

# Methods of drink ethanol assessment for use in monitoring surveys of alcohol consumption.

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# Importance of measuring drink ethanol content

- Most studies in the US assume a standard drink of 0.6 ounces (17.8ml. or 14 grams). 12 grams is also commonly assumed for the US (as in prior NAS studies) and other countries have their own standards.
- In describing research results these standards are often applied to questions on the number of drinks consumed, giving false precision to estimated relationships, particularly in studies of health and disease outcomes.

# 2000 NAS Methods Study

- Overall, drinks were found to be about **11% larger** than the 17.8ml. of ethanol in a “standard drink.”
- Spirits drinks were especially large, nearly 50% larger than the standard on average.
- Wine drinks were also larger than standard drinks.
- Beer drinks were actually smaller due to the popularity of 4.2% ABV light beer, about half the US market share of beer, typically sold in the standard 355ml. Bottle or can.

**Source:** Kerr, Greenfield & Tujague *Alcoholism :Clin Exper Res* 30:1583-1591.

# African American Drinkers in LA

- In a sample of 329 largely African-American drinkers from South Los Angeles, those preferring regular beer were found to have an average size of 16 ounces, those who preferred malt liquor beer had an average drink size of 20 ounces at 7% ABV, equal to more than 2 standard drinks. Hard liquor drinks averaged 9 ounces, but ethanol content was not measured. (Bluthenthal et al., 2005).
- This study suggests that African Americans may drink larger beer and possibly spirits drinks than other ethnicities.

# How drinks were measured

- Drink size was measured directly through either identification of the container the subject drank from (often a 12 ounce bottle or can for beer) or through an exercise involving a measuring beaker and the subject's own glassware.
- To indicate drink levels, all participants received the Perfect Beaker<sup>®</sup>. During the telephone interview, participants were asked to pour water into the vessel they usually used at home to mimic their usual serving of each beverage, then transfer the liquid into the measuring beaker and read to the interviewer the level in ounces, as indicated on the beaker.
- Spirits drinks were more complicated, for example, the gin in a Gin and Tonic may be measured using a jigger or shot glass, or free poured from the bottle into a glass, before or after the ice and tonic. Separate protocols were needed for each case and for drinks with more than one spirit.
- For those respondents who poured their drink over ice, a strainer was provided to separate the ice from the spirits and a 6% empirically based adjustment for ice melt was applied to the reported measure based on the results of experimental pour measurement.

# 2005 NAS Methods Study

- Follow-up of 2005 NAS sample of 6,919.
- In all, 397 individuals from the 2005 NAS responded, resulting in 306 cases with complete, usable home drink information.
- Of these 306, there are approximately equal numbers by major ethnic group: 99 white, 110 black and 97 Hispanic respondents of whom 157 were men and 149 were women.
- Data collection took place between July, 2005 and July, 2006. Interview time of about 30 minutes. Respondents were paid \$25.



# 2005 NAS ABSTENSION RATES

	Current Drinker	Former Drinker	Lifetime Abstainer
	%	%	%
Ethnicity			
White women	70.7	17.2	12.1
Black women	44.2	29.7	26.1
Hispanic women	38.0	21.2	40.8
<b>White men</b>	<b>73.4</b>	<b>17.7</b>	<b>9.0</b>
<b>Black men</b>	<b>57.5</b>	<b>27.8</b>	<b>14.7</b>
<b>Hispanic men</b>	<b>63.8</b>	<b>20.6</b>	<b>15.6</b>

# Characteristics of Participants

	Women		Men	
	N	Percentage	N	Percentage
<b>All participants</b>	<b>202</b>	<b>49.3</b>	<b>195</b>	<b>50.7</b>
<b>Ethnicity</b>				
Black	73	8.8	72	9.2
White	69	83.6	60	78.1
Hispanic	60	7.5	63	12.8
<b>Age Group*</b>				
18-34 years	60	31.6	61	37.3
35-54 years	84	43.8	73	31.9
55 plus years	52	24.6	58	30.9
<b>Region</b>				
Northeast	36	16.7	42	21.2
Midwest	36	23.6	40	18.8
Pacific	22	6.5	17	25.1
South	86	39.3	76	23.0
Mountain	22	14.0	20	11.8

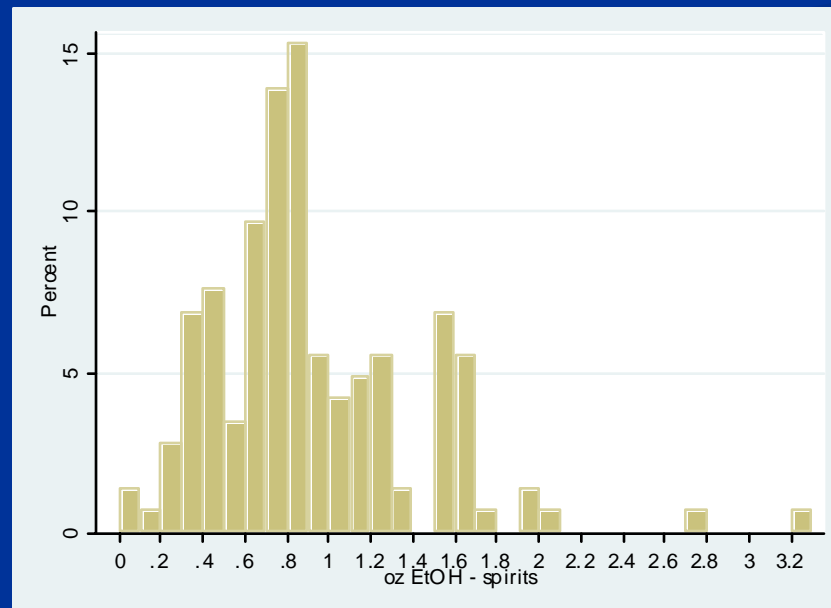
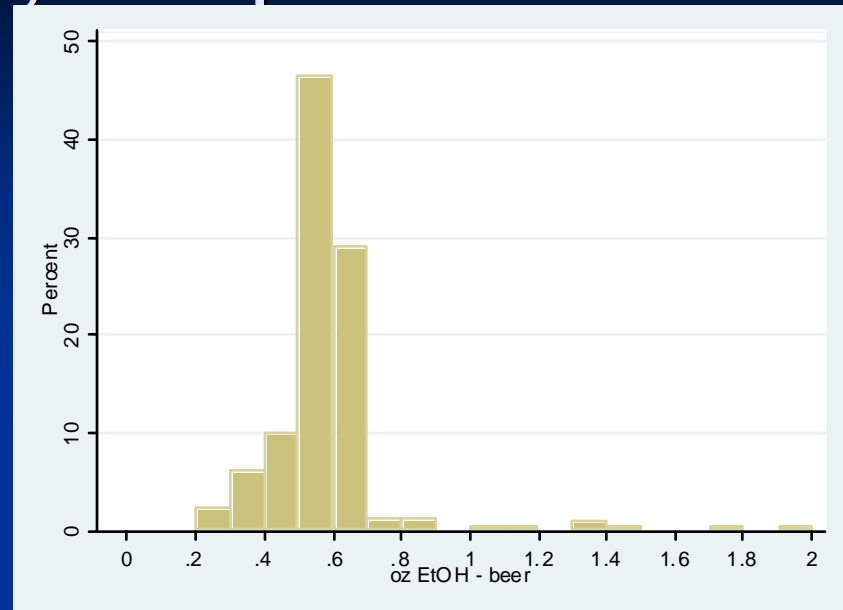
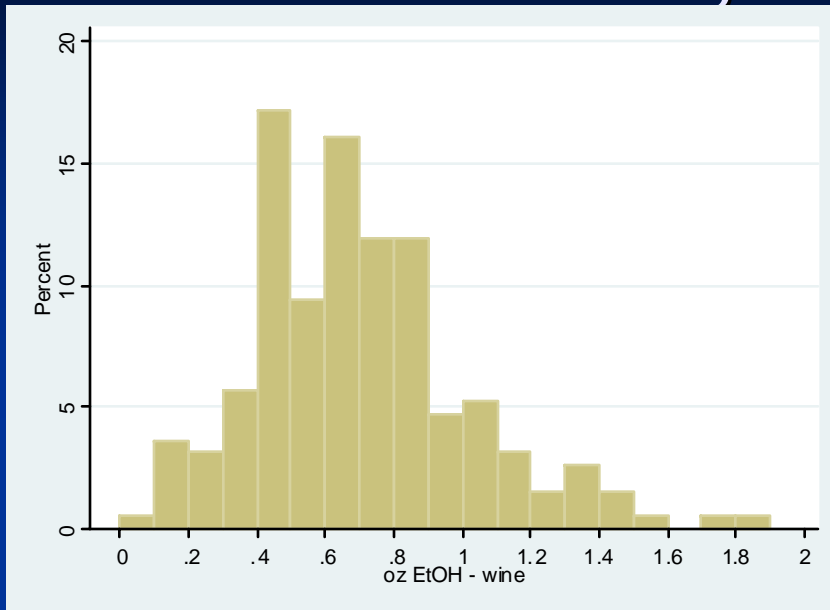
\*Age values were missing for 6 women and 3 men



# Beaker Measured Ethanol Content of a Drink

	<i>N</i>	Mean (EtOH oz)	95% Confidence Interval
Wine	192	0.71	(0.64 – 0.78)
Beer	213	0.56	(0.53 – 0.59)
Spirits	144	0.80	(0.71 – 0.90)
Average	306	0.65	(0.61 – 0.69)

# Drink Ethanol Content in Ounces for Wine, Beer, and Spirits



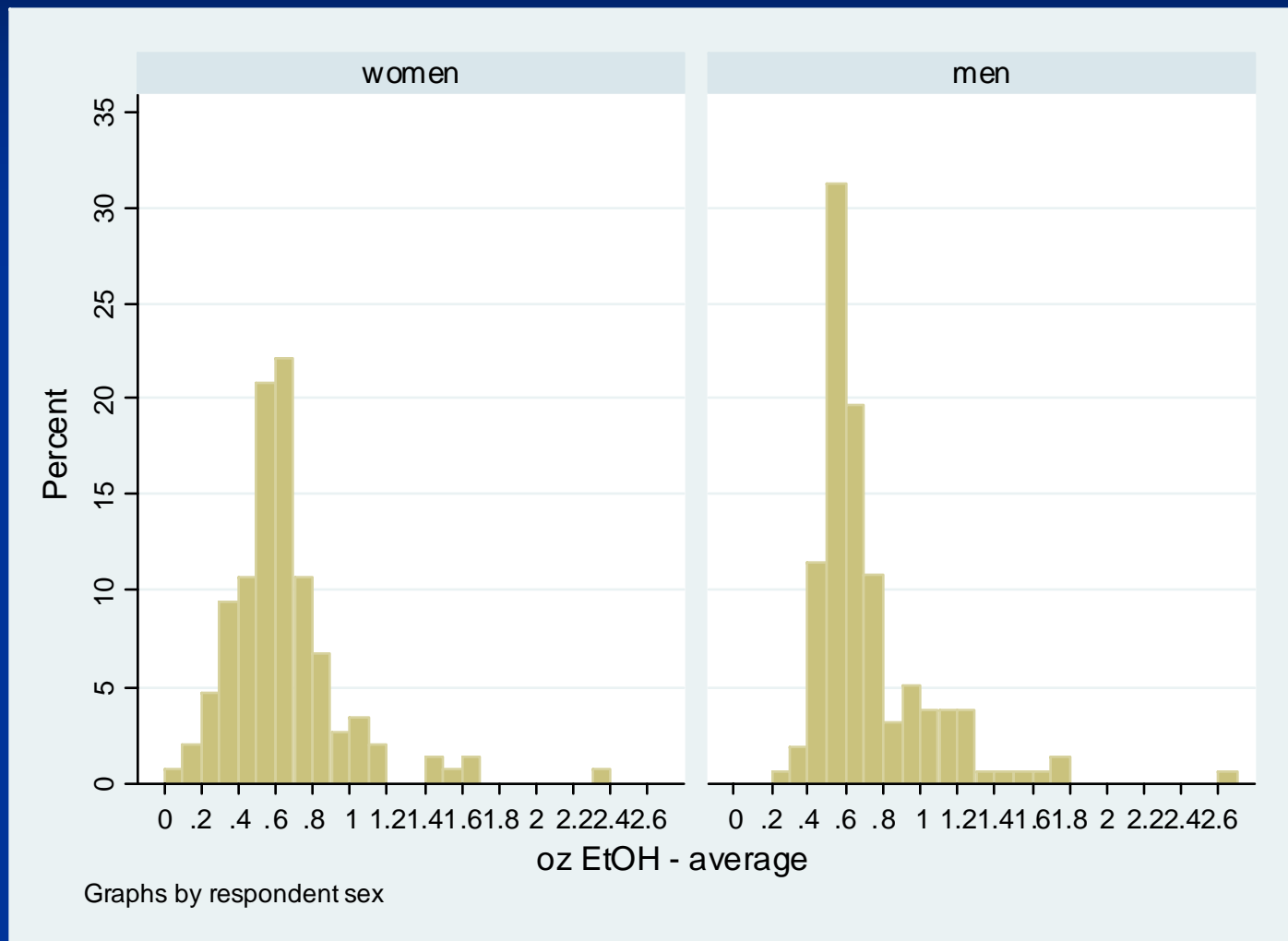
# Beaker Measured Ethanol Content of a Drink by Gender and Ethnicity Groups

	Mean	95% Confidence Interval
<b>Overall</b>		
White women	0.61	(0.56 – 0.66)
Black women	0.64	(0.55 – 0.74)
Hispanic women	0.61	(0.52 – 0.70)
<b>White men</b>	<b>0.66</b>	<b>(0.59 – 0.74)</b>
<b>Black men</b>	<b>0.79</b>	<b>(0.69 – 0.90)</b>
<b>Hispanic men</b>	<b>0.70</b>	<b>(0.59 – 0.81)</b>
<b>Wine</b>		
White women	0.70	(0.62 – 0.78)
Black women	0.67	(0.53 – 0.80)
Hispanic women	0.68	(0.58 – 0.79)
<b>White men</b>	<b>0.72</b>	<b>(0.55 – 0.88)</b>
<b>Black men</b>	<b>0.72</b>	<b>(0.62 – 0.82)</b>
<b>Hispanic men</b>	<b>0.77</b>	<b>(0.64 – 0.90)</b>

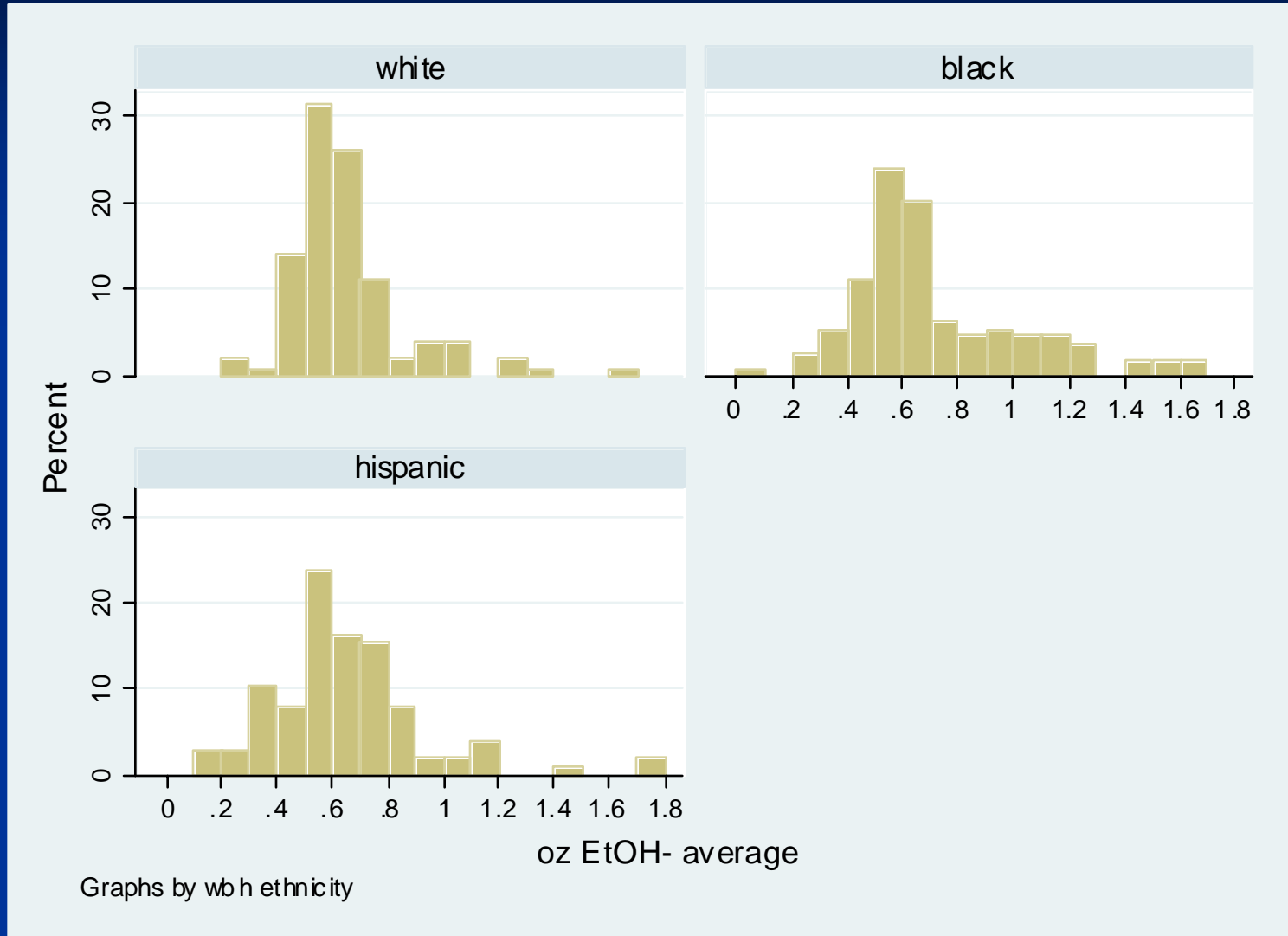
# Beaker Measured Ethanol Content of a Drink by Gender and Ethnicity Groups

	Mean	95% Confidence Interval
<b>Beer</b>		
White women	0.52	(0.49 – 0.56)
Black women	0.52	(0.48 – 0.56)
Hispanic women	0.49	(0.44 – 0.54)
<b>White men</b>	<b>0.57</b>	<b>(0.53 – 0.61)</b>
<b>Black men</b>	<b>0.65</b>	<b>(0.56 – 0.74)</b>
<b>Hispanic men</b>	<b>0.61</b>	<b>(0.51 – 0.71)</b>
<b>Spirits</b>		
White women	0.62	(0.50 – 0.74)
Black women	0.85	(0.64 – 1.05)
Hispanic women	0.71	(0.47 – 0.95)
<b>White men</b>	<b>0.87</b>	<b>(0.74 – 1.00)</b>
<b>Black men</b>	<b>1.02</b>	<b>(0.81 – 1.23)</b>
<b>Hispanic men</b>	<b>0.92</b>	<b>(0.70 – 1.15)</b>

# Drink Ethanol Content in Oz By Gender



# Drink Ethanol Content in Oz by Ethnicity



# Alcohol Volume by Standard vs. Actual Drink

	Standard (0.6oz) Ethanol per Drink		Beaker Measured EtOH per Drink		Difference
	Mean	95% CI	Mean	95% CI	
<b>Overall</b>					<b>%</b>
White women	8.6	(5.50 – 11.67)	8.8	(5.72 – 11.81)	<b>2.3</b>
Black women	11.3	(5.55 – 17.09)	11.1	(6.28 – 15.92)	<b>-1.8</b>
Hispanic women	17.7	(5.04 – 30.30)	17.0	(7.42 – 26.50)	<b>-4.0</b>
White men	29.9	(10.49 – 49.38)	31.8	(13.87 – 49.71)	<b>6.4</b>
Black men	38.8	(19.27 – 58.33)	50.7	(24.49 – 76.92)	<b>30.7</b>
Hispanic men	19.3	(11.55 – 27.09)	25.3	(11.92 – 38.66)	<b>31.1</b>
<b>Wine</b>					
White women	6.2	(3.55 – 8.84)	7.1	(4.18 – 10.04)	<b>14.5</b>
Black women	7.0	(-0.15 – 14.23)	6.5	(1.34 – 11.73)	<b>-7.1</b>
Hispanic women	7.0	(3.19 – 10.75)	8.7	(3.57 – 13.85)	<b>24.3</b>
White men	7.6	(4.15 – 10.97)	11.4	(4.24 – 18.47)	<b>50.0</b>
Black men	25.3	(-6.98 – 57.65)	28.6	(-7.74 – 64.95)	<b>13.0</b>
Hispanic men	9.8	(1.44 – 18.25)	12.3	(2.38 – 22.20)	<b>25.5</b>



# Alcohol Volume by Standard vs. Actual Drink

	Standard (0.6oz) Ethanol per Drink		Beaker Measured EtOH per Drink		Difference
	Mean	95% CI	Mean	95% CI	
<b>Beer</b>					<b>%</b>
White women	6.1	(2.96 – 9.27)	5.0	(2.48 – 7.54)	<b>-18.0</b>
Black women	10.0	(3.68 – 16.26)	8.4	(3.14 – 13.71)	<b>-16.0</b>
Hispanic women	16.3	(0.95 – 31.67)	12.5	(2.17 – 22.82)	<b>-23.3</b>
White men	28.0	(5.22 – 50.74)	25.4	(5.75 – 45.06)	<b>-9.3</b>
Black men	24.4	(9.70 – 39.10)	32.7	(8.98 – 56.47)	<b>34.0</b>
Hispanic men	11.4	(7.31 – 15.54)	12.0	(7.18 – 16.90)	<b>5.3</b>
<b>Spirits</b>					
White women	3.6	(0.89 – 6.23)	4.0	(0.70 – 7.27)	<b>11.1</b>
Black women	4.1	(0.79 – 7.36)	7.7	(1.20 – 14.26)	<b>87.8</b>
Hispanic women	10.3	(1.78 – 18.83)	10.4	(4.13 – 16.68)	<b>1.0</b>
White men	6.1	(3.28 – 8.95)	10.8	(4.06 – 17.58)	<b>77.0</b>
Black men	13.1	(5.09 – 21.07)	19.8	(8.81 – 30.85)	<b>51.1</b>
Hispanic men	7.0	(0.93 – 13.05)	15.8	(-3.12 – 34.62)	<b>125.7</b>

## Most Drinks per Day and Drinks to get Drunk Unadjusted vs. Adjusted Drinks

	Unadjusted		Adjusted	
	Mean	95% CI	Mean	95% CI
<b>Most Drinks/Year</b>				
White women	<b>4.46</b>	(3.38 – 5.53)	<b>4.63</b>	(3.40 – 5.86)
Black women	<b>3.33</b>	(2.48 – 4.20)	<b>3.92</b>	(2.65 – 5.18)
Hispanic women	<b>4.26</b>	(2.29 – 6.22)	<b>4.08</b>	(2.66 – 5.51)
<b>White men</b>	<b>7.80</b>	(4.95 – 10.64)	<b>8.43</b>	(5.72 – 11.13)
<b>Black men</b>	<b>6.19</b>	(4.28 – 8.10)	<b>8.16</b>	(5.46 – 10.87)
<b>Hispanic men</b>	<b>6.60</b>	(5.16 – 8.04)	<b>8.61</b>	(5.85 – 11.37)
<b>Drinks to get Drunk</b>				
White women	<b>3.32</b>	(2.82 – 3.83)	<b>3.32</b>	(2.83 – 3.81)
Black women	<b>4.68</b>	(3.20 – 6.18)	<b>5.26</b>	(3.58 – 6.94)
Hispanic women	<b>3.72</b>	(2.93 – 4.50)	<b>3.90</b>	(3.03 – 4.76)
<b>White men</b>	<b>6.11</b>	(5.22 – 7.01)	<b>6.75</b>	(5.63 – 7.87)
<b>Black men</b>	<b>5.31</b>	(4.32 – 6.31)	<b>6.72</b>	(5.47 – 7.97)
<b>Hispanic men</b>	<b>6.07</b>	(4.57 – 7.57)	<b>7.62</b>	(4.63 – 10.60)

# Usual Type of Beer Drunk

	Women	Men	Total
<b>White (n=93)</b>	%	%	%
Light (<4.5% ABV)	67.8	25.9	42.6
Regular (4.5%-5.5%)	30.8	67.1	52.7
Strong (>5.5%)	1.4	7.0	4.8
<b>Black (n=90)</b>			
Light (<4.5% ABV)	36.4	38.2	37.4
Regular (4.5%-5.5%)	59.6	54.5	56.8
Strong (>5.5%)	4.0	7.3	5.8
<b>Hispanic (86)</b>			
Light (<4.5% ABV)	27.9	49.0	44.0
Regular (4.5%-5.5%)	72.1	51.0	56.1
Strong (>5.5%)	0	0	0

# Usual Type of Spirits Drunk

	Women	Men	Total
<b>White (n=91)</b>	%	%	%
Straight	26.6	55.8	41.7
Mixed	69.9	44.2	56.6
Not clear	3.5	0	1.7
<b>Black (n=97)</b>			
Straight	30.4	50.3	41.2
Mixed	69.6	39.8	53.4
Not clear	0	9.9	5.4
<b>Hispanic (n=72)</b>			
Straight	9.8	8.4	8.9
Mixed	86.1	89.3	88.1
Not clear	4.2	2.3	3.0

## Survey-weighted Least Squares Regression Models of Drink Ethanol Content for Women

	Beer	Wine	Spirits	Drink Average
<b>n</b>	84	94	55	144
<b>Age 18-34 Reference</b>				
Age 35-54	0.014	<b>-0.120(*)</b>	-0.133	-0.026
Age 55+	<b>-0.078*</b>	<b>-0.234*</b>	<b>-0.318(*)</b>	-0.047
<b>White Reference</b>				
African American				0.080
Hispanic				0.016
<b>Alcohol Volume</b>	-0.00002	<b>0.0001*</b>	<b>-0.0002*</b>	<b>0.00005*</b>
<b>BMI (continuous)</b>			<b>0.010*</b>	
<b>Children in Household</b>	<b>-0.042(*)</b>	<b>-0.205*</b>	-0.142	<b>-0.149*</b>
<b>Income \$0-20,000 Ref.</b>				
\$20,000-40,000	-0.019	<b>-0.195*</b>	-0.231	
\$40,000-60,000	<b>0.093*</b>	-0.072	<b>-0.390*</b>	
\$60,000+	<b>0.046(*)</b>	-0.127	-0.177	
Income missing	-0.007	<b>0.197*</b>	-0.063	
<b>Northeast Reference</b>				
Midwest	<b>0.103*</b>	<b>0.335*</b>	<b>-0.238*</b>	<b>0.238*</b>
Pacific	0.011	<b>0.252*</b>	<b>-0.494*</b>	<b>0.176*</b>
South	<b>0.079*</b>	<b>0.226*</b>	-0.147	<b>0.164*</b>
Mountain	<b>0.107*</b>	<b>0.305*</b>	-0.023	<b>0.192*</b>
<b>Light Beer Drinker</b>	<b>-0.064*</b>			
<b>Smoker</b>				<b>-0.161*</b>
<b>Former Smoker</b>				-0.022
<b>R-Squared</b>	<b>0.57</b>	<b>0.49</b>	<b>0.40</b>	<b>0.28</b>

\* indicates coefficient is significantly different from zero at the 95% confidence level

(\*) indicates coefficient is significantly different from zero at the 90% confidence level

# Survey-weighted Least Squares Regression Models of Drink Ethanol Content for Men

	Beer	Wine	Spirits	Drink Average
n	125	94	83	155
Age	-0.0007	0.001	<b>-0.026*</b>	-0.0007
Age squared			<b>0.0003*</b>	
<b>White Reference</b>				
African American	<b>0.124*</b>			
Hispanic	0.076			
Alcohol volume		<b>0.0002(*)</b>	<b>0.0001*</b>	<b>0.00007*</b>
<b>Normal/Underweight Ref.</b>				
Overweight		-0.24	<b>0.174*</b>	
Obese		-0.23	-0.114	
Married (vs. Not)		-0.123	-0.164	<b>-0.179*</b>
<b>Income \$0-20,000 Ref.</b>		Reference		Reference
\$20,000-40,000		0.111		<b>0.325*</b>
\$40,000-60,000		0.132		0.133
\$60,000+		0.177		<b>0.262*</b>
Income missing		0.043		<b>-0.204*</b>
<b>Northeast Reference</b>				
Midwest	0.048			
Pacific	<b>0.109*</b>			
South	0.026			
Mountain	<b>0.071*</b>			
Light Beer Drinker	<b>-0.099*</b>			
Smoker			<b>0.196(*)</b>	
Former Smoker			0.012	
R Squared	<b>0.26</b>	<b>0.18</b>	<b>0.38</b>	<b>0.19</b>

\* indicates coefficient is significantly different from zero at the 95% confidence level

(\*) indicates coefficient is significantly different from zero at the 90% confidence level

# Conclusions

- The average drink was found to be 0.65 ounces of ethanol (15 grams).
- Significant differences were seen by beverage type: Spirits were largest 0.8 oz., beer smallest 0.56 oz. and wine in between 0.71 oz.
- Men had larger drinks than women and African Americans had larger drinks than other ethnicities. However, only men's beer ethanol showed a significant effect in multivariate models.
- Application of individual drink ethanol had a substantial effect on estimated alcohol volume for Hispanic and African American men.