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DIABETES AND DIGESTIVE
AND KIDNEY DISEASES

Announcements

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In this issue

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OITE

Careers in Pharmacy

Dec 13, 2013 11:00 am - 12:00 pm

https://www.training.nih.gov/events/view/2/1278/Careers_in_Pharmacy

Industry Careers

Jan 15, 2014 9:00 am - 11:00 am

https://www.training.nih.gov/events/view/2/1188/Industry_Careers_Overview_and_Job_Packages

Management Boot Camp

Jan 30, 2014 8:00 am - 5:00 pm Jan 31, 2014 8 am to 5 pm

https://www.training.nih.gov/events/view/2/1197/Management_Boot_Camp_Jan_2013

NIDDK Conferences/Seminars

Save the date:

9th Annual Fellows Scientific Retreat April 23 & 24

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The stigma and non-medical costs of obesity

By Joseph P. Tiano

The dramatic rise in global obesity prevalence is a growing health concern. Obesity affects 400 million people worldwide and 80 million people within the United States. Obesity is the leading cause of type-2 diabetes mellitus and it increases the risk of hypertension, dyslipidemia, cardiovascular disease and some cancers. The direct and indirect costs associated with obesity in the United States are \$147 billion/year. There are also social stigmas and non-medical monetary costs to obesity.

Obesity and airlines

In 2013 a Samoan airline became the world’s first carrier to charge passengers by weight. They argue that this is the fairest way to fly since the major cost for airlines is gasoline and the major determinant of how much gasoline a plane uses is the weight of its cargo – people being the majority of cargo weight. The airline charges \$0.57/kg for domestic flights and \$1.03/kg for its only international flight. See table 1 for more details. It should be noted that the Pacific Islands contain many of the world’s most obese countries, with 56% of the Samoan population being obese (by comparison 35% of U.S. adults are obese). Whether other airlines will adopt similar policies for obese passengers is unknown. Southwest Airlines does not charge people by weight but they do have an official “customer of size” policy. Their policy states that “Customers who encroach upon any part of the neighboring seat(s) may proactively purchase the needed number of seats prior to travel in order to ensure the additional seat(s) is available. The armrest is considered to be the definitive boundary between seats; width between the armrests measures 17 inches.” Passengers who cannot fit between the armrests must purchase a second seat. According to Southwest, “if providing the additional seat does not result in our having to deny another Customer boarding, we will refund the ticket to the Customer at no charge, which happens more than 90% of the time.” In April 2013 Airbus – maker of the Airbus A320 – will offer airlines the option of extra-wide seats (20 inches instead of

their standard 18 inches) to accommodate obese passengers. These extra wide seats will be aisle seats and will cost extra. The catch, and why so many people oppose this idea, is that the other two seats in the row will each lose 1 inch to generate the extra space.

With respect to gasoline usage in personal vehicles, Americans used 1 billion gallons more gasoline in 2006 compared to 1960 due to increased passenger weight alone. As a population the extra cost for gasoline due to weight gain is significant (\$2.35 billion/year); however, the extra money obese and morbidly obese (> 100 pounds over ideal body weight) individuals spend yearly on gasoline compared to normal-weight individuals is inconsequential; \$15 and \$33 more, respectively.

Weight		Cost (one way)		D.C. to New York [#]
pounds	kilograms	domestic [^]	international [*]	Fri. - Sun.
100	45	\$ 25.85	\$ 46.72	\$60 - \$150
125	57	\$ 32.32	\$ 58.40	\$60 - \$150
150	68	\$ 38.78	\$ 70.08	\$60 - \$150
175	79	\$ 45.25	\$ 81.76	\$60 - \$150
200	91	\$ 51.71	\$ 93.44	\$60 - \$150
250	113	\$ 64.64	\$ 116.80	\$60 - \$150
300	136	\$ 77.56	\$ 140.16	\$60 - \$150
350	159	\$ 90.49	\$ 163.52	\$60 - \$150
400	181	\$ 103.42	\$ 186.88	\$60 - \$150

[^] Domestic flights are < 100 miles (160km)

^{*} One international flight offered, 200 miles (320km)

[#] 215 miles (346km)

Obesity and shopping

Obese people have more trouble shopping than non-obese people. Many retailers do not offer sizes larger than L or XL. The story is similar for children.

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The increasing obesity rate for children (15%, up from 5% a few years ago) is forcing retailers to make larger children's clothes. Many retail outlets have yet to make available fashionable and trendy clothes for obese children, forcing them to choose from a smaller selection of clothes, which could lead to social stigma by classmates. Furniture is another area of difficulty for the obese. The standard armchair sold in the U.S. is 20-26 inches in width and many cheaper, low quality pieces of furniture (the prevalence of obesity is higher among low-income individuals) wear down quickly from the extra weight. Many online companies and fewer brick-in-mortar stores offer furniture for obese individuals but it comes at extra cost. Obese students are having trouble fitting into school desks where the desk and chair are attached, which potentially may open them up to ridicule from other students. For even younger children there are limited options for child safety seats because they are not designed for obese toddlers.

Obesity and jobs

As if job applicants do not have enough to worry about already with high unemployment and a poor job market, it turns out obesity negatively affects hiring. Overweight and obese applicants are evaluated more negatively and have worse employment outcomes compared to normal-weight applicants. The degree of weight discrimination in hiring is greater for women than men. Weight discrimination does not end after being hired, as obesity is associated with worse performance evaluations, decreased promotion potential and lower wages compared to normal-weight individuals. Various studies found that obese men make 1.0 – 5.0% less while obese females make 2.0-10% less than their normal-weight co-workers when controlling for socioeconomic and other variables. Again, there is greater discrimination towards obese females.

Other costs of obesity

Hundreds of studies have examined the monetary

costs associated with obesity. Those not addressed in detail above are presented here in condensed form. Importantly, these figures are per-person yearly costs. Overweight people spend \$346 more per year on medical costs than normal-weight people, while moderately and severely obese people spend \$807 and \$1,566 more on medical costs per year than normal-weight people. The extra costs associated with obesity for short-term disability, disability pension insurance and sick leave are \$348, \$69 and \$443, respectively. In addition, lost productivity – obese individuals miss 2-3 more days/year than normal-weight individuals – costs \$358 while life insurance costs \$121 more per year than normal weight individuals. The total extra costs (medical + non-medical) associated with obesity are around \$3,700 per person per year.

Television often promotes a negative stereotype of obesity. An analysis of 18 prime-time television sitcoms with 37 central female characters found a positive correlation between weight and the number of negative comments directed towards her by other characters. Similarly, if the central character is male there is a positive correlation between weight and the number of negative comments he directs towards himself. An analysis of over 1,000 cartoons from 1930 – 1990 found that overweight characters were more likely to be depicted as unattractive, unintelligent and the “bad guy” compared to normal-weight characters. These negative stereotypes are also present in print media, advertising and the music industry.

AMA recognizes obesity as a disease

One of the reasons obesity is so openly and negatively stigmatized is because many people view obesity as the fault of the individual (unlike other conditions, which are widely recognized as diseases and place no blame on affected individuals). However, the idea that obesity is not a disease is changing, albeit slowly.

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In April 2002 the Internal Revenue Service (IRS) issued a report recognizing obesity as a disease and it allows taxpayers who spend thousands on weight loss surgery to deduct their unreimbursed medical expenses. The caveat is that they must be recommended for the surgery by a doctor. In 2004 Medicare removed language from its coverage, classifying obesity as a disease, and opening up coverage to some obesity-related expenses. Prescription drugs to fight obesity are not yet covered by Medicare. In 2008 the Obesity Society officially issued its support for classifying obesity as a disease and in June of this year the American Medical Association (AMA) officially recognized obesity as a disease. Although the AMA's decision carries no legal authority, many believe it may affect the way obesity is viewed by insurers and medical institutions. Only time will tell if society's perceptions towards obesity changes.

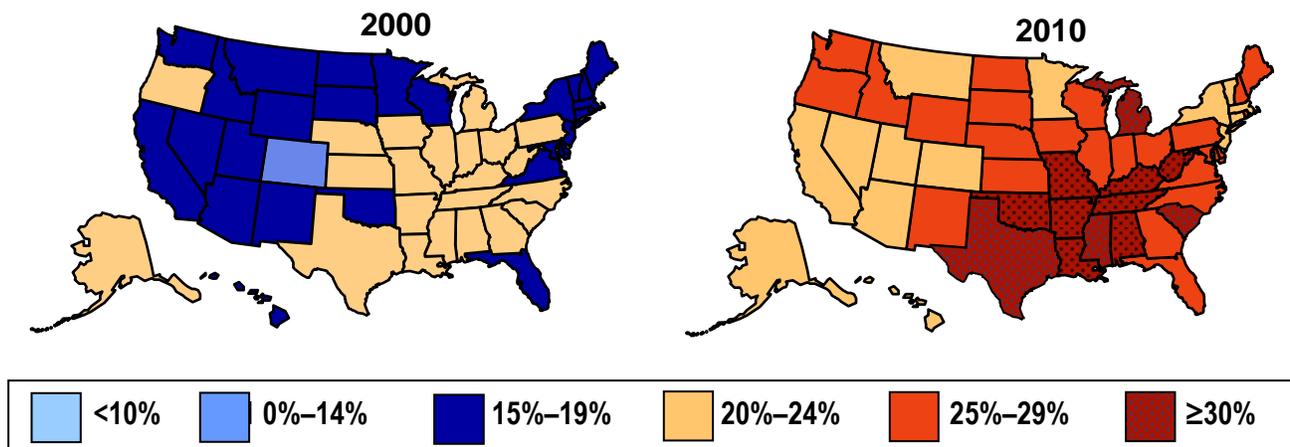
Is stigmatizing obesity having the opposite effect of its intent?

An increasing minority likes to make an analogy between smoking and obesity; since the public shaming of smokers led to smoking's decline, why not publically shame obese people to motivate them to lose weight? Although researchers point towards the stigmatization of smoking as one of the factors contributing towards its decline over the last few decades, the banning of smoking advertisements on TV, the clear connection

between smoking and lung cancer, and the increasingly restrictive laws placed on smoking played a much larger role than the negative stigma now placed on smokers.

Stigmatizing obesity as a motivational tool for obese individuals to lose weight could have negative consequences. Numerous studies show that obese individuals are already at an increased risk for depression, lower self-esteem, lower self-acceptance and lower life satisfaction. Furthermore, two coping mechanisms obese individuals, both children and adults, engage in are avoiding physical activity and comfort eating – setting up a vicious cycle promoting more weight gain. These findings suggest weight discrimination has the opposite effect and promotes weight gain. Several studies have examined the economic and psychological outcomes of obesity but none had yet examined how weight discrimination affects weight loss. In July of this year a first-of-its-kind study was published in *PLOS ONE* that examined the effects of weight discrimination on weight loss. The study concluded that non-obese participants (they did not distinguish between normal-weight and overweight) who experienced weight discrimination were 2.5 times more likely to become obese than those who did not, while obese individuals who experienced weight discrimination were 3 times more likely to remain obese compared to those who did not.

Obesity Trends Among U.S. Adults



Centers for Disease Control and Prevention, 2010.

Alcohol: The good, the bad, the insulin resistant

By Joseph P. Tiano

Just published a manuscript, just won an award, it's Friday night; have a beer or three. Your manuscript was rejected, you did not get that job you wanted, you had a rough week; have a beer or three. Alcohol is the drink everyone turns to in times of celebration and, for better or worse, in times of disappointment and stress. The detrimental effects of copious alcohol consumption on a semi-daily basis are well documented. Less well understood are the beneficial and harmful effects of moderate alcohol consumption and binge drinking.

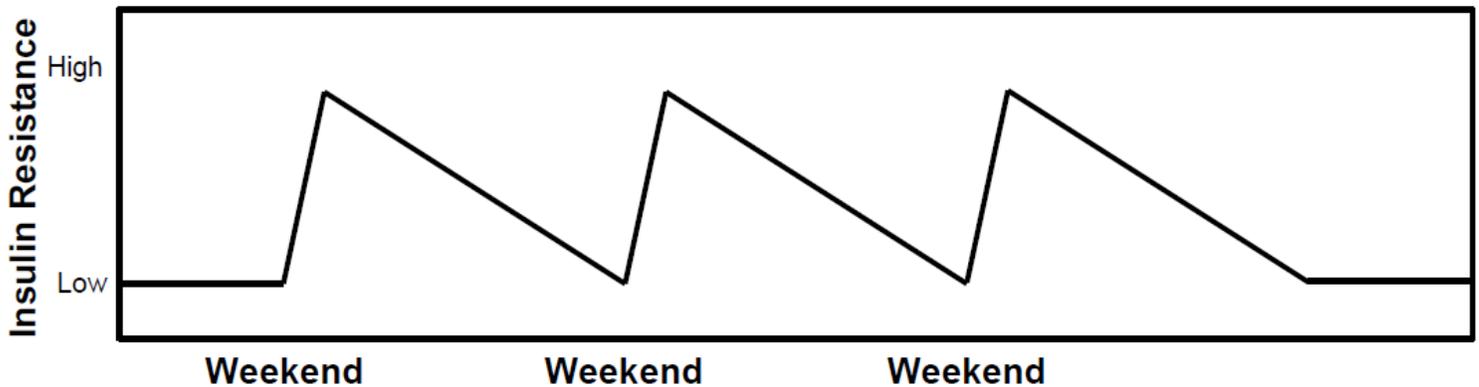
Regular moderate alcohol consumption (1 drink/day; women or 2 drinks/day; men) is associated with increased longevity and lower incidences of overall mortality. A 4 year prospective examination of the Health Professionals Follow-Up Study showed that increases in alcohol consumption over time was associated with a lower risk of type 2 diabetes among rare and light drinkers. Specifically, a 7.5 g/day (approximately half a glass) increase in alcohol consumption was associated with lower diabetes risk among nondrinkers and light drinkers (<15 g/day) but not among moderate drinkers (>15 g/day).

Some of the beneficial effects of alcohol consumption can be traced to specific compounds. Resveratrol is a phytoalexin (antimicrobial) found in many plants, including the skin of grapes used to make wine, and is known to have many beneficial effects. Resveratrol has many anticancer properties and can suppress all three stages of carcinogenesis (initiation, promotion, and progression) in a wide variety of human tumor cells (skin, breast, prostate, gastrointestinal, lung) *in vitro*. Resveratrol is also beneficial under conditions of metabolic stress such as obesity and type 2 diabetes. In diet-induced obese and diabetic mice, long-term resveratrol treatment administered directly into the hypothalamus, normalizes hyperglycemia and greatly improves hyperinsulinemia. Non-human primates fed a high-fat/high-sugar diet supplemented with resveratrol are protected from pancreatic β -cell dedifferentiation. It is important to note that moderate alcohol consumption refers to 1 drink/day and is NOT intended to be an average over several days. Thus, binge drinking (4 or more drinks for women or 5 or more drinks for men on a single occasion) once a week, an average around 1 drink/day, is NOT the same as moderate alcohol

consumption. In fact, binge drinkers have an increased risk for developing the metabolic syndrome and type 2 diabetes. Until recently, it was unclear how excessive alcohol consumption predisposed towards diabetes.

In January 2013, Christoph Buettner and coworkers reported in the journal *Science Translational Medicine* the harmful effects of binge drinking on developing type 2 diabetes. Rats were injected intraperitoneally with 3g/kg of alcohol (roughly equivalent to 7 ounces for a person) once daily for 3 days to simulate binge drinking. Following the last day of alcohol administration rats were assessed for glucose tolerance (the ability to clear glucose from the blood) and insulin sensitivity (the ability of insulin to reduce blood glucose). Alcohol-treated rats displayed impaired glucose tolerance and increased insulin resistance, two early markers of type 2 diabetes. Furthermore, these effects persisted for up to 2.5 days following the last dose of alcohol. These findings are significant because if they are extrapolated to binge-drinking humans it would essentially result in a cyclical pattern of insulin resistance and predispose the binge drinker towards type 2 diabetes (Figure 1). Lastly, the authors reported that the mechanism behind binge drinking-induced insulin resistance is increased inflammation and gene expression of protein-tyrosine phosphatase 1B (PTP1B) in the hypothalamus, a key region of the brain involved in regulating glucose homeostasis. PTP1B is a negative regulator of insulin signaling and PTP1B inhibition in the brains of alcohol-treated rats ameliorated the alcohol-induced insulin resistance. These findings shed light on the molecular mechanisms behind the detrimental effects of excessive alcohol consumption.

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Extrapolating these results to humans looks like this: Consuming large amounts of alcohol on Friday and Saturday night leads to insulin resistance which lasts up to 54 hours following the last drink, or until Wednesday. Then two days later on Friday night the process is repeated. Essentially, regular bouts of binge drinking induces a continuous state of insulin resistance. Insulin resistance is a precursor to type 2 diabetes.

If YOU have a drinking problem, the NIH offers free and confidential counseling.

The NIH holds alcoholics anonymous meetings twice a week on Mondays and Fridays in Building 31A, room B4BN09 (near the NIH fitness center) from 12 noon to 1:00PM. For more information contact 301-496-3164.

If SOMEONE ELSE'S drinking bothers you, the NIH offers free and confidential counseling.

The NIH holds alcoholics anonymous meetings twice a week on Mondays and Thursdays in Building 31A, NIAAA conference room 1B44 from 12 noon to 1:00PM. For more information contact 301-496-3164.

FELCOM HALLOWEEN PARTY

OCTOBER 28, 2013

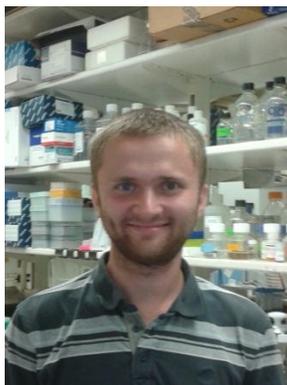


PHOTOGRAPHER: JOSEPH P. TIANO

Welcome New Fellows



Hongping Zheng	Ning Li	Ramon Pinol	Stephan Rosshart
Visiting Fellow, China	Visiting Fellow, China	Visiting Fellow, Netherlands	Visiting Fellow, Germany
PhD, Shanghai Institute of Biochemistry and Cell Biology	PhD, Shan Dong University	PhD, The George Washington University, D.C.	MD, University of Freiburg, Germany
Genetics of Development & Disease Branch (Chuxia Deng), Bldg 10	Laboratory of Molecular Biology (Yang) Bldg 5	Diabetes, Endocrinology and Obesity Branch (Reitman) Bldg 10	Liver Diseases Branch (Rehermann) Bldg 10



Evgeny Bezsonov
Visiting Fellow, Russia
PhD, Lommosov Moscow State University
Laboratory of Biochemistry and Genetics (Wickner) Bldg 8