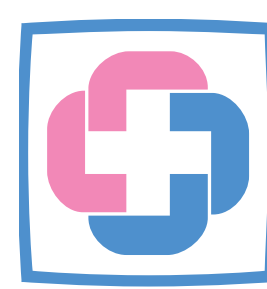


# Healthy by design: Does use of a plate with portion design effect food group guideline adherence?



Singapore Healthcare  
Management 2016



KK Women's and  
Children's Hospital  
SingHealth



DukeNUS  
Medical School

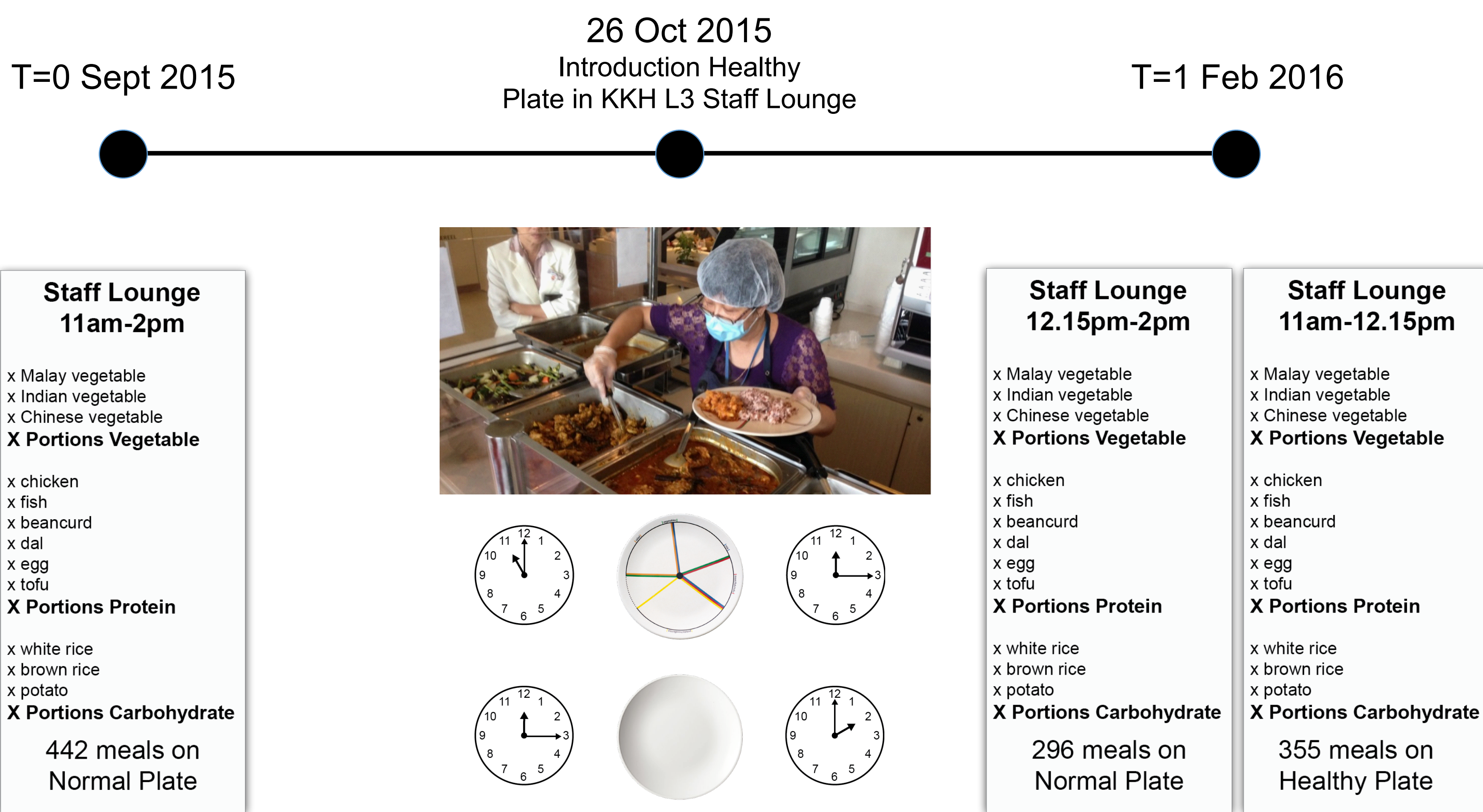
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## Introduction

Both excessive amounts and lack of variety in food intake are important determinants of diabetes and obesity. The Singapore Health Promotion Board (HPB) 'healthy plate' guidelines recommend proportions of .500 vegetables, .250 proteins and .250 carbohydrates. Adherence to these guidelines has however proven to be difficult. This study aims to assess the impact of an actual plate where food group portion guidelines are marked (ETE plate™), using design thinking (DT) approach. We hypothesised that use of the ETE plate™ will result in adherence to the HPB guidelines.

## Methodology

Setting of this study was a hospital staff lounge where about 120 staff per day takes lunch from a buffet style counter. The ETE plate™, with food group portion guidelines printed in coloured lines, was distributed to all staff who had lunch between 11am and 12.15pm. For comparison, a normal plate (with no markings) was distributed to staff that had lunch between 12.15 and 2pm. A stratified five-day sample of cashier receipt data of individual meals taken over five weeks was analysed for the number of vegetable portions, protein portions and carbohydrate portions taken. We assessed for any changes in the proportions from two months before the introduction of the ETE plate™ (T0, September 2015, n=442 meals, all on normal plate) to three months (T1, February 2016, n=355 on ETE plate™, n=296 on normal plate) after. Between-group comparisons were performed using t-tests.



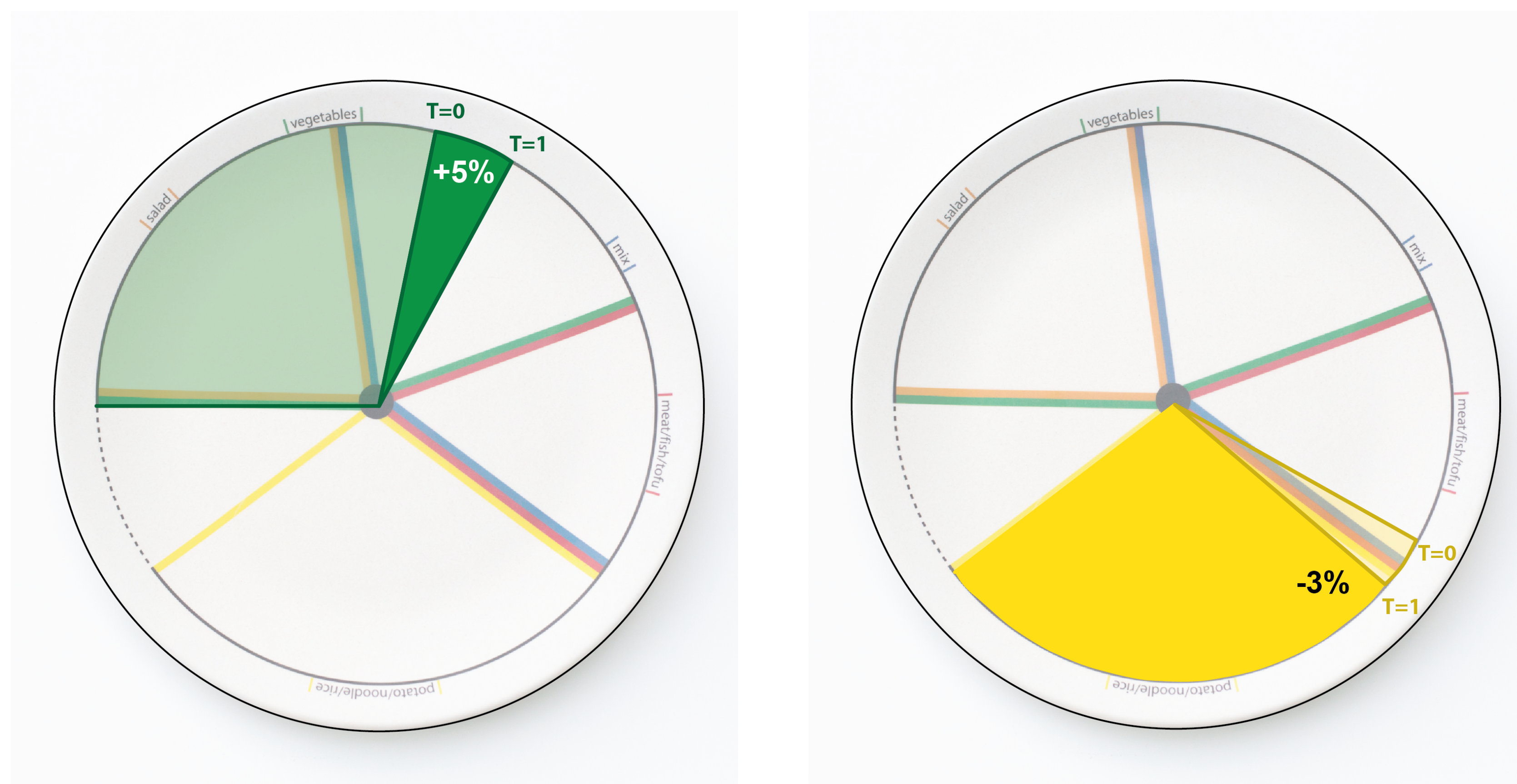
## Results

Significant change was observed for vegetables as well as for carbohydrates. No significant change was observed for proteins. However, a similar direction and magnitude of change in proportions for all the three food groups was also observed for those using the normal plate at T1 (versus T0).

Mean (+/- SD) proportions of vegetables, proteins and carbohydrates per plate

	T0		T1		Difference in Means* (T0-T1marked)	
	Not Marked	Not Marked	Not Marked	Marked	β	P
Vegetables	.317 (+/- .184)	.355 (+/- .164)	.367 (+/- .172)		0.050	0.0001
Proteins	.332 (+/- .160)	.338 (+/- .154)	.315 (+/- .146)		-0.016	0.1313
Carbohydrates	.351 (+/- .135)	.308 (+/- .114)	.318 (+/- .097)		-0.033	0.0001

\*Two-sample t-test

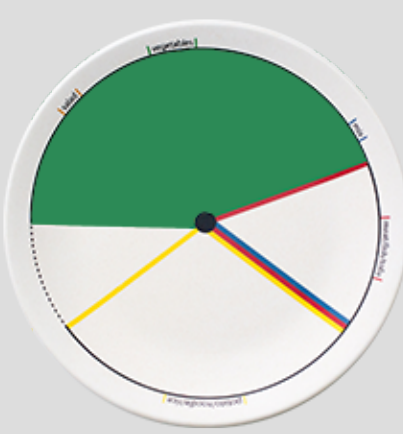


## Conclusion

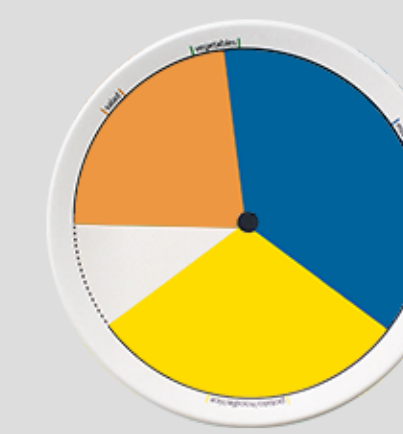
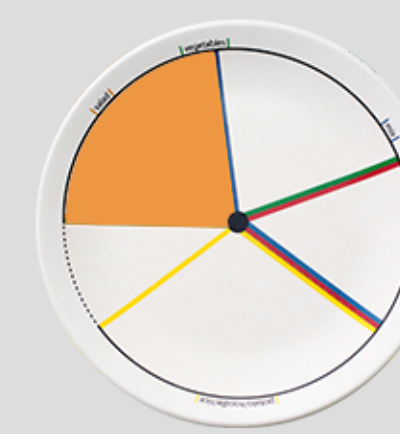
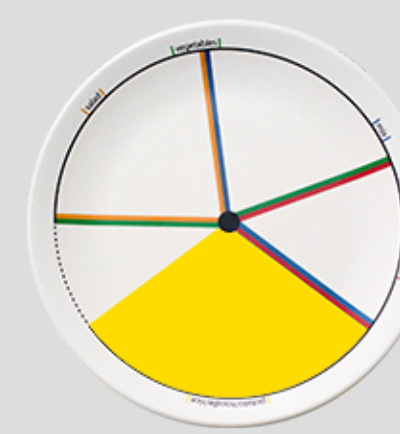
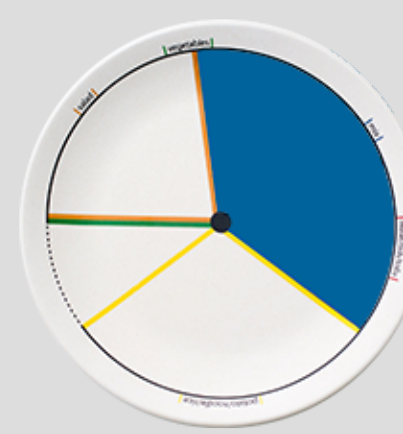
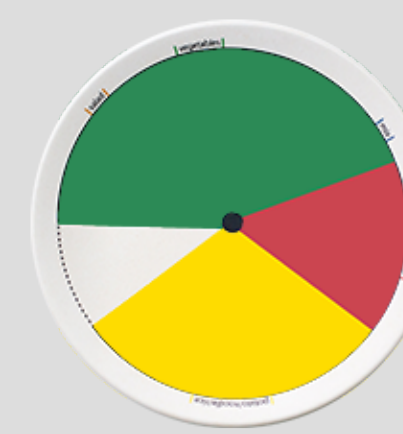
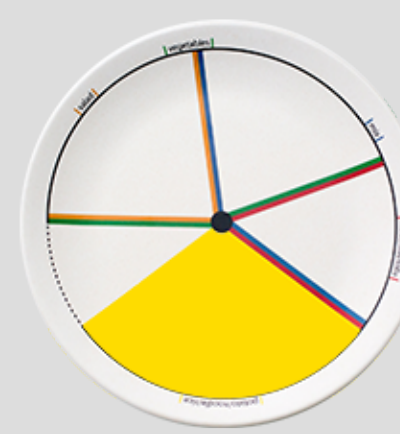
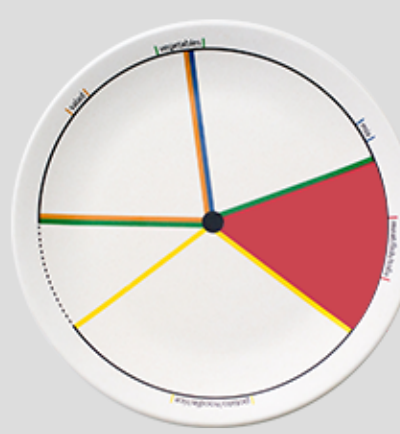
The hypothesis was partly met, given the change in vegetable and carbohydrate portions when using the ETE plate™ moved consumers towards the HPB guidelines. However, the similar beneficial change observed when using the normal plate suggests the role of contamination and environmental effects. A more controlled study design is necessary to further validate our findings. Nonetheless, a DT approach might be useful to nudge eating behaviour change in healthcare staff.

### Healthy Plate Design

Design Thinking methodology was used to design this biodegradable the bamboo fibre portion control plate (ETE plate™). It's design allows universal applications and variety of meals.



ETE plate™ can be used for a meal made up of vegetables, protein and carbohydrate.



ETE plate™ can be used for a 'mixed' meal made up of a mix of vegetables + protein, carbohydrate and salad/ additional vegetables.