

# Neuroscience of Psychoactive Substance Use and Dependence Joint Publication of PAHO and OAS/CICAD

Ms. Laura Anne Krech, MPH  
Technical Officer on Alcohol and Substance Abuse  
Pan American Health Organization

## Neurociencia del consumo y dependencia de sustancias psicoactivas



  
Organización  
de las  
Américas  
Panamericanas  
  
Caribbean  
Institute for  
Research on  
Addiction  
and Drug  
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## Book Overview

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|--|---|
| 1) Introduction  | 5) Genetic Basis of Substance Dependence                |
| 2) Brain Mechanisms: Neurobiology and Neuroanatomy             | 6) Concurrent Disorders                                 |
| 3) Biobehavioural Processes Underlying Dependence              | 7) Ethical Issues                                       |
| 4) Psychopharmacology of Dependence for Different Drug Classes | 8) Conclusion and Implications for Public Health Policy |

## 1. INTRODUCTION

- Psychoactive substances and their sociolegal status
- Global trends in alcohol, tobacco and other drug use and burden
- Adverse effects of psychoactive substances and their mechanisms of action
- Substance dependence in relation to neuroscience

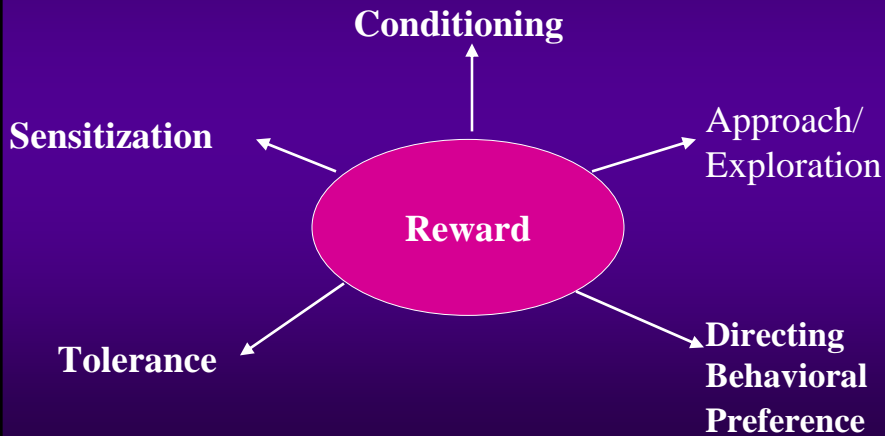
## MAIN RISK FACTORS FOR THE BURDEN OF DISEASE IN THE AMERICAS

### % OF TOTAL DALYS

High Mortality		Low Mortality		Very Low Mortality	
Alcohol	5.5%	Alcohol	11.4%	Tobacco	13.3%
Low birth weight	5.3%	Overweight	4.2%	Alcohol	7.8%
Unsafe sex	4.8%	Blood Pressure	4.0%	Overweight	7.5%
Unsafe water/sanitation	4.3%	Tobacco	3.7%	Blood pressure	6.0%
Overweight	2.4%	Cholesterol	2.3%	Cholesterol	5.3%
Blood Pressure	2.2%	Unsafe sex	2.1%	Low fruit/veg intake	2.9%
Iron Deficiency	1.9%	Lead exposure	2.1%	Physical inactivity	2.7%
Indoor smoke(fuels)	1.9%	Low fruit/veg intake	1.8%	Illicit Drugs	2.6%
Cholesterol	1.1%	Unsafe water/sanitation	1.6%	Unsafe sex	1.1%
Low fruit/veg intake	0.8%	Physical inactivity	1.4%	Iron deficiency	1.0%

### 3. BIOBEHAVIOURAL PROCESSES UNDERLYING DEPENDENCE

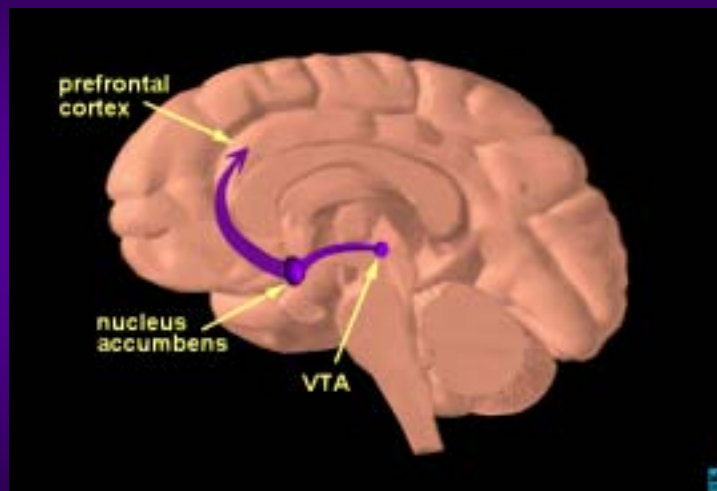
#### Relevance of Reward Functioning to Motivation and Dependence Processes



## DRUG REWARD ALONE DOES NOT EXPLAIN DRUG DEPENDENCE

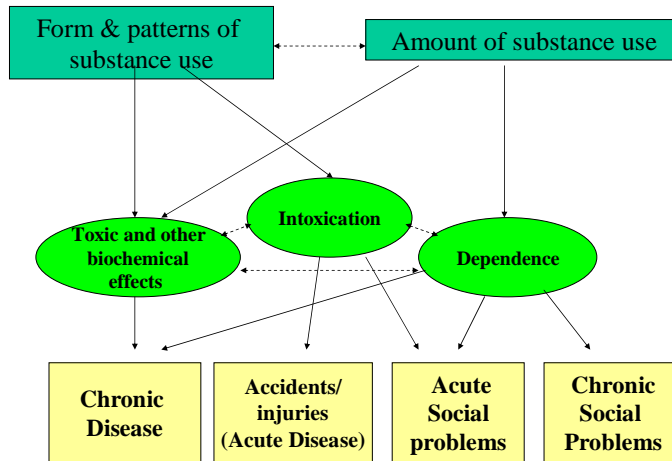
- Positive sensations can explain use
- Most people try, but most do not become dependent
- How does compulsive use and drug seeking occur?
- What explains the inability to control or to stop use?

## Mesolimbic dopamine pathway



<http://www.drugabuse.gov/pubs/teaching/largegifs/slide-9.gif>

## MECHANISMS RELATING PSYCHOACTIVE SUBSTANCE USE TO HEALTH AND SOCIAL PROBLEMS



### 4. PSYCHOPHARMACOLOGY OF DEPENDENCE FOR DIFFERENT DRUG CLASSES

- Alcohol
- Tobacco
- Cannabinoids
- Amphetamines
- Volatile solvents
- Sedatives and hypnotics
- Opioids
- Cocaine (hydrochloride and crack)
- Ecstasy
- Hallucinogens

### 5. GENETIC BASIS OF SUBSTANCE DEPENDENCE

- Family, twin and adoption studies
- Social and cultural aspects
- Risk and protective factors

## **6. CONCURRENT DISORDERS**

- Theories to explain comorbidity
- Schizophrenia and depression

## **7. ETHICAL ISSUES**

- Ethical principles in human biomedical research and animal research
- Emerging ethical issues in neuroscience research

## **8. CONCLUSIONS AND IMPLICATIONS FOR PUBLIC HEALTH POLICY**

- All psychoactive substances can be harmful to health.
- Experimentation does not necessarily lead to dependence.
- Harm to society is not only caused by individuals with substance dependence.

## 8. CONCLUSIONS (CONT.)

- Substance dependence is a complex disorder with biological mechanisms affecting the brain and its capacity to control substance use.
- Substance dependence is not a failure of will or of strength of character but a medical disorder that could affect anyone.

## 8. CONCLUSIONS (CONT.)

- Treatment is cost-effective; it saves lives, thereby improving health and reducing costs on society.
- Investments in neuroscience research must continue and expand to include the social sciences, prevention, treatment, and policy research.

Thank you very much!!!

On behalf of PAHO, I would like to thank you for the attention and the opportunity to present this book. I would also like to thank CICAD/OAS for their financial support to publish this book in Spanish.