

# Global Health Matters

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This article by Lv et al. provides an example of the worldwide movement to improve nutrition information and nutrition labeling. People all over the globe are beginning to request label information on the nutrition of the food they are eating as the level of concern regarding chronic noncommunicable diseases such as obesity, diabetes, and hypertension increases. The authors point out that providing nutrition information on labels is at present a voluntary initiative in China that began with new regulations launched in early 2008. As China becomes a greater influence on the global market, both as a supplier and a consumer of food products, it is critical that the Chinese population has the same information to which developed countries around the world have access. While the effort is highly laudable, the challenge is that this regulation is still voluntary and the regulators must increase their efforts for compliance beyond what is presently being done. In this study, only one-quarter of the food products assessed contained nutrition labeling.

The authors suggest that nutrition information without nutrition education is not enough to protect public health. To make thoughtful and healthful decisions, people need to understand what the information means and how to take this new information and apply it to improving their health and lifestyle. The growing global problem of obesity requires basic information so that individuals can make better choices, as well as educational programs to inform individuals on how to make better decisions. In some cases, even with information, there is still a lack of healthy choices needed to make healthful lifestyle changes.

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## A SURVEY OF NUTRITION LABELS AND FATS, SUGARS, AND SODIUM INGREDIENTS IN COMMERCIAL PACKAGED FOODS IN HANGZHOU, CHINA

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To reduce the risk of chronic diseases that stem from unhealthy diets, the World Health Organization (WHO) made recommendations in its publication, *Global Strategy on Diet, Physical Activity, and Health*. For diet, recommendations for populations and individuals included (1) limiting energy intake from total fats and shifting fat consumption away from saturated fats to unsaturated fats, (2) eliminating trans fats, (3) limiting the intake of free sugars, and (4) limiting salt (sodium) consumption from all sources.<sup>1</sup>

The question is, how can we achieve these diet goals?

Individuals' daily intake of fats, sugars, and salt comes not only from home cooking, but also when eating outside the home in restaurants, workplaces, and marketplaces. In response to consumers' rapidly changing needs, food industries are developing an increasing variety of processed foods. Many food manufacturers increase flavor by simply adding fats, sugars, and salt to foods. In addition, hydrogenated vegetable oils are used not only to give foods a desirable taste and texture, but also to improve food shelf life.

Unfortunately, most consumers are either unaware of the increased health risks associated with some processed foods or lack the skills to distinguish between healthy and unhealthy foods. For consumers to be able to make healthy food choices, WHO recommends that governments ensure accurate, standardized, and comprehensible information is provided on the content of food items. Furthermore, WHO recommends that governments take measures to promote the development, production, and marketing of food products that contribute to a healthy diet and encourage reduced salt content, use of hydrogenated oils, and sugar content in processed foods.<sup>1</sup>

The regulatory environment in China has been characterized by voluntary nutrition labeling. Mandatory labeling is only required on foods with special dietary

uses and foods targeted at special population groups.<sup>2</sup> In 2007, the Ministry of Health of the People's Republic of China promulgated the Regulation for Food Nutrition Labeling, which took effect on May 1, 2008.<sup>3</sup> The regulation encourages food manufacturers to identify nutrient declaration, nutrition claims, and nutrition function claims on sale product labels. Nutrient declaration is a standardized listing of a food's nutrient content and must include information on calories and four core nutrients: protein, carbohydrate, fat, and sodium. Nutrition claims describe the nutritional properties of a food, including nutrient content claim and nutrient comparative claim. Nutrient function claims describe the physiological role of the nutrient in the body's growth, development, and normal functions. A detailed statement of requirements for nutrition labeling can be found in the regulation. It was an important step in helping to prevent chronic diseases at a national policy level.

We conducted a survey soon after the aforementioned regulations were put into place. Our objectives were twofold: (1) examine the prevalence of nutrient declaration and nutrition claims on packaged foods and (2) examine the prevalence of some ingredients, including fats, sugars, and sodium content, in packaged foods. To a certain extent, the results were expected to reflect the most common food products that urban residents could buy.

The survey was part of the Community Intervention for Health (CIH), a program of the Oxford Health Alliance in Hangzhou City, Eastern China. This is a multinational collaboration for comprehensive, community-based interventions to prevent chronic disease, and combines the knowledge and expertise of researchers from around the world. The aim of CIH is to reduce the risk factors for chronic disease, and to develop, assess, and showcase sustainable interventions, demonstrating their effectiveness in a way that is both practical and scientifically rigorous. CIH operates within four settings—schools, workplaces, health centers, and communities—using four strategies to create comprehensive, self-reinforcing interventions. The strategies include structural changes (policy, environmental, and economic); health education; social marketing; and community coalition-building. CIH's overall goal is to transform these communities from ones that foster unhealthy behaviors to ones that encourage healthy lifestyle choices.

## METHODS

### Food product sampling

We conducted the study in one large supermarket in Hangzhou City from December 10–25, 2008. Hangzhou City, the capital of Zhejiang Province, is located in the eastern part of China. The population of permanent residents was nearly eight million in 2008, of which 69% lived in urban areas. Hangzhou City's comprehensive economic strength ranked eighth among all large- and medium-sized cities of China in 2008.<sup>4</sup>

We couldn't find any national or local food sales database to serve as the sampling frame of food products. As such, we identified a large supermarket in an urban area that belongs to a major supermarket chain that operates 4,930 retail stores in 22 provinces of China. This large supermarket offers a wide variety of foods that, to a certain degree, include most common and popular food brands and items in the country and region. Our survey covered all domestically commercially made packaged food products sold in the supermarket during the survey period (e.g., cereals, legumes, vegetables, mushrooms and seaweed, fruit, nuts, meats, dairy products, eggs, seafood, baked foods, convenience foods, snacks, beverages, frozen foods, sugars, candies, fats, and condiments). Baby foods and infant formula, dietary supplements, teas without any added ingredients, and drinks with an ethanol content of >0.5% were not included in the survey.

### Data collection

We developed a data-collection form that defined variables related to the information presented on the food label. The information fell into three categories: (1) general food label information (i.e., net quantity, manufacturing date, shelf life, and ingredients); (2) nutrition labeling information (i.e., nutrient declaration and standardized nutrition claims, nutrients listed in the declaration, and nutrients claimed); and (3) ingredients information (i.e., how many foods had fats, sugar, and sodium listed in their top three ingredients, in addition to the full list of ingredients). Two trained investigators conducted the survey, recording relevant food label information.

We defined 19 product groups based on various food category systems in China, including the Hygienic Standards for Uses of Food Additives,<sup>5</sup> China Food Composition,<sup>6</sup> and the subcategory systems of various Food Hygiene Standards. All surveyed foods were assigned to one of 19 main product groups, with some subgrouping.

### Statistical analyses

We calculated the percentages of foods having net quantity, manufacturing date, shelf life, and a list of ingredients on the food label among all packaged food products by common and small package. According to the Regulation for Food Nutrition Labelling,<sup>3</sup> the following foods qualify for nutrition labeling exemptions: (1) foods consumed at <10 grams or 10 milliliters per day; (2) raw packaged meats, seafood, vegetables, and fruit; (3) food in packages with an available label space of <100 centimeters squared; (4) foods that are processed and prepared in a retail establishment and not offered for sale outside that establishment; and (5) drinks with an ethanol content >0.5%. Considering feasibility issues, the aforementioned items (2), (4), and (5) were kept, and item (3) was simplified for use to exclude those foods with a small label surface area and sold in bulk containers. All foods, excluding those conforming to (2), (4), (5), and simplified (3) items, were included in the following analysis of nutrition labeling.

We calculated the percentages of foods having nutrient declaration and standardized nutrition claims by product groups. Among the foods having nutrient declaration, we calculated the percentages of labeling calories and four major nutrients. Among the foods having standardized nutrition claims, we calculated the percentages of claimed nutrients.

All foods having a legible ingredients list on the label were eligible for food ingredient analysis. We calculated the percentages of foods having fats, sugars, and/or sodium content listed in their top three ingredients and a full list of ingredients by product group. Fat ingredients were further subdivided into vegetable oils, hydrogenated vegetable oils, and animal fats. We conducted the ingredients analysis on the different subsets of food products: (1) when analyzing the percentage of foods having sodium ingredients, excluding the condiments group; (2) when analyzing the percentage of foods having sugar ingredients, excluding the sugars group; (3) when analyzing the percentage of foods having fat ingredients, excluding the fats group; and (4) when analyzing the percentage of foods having any of the previously mentioned ingredients, excluding the condiments, sugars, and fats groups. We used Stata<sup>®</sup> version 10.1 to conduct the statistical analysis.<sup>7</sup>

## RESULTS

The final database consisted of 6,827 food products. Of these, 6,094 food products (89.3%), belonging to 734 food brands, were packaged. A total of 98 food brands

**Table 1. Prevalence of packaged foods with general food labeling in a survey of nutrition labels and fats, sugars, and sodium ingredients in Hangzhou, China, December 2008**

Variable	Labels	
	Large packaged foods (n=5,505)	Small packaged foods <sup>a</sup> (n=589)
Ingredients list	5,305 (96.4)	572 (97.1)
Net quantity	5,496 (99.8)	53 (9.0)
Manufacturing date	5,504 (100.0)	575 (97.6)
Shelf life	5,504 (100.0)	580 (98.5)

<sup>a</sup>Small packaged foods were identified as those with a small label surface area and sold in bulk containers.

(13.4%) and 1,404 food products (23.0%) were made by local manufacturers in Hangzhou.

### General food labeling

A total of 212 food products (3.5%) did not include an ingredients list, of which 174 food products appeared to be single-ingredient foods. Almost all of the non-small packaged food products carried labels that included information on net quantity, manufacturing date, and shelf life (Table 1).

### Nutrition labeling

A total of 5,390 food products were eligible for nutrition labeling analyses. An estimated 26.0% of packaged foods sold had nutrient declaration. Different product groups had a wide range of labeling percentages (Table 2). Milk and dairy products (93.6%), beverages (51.8%), and fats (50.7%) were the groups with the highest percentages of nutrient declaration. A third or fewer of the remaining 16 product groups declared nutrients on the label.

Among the 1,404 food products with legible nutrient declaration, calories were listed on 81.2%, protein on 92.2%, fat on 91.9%, carbohydrate on 79.8%, and sodium on 46.6% of the food labels. Only 605 food products (43.2%) labeled calories and all four major nutrients simultaneously. Among the milk and dairy products, beverages, and fats groups, which had the highest percentages of including nutrient declaration on the labels, the percentage of labels carrying information on both calories and the four nutrients simultaneously was relatively low: 21.1% for milk and dairy products, 31.3% for beverages, and 17.8% for fats.

Among all eligible food products, 653 (12.1%) carried 1,018 standardized nutrition claims, as defined by the Regulation for Food Nutrition Labeling (Table 2). The percentage was highest in the fats (40.3%), milk

**Table 2. Prevalence of packaged food products with nutrient declaration and nutrition claims, by product groups, in a survey of nutrition labels and fats, sugars, and sodium ingredients in Hangzhou, China, December 2008**

<i>Product group</i>	<i>N</i>	<i>Products with nutrient declaration N (percent)</i>	<i>Products with nutrition claims N (percent)</i>
Cereals, tubers, and starches	135	29 (21.5)	11 (8.1)
Legumes	131	29 (22.1)	10 (7.6)
Vegetables	169	24 (14.2)	5 (3.0)
Mushrooms and seaweed	90	8 (8.9)	5 (5.6)
Fruit	303	27 (8.9)	14 (4.6)
Nuts and seeds	393	13 (3.3)	13 (3.3)
Meats	367	21 (5.7)	7 (1.9)
Milk and dairy products	265	248 (93.6)	76 (28.7)
Eggs	53	0 (0.0)	12 (22.6)
Seafood	158	27 (17.1)	19 (12.0)
Baked foods	606	212 (35.0)	69 (11.4)
Convenience foods	706	156 (22.1)	107 (15.2)
Snacks	316	54 (17.1)	48 (15.2)
Beverages	562	291 (51.8)	138 (24.6)
Frozen beverages	36	14 (38.9)	0 (0.0)
Sugars	30	3 (10.0)	0 (0.0)
Cocoa products, chocolate, and candies	470	127 (27.0)	40 (8.5)
Fats	144	73 (50.7)	58 (40.3)
Condiments	456	48 (10.5)	21 (4.6)
Total	5,390	1,404 (26.0)	653 (12.1)

and dairy products (28.7%), and beverages (24.6%) groups. Among the 1,018 items of nutrition claims, the labeling proportions were as follows: vitamins (25.8%), calcium and other minerals (24.5%), protein (12.1%), dietary fiber (12.0%), sugars (10.8%), cholesterol (6.9%), fats (5.4%), carbohydrate (1.3%), calories (1.0%), and sodium (0.3%).

#### **Fats, sugars, and sodium ingredients**

We analyzed the percentages of fats, sugars, and sodium ingredients contained in 5,877 packaged foods products with legible ingredient lists (Table 3). Animal fat content was labeled on 52.9% of instant noodle products while other product groups had a lower labeling prevalence. A total of 630 (11.0%) food products listed hydrogenated vegetable oil in their full list of ingredients; of those, 382 food products (6.6%) listed hydrogenated vegetable oil in their top three ingredients. The major product groups listing hydrogenated vegetable oil as an ingredient are shown in Table 4.

A total of 521 food products (9.9%) had no fats, sugars, and sodium in the full ingredients list, while only 1,131 products (21.4%) did not list them in their top three ingredients. Among them, 247 products appeared to be single-ingredient foods.

#### **DISCUSSION**

There was a rich variety of food options in this large supermarket, which reflected to some extent the more common and popular food brands and items in Chinese cities. The results illustrated that nearly a quarter of packaged food products were labeled as having sodium as a primary ingredient, with half of the products listing sugars and a quarter listing fats. Hydrogenated vegetable oil was found in about 7% of the products. Only a tenth of the surveyed food products sold in the Hangzhou supermarket did not list any of the aforementioned ingredients on the label. It was evident that sodium, sugars, and fats have been added to most of the packaged food products sold in the marketplace.

A judgment on “good” or “bad” food cannot be made simply by looking at the added ingredients. The impact of these ingredients on individuals’ health depends on their intake levels. An individual’s daily intake of these nutrients not only comes from the labeled food products but from various sources. Tools are available to assist people in self-quantifying their intake, including oil pots and salt spoons with quantitative markers for home cooking, developed and distributed by the Chinese health sectors. But how could we know what ingredients and how much of them are added to restaurant foods or packaged processed foods sold in the marketplace? The food label on packages is a simple

**Table 3. Prevalence of food products containing sodium, sugars, and fat ingredients, by product groups, in a survey of nutrition labels and fats, sugars, and sodium ingredients in Hangzhou, China, December 2008**

Product group	Food products containing specific ingredients													
	Sodium				Sugars				Fats					
	Food products N (percent)	Top three N (percent)	Full list N (percent)	Top three N (percent)	Full list N (percent)	Top three N (percent)	Full list N (percent)	Top three N (percent)	Full list N (percent)	Top three N (percent)	Full list N (percent)			
Cereals, tubers, and starches	91 (1.5)	40 (44.0)	45 (49.5)	4 (4.4)	6 (6.6)	5 (5.5)	7 (7.7)	145 (2.5)	47 (32.4)	99 (68.3)	18 (12.4)	60 (41.4)	45 (31.0)	64 (44.1)
Legumes	190 (3.2)	128 (67.4)	178 (93.7)	33 (17.4)	70 (36.8)	41 (21.6)	80 (42.1)	73 (1.2)	18 (24.7)	35 (47.9)	20 (27.4)	24 (32.9)	10 (13.7)	12 (16.4)
Mushrooms and seaweed	391 (6.7)	209 (53.5)	252 (64.5)	316 (80.8)	329 (84.1)	6 (1.5)	7 (1.8)	419 (7.1)	290 (69.2)	365 (87.1)	157 (37.5)	204 (48.7)	37 (8.8)	83 (19.8)
Nuts and seeds	430 (7.3)	289 (67.2)	422 (98.1)	214 (49.8)	341 (79.3)	21 (4.9)	57 (13.3)	265 (4.5)	3 (1.1)	19 (7.2)	175 (66.0)	193 (72.8)	16 (6.0)	24 (9.1)
Milk and dairy products	22 (0.4)	14 (63.6)	22 (100.0)	3 (13.6)	5 (22.7)	0 (0.0)	0 (0.0)	209 (3.6)	144 (68.9)	188 (90.0)	89 (42.6)	147 (70.3)	27 (12.9)	43 (20.6)
Seafood	772 (13.1)	22 (2.8)	567 (73.4)	562 (72.8)	681 (88.2)	488 (63.2)	698 (90.4)	87 (1.5)	1 (1.1)	58 (66.7)	31 (35.6)	65 (74.7)	26 (29.9)	59 (67.8)
Breads	251 (4.3)	10 (4.0)	123 (49.0)	187 (74.5)	231 (92.0)	113 (45.0)	209 (83.3)	397 (6.8)	11 (2.8)	358 (90.2)	307 (77.3)	348 (87.7)	345 (86.9)	393 (99.0)
Chinese pastries	37 (0.6)	0 (0.0)	28 (75.7)	37 (100.0)	37 (100.0)	4 (10.8)	37 (100.0)	714 (12.1)	29 (4.1)	457 (64.0)	142 (19.9)	505 (70.7)	202 (28.3)	476 (66.7)
Biscuits	170 (2.9)	13 (7.6)	170 (100.0)	0 (0.0)	128 (75.3)	142 (83.5)	170 (100.0)	145 (2.5)	0 (0.0)	24 (16.6)	77 (53.1)	100 (69.0)	27 (18.6)	37 (25.5)
Other	399 (6.8)	16 (4.0)	263 (65.9)	65 (16.3)	277 (69.4)	33 (8.3)	269 (67.4)	366 (6.2)	5 (1.4)	181 (49.5)	227 (62.0)	315 (86.1)	185 (50.5)	219 (59.8)
Snacks	104 (1.8)	0 (0.0)	0 (0.0)	101 (97.1)	104 (100.0)	15 (14.4)	21 (20.2)	206 (3.5)	5 (2.4)	181 (87.9)	112 (54.4)	197 (95.6)	170 (82.5)	198 (96.1)
Jelly	56 (1.0)	0 (0.0)	0 (0.0)	14 (25.0)	14 (25.0)	0 (0.0)	0 (0.0)	545 (9.3)	3 (0.6)	32 (5.9)	403 (73.9)	441 (80.9)	101 (18.5)	107 (19.6)
Fried expanded foods	7 (0.1)	0 (0.0)	2 (28.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	7 (0.1)	0 (0.0)	7 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Other	125 (2.1)	1 (0.8)	2 (1.6)	69 (55.2)	75 (60.0)	0 (0.0)	0 (0.0)	145 (2.5)	1 (0.8)	2 (1.6)	69 (55.2)	75 (60.0)	0 (0.0)	0 (0.0)
Drinking water	88 (1.5)	1 (1.1)	1 (1.1)	64 (72.7)	77 (87.5)	0 (0.0)	1 (1.1)	399 (6.8)	16 (4.0)	399 (6.8)	16 (4.0)	277 (69.4)	33 (8.3)	269 (67.4)
Fruit and vegetable juices	60 (1.0)	1 (1.7)	1 (1.7)	50 (83.3)	50 (83.3)	0 (0.0)	0 (0.0)	366 (6.2)	5 (1.4)	181 (49.5)	101 (97.1)	104 (100.0)	15 (14.4)	21 (20.2)
Protein beverages	82 (1.4)	0 (0.0)	8 (9.8)	68 (82.9)	77 (93.9)	2 (2.4)	5 (6.1)	104 (1.8)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Carbonated beverages	173 (2.9)	0 (0.0)	14 (8.1)	142 (82.1)	152 (87.9)	99 (57.2)	101 (58.4)	206 (3.5)	5 (2.4)	181 (87.9)	112 (54.4)	197 (95.6)	170 (82.5)	198 (96.1)
Coffee, tea, and botanical beverages	10 (0.2)	0 (0.0)	4 (40.0)	10 (100.0)	10 (100.0)	0 (0.0)	0 (0.0)	56 (1.0)	0 (0.0)	0 (0.0)	14 (25.0)	14 (25.0)	0 (0.0)	0 (0.0)
Powdered beverages	36 (0.6)	0 (0.0)	11 (30.6)	31 (86.1)	36 (100.0)	17 (47.2)	35 (97.2)	545 (9.3)	3 (0.6)	32 (5.9)	403 (73.9)	441 (80.9)	101 (18.5)	107 (19.6)
Beverages for special uses	23 (0.4)	1 (4.3)	1 (4.3)	NA	NA	0 (0.0)	0 (0.0)	7 (0.1)	0 (0.0)	7 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Frozen beverages	612 (10.4)	0 (0.0)	184 (30.1)	601 (98.2)	602 (98.4)	251 (41.0)	429 (70.1)	125 (2.1)	1 (0.8)	2 (1.6)	69 (55.2)	75 (60.0)	0 (0.0)	0 (0.0)
Sugars	380 (6.5)	0 (0.0)	135 (35.5)	371 (97.6)	371 (97.6)	71 (18.7)	198 (52.1)	88 (1.5)	1 (1.1)	1 (1.1)	64 (72.7)	77 (87.5)	0 (0.0)	1 (1.1)
Cocoa products, chocolate, and candies	232 (3.9)	0 (0.0)	49 (21.1)	230 (99.1)	231 (99.6)	180 (77.6)	231 (99.6)	60 (1.0)	1 (1.7)	1 (1.7)	50 (83.3)	50 (83.3)	0 (0.0)	0 (0.0)
Confectionery	124 (2.1)	1 (0.8)	1 (0.8)	0 (0.0)	0 (0.0)	NA	NA	82 (1.4)	0 (0.0)	8 (9.8)	68 (82.9)	77 (93.9)	2 (2.4)	5 (6.1)
Chocolate	450 (7.7)	NA	NA	74 (16.4)	256 (56.9)	88 (19.6)	145 (32.2)	173 (2.9)	0 (0.0)	4 (40.0)	10 (100.0)	10 (100.0)	0 (0.0)	0 (0.0)
Fats	5,877 (100.0)	1,243 (22.9)	3,059 (56.4)	3,069 (52.4)	4,215 (72.0)	1,540 (26.8)	2,486 (43.2)	36 (0.6)	0 (0.0)	36 (100.0)	17 (47.2)	36 (100.0)	35 (97.2)	35 (97.2)
Frozen beverages	23 (0.4)	1 (4.3)	1 (4.3)	NA	NA	0 (0.0)	0 (0.0)	23 (0.4)	1 (4.3)	1 (4.3)	NA	NA	0 (0.0)	0 (0.0)
Sugars	612 (10.4)	0 (0.0)	184 (30.1)	601 (98.2)	602 (98.4)	251 (41.0)	429 (70.1)	380 (6.5)	0 (0.0)	135 (35.5)	371 (97.6)	371 (97.6)	71 (18.7)	198 (52.1)
Cocoa products, chocolate, and candies	232 (3.9)	0 (0.0)	49 (21.1)	230 (99.1)	231 (99.6)	180 (77.6)	231 (99.6)	124 (2.1)	1 (0.8)	1 (0.8)	0 (0.0)	0 (0.0)	NA	NA
Confectionery	450 (7.7)	NA	NA	74 (16.4)	256 (56.9)	88 (19.6)	145 (32.2)	450 (7.7)	NA	NA	74 (16.4)	256 (56.9)	88 (19.6)	145 (32.2)
Chocolate	5,877 (100.0)	1,243 (22.9)	3,059 (56.4)	3,069 (52.4)	4,215 (72.0)	1,540 (26.8)	2,486 (43.2)	Total						

NA = not applicable

**Table 4. Major product groups with labels containing hydrogenated vegetable oils and their prevalence in a survey of nutrition labels and fats, sugars, and sodium ingredients in Hangzhou, China, December 2008**

<i>Product group (prevalence &gt;5%)</i>	<i>Percent</i>	<i>Subgroup (prevalence &gt;20%)</i>	<i>Percent</i>
Baked foods	38.3	Other (mainly pies)	73.0
		Cookies	50.4
		Breads	28.7
Beverages	19.3	Powdered beverages	57.2
Cocoa products, chocolate, and candies	19.0	Confectionery	25.0
Frozen beverages	16.7	Reconstituted foods	20.7
Snacks	12.8		
Convenience foods	6.9		

and easy tool to help consumers understand nutrient content and the percentage relative to the levels of recommended intakes. It is becoming an increasingly important public health measure in preventing diet-related chronic diseases. Nutrition labeling on packages becomes especially necessary when most of the packaged foods sold in the marketplace contain added ingredients that might contribute to the development of chronic diseases.

Our survey indicated that only a quarter of food products applicable to the requirement of nutrition labeling have nutrient declaration. Fewer than half of the labels listed calories and the four major nutrients simultaneously. Sodium had the lowest labeling prevalence. There were several reasons for this finding, including a time lag between the launch of the regulation and its implementation. The new Regulation for Food Nutrition Labeling was effective in May 2008, only seven months prior to the survey. One reason for the time lag was that food manufacturers were still using old stock labels and were in the process of developing a new nutrition labeling system.<sup>3</sup> Another reason was the voluntary nature of the new regulation, which uses encouragement rather than enforcement.

By contrast, the situation of general food labeling is much better. General labeling is mandated by the General Standards for the Labeling of Prepackaged Foods,<sup>8</sup> disseminated by the General Administration of Quality Supervision, Inspection, and Quarantine (AQSIQ) of the People's Republic of China and in effect since October 2005. Following its initiation, AQSIQ disseminated the Provisions for the Administration of Food Labeling<sup>9</sup> (effective as of September 2008) in which it laid out the penalty for violating the General Standards and Provisions.

As the public's interest in health grows, and increasing attention is paid to the health aspects of food products, food manufacturers will step up their use of nutrition claims. Our survey shows that the nutrition claims have mostly centered on vitamins, calcium

and other minerals, protein, and dietary fiber. This emphasis partly reflects most of the public's nutrient concerns as well as the Chinese population's diet-related health perspectives. Thus far, neither the public nor the food manufacturers are paying much attention to the impact of calories, fats, sugars, and sodium on chronic diseases.

In such a food market environment, it is difficult for consumers to identify these chronic disease-related ingredients in packaged foods, which are an important food source. Overall, the public is eager to follow health advice and adopt healthy dietary practices. However, it seems that consumers are not provided with many healthy food options or information needed to plan daily meals and make healthy choices. Health education campaigns alone have a limited effect on individual behaviors,<sup>10</sup> and increasingly, policy and environmental interventions are being seen as important strategies in producing a greater impact.<sup>11</sup>

Typical objectives of national labeling regulations have been to provide consumers with information, to help consumers make healthful choices, and/or to encourage food manufactures to develop healthy food products.<sup>2</sup> The Regulation for Food Nutrition Labeling issued by the Ministry of Health was an important step in this direction, but improvements are still needed. The mandatory General Standards and Provisions provide AQSIQ with specific authority to implement general food labeling. Under such a regulatory environment, and with strong health education campaigns, Chinese consumers are consciously reading the manufacturing date and shelf life when buying food products. This practice has set a good example for regulating food nutrition labeling.

Another example of success seen after regulation comes from the United States where, in the 1980s, the prevalence of nutrition labeling was only 55%.<sup>12</sup> The Nutrition Labeling and Education Act (NLEA) of 1990 set the legal basis for the Food and Drug Administration to regulate nutrition labeling. Regulations

implementing the NLEA provisions were issued in January 1993.<sup>13</sup> A rapid rise in the prevalence of nutrition labeling (96%) was observed in the Food Label and Package Survey (FLAPS) in 1995.<sup>12</sup>

### Limitations

This study was subject to several limitations. First, the analysis of ingredients was based on the ingredients list labeled by food manufacturers. We did not verify the accuracy of the label statements through quantitative measurements. Secondly, we made an assumption that the same group of ingredients has the same impact on chronic disease. For example, olive oil, coconut oil, palm oil, and other vegetable oils do not have the same health impacts. However, according to the General Standards, food manufacturers could uniformly label any kinds of vegetable oils with the wording of “vegetable oil,” with the exception of olive oil. Hence, the data could only be analyzed by assuming that fats are the most important source of food calories.

Third, FLAPS sampled food products considering annual sales dollars and used the sales data to weigh FLAPS data.<sup>12,14</sup> As the sales data of packaged food products are unavailable in China, equal weight was given to each food product. Lastly, any generalization of food products in the marketplace is limited by the fact that the survey was only conducted in a supermarket. There is a presumption that if food products sold in small stores or stores in rural areas were included, the analysis would indicate a worse situation because they sell increasing amounts of less well-known food brands, which are produced by small-scale local food manufacturers. Nevertheless, the survey is the first to provide a snapshot of nutrition labeling and the three ingredients that are closely related to obesity and major chronic diseases among common packaged food products sold in Hangzhou.

### CONCLUSIONS

The Chinese packaged foods market did not offer individual healthy choices, whether according to the food ingredients or the labels. The voluntary status of nutrition labeling on food products placed on manufacturers by the Chinese government is the first step in complying with international guidelines to reduce the risk for chronic diseases through unhealthy diets. However, more active measures are needed to ensure that nutrition labeling is provided by food manufacturers and to encourage the development of healthier food products.

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### REFERENCES

1. World Health Organization. Global strategy on diet, physical activity, and health. Geneva: WHO; 2004.
2. Hawkes C. Nutrition labels and health claims: the global regulatory environment. Geneva: World Health Organization; 2004.
3. Ministry of Health of the People's Republic of China. Regulation of food nutrition labeling. 2008.
4. Office Information Processing Center, CPC Hangzhou Committee and Hangzhou Municipal Government. About Hangzhou [cited 2010 May 3]. Available from: URL: <http://eng.hangzhou.gov.cn/main/zpd/English/AboutHangZhou/index.shtml>
5. Ministry of Health of the People's Republic of China, Standardization Administration of the People's Republic of China. Hygienic standards for uses of food additives. 2007.
6. Institute of Nutrition and Food Safety, China Center for Disease Control and Prevention. China food composition 2004 (book 2). Beijing: Peking University Medical Press; 2005.
7. StataCorp. Stata®: Release 10. College Station (TX): StataCorp; 2007.
8. General Administration of Quality Supervision, Inspection, and Quarantine of the People's Republic of China, Standardization Administration of the People's Republic of China. General standard for the labeling of prepackaged foods. 2004.
9. General Administration of Quality Supervision, Inspection, and Quarantine of the People's Republic of China. Provisions for the administration of food labeling. 2007.
10. Ebrahim S, Beswick A, Burke M, Smith GD. Multiple risk factor interventions for primary prevention of coronary heart disease. *Cochrane Database Syst Rev* 2006;4:CD001561.
11. Schmid TL, Pratt M, Howze E. Policy as intervention: environmental and policy approaches to the prevention of cardiovascular disease. *Am J Public Health* 1995;85:1207-11.
12. Brandt M, Moss J, Ferguson M. The 2006–2007 Food Label and Package Survey (FLAPS): nutrition labeling, trans fat labeling. *J Food Compos Anal* 2009;22(Suppl):S74-7.
13. Food and Drug Administration (US). Guide to Nutrition Labeling and Education Act (NLEA) requirements. 1994 [cited 2010 Sep 14]. Available from: URL: <http://www.fda.gov/ICECI/Inspections/InspectionGuides/ucm074948.htm>
14. Legault L, Brandt MB, McCabe N, Adler C, Brown AM, Brecher S. 2000–2001 food label and package survey: an update on prevalence of nutrition labeling and claims on processed, packaged foods. *J Am Diet Assoc* 2004;104:952-8.