht, H. (2007, December 3). Crystal meth and HIV/AIDS: The perfect storm? *NEJM Journal Watch*. Retrieved June 1, 2020, from <https://www.jwatch.org/ac20071203000001/2007/12/03/crystal-meth-and-hiv-aids-perfect-storm>.

**Slide #154**

**Methamphetamine Use May Accelerate HIV Reproduction**

According to a paper published by Toussi and colleagues in 2009, methamphetamine speeds up HIV replication in both test tube and animal studies. This slide details the key findings from the test tube studies and mouse model studies.



**REFERENCE:**

Toussi, S.S., Joseph, A., Zheng, J.H., Dutta, M., Santambrogio, L., & Goldstein, H. (2009). Short communication: Methamphetamine treatment increases in vitro and in vivo HIV replication. *AIDS Research and Human Retroviruses*, 25(17), 1117–1121.

**The Effect of Methamphetamine on the Brain of a Person Infected with HIV**

- HIV and meth are thought to have synergistic cognitive and neurological impacts
- In the presence of HIV, methamphetamine can cause:
  - Even greater dopamine release and cellular damage
  - Additive damage to the frontal cortex and basal ganglia
  - Difficulty in adhering to antiretroviral regimen
  - Deficits in attention/working memory, abstract decision-making, and psychomotor speed

SOURCE: Cherner, 2013 155

## Slide #155

### The Effect of Methamphetamine on the Brain of a Person Infected with HIV

Cherner published an article in the *APA Psychology and AIDS Exchange Newsletter* in 2013 about the effects of methamphetamine on the brain of a person infected with HIV. This slide details the key findings.



#### REFERENCE:

Cherner, M. (2013, January). The HIV+ brain on drugs: Focus on methamphetamine. *Psychology and AIDS Exchange Newsletter*. Washington, DC: American Psychological Association.

**Functional Deficits Due to HIV and Methamphetamine Use (1)**

- What is the burden that methamphetamine use and HIV disease impose on an individual's daily functioning
- UCSD researchers assessed daily functioning in four key areas:
  - Everyday cognitive symptoms (memory, communication, intellectual performance)
  - Instrumental (skilled) activities of daily living (medication and financial management, grocery shopping, planning social activities)
  - Basic activities of daily living (housekeeping, home repairs, bathing, dressing)
  - Employment

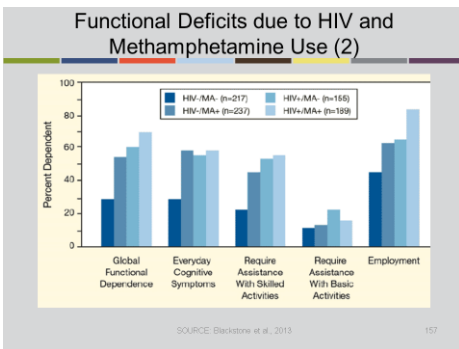
SOURCE: Blackstone et al., 2013 156

## Slide #156

### Functional Deficits Due to HIV and Methamphetamine Use (1)

Blackstone and colleagues from the University of San Diego, Translational Methamphetamine AIDS Research Center conducted a study to assess daily functioning among nearly 800 individuals who were living with HIV and using methamphetamine. They assessed daily functioning in four key areas – everyday cognitive symptoms, instrumental (skilled) activities of daily living, basic activities of daily living, and employment. The next slide contains the key findings from the study.

(Notes for Slide #156,  
continued)



Slide #156

Functional Deficits Due to HIV and Methamphetamine Use (1)



REFERENCE:

Blackstone, K., Iudicello, J. E., Morgan, E. E., Weber, E., Moore, D.J., Franklin, ... the TMARC Group. (2013). HIV infection heightens concurrent risk of functional dependence in persons with chronic methamphetamine use. *Journal of Addiction Medicine*, 7(4), 255–263.

Slide #157

Functional Deficits Due to HIV and Methamphetamine Use (2)

Participants who use methamphetamine (MA+) or are living with HIV (HIV+) showed similar increases in functional dependence (need for assistance), as compared to participants who did not have HIV (HIV-) and/or did not use methamphetamine (MA-). Study participants with HIV and who used methamphetamine (HIV+/MA+) showed the highest levels of functional impairment in most domains of daily life. The greatest disparities were seen in everyday cognitive abilities and skilled activities of daily life (2<sup>nd</sup> and 3<sup>rd</sup> set of bars from the left).

(Notes for Slide #157,  
continued)

**Slide #157**

**Functional Deficits Due to HIV and  
Methamphetamine Use (2)**

One clinical implication of this research study is the need for clinicians to carefully monitor medication compliance among patients who use methamphetamine (HIV-/MA+), patients who are living with HIV (HIV+/MA-), or both (HIV+/MA+).



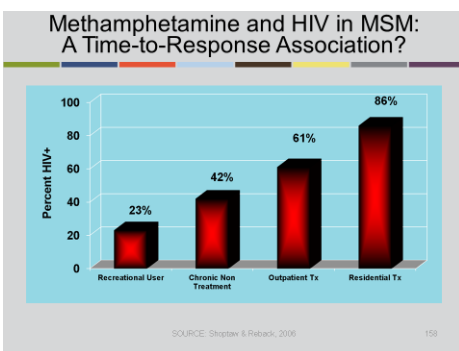
**REFERENCE:**

Blackstone, K., Iudicello, J. E., Morgan, E. E., Weber, E., Moore, D.J., Franklin, ... the TMARC Group. (2013). HIV infection heightens concurrent risk of functional dependence in persons with chronic methamphetamine use. *Journal of Addiction Medicine*, 7(4), 255–263.

**Slide #158**

**Methamphetamine and HIV in MSM: A  
Time-to-Response Association?**

This series of statistics demonstrate the point that the farther along that an MSM who uses methamphetamine is in the substance use disorder treatment continuum of care, the more likely he is to receive a diagnosis of HIV.



(Notes for Slide #158,  
continued)

### Slide #158

#### **Methamphetamine and HIV in MSM: A Time-to-Response Association?**

By starting at the left side of the graph, HIV prevalence is lower in samples of MSM who use methamphetamine and are seeking prevention or non-intervention services. As you move to the right, the prevalence of HIV increases, with very high prevalence observed in the outpatient and residential treatment samples (upwards of 86%). Researchers concluded that the more severe the methamphetamine problem is (as indicated by the intensity of their treatment services), the more likely they will have engaged in behaviors that led to the transmission of HIV.



#### **REFERENCE:**

Shoptaw, S., & Reback, C. J. (2006). Associations between methamphetamine use and HIV among men who have sex with men: A model for guiding public policy. *Journal of Urban Health: Bulletin of the New York Academy of Science*, 83(6), 1151–1157.

Key Points to Ensuring a  
Productive Sexual Health Conversation (1)

- Assess your own comfort discussing sex and identify any biases that you may have.
- Make your patient feel comfortable and establish rapport before asking sensitive questions.
- Use neutral and inclusive terms (e.g., "partner") and pose your questions in a non-judgmental manner.
- Avoid making assumptions. Unless you ask, you cannot know a person's sexual orientation, behaviors, or gender identity.

SOURCE: Altarum Institute, 2016

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## Slide #159

### Key Points to Ensuring a Productive Sexual Health Conversation (1)

Frank and honest discussions of sex, the interconnectivity between sex and substance use, sex without using substances, and safer sex practices are critical. Many of these topics are not generally discussed in polite conversation. Providers need to be comfortable with the information they will be discussing with their patients. Listen to responses without reaction or judgment. Patients will notice if you are uncomfortable hearing their answer to some questions. It might help to practice asking sensitive questions with a friend or colleague to get used to hearing the words in your voice.



#### REFERENCE:

Altarum Institute. (2016). *Sexual Health and Your Patients: A Provider's Guide*. Washington, DC: Author. Available at: <https://nationalcoalitionforsexualhealth.org/tools/for-healthcare-providers/document/ProviderGuide.pdf>.

#### Key Points to Ensuring a Productive Sexual Health Conversation (2)

- Pay attention to your reactions, especially body language and facial expressions, especially if you feel uncomfortable or embarrassed.
- Ask for patient's pronouns. Use those pronouns and support that patient's current gender identity.
- If you are not familiar with a term your patient is using, ask for an explanation.
- Keep things professional and maintain boundaries.

SOURCE: Altarum Institute, 2016

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## Slide #160

### Key Points to Ensuring a Productive Sexual Health Conversation (2)

Some patients may not know the technical terms for the sexual risk behaviors you ask them to describe. Or, patients may use terms that are unfamiliar to you; if in doubt, ask the patient to clarify or explain what is meant by the term being used.

With regards to keeping things professional, the provider should practice re-directing personal questions by (1) asking the person what the answer would mean to them; (2) focusing on the needs of the patient; and (3) clarifying professional roles and boundaries. With regards to maintaining boundaries, the provider can (1) keep focused on them and the information that you are gathering. Tangents may be opportunities for inappropriate comments or behavior; (2) remember that your safety comes first and maintaining boundaries helps to keep the patient safe, as well; and (3) take a break if needed.



#### REFERENCE:

Altarum Institute. (2016). *Sexual Health and Your Patients: A Provider's Guide*. Washington, DC: Author. Available at: <https://nationalcoalitionforsexualhealth.org/tools/for-healthcare-providers/document/ProviderGuide.pdf>.

#### Potential Interactions between Stimulants and HIV Antiretroviral Medications

- Interactions between medications and recreational drugs can **impact the effectiveness** of one or both, and may cause **negative side effects**
- Ritonavir and cobicistat (**HIV boosting agents**) are more likely to interact negatively with central nervous stimulants such as cocaine or methamphetamine
- Ingesting cocaine with **some non-nucleoside reverse transcriptase inhibitors (NNRTIs)** may lead to higher levels of cocaine in the body
- The **first few weeks** of transitioning to a new HIV medication regime present the riskiest time for possible drug-drug interactions

SOURCE: NIDA, 2020

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## Slide #161

### Potential Interactions between Stimulants and HIV Antiretroviral Medications

When two drugs or medications are ingested at the same time, they may interact in a way that impacts their effectiveness and/or causes negative side effects. This can happen with both recreational drugs and medications taken for legitimate medical conditions. Some HIV medications and recreational drugs are processed by the same pathways in the body, which can cause an alteration in the effect of one or both of the drugs when they are ingested at the same time.

The two HIV medications that are most likely to be involved in harmful interactions with drugs such as cocaine and methamphetamine are ritonavir and cobicistat. Both of these medications are called boosting agents, which are taken by people living with HIV to boost the levels of other HIV anti-retroviral medications they take (such as protease inhibitors). The boosting mechanism of ritonavir and cobicistat can slow the processing of recreational drugs in the person's liver, which results in the recreational drug staying in the body for longer or in greater concentrations, causing negative side effects or even an overdose.

(Notes for Slide #161,  
continued)

### Slide #161

## Potential Interactions between Stimulants and HIV Antiretroviral Medications

Taking cocaine with some non-nucleoside reverse transcriptase inhibitors (NNRTIs) may lead to higher levels of cocaine in the body. This applies to efavirenz, nevirapine, and etravirine. And a different kind of interaction may occur with rilpivirine.



### REFERENCE:

Nun. O. (2020, May). *Interactions between HIV Treatment and Recreational Drugs*.

Retrieved June 10, 2020, from

<https://www.aidsmap.com/about-hiv/interactions-between-hiv-treatment-and-recreational-drugs>.


### Slide #162

## PrEP/PEP

**Pre-exposure prophylaxis (or PrEP)** is when people take specific HIV medicines daily to lower their chances of getting infected. Two formulations have been approved for use for PrEP. Both are combinations of two HIV medicines. The first is a combination of tenofovir and emtricitabine and is sold under the name Truvada® (pronounced tru vá duh).

PrEP/PEP

- Pre-exposure prophylaxis (or PrEP): people at high risk for HIV take HIV medicines daily to lower their chances of getting infected through sexual contact
- The CDC reports that PrEP reduces the risk of getting HIV from sex more than 90% (if taken daily)
- Post-exposure prophylaxis (or PEP) means taking ART after being exposed to HIV to prevent infection



SOURCE: CDC, 2020

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**(Notes for Slide #162,  
continued)**

**Slide #162  
PrEP/PEP**

The second is a combination for emtricitabine and tenofovir and is sold under the trade name of Descovy®. Both are approved for daily use as PrEP to help prevent an HIV-negative person from getting HIV from a sexual partner who has HIV. Studies have shown that PrEP is highly effective for preventing HIV if it is used as prescribed. PrEP is much less effective when it is not taken consistently. If PrEP is taken daily, the presence of the medicine in the person's bloodstream can often stop HIV from taking hold and spreading in the body. If PrEP is not taken every day, there may not be enough medicine in the person's bloodstream to block the virus.

PrEP can be prescribed only by a health care provider, so it is important for interested individuals to talk to their provider to see if PrEP is the right HIV prevention strategy. PrEP must be taken daily for it to work. Also, the person must take an HIV test before beginning PrEP to be sure they don't already have HIV, and repeat testing should be done every 3 months.

The cost of PrEP is covered by many health insurance plans, and a commercial medication insurance program provides free PrEP to people with limited income and no insurance to cover PrEP care.

(Notes for Slide #162,  
continued)

## Slide #162 PrEP/PEP

**PEP (post-exposure prophylaxis)** means taking antiretroviral medicines (ART) after being potentially exposed to HIV to prevent becoming infected. PEP should be used only in emergency situations and must be started within 72 hours after a recent possible exposure to HIV. If a person thinks he/she has recently been exposed to HIV during sex, or through sharing needles/equipment to prepare drugs, or if he/she has been sexually assaulted, he/she should talk to a health care provider or an emergency room doctor about PEP right away.



### REFERENCE:

Centers for Disease Control and Prevention. (2020, June 4). *PrEP*. Retrieved June 17, 2020, from <https://www.cdc.gov/hiv/basics/prep.html>.



### IMAGE CREDIT:

CDC website, 2019.

Module 6

## Treatment Considerations for People Who Use Stimulants



### Slide #163

## Module 6: Treatment Considerations for People Who Use Stimulants

Module 6 focuses on treatment considerations for people who use stimulants. Behavioral treatments help engage people in drug abuse treatment, modifying their attitudes and behaviors related to drug abuse and increasing their life skills to handle stressful circumstances and environmental cues that may trigger intense craving for drugs and prompt another cycle of compulsive abuse. Moreover, behavioral therapies can help people remain in treatment longer. Length of time in treatment is the #1 predictor of a successful treatment experience. The longer you can keep a person engaged in treatment, the more likely he/she is to be successful. Behavioral interventions—particularly, cognitive-behavioral therapy—have been shown to be effective for decreasing cocaine use and preventing relapse. Treatment must be tailored to the individual patient's needs in order to optimize outcomes—this often involves a combination of treatment, social supports, and other services. Early engagement techniques should be utilized to ensure that the patient comes back for his/her group and individual sessions. The following section pertains to effective behavioral treatment interventions for stimulant users.

(Notes for Slide #163,  
continued)

### Slide #163

## Module 6: Treatment Considerations for People Who Use Stimulants



***NOTE: People who are engaged in treatment for a substance use disorder are often referred to by a variety of terms, including, but not limited to: patient, client, consumer, participant, recipient, etc. For the purposes of this daylong curriculum, the development team chose to use the term patient. Trainers can feel free to substitute the term patient for a term that is more likely used in his/her region or care setting.***

### **Additional Information for the Trainer:**

Several manuals have been developed for use with people with a cocaine use disorder:

- *Cognitive-Behavioral Approach: Treating Cocaine Addiction (Manual 1)*
- *Community Reinforcement Approach: Treating Cocaine Addiction (Manual 2)*
- *Individual Drug Counseling Approach to Treat Cocaine Addiction: The Collaborative Cocaine Treatment Study Model (Manual 3)*
- *Drug Counseling for Cocaine Addiction: The Collaborative Cocaine Treatment Study Model (Manual 4)*
- *Brief Strategic Family Therapy for Adolescent Drug Abuse (Manual 5)*

## (Notes for Slide #163, continued)

### What Can We Do To Help Angela?



- John has begun getting violent with Angela and she fears for the safety of herself and her children
- She's afraid if she doesn't stop using meth, CPS is going to take her kids away
- Angela doesn't know where to turn, since her mom won't return her calls and her close friends are all fed up with her
- What strengths does Angela have?
- What supports exist in Angela's life/community?
- What are the issues that need to be addressed?
- What providers should be involved in her care?
- What are the top 3 care coordination strategies?

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## Slide #163

### Module 6: Treatment Considerations for People Who Use Stimulants

The manuals are available for download at no cost on the NIDA website. Visit <https://www.drugabuse.gov/drug-topics/cocaine> for more information.

## Slide #164

### What Can We Do To Help Angela?



#### INSTRUCTIONS:

***This is the third time that Angela is mentioned in the training. Distribute copies of the “Participant Handout: Case Study – Angela” to training participants and ask participants to break into small groups of 4-6 people. Read the first three bullets on the slide. Then, ask participants to read the case study in full and discuss the five questions included at the bottom of the slide (the full text for each question is included in the Participant Handout). Give groups 5-7 minutes for a brief discussion. When time is up, bring participants back as a one large group and process answers to the questions in a whole group de-brief. In total, this activity will take approximately 15 minutes.***

(Notes for Slide #164,  
continued)

## Slide #164

### What Can We Do To Help Angela?



#### **INSTRUCTIONS, continued:**

*The de-brief should focus on major issues, service needs, and care coordination strategies. These might include:*

#### **What are the issues that need to be addressed?**

- Increasing meth use
- Social disconnection especially from her mother and close friends
- Domestic violence
- Significant weight loss
- CPS involvement and risk of having children removed

#### **What specific providers should be involved in her care?**

- Substance use treatment provider
- Case manager
- CPS worker
- Medical provider
- Mental health provider
- Shelter/resources for DV

#### **What are the top three case coordination strategies?**

- Cross-system case management
- Integrated treatment planning
- Trauma informed care

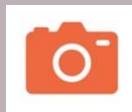
(Notes for Slide #164,  
continued)

## Slide #164

### What Can We Do To Help Angela?



***NOTE TO TRAINER: If it does not come up in the context of the discussion, emphasize talking with Angela to explore her perspectives regarding her strengths, needs, goals, and issues to be addressed and prioritized. What does Angela see as the strengths and supports in her life? What immediate service or treatment needs does Angela identify? What are Angela's long-term goals? What short-term action steps can be taken to move towards them?***



#### **IMAGE CREDIT:**

Purchased Image, Adobe Stock, 2019.

### Diagnostic Challenges (1)

- Are symptoms substance-induced or part of an underlying MH disorder?
  - If very similar symptoms present prior to initiation of substance use, they are likely primary
  - If symptoms go away after period of sustained abstinence, they were likely substance-induced
  - If they persist, it is likely they have an underlying MH disorder
  - What is frequency and intensity of drug use?
- Vital to get accurate history

SOURCES: Chiang et al., 2019; Kline, 2016; Minkes & Brahm, 2016

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## Slide #165

### Diagnostic Challenges (1)

Determining whether presented symptoms are primary or substance induced can be very challenging. Clinicians must rely on three (3) pieces of information:

- **When symptoms first appeared:** if symptoms occurred prior to initiation of substance use, they are more likely to be primary
- **Duration:** if symptoms only occur during intoxication or withdrawal, they are more likely to be substance induced. If they go away with abstinence, they are more likely to be primary.
- **Intensity:** if symptoms are substantially greater than would be expected given frequency and intensity of use, consider the possibility of a primary disorder

For all of these factors, it is critical to get an accurate history of symptoms and substance use. This may be difficult with someone with an active stimulant use disorder (StUD), making accurate diagnosis even more challenging.

(Notes for Slide #165,  
continued)

## Slide #165 Diagnostic Challenges (1)



### REFERENCES:

Chiang, M., Lombardi, D., Du, J., Makrum, U., Sitthichai, R., Harrington, A., ... Fan, X. (2019). Methamphetamine-associated psychosis: Clinical presentation, biological basis, and treatment options. *Human Psychopharmacology*, e2710. doi: 10.1002/hup.2710. Epub 2019 Aug 22.

Kmeic, J., (2018). *Substance Induced Disorders* [PowerPoint slides]. Retrieved June 15, 2020, from <https://www.aoaam.org/resources/Documents/2018%20Convention%20Slides/Monday%20-%2010-8-2018%20-%20130pm%20-%20Co-occurring%20Disorders-%20Substance%20Induced%20vs%20Primary%20Psychiatric%20Disorder%20-%20Kmieciak1.pdf>.

McKee, J., & Brahm, N. (2016). Medical mimics: Differential diagnostic considerations for psychiatric symptoms. *Mental Health Clinician*, 6, 289–296.

### Diagnostic Challenges (2)

Challenges to this approach:

- Sustained abstinence takes time to achieve and maintain
- Relapse to substance use is likely; it is often a part of recovery
- Psychotic symptoms may occur as a symptom of intoxication or withdrawal
- Psychotropic medications have side effects that may mimic symptoms of MH or SUD

SOURCES: Chiang et al., 2019; Kiese, 2018

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## Slide #166

### Diagnostic Challenges (2)

Diagnosis is also challenged by the course of recovery from an SUD:

- Prolonged abstinence is difficult for many people with an SUD to achieve and may take a considerable amount of time.
- Relapse often occurs during treatment. It is unclear what impact continued use may have on determining if a condition is primary or substance induced.
- Psychotic symptoms may occur as a symptom of intoxication or withdrawal. The individual may present with very different symptomatology from session to session.
- Drug use can mimic mental health symptoms and medications for mental and physical health treatments can mimic symptoms of substance use and/or other mental health symptoms.



### REFERENCES:

Chiang, M., Lombardi, D., Du, J., Makrum, U., Sitthichai, R., Harrington, A., ... Fan, X. (2019). Methamphetamine-associated psychosis: Clinical presentation, biological basis, and treatment options. *Human Psychopharmacology*, e2710. doi: 10.1002/hup.2710. Epub 2019 Aug 22.

## (Notes for Slide #166, continued)

## Slide #166 Diagnostic Challenges (2)



### REFERENCES:

Kmeic, J., (2018). *Substance Induced Disorders* [PowerPoint slides]. Retrieved June 15, 2020, from <https://www.aoaam.org/resources/Documents/2018%20Convention%20Slides/Mondays%20-%2010-8-2018%20-%20130pm%20-%20Co-occurring%20Disorders-%20Substance%20Induced%20vs%20Primary%20Psychiatric%20Disorder%20-%20Kmieciak1.pdf>.

### Diagnostic Challenges (3)

- Limited research data exists on how much time must pass to consider a symptom as having been substance-induced. For instance:
  - Cocaine-induced hallucinations or depression may linger even after abstinence has been established
  - Meth-induced psychosis or depression may very transient or last for several months or longer. For some these symptoms may never remit.

SOURCES: Glaser-Edwards, & Moolenaar, 2014  
Saber et al., 1991

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## Slide #167 Diagnostic Challenges (3)

A lack of consensus exists for how long a person should be abstinent before making a primary diagnosis:

- The DSM-5 says substance-induced disorders should remit after about a month. However, brain research shows that the changes from stimulants may persist for a year or more.
- Cocaine-induced psychotic symptoms can last from a few hours to days or weeks
- Likewise, mental health symptoms from methamphetamine can last for months, and for some may become permanent

(Notes for Slide #167,  
continued)

**Slide #167**  
**Diagnostic Challenges (3)**



**REFERENCES:**

Glasner-Edwards, S., & J. Mooney, L. J. (2014). Methamphetamine psychosis: Epidemiology and management. *CNS Drugs*, 28, 1115–1126.

Satel, S. L., Southwick, S. M., & Gawin, F. H. (1991). Clinical features of cocaine-induced paranoia. *American Journal of Psychiatry*, 148, 495–498.

**Slide #168**  
**Diagnostic Challenges (4)**

Managing individuals who present with psychotic symptoms can be challenging. Additionally, there are no large randomized clinical trials of pharmacotherapeutic regimens for the treatment of acute stimulant induced psychosis. Therefore, recommendations are based on clinical practice but fall short of evidence-based clinical guidelines.

Diagnostic Challenges (4)

- Recommendation:
  - At intake/program admission, treat the presenting symptoms
  - May not know etiology at treatment initiation
  - Example: rx meds to address psychotic or depression symptoms
  - Discuss diagnostic challenge with treatment team
  - Explain the diagnostic challenge to the client/patient and enlist their help

SOURCE: Glasner-Edwards & Mooney, 2014

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(Notes for Slide #168,  
continued)

## Slide #168

### Diagnostic Challenges (4)

Recommendations include:

- Get as much information as possible at intake and identifying symptoms
- Develop a treatment plan that includes medical and psychosocial interventions that address psychotic symptoms according to patient needs and safety issues. Treatment will likely begin before providers are certain of the etiology of the symptoms.
- Discuss diagnostic challenges and associated treatment issues with the treatment team
- Elicit the patient help to continually gather more information and move toward resolution of diagnostic ambiguity
  - To the extent possible, explain the difficulty of making accurate diagnosis to the patient and get buy-in from him/her, i.e., “It’s hard to know exactly what is causing what right now. It will be easier to tell when you have some time without alcohol or drugs in your brain. How about if we start with working on reducing your alcohol/drug use, and at the same time see if we can also reduce your (depression/anxiety/paranoia, etc.)?”

(Notes for Slide #168,  
continued)

Diagnostic Challenges (5)

- As patient proceeds in treatment, the etiology of their symptoms should become clearer
- The longer they are abstinent or using minimally and symptoms persist, the more likely that they have a non-substance induced MH disorder
- There will be diagnostic uncertainties, so be prepared to revise your diagnoses and treatment plans over time

How is your tolerance of ambiguity?

SOURCE: Ling et al., 2013 169

**Slide #168**  
**Diagnostic Challenges (4)**



**REFERENCE:**

Glasner-Edwards, S., & J. Mooney, L. J. (2014). Methamphetamine psychosis: Epidemiology and management. *CNS Drugs*, 28, 1115–1126.

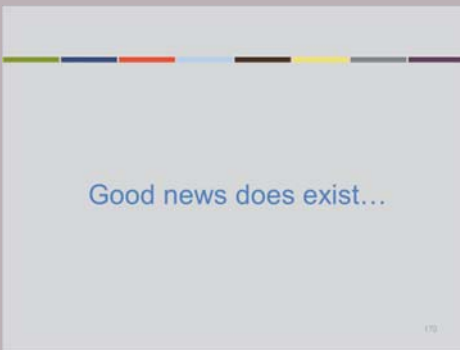
**Slide #169**  
**Diagnostic Challenges (5)**

Keeping the patient engaged in treatment should lead to clarity around diagnosis and treatment, especially as he/she is able to achieve longer periods of abstinence. Ling and colleagues reported that for many people who use stimulants, psychotic symptoms resolve fairly quickly, often in as little as a week. Initial diagnoses should be considered provisional and clinicians should be willing to revise them and the treatment plan as more information becomes available.



**REFERENCE:**

Ling W., Mooney, L., & Rawson, R. A. (2013). Amphetamine-type stimulants. In B. S. McCrady & E. E. Epstein (Eds.), *Addictions: A comprehensive guidebook, second edition* (pp. 174-190). New York, NY: Oxford University Press.



### Slide #170

#### Good news does exist...

Good news does exist with regards to the brain's ability to heal after prolonged use of central nervous stimulants.



### Slide #171

#### Healing is Possible



#### INSTRUCTIONS:

***This slide contains a movie clip that will play automatically when the trainer clicks on the black box. In order for this to work, the connection between the PowerPoint presentation and the video file must be maintained. When moving the PowerPoint file to another location on your computer or to another computer, make sure to always move the video file along with it. If the link becomes broken, the video will need to be reinserted. Delete the black box. From the insert menu in PowerPoint, select "movie." Select the video file that was included for this training. When asked, indicate that the movie should play automatically. It will appear as a black box on the screen. The video should play when the slide show is being viewed when the trainer clicks on the black box.***

(Notes for Slide #171,  
continued)

## Slide #171 Healing is Possible

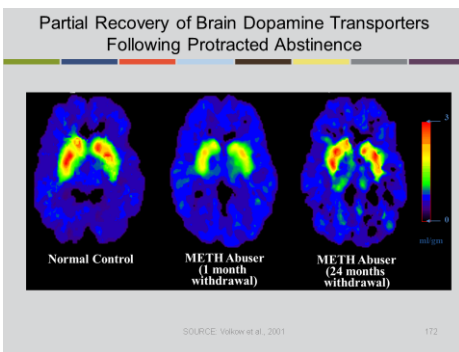
Video Length: 3 minutes, 30 seconds.

This short video clip provides some personal accounts of individual experiences of recovery.



### VIDEO SOURCE:

Meyers, E. (Director). (2008). *Meth Inside Out: Healing*. [Film]. Los Angeles, CA: Eyes of the World Media Group. Available at: <https://vimeo.com/uclaisap>.



## Slide #172 Partial Recovery of Brain Dopamine Transporters Following Protracted Abstinence

It would be unethical to give a human being who has never been exposed to methamphetamine a dose of the drug to see what happens to his/her brain. So when brain imaging researchers wish to study the effects of methamphetamine on the human brain, they match non-using controls to methamphetamine users (by gender, age, socioeconomic status, etc.). In this study, researchers examined the PET scans of chronic methamphetamine abusers [currently we would say person with a methamphetamine use disorder] who had achieved two years of abstinence from methamphetamine.

(Notes for Slide #172,  
continued)

### Slide #172

#### Partial Recovery of Brain Dopamine Transporters Following Protracted Abstinence

The scans showed a return to virtually normal dopamine levels. While this is good news, and suggests that the brain has an amazing ability to repair itself, the subjects in the study did not regain all of the lost cognitive function associated with the damage, which could suggest an incomplete recovery. While the fact that the brain recovers is good news, the not-so-good news is that the recovery takes months, not days. Treatment and recovery are long-term processes.



#### REFERENCE:

Volkow, N. D., Chang, L., Wang, G. L., Fowler, J. S., Franceschi, D., Sedler, M., ... Logan, J. (2001). Loss of dopamine transporters in methamphetamine abusers recovers with protracted abstinence. *The Journal of Neuroscience*, 21(23), 9414–9418.

### Slide #173

#### Treatments for Stimulant Use Disorder – What Do We Know?

This next section of Module 6 provides a review of behavioral interventions that have been shown to be effective with people who use stimulants.

Treatments for Stimulant Use  
Disorder – What Do We Know?

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#### Are there Medications for the Treatment of Stimulant Use Disorder?

- The short answer is **NO**.
- There are a few medicines that have had positive results in clinical trials.
- To date, these medicines have not demonstrated reproducible results
- Much more research is needed to determine the overall efficacy of these medicines.

SOURCE: Skolnick, 2015

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### Slide #174

#### Are There Medications for the Treatment of Stimulant Use Disorder?

No FDA-approved medications exist for the treatment of stimulant use disorder. Many compounds have been studied in formal clinical trials, and some have show positive results. However, to date, none have show consistent and reproducible results for primary outcome measures (abstinence, reduced use, or improved treatment retention).

Much more research is needed to determine if any of these yield results that could lead to FDA approval for the treatment of StUD. The medications that have shown some positive results are reviewed in the following slides.



#### REFERENCE:

Skolnick, P. (2015). Emerging targets for stimulant use disorders: Where to invest in an era of constrained resources? *CNS & Neurological Disorders - Drug Targets*, 14, 691.

#### Medications Considered for Cocaine Use Disorder

A recent meta analysis of medication trials found no strong/consistent evidence for cocaine abstinence, reducing use, or improving treatment retention. Strongest evidence for **bupropion**, **psychostimulants**, **topiramate** for abstinence and **antipsychotics** for retention.

##### Other research has found some evidence for:

- Modafinil (dopamine agonist)
- Disulfiram
- Propranolol
- Buprenorphine+naltrexone

SOURCES: Chan et al., 2019; Kampman, 2019; Shorter & Kosten, 2011; Poling et al., 2008

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### Slide #175

#### Medications Considered for Cocaine Use Disorder

A few medicines that have been approved for other conditions have show some evidence of efficacy for cocaine use disorder.

(Notes for Slide #175,  
continued)

## Slide #175

### Medications Considered for Cocaine Use Disorder

The strongest evidence to date includes bupropion (an antidepressant), psychostimulants (ADHD) and topiramate (anticonvulsant/neurologic pain) for increasing abstinence and antipsychotics for increasing treatment retention.



#### REFERENCES:

Chan, B., Kondo, K., Ayers, C., Freeman, M., Montgomery, J., Paynter, R., & Kansagara, D. (2018). *Pharmacotherapy for Stimulant Use Disorders: A Systematic Review*. Washington, DC: U.S. Department of Veterans Affairs.

Kampman, K. M. (2019). The treatment of cocaine use disorder. *Science Advances*, 5, eaax1532.

Shorter, D., & Kosten, T. R. (2011). Novel pharmacotherapeutic treatments for cocaine addiction. *BMC Medicine*, 9, 119–127.

Poling, J., Oliveto, A., Petry, N., Sofuoglu, A. M., Gonsai, K., Gonzalez, G., ... Kosten, T. R. (2006). Six-month trial of bupropion with contingency management for cocaine dependence in a methadone-maintained population. *Archives of General Psychiatry*, 63, 219–228.

**Medications Considered for  
Methamphetamine Use Disorder**

A recent meta analysis of medication trials found no strong/consistent evidence for MA abstinence, reducing use, or improving treatment retention.

**Some evidence found to support**

- Methylphenidate
- Topiramate (better if abstinent at treatment entry)
- Bupropion (better in low severity users)
- Mirtazapine
- Naltrexone

SOURCES: Chan, et al., 2019  
Chan, et al., 2018

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## Slide #176

### Medications Considered for Methamphetamine Use Disorder

A few medicines that are approved for other conditions have shown some evidence of efficacy for methamphetamine use disorder. Evidence suggests that methylphenidate and topiramate may be useful for reducing stimulant use.

Additionally, bupropion (an antidepressant), and topiramate (anticonvulsant/neurologic pain) may help prevent relapse in abstinent patients.



#### REFERENCES:

Chan, B., Freeman, M., Kondo, K., Ayers, C., Montgomery, J., Paynter, R., & Kansagara, D. (2019). Pharmacotherapy for methamphetamine/ amphetamine use disorder—a systematic review and meta-analysis. *Addiction*, 114, 2122–2136.

Chan, B., Kondo, K., Ayers, C., Freeman, M., Montgomery, J., Paynter, R., & Kansagara, D. (2018). *Pharmacotherapy for Stimulant Use Disorders: A Systematic Review*. Washington, DC: U.S. Department of Veterans Affairs.

**Treatments for Stimulant Use Disorder (StUD) with Empirical Support**

- Contingency Management/Incentives (CMI)
- Community Reinforcement Approach (CRA)
- Cognitive-Behavioral Therapy (CBT)

Other approaches with interest:

- Matrix Model
- Motivational Interviewing
- Physical Exercise
- Mindfulness Meditation

SOURCES: AshaRani et al. 2020;  
Rawson et al. 2015; Palco et al. 2014;  
Rawson et al. 2008

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## Slide #177

### Treatments for Stimulant Use Disorder (StUD) with Empirical Support

A recent meta-analysis of behavioral treatments for methamphetamine use disorder indicate that Contingency Management is far superior to all other treatments. The effect may be improved by combining with Community Reinforcement Approach or Cognitive Behavioral Therapy. Previous research has provided some evidence for motivational interviewing, physical exercise, mindful meditation, and the Matrix Model.



#### REFERENCES:

AshaRani, P. V., Hombali, A., Seow, E., Ong, W. J., Tan, J. H., & Subramaniam, M. (2020). Non-pharmacological interventions for methamphetamine use disorder: a systematic review. *Drug and Alcohol Dependence*, 212, 108060.

Rawson, R. A., Chudzynski, J., Mooney, L., Gonzales, R., Ang, A., Dickerson, D., ... Cooper, D. B. (2015). Impact of an exercise intervention on methamphetamine use outcomes post-residential treatment care. *Drug and Alcohol Dependence*, 156, 21–28.

(Notes for Slide #177,  
continued)



### Slide #177

## Treatments for Stimulant Use Disorder (StUD) with Empirical Support



### REFERENCES:

Polcin, D. L., Bond, J., Korcha, R., Nayak, M. B., Galloway, G. P., & Evans, K. (2014). Randomized trial of intensive motivational interviewing for methamphetamine dependence. *Journal of Addictive Disease*, 33, 253–265.

Rawson, R. A., Marinelli-Casey, P., Anglin, M. D., Dickow, A., Frazier, Y., Gallagher, C., ... Methamphetamine Treatment Project Corporate Authors (2004). A multi-site comparison of psychosocial approaches for the treatment of methamphetamine dependence. *Addiction (Abingdon, England)*, 99(6), 708–717.

### Slide #178

## Group Activity: What Would You Say or Do?



### INSTRUCTIONS:

**Refer to the Case Scenarios Participant Handout. Included on this document is a series of seven clinical scenarios. Break the audience into small groups of 4-6 participants. Assign a specific case scenario to each group.**

(Notes for Slide #178,  
continued)

Slide #178

Group Activity: What Would You Say or Do?



INSTRUCTIONS, continued:

***Ask the groups to pick someone to read the scenario out loud, and then, as a group, discuss what you would say or do if you were leading the group session. After 5-7 minutes, bring the groups back into one large group, and do a whole group de-brief. This activity should take no longer than 15 minutes.***

Managing Craving for Stimulants: A Central  
Task of Treating Stimulant Use Disorder

Key Components

- Classical conditioning and craving
- The brain and addiction
- Craving is involuntary and creates a powerful push to use
- For many, the craving seems overpowering and uncontrollable.
- The craving is triggered by external (people, places, things, times of day) and internal (emotional states) stimuli.
- Managing exposure to triggers and responses to triggers is important

SOURCES: UNODC, 2019; Rounsaville et al., 2002; CSAT, 1999

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Slide #179

Managing Craving for Stimulants: A  
Central Task of Treating Stimulant Use  
Disorder

Helping the patient to deal with cravings is a major component of helping someone with a stimulant use disorder. Educating patients about cravings can help him/her/them understand where cravings come from and to develop strategies for effectively dealing with them, such as:

- Educating patient about classical (Pavlovian) conditioning and the association with cravings
- Educating patient about how their brain functions to provide rewards and how stimulants alter this functioning

(Notes for Slide #179,  
continued)

### Slide #179

## Managing Craving for Stimulants: A Central Task of Treating Stimulant Use Disorder

Craving is an involuntary response and creates a powerful push toward stimulant use. For most, craving is overpowering and seem uncontrollable. Many patients do not understand how cravings are triggered by external and internal stimuli through associations made from classical conditioning. One of the most important tasks, particularly in early recovery, is to manage exposure and responses to triggers.



### REFERENCES:

United Nations Office of Drugs and Crime. (2019). *Treatment of Stimulant Use Disorders: Current Practices and Promising Perspectives*. Vienna, Austria: Author. Available at: [https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment of PSUD for website 24.05.19.pdf](https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment_of_PSUD_for_website_24.05.19.pdf).

Rawson, R. A., Gonzales, R., & Brethen, P. (2002). Treatment of methamphetamine use disorders: an update. *Journal of Substance Abuse Treatment*, 23(2), 145–150.

(Notes for Slide #179,  
continued)

### Slide #179

## Managing Craving for Stimulants: A Central Task of Treating Stimulant Use Disorder



### REFERENCES:

Center for Substance Abuse Treatment.  
(1999). *Treatment of Stimulant Use  
Disorders: Treatment Improvement  
Protocol Series, No. 33*. Rockville, MD:  
Substance Abuse Mental Health Service  
Administration. Available at:  
<http://adaiclearinghouse.net/downloads/TIP-33-Treatment-for-Stimulant-Use-Disorders-61.pdf>.

### Slide #180

## Triggers

Triggers are all of the environmental and emotional stimuli that have become associated with stimulant use. When people encounter triggers, they create a seemingly automatic craving response and places him/her/them at significant risk for use. Learning to identify triggers ahead of time and to avoid them whenever possible is critical. Planning and rehearsing response strategies to unexpected triggers and/or cravings can help the person to gain control over their thoughts and behaviors in order to delay use long enough for the trigger to subside.

### Triggers

- "Triggers" are people, places, things, times of day, emotions that have been associated with stimulant use
- When a person who used stimulants comes in contact with these triggers they "automatically" begin to crave drugs and are at risk to use

SOURCES: UNODC, 2010; Rawson, et al., 2002; CSAT, 1999

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(Notes for Slide #180,  
continued)

## Slide #180 Triggers



### REFERENCES:

United Nations Office of Drugs and Crime. (2019). *Treatment of Stimulant Use Disorders: Current Practices and Promising Perspectives*. Vienna, Austria: Author. Available at: [https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment of PSUD for website 24.05.19.pdf](https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment%20of%20PSUD%20for%20website%2024.05.19.pdf).

Rawson, R. A., Gonzales, R., & Brethen, P. (2002). Treatment of methamphetamine use disorders: an update. *Journal of Substance Abuse Treatment*, 23(2), 145–150.

Center for Substance Abuse Treatment. (1999). *Treatment of Stimulant Use Disorders: Treatment Improvement Protocol Series, No. 33*. Rockville, MD: Substance Abuse Mental Health Service Administration. Available at: <http://adaiclearinghouse.net/downloads/TIP-33-Treatment-for-Stimulant-Use-Disorders-61.pdf>.

Do People Who Use  
Methamphetamine Respond  
Differently to Treatment than People  
Who Use Cocaine?

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Response to Behavioral Treatments:  
Cocaine vs. Methamphetamine

- In published research studies where treatment response to behavioral treatments have been compared with cocaine users vs meth users, there has been **no evidence of differential response** for the following interventions:
  - Matrix Model
  - Contingency Management
  - Community Treatments

SOURCES: Luchansky et al., 2007; Roll et al., 2006;  
Copleland & Sorenson, 2001; Huber et al., 1997

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## Slide #181

### Do People Who Use Methamphetamine Respond Differently to Treatment than People Who Use Cocaine?

This sub-section of Module 6 compares the treatment response of people who use methamphetamine vs. people who use cocaine.

## Slide #182

### Response to Behavioral Treatments: Cocaine vs. Methamphetamine

Several research studies have been conducted looking at treatment outcomes for cocaine and methamphetamine users with a variety of behavioral interventions. These studies have shown similar outcomes regardless of which stimulant is being used. Therefore, as we discuss treatment issues, we will discuss treatment of stimulant use disorders generally as they can be applied to both methamphetamine and cocaine users equally.



## REFERENCES:

Luchansky, B., Krupski, A., & Stark, K. (2007). Treatment response by primary drug of abuse: does methamphetamine make a difference? *Journal of Substance Abuse Treatment*, 32(1), 89–96.

## Contingency Management (also known as Motivational Incentives)

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### Psychosocial Interventions for Cocaine and Psychostimulant Amphetamine-Related Disorders

- Twenty-seven randomized controlled studies (3,663 participants) fulfilled inclusion criteria and had data that could be used for at least one of the main comparisons.
- Compared different behavioral interventions for retention in treatment and reducing stimulant use.
- Results showed using some form of **contingency management showed better results** both for reducing dropouts and lowering stimulant use.

SOURCES: Haidich, 2010; Knapp, et al., 2007

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## Slide #183

### Contingency Management (also known as Motivational Incentives)

The following section reviews Contingency Management (also known as Motivational Incentives) in more detail.

## Slide #184

### Psychosocial Interventions for Cocaine and Psychostimulant Amphetamine-Related Disorders

A meta-analysis is a formal, study designed to assess previous research studies to determine what a body of research says about a particular topic. The benefits of conducting a meta-analysis include consolidating and conducting a new quantitative review of a large, complex, and sometimes conflicting studies to determine collective outcomes across the studies. This kind of analysis helps to understand conclusions that can be drawn from studies conducted across time on a particular topic/subject area.

Knapp and colleagues conducted a meta-analysis of 27 studies involving over 3,600 patients. The studies included multiple behavioral interventions designed to increase treatment retention and reduce stimulant use. The authors concluded that interventions that included some form of contingency management performed better than those without CM in reducing dropouts and lowering stimulant use.

(Notes for Slide #184,  
continued)

**Slide #184**

**Psychosocial Interventions for Cocaine  
and Psychostimulant Amphetamine-  
Related Disorders**



**REFERENCES:**

Haidich A. B. (2010). Meta-analysis in medical research. *Hippokratia*, 14(Suppl 1), 29–37.

Knapp, W. P., Soares, B., Farrell, M., & Silva de Lima, M. (2007). Psychosocial interventions for cocaine and psychostimulant amphetamines related disorders. *Cochrane Database of Systematic Reviews*, Issue 3. Art. No.: CD003023.

**Slide #185**

**Psychosocial Interventions for Cocaine  
and Amphetamine Use Disorder**

De Crescenzo and colleagues conducted a meta-analysis of 50 clinical studies involving nearly 7,000 patients and a dozen different behavioral interventions for stimulants. They concluded that the most effect and most acceptable interventions for both short and long treatment were a combination of contingency management (CM) and community reinforcement approach (CRA).

**Psychosocial Interventions for Individuals with  
Cocaine and Amphetamine Use Disorder**

- Meta-analysis of 50 clinical studies (6,943 participants) on 12 different psychosocial interventions for cocaine and/or amphetamine addiction.
- The **combination of contingency management and community reinforcement approach**, was the most efficacious and most acceptable treatment both in the short and long term.

SOURCE: De Crescenzo et al., 2018

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(Notes for Slide #185,  
continued)

Responding to Global Stimulant Use:  
Challenges and Opportunities

- Psychosocial interventions [other than contingency management](#) have weak and non-specific effects on stimulant problems
- No effective pharmacotherapies have been approved
- Substantial research investment is needed to develop more effective, innovative, and impactful prevention and treatment

SOURCE: Farrell et al., 2019

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**Slide #185**

**Psychosocial Interventions for Cocaine and Amphetamine Use Disorder**



**REFERENCE:**

De Crescenzo, F., Ciabattini, M., D'Alò, G. L., De Giorgi, R., Del Giovane, C., Cassar, C., ... Cipriani, A. (2018). Comparative efficacy and acceptability of psychosocial interventions for individuals with cocaine and amphetamine addiction: A systematic review and network meta-analysis. *PLoS Medicine*, 15(12), e1002715.

**Slide #186**

**Responding to Global Stimulant Use:  
Challenges and Opportunities**

In another review published in the journal *Lancet*, Farrell and colleagues found support for utilization of contingency management, as well. They further noted that other behavioral interventions had little effect on stimulant use disorders. The authors called for substantial investment in research to develop innovative and impactful treatment and prevention interventions for stimulant use disorders.

## (Notes for Slide #186, continued)

### Contingency Management (1)

- Based on pioneering work of Steven Higgins & colleagues at the University of Vermont
- Very powerful approach for achieving initial abstinence from numerous drugs of abuse
- Clients adhering to targeted behavior (i.e. drug abstinence, attendance, attending job training, etc) are positively reinforced

SOURCES: Davis et al., 2016;  
Higgins & Petry, 1999

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## Slide #186

### Responding to Global Stimulant Use: Challenges and Opportunities



#### REFERENCE:

Farrell, M., Martin, N. K., Stockings, E., Bórquez, A., Cepeda, J. A., Degenhardt, L., ... McKetin, R. (2019). Responding to global stimulant use: challenges and opportunities. *Lancet (London, England)*, 394(10209), 1652–1667.

## Slide #187

### Contingency Management (1)

So, what is contingency management (CM)? CM was developed by Dr. Steve Higgins. He found that systematically applying reinforcers to specific target behaviors was very effective in helping individuals with a substance use disorder achieve abstinence and maintain other behaviors that are associated with treatment success.



#### REFERENCES:

Davis, D. R., Kurti, A. N., Skelly, J. M., Redner, R., White, T. J., & Higgins, S. T. (2016). A review of the literature on contingency management in the treatment of substance use disorders, 2009-2014. *Preventive Medicine*, 92, 36–46.

(Notes for Slide #187,  
continued)

**Slide #187**  
**Contingency Management (1)**



**REFERENCES:**

Higgins, S. T., & Petry, N. M. (1999). Contingency management. Incentives for sobriety. *Alcohol Research & Health: The Journal of the National Institute on Alcohol Abuse and Alcoholism*, 23(2), 122–127.

Contingency Management (2)

Theory

- Substance use is maintained in part through operant conditioning – euphoria provides positive reinforcement
- Alleviation of withdrawal symptoms provides negative reinforcement (increasing a behavior by taking away something aversive)
- Thus, we need a reinforcement paradigm powerful enough to combat the positive and negative reinforcement that keeps people who use stimulants coming back for more

SOURCE: NIDA, 2009

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**Slide #188**  
**Contingency Management (2)**

Contingencies work by changing the reinforcement associated with substance use. Substance use is maintaining because the sensations associated with the substance are powerfully reinforcing. The alleviation and removal of withdrawal symptoms is also a strong negative reinforce (i.e., reinforcement is experienced through the removal of aversive experience). In order to combat these positive and negative reinforcers, we need new powerful reinforcers that encourage an individual NOT to use the substance.

(Notes for Slide #188,  
continued)

**Slide #188**  
**Contingency Management (2)**



**REFERENCE:**

National Institute on Drug Abuse. (2020, June 1). *Contingency Management Interventions/Motivational Incentives (Alcohol, Stimulants, Opioids, Marijuana, Nicotine)*. Retrieved June 1, 2020, from <https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/evidence-based-approaches-to-drug-addiction-treatment/behavioral-therapies/contingency-management-interventions-motivational-incentives>.

**Contingency Management (3)**

A technique employing the systematic delivery of positive reinforcement for desired behaviors. In the treatment of methamphetamine dependence, vouchers or prizes can be “earned” for submission of methamphetamine-free urine samples.

SOURCE: NIDA, 2020

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**Slide #189**  
**Contingency Management (3)**

To counter the reinforcing aspects of substance use, Higgins developed a set of techniques for the delivery of positive reinforcers for behaviors that help to move the person forward in treatment. For people who use methamphetamine, reinforcers are most commonly provided for methamphetamine-negative urine samples. However, they have also been applied to treatment attendance or other observable components of treatment.

## (Notes for Slide #189, continued)

## Slide #189 Contingency Management (3)



### REFERENCE:

National Institute on Drug Abuse. (2020, June 1). *Contingency Management Interventions/Motivational Incentives (Alcohol, Stimulants, Opioids, Marijuana, Nicotine)*. Retrieved June 1, 2020, from <https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/evidence-based-approaches-to-drug-addiction-treatment/behavioral-therapies/contingency-management-interventions-motivational-incentives>.

### Contingency Management (4) Principles of Higgins' CM approach

- Drug use **and** abstinence must be swiftly and accurately detected
- Abstinence is positively reinforced
- Drug use results in loss of reinforcement (**not** punishment)
- Emphasis on development of reinforcers that compete with reinforcers of drug use

SOURCE: NIDA, 2020

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## Slide #190 Contingency Management (4)

In order to be effective, reinforcement must be provided accurately and consistently. Therefore, substance use/abstinence must be quickly and accurately detected. If the patient is abstinent, he/she will receive a reinforcement. If use is detected, the patient is not given a reinforcement; he/she is also not given a punishment. The goal of the intervention is to develop a reinforcement schedule that competes with the reinforcing effects of substance use.

(Notes for Slide #190,  
continued)

**Slide #190**

**Contingency Management (4)**



**REFERENCE:**

National Institute on Drug Abuse. (2020, June 1). *Contingency Management Interventions/Motivational Incentives (Alcohol, Stimulants, Opioids, Marijuana, Nicotine)*. Retrieved June 1, 2020, from <https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/evidence-based-approaches-to-drug-addiction-treatment/behavioral-therapies/contingency-management-interventions-motivational-incentives>.

**Slide #191**

**Contingency Management (5)**

So the quickest and most direct way of determining if someone has used or not is through regular urine testing (UAs).

Methamphetamine and cocaine stay in a person's system for about three days. By testing three times a week, a provider can get a fairly continuous read on use. UAs should be conducted on site so that immediate feedback can be provided to patient. If the results are negative, the person receives reinforcement in the form of points or vouchers. These points/vouchers can then be redeemed for items consistent with treatment goals (movie tickets, groceries, sporting goods, etc.).

Contingency Management (5)  
Principles of Higgins' CM approach

- Urine specimens required 3x/week
- UA's conducted on-site
- Abstinence (measured by urinalysis) reinforced with a voucher system
- Patients receive points redeemable for items consistent with a drug-free lifestyle, such as movie tickets, grocery vouchers, sporting goods, but never cash

SOURCE: NIDA, 2020

(Notes for Slide #191,  
continued)

## Slide #191 Contingency Management (5)

Most programs do not give cash. Some programs use gift cards as reinforcers.



### REFERENCE:

National Institute on Drug Abuse. (2020, June 1). *Contingency Management Interventions/Motivational Incentives (Alcohol, Stimulants, Opioids, Marijuana, Nicotine)*. Retrieved June 1, 2020, from <https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/evidence-based-approaches-to-drug-addiction-treatment/behavioral-therapies/contingency-management-interventions-motivational-incentives>.

### CM in Practice: Challenges

- Must be simple
  - Easy to track target behaviors
  - Little burden on the counselor or administrative staff (can't reward patients and punish staff)

SOURCE: NIDA, 2020

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## Slide #192 CM in Practice: Challenges

One of the challenges in implementing contingency management is determining the right target behaviour to reinforce. It must be readily observable and easy to track, so that it can be consistently reinforced each time it occurs. Examples of behaviours commonly used include providing a substance negative urine sample or group attendance. Additionally, the procedures must be simple for staff to follow without significantly increasing their work burden. It is a bad outcome if the patient gets rewarded but the staff feel punished.

## (Notes for Slide #192, continued)

## Slide #192 CM in Practice: Challenges



### REFERENCE:

National Institute on Drug Abuse. (2020, June 1). *Contingency Management Interventions/Motivational Incentives (Alcohol, Stimulants, Opioids, Marijuana, Nicotine)*. Retrieved June 1, 2020, from <https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/evidence-based-approaches-to-drug-addiction-treatment/behavioral-therapies/contingency-management-interventions-motivational-incentives>.

### CM in Practice: More Challenges

- Addressing staff resistance
  - Patients should not have to be “paid” or “bribed”; recovery is the reward
  - Motivation needs to come from within
- Reframe CM as an engagement and retention technique along with traditional interventions and approaches

SOURCE: NIDA, 2020

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## Slide #193 CM in Practice: More Challenges

Staff are sometimes resistant to the idea of using reinforcement in treatment. They complain that paying people not to use is a bad idea because they should want to stop using drugs without being bribed. They feel that the patients’ motivation should come from within rather than from outside using reinforcement. Reminding staff that we all do things that we find rewarding in some way—consider, for instance, the positive feeling that you get when you help someone, or the pay check that you get when you show up for work. It is often easier for staff to understand if we define CM as an engagement and retention strategy that can be used along with other elements of behavioral treatments.

## (Notes for Slide #193, continued)

## Slide #193 CM in Practice: More Challenges



### REFERENCE:

National Institute on Drug Abuse. (2020, June 1). *Contingency Management Interventions/Motivational Incentives (Alcohol, Stimulants, Opioids, Marijuana, Nicotine)*. Retrieved June 1, 2020, from <https://www.drugabuse.gov/publications/principles-drug-addiction-treatment-research-based-guide-third-edition/evidence-based-approaches-to-drug-addiction-treatment/behavioral-therapies/contingency-management-interventions-motivational-incentives>.

### Contingency Management Apps

- **DynamiCare** Health is a platform for families and individuals that reinforces a person's recovery from addiction and rewards healthy behavior. DynamiCare's easy-to-use technology includes random breath and saliva tests submitted through the app, verified treatment attendance check-ins, a supportive Recovery Coach, rewards for healthy progress, and a dashboard for supporters. [www.dynamicarehealth.com](http://www.dynamicarehealth.com).
- **reSET** is a 90-day Prescription Digital Therapeutic (PDT) for Substance Use Disorder (SUD) intended to provide cognitive behavioral therapy (CBT), as an adjunct to a contingency management system, for patients 18 years of age and older who are currently enrolled in outpatient treatment. FDA approved. <https://www.resetforrecovery.com>.

SOURCES: DynamiCare Health, 2020;  
Pear Therapeutics, 2020

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## Slide #194 Contingency Management Apps

SUD treatment programs can set up their own monitoring and tracking system to manage CM activities with their patients. Online management systems are available. While these programs have fees involved, they make management of CM quick, easy, and straightforward. Two notable examples that have been well tested are DynamiCare and reSET.

(Notes for Slide #194,  
continued)

## Slide #194 Contingency Management Apps



### REFERENCES:

DynamiCare Health. (2020, June 18). *Our Program*. Retrieved on June 18, 2020, from <https://www.dynamicarehealth.com/info>.

Pear Therapeutics. (2020, June 18). *reSET-O/reSET*. Retrieved on June 18, 2020, from <https://www.resetforrecovery.com>.

## Slide #195 Community Reinforcement Approach (CRA)

As noted above, Contingency Management has been shown to be the most consistently effective intervention with stimulant users. In the meta analysis conducted by De Crescenzo and colleagues, effects are improved when contingency management (CM) and community reinforcement approach (CRA) are combined.

Community Reinforcement  
Approach (CRA)

SOURCE: De Crescenzo et al., 2018

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## (Notes for Slide #195, continued)

### Slide #195

## Community Reinforcement Approach (CRA)



### REFERENCE:

De Crescenzo, F., Ciabattini, M., D'Alò, G. L., De Giorgi, R., Del Giovane, C., Cassar, C., ... Cipriani, A. (2018). Comparative efficacy and acceptability of psychosocial interventions for individuals with cocaine and amphetamine addiction: A systematic review and network meta-analysis. *PLoS Medicine*, 15(12), e1002715.

### Slide #196

## Community Reinforcement Approach

Community Reinforcement Approach (CRA) combines several behavioural strategies to identify what reinforcers (contingencies) in the environment encourage or discourage substance use. CRA seeks to change the contingencies to make not using more rewarding than using. In looking at this strategies, it becomes clear why adding an additional set of contingencies for not using (CM) would augment the standard CRA program.

### Community Reinforcement Approach

- Community Reinforcement Approach (CRA) is a combination of behavioral strategies to
  - Identify the role of environmental contingencies in encouraging or discouraging substance use
  - Rearrangement of these contingencies so that a non-substance using life is more rewarding than a using one.

SOURCES: Meyers et al., 2011; Budney & Higgins, 1998

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## (Notes for Slide #196, continued)

## Slide #196 Community Reinforcement Approach



### REFERENCES:

Meyers, R. J., Roozen, H. G., & Smith, J. E. (2011). The community reinforcement approach: an update of the evidence. *Alcohol Research & Health: The Journal of the National Institute on Alcohol Abuse and Alcoholism*, 33(4), 380–388.

Budney, A. J., & Higgins, S. T. (1998). *Therapy Manuals for Drug Addiction: A Community Reinforcement Plus Vouchers Approach: Treating Cocaine Addiction*. NIH Publication Number 98-4309. Washington, DC: National Institute on Drug Abuse.

## Slide #197 Components of CRA

CRA includes a mix of behavioral interventions, including behavioral skills training.



### REFERENCES:

Meyers, R. J., Roozen, H. G., & Smith, J. E. (2011). The community reinforcement approach: an update of the evidence. *Alcohol Research & Health: The Journal of the National Institute on Alcohol Abuse and Alcoholism*, 33(4), 380–388.

### Components of CRA

- CRA Components include:
  - behavioral skills training
  - social and recreational counseling
  - marital therapy
  - motivational enhancement
  - job counseling
  - relapse prevention
- For application to the treatment of cocaine dependence, a [voucher based reinforcement program is added](#).

SOURCES: Meyers et al., 2011; Budney & Higgins, 1998

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## (Notes for Slide #197, continued)

## Slide #197 Components of CRA



### REFERENCES:

Budney, A. J., & Higgins, S. T. (1998). *Therapy Manuals for Drug Addiction: A Community Reinforcement Plus Vouchers Approach: Treating Cocaine Addiction*. NIH Publication Number 98-4309. Washington, DC: National Institute on Drug Abuse.

## Slide #198 Evidence for Community Reinforcement Approach

Evidence for  
Community Reinforcement Approach

- Comparing CRA to standard drug treatment:
  - Increased rates of treatment completion
  - Greater rates of abstinence during treatment
- CRA in combination with CM:
  - Were more likely to complete treatment
  - Had longer continuous abstinence during treatment
  - Had more improved measures of drug/psych problems
- CRA in combination with CM:
  - Reduced use of cocaine during treatment
  - Improved psychological and employment functioning during treatment and at 6-month follow up

SOURCES: DeCoster et al., 2010; Higgins et al., 2003; Copeland & Sorenson, 2001; Higgins et al., 1994; Higgins et al., 1993

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In looking at the research literature, there is considerable support for CRA. For stimulant use, most of the research has been done with cocaine users. However, given the findings of Copeland & Sorenson and other research described above (see slide 182) that people who cocaine do not differ in their response to treatment from those using methamphetamine, it is reasonable to apply this research to all stimulant users. CRA alone was found to lead to longer periods of abstinence during treatment and increase treatment completion. CRA in combination with CM was found to increase treatment retention, lead to longer periods of abstinence; reduce amount used; and improve measures of drug and psychological problems.

(Notes for Slide #198,  
continued)

## Slide #198

### Evidence for Community Reinforcement Approach



#### REFERENCES:

De Crescenzo, F., Ciabattini, M., D'Alò, G. L., De Giorgi, R., Del Giovane, C., Cassar, C., ... Cipriani, A. (2018). Comparative efficacy and acceptability of psychosocial interventions for individuals with cocaine and amphetamine addiction: A systematic review and network meta-analysis. *PLoS Medicine*, 15(12), e1002715.

Higgins, S. T., Sigmon, S. C., Wong, C. J., Heil, S. H., Badger, G. J., Donham, R., ... Anthony, S. (2003). Community reinforcement therapy for cocaine-dependent outpatients. *Archives of General Psychiatry*, 60(10), 1043–1052.

Copeland, A. L., & Sorensen, J. L. (2001). Differences between methamphetamine users and cocaine users in treatment. *Drug and Alcohol Dependence*, 62(1), 91–95.

Higgins, S. T., Budney, A. J., Bickel, W. K., Foerg, F. E., Donham, R., & Badger, G. J. (1994). Incentives improve outcome in outpatient behavioral treatment of cocaine dependence. *Archives of General Psychiatry*, 51(7), 568–576.

(Notes for Slide #198,  
continued)

### Slide #198

## Evidence for Community Reinforcement Approach



### REFERENCES:

Higgins, S. T., Budney, A. J., Bickel, W. K., Hughes, J. R., Foerg, F., & Badger, G. (1993). Achieving cocaine abstinence with a behavioral approach. *The American Journal of Psychiatry*, 150(5), 763–769.

### Other Behavioral Interventions with Research Support

- Cognitive Behavioral Therapy/  
Relapse Prevention
- Motivational Interviewing
- Matrix Model
- Exercise
- Mindfulness

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### Slide #199

## Other Behavioral Interventions with Research Support

The next section of Module 6 reviews other behavioral interventions with research support, including: Cognitive Behavioral Therapy/Relapse Prevention, motivational interviewing, the Matrix Model, exercise, and mindfulness.

### Cognitive Behavioral Therapy and Relapse Prevention

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### Slide #200

## Cognitive Behavioral Therapy and Relapse Prevention

The next behavioral intervention to be reviewed in more detail is Cognitive Behavioral Therapy/Relapse Prevention.

### Cognitive Behavioral Therapy (CBT)

- Underlying assumption = **learning processes** play an important role in the **development and continuation** of a stimulant use disorder
- CBT attempts to help patients **recognize** the situations in which they are most likely to use stimulants, **avoid** these situations when appropriate, and **cope** more effectively with a range of problems and problematic behaviors associated with substance use.
- CBT is **compatible with** a range of other treatments patients may receive, such as pharmacotherapy.
- Also known as **Relapse Prevention**

SOURCE: NIDA, 2016; Carroll, 1998

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## Slide #201

### Cognitive Behavioral Therapy (CBT)

Cognitive Behavioral Therapy (CBT) seeks to help patients recognize, avoid, and cope with the situations in which they are most likely to use drugs. Thoughts cause feelings and behaviors, not external things, like people, situations, and events. You can change the way a person thinks to feel or act better even if the situation does not change.

CBT is a short-term, evidenced-based, focused approach which has been used to help individuals with substance abuse disorders. CBT is a flexible, individualized approach that can be adapted to a wide range of patient and treatment settings. CBT emphasizes learning of skills to be used to achieve abstinence, and addresses other problems, including initiation and mastery of skills through practice, role playing, and extra-sessions tasks. NIDA published a CBT manual, which can be downloaded from: <https://archives.drugabuse.gov/sites/default/files/cbt.pdf>.

## (Notes for Slide #201, continued)

### Slide #201

#### Cognitive Behavioral Therapy (CBT)



#### REFERENCES:

National Institute on Drug Abuse. (2016, May 6). *Cocaine*. Retrieved May 14, 2020, from

<https://www.drugabuse.gov/publications/research-reports/cocaine/what-cocaine>.

Carroll, K., M. (1998). *Therapy Manuals for Drug Addiction: A Cognitive-Behavioral Approach: Treating Cocaine Addiction*.

NIH Publication Number 98-4308.

Washington, DC: National Institute on Drug Abuse. Available at:

<https://archives.drugabuse.gov/sites/default/files/cbt.pdf>.

#### What CBT Skills can Clinicians Use when Working with People Who Use Stimulants?

- Functional analysis and patterns of use
- Coping with craving
- Addressing and resolving ambivalence
- Refusal skills
- Seemingly irrelevant decisions
- Planning for emergencies
- Problem solving skills
- HIV/HCV risk reduction

SOURCES: McHugh et al., 2010;  
Carroll, 1998; Carroll et al., 1994

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### Slide #202

#### What CBT Skills can Clinicians Use when Working with People Who Use Stimulants

This slide lists the CBT skills that clinicians can use with patients who use stimulants.

Key skills for people who use stimulants include:

- Analyzing the patterns of use and conducting a functional analysis to determine what the person hoped to gain by using, what the outcome of the use was, and alternative strategies for meeting the need
- Identifying early signs of a craving developing and learning strategies to cope with the craving until it passes

(Notes for Slide #202,  
continued)

## Slide #202

### What CBT Skills can Clinicians Use when Working with People Who Use Stimulants

- Recognizing ambivalence to change and helping the patient resolve the ambivalence in the direction of change
- Learning drug refusal techniques and helping the patient develop skills through practice including role play
- Making connection between seemingly irrelevant decisions and how these compound to lead the person toward drug related behaviors
- Planning for emergency situations and strategies for respond to them without using
- Developing strategies and skills for problem solving; specific in-session practices and role play can be very helpful in developing these skills
- Identifying risk for HIV and Hepatitis C and developing strategies to reduce risk



#### REFERENCES:

McHugh, R. K., Hearon, B. A., & Otto, M. W. (2010). Cognitive behavioral therapy for substance use disorders. *The Psychiatric Clinics of North America*, 33(3), 511–525.

(Notes for Slide #202,  
continued)

## Slide #202

### What CBT Skills can Clinicians Use when Working with People Who Use Stimulants



#### REFERENCES:

Carroll, K., M. (1998). *Therapy Manuals for Drug Addiction: A Cognitive-Behavioral Approach: Treating Cocaine Addiction*. NIH Publication Number 98-4308. Washington, DC: National Institute on Drug Abuse. Available at: <https://archives.drugabuse.gov/sites/default/files/cbt.pdf>.

Carroll, K. M., Rounsaville, B. J., Nich, C., Gordon, L. T., Wirtz, P. W., & Gawin, F. (1994). One-year follow-up of psychotherapy and pharmacotherapy for cocaine dependence. Delayed emergence of psychotherapy effects. *Archives of General Psychiatry*, 51(12), 989–997.

## Slide #203

### Relapse Prevention: Overview

Relapse prevention is a CBT intervention that is focused on preventing return to substance use, and managing any return to use so that patients can continue in care and working toward achieving treatment goals.

#### Relapse Prevention Overview

##### Goals:

1. Prevent lapse or initial return to substance use (or whatever behavior is being addressed), so that a full-blown relapse (return to problematic use) is less likely.
2. Successful management of relapse episodes if they do occur, to prevent exacerbation or continuation of substance use.

SOURCES: Carroll & Rawson, 2006;  
Carroll, 1998

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(Notes for Slide #203,  
continued)

## Slide #203

### Relapse Prevention: Overview



#### REFERENCES:

Carroll, K. M., & Rawson, R. A. (2005). Relapse Prevention for Stimulant Dependence. In G. A. Marlatt & D. M. Donovan (Eds.), *Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behaviors, Second Edition*. (pp. 130-150). New York, NY: The Guilford Press.

Carroll, K., M. (1998). *Therapy Manuals for Drug Addiction: A Cognitive-Behavioral Approach: Treating Cocaine Addiction*. NIH Publication Number 98-4308. Washington, DC: National Institute on Drug Abuse. Available at: <https://archives.drugabuse.gov/sites/default/files/cbt.pdf>.

## Slide #204

### Relapse Prevention: Theory and Key Constructs

One of the key constructs for relapse prevention is identifying high-risk situations for either reinitiating stimulant use or exacerbating use. Identifying both interpersonal risk and intrapersonal risk such as emotions and thoughts.

Relapse Prevention  
Theory and Key Constructs

- High-risk situation = Any situation that poses a threat for resumed or excessive substance use. Includes:
  - Intrapersonal
  - Interpersonal

SOURCE: Donovan, 1999

(Notes for Slide #204,  
continued)

**Slide #204**

**Relapse Prevention: Theory and Key  
Constructs**



**REFERENCE:**

Donovan, D. M. (1999). Assessment Strategies and Measures in Addictive Behaviors. In B. S. McCrady and E. E. Epstein (Eds.), *A Comprehensive Guidebook* (pp. 187-215). New York, NY: Oxford University Press.

Relapse Prevention  
Risk Situations

- In analysis of >300 initial relapses to cigarettes, alcohol, heroin use, gambling, or overeating, over 70% related to:
  - **Negative emotional states** (intrapersonal) such as anger, boredom, anxiety, frustration, depression accounted for 35% of relapses.
  - **Social pressure** (direct or indirect verbal pressure) accounted for 20%.
  - **Interpersonal conflict** (ongoing conflictual relationships or recent conflict) accounted for 16%.

SOURCE: Donovan, 1999

**Slide #205**

**Relapse Prevention: Risk Situations**

In a study of relapse to cigarettes, alcohol, heroin, gambling, or overeating, investigators found that 70% of the relapses were related to 3 risk factors:

- Negative emotional states (35%)
- Social pressure (20%)
- Interpersonal conflict (16%)



**REFERENCE:**

Donovan, D. M. (1999). Assessment Strategies and Measures in Addictive Behaviors. In B. S. McCrady and E. E. Epstein (Eds.), *A Comprehensive Guidebook* (pp. 187-215). New York, NY: Oxford University Press.

### Relapse Prevention Setting Treatment Goals

- Client chooses whether to pursue goal of abstinence or moderation (may not have this choice in controlled settings).
- Therapist offers guidance but does not make the decision for the client.
- Harm reduction perspective postulates that reducing from abusive use to moderate use is a step in the right direction and should be reinforced by therapist.

SOURCE: Carroll & Rawson, 2005

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## Slide #206

### Relapse Prevention: Setting Treatment Goals

Relapse prevention should be patient-driven. The patient determines the goal when possible. They often choose moderation, rather than abstinence as a goal. Providers should be willing to start with this goal and see what progress can be made. The therapist's role is to offer guidance and direction, but not to make decisions for the patient. Reducing use moves the patient in the right direction and may be enough for the patient to achieve what he/she wants. If it does not help them achieve desired outcomes, then new goals can be established. Again, the goal may be increased moderation or it may be abstinence.



#### REFERENCE:

Carroll, K. M., & Rawson, R. A. (2005). Relapse Prevention for Stimulant Dependence. In G. A. Marlatt & D. M. Donovan (Eds.), *Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behaviors, Second Edition*. (pp. 130-150). New York, NY: The Guilford Press.

## Motivational Interviewing

### Motivational Interviewing (MI)

- "...a directive, client-centered method for enhancing intrinsic motivation for change by exploring and resolving ambivalence (Miller & Rollnick, 2002).
- "...a way of being with a client, not just a set of techniques for doing counseling" (Miller and Rollnick, 1991).
- Studies demonstrated reduction in stimulant use with motivational interviewing

SOURCES: Pomeroy et al., 2014;  
Miller & Rollnick, 2012; Stein et al., 2009

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## Slide #207

### Motivational Interviewing

The next behavioral intervention to be reviewed in more detail is Motivational Interviewing.

## Slide #208

### Motivational Interviewing (MI)

Compared with non-directive counseling, motivational interviewing is more focused and goal-directed. The examination and resolution of ambivalence is its central purpose, and the counselor is intentionally directive in pursuing this goal.

### Additional Information for the Trainer regarding the "MI Spirit":

The spirit of MI can be characterized in a few key points. The following information was excerpted directly from

<https://motivationalinterviewing.org/>:

***Motivation to change is elicited from the patient, and not imposed from without.*** Other motivational approaches have emphasized coercion, persuasion, constructive confrontation, and the use of external contingencies (e.g., the threatened loss of job or family). Such strategies may have their place in evoking change, but they are quite different in spirit from motivational interviewing which relies upon identifying and mobilizing the patient's intrinsic values and goals to stimulate behavior change.

(Notes for Slide #208,  
continued)

## Slide #208

### Motivational Interviewing (MI)

Compared with non-directive counseling, motivational interviewing is more focused and goal-directed. The examination and resolution of ambivalence is its central purpose, and the counselor is intentionally directive in pursuing this goal.

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***It is the patient's task, not the counselor's, to articulate and resolve his or her ambivalence.*** Ambivalence takes the form of a conflict between two courses of action (e.g., indulgence versus restraint), each of which has perceived benefits and costs associated with it.

(Notes for Slide #208,  
continued)

**Slide #208**

**Motivational Interviewing (MI)**

Many patients have never had the opportunity of expressing the often confusing, contradictory, and uniquely personal elements of this conflict, for example, *"If I stop smoking I will feel better about myself, but I may also put on weight, which will make me feel unhappy and unattractive."* The counselor's task is to facilitate expression of both sides of the ambivalence impasse, and guide the patient toward an acceptable resolution that triggers change.

***Direct persuasion is not an effective method for resolving ambivalence.*** It is tempting to try to be "helpful" by persuading the patient of the urgency of the problem about the benefits of change. It is fairly clear, however, that these tactics generally diminish the probability of change (Miller, Benefield and Tonigan, 1993, Miller and Rollnick, 1991).

***The counseling style is generally a quiet and eliciting one.*** Direct persuasion, aggressive confrontation, and argumentation are the conceptual opposite of motivational interviewing and are explicitly proscribed in this approach. To a counselor accustomed to confronting and giving advice, motivational interviewing can appear to be a hopelessly slow and passive process. The proof is in the outcome.

(Notes for Slide #208,  
continued)

## Slide #208

### Motivational Interviewing (MI)

More aggressive strategies, sometimes guided by a desire to "confront patient denial," easily slip into pushing patients to make changes for which they are not ready.

***The counselor is directive in helping the patient to examine and resolve ambivalence.*** Motivational interviewing involves no training of patients in behavioral coping skills, although the two approaches not incompatible. The operational assumption in motivational interviewing is that ambivalence or lack of resolve is the principal obstacle to be overcome in triggering change. Once that has been accomplished, there may or may not be a need for further intervention such as skill training. The specific strategies of motivational interviewing are designed to elicit, clarify, and resolve ambivalence in a patient-centered and respectful counseling atmosphere.

***Readiness to change is not a patient trait, but a fluctuating product of interpersonal interaction.*** The therapist is therefore highly attentive and responsive to the patient's motivational signs. Resistance and "denial" are seen not as patient traits, but as feedback regarding therapist behavior.

(Notes for Slide #208,  
continued)

## Slide #208

### Motivational Interviewing (MI)

Patient resistance is often a signal that the counselor is assuming greater readiness to change than is the case, and it is a cue that the therapist needs to modify motivational strategies.

***The therapeutic relationship is more like a partnership or companionship than expert/recipient roles.*** The therapist respects the patient's autonomy and freedom of choice (and consequences) regarding his or her own behavior.



#### REFERENCES:

Polcin, D. L., Bond, J., Korch, R., Nayak, M. B., Galloway, G. P., & Evans, K. (2014). Randomized trial of intensive motivational interviewing for methamphetamine dependence. *Journal of Addictive Diseases*, 33(3), 253–265.

Miller, W. R., & Rollnick, S. (2012). *Motivational Interviewing: Helping People Change, 3<sup>rd</sup> Edition*. New York, NY: The Guilford Press.

Stein, M. D., Herman, D. S., & Anderson, B. J. (2009). A motivational intervention trial to reduce cocaine use. *Journal of Substance Abuse Treatment*, 36(1), 118–125.

### MI: Basic Principles and Micro-Skills

- Motivational Interviewing Principles:
  - Express empathy
  - Develop discrepancy
  - Roll with resistance
  - Support self-efficacy
- Motivational Interviewing Micro-Skills (OARS):
  - Open-Ended Questioning
  - Affirming
  - Reflective Listening
  - Summarizing

SOURCE: Miller & Rollnick, 2012

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## Slide #209

### MI: Basic Principles and Micro-Skills

The strategic goals of MI are to: (a) resolve ambivalence; (b) avoid eliciting or strengthening resistance; (c) elicit “Change Talk” from the patient; (d) enhance motivation and commitment for change; and (e) help the patient move through the Stages of Change. A series of MI micro-skills (which will be described on the next slide) can be used to move a patient through the Stages of Change to elicit and reinforce self-motivational statements (a.k.a., Change Talk).

**Empathy** may be the most crucial principle. It creates an environment conducive to change, instills a sense of safety and a sense of being understood and accepted, and reduces defensiveness. Empathy sets the tone within which the entire communication occurs. Without it, other components may sound like mechanical techniques.

By **developing discrepancy**, the clinician can help the patient to become more aware of the discrepancy between their addictive behaviors and their more deeply-held values and goals. Part of this is helping patient to recognize and articulate negative consequences of use. It is more effective if the *patient* does this, not the clinician.

(Notes for Slide #209,  
continued)

## Slide #209

### MI: Basic Principles and Micro-Skills

With regards to **rolling with resistance**, in general, it is not helpful to argue with patients. Confrontation elicits defensiveness, which predicts a lack of change. It is particularly counter-therapeutic for a clinician to argue that there is a problem while the patient argues that there isn't one. The patient does not need to accept a diagnostic label (e.g. "addict" or "alcoholic") for change to occur.

**Supporting self-efficacy** can be conceptualized as a specific form of optimism, that is, a "can-do" belief in one's ability to accomplish a particular task or change. This principle is crucial to help the patient see and experience his/her own ability to make positive changes. Part of this is the *clinician* believing in the patient's ability to change.

**Open-ended questions:** (a) solicits information in a neutral way; (b) helps the person elaborate his/her own view of the problem and brainstorm possible solutions; (c) helps the therapist avoid prejudgments; (d) keeps communication moving forward; (e) allows the patient to do most of the talking.

(Notes for Slide #209,  
continued)

## Slide #209

### MI: Basic Principles and Micro-Skills

**Affirmations** should be focused on achievements of the individual, and are intended to: (a) support the individual's persistence; (b) encourage continued efforts; (c) assist the individual in seeing the positive in the situation; and (d) support the individual's proven strengths.

With **reflective listening**, one should: (a) listen to both what the person says and to what the person means; (b) check out assumptions; (c) create an environment of empathy (nonjudgmental); and (d) be aware of intonation (statement, not question). The clinician does not have to agree with the patient.

**Summaries** capture both sides of the ambivalence (You say that \_\_\_\_\_ but you also mentioned that \_\_\_\_\_.) They demonstrate the clinician has been listening carefully. Summaries also prompt clarification and further elaboration from the person. Lastly, summaries prepare patients to move forward.



#### REFERENCE:

Miller, W. R., & Rollnick, S. (2012). *Motivational Interviewing: Helping People Change, 3<sup>rd</sup> Edition*. New York, NY: The Guilford Press.



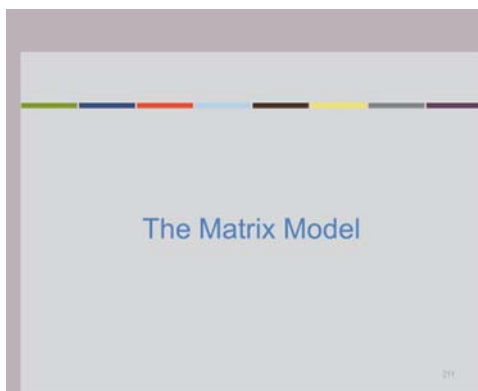
## Slide #210

### Group Activity: MI Skills in Practice



#### INSTRUCTIONS:

*If time permits, refer back to the Case Scenarios Participant Handout. Included on this document is a series of brief prompts. Break the audience into small groups of 4-6 participants. Assign a prompt to each group. Ask half of the groups to write 3-5 open-ended questions that could be used to engage the patient in a conversation to address the issue highlighted in the prompt. Ask the other half of the groups to write 3-5 reflections that could be used to engage the patient in continuing the conversation to address the issue highlighted in the prompt. After 5-7 minutes, bring the groups back into one large group, and do a whole group debrief. This activity should take no longer than 15 minutes.*



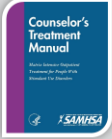
## Slide #211

### The Matrix Model

The next behavioral intervention to be reviewed in more detail is the Matrix Model.

Behavioral Approach:  
Matrix Model

- 16-week **intensive outpatient** treatment was modestly better treatment as as usual to improve retention and reduce methamphetamine use
- Therapist functions as **teacher and coach**
- Incorporates a variety of approaches
  - CBT
  - CM
  - MI
  - 12-Step Facilitation
  - Family Involvement
  - Person-centered therapy



SOURCES: CSAT, 2000; Rawson, et al., 2004

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## Slide #212

### Behavioral Approach: Matrix Model

The Matrix Model is an intensive, outpatient treatment approach for individuals with substance use disorders, which was developed through 30 years of experience in real-world treatment settings. The intervention integrates aspects of several treatment approaches, including cognitive-behavioral therapy, contingency management, motivational interviewing, 12-step facilitation, family involvement, and supportive/person-centered therapy. Core components consist of early recovery groups, relapse-prevention groups, family education, social-support groups, and individual counseling delivered over a 16-week period. Clients learn about issues critical to addiction and relapse, such as cue-induced craving and related behaviors. Clients also receive direction and support from a trained therapist, become familiar with self-help programs, and are monitored for drug use by urine and breath testing. Family members receive education to help understand and support the recovery process.

The therapist functions simultaneously as teacher and coach, fostering a positive, encouraging relationship with the client and using that relationship to reinforce positive behavior change. The interaction between the therapist and the client is realistic and direct, but not confrontational or paternalistic.

(Notes for Slide #212,  
continued)

## Slide #212

### Behavioral Approach: Matrix Model

Therapists are trained to conduct treatment sessions in a way that promotes self-esteem, dignity, and self-worth.

The Matrix Model Manual can be downloaded from:

<https://store.samhsa.gov/product/Matrix-Intensive-Outpatient-Treatment-for-People-With-Stimulant-Use-Disorders-Counselor-s-Treatment-Manual/SMA13-4152>.



#### REFERENCES:

Center for Substance Abuse Treatment. (2006). *Counselor's Treatment Manual: Matrix Intensive Outpatient Treatment for People With Stimulant Use Disorders*. HHS Publication No. (SMA) 13-4152. Rockville, MD: Substance Abuse and Mental Health Services Administration.

Rawson, R. A., Marinelli-Casey, P., Anglin, M. D., Dickow, A., Frazier, Y., Gallagher, C., ... Methamphetamine Treatment Project Corporate Authors (2004). A multi-site comparison of psychosocial approaches for the treatment of methamphetamine dependence. *Addiction (Abingdon, England)*, 99(6), 708–717.

(Notes for Slide #212,  
continued)

**Slide #212**

**Behavioral Approach: Matrix Model**



**IMAGE CREDIT:**

SAMHSA, Matrix Model Manual cover, 2013.

Self-Reported Methamphetamine Use by  
Treatment Condition (MTP)

- The SAMHSA-funded Methamphetamine Treatment Project (MTP) is the largest randomized clinical trial of treatments for methamphetamine (MA) dependence
- Compared the Matrix Model to with treatments- usual (TAU) in eight community out-patient settings in the Western United States.
- Those in the Matrix treatment condition attended more clinical sessions, stayed in treatment longer, provided more MA-free urine samples during treatment, and had longer periods of MA abstinence.
- Effect only during active treatment and not maintained a follow up.

SOURCE: Rawson et al., 2004

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**Slide #213**

**Self-Reported Methamphetamine Use  
by Treatment Condition (MTP)**

**Aims:** The Center for Substance Abuse Treatment (CSAT) Methamphetamine Treatment Project (MTP) is the largest randomized clinical trial of treatments for methamphetamine (MA) dependence to date. The objective of the study was to compare the Matrix Model, a manualized treatment method, with treatments-as-usual (TAU) in eight community out-patient settings in the Western United States.

**Design:** Over an 18-month period between 1999 and 2001, 978 treatment seeking, MA-dependent people were randomly assigned to receive either TAU at each site or a manualized 16-week treatment (Matrix Model).

**Setting:** The study was conducted as an eight-site out-patient trial, with six sites located in California and one each in Montana and Hawaii.

(Notes for Slide #213,  
continued)

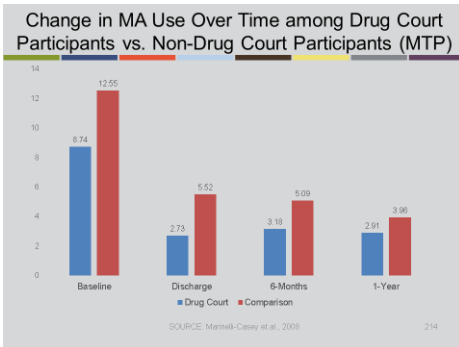
### Slide #213

#### Behavioral Approach: Matrix Model

**Findings:** In the overall sample, and in the majority of sites, those who were assigned to Matrix treatment attended more clinical sessions, stayed in treatment longer, provided more MA-free urine samples during the treatment period and had longer periods of MA abstinence than those assigned to receive TAU. Measures of drug use and functioning collected at treatment discharge and 6 months post-admission indicate significant improvement by participants in all sites and conditions when compared to baseline levels, but the superiority of the Matrix approach did not persist at these two time points.

**Conclusions:** Study results demonstrate a significant initial step in documenting the efficacy of the Matrix approach. Although the superiority of the Matrix approach over TAU was not maintained at the post-treatment time points, the in-treatment benefit is an important demonstration of empirical support for this psychosocial treatment approach.

(Notes for Slide #213,  
continued)



**Slide #213**

**Behavioral Approach: Matrix Model**



**REFERENCE:**

Rawson, R. A., Marinelli-Casey, P., Anglin, M. D., Dickow, A., Frazier, Y., Gallagher, C., ... Methamphetamine Treatment Project Corporate Authors (2004). A multi-site comparison of psychosocial approaches for the treatment of methamphetamine dependence. *Addiction (Abingdon, England)*, 99(6), 708–717.

**Slide #214**

**Change in MA Use Over Time among Drug Court Participants vs. Non-Drug Court Participants (MTP)**

Relatively little is known about the impact of drug court treatment programs for methamphetamine (MA) dependence. This article examines treatment performance among a subsample of 287 MA-dependent adults who participated in the Methamphetamine Treatment Project from 1999 to 2001. To gain a preliminary indication of MA users' response to drug court intervention, we compared a group of 57 MA-dependent participants treated in outpatient treatment within the context of a drug court to a group of comparable MA-dependent individuals treated in outpatient treatment but not supervised by a drug court (n = 230).

(Notes for Slide #214,  
continued)

### Slide #214

#### Change in MA Use Over Time among Drug Court Participants vs. Non-Drug Court Participants (MTP)

Analyses reveal that drug court participation was associated with better rates of engagement, retention, completion, and abstinence, compared to outpatient treatment without drug court supervision. Six- and 12-month outcome analyses indicated that participants who were enrolled in drug court intervention used MA significantly less frequently. These findings suggest that drug court supervision coupled with treatment may improve the outcomes of MA dependent offenders beyond that seen from treatment alone.



#### REFERENCE:

Marinelli-Casey, P. Gonzales, R., Hillhouse, M., Ang, A., Zweben, J., Cohen, J., ... Methamphetamine Treatment Project Corporate Authors. (2008). Drug court treatment for methamphetamine dependence: Treatment response and posttreatment outcomes. *Journal of Substance Abuse Treatment*, 34, 242–248.

Getting Off: A Behavioral Treatment Intervention  
for Gay and Bisexual Men Who Use Methamphetamine

Contingency Management (CM):

- Provide increasingly valuable reinforcers for urine samples documenting drug abstinence

Gay-specific Cognitive Behavioral Therapy (GCBT):

- Cognitive Behavioral strategies for instilling abstinence and preventing relapse in a gay-specific HIV risk reduction intervention



SOURCES: Reback et al., 2014;  
Shoptaw et al., 2005

## Slide #215

### Getting Off: A Behavioral Treatment Intervention for Gay and Bisexual Men Who Use Methamphetamine

Gay-Specific Cognitive Behavioral Therapy (GCBT): CBT that is culturally tailored to address gay-specific issues, and emphasizes HIV risk reduction. At Friends Getting Off, formerly Friends La Brea, is a community-based outpatient treatment program located at Friends Community Center, a division of Friends Research Institute, Inc. The program offers CM+GCBT to help gay and bisexual men to stop using methamphetamine and to change risk behavior related to HIV and other substance use. Since 2007, the *Getting Off* Intervention has been adopted by multiple other community-based treatment programs.

The *Getting Off* Manual can be downloaded from: [http://uclacbam.org/wp-content/uploads/2018/04/Getting\\_Off\\_Behavioral\\_Treatment\\_Manual.pdf](http://uclacbam.org/wp-content/uploads/2018/04/Getting_Off_Behavioral_Treatment_Manual.pdf).



#### REFERENCES:

Reback, C. J., Veniegas, R., & Shoptaw, S. (2014). Getting Off: Development of a model program for gay and bisexual male methamphetamine users. *Journal of Homosexuality*, 61, 540–553.

(Notes for Slide #215,  
continued)

**Slide #215**

**Getting Off: A Behavioral Treatment  
Intervention for Gay and Bisexual Male  
Methamphetamine Users**



**REFERENCES:**

Shoptaw, S., Reback, C. J., Peck, J. A., Larkins, S., Freese, T. E., & Rawson, R. A. (2005). *Getting Off: A Behavioral Intervention for Gay and Bisexual Male Methamphetamine Users*. Los Angeles, CA: Friends Research Institute, Inc. Available at: [http://uclacbam.org/wp-content/uploads/2018/04/Getting\\_Off\\_Behavioral\\_Treatment\\_Manual.pdf](http://uclacbam.org/wp-content/uploads/2018/04/Getting_Off_Behavioral_Treatment_Manual.pdf).



**IMAGE CREDIT:**

UCLA ISAP, Getting Off Treatment Manual Cover, 2005.

**Slide #216**

**A Gay-Specific Cognitive Behavioral  
Therapy Intervention**

The Gay-Specific Cognitive Behavioral Therapy (GCBT) intervention is based upon the theoretical concepts of CBT and relapse prevention therapy, and includes eight core elements.

A Gay-Specific Cognitive Behavioral  
Therapy Intervention

In addition to cognitive behavioral therapy, the gay  
specific treatment intervention (GCBT) focused on:

- Gay culture (bars/clubs, social and sexual  
contexts)
- Gay identity (multiple stigmas, internalized  
homophobia → low self-esteem, shame, guilt)
- Gay sex (sex-drug link; conditioned response)
- HIV
- Recreating a gay life independent from  
methamphetamine use

SOURCES: Reback et al., 2014;  
Shoptaw et al., 2005.

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(Notes for Slide #216,  
continued)

## Slide #216

### A Gay-Specific Cognitive Behavioral Therapy Intervention

The elements are: (1) Matrix Intensive Outpatient Treatment for Stimulant Use Disorders; (2) HIV prevention; (3) use of small-group sessions; (4) identification of methamphetamine use and sexual risk situations; (5) retaining participants who test positive for methamphetamine use; (6) referral of participants to higher levels of substance use disorder treatment as indicated; (7) delivery of the intervention by a counselor trained in CBT principles; and (8) supervision of counselors by a clinically trained project director.



#### REFERENCES:

Reback, C. J., Veniegas, R., & Shoptaw, S. (2014). Getting Off: Development of a model program for gay and bisexual male methamphetamine users. *Journal of Homosexuality*, 61, 540–553.

Shoptaw, S., Reback, C. J., Peck, J. A., Larkins, S., Freese, T. E., & Rawson, R. A. (2005). *Getting Off: A Behavioral Intervention for Gay and Bisexual Male Methamphetamine Users*. Los Angeles, CA: Friends Research Institute, Inc. Available at: [http://uclacbam.org/wp-content/uploads/2018/04/Getting\\_Off\\_Behavioral\\_Treatment\\_Manual.pdf](http://uclacbam.org/wp-content/uploads/2018/04/Getting_Off_Behavioral_Treatment_Manual.pdf).

## Physical Exercise

### Slide #217

#### Physical Exercise

The next section of Module 6 will examine the impact of physical exercise as a treatment for use of stimulants.

### Exercise for Methamphetamine Dependence Study Design

Research has demonstrated benefit of aerobic exercise for improving depression, anxiety, cognitive deficits, and substance use outcomes.

#### **Methods:**

- All 135 study participants received treatment as usual for MUD in a residential treatment program
- They were randomly assigned to either:
  - an 8-week, 3x/week structured aerobic and resistance exercise intervention
  - an 8-week health education condition.
- Outcome measure collected through study enrollment and for 12 weeks follow-up.

SOURCES: Ravonni et al., 2015;  
Mooney et al., 2014

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### Slide #218

#### Exercise for Methamphetamine Dependence Study Design

**Background:** Effective pharmacotherapies to treat methamphetamine (MA) dependence have not been identified, and behavioral therapies are marginally effective. Based on behavioral studies demonstrating the potential efficacy of aerobic exercise for improving depressive symptoms, anxiety, cognitive deficits, and substance use outcomes, the study described here is examining exercise as a potential treatment for MA-dependent individuals.

**Methods:** This study is randomizing 135 participants with MA dependence at a residential treatment facility for addictive disorders to receive either a thrice-weekly structured aerobic and resistance exercise intervention or a health education condition.

(Notes for Slide #218,  
continued)

### Slide #218

#### Exercise for Methamphetamine Dependence Study Design

Seeking evidence for a possibly effective adjunct to traditional behavioral approaches for treatment of MA dependence, this study assessed the ability of an 8-week aerobic and resistance exercise protocol to reduce relapse to MA use during a 12-week follow-up period after discharge from residential-based treatment.



#### REFERENCES:

Rawson, R. A., Chudzynski, J., Mooney, L., Gonzales, R., Ang, A., Dickerson, D., ... Cooper, C.B. (2015). Impact of an exercise intervention on methamphetamine use outcomes post-residential treatment care. *Drug Alcohol Dependence*, 156, 21–28.

Mooney, L. J., Cooper, C., London, E.D., Chudzynski, J., Dolezal, B., Dickerson, D., ... Rawson, R. (2014). Exercise for methamphetamine dependence: Rationale, design, and methodology. *Contemporary Clinical Trials*, 37, 139–147.

### Does Exercise Improve Outcomes Post-Treatment?

- Yes!
- Fewer exercise participants returned to meth use compared to the education participants at 1-, 3-, and 6-months post-discharge (not statistically significant)
- Significant interaction found for self-reported meth use and meth urine drug test results – lower severity users in the exercise group reported using meth significantly fewer days at the three post-discharge time points than lower severity users in the education group
- Lower severity users in the exercise group also had a lower percentage of positive urine results at the three time points than the lower severity users in the education group (relationships not seen in higher severity groups)

SOURCE: Rawson et al., 2015

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## Slide #219

### Does Exercise Improve Outcomes Post-Treatment?

**Results:** While fewer exercise participants returned to MA use compared to education participants at 1-, 3- and 6-months post-discharge, differences were not statistically significant. A significant interaction for self-reported MA use and MA urine drug test results by condition and MA severity was found: lower severity users in the exercise group reported using MA significantly fewer days at the three post-discharge time points than lower severity users in the education group. Lower severity users in the exercise group also had a lower percentage of positive urine results at the three time points than lower severity users in the education group. These relationships were not present in the comparison of the higher severity conditions.

**Conclusion:** Results support the value of exercise as a treatment component for individuals using MA 18 or fewer days/month.

(Notes for Slide #219,  
continued)

## Slide #219

### Does Exercise Improve Outcomes Post-Treatment?

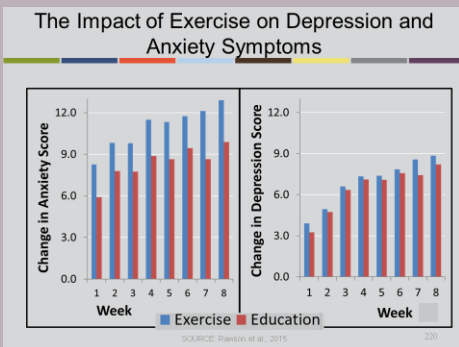


#### REFERENCE:

Rawson, R. A., Chudzynski, J., Mooney, L., Gonzales, R., Ang, A., Dickerson, D., ... Cooper, C.B. (2015). Impact of an exercise intervention on methamphetamine use outcomes post-residential treatment care. *Drug and Alcohol Dependence*, 156, 21–28.

## Slide #220

### The Impact of Exercise on Depression and Anxiety Symptoms



These graphs show change scores for anxiety (left) and depression (right). The blue bars correspond to the exercise condition, and the red bars correspond to the education/control condition. Higher scores indicate more change and therefore show improvement in the mood symptom.

#### Key findings include:

- No significant differences were seen in baseline characteristics between the two groups in either Beck Anxiety Inventory (BAI) or Beck Depression Inventory (BDI) scores
- A significant interaction effect between exercise intervention and session attendance; Session attendance at education sessions was not related to anxiety/depression scores

(Notes for Slide #220,  
continued)

**Slide #220**

**The Impact of Exercise on Depression  
and Anxiety Symptoms**

**Key findings, continued:**

- Those who attended more exercise sessions had significantly lower BDI and BAI scores over time, compared to the control group
- The change in BAI anxiety scores from baseline to Week 8 appeared to be larger in terms of effect size relative to BDI



**REFERENCE:**

Rawson, R.A., Chudzynski, J., Gonzales, R., Mooney, L., Dickerson, D., Ang, A., ... Cooper, C.B. (2015). The impact of exercise on depression and anxiety symptoms among abstinent methamphetamine-dependent individuals in a residential treatment setting. *Journal of Substance Abuse Treatment*, 57, 36–40.

**General Conclusions:  
Exercise and Mood for Patients with MUD**

- Results support the role of a structured exercise program as an effective intervention for improving mood symptoms associated with MA abstinence
- Exercise Program:
  - May have greater value for patients with symptoms of anxiety than for those with symptoms of depression
  - More attendance in exercise sessions resulted in greater reduction in symptoms of anxiety and depression

SOURCE: Rawson et al., 2015

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**Slide #221**

**General Conclusions: Exercise and  
Mood for Patients with MUD**

The investigators concluded that this study adds support for using a structured exercise program for improving mood during initial methamphetamine abstinence. There seems to be a greater value for exercise than depression although both improved when compared to clients receiving an education group.

(Notes for Slide #221,  
continued)

## Slide #221

### General Conclusions: Exercise and Mood for Patients with MUD

It is also notable that that the more exercise groups attended, the greater the reductions in both anxiety and depressions symptoms.



#### REFERENCE:

Rawson, R.A., Chudzynski, J., Gonzales, R., Mooney, L., Dickerson, D., Ang, A., ... Cooper, C.B. (2015). The impact of exercise on depression and anxiety symptoms among abstinent methamphetamine-dependent individuals in a residential treatment setting. *Journal of Substance Abuse Treatment*, 57, 36–40.

## Slide #222

### Exercise Training also Improves Heart Rate Variability after Methamphetamine Use Disorder

As you saw originally on slide 99, heart rate variability is an indicator of overall autonomic nervous system health and has been shown to improve with physical exercise training. Methamphetamine has been shown to decrease heart rate variability and to cause other autonomic nervous system problems. Exercise was shown in improve heart rate variability in clients with MUD demonstrating improved autonomic nervous system balance.

#### Exercise Training also Improves Heart Rate Variability after Methamphetamine Use Disorder

- Heart rate variability (HRV) reflects a healthy autonomic nervous system and is **increased with physical training**
- **Methamphetamine** dependence causes autonomic dysfunction and **diminished HRV**.
- Physical training yielded a **marked increase in HRV**, representing increased vagal modulation or **improved autonomic balance**

SOURCES: Rawson et al., 2015;  
Cotassi et al., 2014

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(Notes for Slide #222,  
continued)

**Slide #222**

**Exercise Training also Improves Heart Rate Variability after Methamphetamine Use Disorder**



**REFERENCES:**

Rawson, R. A., Chudzynski, J., Mooney, L., Gonzales, R., Ang, A., Dickerson, D., ... Cooper, C. B. (2015). Impact of an exercise intervention on methamphetamine use outcomes post-residential treatment care. *Drug and Alcohol Dependence*, 156, 21–28.

Dolezal, B. A., Chudzynski, J., Dickerson, D., Mooney, L., Rawson, R. A., Garfinkel, A., & Cooper, C. B. (2014). Exercise training improves heart rate variability after methamphetamine dependency. *Medicine and Science in Sports and Exercise*, 46(6), 1057–1066.

**Slide #223**

**The CTN STRIDE Study**

In another exercise study for individuals with StUD receiving treatment in community settings, vigorous exercise was shown to reduce stimulant use if the person participated adequately in the program. Reduction in probability of use and/or days of use across the three primary racial/ethnic groups in the study.

The CTN STRIDE Study

- A study of intensive exercise interventions for people with stimulant use disorders, in community-based substance use disorder treatment programs.
- Given adequate participation, vigorous exercise may benefit people who use stimulants by reducing stimulant use.
- Results demonstrated reduced probability of use and/or days of use for Black, Hispanic, and White participants.
- Therefore strategies for retention are important, especially for people of color.

SOURCE: Sanchez et al., 2017

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## (Notes for Slide #223, continued)

### Slide #223 The CTN STRIDE Study

Strategies to increase retention rates are therefore essential. Identifying underlying programmatic causes for early drop out and addressing them is essential.



#### REFERENCE:

Sanchez, K., Greer, T. L., Walker, R., Carmody, T., Rethorst, C. D., & Trivedi, M. H. (2017). Racial and ethnic differences in treatment outcomes among adults with stimulant use disorders after a dosed exercise intervention. *Journal of Ethnicity in Substance Abuse*, 16(4), 495–510.

### Slide #224 The CTN STRIDE Study (2)

The study noted key differences by race/ethnicity in substance use patterns. Participants who were Hispanic and White were more likely to seek treatment for methamphetamine or prescription stimulants and were more likely to use intranasally or by injection. Participants who were Black were more likely to seek treatment for cocaine, and were also more likely to be older, to use by smoking, and to leave treatment sooner. Investigators noted that it is essential to explore strategies for recruiting individuals who are Black and use stimulants into treatment earlier and providing culturally responsive care designed to retain them is essential.

#### The CTN STRIDE Study (2)

- When compared to White and Hispanic participant, who sought treatment for stimulants other than cocaine, Black participants were more likely to:
  - Seek treatment for cocaine
  - Be older
  - Use more by smoking and less by nasal and injection routes
  - Leave treatment sooner
- Additionally, strategies to recruit Black people with SUD into treatment at an earlier age, and culturally responsive care designed to retain in treatment seem essential
- Future research should focus on inclusion of race/ethnic groups, to test interventions targeted with a specific focus on what works for certain populations.

SOURCE: Sanchez et al., 2017

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(Notes for Slide #224,  
continued)

**Slide #224**

**The CTN STRIDE Study (2)**

Research concluded by noting the need for research that focus on inclusion of various racial/ethnic groups and testing intervention that target the specific needs of each group would likely improve outcomes.



**REFERENCE:**

Sanchez, K., Greer, T. L., Walker, R., Carmody, T., Rethorst, C. D., & Trivedi, M. H. (2017). Racial and ethnic differences in treatment outcomes among adults with stimulant use disorders after a dosed exercise intervention. *Journal of Ethnicity in Substance Abuse*, 16(4), 495–510.

**Slide #225**

**Predicting Abstinence from  
Methamphetamine after Residential  
Treatment**

McKetin and colleagues examined what patient and treatment characteristics predict abstinence from methamphetamine after residential treatment. Participants (n = 176) were dependent on methamphetamine and entering residential rehabilitation for methamphetamine use. Simultaneous logistic regression was used to identify independent predictors of continuous abstinence from methamphetamine use at 1 year follow-up.

Predicting Abstinence from  
Methamphetamine after  
Residential Treatment

SOURCE: McKetin et al., 2017

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(Notes for Slide #225,  
continued)

### Slide #225

#### **Predicting Abstinence from Methamphetamine after Residential Treatment**

Measures included demographics, drug use, psychiatric comorbidity (Diagnostic and Statistical Manual of Mental Disorders, major depression, social phobia, panic disorder, schizophrenia, mania and conduct disorder), symptoms of psychosis and hostility, readiness to change, motivations for treatment and treatment characteristics (duration, rapport, group and individual counselling). The next slide details the four predictors of abstinence from methamphetamine following residential treatment.



#### **REFERENCE:**

McKetin, R., Kothe, A., Baker, A. L., Lee, N. K., Ross, J., & Lubman, D. I. (2018). Predicting abstinence from methamphetamine use after residential rehabilitation: Findings from the Methamphetamine Treatment Evaluation Study. *Drug and Alcohol Review*, 37(1), 70–78.

#### Four Predictors of Abstinence from Methamphetamine after Residential Treatment

Four variables retained in final predictive model:

- More weeks of treatment (+)
- High rapport with service providers (+)
- Individual counseling sessions (substance use or mh) (+)
- Negative association with injecting methamphetamine (-)\*

\*Injectors had low probability of abstinence, but did better with longer treatment and individual counseling

SOURCE: McKetin et al., 2017

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## Slide #226

### Four Predictors of Abstinence from Methamphetamine after Residential Treatment

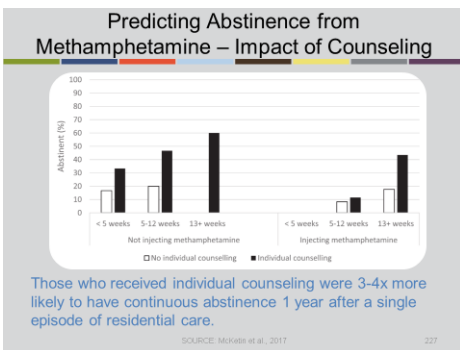
McKetin and colleagues investigated variables that could be used to predict continued methamphetamine abstinence following discharge from residential treatment programs. They identified four key variables. Abstinence was positively associated with more weeks in treatment, good rapport with their care provider, and great number of individual counseling sessions for substance use or mental health related issues. Abstinence was negatively associated (use was more likely) if they had used methamphetamine by injection.

It is notable that among people who inject, probability of abstinence increased for those who stayed in treatment longer and had more individual counseling.



#### REFERENCE:

McKetin, R., Kothe, A., Baker, A. L., Lee, N. K., Ross, J., & Lubman, D. I. (2018). Predicting abstinence from methamphetamine use after residential rehabilitation: Findings from the Methamphetamine Treatment Evaluation Study. *Drug and Alcohol Review*, 37(1), 70–78.



## Slide #227

### Predicting Abstinence from Methamphetamine – Impact of Counseling

This graph shows the difference in groups for those who did (black bars) and did not (white bars) receive individual counseling. Among those who did not inject, sustained abstinence was more likely for those receiving individual counseling. Notice that among those who did not receive counseling, none were abstinent for 13 weeks or longer. Among those who used methamphetamine by injection, those receiving individual counseling were significantly more likely to be abstinent as far out as 13+ weeks. For both groups (not shown on graph), those receiving individual counseling were 3-4 times more likely to be continuously abstinent for one year after only one episode of residential treatment.



#### REFERENCE:

McKetin, R., Kothe, A., Baker, A. L., Lee, N. K., Ross, J., & Lubman, D. I. (2018). Predicting abstinence from methamphetamine use after residential rehabilitation: Findings from the Methamphetamine Treatment Evaluation Study. *Drug and Alcohol Review*, 37(1), 70–78.

Recommendations for  
Outpatient Stimulant Use Disorder Treatment

- Durations over 90 days (with continuing care for another 9 months).
- Techniques and clinic practices that improve treatment retention are critical.
- Treatment should include 3-5 clinic visits per week for at least 90 days.

SOURCES: UNODC, 2019.  
Ranson et al., 2020; CSAT, 1999

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## Slide #228

### Recommendations for Outpatient Stimulant Use Disorder Treatment

Across the treatment studies some common elements seem to be key:

- Longer treatment is better. At minimum treatment should be at least 90 days with ongoing continuing care for another 9 months.
- All services should focus on retaining clients in care. This means that use or negative behaviors in treatment should not result in their discharge from care unless there are no alternatives. Strategies to increase retention must also be identified and employed.
- More treatment is better. Treatment with 3-5 visits per week for at least the first 3 months is recommended.



#### REFERENCES:

United Nations Office of Drugs and Crime. (2019). *Treatment of Stimulant Use Disorders: Current Practices and Promising Perspectives*. Vienna, Austria: Author. Available at: [https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment\\_of\\_PSUD\\_for\\_website\\_24.05.19.pdf](https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment_of_PSUD_for_website_24.05.19.pdf).

(Notes for Slide #228,  
continued)

**Slide #228**

**Recommendations for Outpatient  
Stimulant Use Disorder Treatment**



**REFERENCES:**

Rawson, R. A., Gonzales, R., & Brethen, P. (2002). Treatment of methamphetamine use disorders: an update. *Journal of Substance Abuse Treatment*, 23(2), 145–150.

Center for Substance Abuse Treatment. (1999). *Treatment of Stimulant Use Disorders: Treatment Improvement Protocol Series, No. 33*. Rockville, MD: Substance Abuse Mental Health Service Administration. Available at: <http://adaiclearinghouse.net/downloads/TI-P-33-Treatment-for-Stimulant-Use-Disorders-61.pdf>.

Recommendations for Outpatient Stimulant Use  
Disorder Treatment (2)

- Employ **evidence-based practices** [i.e., Contingency Management (CM), Community Reinforcement Approach (CRA), Cognitive Behavioral Therapy (CBT), Motivational Interviewing (MI), Matrix Model].
- **Family involvement** and **12-step programs** appear to improve outcome.
- **Urine testing** (at least weekly is recommended)

SOURCES: UNODC, 2019;  
Rawson, et al., 2020; CSAT, 1999

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**Slide #229**

**Recommendations for Outpatient  
Stimulant Use Disorder Treatment (2)**

Because we know what research says about efficacy, evidence-based practices should be used in treatment. For StUD, CM and CRA should be considered first, as they have the strongest evidence. Research support also exists for CBT, MI, and the Matrix Model. More research is needed, however, to demonstrate efficacy and to determine which programs work best for which groups/sub-populations.

(Notes for Slide #229,  
continued)

## Slide #229

### Recommendations for Outpatient Stimulant Use Disorder Treatment (2)

Research should also continue to focus on the role of family in treatment and 12-step participation, as there is a body of literature indicating that these may improve treatment outcomes. Finally, at least weekly (3x/week is better) urine testing. Urine tests should not be used punitively (e.g., to kick people out of treatment if they are positive). Rather, they should be used as a clinical tool to get objective measures of use, help the person to be honest and disclose use if it occurs, and to track progress of the client in being able to reduce or abstain from use.



#### REFERENCES:

United Nations Office of Drugs and Crime. (2019). *Treatment of Stimulant Use Disorders: Current Practices and Promising Perspectives*. Vienna, Austria: Author. Available at: [https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment of PSUD for website 24.05.19.pdf](https://www.unodc.org/documents/drug-prevention-and-treatment/Treatment_of_PSUD_for_website_24.05.19.pdf).

Rawson, R. A., Gonzales, R., & Brethen, P. (2002). Treatment of methamphetamine use disorders: an update. *Journal of Substance Abuse Treatment*, 23(2), 145–150.

(Notes for Slide #229,  
continued)

## Slide #229

### Recommendations for Outpatient Stimulant Use Disorder Treatment (2)



#### REFERENCES:

Center for Substance Abuse Treatment. (1999). *Treatment of Stimulant Use Disorders: Treatment Improvement Protocol Series, No. 33*. Rockville, MD: Substance Abuse Mental Health Service Administration. Available at: <http://adaiclearinghouse.net/downloads/TI-P-33-Treatment-for-Stimulant-Use-Disorders-61.pdf>.

## Slide #230

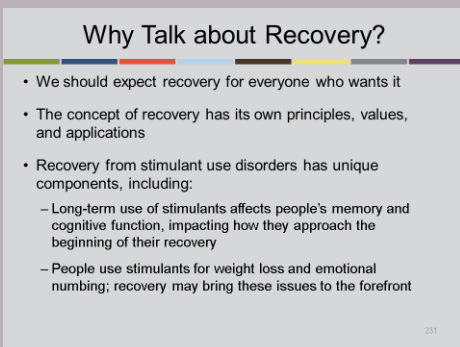
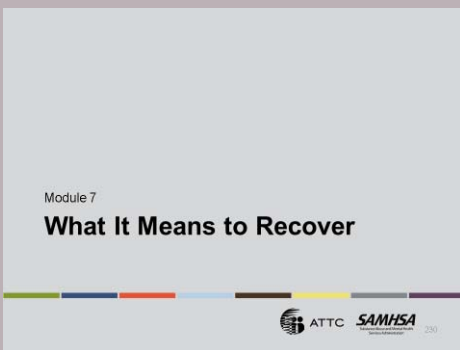
### Module 7: What It Means to Recover

The final module in today's training, Module 7, provides a brief discussion of what it means to recover from stimulant use.

## Slide #231

### Why Talk about Recovery?

Recovery is complex and deeply personal, and it is something we should expect for everyone we work with who is seeking recovery for a stimulant use disorder. In order to best support someone, we need to have a strong foundation in recovery principles and understand the unique ways that long-term stimulant use may impact people's recovery journeys.



(Notes for Slide #231,  
continued)

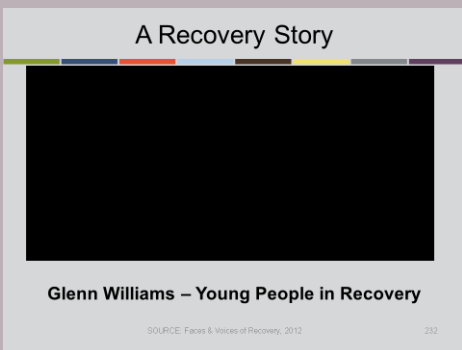
## Slide #231 Why Talk about Recovery?

For example, long-term stimulant use affects people's memory and cognitive function; therefore, professionals working with them may need to adjust initial expectations and tasks. Also, many people use stimulants for weight loss and to "numb out" emotional pain; once they are no longer using stimulants, they may experience weight gain and a resurgence of emotions, which can challenge their recovery. We need to recognize these challenges in order to best support their success in recovery.

Although recovery is a common concept in behavioral health fields, many people are not familiar with its principles, values, and application. Let's take some review principles and language, and ways that recovery from stimulant use disorders is unique.



***A supplemental module on the Overview of Recovery and Recovery Supports is available for viewing at: <https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>. This will provide a much deeper look at these principles.***



## Slide #232

### A Recovery Story



#### INSTRUCTIONS:

***This slide contains a movie clip that will play automatically when the trainer clicks on the black box. In order for this to work, the connection between the PowerPoint presentation and the video file must be maintained. When moving the PowerPoint file to another location on your computer or to another computer, make sure to always move the video file along with it. If the link becomes broken, the video will need to be reinserted. Delete the black box. From the insert menu in PowerPoint, select “movie.” Select the video file that was included for this training. When asked, indicate that the movie should play automatically. It will appear as a black box on the screen. The video should play when the slide show is being viewed when the trainer clicks on the black box.***

Video Length: 2 minutes, 50 seconds.

Recovery is a personal journey to find wellness after experiencing a substance use disorder. Although there are many different definitions of recovery (some of which we will see later), the essence of recovery is best communicated through the real life stories of people who live it every day.

(Notes for Slide #232,  
continued)

**Slide #232**  
**A Recovery Story**

Let's start this module with a short video where Glenn Williams shares his recovery story.



**VIDEO SOURCE:**

Faces & Voices of Recovery. (2012, September 17). *Glenn Williams – Young People in Recovery*. [Film]. Retrieved May 29, 2020, from <https://www.youtube.com/watch?v=iYT3Mh0ITzg>.

**Defining Recovery: Example 1**

*"Recovery is a process of change through which individuals improve their health and wellness, live self-directed lives, and strive to reach their full potential."*

- SAMHSA Definition of Recovery (2012)

SOURCE: US DHHS, SAMHSA, 2012

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**Slide #233**  
**Defining Recovery: Example 1**

In 2012, SAMHSA released a working definition of recovery, along with 10 guiding principles of recovery that we will review later. SAMHSA defines recovery as "a process of change through which individuals improve their health and wellness, live self-directed lives, and strive to reach their full potential."

## (Notes for Slide #233, continued)

### Slide #233

#### Defining Recovery: Example 1



#### REFERENCE:

U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. (2012). *SAMHSA's Working Definition of Recovery: 10 Guiding Principles of Recovery*. Accessed May 29, 2020, from <https://store.samhsa.gov/sites/default/files/d7/priv/pep12-recdef.pdf>.

#### Defining Recovery: Example 2

"Recovery is a lived experience of improved life quality and a sense of empowerment; that the principles of recovery focus on the central ideas of hope, choice, freedom and aspiration that are experienced rather than diagnosed and occur in real life settings rather than in clinical settings. Recovery is a process rather than an end state, with the goal being an ongoing quest for a better life."

- David Best & Alexandre Laudet

SOURCE: Best & Laudet, 2019

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### Slide #234

#### Defining Recovery: Example 2

This slide contains another definition of recovery; this definition comes from David Best and Alexandre Laudet.



#### REFERENCE:

Best, D., & Laudet, A. (2019). *Opioid 101 Panel: Effective Interventions in Prevention, Treatment and Recovery*. Opioid Response Network.

#### SAMHSA's Guiding Principles of Recovery



SOURCE: US DHS, SAMHSA, 2012

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### Slide #235

#### SAMHSA's Guiding Principles of Recovery

SAMHSA has identified 10 guiding principles of recovery.

## (Notes for Slide #235, continued)

### Slide #235

## SAMHSA's Guiding Principles of Recovery

Let's briefly discuss each one. As we move through them, think about whether and how these principles are present in the work you do and the organizations you work in.



### REFERENCE:

U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. (2012). *SAMHSA's Working Definition of Recovery: 10 Guiding Principles of Recovery*. Accessed May 29, 2020, from <https://store.samhsa.gov/sites/default/files/d7/priv/pep12-recdef.pdf>.

### Why Language Matters

- Language should reflect the values of recovery
- Useful to have a discussion among your own community – what are our shared values of recovery?
- Shifting language to reflect values can have a huge impact
- Studies regarding bias in language include those by Ashford et al. (2018) and Kelly & Westerhoff (2010)

SOURCES: Ashford et al., 2018;  
Kelly & Westerhoff, 2010

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### Slide #236

## Why Language Matters

**Language matters.** Two recent studies, one by Kelly & Westerhoff in 2010 and a second one by Ashford, Brown & Curtis in 2018, discuss how terms like "substance abuser," "addict," "alcoholic," and "opioid addict" are associated with a negative bias or connotation.

The language we use when we talk about the challenges related to substance use should reflect the values of recovery. Individuals should work to broaden and encourage communication about language in communities and agencies.

(Notes for Slide #236,  
continued)

## Slide #236

### Why Language Matters

For example, what are the shared values of recovery? What are terms we use to describe people with substance use disorders, treatment, and recovery? How may those terms be problematic? When language is shifted to reflect recovery values, individuals are able to not only impact our direct interactions with people, but community and societal views about substance use and recovery.



#### REFERENCES:

Ashford, R. D., Brown, A. M., & Curtis, B. (2018). Substance use, recovery, and linguistics: The impact of word choice on explicit and implicit bias. *Drug and Alcohol Dependence*, 189, 131–138.

Kelly, J. F., & Westerhoff, C. M. (2010). *Does it matter how we refer to individuals with substance-related conditions? A randomized study of two commonly used terms. International Journal of Drug Policy*, 21(3), 202–207.

## Language That Reflects Recovery Values

### Shifting language to reflect values

- Person first
  - He's a schizophrenic [versus](#)
  - He is a person with a diagnosis of schizophrenia [or](#)
  - He's experienced hearing voices
- Strengths-based
  - She manipulates the system to get what she wants [versus](#)
  - She's resourceful in her efforts to stay alive and safe

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## Slide #237

### Language That Reflects Recovery Values

As clinicians, practitioners, or other people who serve/support people with substance use disorders, we should always consider how to shift common-place but stigmatizing language to better reflect recovery values and principles. We can do this by using person-first, recovery-oriented, and strengths-based language. For example, instead of saying that someone is a schizophrenic, we can say “he is a person with a diagnosis of schizophrenia” or “he’s experienced hearing voices.” The first sentence makes it seem like his diagnosis is his whole identity, where the other examples show that he is a person with certain experiences.

We can also be reframe certain language to be more strength-based. For example, instead of calling someone “manipulative,” we can recognize that she is being resourceful in her effort to stay alive and safe.

For example, what are the shared values of recovery? What are terms we use to describe people with substance use disorders, treatment, and recovery? How may those terms be problematic? When language is shifted to reflect recovery values, individuals are able to not only impact our direct interactions with people, but community and societal views about substance use and recovery.

Stigmatizing Language	Current Language
Addict	Person with a substance use disorder
Addicted infant	Infant with Neonatal Abstinence Syndrome (NAS)
Addicted to [alcohol/drug] ...	Has a [alcohol/drug] use disorder
Alcoholic	Person with an alcohol use disorder
Clean	Abstinent
Clean screen	Substance-free
Crack Babies	Substance-exposed infant or Substance-affected infant
Lapse / Relapse / Slip	Resumed/Experienced a recurrence
Medication-Assisted Treatment (MAT)	Medications for Addiction Treatment (MAT)
Opioid replacement	Medications for Addiction Treatment (MAT)
Opioid Replacement Therapy (ORT)	Medications for addiction treatment (MAT)
Pregnant Opioid Addict	Pregnant woman with opioid use disorder
Reformed addict or alcoholic	Person in recovery
Substance Abuse	Substance use disorder
Substance abuse disorder	Person with a substance use disorder
Substance Misuse	Substance use / non-medical use
Victims / "drug victims"	Prenatally exposed to [drug name]

SOURCE: Mid-America ATTC, 2017

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## Slide #238

### Words Have Power

Many examples exist for how providers can shift their language away from the use of stigmatizing terms to person-first, affirming language to support recovery. One additional useful guide is the online Addictionary by the Recovery Research Institute, a catalogue of addiction related terms that flags those terms associated with stigma. Additional information is available at:

<https://www.recoveryanswers.org/addiction-ary/>.



## REFERENCE:

Mid-America Addiction Technology Transfer Center. (2017). *Language Matters: Using Affirmative Language to Inspire Hope and Advance Recovery*. Accessed May 29, 2020, from <https://attcnetwork.org/centers/mid-america-attc/product/language-matters-using-affirmative-language-inspire-hope-and->

Context Also Matters	Recovery Dictionary	Person-First Language	Stigmatizing Language	Recovery-Focused Language	Recovery-Focused Language
Addict	✓	✓	✗	✓	✓
Alcoholic	✓	✓	✗	✓	✓
Substance Abuser	✓	✓	✗	✓	✓
Opioid Addict	✓	✓	✗	✓	✓
Relapse	✓	✓	✗	✓	✓
Medication-Assisted Treatment	✓	✓	✗	✓	✓
Medication-Assisted Recovery	✓	✓	✗	✓	✓
Person w/ a Substance Use Disorder	✓	✓	✗	✓	✓
Person w/ an Alcohol Use Disorder	✓	✓	✗	✓	✓
Person w/ an Opioid Use Disorder	✓	✓	✗	✓	✓
Long-term Recovery	✓	✓	✗	✓	✓
Pharmacotherapy	✓	✓	✗	✓	✓

SOURCES: AMATTC, et al., 2018; LRI's Recovery Kitchen, 2018; March, 2017

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## Slide #239

### Context Also Matters

We also need to recognize that context matters for when certain terms are appropriate to use or not.

(Notes for Slide #239,  
continued)

**Slide #239**  
**Context Also Matters**

First, people should be supported to self-identify however feels appropriate for them. Some people feel power in identifying as an addict, where others feel stigmatized and dismissed. Plus, terms like “addict,” “alcoholic,” or “relapse” may be appropriate and commonly used in mutual aid meetings like AA or NA, but are not terms that should be used generally in public, with patients/clients, in medical settings, or with journalists. Instead, we can use terms like “a person with a substance use disorder,” “someone struggling with alcoholism,” or “a person resuming drug or alcohol use.”

Terms we should be cautious not to use include “substance abuser”. This terms can come across as stigmatizing and hurtful. For example, studies have found that the use of the term “abuser” “increase[s] stigma and reduce[s] the quality of care.”



**REFERENCES:**

Ashford, R. D., Brown, A. M., & Curtis, B. (2018). *Substance use, recovery, and linguistics: The impact of word choice on explicit and implicit bias. Drug and Alcohol Dependence, 189*,131–138.

(Notes for Slide #239,  
continued)

**Slide #239**  
**Context Also Matters**



**REFERENCES:**


Liv's Recovery Kitchen. (2018). *Language Matters: A Recovery Scientist Explains the Impact of Our Words*. Retrieved May 29, 2020, from <https://www.livsrecoverykitchen.com/articles/2018/7/10/language-matters-a-recovery-scientist-explains-the-impact-of-our-words>.

Walsh, C. (2017). *Revising the Language of Addiction*. The Harvard Gazette. Retrieved May 29, 2020, from <https://news.harvard.edu/gazette/story/2017/08/revising-the-language-of-addiction/>.

**Slide #240**  
**Responding to the Impact of Long-Term Stimulant Use**

Responding to the Impact of Long-Term Stimulant Use

- Awareness of the challenges of early recovery
  - Overloading people with paperwork or complex tasks
- Patience with the healing process for each individual
  - From themselves
  - From behavioral health community
  - From family and friends



SOURCE: Tennessee Works, 2020 240

What does this all mean for supporting people with stimulant use disorders? First, we need to be sensitive to the challenges that come with long-term stimulant use. If an individual is navigating memory loss, irritability, shame, or overwhelm due to their long-term stimulant use, we should be aware that overloading them with tons of paperwork or complex tasks as they are in the initial stages of recovery could be detrimental to both their recovery and our relationship.

(Notes for Slide #240,  
continued)

## Slide #240

### Responding to the Impact of Long-Term Stimulant Use

We also need to practice, encourage, and support patience with the healing process for each individual. First, people need to practice patience with themselves: recovery can be overwhelming, is nonlinear (meaning setbacks are a normal part of the process), and requires exploration into sometimes painful parts of our lives (feelings of isolation, loneliness, self-worth, grief, etc.). Recovery is hard work, and cultivating patience is a critical part of the process.

As professionals in the behavioral health community, we also need to practice patience for people in recovery amongst ourselves. We need to support people's self-determination and decision-making, even if there is a risk of failure. We can think of this as the "dignity of risk." As Robert Perske (a disability rights activist) said, *"To deny the right to make choices in an effort to protect the person with disabilities from risk is to diminish their human dignity."* This idea relates to individuals with substance use challenges as well – we need to support healthy risk, even if we fear that someone may relapse or fall back on unhealthy relationships.

Finally, we can encourage family and friends to practice patience with the healing process for their loved ones in recovery.

(Notes for Slide #240,  
continued)

## Slide #240

### Responding to the Impact of Long-Term Stimulant Use

We can do this through education about the recovery process (including the dignity of risk, the challenges that come with recovery, etc.). We can also encourage family and friends to get support themselves, since recovery and substance use challenges affect the family as a whole.



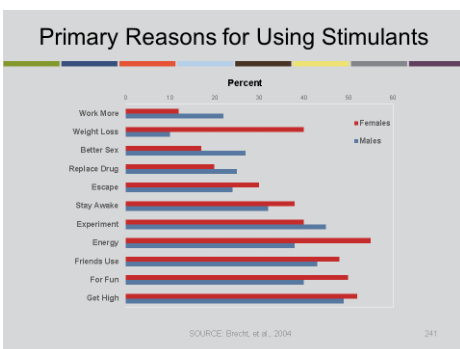
#### REFERENCE:

Tennessee Works. *The Dignity of Risk*. Retrieved May 29, 2020, from <http://www.tennesseeworks.org/the-dignity-of-risk/>.



#### IMAGE CREDIT:

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## Slide #241

### Primary Reasons for Using Stimulants

As noted earlier, people use stimulants for different reasons, Women use more frequently to lose weight, to gain energy, because their friends use.

## (Notes for Slide #241, continued)

### Slide #241

#### Primary Reasons for Using Stimulants

Men use more frequently to experiment to work more and to have better sex. When supporting people as they begin and maintain their recovery journey, we need to be mindful that there are social and cultural reasons that people rely on stimulants. In order to best support a person's recovery, we need to recognize those reasons and plan how to support their needs without the use of stimulants.



#### REFERENCE:

Brecht, M. L., O'Brien, A., von Mayrhauser, C., & Anglin M. D. (2004).

*Methamphetamine use behaviors and gender differences. Addictive Behavior.* 29(1), 89–106.

### Slide #242

#### Issues Related to Trauma

Substance use and trauma are interconnected – people who experience trauma are more likely to develop a substance use disorder. Many individuals with significant stimulant and/or poly-drug use have extensive experience with trauma. A 2010 study found that 42.9 percent of the people they interviewed (all of whom had cocaine use disorders) met the DSM-III criteria for *lifetime* PTSD.

#### Issues Related to Trauma

- Many people with stimulant use disorder have extensive experience with trauma
  - One study showed that 42.9% of people with cocaine dependence met the criteria for lifetime PTSD
  - People with PTSD are more likely to use crystal methamphetamine across their lifetimes
- Recovery approaches should be trauma-informed
  - How safe does a person feel in the setting they are in and the people they are with?
  - Counseling for trauma may be needed

SOURCES: Back et al., 2010; Smith et al., 2010

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(Notes for Slide #242,  
continued)

## **Slide #242**

### **Issues Related to Trauma**

Another study found that individuals with PTSD after being exposed to a traumatic event are more likely to use crystal methamphetamine throughout their lives compared to people who were exposed to a traumatic event but who did not develop PTSD.

This tells us that recovery approaches must be trauma-informed in order to be effective address the totality of a person's experience. As professionals in the behavioral health field, we should ask ourselves how safe a person feels in the setting they are in and the people they are with. Are there ways in which the setting or relationship inadvertently reinforces a traumatic experience? Has the organization made changes to ensure they have a trauma-informed environment and policies? Finally, when supporting a person with stimulant use disorders, counseling for trauma may be needed in addition to recovery planning and other clinical and nonclinical supports.

(Notes for Slide #242,  
continued)

**Slide #242**

**Issues Related to Trauma**



**REFERENCES:**

Back, S., Dansky, B. S., Coffey, S. F., Saladin, M. E., Sonne, S., & Brady, K. T. (2010). Cocaine dependence with and without posttraumatic stress disorder: A comparison of substance use, trauma history and psychiatric comorbidity, *American Journal on Addictions*, 9(1), 51–62.

Smith, R. C., Blumenthal, H., Badour, C., & Feldner, M. T. (2010). An investigation of relations between crystal methamphetamine use and posttraumatic stress disorder, *Addictive Behaviors* 35, 625–627.

**Concluding Thoughts**

- The availability and use of cocaine and methamphetamine is widespread across the U.S. and beyond
- Central nervous system stimulants effect multiple organ systems, including the brain, heart, lungs, kidneys, liver, and skin
- The brain does have the ability to heal from use of stimulants, it just takes time
- A variety of behavioral interventions have been shown to be effective
- No FDA-approved medications exist (yet)
- Recovery is possible

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**Slide #243**

**Concluding Thoughts**

This slide summarizes the major take-away points from the daylong training.

### Resources for Continued Learning

- ATTC Network's Focus on Stimulant Misuse Web Page: <https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>
- Evidence-Based Resource Guide Series: Treatment of Stimulant Use Disorders: <https://store.samhsa.gov/product/Treatment-of-Stimulant-Use-Disorder/PEP20-06-01-001>
- Northwest ATTC's Contingency Management for Healthcare Settings Self-Paced Online Course: <https://healtheknowledge.org/course/search.php?search=Contingency+Management>

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## Slide #244

### Resources for Continued Learning

This slide contains links to additional resources for continued learning.



### REFERENCE:

Substance Abuse and Mental Health Services Administration. (2020). *Treatment of Stimulant Use Disorders*. SAMHSA Publication No. PEP20-06-01-001  
Rockville, MD: National Mental Health and Substance Use Policy Laboratory.  
Substance Abuse and Mental Health Services Administration.

## Slide #245

### Thank You For Your Time

This is the concluding slide for the daylong curriculum. The full Stimulant 101 training package is available for viewing or downloading from

<https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>.

Thank participants for their time and answer any final questions that remain.

### Thank You For Your Time

- To access additional components of this curriculum, please visit: <https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse>
- For additional information regarding SUD-related Training/TA, please visit: <http://www.attcnetwork.org>
- For additional information regarding HIV/AIDS-related Training/TA, please visit: <https://aidsetc.org/>

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(Notes for Slide #245,  
continued)

## Slide #245

### Thank You For Your Time

*This product was created by the Addiction Technology Transfer Center Network under a series of cooperative agreements from the Substance Abuse and Mental Health Services Administration (SAMHSA). The opinions expressed are the views of the ATTC Stimulant Workgroup and do not reflect the official position of the Department of Health and Human Services (DHHS), SAMHSA or CSAT. No official support or endorsement of DHHS, SAMHSA, or CSAT for the opinions described in this program is intended or should be inferred.*



## **Appendix 1: Recommended Optional Group Activities**

### Group Activity

- You will each be assigned to a breakout room
- In your breakout, please answer the following questions:

–What were 2-3 useful, interesting, and/or surprising pieces of information you got from the information on the scope of the problem?  
–How will you use this information in your work?

## Optional Group Activity #1 (Appears as Slide 42 in Condensed Virtual Overview, Part 1)



### INSTRUCTIONS:


***Using Zoom, Break participants up into smaller groups. The number of groups will depend on size of audience. Recommend 6-10 per group. Ask participants to review the information presented in their groups and answer the questions on the slide. Then bring back together to debrief. Allow 9 minutes for discussion and 6 minutes for debrief (15 minutes total). Alternately, this could be done in the main room as a single group activity if number of participants is small or if breakout option is not included in your zoom subscription.***



***NOTE: If you decide to insert this optional activity into the daylong face-to-face version of the curriculum, you would insert it after slide 47.***

Group Activity

- You will be placed into a breakout room.
- Using the White Board feature of zoom, draw the outline of a brain



- Working with your group, indicate all the areas that you know are impacted by substance use.

## Optional Group Activity #2 (Appears as Slide 17 in Condensed Virtual Overview, Part 2)



### INSTRUCTIONS:

***This slide contains animation and requires use of Zoom Breakout Rooms and the Zoom Whiteboard. Trainers should practice ahead of time to be sure that they are comfortable with the animation and the technology.***

***In a minute, everyone will be divided up into smaller breakout rooms. Your goal in your breakout rooms is to draw an outline of a brain using the Zoom Whiteboard.***


***Advance slide – brain image will disappear and a rough drawing of a brain will appear.***

***Once the annotation tools appear in the Whiteboard, use the colored markers to indicate all the areas that you can identify that are impacted by substance use.***

***For this group activity, you will use Zoom to divide people up into breakout rooms (6-10 people per room are recommended). Each group will draw an outline of a brain and then use the colored pens to indicate the areas on the brain where substance cause an impact.***

Group Activity

- You will be placed into a breakout room.
- Using the White Board feature of zoom, draw the outline of a brain



- Working with your group, indicate all the areas that you know are impacted by substance use.

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## Optional Group Activity #2 (Appears as Slide 17 in Condensed Virtual Overview, Part 2)



### INSTRUCTIONS, continued:

***Give participants about 5 minutes to draw on their brains, bring them back together, and then proceed with the next slide.***

***Alternative – If the group is small or the trainer does not want to use breakout groups, this can be done as a whole group exercise with the trainer using the whiteboard, asking participants if they have an answer, and having them draw on the brain.***




***The following are the Zoom instructions pertinent to this activity:***

### **Creating breakout rooms:**

- Once you have joined the meeting, click **breakout rooms**
- Select the number of **rooms** you would like to create, and how you would like to assign your participants to those **rooms**: Automatically: Let **Zoom** split your participants up evenly into each of the **rooms**
- Click Create **Rooms**

Group Activity

- You will be placed into a breakout room.
- Using the White Board feature of zoom, draw the outline of a brain



- Working with your group, indicate all the areas that you know are impacted by substance use.

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## Optional Group Activity #2 (Appears as Slide 17 in Condensed Virtual Overview, Part 2)



### To use the whiteboard:

- Once you have joined the meeting, click on Share Screen
- Select the **Whiteboard** and click on Share Screen
- When you click on the **Whiteboard**, the annotation tools will become available
- You can save the **Whiteboard** as a PNG file. It will then be stored in the **Zoom** folder as '**whiteboard.png**'



**NOTE:** *If you decide to insert this optional activity into the daylong face-to-face version of the curriculum, you would insert it after slide 68.*



## **Appendix 2: Participant Handouts for Case Study and Interactive Activities**



## **National Core Curriculum: Stimulants and their Impact on Brain and Behavior – Best Practices and Approaches for Effective Treatment and Recovery**

### **Participant Handout: Case Study – Angela**



Angela is a 32-year-old Caucasian woman living in a small rural town outside of Sacramento, CA. She is a single mom of three children ranging in age from 12 to 3. She works two part-time jobs (one as a bartender and one as a house cleaner).

Angela has a history of alcohol and marijuana use since she was a teenager. She graduated high school and went to community college studying fashion design, but dropped out after two semesters. She still likes to sketch and design clothes, a past time she is just starting to share with her 12 year old. She started using methamphetamine 2 years ago to lose a little weight to feel more attractive while dating.

Angela's methamphetamine use has escalated in the last 6-months after she began dating John, a local drug dealer. She has lost a significant amount of weight and experiences bouts of severe depression and anxiety. Angela is estranged from her mom, who in the past was a constant source of support for her and her three children.

Angela was recently fired from her bartending job, and is having trouble making ends meet with her housekeeping job as the sole source of income. She still stays in touch with a couple of the staff at the bar, mostly via text and social media. John has begun getting violent with Angela and she fears for the safety of herself and her children. She's afraid if she doesn't stop using meth, CPS is going to take her kids away. She saw it happen to a member of a local church she sometimes attends. Angela doesn't know where to turn, since her mom won't return her calls and her close friends are all fed up with her.



### Discussion Questions:

1. What strengths does Angela have?
2. What supports exist in Angela's life and in her community that she might draw upon?
3. What are the issues that need to be addressed? How would you identify and prioritize these issues?
4. What specific types of providers should be involved in Angela's care?
5. What are the top three (3) strategies would you employ to coordinate care among the various providers?

Training participants may wish to view the supplemental module entitled *Overview of Recovery and Recovery Supports* for more information on supporting individuals in identifying and building recovery capital. Visit <https://attcnetwork.org/centers/global-attc/focus-stimulant-misuse> for more details.



## **National Core Curriculum: Stimulants and their Impact on Brain and Behavior – Best Practices and Approaches for Effective Treatment and Recovery**

### **Participant Handout: Case Scenarios**



#### **Group Activity: What Would You Say or Do?**

##### **Scenario 1**

You've just completed the check-in portion of group and a popular patient who has been sporadically attending and has missed the last two sessions comes into group late and appears to be under-the-influence. As she is taking a seat, she is greeting other group members and in response to another group member's question "we've missed you, how have you been?" the client begins to catch the group up on her life over the past 10 days, including sexual encounters and drug use. You let the client proceed for a minute, but realize her graphic recollection of the recent events begin to elevate the energy in the room to what feels uncomfortable. How do you intervene in this situation?

##### **Scenario 2**

You're running a group and one of your clients is sitting in the back of the room, seemingly not paying attention, but rather reading a magazine. He's not being disruptive, though he is also not participating in the group discussion. Other clients don't say anything, though they do notice that he appears to be uninterested in the topic being discussed, and they seem to be looking to you to see how you will manage what is going on. What do you do?



### **Scenario 3**

Several of the new clients in your Early Recovery Skills group have little to no recovery experience and have no experience participating in group counseling sessions. Their social skills leave a lot to be desired. The majority of the group members have identified methamphetamine as their primary drug, though virtually all of them are poly-drug users. The energy in the room is high, and there is an odor of cannabis on at least one group member. Before you even have a chance to begin the group, you notice that one of your clients who has been diligent on working a program seems unusually agitated by their behavior and the smell of drugs in the room. What do you do?

### **Scenario 4**

During the check-in one of the clients begins to talk about his sex life while on methamphetamine and how intense it was, especially with the extra-marital sex. He has not had physical contact with his wife in several months and his craving for meth seems to be increasing as are his thoughts about re-initiating his extra-marital affair. He is anxious, sweating and fidgety while telling you this and says that he wants to use right now. How do you handle this?

### **Scenario 5**

During a group session each group member shares about the topic for the day except for one. He seems disconnected from the group and has not been paying attention to other group members when they are speaking. You notice that he seems slightly agitated, fidgeting in his seat more than normal. You ask if he has anything to contribute to the conversation. He is quiet for a while and then accuses another group member of “stealing his thoughts”. He avoids eye contact and says he would like to leave the group as soon as possible. How do you proceed?



### **Scenario 6**

A client arrives for group several minutes late and apologizes to everyone for being late, stating that he was “running behind” all day. As the group continues, you notice the client beginning to nod off. He sits up when you address him directly, asking whether or not he needs to take a break. He says he’s doing fine, but as the session progresses, he begins noticeably struggling with staying awake and appears to be asleep while other group members are sharing information. How do you address this client’s behavior? What additional questions and assessment are important at this point?

### **Scenario 7**

A new client dominates the conversation from the moment the group starts. The client becomes tearful while describing the reason that she’s attending session. You notice other group members starting to become frustrated and restless about not being able to provide input. Finally, one group member reaches her breaking point and yells, “ENOUGH! You don’t even belong to this group. You’re just some privileged white girl who needs to pretend to have some friends each week because no one else cares to listen to you!” The other group members seem surprised that this particular group member was as direct as she was but nod in agreement with her. Before you can say anything, the new client jumps up and shoves the other client. How do you intervene to manage/de-escalate the situation? If able to de-escalate, how would you address cultural and relational issues within the group?



## **Group Activity: MI Skills in Practice**

MI Prompt #1: Patient starts talking to someone who is clearly not in the room.

MI Prompt #2: Patient interrupts frequently, bringing conversation back to herself.

MI Prompt #3: Patient is silent, not participating and appears to be very angry.

MI Prompt #4: Patient asks for help and then rejects suggestions that are offered, calling therapist stupid and non-understanding.


MI Prompt #5: Blames and judges other members, will not admit to being wrong.

MI Prompt #6: Patient begins describing sex he had on meth in graphic detail and is beginning to show physical symptoms of excitement.

MI Prompt #7: A client states he just had an argument with his partner about his meth use; he says, “It got really bad, but we’d never hit each other or anything like that.”

MI Prompt #8: A client states that she is willing to work on reducing her marijuana and alcohol use, but she’s not willing to talk about her methamphetamine use.

MI Prompt #9: A client appears drowsy and irritable; when probing about current functioning, the client reports not wanting to go to sleep and methamphetamine is the best way to avoid sleeping.



MI Prompt #10: Your client laughs at the conversation of cutting down and dismisses your ideas for cutting back on use, saying that her friends would think she's a loser.

MI Prompt #11: A client is diligent about completing group work, including all homework assigned and states, "I would love to stop using meth but I'd never get anything done if I did."


MI Prompt #12: A client enters session visibly angry and yelling about how he is "so pissed at my girlfriend because she won't share her meth with me."

MI Prompt #13: During a group session, a more senior member of the group calls a newer individual who is attempting to cut down on meth use "a loser who can't get their life together. You just need some tough love."

MI Prompt #14: During a consultation, you suggest a referral for psychotropic meds to assist your client with co-occurring issues related to meth and depression; the client refuses, saying, "It's a dumb idea and won't help. Using those drugs is just a scam started by big pharma to put trackers in everyone."

MI Prompt #15: A new client has been irritable throughout session, sweating and fidgeting in his seat. At one point he says to you, "A client tells you that you'd never understand what they're going through because you've never used drugs before."

MI Prompt #16: You discover that a client has relapsed due to a connection he made with a previously discharged client who is now selling him meth.



MI Prompt #17: A client makes repeated lewd comments about other group members and, when confronted in group, denies that he said those things.

MI Prompt #18: You attempt to guide the group through a mindfulness exercise. In the middle of it, a client stands up and, visibly flushed, says loudly, “This isn’t working! It’s too hot in here? Is anyone else really hot?”

MI Prompt #19: A client discloses that, due to relapse, he’s violated his parole; he asks you to not tell his probation officer.

MI Prompt #20: A client who had previously managed to cut down on meth use appears sullen and withdrawn in session; when asked about use, the client responds, “What does it matter; you’ve never used, so you don’t get it.”