

## INTRODUCTION

The problem of hospital malnutrition in the U.S. has been a concern for decades and remains a concern today. Despite the availability of validated screening tools, malnutrition risk continues to be under-recognized, non-validated tools continue to be used, malnutrition risk continues to be under-recognized, and estimates of malnutrition risk in hospitalized patients vary greatly. This variation exists because most estimates of malnutrition risk are based on discrete versus broad patient populations. Further, while the association between hospital food intake and patient outcomes is well established in countries outside the U.S., no such data currently exists for the U.S. Analysis of the U.S. sample of the nutritionDay worldwide dataset provides U.S. based knowledge on hospital nutrition practices to optimize the nutritional care provided to adult hospital patients.

The aims of this study were:

1. To assess the prevalence of malnutrition risk, for a variety of patient types, using a broad sample of U.S. hospitals
2. To evaluate the impact of hospital food intake on mortality rate.

## METHODS

nutritionDay worldwide is a robust, one-day, cross sectional survey of nutritional factors and food intake in adult hospitalized patients. nutritionDay in the U.S. was conducted by volunteers in 601 hospital units/wards across the U.S. nutritionDay data includes both self-reported patient data on food intake and appetite, as well as patient outcome and nutritional process data. This study analyzed data from 2009 through 2015 for all adult patients from participating U.S. hospitals. Prevalence of malnutrition risk was assessed by mapping self-reported survey questions from nutritionDay to the Malnutrition Screening Tool (MST) and identifying patients with a MST score of 2 or higher as being at risk of malnutrition. Fine and Gray competing risk regression model was used to evaluate the impact of MST score and food intake on patients' hospital outcomes including 30-day readmissions, length of stay and 30-day in-hospital mortality, while controlling for age, mobility, and other disease related factors.

## RESULTS

### Demographics

The overall adult population consisted of 9,959 patients on 601 units/wards from 245 hospitals in the U.S. Patients were relatively equally divided by gender with 53% being female. Mean age of the participants was 64 years (IQR 52-76). The average BMI was 29.19 kg/m<sup>2</sup> (SD 8.15 kg/m<sup>2</sup>), with 66.2% of patients having a BMI of 25 kg/m<sup>2</sup> or greater. The most common conditions were diabetes (28.8%) cardiac insufficiency (23.2%). Specialties with the most patients included general internal medicine(48.3%), cardiology (14.7%), oncology (7.6%), and general surgery (7.4%).

### Malnutrition Risk

MST score was calculated in 9,489 patients. Statistics on risk factors per the MST are shown in Figure 1. The overall prevalence of malnutrition risk (MST score  $\geq$  2) was 32.7%. The prevalence of malnutrition risk was highest in infectious disease (46.1%) and long-term care (45.8%) and lowest in orthopedic surgery (23.7%) units/wards. The MST scores by specialty are shown in Figure 2.

Figure 1: Patient Demographics for Malnutrition Risk Factors

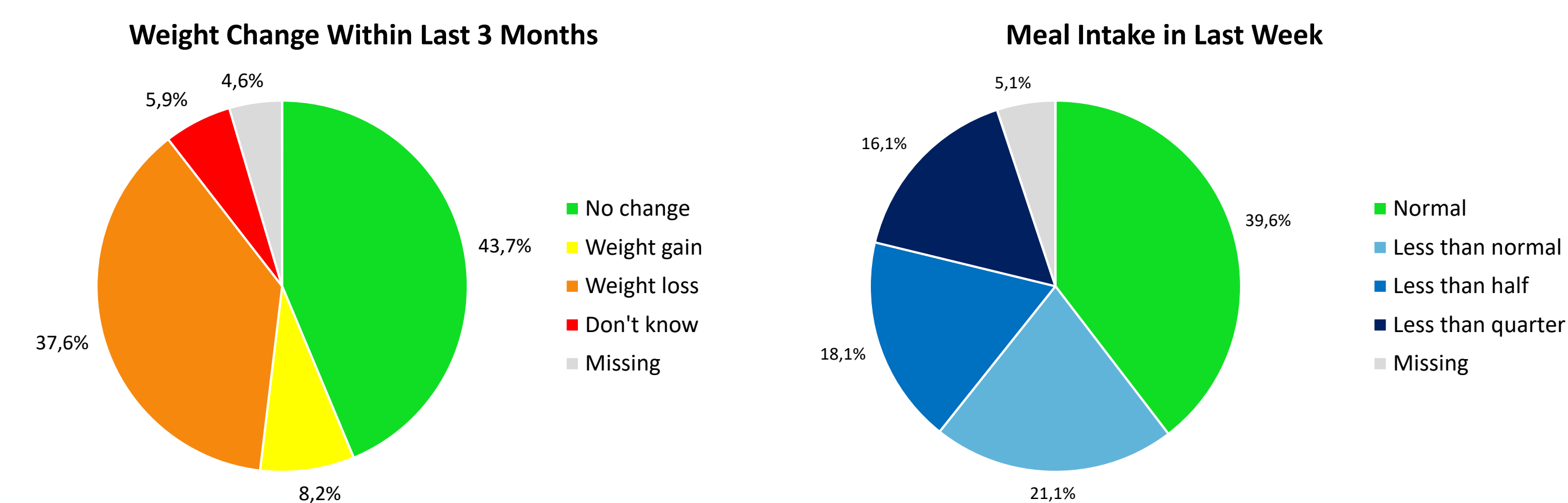
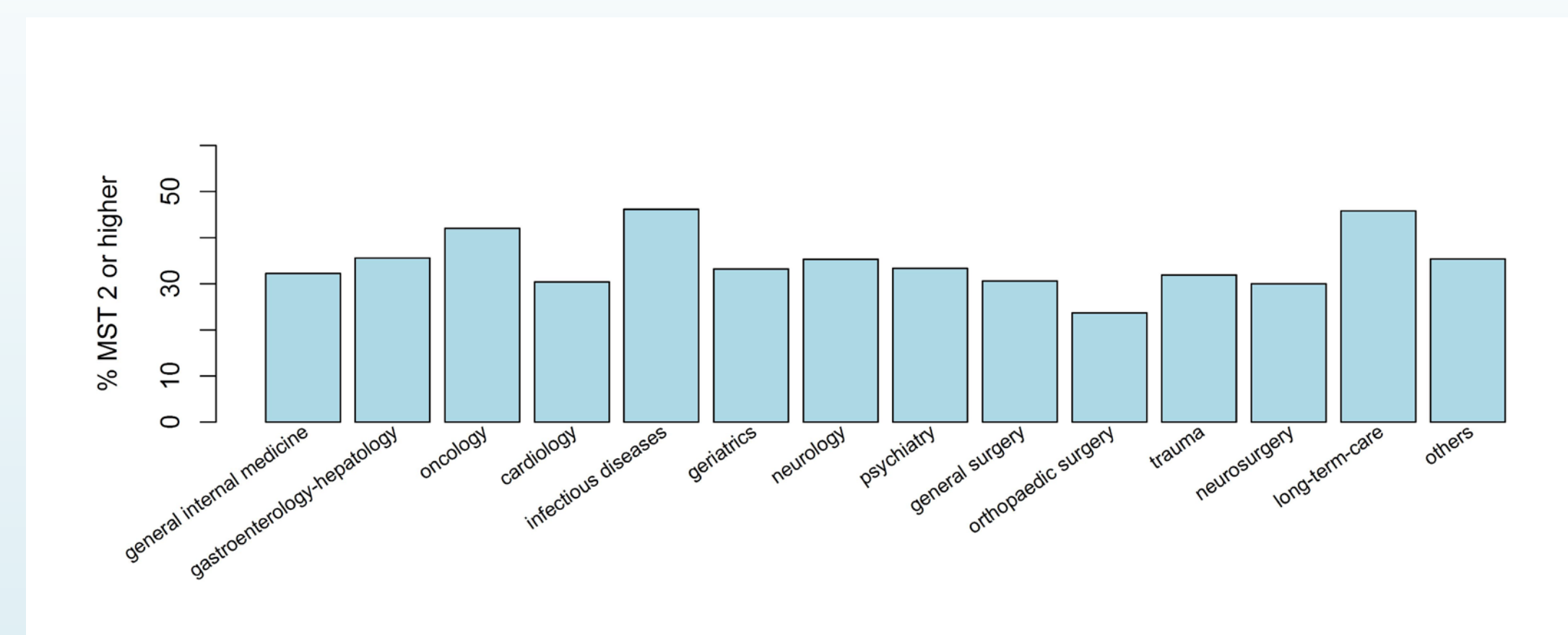


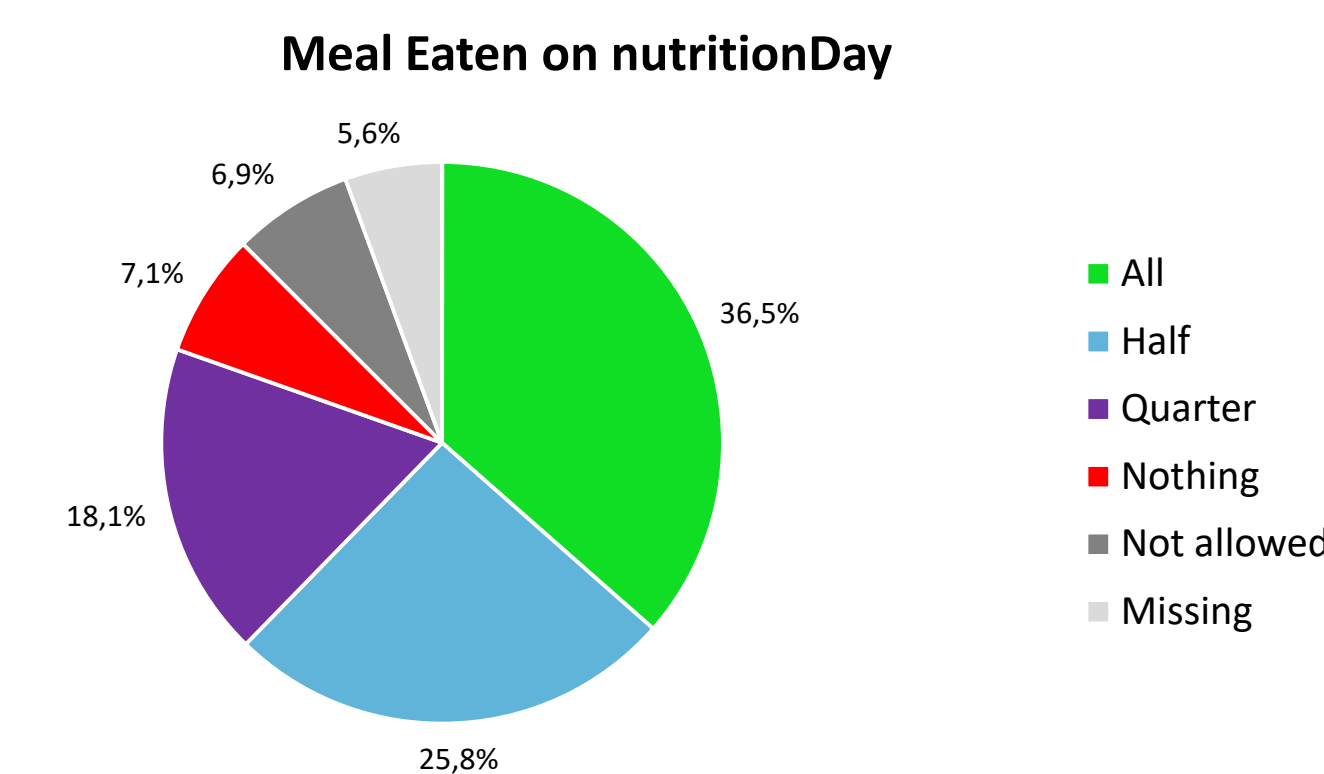
Figure 2: MST Scores by Specialty



### Food Intake on nutritionDay

More than half of all patients on nutritionDay did not eat their full meal. On nutritionDay, 36.5% of patients ate their entire meal, 25.8% ate half their meal, and 32.1% ate about a quarter of their meal or less. Within the 32.1% of patients who ate a quarter of their meal or less, 6.9% of patients were not allowed to eat on nutritionDay. The distribution of food intake on nutritionDay is shown in Figure 3.

Figure 3: Food Intake on nutritionDay



### Food Intake and Mortality

There appears to be a negative relationship between meal consumption and survival. In the multivariate analysis, patients who ate about a quarter of their meal had a mortality HR of 3.24 (95%CI: [1.73, 6.07]; p-value=0.0002) compared to those who ate all their meal. This mortality HR increased to 5.99 (95% CI: [3.03; 11.84]; p-value=0.0000) for patients who were allowed to consume food but ate nothing. Those who were not allowed to eat had a HR of 4.38 (95% CI: [2.00; 9.58]; p-value=0.0002). The Fine and Gray Competing Risk Regression Model is shown in Table 1.

Table 1: Fine and Gray Competing Risk Regression Model

Variable	Level	Multivariate	
		HR + 95% CI	p-value
Eaten today	All	Reference	
	Half	1.27 [0.62; 2.59]	0.5100
	Quarter	3.24 [1.73; 6.07]	0.0002
	Nothing	5.99 [3.03; 11.84]	0.0000
	Not Allowed	4.38 [2.00; 9.58]	0.0002
	Missing	3.56 [1.20; 10.58]	0.0200

## CONCLUSIONS

nutritionDay in the US provides much needed data on nutrition care and food intake in US hospital patients. The results of this study provide the most robust estimate of malnutrition risk in hospitalized U.S. patients to date, finding that approximately 1 in 3 are at risk. This rate of malnutrition risk shows that hospital malnutrition remains a problem/challenge in US hospital patients. Additionally, this study shows that patients who have diminished intake experience increased mortality risk. These results highlight the continued concern of malnutrition in the hospital setting, and the need for optimal nutrition care to improve outcomes. There is a large variation in nutrition care practices in hospitals across the U.S. It is critical to improve care practices nationally to provide better care for patients, to improve outcomes, and ultimately, to impact mortality.

## DISCLOSURES

This analysis was funded by Abbott.