

# Do the Labels tell the Truth about Sodium?

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## Objective:

The objective of this study is to compare sodium values from laboratory analyses to those on the Nutrition Facts Panel (NFP) and websites for packaged foods and restaurant foods, respectively. In addition, we tested the hypothesis that the differences between analytical and NFP/website values are not significant based on source of food – store or restaurant.

## Background:

All commercially processed foods are required by U.S. law to have nutrition labeling since 1990. Sodium is one of the labeled nutrients, and as per the regulations, a food label complies with U.S. regulations as long as the product's sodium content is no more than 20% higher than the value declared on the label. As per the Affordable Care Act of 2010, all restaurants with 20 or more locations will be required to have nutrition information at the point-of-purchase. Guidelines for this legislation are still pending, however, most national or regional chain restaurants have nutrition information available on request, in a brochure on premise, or on their website.

USDA National Nutrient Database for Standard Reference (SR) is the most authoritative food composition database in the U.S. It is used as the foundation for most food composition databases and for national nutrition monitoring. A large proportion of the data in SR is based on nationwide sampling and laboratory analysis obtained as part of the National Food and Nutrient Analysis Program, a collaborative program between USDA, CDC, FDA, and NIH. This current study's analyses are based on 77 highly popular, sodium contributing food items analyzed between 2010-2013 as part of ongoing national sodium monitoring efforts.

## Methods:

**Sampling:** A specific sampling plan was developed for each food item. We sampled top national and private-label brands from 12 locations nationwide aiming to represent 70-80% of retail sales, based on Nielsen 2009 point-of-sales data. Similarly, we sampled 2-4 major family-style or fast-food restaurants for each restaurant item from up to 12 locations nationwide. Same brands from two locations were homogenized, composited and sent to pre-qualified labs for analysis. Over 1,000 composites were analyzed for these 77 food items.

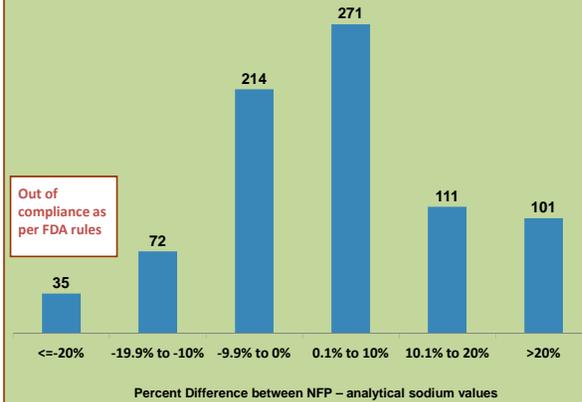
**Analysis:** Samples of food items were analyzed using valid, approved analytical method for sodium - AOAC 985.01 (3.2.06) + 984.27 (50.1.15), AOAC 968.08 (4.8.02) + 985.35 (50.1.14) + 965.05 (2.6.01). In-house control materials and Standard Reference Materials were employed to monitor accuracy of analyses. Sodium values from different samples were weighted by the market share of the selected brands to generate nationally representative values for the food item.

**Label collection:** Labels for packaged foods sampled and analyzed were collected and scanned. Similarly, when restaurant samples were obtained, nutrition information at respective restaurants was requested and/or obtained by NDL. If not available, we used information from websites corresponding to the time of sampling.

**Statistical Analyses:** We calculated percent differences between the laboratory sodium value and the corresponding NFP/website values for 804 individual samples for which both label and analytical data were available. We then calculated the mean, weighted differences for each of the 77 food items, and tested them for significance using independent t-test and Mann Whitney tests, as appropriate. Furthermore, we tested the significance of differences in label vs. analytical by source (restaurant vs store) using ANCOVA and Tukey-HSD adjustments.

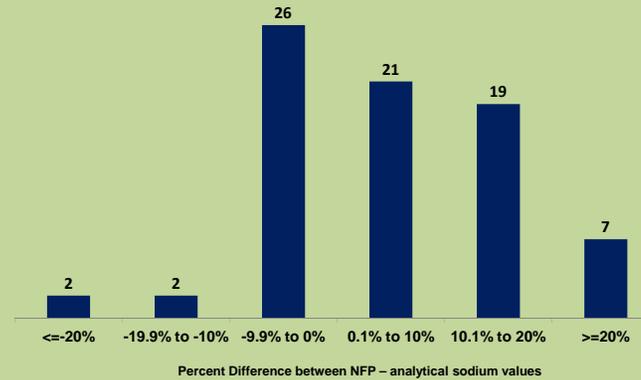
## Results

Differences in sodium (mg/100g) between NFP – analytical values for 804 samples.



Out of compliance as per FDA rules

Differences in sodium (mg/100g) between NFP and mean analytical values for corresponding 77 food items (weighted by market share of the brands)

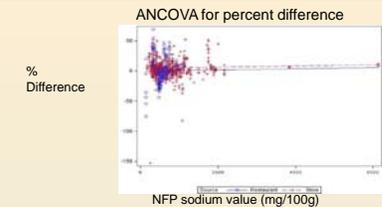


## Food items with the greatest mean differences between analytical and NFP sodium values

Sentinel Description	n	Mean Analytical sodium (mg/100g)	Mean NFP sodium (mg/100g)	Mean % Difference
Bologna	7	1382	1038	-33*
Chicken soft taco, fast food	6	613	479	-28
Cheese pizza, thick crust, fast food or restaurant	12	597	524	-14*
Bean burrito, fast food	6	562	495	-14
Cheese pizza, thin crust, fast food or restaurant	12	742	679	-9
Green beans, canned	2	239	340	30
Pork and beans, canned	4	259	390	33
Corn, canned	3	185	287	35*
Chili with meat and beans, fast food or restaurant	6	381	604	37
Coleslaw, fast food or restaurant	6	178	329	46

\* p<0.05

Hypothesis: Differences between analytical and NFP/website sodium values are not significant based on source of food – store or restaurant.



NFP Sodium Quartile (mg/100 g)	Mean % Difference (Restaurant)	Mean % difference (Store)	Significance
1 <sup>st</sup> (0-412)	10.34	8.24	0.9880
2 <sup>nd</sup> (412.1-647)	-7.67	3.12	<0.0001
3 <sup>rd</sup> (647.1-929)	6.68	3.0	0.7714
4 <sup>th</sup> (>929)	7.72	5.23	0.9999
Overall	0.58	5.13	0.0026

## Discussion and Conclusions:

- About 4% of the ~800 samples were 'out of compliance' (includes restaurant items), i.e. analytical sodium values > 20% of NFP values. About 17% of the samples were at least ± 20% different. The range of difference for the individual samples -83% to +69%.
- The mean difference between the analytical and label sodium value for all 77 foods was 3.9%. When the differences between the analytical and label sodium value were averaged for the brands and weighted by market share of the brands, about 1/3<sup>rd</sup> of the 77 foods were at least ± 10% different. The differences ranged from -33% to +46%.
- Differences between analytical and NFP/website sodium values are not significant based on source of food – store or restaurant, when comparisons are made between foods with similar sodium values, except for the second quartile values. Differences were significant, when all foods were combined.
- While the majority of the labels provide accurate information regarding sodium to consumers, some caveats exist. Knowledge about these limitations can provide dietitians a more pragmatic perspective.

<b>Percent Difference</b>	<b>Number of Samples</b>
<=-20%	35
-19.9% to -10%	72
-9.9% to 0%	214
0.1% to 10%	271
10.1% to 20%	111
>20%	101
	804

<b>Percent Difference</b>	<b>Number of Sentinel Foods</b>
<u>&lt;=-20%</u>	2
-19.9% to -10%	2
-9.9% to 0%	26
0.1% to 10%	21
10.1% to 20%	19
<u>&gt;=20%</u>	7
	<b>77</b>