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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES • National Institutes of Health • National Institute on Alcohol Abuse and Alcoholism

FEATURE

MINORITY HEALTH RESEARCH GAINS MOMENTUM AT NIAAA



America's demographics are changing faster than ever before. This past December, the U.S. Census Bureau released a report predicting that ethnic minorities in the United States will increase dramatically, from 37 to 57 percent of the population between now and 2060.

This rapid growth heightens the need for more research on minority health issues, including epidemiologic studies and investigations to learn more about effective alcohol prevention and treatment approaches. NIAAA's Health Disparities Research Program addresses the unique alcohol-related issues facing racial and ethnic minorities.

Challenges

Racial and ethnic minorities experience higher alcohol-related morbidity and mortality rates than non-Hispanic Whites. For example, research shows that Hispanics and Blacks experience liver cirrhosis at higher rates than non-Hispanic Whites (Flores, 2008). White Hispanic men have the highest death rates from liver

cirrhosis, about 1.8 times the rates for White and Black non-Hispanic males. (Yoon and Yi, 2008). Black men are more likely than White men to suffer alcohol-related esophageal cancer and pancreatic disease, and also have higher mortality rates from alcohol-related car crashes.

Blacks and Hispanics in particular are also less likely than Whites to get professional treatment for alcohol problems (Chartier, 2011, and Schmidt, 2007), possibly because they have less access to health care generally. A recent analysis showed that 35 percent of non-Hispanic Whites who are at-risk drinkers visited a primary care physician compared with 21 percent of Blacks, 24.6 percent of English-speaking Hispanics, and 3.6 percent of Spanish-speaking Hispanics (Mulia and Schmidt, 2011). As a result, members of minority groups may not receive the screening and intervention necessary to prevent additional problems.

Reluctance to enter treatment may stem from concerns about finding and paying for services (Schmidt, 2007). Also, Hispanics in particular worry that providers will not understand their language, background, and culture, and believe treatment will not work (Zemore, 2009).

The impact of these health issues may intensify as these segments of the population grow.

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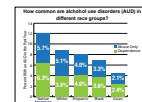


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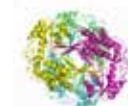


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FEATURE

NIAAA INSPIRES DIVERSITY IN THE NEXT GENERATION OF RESEARCHERS

The lack of diversity in the biomedical research workforce community is a longstanding issue. Most recently, an August 2011 report in *Science* found that African-American researchers are 13.2 percentage points less likely than similarly credentialed White researchers to successfully compete for NIH research funding awards. While NIH is in the process of developing programs to address this larger issue, NIAAA currently supports programs that encourage racial and ethnic minority investigators to pursue scientific research, especially in health disparities.

NIAAA supports a range of programs that help minority researchers at all stages of their careers. These include programs that inspire high school students to choose biomedical sciences as a career path and that encourage senior faculty to mentor the next generation of researchers. For example, the Research Supplements to Promote Diversity in Health-Related Research (<http://www.niaaa.nih.gov/grant-funding/funding-opportunities/diversity-supplements>) is a grant that allows scientists from high school to senior-level faculty to experience what it is like to pursue research in NIAAA-funded laboratories. Through NIH, NIAAA also offers predoctoral fellowship awards to support students from underrepresented groups who are pursuing health-related graduate degrees.

Recruiting and nurturing the careers of diverse researchers is more than just

“the right thing to do,” according to Lynn Morin, public health analyst in NIAAA’s Health Disparities Research Program. Greater diversity enhances NIH’s level of cultural competency by recognizing that various ethnic groups may approach health and wellness differently. It also helps NIH address issues relating to minority health, since evidence shows that racial and ethnic minority investigators often study health equity in diverse populations.

Morin and Judith Arroyo, Ph.D., NIAAA’s Minority Health and Health Disparities Initiatives coordinator, also travel to meetings around the country to help mentor minority investigators, guiding them to learn about and take advantage of opportunities like these. They help applicants network among NIH investigators and extramural scientists with similar research interests, and then offer guidance on maintaining and nurturing relationships with senior faculty. As Morin noted, “My colleagues throughout NIH are always passionate about helping



Luis Natividad, Ph.D., receives his doctoral hood from mentors Laura O’Dell, Ph.D., associate professor, and Edward Castañeda, Ph.D., chair, both alcohol researchers in the Department of Psychology at the University of Texas–El Paso. Dr. Natividad, whose research focuses on the neural mechanisms of alcohol addiction, is currently a postdoctoral fellow at the Scripps Research Institute in California and a participant in NIAAA’s Research Supplements to Promote Diversity in Health-Related Research.

enthusiastic young investigators throughout all stages of their careers.”

NIH is beginning to collect data to show the fruits of this labor. For its part, NIAAA keeps in contact with the students it helps, and the Institute tracks their career paths. The goal is for these students to build careers in biomedical research and earn their own NIH R01 awards. “We look forward to watching these investigators develop and produce knowledge that will enhance biomedical research and improve health outcomes for all Americans,” said Morin.

NEWS FROM THE FIELD

ALCOHOL AND PREGNANCY: THE LONG-TERM CONSEQUENCES

Now, there’s more evidence of the dangers of heavy drinking while pregnant. New research shows that children whose mothers drank while pregnant had abnormal brain development patterns years after being exposed to alcohol in the womb.

The study is the first to follow children over time using magnetic resonance imaging technology to look at how heavy alcohol exposure before birth interferes with brain growth in childhood and adolescence.

The findings suggest that children with heavy alcohol exposure may have decreased brain plasticity—the brain’s ability to grow and remodel itself based on experience with the outside world. Such adaptation continues throughout

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NIAAA Initiatives

The NIAAA Minority Health and Health Disparities Initiatives, coordinated by Judith Arroyo, Ph.D., is addressing these issues through enhanced research efforts and collaborations across the National Institutes of Health (NIH) and with outside organizations.

Top research priorities include increasing minority representation in research populations, developing a better understanding of minority subgroups, broadening the knowledge base, especially of Asian American and American Indian/Alaska Native (AI/AN) communities, and identifying the genetic contribution to problems.

I am excited about harnessing the power of research to support the needs of racial and ethnic minority groups.

— Judith Arroyo, Ph.D.

The 2004–2005 National Epidemiologic Survey on Alcohol Related Conditions (NESARC) oversampled both Blacks and Hispanics. Future NESARC surveys will continue oversampling these groups, and there are also plans to oversample Asian Americans. In addition, NIAAA hopes to expand funding opportunity announcements, so researchers can conduct secondary analysis on a variety of existing data sets, including NESARC, to yield more information on alcohol-related problems among minorities.

Another key issue is why minority subgroups experience alcohol problems differently. “Hispanics from Mexico have different issues than those from Puerto Rico and Cuba. Black Americans have different issues depending on whether they are African American, Afro Caribbean, or Haitian, or have lived here for generations,” Dr. Arroyo said. “We need to understand these differences better.” In addition, she said, “We are trying to engage with Asian American communities to better understand their needs.”

NIAAA grantees are making great strides in a variety of critical research areas. James Allen, Ph.D., at the University of Alaska, studies how Alaska Native culture protects young people from the allure of alcohol. “We discovered that these communities have a wealth of strengths to draw on that help individuals quit drinking and that can protect them from drinking in the first place,” said Dr. Allen.

Cindy Ehlers, Ph.D., at the Scripps Research Institute, investigates factors affecting how different minority groups react to alcohol. She explains that ethnic groups can differ in certain enzymes that metabolize alcohol. About 40 percent of Asians and 15 percent of African Americans have differences in these enzymes, which serve as a protective factor against the development of alcohol use disorders.

Psychosocial factors, which vary across ethnic groups, also can play a role. “For Hispanics, acculturation

stress can influence drinking patterns and risk for problems. For Native Americans, historical trauma can make a difference,” said Dr. Ehlers. Understanding these influences can help researchers develop effective prevention and treatment approaches.

In addition to these efforts, the NIAAA program is joining several other NIH Institutes on funding opportunity announcements to increase the number of grants studying minority health issues. The NIAAA program also is working with the National Institute on Drug Abuse on a joint portfolio review and will establish an expert panel to determine what areas need more attention.

Outside NIH, the program cooperates with a variety of groups to promote minority health research. For the past 10 years, NIAAA has supported the National Hispanic Science Network’s alcohol-related research symposia and sponsored junior investigators so they could attend and present their work at these conferences.

NIAAA also hosted two symposia on minority health issues at the Research Society on Alcoholism’s (RSA) 2012 conference. Plans for events at the upcoming RSA annual conference are underway.

All of these efforts promise to enhance understanding of minority health issues. “I am excited about harnessing the power of research to support the needs of racial and ethnic minority groups,” says Dr. Arroyo.

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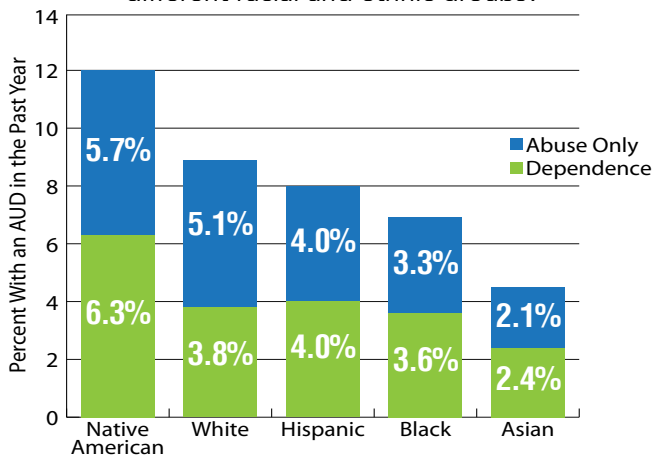
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BY THE NUMBERS

EVERY PICTURE TELLS (PART OF) A STORY

How common are alcohol use disorders (AUDs) in different racial and ethnic groups?



The picture of alcohol abuse and dependence among different racial and ethnic groups in the United States is complex and is changing in conjunction with the rapidly shifting national demographics. As shown in the chart, the prevalence of alcohol use disorders (AUDs) varies among different groups. Rates of past-year AUDs range from a high of nearly 12 percent among Native Americans to a low of 4.5 percent among Asian Americans. In between, rates among Blacks, Hispanics, and Whites range from 7 to 9 percent, close to the average of 8.5 percent for all U.S. adults. (Grant et al., 2006).

The big-picture statistics tell only part of the story. Studies have also teased apart racial and ethnic differences in drinking patterns, the severity of AUDs, social and medical consequences, treatment

usage, and more. Among the findings:

- **Dependence severity:** Alcohol dependence is less common among Blacks and Hispanics compared to Whites, but Blacks and Hispanics are more likely than Whites to have severe dependence that persists or recurs (Dawson et al., 2005).

- **Medical consequences:** Black men have higher rates of alcohol-related pancreatic disease and esophageal cancer than White men. Overall, Hispanic men have the highest rates of death from liver cirrhosis (Chartier and Caetano, 2010). It's important to consider both race and ethnicity, however, as White Hispanic men have the highest cirrhosis death rates and Black Hispanic men the lowest (Dawson et al., 2001).

- **Treatment usage:** Compared with Whites, Blacks and Hispanics are less likely to use private health care for AUDs, and Hispanics are less likely to use alcohol treatment programs. The more severe the alcohol problem, the less likely Blacks and Hispanics are to use

alcohol services (Chartier and Caetano, 2011).

Adding to the complexity, there are differences not only across groups but also within groups. For example, Hispanics from different countries of origin have different rates of AUDs. These rates, in turn, are influenced by birthplace, with more AUDs found among U.S.-born rather than foreign-born Hispanics (Alegria et al., 2006).

Moreover, rates change with time. Trend data have shown, for example, that alcohol abuse increased between 1992 and 2002 among White and Black men and women, Hispanic men (Caetano et al., 2011), and young adult Asian women (Grant, 2006). During the same time frame, alcohol dependence decreased among White and Hispanic men (Caetano et al., 2011) and increased among some young adult minorities, including Black women and Asian men (Grant, 2006).

A broad goal of all of this research is to help pinpoint who is at risk for alcohol-related problems. Continued work is needed to fill in the picture more completely, so that effective prevention and treatment programs can be targeted to specific groups and subgroups that are in need. This knowledge will become increasingly critical as the United States moves toward a population that consists primarily of people of racial and ethnic minority heritage.

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NEWS FROM THE FIELD

WOMEN'S STRESS-RELATED DRINKING LINKED TO EARLY ABUSE

Early life stress can increase vulnerability to stress-related drinking in women, especially in response to events that are not under their control, according to a recent study. This study is the first to examine whether adults with a history of maltreatment during childhood drink more heavily in reaction to stressful life events.

The study explored the stress sensitization hypothesis, which is the idea that early life stress leads to long-term psychobiological changes in the brain, increasing sensitivity to future stressful life events (SLEs) and raising the risk for stress-related drinking. The researchers interviewed 4,038 adult twins to examine early life stress, past-year SLEs, and drinking patterns. The study defined early life stress as maltreatment, including physical abuse, sexual abuse, or neglect before the age of 15. Later SLEs included job loss, major financial problems, legal problems, marital problems, robbery, and serious illness. Researchers categorized stressors by whether they

were likely caused by an individual's own behavior or by independent or "fateful" factors. The study also considered the possible effects of depression related to childhood maltreatment as a cause for stress-related drinking.

Among women who reported maltreatment before age 15, those with more independent SLEs (not caused by the individual's behavior) drank more heavily. Researchers did not see this association among women without a history of maltreatment. Among men, there was little evidence that childhood maltreatment affected the association between SLEs and stress-related drinking. Further, for women with a history of maltreatment, stress-related drinking was not found to be related to symptoms of depression.



According to the authors, "Given that women are more vulnerable than men to both the short- and long-term adverse physiological consequences of heavy drinking, ... a better understanding of how childhood maltreatment and other kinds of childhood trauma increase risk for stress-related drinking is important for reducing the health impact of drinking in women."

The article abstract can be found here:

Interactive effects of childhood maltreatment and recent stressful life events on alcohol consumption in adulthood

<http://www.ncbi.nlm.nih.gov/pubmed/22630794>

NEWS FROM THE FIELD: Alcohol and Pregnancy . . . Continued from page 2



one's life and is crucial to learning new skills and adapting to the environment.

During normal development, brain volume increases rapidly at a young age as new neural connections form and then decrease in certain regions during adolescence as underused brain connections are cleared away to increase efficiency. While children whose mothers didn't drink showed this pattern of robust brain growth and reduction, children

with heavy exposure to alcohol showed patterns of static growth.

Among the 70 children in the study who had been heavily exposed to alcohol in utero (13 drinks per week throughout the pregnancy, on average), lack of growth was most obvious in the rear portions of the brain—particularly in the parietal cortex, which is thought to be involved in selective attention and the production of planned movement.

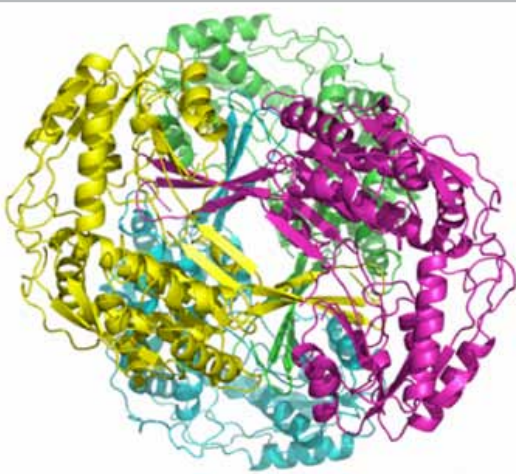
The article abstract can be found here:

A longitudinal study of the long-term consequences of drinking during pregnancy: Heavy in utero alcohol exposure disrupts the normal processes of brain development

<http://www.ncbi.nlm.nih.gov/pubmed/23115162>

A CLOSER LOOK

THE GENETIC BASIS OF ALCOHOL FLUSHING IN ASIAN POPULATIONS



A three-dimensional model of the enzyme that commonly causes alcohol-induced flushing in people of East Asian ancestry. The four colors in the diagram represent four identical protein ribbons stacked across one another to make up ALDH2. Variation in ALDH2 renders it partially inactive, leading to a buildup of toxic acetaldehyde in the body.

Photo courtesy of Thomas Hurley, Ph.D., and colleagues, Indiana University School of Medicine.

You may know someone who flushes bright red after only a few sips of alcohol. This phenomenon, known as alcohol flush, is common among people of East Asian descent and is usually caused by a specific genetic variation that makes an individual unable to fully metabolize, or break down, alcohol in the body.

When you drink, alcohol is first metabolized into acetaldehyde, a toxic byproduct similar to formaldehyde, that causes DNA damage and has other cancer-promoting effects. What looks like a mass of ribbons run amok in the diagram is actually ALDH2, an enzyme that plays a critical role in breaking down acetaldehyde into acetate, a nontoxic metabolite in the body.

An estimated 30 to 50 percent of people with East Asian ancestry (e.g., Chinese, Japanese, Korean) carry a defect in one or both copies

of the ALDH2 gene that codes for the enzyme, causing acetaldehyde to accumulate in the body when they drink alcohol and bringing on facial flushing, as well as nausea and rapid heartbeat for some. The reaction may be more than a nuisance—multiple studies show a strong link between alcohol flush and an increased risk of throat cancer, for example.

Someone with one defective ALDH2 copy may increase his or her risk of esophageal cancer six- to tenfold by consuming just two drinks a day. Based upon these findings, acetaldehyde derived from alcohol metabolism is classified as “carcinogenic to humans” by the International Agency for Research on Cancer. Notably, those with two defective copies of ALDH2 have low rates of alcohol dependence and esophageal cancer because the symptoms of alcohol flushing are so severe they drink very little.

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5 QUESTIONS WITH . . .

JUDITH ARROYO, PH.D.

Dr. Arroyo is NIAAA's Minority Health and Health Disparities Initiatives coordinator.

1 Do you believe the alcohol research field pays sufficient attention to issues facing minority populations?

Yes and no. Under-represented minorities (URMs) will comprise the majority of the U.S. population by the year 2050. In fact,

as of last year, there were more URM babies under age 1 than White babies under age 1 in the United States. Clearly, we need to rapidly and substantially increase our knowledge about health disparities in URMs to avoid major public health problems. To date, we have made important strides in some areas, but not in others. For example, we have considerable epidemiologic data on Hispanics and

African Americans but less reliable information on AI/AN and Asian Americans. In the area of prevention, we don't have any research on Asian Americans at all. Then, there's the question of research depth. We need more projects that drill down beyond racial and ethnic labels to investigate differences within ethnic groups, such as those associated with gender, place

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NEWS FROM THE FIELD

DISADVANTAGED NEIGHBORHOODS AFFECT RISK FOR ALCOHOL PROBLEMS

Numerous studies highlight the importance of environmental influences on risk behaviors for substance use. Neighborhoods provide basic infrastructure and important social contexts, and thus are critical influences on the risk for alcohol problems. To address the lack of recent U.S. studies of the relationship between neighborhood disadvantage and alcohol outcomes, NIAAA-supported investigators analyzed data from the 2000 and 2005 National Alcohol Surveys.

In these large surveys of U.S. adults, researchers led by Dr. Katherine Karriker-Jaffe at the Alcohol Research Group in Emeryville, CA, measured neighborhood disadvantage by assessing levels of employment, income, education, and related indicators of socioeconomic status.

The researchers found that the effects of neighborhood disadvantage on drinking outcomes varied among

subgroups in the study. For example, neighborhood disadvantage was significantly associated with increased abstinence (nondrinking) for all groups except Black and Hispanic men. Among drinkers, neighborhood disadvantage was associated with decreased heavy drinking by Whites but increased heavy drinking by Blacks. Neighborhood disadvantage was significantly associated with negative alcohol consequences for White women and was marginally significant for Black men, but was not significant for other groups. Finally, despite elevated odds of alcohol dependence for White women, neighborhood disadvantage was not significantly associated with alcohol dependence for any other group. The findings appeared in the November 2012 issue of the *Journal of Studies on Alcohol and Drugs*.

Investigators conclude that their findings may have important implications for preventing alcohol problems.

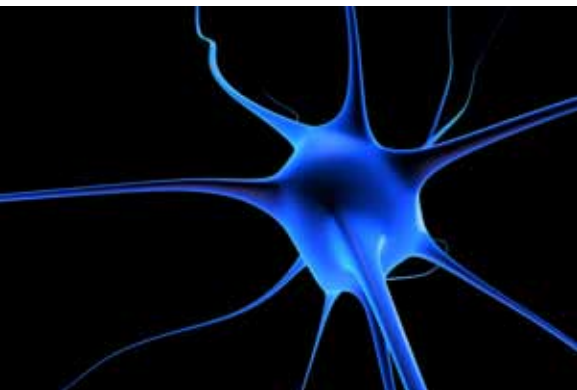


Targeted interventions could be developed to address unequal impacts of neighborhood disadvantage. In particular, efforts to reach Blacks and White women in disadvantaged areas may decrease heavy drinking and lessen the burden of alcohol problems among these groups.

The article abstract can be found here:
Neighborhood disadvantage and adult alcohol outcomes: Differential risk by race and gender
<http://www.ncbi.nlm.nih.gov/pubmed/23036203>

NEWS FROM THE FIELD

HOW CHRONIC HEAVY DRINKING DAMAGES THE BRAIN



Chronic alcoholism typically takes a heavy toll on the brain. Exposed to years of heavy drinking, neurons may stop functioning properly and brain tissue can atrophy. In fact, chronic alcoholism is one of the leading causes of dementia, second only to Alzheimer's disease.

In total, an estimated 50 to 75 percent of long-term alcoholics show cognitive impairment and structural damage to the brain as a result of their drinking. However,

the way in which alcohol leads to brain degeneration is not fully understood.

A mini-review published in the journal *Experimental Biology and Medicine* explores the existing evidence, focusing on the potential role of DNA damage and issues with DNA repair.

Every day, cells work to repair damage to DNA caused by natural metabolic processes and environmental sources such as exposure to ultraviolet light and radiation. Repairing DNA is critical for cellular functioning, and accumulation of too much damage may cause the cell to die, go dormant, or divide uncontrollably, potentially resulting in a cancerous tumor.

Chronic heavy drinking is known to cause extensive DNA damage, which can result in "genomic instability"—a term for aberrant changes to the genetic makeup that put one at risk for a host of disorders, including cancer and neurodegeneration.

Accumulated DNA damage is thought to be an important factor underlying aging. Therefore, defective DNA repair may cause the brain to age prematurely.

Studies also suggest that impairment to a key cellular process known as one-carbon metabolism is involved in alcohol-related brain damage. This biochemical process plays a critical role in creating DNA precursors, DNA repair, and DNA methylation, so dysfunction may cause genomic instability, leading neurons to work improperly or die.

By understanding the mechanisms that cause chronic alcohol abuse to damage the brain, scientists may one day be able to develop therapeutics that reduce or eliminate damage.

The article abstract can be found here:
DNA damage and neurotoxicity of chronic alcohol abuse
<http://www.ncbi.nlm.nih.gov/pubmed/22829701>

5 QUESTIONS WITH . . . *Continued from page 6*

of birth, national origin, and level of acculturation. Understanding these nuances will give us a sharper and more comprehensive picture of alcohol trends in different minority communities. NIAAA is funding several studies and young investigators in these areas, but we still have a way to go. And that's the bottom line here overall—we are making progress, but there is still a lot more work to be done.

2 What are the benefits of having scientists from racially and ethnically diverse backgrounds working on this research?

Diverse, multicultural researchers can facilitate this type of research in many ways. Look at research design, for example. URM investigators tend to ask culturally informed questions that enhance the creativity and focus of the research. They are more likely to integrate culturally relevant issues that, while obvious to someone from a given culture, may not be evident to an outsider. When URMs are part of the review groups that evaluate grant proposals, they can offer a unique perspective on the innovation and significance of the proposed minority-focused research. Consider, too, the problem of clinical trial participation. Scientists everywhere are struggling to recruit individuals for studies, and URM-focused research is no exception. Language and cultural barriers add to these challenges. However, the presence of URMs on research staffs can help minority individuals feel more comfortable with the research environment and, therefore, be more likely to participate as subjects. Finally, we need to consider the continuity and long-term future of URM research. Having URM investigators in key research roles allows them to identify and mentor promising URM students to join the next generation of investigators. For all these reasons, increasing URM representation in research projects is critical to building the necessary knowledge base about these issues.

3 Are there any notable trends in alcohol use among minority communities?

Yes, quite a few bear watching. First, let's look at the big picture—overall drinking rates. Although there is considerable variability across surveys, it appears that AI/ANs have the highest overall rates of alcohol abuse and dependence, followed by non-Hispanic Whites, then Hispanics, African Americans, and Asian Americans. A separate, but very important measure is “new cases” or incidences of alcohol dependence, which can help predict future trends and identify new problem areas. By this measure, the rate is lowest among Asian Americans and non-Hispanic Whites. Incidence rates are higher for Hispanics, African Americans, and AI/ANs; these groups may also have more persistent or recurrent alcohol problems than other URMs. Other interesting trends are grounded in gender differences. Historically, minorities have had large gender gaps in alcohol use, with women drinking much less than men or abstaining altogether. But this gender gap seems to be disappearing, at least among Hispanic young women. Recent *Monitoring the Future* data show Hispanic high school girls are drinking as much, or in some instances more, than their male counterparts.

4 Where do you see the research heading?

In the coming years, URM research at NIAAA will focus on collaborations, technical assistance, and attention to the alcohol-related issues of specific minority groups. Sometime this year, we hope to undertake a review of minority health and health disparities addiction research, supported by NIAAA and the National Institute on Drug Abuse, to determine how to direct our resources more collaboratively. There's also a lot of interest in developing cultural adaptations of existing evidence-based prevention and treatment interventions. By extension, we also will focus on capacity building in minority communities. For example, for the past

3 years, NIAAA has partnered with other Institutes and the NIH Office of Behavioral and Social Sciences Research on outreach and technical assistance workshops for AI/AN communities. Fortunately, we are beginning to see the fruits of these efforts, and expect to see many more innovative and high-quality grant proposals to study this population. And finally, we need to address some of our knowledge gaps. For example, although Asian Americans may have relatively lower rates of AUDs, problems (many of them unique to this group) still exist, so we hope to increase research focused on this community.

5 What would we be surprised to learn about you?

I was born and raised until age 6 in El Paso, Texas, where everyone I knew spoke Spanish. When people hear that English was not my first language, they often are surprised that I do not have a marked Spanish accent. I tell them that I *did* have an accent when I left Texas; that is, I spoke English with a Texas drawl, which I quickly made all efforts to lose!

ABOUT US

NIAAA Spectrum is NIAAA's first-ever webzine. With engaging feature articles, short news updates, and colorful graphics, *NIAAA Spectrum* offers accessible and relevant information on NIAAA and the alcohol research field for a wide range of audiences. Each issue includes feature-length stories, new research findings from the field, image and data analyses, and an interview with an NIAAA staff member or alcohol researcher. *NIAAA Spectrum* is published three times a year.

CONTACT US

National Institute on Alcohol Abuse and Alcoholism (NIAAA)

5635 Fishers Lane, MSC 9304
Bethesda, MD 20892-9304
Communications/Public Info:
301-443-3860
<http://www.spectrum.niaaa.nih.gov>