BRIEF REPORT

2017 CALDAR Summer Institute and International Conference Promoting Global Health

Program

Tuesday August 15, 2017.

7:00 am	Registration/breakfast.
8:00 am-11:45 am	**Workshop 1:** Introduction to Longitudinal Data Analysis using Mixed Models.
	Donald Hedeker, Ph.D., University of Chicago, IL, USA.
	Workshop 2: An Introduction to Economic Evaluation in Substance Use Disorders.
	Bruce Schackman, Ph.D., Cornell University, NY, USA.
	Sean Murphy, Ph.D., Cornell University, NY, USA.
11:45 am-1:15 pm	Lunch.
1:15 pm-5:00 pm	**Workshop 3:** Ecological Momentary Assessment: Data collection methods and analytic approaches.
	Genevieve Dunton Ph.D., University of Southern California, CA, USA.
	Donald Hedeker Ph.D., University of Chicago, IL, USA.
	Workshop 4: Data Science: Data-mining health records for clinical decision support & Tutorial on deep learning for the addiction researcher.
	Jonathan H. Chen, M.D., Ph.D., Stanford University, CA, USA.
	Sean X. Luo, M.D., Ph.D., Columbia University, NY, USA.

Wednesday August 16, 2017

7:00 am	Registration/breakfast.
8:30 am-8:40 am	Conference kick-off/welcome.
8:40 am-9:30 am	**Keynote.**
	Kimberly A. Johnson, Ph.D., Center for Substance Abuse Treatment, SAMHSA, MD, USA.
	How the opioid epidemic can be addressed with what we have learned from HIV.
9:30 am-11:00 am	**Symposium 1.** Long-Term Treatment Outcomes for Opioid Use Disorder.
	Chair: Betty Tai, Ph.D., NIDA, NIH, MD, USA.
	Discussant: Andrew Saxon, M.D., VA Puget Sound Health Care System, WA, USA.

Speakers:
Roger Weiss, M.D., Harvard Medical School, MA, USA.
The Prescription Opioid Addiction Treatment Study: Long-Term Follow-Up Outcomes.

Yih-Ing Hser, Ph.D., University of California, Los Angeles, CA, USA.
The Long-Term Follow-Up of the START (Starting Treatment with Agonist Replacement Therapies) Study.

Edward V. Nunes, M.D., Columbia University, NY, USA.
Naltrexone Treatment of Opioid Use Disorder: Outcomes and Future Directions.

Constance Weisner, Dr.P.H., M.S.W., Kaiser Permanente Northern California Division of Research, CA, USA.
Predictors and Outcomes Associated with Opioid Use Disorder, Based on the Electronic Health Records in a Large Healthcare System.

11:00–12:00 pm   **Special Lectures.**
                        Chair: Linda Chang, M.D., University of Maryland, MD, USA.

                        Speakers:
                        Walter Ling, M.D., University of California, Los Angeles, CA, USA.
                        The Current US Opioid Crisis: How We Got Here, and Now What.

                        Howard Gendelman, M.D., University of Nebraska, NE, USA.
                        LASER ART.

12:00 am-1:30 pm   Lunch.

1:30 pm-3:00 pm   **Symposium 2**. Substance use, HIV, and care in Asian countries.
                        Chair: Gene-Jack Wang, M.D., NIAAA, NIH, MD, USA.

                        Speakers:
                        Min Zhao, M.D., Ph.D., Shanghai Mental Health Center, Shanghai, China.
                        Drug Abuse Treatment and HIV Prevention in China.

                        Amit Chakrabarti, M.D., National Institute of Occupational Health, Kolkata, India.
                        Substance Use and HIV among Migrant Workers in India: Evidence, Challenges and Interventions.

                        Heesun Chung, Ph.D., Chungnam National University, Daejeon, South Korea.
                        Prevalence of New Psychoactive Substances in Northeast Asia from 2007 to 2015.

                        Jih-Heng Li, Ph.D., Kaoshueng Medical University, Kaohsiung City, Taiwan.
                        Essentiality of Effective Legislative Management for NPS Control: Lessons Learned from the Comparative Study on NPS Abuse Situation Between Taiwan and Korea.

                        Le Minh Giang, Ph.D., Hanoi Medical University, Hanoi, Vietnam.
                        Substance Use Disorders and Responses in Vietnam: The Prospect and Challenges in Ending the HIV Epidemic among PWIDs.

                        Symposium 3. Technology-based Interventions to Addiction Research.
                        Chair: Edward V. Nunes, M.D., Columbia University, NY, USA.

Speakers:
Cathy J. Reback, Ph.D., Friends Research Institute, Inc., CA, USA.
Theory-based Text Messages Reduce Methamphetamine Use and HIV Sexual Risk Behaviors among MSM.

Kenzie L. Preston, Ph.D., NIDA Intramural Research Program, NIH, MD, USA.
Mobile Delivery of Addiction Interventions.

Di Liang, Ph.D., University of California, Los Angeles, CA, USA.
A Pilot Trial of a Smartphone Application Supporting Recovery from Addiction in Shanghai, China.

Emily A. Scherer, Ph.D., Dartmouth College, NH, USA.
Modeling Strategies for Intensively Collected Data in a Longitudinal Drug Abuse Study.

3:00 pm-3:15 pm   Break.

3:15 pm-5:00 pm   **Symposium 4.** Seeking a Cure for HIV-AIDS.
                         Chair: Sulie Chang, Ph.D., Seton Hall University, NJ, USA.

                         Speakers:
                         Kamel Khalili, Ph.D., Temple University, PA, USA.
                         Elimination of HIV-1 DNA by CRISPR Technology in Living Animals.

                         Zhiwei Chen, M.D., University of Hong Kong, Hong Kong, China.
                         A Useful Humanized Mouse Model for HIV-1 Cure Research.

                         Zucai Suo, Ph.D., Ohio State University, OH, USA.
                         Long-Term Survival of AIDS Patients Treated with Only Traditional Chinese Medicine.

                         Symposium 5. Cannabis Use and Health effects.
                         Chair: Christine Grella, Ph.D., University of California, Los Angeles, CA, USA.
                         Discussant: Karen Miotto, M.D., University of California, Los Angeles, CA, USA.

                         Speakers:
                         Mary-Lynn Brecht, Ph.D., University of California, Los Angeles, CA, USA.
                         Trends in Selected Indicators of Marijuana Use and Consequences.

                         Gene-Jack Wang, M.D., NIAAA, NIH, MD., USA.
                         Imaging of Brain Dopamine System in Cannabis Abusers.

                         Itai Danovitch, M.D., Cedars-Sinai Medical Center, CA, USA.
                         State of the Art Treatments for Cannabis Use Disorders.

                         Larissa Mooney, M.D., University of California, Los Angeles, CA, USA.
                         Medical and Psychiatric Effects of Cannabis Use.

5:00 pm-7:00 pm   **Reception/Poster Session.**

Thursday August 17, 2017.

7:00 am   Registration/breakfast.

8:00 am-9:30 am   **Symposium 6.** Precision Medicine and its Implication in the Treatment of Substance Use Disorders.
Chair: Ming D. Li, Ph.D., Zhejiang University, Hangzhou, China & Seton Hall University, NJ, USA.

Speakers:
Ming D. Li, Ph.D., Zhejiang University, Hangzhou, China & Seton Hall University, NJ, USA.
Precision Prevention and Precision Treatment.

Xiangxing Chen, Ph.D., University of Nevada, NV, USA.
Inclusion of Genetically Correlated Psychiatric Disorders to Improve the Diagnosis of Schizophrenia.

Li-Shiun Chen, M.D., M.P.H., Sc.D., Washington University, MO, USA.
Can We Clear the Smoke? From Genes to the Bedside.

Madhavan Nair, Ph.D., Florida International University, FL, USA.
Getting in to the Brain: Potential of Nanotechnology to Manage Neuro-AIDS and Drug Addictions.

9:30 am-11:00 am   **Symposium 7.** The Cascade of Care in Vietnam: From Communities to Codons.
Chair: Gavin B. Bart, M.D., Ph.D., University of Minnesota, MN, USA.

Speakers:
Gavin B. Bart, M.D., Ph.D., University of Minnesota, MN, USA.
Using Precision Medicine to Improve Methadone Dosing: Initial Concepts.

Le Minh Giang, M.D., Ph.D., Hanoi Medical University, Hanoi, Vietnam.
Ambivalence and Silence: Family and PWIDs in an Urban Setting in Vietnam.

Li Li, Ph.D., University of California, Los Angeles, CA, USA.
Enhancing Community Health Workers' Role in HIV and Drug Control in Vietnam.

David S. Metzger, Ph.D., University of Pennsylvania, PA, USA.
Integrated Treatment for Opioid Addiction in an HIV clinic in Ho Chi Minh City.
(HCMC), Vietnam.

Todd Korthuis, M.D., M.P.H., Oregon Health & Science University, OR, USA.
Implementation of Office-based Buprenorphine in Vietnam HIV Clinics.

11:00 am-12:00 am   Participant oral presentation (TBN).
Chair: Larissa Mooney, M.D., University of California, Los Angeles, CA, USA.

12:00 am-1:30 pm   Lunch.

1:30 pm-3:00 pm   **Symposium 8.** Electronic Records-based Research and Applications.
Chair: Yih-Ing Hser, Ph.D., University of California, Los Angeles, CA, USA.

Speakers:
Jonathan H. Chen, M.D., Ph.D., Stanford University, CA, USA.
Opioid Prescribing Distribution: What if it's not just a few Bad Apples?

Fei Wu, Ph.D., Los Angeles County Chief Executive Office, CA, USA.
The Services Homeless Single Adults Use and their Associated Costs: An Examination of Utilization Patterns and Expenditures over One Fiscal Year.

Larissa Mooney, M.D., University of California, Los Angeles, CA, USA.
Chronic Pain and Mortality among Patients with Opioid Use Disorder in a Large Healthcare System.

Elizabeth Evans, Ph.D. Veterans Administration, CA & University of Massachusetts, MA, USA.
Prospects of Mining Big Data for Longitudinal Substance Abuse Research.

Symposium 9. The Adolescent Brain Cognitive Development (ABCD) Study.
Chair: Linda Chang, M.D., University of Maryland, MD, USA.

Speakers:
Terry Jernigan, Ph.D., & Sandra Brown, Ph.D., University of California, San Diego, CA, USA.
Overview of the ABCD Study by the Coordinating Center.

Anders Dale, Ph.D., University of California, San Diego, CA, USA.
Data Acquisition, Analyses and Informatics for the ABCD Study.

Elizabeth Sowell, Ph.D., University of Southern California, CA, USA.
Biospecimens from the ABCD Study.

3:00 pm-3:15 pm	Break.

3:15 pm- 4:45 pm   **Symposium 10.** State Responses to the Nation's Opioid Crisis.
Chair: Gavin B. Bart, M.D., Ph.D., University of Minnesota, MN, USA.

Speakers:
Kimberly A. Johnson, Ph.D., Center for Substance Abuse Treatment, SAMHSA, MD, USA.

Marlies Perez, California Department of Health Care Services, CA, USA.
California's MAT Expansion Project.

Mike Small, Department of Justice, CA, USA.
CURES 2.0 Features: CA Prescription Drug Monitoring Program.

Kelly Pfeifer, M.D., California Health Care Foundation, CA, USA.
Making Medication-Assisted Treatment Work in Primary Care.

Thomas Alfieri, Ph.D., Purdue Pharma L.P., CT, USA.
Measuring the Impact of a Statewide Initiative to Increase Use of the Virginia PDMP.

4:45 pm-5:00 pm   Wrap-up and Adjourn.

Workshops

Introduction to Longitudinal Data Analysis using Mixed Models

Donald Hedeker[1]; [1]University of Chicago, IL, USA.

Mixed models (aka multilevel or hierarchical linear models) are increasingly used for analysis of longitudinal data in many research areas. A basic characteristic of these models is the inclusion of random subject effects to account for the influence of subjects on their repeated observations. These random subject effects describe each person's growth across time and explain the correlational structure of the longitudinal data. In addition, they indicate the degree of subject variation that exists in the population of subjects. An important advantage of mixed models is that they do not require subjects to be measured at all study time points, thus subjects with incomplete data across time are included in the analysis. This workshop will focus on describing mixed models for continuous outcomes in a very practical way. It will be shown that these models can be seen as extensions of ordinal multiple regression models. Following the multilevel or HLM approach, the within- and between-subjects components of the model will be described. Several analyses of a psychiatric longitudinal dataset will be illustrated in order to carefully describe the key features of mixed models for longitudinal data analysis. In terms of computer application, examples using SAS, STATA, SPSS, and Supermix will be presented and illustrated.

An Introduction to Economic Evaluation in Substance Use Disorders

Bruce Schackman[1] and **Sean Murphy**[1]; [1]Cornell University, NY, USA.

The course will provide an introduction to economic evaluation methods used to evaluate health care interventions, with a focus on cost-effectiveness analysis (CEA) of interventions for substance use disorders. The course will introduce students to concepts relevant to measurement of costs, health utilities, and quality adjusted life years (QALYs) and their use in CEA. Student will gain a basic understanding of how CEA simulation models and clinical studies are developed, analyzed and interpreted, giving them skills to understand the literature and to consider how economic evaluation could be applied to their own research. Course Program includes (1) *Introduction & Motivation* : Discuss the relevance of economic evaluation of interventions for substance use disorders and introduce resources available from the NIDA-funded Center for Health Economics of Treatment Interventions for Substance Use Disorders, HCV, and HIV (CHERISH), (2) *Costing Methods and Practice:* Provide an overview of what is a "cost" versus a "charge" versus a "payment," what costs to include in an economic evaluation, how to measure or estimate costs, and how to address measurement uncertainty. Examples will be drawn from recent studies of HIV and HCV testing and care linkage in substance use treatment settings, (3) *Introduction of Health Utilities and QALYs:* Provide an overview of quality of life measures, differences between directly assessed and community-derived measures, the relationship between quality of life and health utility, and why we use QALYs in CEA. Examples will be drawn from recent studies of quality of life in opioids use disorder, and (4) *Cost-Effectiveness Analysis:* Provide an overview of CEA methods and study designs, basic simulation model building, and model inputs and interpretation, with examples drawn from CEAs of health interventions in substance users.

Methods, Applications, and Statistical Analyses for Ecological Momentary Assessment Data

Genevieve Dunton[1] and **Donald Hedeker**[2]; [1]University of Southern California, CA, USA. [2]University of Chicago, IL, USA.

With recent advancements in smartphone technology, Ecological Momentary Assessment (EMA) methods are becoming increasingly common in psychological, behavioral, and epidemiological settings. EMA data are collected frequently and can examine dynamic behavioral changes and associations across short time scales such as hours and days. In light of these characteristics, the utility of EMA methods have become evident for studying health behaviors that reduce risks for chronic disease. This workshop will cover basic methods, applications, and statistical analytic strategies for EMA data. The first part of the workshop will highlight several key ways in which EMA can advance our understanding of health behaviors, and discuss study design and sampling issues for collecting EMA data. It will describe how EMA can address questions about synchronicity, sequentiality, and instability. The second part will focus on statistical analysis of EMA data. Data from EMA studies are inherently multilevel with, for example, (level-1) observations nested within (level-2) subjects. Thus, mixed models (aka multilevel or hierarchical linear models) are increasingly used for EMA data analysis. In this workshop, use of mixed models for analysis of EMA data will be described, and in particular, the treatment of occasion-varying covariates, and the decomposition of the within-subjects (WS) and between-subjects (BS) effects of such covariates. Furthermore, because there are so many measurements per subject, models for relating covariates to the WS and BS variance will be described. Such extended mixed models can be used to assess the determinants of inter-individual and between-subjects variation. Examples will be provided from several EMA datasets that collect information

on time-varying predictors of physical activity and dietary intake. Challenges and limitations of collecting and analyzing EMA data in behavioral research will also be discussed.

Wisdom of the Crowd or Tyranny of the Mob? Data-Mining Health Records for Clinical Decision Support

Jonathan H. Chen[1]; [1]Stanford University, CA, USA

Medical decision making is fraught with both uncertainty and undesirable variability. The vast majority of our clinical decisions lack adequate evidence to determine their efficacy and inconsistent implementation compromises quality and efficiency. The current standards in clinical decision support reinforce best-practices but are limited in scalability by manual production. "Grand challenges" thus include mining clinical data sources to automatically generate decision support content. Statistical approaches allow us to learn patterns that reflect real-world standards of care vs. outliers. I will review my efforts developing a collaborative filtering machine-learning approach to clinical order entry, analogous to Netflix or Amazon.com's "Customer's who bought A also bought B" algorithm. This automatically generated decision support content can reproduce, and even optimize, manual constructs like order sets while remaining largely concordant with guidelines and avoiding inappropriate recommendations. This has even more important implications for prevalent cases where well-defined guidelines do not exist. The same methodology is predictive of clinical outcomes comparable to state-of-the-art risk prediction models. Using such methods on routinely generated real-world clinical data will allow us to build knowledge for the future, even as we enhance care today, in a closed-loop learning health system.

Tutorial on Deep Learning for Addiction Researchers – Opening the Hood

Sean X. Luo[1]; [1]Columbia University, NY, USA.

When you type the word "cigarette" into Google Image search, hundreds of photos of cigarettes pop up on your screen. How does the computer identify images of cigarettes of various angles, sizes and levels of abstraction (i.e. drawing versus photo) from hundreds of millions of photos of all kinds of objects? The engineering principle behind the underlying algorithm is called "Deep Learning". In the past 5 years Deep Learning has made significant progress in several areas in artificial intelligence in which models can achieve close to human-level performance: machine translation, vision and speech recognition. Is it possible that similar methods can be applied to addiction research? In this workshop, I aim to first review traditional statistical frameworks in addiction research, and their common limitations and pitfalls. I will then review "classical" machine learning methods, which represent a computer science counterpart to

multivariate statistics. Finally, I will present the principles of Deep Learning and recurrent neural networks. The focus of the tutorial will be conceptual and to create collaborative pathways for addiction researchers to work together with engineers, rather than technical details. A variety of case study and interactive demos will be used.

Symposia

Symposium 1

Long-term Treatment Outcomes for Opioid Use Disorder

Edward Nunes[1], **Roger Weiss**[2], **Constance Weisner**[3], **Yih-Ing Hser**[4], **Andrew Saxon**[5], **Betty Tai**[6]; [1]Columbia University, New York, NY, USA. [2]Harvard University, Cambridge, CA, USA. [3]University of California, San Francisco, San Francisco, CA, USA. [4]University of California, Los Angeles, Los Angeles, CA, USA. [5]University of Washington, Seattle, WA, USA. [6]Center for Clinical Trials Network, National Institute on Drug Abuse.

Much is known about the acute treatment of opioid dependence. Medications (methadone, buprenorphine, injection naltrexone) are effective, but the relapse rate is high after acute detoxification and if the patient is not maintained in the medication treatment. Less is known about the long-term prognosis and management of opioid dependence. Studies on the long-term course of opioid use can inform the long-term management of patients with opioid use disorder. Chaired by Dr. Betty Tai, this symposium will bring together lead investigators to present findings of long-term follow-ups on cohorts of patients entered into clinical trials in the National Drug Abuse Clinical Trials Network (CTN) and related studies. Dr. Roger Weiss will present a follow-up over 42 months after enrollment in CTN-0030 (POATS), a multi-site trial of buprenorphine for patients with prescription opioid dependence, examining patterns and predictors of long-term outcomes of opioid dependence. Dr. Yih-Ing Hser will present follow-up data over 4–7 years after enrollment in CTN0027, a multi-site 6-month trial comparing buprenorphine to methadone maintenance. Dr. Edward Nunes will present 18-month follow-up data on a NIDA-funded, multi-site, 6-month trial of injection naltrexone for opioid dependence. General patterns across the studies include that relapse rates after discontinuation of medication are substantial, but a minority of patients are able to remain abstinent off of medication. Dr. Constance Weisner will present predictors and outcomes associated with opioid use disorder, based on the electronic health records in a large healthcare system. Dr. Andrew Saxon will lead a panel discussion and will focus on the implications of the findings for the long-term management of patients with opioid dependence.

Symposium 2

Drug Abuse Treatment and HIV Prevention in China

Youwei Zhu[1], Jiang Du[1], Haifeng Jiang[1], **Min Zhao**[1*];
[1]Shanghai Mental Health Center, Shanghai Jiao Tong
University School of Medicine, Shanghai, China.
[*]Corresponding author

The escalation of drug abuse and its association with increased
risk of HIV/AIDS have long been public health concerns in
China. The current overall HIV infection rates among drug
abusers is 2.96%. Drug abuse treatment is crucial for HIV/
AIDS prevention. Like other countries in the world, China is
also struggling to solving the complex problems through im-
proving care systems and policies toward drug abuse and HIV/
AIDS prevention. There are several drug abuse treatment sittings
in China, voluntary drug abuse treatment centers, methadone
maintenance treatment clinics (MMT), compulsory isolated drug
rehabilitation centers, and community drug abuse treatment and
rehabilitation. Combined medical, physical, behavioral, psycho-
logical as well as social inventions are used to help patients
achieving and maintaining abstinence. For HIV/AIDS preven-
tion, HIV voluntary counseling and testing (VCT) is available in
centers for disease control and prevention (CDC), hospitals and
MMT centers. In addition, all AIDS patients can get free antire-
troviral therapies in specialized hospitals through referral. In ad-
dition, voluntary needle exchange programs are available for
injecting drug users. Although drug abuse treatment and HIV/
AIDS prevention efforts have been improved greatly in China
and evidence-based practices on pharmacological, behavioral,
psychosocial interventions have been implemented, there are still
huge challenges and China is still working hard to improve
systems and policies of health services toward drug abuse and
HIV/AIDS prevention. Policies and regulations such as coordi-
nating among different treatment sittings, exploring new models
of treatment for addiction, creating a good environment for re-
habilitation and promoting research are needed to decrease both
drug abuse and HIV/AIDS in China.

Prevalence of New Psychoactive Substances in Northeast Asia from 2007 to 2015

Junhui Lee[1], Ling-Yi Feng[2], Jih-Heng Li[2,*], and **Heesun
Chung**[1,*]; [1]Graduate School of Analytical Science and
Technology, Chungnam National University, Daejeon,
Korea. [2]School of Pharmacy and Ph.D. Program in
Toxicology, College of Pharmacy, Kaohsiung Medical
University, Kaohsiung, Taiwan.
[*]Corresponding author

The proliferation of new psychoactive substances (NPS) is a
global trend in drug abuse and its regulation is a worldwide
concern. Because there is not enough information available
for the prevalence of NPS in Asian countries, this research
focused on the investigation of legal status of NPS in
Northeast Asian countries, including China, Japan, Korea
and Taiwan in order to provide information on the prevalence
and trends of emerging NPS. This study was performed using
data provided by the Korea Food and Drug Administration,
National Institute of Health Sciences in Japan, China Food
and Drug Administration, and Taiwan Food and Drug
Administration from 2007 to 2015. The results showed that
a total of 940 NPS were reported in 4 countries from 2007 to
2015. It was found that Japan is the most progressive country
in terms of the NPS regulation with 41% of the total number of
controlled NPS in Northeast Asia, followed by South Korea
(21%), China (28%), Taiwan (10%). NPS was broadly sched-
uled in 2011 but the number of scheduled NPS has dramati-
cally increased from 2013 to 2015. Northeast Asia is in danger
of these emerging NPS and the effective regulation across
countries is important for the prevention of NPS.

Essentiality of Effective Legislative Management for NPS Control: Lessons Learned from the Comparative Study on NPS Abuse Situation Between Taiwan and Korea

Ling-Yi Feng[1], Eunyoung Han[2], Heesun Chung[3], **Jih-Heng
Li**[1*]; [1]School of Pharmacy and Ph.D. Program in Toxicology,
College of Pharmacy, Kaohsiung Medical University,
Kaohsiung, Taiwan. [2]College of Pharmacy, Duksung
Women's University, Seoul, Korea. [3]Graduate School of
Analytical Science and Technology, Chungnam National
University, Daejeon, Korea
[*]Corresponding author

Abuse of New Psychoactive Substances (NPS) has become a
new threat to public health and security worldwide. However,
most of NPS remain elusive because of their easy modifica-
tion of chemical structures to shun legal control. To make
evidence-based drug policy and measures, data of NPS-
related seizures and arrests were collected via anti-drug related
agencies of both Taiwan and Korea from 2006 through 2014
for comparison. The results showed that in Taiwan the major
misuse of NPS has been ketamine, while it was seldom found
in Korea. Besides ketamine, the major type of NPS use was
the synthetic cathinones in Taiwan whereas it was the synthet-
ic cannabinoids and phenethylamines in Korea. The differ-
ence in the item numbers of controlled NPS between Taiwan
(23) and Korea (93) may be due to the implementation of
temporary control on NPS in Korea since 2011. Although
the controlled NPS items in Taiwan were far less than those
in Korea, the quantity of total NPS seizures, especially with
ketamine, was much larger in Taiwan than in Korea. To min-
imize and prevent harm from NPS, the authorities and agen-
cies require a careful assessment, evaluation, early

identification, and surveillance about NPS users in a clinical and social setting. In addition, there is a need to construct effective legislative management and provide preventive education to the youth. Furthermore, rapid and precise analytical methods for NPS abuse need to be developed.

Symposium 3

Technology-based Interventions to Addiction Research

Cathy J. Reback[1,2,3], **Kenzie L. Preston**[4], **Emily A. Scherer**[5], **Di Liang**[6], **Edward Nunes**[7]; [1]Friends Research Institute, Inc. [2]Semel Institute of Neuroscience and Human Behavior, University of California, Los Angeles, Los Angeles, CA, USA. [3]UCLA Center for HIV Identification Prevention and Treatment Services, Los Angeles, CA, USA. [4]NIDA Intramural Research Program, Baltimore, MD, USA. [5]Dartmouth College, Hanover, NH, USA. [6]Integrated Substance Abuse Programs, University of California, Los Angeles, CA, USA. [7]Columbia University, New York, NY, USA.

The rapid advancement in technology and widespread availability of smartphones and other mobile devices have opened opportunities for assessments and interventions that were previously not possible in addressing substance use disorders and other physical and mental health concerns. At the same time, challenges remain in harnessing mobile technologies to improve addiction treatment and prevention, as well as strategies for analyzing intensive longitudinal data in drug abuse research. Chaired by Dr. Edward Nunes, this session will include presentations of findings from several technology-based intervention studies, as well as analytic methods for intensive data collected. Dr. Cathy J. Reback will present findings from a technology-based randomized controlled trial testing theory-based text messages in reducing methamphetamine use and HIV sexual risk behaviors among MSM. Dr. Kenzie L. Preston's addiction-research clinic has incorporated ambulatory assessment of behavior, mood, and environment (using smartphones and GPS) into large natural-history studies to collect field data for the design and delivery of an empirically based just-in-time mobile intervention. She will present the use of both person-level factors (including sex differences) and momentary factors (such as exposure to stressors and other drug-use triggers) to predict incipient risk of drug craving or drug use. Dr. Di Liang will present findings based on a pilot trial conducted in Shanghai, China, of a smartphone application supporting recovery from addiction. Dr. Emily A. Scherer will describe the methodology for analyzing intensively collected data in longitudinal drug abuse research, including some innovative methods that allow for addressing research questions not possible with less intensive data collection.

Theory-based Text Messages Reduce Methamphetamine Use and HIV Sexual Risk Behaviors among MSM

Cathy J. Reback[1,2,3], Jesse B. Fletcher[1], Dallas Swendeman[3]; [1]Friends Research Institute, Inc. [2]Semel Institute of Neuroscience and Human Behavior, University of California, Los Angeles, Los Angeles, CA, USA. [3]UCLA Center for HIV Identification Prevention and Treatment Services, Los Angeles, CA, USA.

Methamphetamine (MA)-using men who have sex with men (MSM) and/or African American/Black MSM continue to exhibit high rates of HIV. A RCT tested the efficacy of text messages to reduce MA use and HIV risks among MSM. 286 MSM enrolled in an 8-week, gay-specific, theory-based text-messaging intervention to decrease MA use and HIV risks. Participants were randomized into 1 of 3 arms: a weekly assessment and 5 daily auto messages plus real-time text conversations (TXTPHE); assessment plus 5 daily messages (TXT-Auto); assessment only (AO). Follow-up assessments occurred at 8-weeks (84%) and 3- (90%), 6- (86%), and 9-months (93%) post-enrollment. Participants were mostly non-white (80%), HIV-negative (59%), averaged 42 years (SD=11), and had severe MA use disorder (DSM-5; 64%). Robust negative binomial panel regressions showed that from baseline to 9month follow-up, participants significantly reduced days of MA use ($IRR_{PHE}=0.70$; $IRR_{Auto}=0.67$; $IRR_{AO}=0.55$), sex while on MA ($IRR_{PHE}=0.65$; $IRR_{Auto}=0.35$; $IRR_{AO}=0.55$), casual male sex partners ($IRR_{PHE}=0.57$; $IRR_{Auto}=0.46$; $IRR_{AO}=0.41$), anonymous male sex partners ($IRR_{PHE}=0.43$; $IRR_{Auto}=0.27$; $IRR_{AO}=0.46$), and condomless anal intercourse (CAI) with casual partners ($IRR_{PHE}=0.49$; $IRR_{Auto}=0.22$; $IRR_{AO}=0.28$) and exchange partners ($IRR_{PHE}=0.32$; $IRR_{Auto}=0.05$; $IRR_{AO}=0.05$). Only participants in the TXT-Auto significantly reduced CAI with anonymous partners ($IRR_{Auto}=0.15$). All arms demonstrated equivalent efficacy across both HIV-positive and HIV-negative participants; superior sexual risk outcomes were observed among racial/ethnic minority participants and participants diagnosed with a severe MA use disorder, two extremely high-risk priority populations.

Mobile Delivery of Addiction Interventions

Kenzie L. Preston[1]; [1]NIDA Intramural Research Program, Baltimore, MD, USA.

Addiction is an especially good target for mobile interventions because the risk of relapse persists for years after the end of treatment and because the content of addiction treatment is

usually amenable to delivery on mobile devices. Our addiction-research clinic has incorporated ambulatory assessment of behavior, mood, and environment (using smartphones and GPS) into large natural-history studies to collect field data for the design and delivery of a just-in-time mobile intervention. We are using our field data to develop future-predicting mobile interventions that are far more empirically grounded than any that are now available. Data will be presented on the use of both person-level factors (including sex differences) and momentary factors (such as exposure to stressors and other drug-use triggers) to predict incipient risk of drug craving or drug use. These data will be discussed in the context of challenges in harnessing mobile technologies to improve treatment and prevention.

Symposium 4.

Seeking a Cure for HIV-AIDS

Sulie L. Chang[1]; [1]Seton Hall University, South Orange, NJ, USA

HIV/AIDS researchers have been seeking for a cure for HIV-AIDS. Three AIDS investigators will present their different approaches at finding an HIV cure.

Dr. Kamel Khalili's cure strategy for HIV-1infection and AIDS is a paradigm shift. He and his research team at Temple University School of Medicine first directly eliminate the proviral genome from HIV positive cells and eliminate the infected cells harboring latent virus. Dr. Khalili's group and his collaborators including Drs. Brian Wigdahl (Drexel University College of Medicine), Fatah Kashanch (George Mason University), Madhavan Nair (Florida International University), Howard Gendelman (University of Nebraska Medical Center), Jonathan Karn (Case Western Reserve University) and Rosemarie Booze (University of South Carolina) and their teams have applied CRISPR/Cas9 system in a variety of methods including plasmid, lentiviral and Adeno-associated virus to cell models for latency, *in vitro* HIV-1 infection of CD4+ T-cells from HIV-1 positive patients and transgenic animals encompassing multiple integrated copies of HIV-1. Dr. Khalili will share the success of their gene editing strategies in excising HIV-1 viral genes from HIV transgenic animals and from primary cell culture of the HIV patients and address that CRISPR/Cas9 is an effective, precise, efficient and safe strategy for eradication of HIV-1 in several laboratory models. Dr. Khalili's studies assure advancement of their gene editing molecules toward clinical trials of AIDS cure.

There has been a hope that immunotherapy could be used to functionally cure HIV. Dr. Zhiwei Chen from The University of Hong Kong will share their novel strategy of the passive immunization using broadly neutralizing antibodies (bnAbs) in a humanized mouse model. Their studies show that a single gene-encoded engineered bnAb (ebnAb) could neutralize all HIV- 1 strains tested, the soluble ebnAb alone showed complete protection when administered prior to diverse live HIV-1 challenges although unable to halt viral rebound, AAV-transferred ebnAb gene, in a single injection, resulted in post- exposure viremia control and subsequent elimination of infected splenocytes. Dr. Chen's studies warrant clinical development of ebnAb to cure AIDS with genetically divergent HIV-1 subtypes.

Traditional Chinese herbal medicine (TCM) has been used in Chinese society for more than 5,000 years to treat diseases from inflammation to cancer. Dr. Zucai Suo, from The Ohio State University, will share their intriguing discovery of long-term survival of AIDS patients treated with traditional Chinese medicine. Early this year, Dr. Suo and his collaborator reported traditional Chinese medicine in HIV cure based on an unreported study started in the early 2000s that nine AIDS patients, ages 51-67, are currently in good health. These individuals were treated with a unique formula of TCM from 2001- 2006 or longer, with or without occasional antiviral therapy added later. These patients currently have low or undetectable HIV in their systems suggesting a potential promise of TCM as a functional cure for HIV-AIDS. Dr. Suo's reversed translational studies in animal models based on this discovery, if successful, would convince the use of TCM in cure AIDS.

Elimination of HIV-1 DNA by CRISPR Technology in Living Animals

Kamel Khalili[1]; [1]Department of Neuroscience/Center for Neurovirology, Lewis Katz School of Medicine at Temple University, Philadelphia, Pennsylvania USA.

AIDS remains an incurable disease despite current antiretroviral drugs that suppress HIV-1 replication, but fail to eliminate the virus. Thus, a novel strategy that permanently eliminates latent virus is needed to achieve a cure for AIDS. We employed CRISPR technology and developed a gene editing strategy that eliminates integrated proviral DNA from the host genome and protects cells against the spread of the virus and re-infection. Our technology is harmless to cells, precise, and can be easily administered to living animal models harboring the HIV-1 genome. We created an all in one gene editing platform that by targeting HIV-1 DNA and excising a 978 bp viral DNA integrated host genome and simultaneously editing the cellular receptor gene responsible for viral infection, permanently suppressing viral replication. IV inoculation of our gene editing molecule is widespread in an in vivo animal model and excises viral DNA in transgenic mice

harboring multiple copies of the viral DNA. This strategy efficiently edits HIV-1 in humanized mice programmed with HIV-1 infected blood cells from patients. The CRISPR gene editing platform can be utilized to advance to clinical trials for a cure for AIDS.

A Useful Humanized Mouse Model for HIV-1 Cure Research

Zhiwei Chen[1]; [1]AIDS Institute and Department of Microbiology, Research Center for Infection and Immunity, State Key Laboratory of Emerging Infectious Diseases, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong SAR, China.

Passive immunization using broadly neutralizing antibodies (bnAbs) is a novel strategy for HIV-1 prophylaxis and immunotherapy. In HIV-1 immunotherapy studies, treatment efficacy using combined antiretroviral (cART) drugs and bnAb remains incompletely investigated. Here, we report the establishment of a humanized mouse model for HIV cure research. We found that cART alone, provided as early as 3-4 days post live HIV-1 infection, could not prevent the establishment of viral latent reservoir in this humanized mouse model. Viral load rebound took place quickly after we stopped cART. We then tested a potent engineered bnAb (ebnAb) in this model. We found that ebnAb alone conferred complete protection when administered prior to diverse live HIV-1 challenges but was unable to halt viral rebound in a therapeutic setting. Similar results were obtained when ebnAb was tested in combination with cART. To our surprise, however, a single intramuscular injection of AAV-transferred ebnAb gene resulted in post-exposure viremia control in negative correlation with peripheral antibody concentration, and subsequent elimination of infected splenocytes as confirmed by virus outgrowth and adoptive transfer experiments. Our findings indicated that a relatively prolonged high level of ebnAb is likely needed to eliminate latently infected splenocytes as compared with the therapeutic effects of the cART/ebnAb regimen. Our results, therefore, establish a useful humanized mouse model for HIV-1 cure research and warrant the clinical development of our ebnAb for immunotherapeutic cure of HIV-infection.

Long-Term Survival of AIDS Patients Treated with Only Traditional Chinese Medicine

Zucai Suo[1]; [1]Department of Chemistry and Biochemistry, and Comprehensive Cancer Center, The Ohio State University, Columbus, Ohio, USA.

Traditional Chinese herbal medicine (TCM) has been used in Chinese society for more than 5,000 years to treat diseases from inflammation to cancer. In this presentation, we report the case of nine living AIDS patients in the age range of 51 to 67 who were treated with either a unique formula of TCM alone from 2001 to 2009 or the TCM from 2001 to 2006 and then switched to occasional antiretroviral therapy. Surprisingly, the viral loads of eight patients were at undetectable levels on June 28, 2016 while the remaining patient had a low viral load of 29 copies/ml. The CD4+ counts (170 to 592 cells/μl) and CD4+/CD8+ ratios (0.21 to 0.90) of the nine patients are excellent, contributing to their current good health. Thus, the case study suggests that the TCM has the potential to become a cure for HIV infection.

Symposium 5.

Cannabis Use and Health Effects

Larissa Mooney[1], **Mary-Lynn Brecht**[1], **Gene-Jack Wang**[2], **Itai Danvitch**[3], **Karen Miotto**[1], **Christine Grella**[1]; [1]University of California, Los Angeles, Los Angeles, California, USA. [2]Laboratory of Neuroimaging, National Institute on Alcohol Abuse and Alcoholism, Bethesda, MD, USA. [3]Cedars-Sinai Medical Center, Los Angeles, California, USA

Cannabis is the most widely used illicit substance worldwide, and approximately 3 out of 10 users in the United States develop cannabis use disorder (CUD). The potency of THC, the primary psychoactive compound in cannabis, has been rising steadily over the past few decades. Despite the high prevalence of cannabis use, scientific investigation on cannabis use patterns, health effects, and other functional outcomes has been limited. Chaired by Dr. Christine Grella, this symposium will highlight current knowledge on cannabis epidemiology, psychosocial and health effects, as well as evidence-based treatment interventions for CUD. The symposium will conclude with a summary and discussion facilitated by Dr. Karen Miotto. Dr. Mary Lynn Brecht will describe trends for selected indicators of marijuana use and consequences, including treatment admissions, mortality, hospital emergency department admissions, and law enforcement drug seizures.
Using multimodal imaging to assess cannabis abusers, Dr. Gene-Jack Wang will present findings on effects of cannabis in brain dopamine systems.
Dr. Larissa Mooney will describe the pharmacology of cannabis, with a focus on potential therapeutic and adverse effects and functional outcomes in cannabis users. Psychosocial outcomes associated with cannabis use will be discussed, including those related to school performance, employment, and criminal activity. Common psychiatric symptoms and disorders in cannabis users will be reviewed, including early use as a risk factor for development of psychosis. Medical conditions associated with cannabis use will be discussed, and an

overview of potential therapeutic uses of medical cannabis will be provided.

An overview of behavioral and pharmacological treatment interventions for CUD will be presented by Dr. Itai Danovich. The diagnosis of CUD using DSM-5 criteria will be reviewed, and common psychiatric disorders in individuals with CUD will be reviewed with a focus on treatment implications. Though there are no current approved medications for cannabis use disorder, results of clinical pharmacotherapy trials to date will be discussed, with an emphasis on medications that have demonstrated potential efficacy or promise in CUD treatment. Evidence-based behavioral interventions for CUD will also be summarized.

Imaging of Brain Dopamine System in Cannabis Abusers

Gene-Jack Wang[1]; [1]Laboratory of Neuroimaging, National Institute on Alcohol Abuse and Alcoholism, Bethesda, MD, USA.

The expanding legalization of cannabis for medical or recreational purposes in the U.S.A. and in other countries poses a sense of urgency toward addressing the limited evidence regarding potential deleterious effects of cannabis to the human brain. Despite the high prevalence of cannabis consumption worldwide, the effects of cannabis abuse in the human brain are not well understood. We used multimodal imaging to assess the effects of cannabis abuse in the brain dopamine (DA) system. Using PET and [11C]raclopride (radioligand that binds to D2/D3 receptors), we assessed effects of methylphenidate (MP, a drug that elevates extracellular DA) in active cannabis abusers (CA). CA had attenuated behavioral responses and decreased ventral striatal (VS) DA responses to MP. Using PET and 18FDG to measure brain glucose metabolism, CA had lower baseline glucose metabolism in the frontal cortex including anterior cingulate, which was associated with negative emotionality. MP-induced metabolic increases in putamen, caudate, midbrain, thalamus, and cerebellum were significantly attenuated in CA. MP-induced metabolic increases in putamen correlated negatively with addiction severity. Compared fMRI with a sensorimotor reaction time task and PET, we found fMRI signals in CA had weaker DAergic modulation in VS. These deficits might contribute to cannabis's negative emotionality and addictive behaviors.

Symposium 6.

Precision Medicine and Its Implications in the Treatment of Substance Use Disorders

Ming D. Li[1,2], **Xiangxing Chen**[3], **Li-Shiun Chen**[4], and **Madhavan Nair**[5]; [1]Institute of NeuroImmune Pharmacology, Seton Hall University, South Orange, NJ, USA. [2]State Key Laboratory State Key Laboratory for Diagnosis and Treatment of Infectious Diseases, The First Affiliated Hospital, Zhejiang University School of Medicine, Hangzhou, Zhejiang, China. [3]Nevada Institute of Personalized Medicine, University of Nevada, Los Vegas, NV, USA. [4]Department of Psychiatry, Washington University, St Louis, MO, USA. [5]Department of Immunology and Institute of NeuroImmune Pharmacology, Florida International University, Miami, FL, USA

During the past 30 years, significant progress has been made in genetics and biotechnology, especially sequencing techniques. Sequencing instruments and methods have evolved from the original labor intensive, manually operated platforms where only hundreds of nucleotides could be sequenced to almost completely automatic next-generation sequencing platforms where millions of nucleotides can be sequenced per day. Because of these revolutionizing advances in sequencing technologies, not only have there been changes in biomedical research in almost every field but there also have been great challenges to bioinformatics and computing biology. In the fields of precision medicine, personalized medicine, and pharmacogenomics, it has been a significant challenge to identify "powerful" genetic variants that can be used to predict the treatment efficacy or drug response of a patient. This is especially true in today's genomic field, where millions of variants could be easily identified from a patient's DNA with next-generation sequencing technologies. How to utilize these newly generated genetic information in public health and clinics has become a major research area in the biomedical field, which forms the foundation of precision prevention and precision treatment. The main objective of this symposium is to provide an update on this progress and new developments, with the focus on the treatment of drug addictions. In addition to presenting basic concepts and technologies related to precision medicine, each invited speaker will present a summary of what has been accomplished in the past regarding the development of nanomedicine and pharmacogenetics in the treatment of drug addictions and other psychiatric diseases.

Inclusion of Genetically Correlated Psychiatric Disorders to Improve the Diagnosis of Schizophrenia

Xiangning Chen[1], Jingchun Chen[1], Jainshing Wu[1] and Travis Mize[1]; [1]University of Nevada Las Vegas, Las Vegas, NV, USA

Schizophrenia is a severe mental disorder that affects about 1% of the population worldwide. Like many psychiatric disorders, the diagnosis is based on a physician's interview of the patient; there are no objective tests or measurements. This somewhat subjective procedure often leads to misdiagnosis. In recent years, genetic studies of schizophrenia have identified many

loci that contribute to the development of the disorder. There is also accumulating evidence that many comorbid psychiatric disorders are genetically related to schizophrenia. Since schizophrenia is highly heritable, we reason that genetic risks for the disorder could be utilized to improve its diagnosis. We estimated genetic correlations between schizophrenia and comorbid disorders using their respective GWAS summary statistics to identify the disorders that are genetically related to schizophrenia. We then calculated polygenic risk scores (PRSs) for those disorders that are significantly correlated with schizophrenia for the subjects of Molecular Genetics of Schizophrenia (MGS) study. Using the PRSs for both schizophrenia and comorbid disorders, we constructed a multivariable prediction model for schizophrenia diagnosis. We found that at least 10 different disorders were genetically correlated with schizophrenia, including bipolar disorder, major depression, autism, attention deficit hyperactivity disorder, cigarette smoking, neuroticism, ulcerative colitis, Crohn's disease, inflammatory bowel disease, coronary artery disease, and blood triglycerides. By comparing the fitting statistics, we found that models with the inclusion of PRSs of comorbid diseases performed better than the model with PRS of schizophrenia alone. The model incorporating the PRSs of schizophrenia, bipolar disorder, major depression, and autism produced an AUC of 0.94. In contrast, the model with schizophrenia PRS alone had an AUC of 0.89. Our results demonstrated that with the inclusion of PRSs from genetically correlated diseases, we could significantly improve the performance of diagnosis prediction for schizophrenia.

Can We Clear the Smoke? From Genes to the Bedside

Li-Shiun Chen[1]; [1]Washington University School of Medicine, St. Louis, MO, USA

Cigarette smoking is highly addictive and a leading threat to global health. Modern human genetic research has identified robust genetic variants that increase the risk for heavy smoking and nicotine dependence. An important step in translating these genetic discoveries is to identify the genetic factors affecting smoking cessation in order to improve current smoking-cessation treatments and predicting patient prognosis. We will demonstrate the significant genetic variants that predict nicotine dependence, smoking cessation, and response to cessation pharmacotherapy. These data suggest that genetic risks may predict smoking-cessation outcomes and moderate the effect of pharmacological treatments. Some pharmacogenetic findings have been replicated in meta-analyses of multiple smoking cessation trials. The variation in efficacy between smokers with different genetic markers suggests that personalized smoking-cessation pharmacotherapy based upon genotype could maximize the efficiency of such treatment while minimizing side effects. As a result, these genetic markers are useful to predict clinical predictors such as the number needed

to treat (NNT) and the number needed to harm. In summary, as precision medicine is revolutionizing health care, smoking cessation treatment is an example where genetic variants can identify individuals at increased risk. Current evidence strongly suggests that genetic variants predict cessation failure and that cessation pharmacotherapy effectiveness is modulated by biomarkers such as genotypes (e.g., *CHRNA5* or *CYP2A6)* or metabolic markers (e.g., nicotine metabolism ratio (NMR)). These findings strengthen the case for the development and rigorous testing of treatments that target patients with different biological risk profiles.

Getting into the Brain: Potential of Nanotechnology to Manage Neuro-AIDS and Drug Addictions

Madhavan Nair[1]; [1]Department of Immunology and Institute of NeuroImmune Pharmacology, Florida International University, Miami, FL, USA.

A 2016 report suggests that more than 36.7 million people are living with HIV/AIDS in the world today, which includes about 1.2 million people in the U.S. Current studies also show that more than 247 million people abuse substances in the world, which includes more than 24 million Americans. Reports also show that more than 3–4 million people are living with HIV and use illicit drugs. Although highly active anti-retroviral therapy (HAART) has resulted in a remarkable decline in the morbidity and mortality in AIDS patients, inadequate delivery of HIV drugs across the blood-brain barrier (BBB) to the brain results in HIV persistence. Drugs of abuse such as opiates act synergistically with HIV-1 to potentiate the HIV-related neurotoxicity that leads to development of Neuro-AIDS. In recent years, use of nanotechnology has shown exciting prospects for the development of novel drug delivery systems. We herein report the development of a Magneto-Electric Nanocarrier (MEN) to deliver and release on-demand HIV drugs and opiate antagonists, that otherwise cannot penetrate to the brain, and therefore inhibit HIV and reverse opiate-mediated adverse neurological effects. The proposed nanocarrier is anticipated to simultaneously reduce Neuro-AIDS and opiate addiction in HIV-1 infected opiate addicts. Further, this invented/patented new technology will have universal applicability for targeting and controlling release of drugs against a variety of other CNS diseases such as Parkinson's, Alzheimer's, and brain tumors.

Symposium 7.

The Cascade of Care in Vietnam: From Communities to Codons

Le Minh Giang[1], **Li Li**[2], **David Metzger**[3], **P. Todd Korthuis**[4], **Gavin Bart**[5]; [1]Hanoi Medical University, Hanoi,

Vietnam. [2]University of California Los Angeles, Los Angeles, CA, USA. [3]University of Pennsylvania, Pennsylvania, PA, USA. [4]Oregon Health Sciences University, Portland, OR, USA. [5]Hennepin County Medical Center, University of Minnesota, Minneapolis, MN, USA

Vietnam has an injection-drug-driven HIV epidemic. Efforts to achieve the UNAIDS 90-90-90 treatment target requires attention to the needs of drug users. Fear of legal implications and the stigma of HIV and drug use keep many drug users from being tested for HIV. Those who do test positive are often reluctant to enroll in treatment, and ongoing drug use or difficulty accessing addiction treatment can interfere with optimal HIV care. Methadone treatment has been widely disseminated throughout Vietnam, yet the lack of integration with HIV care poses difficulties for many patients and leads to attrition. Further, antiretroviral treatment combinations in Vietnam often interact with methadone, complicating the course of addiction treatment and leaving patients vulnerable to withdrawal and relapse. Various models of increasing HIV testing uptake, access to antiretroviral treatment, and integrated models of HIV and addiction care are being explored in Vietnam. This symposium will highlight the breadth of NIH-NIDA-funded HIV research in Vietnam.

Dr. Le Minh Giang will present his ethnographic work showing the challenges and ambivalence experienced by families in caring for HIV-infected drug users in Hanoi. Factors contributing to a day-by-day care approach rather than discussing the past or the future of the drug user will be explored.

Dr. Li Li will present findings from a controlled trial of a community health worker intervention to improve their interactions with drug users regarding HIV and drug use prevention and treatment. Compared to controls, the intervention resulted in significantly greater improvement in health worker interactions with patients. Similarly, there was a significant intervention effect on reduction of negative attitudes toward drug users, and drug avoidance self-efficacy was significantly greater for drug users in the intervention group.

Dr. David Metzger will present findings from Vietnam's first buprenorphine pilot study. This feasibility study introduced both methadone and later buprenorphine into an HIV treatment setting in Ho Chi Minh City. Evaluations included HIV and ART engagement, retention, and impact on HIV viral load, CD4 cell count, and continued drug use. Of 448 enrolled drug users, all HIV-positive participants (n=152) were linked to care, over 95% received ART, and 90% were virally suppressed at 12 months. While addiction treatment adherence correlated to HIV outcomes, there were no differences in HIV outcomes between methadone and buprenorphine patients.

Dr. Todd Korthuis will present findings from a multisite randomized trial of integrated HIV and buprenorphine care or methadone clinic referral in the north of Vietnam. An interim analysis of the first 150 participants indicates improved point estimates in ART uptake and HIV viral suppression as well as reductions in urine tests positive for opioids at 6 months, in both groups. He will further address qualitative interviews with HIV providers that identify barriers and facilitators of buprenorphine/naloxone implementation in Vietnam HIV clinics.

Dr. Gavin Bart will present a population pharmacokinetic approach to determining interindividual variability in methadone antiretroviral drug-drug interactions. Methadone pharmacokinetics were determined in over 200 methadone-maintained patients in Hanoi, and covariates contributing to interindividual variability in clearance were identified.

Symposium 8.

Electronic Records-based Research and Applications

Larissa Mooney[1], Jonathan H. Chen[2], Fei Wu[3], Elizabeth A. Evans[4,5], Yih-Ing Hser[1]; [1]Integrated Substance Abuse Programs, University of California, Los Angeles, Los Angeles, CA, USA. [2]Stanford University, Stanford, CA, USA. [3]Los Angeles County Chief Executive Office, CA, USA. [4]Veterans Administration Greater Los Angeles Healthcare System, Veterans Administration Center for the Study of Healthcare Innovation, Implementation, and Policy, Los Angeles, CA, USA. [5]Department of Health Sciences and Health Promotion, University of Massachusetts, Amherst, MA, USA.

The utilization of administrative data and health records in substance abuse research has become more widespread than ever. Despite several notable limitations, these data contribute valuable information, ranging from services access and utilization to treatment outcomes. Mining existing data presents a cost-effective opportunity to take full advantage of readily available resources, often in a large scale not feasible using the traditional survey or personal interview methods. Chaired by Dr. Yih-Ing Hser, Dr. Larissa Mooney will present findings on morbidity and mortality among patients with opioid use disorder in a large general healthcare system, based on electronic health records that were linked to the CDC National Death Index. Dr. Fei Wu will illustrate the use of electronic administrative records from County Health, Welfare, and Law Enforcement Departments to examine service utilization and cost patterns among homeless single adults in Los Angeles. By analyzing a publicly released national dataset of Medicare Part D prescriptions for over 800,000 prescribers and a billion medication prescriptions, Dr. Jonathon H. Chen will present findings on the opioid prescribing distribution on a national scale. Dr. Elizabeth Evans will illustrate mining administrative data by linking data from multiple sources (e.g., drug

treatment, mental health, criminal justice systems) to advance longitudinal substance abuse research with examples from several CALDAR projects.

Opioid Prescribing Distribution: What if it's not just a few Bad Apples?

Jonathan H. Chen[1]; [1]Stanford University, Stanford, CA, USA.

The CDC, FDA, and surgeon general all currently recognize a public health epidemic of drug overdoses, with the majority of such overdoses driven by prescription opioids. A popular narrative points to corrupt "pill mills" and "bogus pain clinics" as the source of the problem, with one study showing 10% of prescribers responsible for 80% of the prescriptions. By analyzing a publicly released national dataset of Medicare Part D prescriptions for over 800,000 prescribers and a billion medication prescriptions, we assessed the prescribing distribution on a national scale. We found that the bulk of prescription volume comes from general practitioners, with no more extreme skewing of the prescriptions than for any other medication and comparatively rare use of buprenorphine/naloxone for medication-assisted therapy of opioid dependence.

Symposium 9.

The Adolescent Brain Cognitive Development (ABCD) Study

Terry Jernigan[1], **Sandra Brown**[2], **Anders Dale**[2,3], **Elizabeth Sowell**[4,5], **Linda Chang**[6]; [1]Center for Human Development, University of California, San Diego, San Diego, California, USA. [2]University of California, San Diego School of Medicine, San Diego, California, USA. [3]Department of Neuroscience, University of California, San Diego, San Diego, California, USA. [4]Children's Hospital of Los Angeles, Los Angeles, California, USA. [5]University of Southern California, Los Angeles, California, USA. [6]University of Maryland School of Medicine, Department of Radiology and Nuclear Medicine and Department of Neurology, Baltimore, Maryland, USA.

The brain develops throughout the first third of the human lifespan, but rapid growth occurs during childhood and adolescence. However, many host factors and environmental influences may affect brain development. Such factors may include genetics, socioeconomic status, substance use, familial or ongoing medical or psychiatric disorders, and many cultural or lifestyle differences between individuals. With advances in brain imaging and computer technologies, genetics and other biomarkers, quantitative measurements of brain development can be achieved non-invasively and longitudinally. Under the visionary leadership of the Collaborative Research on Addiction at NIH (CRAN), which is a partnership between National Institute on Drug Abuse (NIDA), National Institute on Alcohol Abuse and Alcoholism (NIAAA), and National Cancer Institute (NCI), the Adolescent Brain Cognitive Development (ABCD) study was initiated and launched since 2015. CRAN also recruited additional NIH institutes and Centers to be partners in this major effort to unravel the various risk or protective factors that might influence brain development in adolescents. These additional ICs include the Eunice Kennedy Shriver National Institute on Child Health and Human Development (NICHD), the National Institute of Mental Health (NIMH), National Institute of Neurological Disorders and Stroke (NINDS), the NIH Office of Behavioral and Social Sciences Research (OBSSR), the National Institute on Minority Health and Health Disparities (NIMHD) and others. Due to the significant educational, scientific and health values of the study, major support has been provided from many organizations, including the American Association of School Superintendents Association (AASA), the National Association of Elementary School Principals (NAESP), the American Academy of Pediatrics, the National Resource on ADHD, the American Academy of Child & Adolescent Psychiatry, the American Psychological Association, the American School Health Association, etc.

The ABCD study (www.abcdstudy.org) is a large-scale longitudinal study that involves 11 research hubs and 21 data collection sites across the United States, being led by the Coordinating Center (CC) and the Data and Informatics Center (DAIC) at the University of California at San Diego (UCSD), in collaboration with the NIH ICs, forming the ABCD consortium. This consortium has begun to successfully recruit and enroll a cohort of 10,000 children starting at ages 9-10 years of age, and will follow them from pre-adolescence into early adulthood over the next 10 years. The data and samples gathered from this large longitudinal cohort will be rigorously monitored and accurately processed and rapidly be made available to the scientific, academic and public community. These data will provide not only baseline standards for normal brain development (similar to those that currently exist for height, weight, and other physical characteristics), but will yield significant insights into brain and cognitive development, as well as social, emotion, and physical development during adolescence. The symposium speakers will provide an overview of the study design, protocol and rigorous procedures that are being implemented, as well as plans for future data queries or sample requests.

Symposium 10.

Making Medication-Assisted Treatment Work in Primary Care

Kelly Pfeifer[1]; [1]California Health Care Foundation, CA, USA

The opioid epidemic creates a demand for addiction treatment that far outpaces the supply of specialist physicians. A new workforce must be built to meet the needs of a growing population with opioid addiction and other substance use disorders, and community health centers are ideally positioned to fill this need. Many of these health centers have already integrated mental health treatment into primary care, and with new funding opportunities, they are stepping up to integrate addiction treatment as well. The California Health Care Foundation (CHCF) is dedicated to initiatives that promote health care that works for all Californians. In 2016, CHCF launched a learning collaborative for 25 community health centers across California. These centers are working together to add medication-assisted treatment (MAT) for opioid use disorder to their treatment services – and ensure it is integrated with primary care and mental health services. While this work is not easy – it requires changes in culture, workflow, and data-sharing structures – clinicians and staff find substantial rewards in helping people find the path to recovery. This presentation will describe what we have learned in the process, and how primary care MAT fits into a broader picture of statewide efforts to ensure all patients with substance use disorder can obtain effective treatment when and where they need it.

Measuring the Impact of a Statewide Initiative to Increase Use of the Virginia PMP

Thomas Alfieri[1]; [1]Purdue Pharma L.P., Stamford, CT, USA.

Purdue Pharma L.P., Virginia Governor Terry McAuliffe and the Virginia Secretary of Health and Human Resources announced the formation of a public-private partnership to enhance utilization of the state prescription monitoring program (PMP) as part of the solution to address the opioid crisis. The Commonwealth of Virginia will connect the state PMP to the electronic health records (EHR) used by Virginia prescribers and pharmacists to make information from the PMP an integral part of the workflow when prescribing or dispensing controlled substances. The goal is to improve the performance, access and usability of the PMP program data for 18,000 prescribers and 400 pharmacies in the Commonwealth of Virginia by the end of 2017. The Virginia PMP provides to authorized users a patient's prescription history for Schedule II – IV prescriptions for the prior 12 months as reported by all Virginia pharmacies and by out-of-state pharmacies delivering to people in Virginia. Additionally, the PMP prescription

report informs clinical decision-making to help prevent or stop harm from duplicate drug therapy, prescription drug misuse, abuse and diversion. This presentation will outline the potential benefits of increased PMP use, and outline ways that these benefits will be measured.

Special lectures

The Current US Opioid Crisis: How We Got Here, and Now What?

Walter Ling[1]; [1]Integrated Substance Abuse Programs, University of California, Los Angeles, Los Angeles, CA, USA.

It seemed like the right thing to do. There was a lot of unnecessary suffering: cancer patients surviving with pain, injured war veterans with persistent pain, patients outliving former killer diseases enduring chronic pain, and more… And yes, there was genuine under-treatment of pain, and underutilization of opioids, especially in the developing countries of the world. We need to do better. So let us bring on more powerful and more plentiful opioids. Let us train physicians and other prescribers to do a better job of using these powerful drugs, empower patients and families to ensure that pain is treated adequately; let's make pain a vital sign, the 5th, and make its treatment a right, not privilege. Let patients rate their doctors on the satisfaction of the services they receive. The current US opioid crisis is our saga with pain and addiction; it is a 40-year journey wandering in the wilderness, not unlike the Israelis'. Huge fortunes were made, reputations gained and lost. It is a serious public health problem, and it is big business. A generation of innocent lives has been ruined, lost, wasted. Are all these, as William Blake would have it, innocence and experience? Or are there things more complicated, more sinister perhaps, like the marriage of heaven and hell?

LASER ART

Howard E. Gendelman[1]; [1]Department of Pharmacology and Experimental Neuroscience, University of Nebraska Medical Center, Omaha, NE, USA

Our laboratory is focused on the development of long acting slow effective release antiretroviral therapy (LASER ART) to improve adherence and drug biodistribution to combat human immunodeficiency virus type one (HIV1) infection. We believe that such advances can revolutionize current HIV/AIDS treatments. Drug carrier technologies characterized by high antiretroviral drug (ARV) payloads in a single carrier. The surface modifications of ARV carriers target macrophages and facilitate drug transport across physiological barriers

The persistence of HIV-1 in lymphoid, gut and nervous system reservoirs poses a challenge to viral eradication. Emerging slow-release drug carriers can target intracellular pathogens, activate antiviral immunity, promote genome editing, sustain drug depots and combine therapeutics with image contrast agents, and can meet unmet clinical needs for HIV-infected patients. Such efforts will bring the medicines to reservoir sites and accelerate viral clearance. To this end a "multimodal imaging theranostic nanoprobes" were developed as a real-time non-invasive platform for rapidly testing antiretroviral drug distribution. Our work employs relevant animal models for studies on eliminating residual HIV infection that has now been achieved in limited investigations. We have made a library of antiretroviral nanomedicines including antiretroviral entry, integrase, nucleoside and nonnucleoside reverse transcriptase and protease inhibitors. The work links ongoing research activities in humanized NOD/scid-IL-2Rγc testing a broad range of bioimaging and omics methodologies. This presentation will present work that serves to improve ARV pharmacokinetic and pharmacodynamics testing to facilitate therapeutic LASER ART drug delivery schemes and testing of molecular determinants of viral replication.

Abstracts

Cigarette and E-Cigarette Use in Minority HIV-positive and HIV-negative Men Who Have Sex with Men (MSM)

Anna Arzuyan[1], Shannon R. Rojas[1], Joshua M. Cohen[2], Jennifer F. Hsia[1], Steve Shoptaw[2]; [1]Clinical Psychology Ph.D. Program, California School of Professional Psychology, Los Angeles, CA, USA. [2]Department of Family Medicine at David Geffen School of Medicine, University of California at Los Angeles, Los Angeles, CA, USA

Men who have sex with men (MSM), both HIV-negative and HIV-positive, exhibit higher smoking rates than their heterosexual peers. Among MSM living with HIV, cigarette smoking carries threats to livelihood from tobacco-related illnesses and other health problems. This study examined the prevalence of reported use of cigarettes and e-cigarettes in a sample of MSM of color in Los Angeles who are participants in a NIDA-funded cohort study, the MStudy. We predicted smoking status would correspond with illicit drug use and other health threats. Self-reported cigarette and e-cigarette use were collected at 6 months prior to baseline for 390 participants. Concurrent illicit drug use was confirmed by urine test results. Within the sample, 50% were HIV-positive; 40.4% identified as Black and 46.4% Hispanic/Latino. Based on urine analyses, marijuana (n =128) yielded the most positive screens, then methamphetamine (n =61), amphetamines (n =46), and cocaine (n = 19). Overall, 49.2% (n=192) of individuals smoked cigarettes and/or e-cigarettes. Cigarette smoking rates differed between HIV-negative and HIV-positive men, $\chi2(2) = 8.52$, $p = 0.01$, while e-cigarette use did not differ by HIV status, $\chi2(2) = 2.68$, $p > 0.2$. The results of logistic regressions between tobacco use and recent use of other substances will also be presented. These results suggest important links between cigarette smoking and illicit drug use among our sample and highlight the importance of tobacco control policies and interventions when working with MSM of color.

Substance Use and Self-Reported Viral Suppression among Men who have Sex with Men Living with HIV

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Antiretroviral therapy (ART) has improved significantly over the past several years and has helped to improve the quality of life for populations living with HIV (PLHIV). Nevertheless, near-perfect adherence is needed to achieve viral suppression. Substance use is common among PLHIV and has been linked to lower adherence to ART. Therefore, substance use may play a significant role in the lower likelihood of achieving viral suppression. However, research assessing this relationship is sparse. The objective of this study was to determine if substance use at baseline was associated with self-reported viral suppression over 12 months. Data were obtained from 337 MSM who participated in a longitudinal disclosure intervention study. Substance use was measured using the Substance Abuse and Mental Illness Symptoms Screener and was operationalized by summing scores on all seven items. Growth curve models were used to determine the association between substance use and self-reported viral suppression over five time points. The longitudinal analysis showed that viral suppression among participants did not change over time. Therefore, logistic regression using only baseline data was used to determine the association between substance use and viral suppression at one time point. After adjusting for age, race/ethnicity, income, education, employment and time since diagnosis, every increase in substance use score was associated with an 8% decrease in the likelihood of being virally suppressed (adjusted OR: 0.92; 95% CI: 0.87 – 0.98). These findings suggest that substance use treatment components should be included in intervention programs geared towards improving viral suppression among MSM living with HIV.

Substance Use and Disclosure Behavior, Beliefs and Intention among Men Who have Sex with Men Living with HIV: A Longitudinal Assessment

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Substance use is associated with HIV risk behaviors, including unprotected sexual intercourse and greater number of sexual partners. Indeed, injection drug use is one of the principal risk factors for HIV transmission. However, another risk factor for HIV transmission that may be influenced by substance use is HIV nondisclosure. Men who have sex with men (MSM) continue to be disproportionately affected by the HIV epidemic. Nevertheless, research examining the relationship between substance use and HIV disclosure among MSM living with HIV over time is lacking. The objective of this study was to examine the associations between substance use and disclosure behavior, disclosure beliefs, and disclosure intention among MSM living with HIV over 12 months. Data were obtained from 336 participants in a longitudinal disclosure intervention study. Substance use was measured using the Substance Abuse and Mental Illness Symptom Screener (SAMISS) and was operationalized by sum scores of the seven items. Growth curve models (adjusting for age, race/ethnicity, income, education, employment, and time since diagnosis) were used to determine the association between substance use at baseline and changes in disclosure behavior, beliefs and intention over five time points. The mean score of substance use was 13.7 (SD = 5.7; range = 5 – 35). Disclosure behavior, beliefs, and intention increased over time. Substance use was negatively associated with disclosure behavior (-0.334; p = 0.014), beliefs (-0.214; p = 0.002), and intentions (-0.216; p = 0.01). Substance use treatment components should also be included in disclosure intervention programs for MSM living with HIV.

Association of the DRD2/ANKK1 A1 Allele with Alcohol Consumption in Mexican Native Amerindians and in the Non-native Population

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Mexico has an ancient tradition of alcohol drinking influenced by genetic and sociocultural factors. This study aimed to determine the distribution of the DRD2/ANKK1 TaqIA polymorphism in Mexican populations and to analyze its association with heavy drinking. In a cross-sectional and analytical study, 680 unrelated subjects, including two Native Amerindians groups (87 Nahuas and 139 Huicholes), and two Mestizos groups (158 subjects from Tepic, Nayarit, and 296 subjects from Guadalajara, Jalisco) were enrolled. DRD2/ANKK1 genotyping was performed by PCR-RFLP and allelic discrimination assays. Genetic analyses were conducted by Arlequin and Structure software. Heavy drinking was defined as ≥300 g alcohol/week. The association of the DRD2/ANKK1 TaqIA polymorphism with heavy drinking was estimated. Heavy drinking was prevalent in 64.7% of the study population. The DRD2/ANKK1 A1 allele prevailed in 67% and 65% of Nahuas and Huicholes, respectively, and 51% and 47.3% in Mestizos from Tepic and Guadalajara, respectively. Heavy drinking was associated with the A1A1 genotype in the Mestizos of Guadalajara (A1A1 vs. A1A2 OR=4.79, 95%CI 1.81-12.68, p=0.0006; A1A1 vs. A1A2 + A2A2, OR=4.09, 95%CI 1.56-10.68, p=0.0021) and in the Mestizos from Tepic (A1A1 vs. A1A2, OR=5.92, 95%CI 2.1216.49, p=0.0002); A2A2, OR=14.56, 95%CI 3.57-59.24, p=0.00004; A1A2+ A2A2, OR=6.68, 95%CI 2.42-18.42, p=0.00005). In Native Amerindians, a lack of association was found. High frequencies of the DRD2/ANKK1 A1 allele were present in Mexican populations. Native Amerindians exhibited the highest frequencies of the A1 allele documented worldwide to date. The A1A1 genotype was associated with heavy drinking in Mestizos.

Environmental Exposures, Epigenetic Changes and Vulnerability to Psychiatric Disorders: The Consortium on Vulnerability to Externalizing Disorders and Addictions (c-VEDA) Study: Methodological Issues

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Environmental and genetic factors known to contribute to risk for or resilience to pathogenesis of neuropsychiatric disorders have not been investigated in the diverse socio-cultural contexts in emerging societies such as India. The c-VEDA is a first-of-its-kind longitudinal cohort study aiming to investigate the effects of specific environmental influences on existing genomic variations that might influence trajectories of brain development, and consequent differences in temperament, cognitive abilities, and psychopathological states. With an aim to establish a longitudinal cohort of 10,000 participants within the age ranges of 6–11, 12–17, and 18–23 years from geographically distinct parts of India with different socio-cultural and geographical backgrounds, this study is recruiting from eight (8) sites. Thus, the participants have different exposures to environmental neurotoxic, nutritional, and psychosocial stressors. The phenotypic characterization includes psychometric and anthropometric assessments, behavioural characterization, neuropsychological tests, and assessment of environmental exposures. Blood and/or saliva are being collected from all participants for epigenetic studies for candidate genes. A deep phenotyping subset of n=1,000 are being further assessed by MRI scans of the brain and exposure to environmental neurotoxins. The c-VEDA commenced recruitment in November 2016. The c-VEDA cohort study is constructed to discover vulnerabilities for developing externalizing disorders and addictions and is likely to have a significant bearing on the development and treatment of externalizing and substance use disorders. Bio-banking of biological samples collected from all cohorts will provide further opportunity to identify newer biomarkers of exposure and early disease.

School Neighborhood Environment and Teenager's Body Mass Index in Taiwan

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The objective of this study is to identify environmental factors influencing obesity by examining the relationship between school neighborhoods and teenagers' body mass index (BMI). A total of 1200 school teenagers aged 15-18 years from 20 high schools completed the Nutrition and Health Survey in Taiwan (HAHSIT) in 2010-2011.The hierarchical and geographically weighted regression was used to estimate the associations between neighborhood- and individual-level factors and students' BMI. The key independent variable was school reachable geographically weighted density of three categories of potentially obesogenic characteristics including food (supermarket, convenience store, beverage store, fast food restaurant), recreational physical activity (gym, sport playground, community activities center, park), and static activities (library, cyber cafe, comic book rental shops) environments. For the overall sample, it was found that the park (-0.443, p=0.03) and library (-1.30, p=0.01) density was associated with decreased BMI. Furthermore, among girls, the coffee shop (1.10, p=0.04) was associated with increased BMI and library (-1.54, p=0.01) with decreased BMI, while such relationships were not significant among teen boys. The study findings reveal heterogeneity of gender level determinants of obesity across geographical/environmental characteristics. The health education and obesogenic environmental improvement would require gender-specific strategies in needed areas in Taiwan.

A Longitudinal Study of the Motivations for the Non-Medical Use of Prescription Drugs in a National Sample of Young Adults

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The non-medical use of prescription drugs (NMUPD) is a significant and growing public health concern with young adults at great risk for use, abuse, and related negative outcomes (e.g., unintentional overdose deaths). Motivations for substance use are important predictors of use patterns and problems in young adults. Changes in motivations for the non-medical use of prescription stimulants, central nervous system (CNS) depressants, and opioids were investigated, along with sex and college attendance as potential moderators, using three waves of data from a longitudinal nationally representative sample of 14,990 19 to 24-year-olds in the Monitoring the Future study cohorts collected from 1976 to 2013. Both recreational and self-treatment motivations were commonly reported over time and across drug classes, with four to five popular motivations acknowledged in each class. Overall, generalized estimated equations repeated measure analyses found that NMUPD motivations remained relatively stable across young adulthood. There were some reductions in the motivations of experimentation and boredom, and an increase in select self-treatment motivations. Men were more

likely to endorse recreational motivations, while females were more likely to endorse self-treatment motivations, though this varied somewhat by prescription drug class. Young adults not enrolled in college courses were more likely to endorse using stimulants non-medically for different reasons than their peers who were enrolled. Efforts aimed at preventing or reducing NMUPD in young adult populations should include targets to reduce both self-treatment and recreational motivations and may need to be tailored by prescription drug class, sex, and college attendance status.

Brief Intervention Helped Individuals with Problem Alcohol Use Who Experienced the Wenchuan Earthquake in Sichuan, China

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This study evaluated the feasibility of a structured Brief Intervention (BI) for reducing problem alcohol use among individuals who experienced the Wenchuan earthquake. 1,336 clients from 18 Beichuan county village hospitals were invited to receive the Alcohol Use Disorders Identification Test (AUDIT). Of those, 239 individuals (AUDIT score of greater than or equal to 7) were included in the study. The participants from intervention village hospitals who were assigned to the BI group (n=118) received a structured BI lasting 15–30 minutes plus general health education. The participants from the control village hospitals were assigned to the control group (n=121) and only received general health education. Baseline and post-intervention assessments at 12 weeks were conducted using the AUDIT, Substance Abuse Knowledge Scale (SAKS), Self-rating Depression Scale (SDS), Self-rating Anxiety Scale (SAS), and General Wellbeing Schedule (GWS). At 3-months follow-up, the BI group had reduced scores on the AUDIT (F=65.84; p<0.001) and increased scores on the SAKS (F=44.45; p<0.001), but the control group had increased scores on the SAS (F=10.76; p=0.001) and SDS (F=18.43; p<0.001), compared with baseline. BI group showed more decreases in AUDIT scores (group*time effect, F=34.8; p<0.001), and had more increases in SAKS scores (group*time effect, F=15.7; p<0.001), compared with control group. The study demonstrated the feasibility of BI in problem alcohol users who experienced traumatic events. Further research needs to be done to test the effectiveness of BI over a longer period of time, and provide evidence in support of BI as an effective technique in China.

Assessing the Drug Use and Behavioral Health of Adolescent Drug Users in the Philippines: Moving Toward a Culturally Appropriate and Age Specific Treatment Response

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Drug use among adolescent populations in the Philippines has dramatically increased and has become a major concern for treatment providers. Currently, an explanatory model has not been established on this phenomenon. Informed by a pragmatist perspective, a concurrent triangulation mixed methods using a survey and case studies was employed among a cohort of early adolescents, aged 10 to 17 years old, in 10 government-accredited treatment centers to address this need. Findings showed that a majority of the 114 adolescent drug users involved in the study came from lower and middle income groups, went to secondary schools, and tried nicotine and alcohol prior to methamphetamine hydrochloride and marijuana. Drug initiation was associated with dysfunctional families, adverse childhood experiences, and peer influence, among others. Continuing drug use, on the other hand, was associated with unresolved personal and family relations problems, peer influence, and intense cravings. Failed attempts to quit were associated with peer influence and addiction. A majority were moderate users and had experienced bouts of paranoia, auditory hallucinations, and depression as drug effects. Heavy use significantly affected their social relations, work, and school performance and led to criminal acts such as selling household items, drug pushing, and stealing to sustain drug use. Most rated the treatment effectiveness as average and referred to overcrowding, repetitive activities, and poor facilities as weaknesses and use of spiritual and family therapy as strengths. A majority agreed that lack of individualized and age-specific treatment services for adolescents were major weaknesses of the treatment program. Suggestions were made by this study to address these issues.

Treatment Intervention for Drug-Using Women in the Philippines: A Feminist Perspective

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In the Philippines, a significant number of women drug users remain as a hidden, invisible, and alienated group. To date, there exists a disparity of treatment services provided to them, with only 2 treatment centers providing direct services. Guided by a feminist perspective, a sequential explanatory mixed methods of survey and phenomenology was used among 65 women drug users undergoing treatment to identify their characteristics, the dynamics and consequences of their drug-using behavior, and to assess the effectiveness of the treatment services given to them. Results showed that Filipino women undergoing treatment

ranged from 12 to 47 years old, belonged to middle-income families, and were initiated to drugs due to curiosity, peer pressure, and family and economic problems, among other reasons. They continued to use drugs because of peer pressure and unresolved family and economic issues. Attempts to quit drugs failed because of continuing peer influence and addiction. A majority provided an ambivalent assessment of treatment intervention. Most abhorred the "prison culture" of treatment for women compared to that for men. Overall they found the treatment intervention as ineffective, discriminatory, and alienating. A majority recommended that a special treatment facility and more enabling treatment intervention for women should be provided for better treatment outcomes.

Effectiveness Study of Various Treatment Modalities for Drug Users in the Philippines

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Current drug treatment and rehabilitation modalities in the Philippines vary among various treatment centers, and their treatment effectiveness has not been well-studied or well-assessed. Using concurrent mixed designs via population survey and key-informant interviews, this paper identified various treatment modalities used by 10 treatment centers in the Philippines and evaluated their effectiveness in terms of number of clients released in the past 2 years and their level of client satisfaction, including their treatment success. Results of interviews with 800 (+/-) drug-using participants, aged 12 years old to 69 years old, show that most came from different family backgrounds, varied in terms of how they initiated drug use and its later abuse, and differed in response to treatment recovery and success. Interviews with key informants from treatment centers confirm that treatment providers vary in terms of their treatment modalities – such as the use of therapeutic community (TC) approach, 12-step facilitation (TSF), eclectic methods (e.g., combining TC and TSF), among others. Findings show that a majority of those who went for treatment recovered after 6–12 months of treatment. However, treatment success cannot be ascertained beyond that in the treatment facility, due to lack of a systematic after-care programs. In addition, the treatment effects of the various modalities significantly varied. However, their overall effectiveness was rated as average. The study recommends an improved treatment modality that includes strengthening of relapse prevention and an after-care program that is more culturally appropriate and evidence-informed and capacity building of treatment service providers.

Designing an Evidence-based Community-Based Treatment Intervention Program for Drug Users in the Philippines: Moving Toward a Comprehensive Treatment Approach

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The staggering number of more than 1 million drug users that have "voluntarily surrendered" in response to "Operation Tokhang" (a "war on drugs" campaign) in the Philippines took everyone by surprise. Consequently, the existing 44 treatment and rehabilitation centers in the country could not cope with admitting them all for treatment. In response, local government units were called to develop and implement community interventions to address the mass number of *"voluntary surrenderers"* in their own communities. This paper presents the process undertaken in the design of an evidence-based treatment intervention program for drug users that made use of the participatory action research method through a survey, focus groups, and key informant interviews among "voluntary surrenders" in one community in Metro Manila and primary data drawn from studies conducted among drug users undergoing treatment in 9 treatment and rehabilitation centers located in Metro Manila and neighboring provinces. Our question was "What is the best treatment response that can be provided to drug users that have "voluntary surrendered" through "Operation Tokhang" in the Philippines?" This paper addresses this crucial question in response to the need for a culturally fit and social-justice-driven community-based treatment intervention program. It, likewise, argues that the current response to treatment of "voluntary surrenderers" such as zumba, sports, jogging, bible studies, and the like, lacks evidence-based programming and, thus, is not responsive to their treatment needs. Using the same data, the paper argues for a comprehensive treatment response framed under a balanced approach of restorative justice and behavioral health.

Gender Differences Among Veterans and Civilians in the Associations Between Childhood Adversity and Substance Use Disorders: Results from a National Epidemiologic Survey

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We analyzed data on 3,119 Veterans and 33,182 civilians from the 2012-13 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC-III) to examine whether gender moderates associations between childhood adversity and DSM 5 lifetime occurrence of alcohol and drug use disorders (AUD, DUD). Using weighted, stratified multinomial logistic regression, we examined predictors of each disorder, tested a gender by childhood adversity interaction term, and conducted pairwise comparisons of predicted probabilities. Lifetime prevalence of AUD and DUD was higher with greater childhood adversity exposure. Among civilians, women had a lower prevalence of AUD and DUD than men; however, moderation analyses revealed that with more childhood adversity, the gender gap in predicted probability narrowed for AUD and it widened for DUD. Among Veterans, in contrast, women and men generally had similar AUD and DUD prevalence. However, among Veterans with more childhood adversity, a gender gap in predicted probability for AUD was suggested, such that with 3 or more exposures, prevalence among men surpassed that of women (p=0.11). Also, among Veterans with no childhood adversity, men had a higher prevalence of DUD than women, but with higher levels of childhood adversity, this gender gap converged. Childhood adversity is associated with gender differences in AUD and DUD risk during adulthood, and the nature of these relationships is divergent across Veterans and civilians. Veterans Affairs and community health centers can counteract the long-term effects of childhood adversity on behavioral health by adapting existing trauma-informed interventions to be sensitive to both gender and also Veteran status.

Evaluation of Accessibility Coverage to Medical Facilities for Heroin Users with Geographic Information System – An Evidence-Based Harm Reduction Approach

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In the early 2000s, an escalation of HIV/AIDS infection was observed among heroin IDUs in Taiwan. In August 2005, a national pilot harm reduction program, with measures including NSPs and methadone maintenance treatment programs, was initiated. Because of a dramatic 10% decrease in all new HIV seropositive cases reported in 2006, a nationwide harm reduction program was implemented. We later found that, besides the harm reduction policy, HIV education programs and HIV testing of drug users were also essential for the effective control of the spread of HIV. In this study, the association of accessibility coverage to medical facilities and socioeconomic status with HIV risk for heroin users was further evaluated by Geographic Information System (GIS) in a Southern City of Taiwan. Data of 7890 heroin users were collected from 2011 to 2015 and categorized into five risk groups according to their income and distance to treatment settings in this study. The results of GIS-based analysis indicate that the area with over 50% accessibility coverage rate had less number of HIV cases with statistical significance. Inconvenient access to medical facilities could result in poor treatment outcomes, including relapse to drug use and needle-sharing with higher HIV incidences. Therefore, in order to effectively reduce HIV incidences among the heroin users, the accessibility coverage and locations of medical treatment facilities should meet the needs of drug users. It is also advised that the formulation of policies associated with substance abuse problems should be scientifically based and geographical indicators could serve for this purpose from either prevention or intervention perspectives.

Integration and Analysis of Localization-based Drug Abuse Database for Evidence-based Drug Policy

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Substance abuse not only endangers an individual's own health, but also causes spread of infectious diseases and considerable social costs to the whole society. However, the substance abuse problem may vary from one region to another, from one country to another, and even from one city/county to another in a given country. Therefore, it is imperative to establish a comprehensive drug abuse reporting system to collect and integrate data for analysis and comparison, so that evidence-based policy can be made to meet local needs. Substance-abuse-related information systems should include, at the very least, the prevalence of substance use, drug seizures (types and amounts), co-morbidity of addiction patients,

numbers of drug offenders, and results of drug urine tests. In this study, data were collected between 2011 and 2015 from various agencies responsible for drug abuse control in Taiwan. Multivariate analysis and regression analysis were used for statistical analysis. The risks and protective factors for substance abuse were identified for use in preventive education and rehabilitation programs. The results of drug seizures and types of drug offenses were applied to assist incumbent agencies in optimizing their strategy in substance abuse control and prevention. With such an evidence-based drug policy, the strategy and measures can be tailored to tackle local drug problems.

The Medical Utilization of Taiwan National Health Insurance among Drug Abuse Patients

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Substance use disorders (SUDs) are persistent and long-term afflictions with severe consequences, particularly high morbidity and premature mortality. Taiwan national health insurance covers 99.5 % of the population in Taiwan. However, the addiction treatment expenses of SUDs are not covered. We would like to calculate the medical costs and medical utilization among SUD patients in national health insurance. In this study, we used a sub-data set of the Taiwan National Health Insurance Research Database (NHIRD) that includes files of inpatient claims and ambulatory care claims for 1 million beneficiaries randomly selected from insurers from 2000–2010. The comorbidity was identified by different biological systems: neoplasm (ICD-9:14-23), endocrine (ICD-9:24-27), mental disease (ICD-9:29-31), nervous and sensory system (ICD-9:32-38), circulation system (ICD-9:39-45), respiratory system (ICD9:46-51), digestive system (ICD-9:52-57), urology and reproductive system (ICD-9:58-62), skeleton and muscle system and connective tissue (ICD-9:71-73), and lesion and intoxication (ICD-9:80-99). A total of 1,769 drug-abuse patients were identified from 1/23 Taiwan population. Both the incidence and prevalence of SUDs peaked in 2005, compared to the stable levels in the years 2000–2004. Mental diseases were the major comorbidity for these patients. Outpatient costs rose steadily from around 700 dollars in 2000 to over 1,000 dollars in 2010. Since 2000, the cost of inpatient care was around 3,450 dollars; it peaked to around 6,500 dollars after 2003. The study reveals that the need for medical care by these SUD populations.

Anxiety Symptoms and Alcohol Use Trajectories in Later Life: Prospective Evidence from the MIUDS Study

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While literature suggests a higher prevalence of anxiety disorders among older alcohol users, few studies have examined the longitudinal relationship between anxiety symptoms and alcohol consumption in later life. The aim of this study was to determine the effects of late-life anxiety symptoms on subsequent 18-year alcohol use trajectories. Data were drawn from three waves (wave 1 [1995–1996], wave 2 [2004–2006], and wave 3 [2014–2015]) of the MacArthur Foundation Survey of Midlife Development in the United States (n=7,108; mean age= 46.8 at baseline). Symptoms of generalized anxiety disorder (GAD) within the previous 12 months were assessed by using the Composite International Diagnostic Interview–Short Form (CIDI-SF) scale. The amount of alcohol use was measured as the typical number of drinks that participants had on days on which they drank during the past month. Covariates (age, gender, race, income, education, and physical health) were assessed at baseline. Latent growth curve modeling was used to identify the association between anxiety symptoms and longitudinal changes in alcohol consumption, adjusting for the covariates measured at baseline. We found that individuals with higher levels of anxiety symptoms tended to have an increase in alcohol consumption over time ($\beta=0.07$, $p<0.05$). The results highlight the role of anxiety symptoms in determining the use of alcohol in later life. Therefore, our findings indicate that ongoing efforts to improve mental health, especially symptoms of anxiety, may help older adults to reduce hazardous alcohol consumption.

SBIRT in Jail Settings: Who Responds Best to Brief Interventions to Address Alcohol and Drug Misuse at the One-Year Follow-Up?

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Research on identifying effective strategies to reduce alcohol and drug use among those involved in the criminal justice system has grown substantially over the last two decades.

While SBIRT has shown some promise in reducing alcohol and drug use among a variety of different populations, an initial evaluation of SBIRT in a jail setting found that there was no difference in drug use and treatment outcomes between those who received the SBIRT intervention and those who did not. However, it is unknown whether certain inmates responded better to SBIRT than others. The purpose of this study is to determine whether the outcomes (treatment participation, drug use) of the SBIRT intervention differed by the baseline risk level (no use/low risk, medium risk, high risk) for selected drugs (alcohol, opioid, amphetamine, marijuana, and cocaine), controlling for demographic and other baseline characteristics. The findings from this study can help foster the development of more targeted interventions to address alcohol and drug misuse among criminal justice populations.

Measuring Changes in Taiwan Substance Abuse and Its Effect on Health, Social, and Economic Factors by Using a Population-based Dataset

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Drug use disorders directly accounted for 20 million disability-adjusted life years (DALYs) in 2010 in Taiwan. This was 2.13% of all causes of DALYs among 15- to 49-year-olds. We aim to present the effect of drug use disorders on health, social, and economic factors in Taiwan. We would like to define the cost parameters as including addiction treatment, health costs associated with the consequences of drug use, justice system costs, and accidental harm costs. By using open government data, health insurance databases, and relevant datasets, we calculated the national costs of illicit drug use from 2005 to 2015. We also evaluated the risk factors for illicit drug users by using a regression model. The proportion of illicit drug users in prisons increased each year, from 40.52% in 2005 to 47.42% in 2015. Jail costs also increased from 7.5 to 16.7 million US dollars. The number of heroin users under treatment dropped from a peak of 11,736 in 2012 to 8,789 in 2015. Treatment costs decreased from 1.2 to 0.9 million. The number of stimulant users under treatment increased from 14 in 2012 to 2,190 in 2015, and costs increased from 11.6 thousand to 1.8 million. The regression model found an increase in illicit drug users with TB in non-urban areas. Further research is required to include loss of productivity to the estimate of costs attributed to illicit drug dependence.

Perceived Stigma and Barriers to Care among People Who Inject Drugs in Vietnam

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People with a history of injecting drug use (PWID) face considerable challenges in Vietnam, including a high risk of HIV infection, drug-related stigma, and lack of access to care. Seeking and utilization of healthcare, as well as harm reduction services, for PWID, are often hampered by drug-related stigma. This study aimed to examine the impacts of drug-related stigma on access to care and utilization of harm reduction services among PWID in Vietnam. A cross-sectional study was conducted among 900 PWID. Participants completed the survey using Audio Computer-Assisted Self Interview (ACASI) between late 2014 and early 2015. Linear multiple regression models and logistic regression models were used to assess the relationship between PWID's stigma, access to care, and utilization of harm reduction services, including methadone maintenance treatment (MMT) or needle exchange programs (NEPs). PWID perceived that drug-related stigma was significantly associated with a lower level of general access to care, but not with MMT or NEP utilization. Levels of education were positively correlated with access to care, as well as utilization of MMT and NEP. This study underscores the need for future public health interventions addressing drug-related stigma as a factor that may impede access to care among PWID in Vietnam.

Acute Impacts of Extreme Hot Temperature Exposure on Emergency Room Admissions Related to Alcohol Addiction and Other Mental Illness in Taiwan

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The purpose of this study was to assess the effects of extremely high air temperatures on hospital emergency room visits (ER) related to alcohol addiction and other mental illnesses in Taiwan. A time series study was conducted using health and climatic data from 2000 to 2010 in Taiwan. A national health insurance database, temperature database, and air quality surveillance database were used for this study. Relative risks (RRs) for increases in emergency room (ER) visits were estimated for alcohol addiction and other mental illnesses after exposure to extremely hot temperatures (the 99th percentile) while using the 50th percentile of the daily mean temperature as reference. Poisson regression models using a distributed lag

non-linear model (DLNM) were used. We adjusted for the effects of humidity and outdoor air pollutants. We found an association between alcohol addiction and other mental illnesses and mean daily temperature at 23.6°C on ER visits. The association was strongest within 0–7 days after exposure to hot temperatures. Increases (RR 1.02, 95% CI 1.01–1.04) in major depressive disorder (MDD) ER visits was observed over a cumulative period of 7 days after exposure to high ambient temperature (99th percentile vs. 50th percentile). The opposite association was reported for alcohol addiction (RR 0.99, 95% CI 0.98–0.99). No significant associations with anxiety, dementia, and delirium were found. Our findings suggest that extreme temperatures pose a risk to the health and wellbeing for individuals with alcohol addiction and other mental illnesses.

Substance Use Prior to Sexual Encounters in Men Who Have Sex with Men (MSM) Living with HIV: Longitudinal Findings from an Intervention Study

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New diagnoses of HIV are highest among gay, bisexual, and other men who have sex with men (MSM) compared to other individuals. Substance use is linked to risky sexual behavior (e.g., unprotected sex), increasing the chance of HIV transmission. The current study draws on longitudinal data from an HIV disclosure intervention to examine whether (a) reports of alcohol and drug use prior to sexual encounters changed over 12 months among MSM living with HIV, and (b) whether these changes differ between an intervention and control group. Data were collected at five time points and included 995 sexual encounters ($N = 294$ participants at baseline). Approximately, half of the men were randomized to an HIV disclosure intervention (DI) group and half were randomized to an attention control case management (ACCM) group. Data were analyzed using mixed-effects models, controlling for a number of demographic characteristics. The percentage of sexual encounters involving drug use prior to the encounter significantly changed over time in a curvilinear manner. Drug use declined immediately following the intervention, increased at 1-month follow-up, and then decreased again following a booster session at 3-months follow-up. No significant changes were found in the percentage of sexual encounters involving alcohol use. Additionally, no significant differences were found between the DI and ACCM group. Although not specifically designed to address substance use, both the DI and ACCM showed promising results in reducing drug use prior to sexual encounters among MSM living with HIV.

The Association between Opioid Use Disorder and Death in a General Healthcare System: A Matched Control Study

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Individuals with opioid use disorder (OUD) have elevated mortality. Our recent study demonstrated higher mortality among OUD patients in a general healthcare system than in addiction specialty programs. It was not clear whether patients with OUD had higher mortality than patients without OUD in the same general health system. We conducted a matched cohort study using the electronic health records of a large university health system in the US from 2006–2014. We identified 1,683 OUD patients whose last encounter was before the end of 2014. For each OUD patient, two non-OUD controls were matched by gender, date of birth (within 3 years), last encounter date (within 1 year), and highest cosine similarity by the Elixhauser Comorbidity Index (which includes 30 out of the 31 measures associated with hospital mortality, excluding the drug abuse). Mortality status was determined by the National Death Index. Logistic regression (N=5,047) predicting mortality was conducted, controlling for age, gender, race, payment methods for healthcare, physical conditions (e.g., cancer, heart diseases), mental disorders (e.g., depression, anxiety), and other substance use disorders (e.g., alcohol, cannabis). There were 465 deaths (27.6%) among the OUD patients and 374 deaths (11.1%) among control patients. The presence of OUD was associated with higher mortality risk (OR: 2.28, 95% CI: 1.84-2.83, p<0.001) after regression adjustments. This study confirmed that OUD was associated with increased mortality risk in general health systems. Addressing the challenges of substance use disorders should be an urgent priority for providers in general health systems.

Additive Effects of HIV-infection and Chronic Tobacco Smoking on Brain Microstructure

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Tobacco smoking in adults with HIV-infection is twice that of

the general population in the United States. Both HIV-infection and chronic smoking are associated with altered brain microstructures and cognitive impairment. Whether smoking increases HIV replication or the risk for HIV-associated neurocognitive disorder is unknown. This study aims to evaluate potentiate additive or synergistic effects of tobacco-smoking and HIV-infection on brain microstructures using a 2x2 design. We hypothesized that HIV-smokers would show the greatest white matter abnormalities compared to seronegative (SN) participants with or without smoking, or individuals with HIV-infection. Diffusion tensor imaging was obtained in 21 HIV+ smokers, 25 HIV+ non-smokers, 25 SN smokers, and 23 SN non-smokers. Fractional anisotropy (FA), mean diffusivity, radial and axial diffusivity were assessed in 10 major fiber tracts and FA and MD were measured in 5 subcortical grey matter regions. Multivariate ANCOVA was used to detect group differences, with age as a covariate, and corrected for false discovery rate. Both chronic smoking and HIV-infection were associated with lower FA and higher diffusivity than SN nonsmoker in 8 white matter regions. In addition, HIV+ smokers exhibited the lowest FA and highest diffusivity in these regions. Significant HIV-by-smoking interaction on axial diffusivity was detected in the bilateral sagittal stratum. Low FA and high diffusion in the white matter regions reflect less restricted water movement, which could result from axonal damage and tissue swelling associated with neuroinflammation. Our findings suggest that HIV infection and chronic smoking may have additive effects on these white matter microstructural abnormalities.

Distress Tolerance and Craving in Heavy Drinking Smokers

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It is unknown if distress tolerance (DT) interacts with abstinence-induced craving, a stressor, to negatively impact cessation of drinking. We examined: 1) DT x abstinence-induced cigarette and alcohol craving among heavy-drinking smokers; we examined this effect on cigarette and alcohol cravings after individuals consumed a drink and cigarette after a brief abstinence; and 2) Whether pharmacological interventions that reduce alcohol and cigarette craving would modulate these interactive effects.120 heavy-drinking smokers were randomly assigned to one of four medications: 1) varenicline, 2) naltrexone, 3) varenicline+naltrexone, or 4) placebo. At baseline, participants completed the breath-holding task, a DT measure. Participants took medication for 9 days and then completed a visit after 12hrs of nicotine deprivation. At the visit,

participants completed cigarette/alcohol craving measures. They then received an alcohol dose to reach .060g/dl BrAC, at which point they reported post-drink alcohol craving (PDAC). Participants then smoked a cigarette and reported post-cigarette smoking craving (PCSC). For placebo, DT x post-abstinence alcohol craving was not predictive of PDAC. DT x post-abstinence smoking craving was associated with PCSC; for low DT, post-abstinence smoking craving was positively associated with PCSC. This association was nonsignificant for high DT. DT x post-abstinence alcohol/smoking cravings were nonsignificant for PCSC/PDAC in the active medication groups. Heavy-drinking, low DT smokers who experience severe abstinence-induced cravings may be vulnerable to relapse after a post-abstinence cigarette. Having high DT, and/or being treated with certain medications, may attenuate this relationship between craving post-abstinence and smoking. While alcohol effects were nonsignificant, the sample's average AUD severity was low; future replication with more severely alcohol dependent populations is warranted.

Commune Health Workers' Prejudicial Attitudes toward People Who Use Drugs in Vietnam

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In Vietnam, commune health workers (CHW), the primary healthcare workers at the community level, play an important role in HIV and drug-use prevention by providing routine preventive services to local residents, including people who use drugs (PWUD). The aim of this study is to investigate CHW's prejudicial attitudes toward PWUD and identify their correlated factors. A total of 300 CHW were recruited from 60 communes in Phu Tho and Vinh Phuc Provinces, Vietnam. The CHW completed a survey using the Audio Computer-Assisted Self-interview (ACASI) method. The CHW's background characteristics, perceived risk of occupational disease infection at work, perceived institutional support, and prejudicial attitudes toward PWUD were collected. The majority of the CHW (N=227; 75.7%) were women. The average age was 39.3 years. More than half (N=168; 56.0%) were doctors/assistant doctors and 83 (27.7%) were nurses/midwives. No demographic characteristics and professional characteristics were found to be correlated with a drug-related prejudicial attitude. CHW's perceived occupational risk and perceived institutional support were significantly associated with their prejudicial attitudes toward PWUD in both univariate analysis and multiple regression ($p<0.0001$ and $p=0.0191$ for perceived risk and perceived institutional support in multiple regression, respectively). The

study shed lights on drug-related stigma in primary healthcare settings in Vietnam, which needs to be addressed to facilitate the decentralization of drug-related treatment and care. The findings suggest that enhanced institutional support and improved job safety are crucial to reducing drug-related stigma and maintaining a high quality of healthcare provided for PWUD at community-based healthcare settings.

MMT Providers' Attitude toward Clients and Job Satisfaction in China

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For treatment success in methadone maintenance treatment (MMT) clinics, it is essential for providers to have a positive attitude toward clients. A negative attitude may influence providers' interactions with clients and lead to insufficient MMT services. Prior evidence has shown that various factors may influence providers' attitudes toward clients in drug treatment settings, including their job satisfaction. The aim of this study was to assess the level of providers' negative attitude toward clients and examine its association with background characteristics and job satisfaction in MMT clinics in China. The study used cross-sectional data on 418 providers from 68 MMT clinics in China, which were collected from 2012 to 2013. The ANOVA test was used to assess the level of negative attitude toward clients among providers with different characteristics, while multiple linear regression analyses were conducted to examine its association with selected variables. A higher level of negative attitude was found among providers who were female, younger than 30 years old, or working in the medical field for less than five years. The regression analyses showed that providers' job satisfaction and working duration in the medical field were negatively associated with their negative attitude toward clients. This study highlights concerns about providers' negative attitude toward clients and underscores the importance of job satisfaction in MMT settings in China. Structural interventions and institutional supports are urgently needed to improve MMT providers' overall job satisfaction, which may help to reduce their negative emotions during work and lead to more effective care services for clients.

A Course of Methylphenidate May Improve Smoking Cessation Outcomes in Patients with More Severe ADHD: Results from Follow-up Data from a Multi-site Randomized Controlled Trial

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In a multisite, randomized study (CTN-0029), a 3-month course of osmotic-release oral system methylphenidate (OROS-MPH) improved smoking cessation in a group of patients with higher baseline severity in Attention-Deficit/Hyperactivity Disorder (ADHD). This treatment, however, worsened smoking cessation outcomes in the group with lower baseline severity. We wanted to examine whether this differential treatment effect persisted after OROS-MPH was stopped. We conducted a secondary analysis of the follow-up data from that study. Patients were followed for an additional month after stopping OROS-MPH. We tested the hypothesis that OROS-MPH has an effect on abstinence. In the high severity group (defined as those with ADHD-RS $\geq$ 36, n=134), patients who received OROS-MPH had an improved abstinence even after the medication was stopped (48% for OROS-MPH vs. 26% for placebo, OR = 0.37, P = 0.02). In the lower severity group (n=121), there was no difference between abstinence (36% for OROS-MPH and 37% for placebo) at the end of the 1-month follow-up period between the two treatment groups. The beneficial effect of OROS-MPH in initiation of abstinence may last beyond the course of treatment for patients with more severe ADHD, whereas the harmful effect of OROSMPH in the lower baseline severity group washes out after the medication is stopped. This differential effect suggests adjunct psychostimulant treatment may have promise in initiation of smoking cessation in patients with high baseline ADHD symptom severity.

The Effects of Insurance Parity on Access to Medication-Assisted Treatments for Opioid Use Disorders

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Drug overdose deaths in America exceeded 50,000 in 2015,

claiming more lives annually than gun and motor vehicle accidents since 2009. Health insurance parity laws, such as the Mental Health Parity and Addiction Equity Act (MHPAEA), could help increase the adoption and implementation of opioid agonist therapies, a form of medication-assisted treatment (MAT), for opioid use disorders. This paper addresses the gap in research by evaluating the effect of MHPAEA's implementation on access to MAT. Using prescription-level data from a large commercial pharmacy database, I estimated the effects of insurance parity on access to MAT in states with no previous parity laws relative to those with preexisting parity laws. As a robustness check to these estimates, I evaluated the effects of MHPAEA at the state level using the DEA's ARCOS as an alternate data source. I found that the federal parity law for substance use disorders did not increase access to buprenorphine and did not increase or decrease medication costs for patients or payer types. While I found an overall increase in the amount of buprenorphine purchased in all states and payer groups, this increase was not associated with parity. These findings suggest that the implementation of the federal parity law did not successfully expand treatment for people with opioid use disorders beyond the growth that was already occurring nationally. Policymakers should evaluate whether parity will be adequate to meet the treatment needs caused by the current opioid epidemic in light of the probable repeal of the Affordable Care Act.

Patterns of Treatment Utilization and Heroin Use: Findings from the Australian Treatment Outcome Study

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Heroin dependence is a chronic, relapsing condition that often persists over the life course. Treatment for heroin use is rarely a single episode; rather, multiple treatment attempts are often needed to reduce use. Using data collected through the 10- to 11-year follow-up of the Australian Treatment Outcome Study (ATOS), this paper identifies and models joint patterns of heroin use and treatment utilization using a group-based trajectory approach. In 2001–2002, 615 people with heroin dependence were recruited into ATOS and re-interviewed at 3, 12, 24, and 36 months, and 10 to 11 years (follow-up rates of 89%, 81%, 76%, 70%, 70%, respectively). At each time point, structured interviews were administered. We identified four patterns of treatment utilization: one in five (21.7%) followed a "late increase" pattern, with low treatment utilization in the first 2–5 years and higher utilization in the next 5 years; one in three (30.1%) followed a "reduced treatment" pattern; one in

seven (13.7%) followed a "rapid increase with gradual decrease" pattern; and one in three (34.5%) demonstrated "long-term treatment." Six patterns of heroin use were identified: "rapid decrease to maintained abstinence"; "rapid decrease with rapid relapse"; "rapid decrease with late relapse"; "gradual decrease to near abstinence"; "gradual decrease"; and "no decrease". Trajectories of heroin use were found to be linked with patterns of treatment utilization. Periods of greater likelihood of treatment utilization were associated with decreasing or lower heroin use. Although treatment utilization was generally associated with lower frequency of heroin use, a proportion of participants continued to use heroin whilst engaging in treatment throughout the 10- to 11-year period.

Health Disparities in LGB Teen Parents

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Interventions to reduce pregnancy in adolescence have contributed to a reduction of such pregnancies in the last decade. When considering sexuality and teen pregnancy, lesbian, gay, and bisexual (LGB) adolescents experience considerably higher rates of pregnancy: 1 in 5 gay/bisexual males (18.6%) reported they had caused a pregnancy, compared to 11.8% of their heterosexual counterparts. Similarly, 1 in 4 lesbian/bisexual girls (25.0%) reported a history of one or more pregnancies compared to 21.9% of heterosexual girls. Interventions require an examination of sexuality and gender as important factors in adolescent pregnancy. Current scholarship is emerging in the field but has limitations. This preliminary research aims to identify gaps in current scholarship to understand population characteristics, propose interventions, and suggest resources for LGB adolescent parents. A literature review was conducted using multiple databases to identify relevant scholarship in teen pregnancy and LGB adolescents. Search keywords included: LGB teen parents and LGB adolescents. Given the limited research available, local resources were also included. Current literature indicates that LGB teen parents are more likely to engage in sexual risk behaviors, are at greater propensity of abusing substances, are at higher risk of becoming homeless, witness social impacts of stigma on their sexuality, and use pregnancy as a way to cope with their sexuality. The development of resources is needed to address the complex needs of LGB adolescent parents and their families. LGB adolescent families can benefit from comprehensive sexuality education to reduce risk behaviors and victimization. Further research should be conducted on characteristics, trends, and interventions targeting LGB adolescent mothers and fathers.

Functional Changes Associated with Reductions in Cannabis Use: An Exploratory Qualitative Study

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As cannabis use has become more common, so has the prevalence of cannabis use disorders (CUDs). CUDs are associated with myriad harms, but little is known about functional improvements that individuals with CUDs experience as they reduce their cannabis use. Knowledge of the functional improvements associated with reduced cannabis use can inform appropriate treatment goals and endpoints that are clinically meaningful for use in trials of treatments for CUD. Qualitative data were collected from five focus groups conducted in 2016–2017 with seven treatment providers and 23 patients who were in treatment for CUD. Focus groups were recorded and transcribed, and transcriptions were analyzed using template analysis to identify functional changes associated with reductions in cannabis use. All transcripts were double-coded by two members of the research team, who reached 100% consensus on reported findings. The functional improvements associated with reduced cannabis use included reduced apathy, increased productivity, greater engagement in activities, and improvements in cognition, quality of life, and self-care. Some participants reported that negative consequences of reduced use included difficulties addressing physical, psychiatric, and emotional challenges that cannabis had helped them alleviate, though many participants also reported improvements in these domains. Findings from this exploratory qualitative study highlight areas of functional improvement associated with reductions in cannabis use among individuals with CUDs. Further research is needed in examining longitudinal relationships between cannabis reduction and functional outcomes, and investigating factors that may influence these relationships.

Development of a Patient-Centered Research Agenda for Patients with Opioid Use Disorders

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Individuals with opioid use disorders (OUD) are among the most marginalized and poorly served patients in the U.S. health care system. Though a voluminous body of research focuses on ways to optimize service delivery and achieve some treatment goals, little is known about ways to tailor OUD services to address the real-world concerns of patients and their families. The Stakeholders' Substance Use Research and Treatment Information Exchange (SSURTIE) worked to address this issue by bringing together patients, family members, researchers, and treatment providers living in Los Angeles to collaboratively identify what the goals of patient-centered treatment for OUD should be. From 2015 to 2017, 75 individuals participated in 13 SSURTIE meetings. Through an iterative process of group discussion and qualitative data analysis that utilized a ground theory approach, the research team identified three main ways that OUD treatment can become more patient-centered: (1) by enhancing patient and family member knowledge about OUD and OUD treatment; (2) ensuring that treatment fosters strong patient-provider relationships; and (3) ensuring that services empower patients and families to handle challenges related to substance use and other issues after they complete formal treatment. Findings from this project can inform future research by examining the treatment interventions and policies that are most likely to promote outcomes that are meaningful to the real-world concerns of patients and their families.

Chronic Stress and Sexual Functioning among African American Women with At-Risk Partners in South Los Angeles

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The biopsychosocial model posits that chronic stress can influence female sexual functioning. We examined potential associations of various sources of chronic stress on sexual function using baseline data from a behavioral intervention study of 219 African American women with at-risk partners in South Los Angeles. Data were collected on: 1) self-reported measures of chronic burden, lifetime history of trauma, sexual abuse, and perceived racism, sexism and psychological distress; 2) female sexual function domains: desire, arousal, and satisfaction using the Female Sexual Function Index (FSFI); and 3) potential moderators: social support and spirituality. This largely low-income population experienced significant chronic and acute stressors. Most (61.6%) reported experiencing a moderate-to-high chronic burden (score >29); however, just 9.6% of the sample had scores indicating moderate-to-high psychological distress symptoms (score >50). Participants reported moderate levels of social support. Sexual functioning showed a median score of 2.4 for desire, 4.5 for arousal, and 4.8 for satisfaction (reference scores of

healthy controls: desire = 2.1; arousal = 5.08; satisfaction = 5.04). Multiple logistic regression found that chronic burden was a significant predictor of decreased overall sexual function, sexual arousal, and satisfaction (OR = 0.52; 95% CI 0.28 - 0.99, OR = 0.51; 95% CI 0.27 – 0.96 and OR = 0.44; 95% CI 0.21 – 0.91, respectively). In addition, having a main partner was associated with sexual satisfaction, whereas age greater than 48 was associated with decreased sexual arousal. These data indicate that ongoing stressors can have a greater impact on sexual functioning than acute traumatic events.

Engagement in the HIV Pre-Exposure Prophylaxis Care Cascade for MSM with High-Risk Non-Injection Substance Use: Results from a Sexual Health Clinic in Los Angeles, California

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The effect of substance use on initiation of and adherence to HIV pre-exposure prophylaxis (PrEP) has not been clearly delineated in community settings. To contribute to the understanding of how and when substance use affects effective use of PrEP, we measured the relationships between high-risk non-injection substance use and engagement in the PrEP care cascade. Awareness and initiation were measured among HIV-negative men who have sex with men (MSM) who sought testing for HIV or sexually transmitted infections (STIs) at the Los Angeles LGBT Center's (the Center) Sexual Health Program between August 2015 and December 2016. Retention in care and adherence were measured in a longitudinal study of 645 MSM receiving PrEP at the Center during this period. Of 13,339 MSM testing, 41% reported high-risk substance use in the past year: this included 5% methamphetamine use, 19% club drug (ecstasy, nitrites [poppers], or GHB) use, 2% prescription drug misuse, and 16% binge drinking only. Overall, 75% of MSM who use non-injection substances met criteria (recent STI or condomless anal intercourse) for PrEP initiation based on Centers for Disease Control and Prevention guidelines; of these, 51% self-identified as eligible for PrEP. Current PrEP use varied from 12% of methamphetamine users, to 14% of club drug users, to 6% of binge drinkers. The results reveal that while MSM who use noninjection substances are aware of PrEP and their eligibility for its use, their initiation of PrEP remains low despite the clear association between use of these substances with HIV acquisition.

Measuring Pain Severity and Sleep during Kratom (*Mitragyna speciosa*) Cessation

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Kratom (*Mitragyna speciosa*) has gained popularity in the U.S. as an analgesic and treatment for opioid addiction, although not many human studies have been conducted to verify these claims. Users also reported side-effects on the cessation of kratom use; this study measures sleep quality and pain severity associated with kratom cessation. 170 regular kratom users, identified by self-reported daily kratom use, were recruited from northern peninsular Malaysia. The Brief Pain Inventory (BPI) and Pittsburgh Sleep Quality Index (PSQI) scales were administered. Respondents were divided into two groups based on their self-reported quantity of kratom use: *1-3 glasses* vs. *≥4 glasses*. The sample mean age was 31.7 years, and average duration of kratom use was 94 months (SD=51.31). More than half (55%, n=94/117) consumed 1-3 glasses of kratom juice daily (*Mitragynine* dose ranged from 72mg to 85mg). More than half (54%, n=92/170) reported mild to moderate sleep quality, whereas 46% (n=78/170) reported worsened sleep quality during kratom cessation. Two-thirds reported mild to moderate pain severity (84%, n=143/170), and pain interference (70%, n=119/170) during cessation. Chi-square tests indicated that respondents who consumed ≥4 glasses of kratom juice daily were more likely to report worsened sleep quality ($p<0.027$) and severe pain interference ($p<0.037$), than those who consumed 1-3 glasses of kratom juice. There were no differences in pain severity scores between respondents who used 1-3 or ≥4 glasses of kratom juice daily ($p<0.097$). Kratom cessation was associated with worsened sleep quality and severe pain interference among those who consumed kratom heavily (≥4 glasses per day).

Probabilistic Linking and Longitudinal Propensity Score Matching with Mahanalobis Distance on Health Home Data of New York

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The New York State Health Homes (HH) program provides care coordination and management to high-cost

Medicaid clients with complex needs. Between 2012 and 2014, 155,000 Medicaid clients were enrolled in 33 HHs, out of which 49,000 were identified as substance use disorder (SUD) clients with comorbid chronic mental and/or general health conditions. Information obtained from Medicaid claims were used to identify health conditions and treatment utilization, while state registry data was used to obtain socio-demographic characteristics and addictions history. We combined data from Medicaid and a statewide registry to create a statistically matched comparison group utilizing Propensity Score Analysis (PSA) and Mahananobis distance. Longitudinal trends of service utilization were generated to study program outcomes. SUD clients enrolled into HHs had significantly higher levels of comorbid medical—HIV (26%), diabetes (14%), coronary heart disease (18%), and asthma (10%)—and severe mental illness (52%) compared to all SUD clients in the Medicaid system. HH enrollees also had higher levels of recent drug use, homelessness, and criminal justice involvement. Patterns of utilization of inpatient detoxification, inpatient rehabilitation, and emergency departments were similar to the comparison group. However, outpatient care for SUD and other comorbid conditions were significantly higher for HH enrollees. We concluded that the HH program was successful in enrolling SUD clients with high levels of chronic and psychiatric comorbid conditions. Preliminary findings indicate increased outpatient care, but impacts on hospitalizations and emergency department use are yet to emerge.

The Association of Changes in Cannabis Use with Functional Outcomes Among Cannabis Users with Major Depression

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Cannabis remains the world's most widely used illicit substance, with an estimated 183 million people worldwide reported having used it in 2014. Cannabis use disorders tend to be chronic and undertreated, despite well-documented associated medical and psychiatric issues. With regard to psychiatric risk factors, those with cannabis use disorders are at four times the risk of developing subsequent depression, and are two times as likely to have experienced clinical depression and have a co-occurring mood

disorder. In the present study, we pilot tested a computer-delivered cognitive behavioral therapy (CBT)/motivational enhancement therapy (MET) intervention, Self Help for Alcohol and Other Drug Use and Depression (SHADE), which targets cannabis use and depression, in a primary psychiatric care setting. Thirty cannabis users with major depression presenting for psychiatric treatment received the SHADE intervention. Preliminary data show that integrating SHADE with depression treatment produced improvements in both mental health symptoms and substance use. More specifically, reductions in cannabis use were significantly correlated with changes in functional outcomes, including reductions in depressive symptoms at both treatment end (r = 0.41, p = 0.04) and at the 1-month follow-up (r = 0.51, p = 0.02). Likewise, as cannabis use decreased, health-related quality of life increased, as observed at treatment end, although at the trend level (r = -0.35, p = 0.12), and significantly at the 1-month follow-up (r = -0.48, p = 0.03). Overall, initial findings suggest that SHADE is feasible and efficacious in reducing cannabis use and improving functional outcomes in depressed cannabis users in psychiatric care settings.

To Treat or Not to Treat: Characteristics of Community Heroin Users in Northern Taiwan

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This study aimed to characterize community heroin users in Taiwan on different treatment modalities using a social network approach. Respondent-driven sampling (RDS) was used to recruit community heroin users (age 20 or above) from the metropolitan Taipei area and Taoyuan City, Taiwan. All participants were grouped by their treatment and outcome status: methadone treatment (MT), buprenorphine-naloxone treatment (BT), no treatment (NT), and abstinent (AB). RDSAT software and Wald test were used for data analyses. A total of 521 heroin users were recruited via 17 seeds; 285 (Estimated population proportion, EPP=0.413) were MT, 49 (EPP=0.100) were BT, 155 (EPP=0.371) were NT, and 32 (EPP=0.116) were AB. Regularity of drug use, indicated by self-reported use during the last 4 consecutive weeks, were significantly different among the 4 groups for alcohol (MT=18.7%, BT=33.7%, NT=20.6%, and AB=67.1%; p=0.0004), opioid (MT=34.7%, BT=57.8%, NT=38.2%, and AB=0.7%; p=0.0029), and methamphetamine use (MT=9.2%, BT=0.9%, NT=28.8%, and AB=0.9%; $p<10^{-4}$). More than one-third of active community heroin users remained untreated in the catchment area using the RDS estimation. Two-thirds of abstinent individuals might have drinking problems,

more than half of buprenorphine-treated patients remained regular users of heroin, and the untreated community of heroin users also had significant methamphetamine co-use. More efforts are needed to improve the quality of care for heroin users in Taiwan.

Community Ketamine Users in Taiwan: A Social Network Approach

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Abuse of ketamine is a serious issue in Asian countries. In Taiwan, more than 30,000 are arrested annually for ketamine possession. Most of the affected individuals were young. It is crucial to control this fast-growing problem and prevent its negative consequences, such as psychiatric comorbidity and urological problems. Characterizing ketamine users' profiles and treatment needs is pivotal. However, most of them are hidden in the community and their clinical features are unclear. The present study aimed to identify clinical features, i.e., physical and psychiatric comorbidity, of community ketamine users via a social network approach. A total of 148 ketamine users were enrolled using snowball sampling; 60 met a lifetime diagnosis of ketamine abuse or dependence by DSM-IV-TR (problematic user, PU) and 88 "ever used" with no clinical diagnosis for ketamine (ever user, EU). A comparison group of 49 with "never use" of ketamine (never user, NU) were also recruited. Relative to NU, both PU and EU were significantly characterized by being less educated, more unemployed, as well as having more subjective complaints of urological problems. However, concurrent psychiatric comorbidities, including affective, anxiety, and psychotic disorders, did not differentiate these 3 groups. Polydrug use was frequent among EU and PU, and alcohol and methamphetamine were the most commonly co-used substances. Since polydrug use is common in this population, their drug use career and the effects of drug combination on clinical outcomes warrant further investigation. Routine urological assessment should be considered in the management of ketamine use problem.

Methamphetamine Chemsex with Subsequent Repeated Oral Gonorrhea Infection and HIV Postexposure Prophylactic Treatments: A Case Report

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Methamphetamine use before or during sex, or "chemsex," involves consensual intentional sex under the influence of methamphetamine, which may expose individuals to hazards of various domains. This paper reports the case of a 22-year-old sexually active homosexual man who repeatedly engaged in chemsex and subsequently experienced a series of hazardous consequences such as oral gonorrhea infection and severe psychological distress, as well as being at a high risk for human immunodeficiency virus (HIV) infection. Psychotropic agents, HIV postexposure prophylactic (PEP) agents, and gonorrhea treatments were prescribed. Multidisciplinary psychotherapeutic interventions to relieve the fear of HIV were performed, including individual counseling, which provided strategies for maintaining sobriety from methamphetamine, education regarding safer sex without drugs, and intimate relationship enhancement regarding the subject's sexual orientation. Within the 6-month follow-up, his anxiety and depressive symptoms were gradually relieved. He successfully learned better skills regarding safer sex and his serial HIV check-ups remained negative.

Identifying Patterns in Behavioral Public Health Data Using Mixture Modeling with an Informative Number of Repeated Measures: Applications in Substance Abuse and HIV Prevention Research

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DIMM is a machine-learning technique for clustering individuals based on their patterns of responses (e.g. on a questionnaire of drug items). It is an extension of the finite mixture model, which allows for the number of repeated measures to be incorporated and contributes to the clustering of individuals. The dimension of the repeated measures can be summarized into a count of responses and can be assumed to follow a truncated Poisson distribution and this information can be included into what is called a dimension informative finite mixture model (DIMM) [NIH/NHLBI R01HL111195]. This model has been applied to binary drug items among male sex workers (MSW) in Vietnam. Based on reported drug use within a one month period from an 11-item drug use list, three

distinct drug use classes were identified: (1) alcohol use, (2) alcohol and tobacco use, and (3) high polydrug use. The current drug use classes are also associated with sex worker status, housing stability, income level, educational attainment, marital status, sexual identity, and sexual preferences. Early ages of alcohol initiation are seen for all three classes. High current drug users show the earliest onset of alcohol use; such onset is significantly delayed for moderate and low current drug users. The data illustrate the complexity of drug factors that must be accounted for, both in advancing our epidemiological understanding of the complexity of drug use and the use of drug-risk initiation data to predict its relationship to current drug use subtypes among high risk populations.

Efficacy of Prefrontal Theta-burst Stimulation in Methamphetamine Addiction: A Randomized Sham-controlled Study

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Repetitive transcranial magnetic stimulation (rTMS) could modulate cortical excitability and has the potential to treat methamphetamine addiction. Theta-burst stimulation (TBS) is a new form of rTMS that has a more rapid effect on synaptic plasticity than traditional rTMS protocols, and such a quick method could generate a powerful and consistent effect. A randomized sham-controlled study was conducted to investigate the anti-craving efficacy of intermittent TBS and differences between the effects of real and sham stimulation. Forty methamphetamine-addicted patients were randomized to receive 4 weeks of 5 min sham or intermittent TBS to the left dorsolateral prefrontal cortex (DLPFC). Subjects rated their craving at baseline after exposure to MA-associated cues and after iTBS sessions each week. GABA and glutamate +glutamine (Glu+Gln) of the left dorsolateral prefrontal cortex were determined by magnetic resonance spectroscopy (MRS). The cognitive function was measured by Cogstate Battery before and after iTBS intervention. Real iTBS over the left DLPFC reduced craving significantly after 2 weeks of iTBS as compared to sham stimulation (p<0.05) and lasted 4 weeks. Real iTBS over the left DLPFC reduced GABA levels (p=0.040), while in the sham stimulation group, Glu+Gln decreased (p=0.012) significantly after the intervention. Furthermore, real rTMS improved verbal learning, memory (p=0.006), and problem solving (p=0.003) in MA-addicted patients. The present study demonstrates that iTBS of the left DLPFC could reduce craving and have no negative effects on cognitive function; the mechanism may be associated with GABA and Glu+Gln changes of DLPFC in methamphetamine addiction.

Baseline Characteristics and Outcomes Associated with Long-Term Opioid Abstinence After Randomization to Methadone Versus Buprenorphine/Naloxone in a Multi-Site Trial

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Previous studies have suggested that 5 years of opioid abstinence is a good predictor of long-term recovery from opioid addiction. Based on a long-term follow-up study of participants randomized to methadone (MET) versus buprenorphine/naloxone (BUP) in a multisite trial, we investigated baseline characteristics associated with the likelihood of being abstinent from opioid use for at least five years after randomization. Among 699 participants with a follow-up period of 5 or more years (Mean of 6.7, SD=1.0), 232 did not use opioid for more than 5 years. The logistic regression results suggest that randomization to MET (vs. BUP; OR: 1.48; 95%CI: 1.06, 2.07), East Coast residency (vs. West; OR: 1.43; 95%CI: 1.00, 2.05), not smoking cigarettes (OR: 1.81; 95%CI: 1.07, 3.05), not using cocaine (OR: 1.86; 95%CI: 1.27, 2.73), and not injecting the drug (OR: 2.37; 95%CI: 1.66, 3.38) at baseline was each associated with a significantly higher likelihood of maintaining opioid abstinence for at least 5 years. Additionally, participants maintaining opioid abstinence for 5 years showed lower severity (measured by the Addiction Severity Index) than non-abstinent participants at the end of follow-up period in drug use (0.10 vs. 0.18), employment (0.52 vs. 0.65), family or social relationships (0.07 vs. 0.11), legal problems (0.02 vs. 0.09), and psychiatric problems (0.15 vs. 0.21). Our findings identified baseline predictors of long-term abstinence and confirmed that long-term opioid abstinence is associated with improvement in other key life domains.