for linear trend); they were 5.9%, 4.2%, 3.8%, and 2.4%, respectively, for first-listed PE and 11.4%, 7.8%, 7.8%, and 7.1%, respectively, for any-listed PE (Figure).

Comment. Because of the scope of this article, we report several overall estimates of in-hospital deaths with a first-listed and an any-listed PE diagnosis in the United States during 2001-2008 that were not available previously. The annual number of deaths ranged from 3600 to 5870 and from 14 870 to 18 560 among hospitalizations with a first-listed PE diagnosis and an any-listed PE diagnosis, respectively. Despite the decline in the overall case-fatality rate of hospitalizations with a PE diagnosis, we did not find a corresponding reduction in the numbers of in-hospital deaths, especially among those with a first-listed PE diagnosis. Although the exact reasons for the decline in case-fatality rates were unknown and may warrant further investigation, the decrease may be multifaceted and could be attributable to a combination of an increased number of PE diagnoses resulting from improved diagnostic techniques together with more effective treatment and fewer complications.[7,8]

Regardless of an overall decline in the case-fatality rate in hospitalizations related to PE during the study period, the annual number of in-hospital deaths remains relatively stable, especially for any-listed PE. As the US population is aging, reducing the number of in-hospital deaths from PE and improving patients' quality of life are important clinical and public health goals and pose a formidable challenge for the health care systems. The decline in the case-fatality rate stabilized during the periods of 2005-2006 and 2007-2008 in hospitalizations with any-listed PE. Therefore, our results provide support for identifying and implementing effective preventive strategies among hospitalized patients.

Our research has some limitations. Although we evaluated in-hospital deaths with a diagnosis of PE, PE cases may be underreported because (1) asymptomatic patients with PE and other comorbid conditions might be undiagnosed and (2) a misdiagnosed PE or a PE diagnosis was not made before death occurred. Nonetheless, our study represents an important effort to characterize PE-related mortality burden in US hospitals.

In conclusion, the estimated annual number of in-hospital deaths among hospitalizations with a diagnosis of PE remained relatively stable during 2001-2008, despite the decline in the case-fatality rates for the same period. Therefore, PE remains an important clinical and public health concern in the United States.

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First Foods Most: After 18-Hour Fast, People Drawn to Starches First and Vegetables Last

Short-term food deprivation of 18 to 24 hours is fairly common.[1-3] It can be medically imposed before blood draws or surgery, or it can be self-imposed in the case of serious dieting, religious fasts, and chaotic work schedules.[4,5]

See Invited Commentary

Animal studies have examined only calorie levels rather than food types following deprivation.[6,7] The question arises: when a food-deprived person finally eats, what foods do they eat first and most? The answer has implications for the precautions that patients, fasters, medical interns, and dieters should take when first serving and eating food after a short period of food deprivation.

Methods. A total of 128 participants were recruited from Cornell University for course credit, and they were ran-

Table. First Foods Chosen in 18-Hour Fasters and Controls[a]

	All Participants		Women		Men		
Food Type	Controls	Fasters	Controls	Fasters	Controls	Fasters	Correlation[b]
Starches	6 (13)	14 (35)	1 (4)	8 (53)	4 (18)	6 (25)	0.21 (P = .02)
Protein	14 (31)	13 (33)	7 (32)	3 (20)	7 (32)	9 (38)	0.14 (P = .06)
Vegetables	25 (56)	10 (25)	14 (64)	3 (20)	11 (50)	7 (29)	0.17 (P = .05)

[a] Unless otherwise noted, data are reported as number (percentage) of study participants.
[b] Correlation coefficient for first food choice with total calorie intake of that food.

domly assigned to 2 experimental conditions: one group was instructed to avoid eating 18 hours prior to a lunchtime study (no food or beverages after 6:00 PM the night before the study), and the control group was not. The study was conducted during 12 weekday lunches involving 10 to 12 participants across both conditions and was approved by the institutional review board.

After arriving for lunch, participants were presented with a buffet of 2 starches (dinner rolls and French fries), 2 proteins (chicken and cheese), 2 vegetables (carrots and green beans), and a beverage. The order of the food on the tables was rotated across sessions to prevent an order bias. The amount of the foods participants served themselves was surreptitiously measured by scales embedded in the tables, and food consumption was unobtrusively videotaped.

After finishing the meal, participants completed a questionnaire in which they indicated if they had skipped breakfast and confirmed the order in which they had first tasted or eaten each of the foods they had for lunch. Intake was determined by deducting the amount left over from the amount served. Across both study groups, participants were similar with respect to BMI, age, and sex. All analyses were performed using SAS statistical software, version 9.2 (SAS Institute Inc). $P < .05$ was considered statistically significant.

Results. We eliminated people who did not follow fasting instructions from analysis (n=43). However, those were still included in calculating correlations between first food served and calories eaten.

Participants in the control group started their meals with the high-calorie foods (starches and protein) less often than did participants in the fasting condition (44% [20 of 45] vs 75% [30 of 40]; χ^2=6.83) (P=.01). Although this trend appeared stronger for women (36% [8 of 22] vs 80% [12 of 15]) than for men (50% [11 of 22] vs 66% [16 of 24]), the interaction with sex was not significant. The **Table** lists the types of foods served by study group consumption; compared with the control group, fasters were more likely to eat a starch first (13% [6 of 45] vs 35% [14 of 40]; χ^2=5.53) (P=.02) and less likely to eat a vegetable first (56% [25 of 45] vs 25% [10 of 40]; χ^2=8.16) (P=.005).

Importantly, starting their meal with a particular food led all participants to consume 46.7% more calories of it (128.57 vs 84.91 calories) ($F_{1,122}$ = 3.89, P = .047). Indeed, in using choice as a binary variable, we found that the food that a person chose to eat first was correlated with how much was served (product-moment correlation coefficient, 0.24; $P < .001$), and it was correlated with how much of it the person ultimately ate during the entire meal (product-moment correlation coefficient, 0.21; P = .003) .

Comment. When a food-deprived patient, faster, medical intern, or dieter first encounters food, the first food they eat may well end up being the food of which they eat the most. In general, they will be most drawn to starches and will eat them instead of nutrient-dense vegetables. Even relatively mild food deprivation can alter the foods people choose to eat, potentially leading them to eat starches first and most.

Hospitals and cafeterias that deal with food-deprived individuals should make healthier foods—vegetables, salads, and fruit—much more convenient, visible, and enticing than starches to avoid such biasing of choices toward potentially less healthy choices. In addition, the serving size of starches can be reduced, or they can be offered in combo meals that balance the amount of starches with protein and vegetables.

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INVITED COMMENTARY

Are the Hungry More at Risk for Eating Calorie-Dense Nutrient-Poor Foods?

Consumption of calorie-dense and nutrient-poor foods (foods with little or no nutritional value such as potato chips, candy, and sugar-sweetened beverages) is a major contributor to the obesity epidemic, owing in part to changes in the American food system.[1] Wansink and colleagues[2] demonstrate that after individuals have fasted, they are more likely than individuals who have not fasted to consume foods that are calorie dense and nutrient poor, namely starches and proteins. Those in the fasting group consumed a significantly greater amount of calories (46.7% more), and they were less likely to consume the vegetables first. The authors highlighted the importance of the results in terms of medical patients, dieters, and others who might be fasting.[2] The implications for obesity are implied, given the emphasis on calorie density and selection of food items. The authors also give recommendations specific to hospital cafeteria settings: to make more healthful choices such as vegetables and fruits visually appealing and convenient to food-deprived individuals to promote consumption of these items over less healthful foods.[2]

Obesity prevention in the health care setting is an important priority, both in terms of the physical environment, as Wansink and colleagues identified,[2] and in terms of the treatment given directly to patients (ie, health care authority with patients), but these findings are also relevant to other food-deprived individuals such as those experiencing hunger or food insecurity. *Food-secure households* are defined as those having consistent access to enough food for all household members to lead active and healthy lives. Households that experience uncertainty around acquiring adequate food to meet their household needs due to insufficient resources have low food security or are called *food insecure*.[3] Health disparities rooted in the disproportionately higher rates of obesity in low-income, racially and ethnically diverse populations[4] are also important to consider, since these populations may also experience higher levels of food insecurity.[3]

We believe that the findings of Wansink et al[2] may be applied to food-insecure populations as well as to medically or voluntarily fasting populations. Food-insecure populations also experience extended periods of hunger and thus may be more prone to over-consume calorie-dense, nutrient-poor foods. For both food insecure populations and those at risk for obesity, the dietary quality of foods being consumed may be compromised (eg, fewer vegetables and fruits and more starches and protein), further perpetuating both of these conditions.

Currently in the United States, 14.5% of the population experiences food insecurity.[3] The hunger-obesity paradox has been described in the literature,[5] and recently, a framework has been proposed in which poverty is identified as the broad environmental and social context for food insecurity and the cycle of mutual influence that may promote excess weight gain and poor health outcomes.[6] Empirical data support the link between obesity and food insecurity, largely in women,[7] which remarkably corresponds with the findings of Wansink et al[2] that women were most likely to select the high-calorie foods. However, the findings are tenuous for other populations, including children, potentially owing to the preponderance of cross-sectional studies and lack of comprehensive measurement of related factors in a single study design over time.

The question of whether individuals tend to overindulge in calorie-dense, nutrient-poor foods after fasting was also raised in a recent Institute of Medicine workshop and report on the potential intersect between hunger and obesity.[8] The question could not be answered during the workshop, but it was highlighted as needing further investigation. In addition, there are other outside factors that influence food selection and that must be taken in account, especially for low-income populations who may tend to eat less-nutritious foods, owing in part to the lower cost of these items.[9] Wansink and colleagues[2] provide some baseline information for other researchers to build on in both the food insecurity and obesity domains.

The study by Wansink and colleagues[2] is novel in that no recent studies to our knowledge have looked at the result of short-term food deprivation and the resultant food choices. However, it should be noted that 1 limitation that affects generalizability of the results is that a convenience sample of 128 college students was used. This study opens the door for further research to be conducted using a more diverse study population (eg, low-income, racially diverse individuals from across the lifespan), which could have further implications for the study of factors related to both food insecurity and obesity. Therefore, this study can help serve as a pilot to ignite health promotion research in the direction of multidisciplinary work in laboratory, clinical, and community settings to elucidate potential mechanisms involved with the consumption of calorie-dense, nutrient-poor foods in food-deprived individuals, which can relate to research in both food insecurity and obesity prevention.

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