The timing of carbohydrates intake

the National Diet and Nutrition Survey Rolling Programme (2008-2014)

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Background

"Temporal eating patterns"--the timing, frequency, and regularity of food intake or eating occasions across the day may play a role in health outcomes:

- Interplay between timing of food intake and circadian rhythms, physiology, and metabolism. (Asher *et al* 2015, Cell)

- Skipping breakfast is associated with higher risk of type 2 diabetes. (Uemura *et al* 2015, J Epidemiol)

- Shift workers have a higher risk of metabolic syndrome (De Bacquer *et al*, 2009 Int J Epidemiol) and type 2 diabetes (Pan *et al* 2011, PLoS Med).

- Evening energy intake is positively associated with overweight/obesity. (Almoosawi *et al* 2016, Proc Nutr Soc)

- Three distinct temporal eating patterns were identified (next 2 slides) in both Australian poulation (Leech *et al* 2017, Int J Behav Nutr Phys Act) and general population in the UK.

Australian (NNPAS)
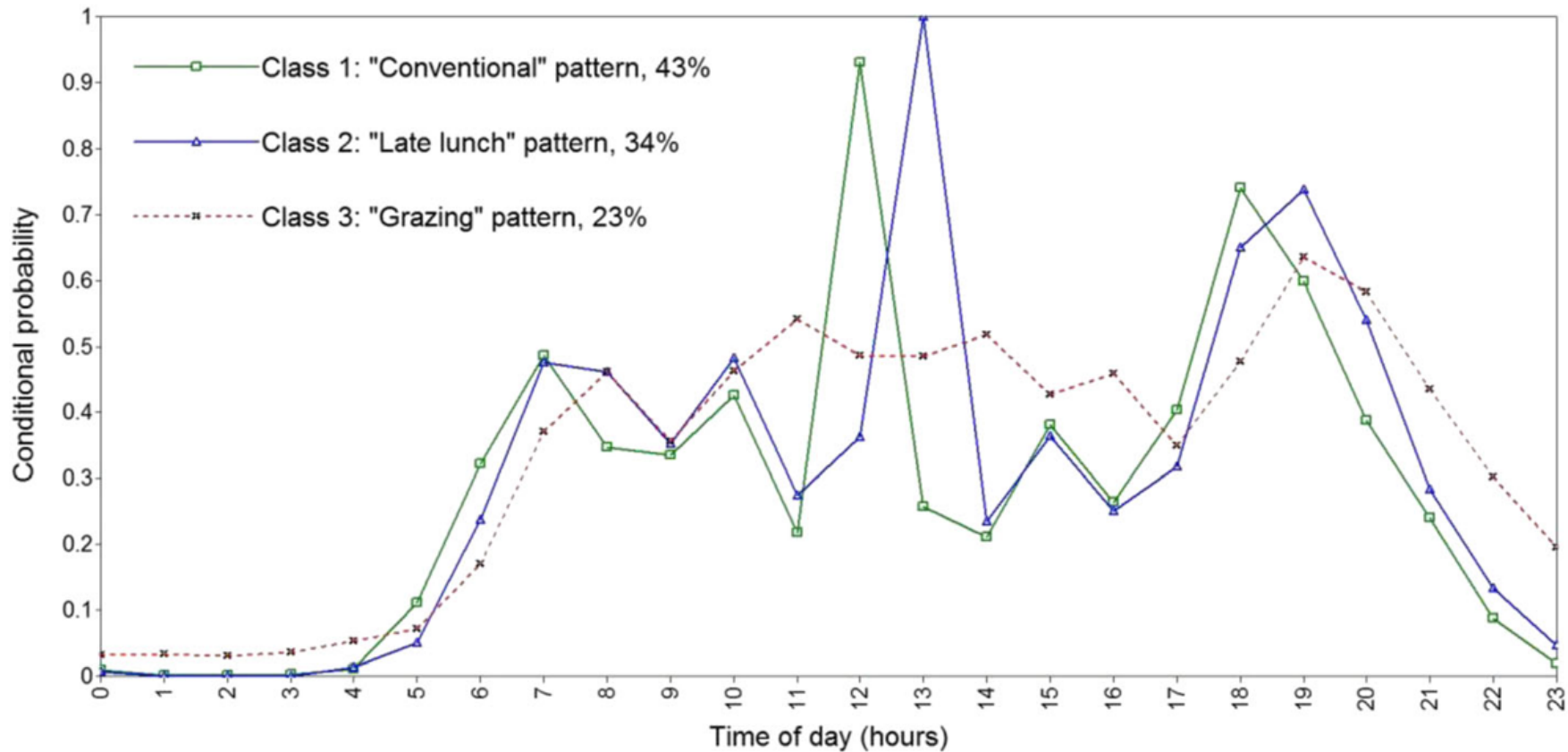
the UK NDNS RP
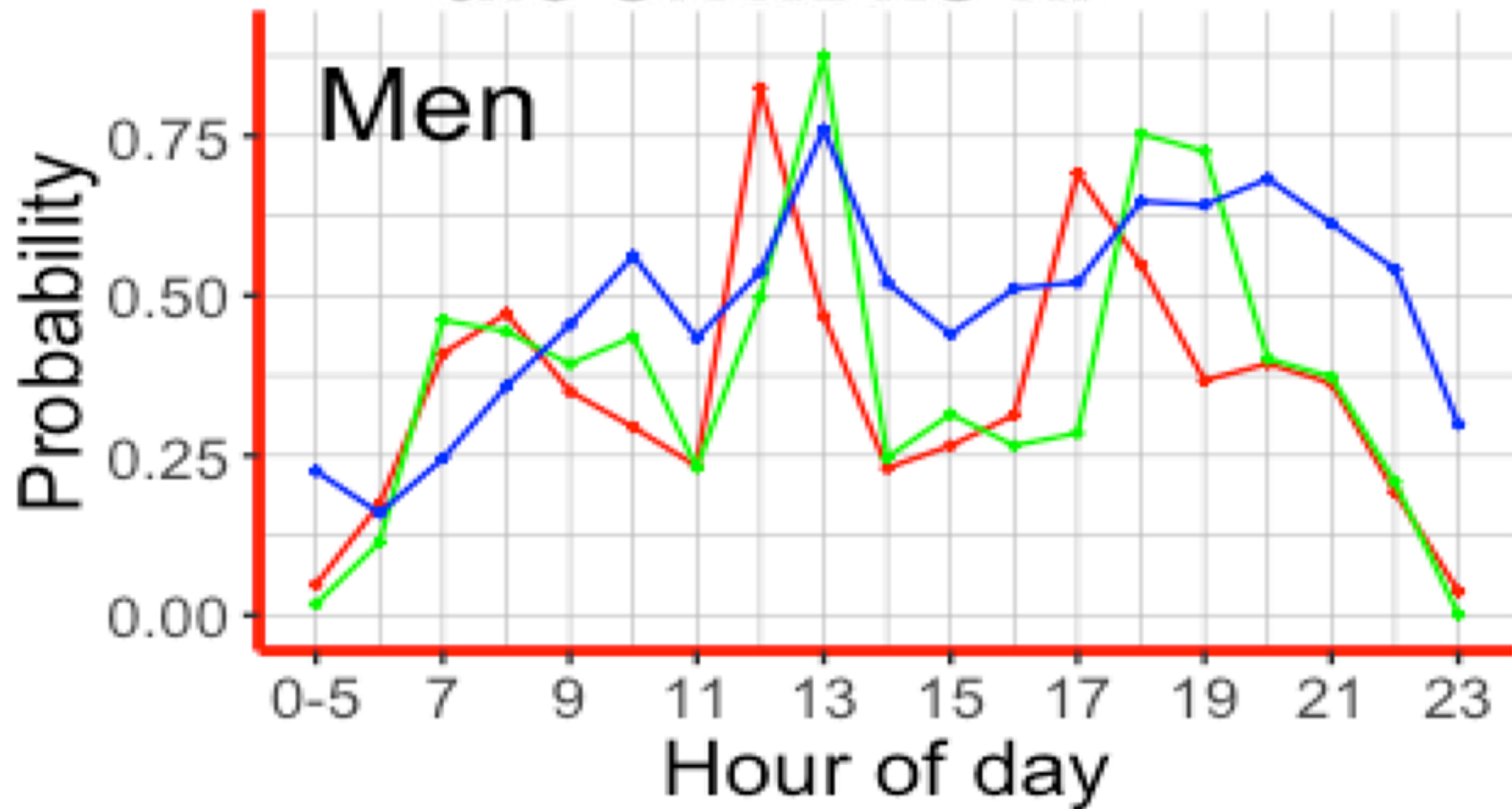
Objectives

- Investigate the timing of eating within the day and specific nutrients -- carbohydrates.

- Potentially we will also look at the temporal patterns of carbohydrates quality, more specifically intrinsic milk sugar, extrinsic milk sugar, starch and non-starch polysaccharide.

- Additionally, depending on the findings of preceding analysis, the association between carbohydrates eating patterns and diabetes and/or obesity will be explored.

Methods (1) -- data

- The NDNS RP is an ongoing programme funded by the UK government on the purpose of surveillance of the food consumption, nutrient intake, and nutritional status of the general UK population.

- Data can be downloaded from the UK data service

- Target population for this project: adults, age range 19-64 years (sample size: 3662).

  - Year 1-4: 1126 men and 1571 women
  - Year 5-6: 373 men and 592 women

- Collection of dietary data: the four-day food diary.

Day *Thurs*		Date *31st March*		
Time	**Where?** **With Whom?** **TV on?** **At table?**	**Food/Drink description & preparation**	**Brand Name**	**Portion size or quantity <u>eaten</u>**
		6am to 9am		
6.30 am	Kitchen Alone No TV Standing	Filter coffee, decaffeinated milk (fresh, semi-skimmed) Sugar white	Douwe Egberts Silverspoon	Mug A little 1 level tsp
7.30 am	Kitchen Partner TV on At table	Filter coffee with milk and sugar Cornflakes Milk (fresh, semi-skimmed) Toast, granary medium sliced Light spread Marmalade	As above Tesco's own Hovis Flora Hartleys	As above 1b drowned 1 slice med spread 1 heaped tsp
		9am to 12 noon		
10.15 am	Office desk Alone	Instant coffee, not decaffeinated Milk (fresh, whole) Sugar brown	Kenco	Mug A little 1 level tsp
11 am	Office desk Alone	Digestive biscuit – chocolate coated on one side	McVities	2

Time	Where? With Whom? TV on? At table?	Food/Drink description & preparation	Brand Name	Portion size or quantity eaten
5pm to 8pm				
6.30 pm	Pub Partner	Gin Tonic water diet Lager Salted peanuts	Gordon's Schweppes Draught KP	Single measure 1/2 small glass 1 pint 1 handful
8 pm	Dining room Family No TV At table	Spaghetti, wholemeal Bolognese sauce (see recipe) Courgettes (fried in butter) Tinned peaches in juice (juice drained) Single cream UHT Orange squash No Added Sugar	Tesco's own Prince's Sainsbury's own	3b 6 tablespoons 4 tablespoons 3 halves 1 tablespoon 200ml glass, 1 part squash, 3 parts tap water
8pm to 10pm				
9 pm	Sitting room Alone TV on Not at table	Grapes, green, seedless Chocolates, chocolate creams Potato crisps, Prawn Cocktail	 Bendicks Walkers	15 2 25g bag (from multipack)
10pm to 6am				
10.30 pm	Bed room Partner No TV Not at table	Camomile tea (no milk or sugar)	Twinings	1 mug

Was the amount of **food** that you had today about what you usually have, less than usual, or more than usual?

Yes, usual ☑   No, **less** than usual ☐   No, **more** than usual ☐

Please tell us why you had less than usual	*Please tell us why you had more than usual*

Was the amount you had to **drink** today, including water, tea, coffee and soft drinks [and alcohol], about what you usually have, less than usual, or more than usual?

Yes, usual ☐   No, **less** than usual ☐   No, **more** than usual ☑

Please tell us why you had less than usual	*Please tell us why you had more than usual*
	Went to pub after work

Methods (2) -- analysis

- Latent Class Analysis (CLA): to separate people into several eating pattern groups and also to calculate the probability of an Eating Occasion (EO) occurring for each class for every hour of the day.

- For every hour of the day whether an EO had occurred need to be calculated individually.

- The definition of an eating occasion specifically for carbohydrates need to be defined (total energy intake may also need to be adjusted).

- Multiple days (3-4 days) of dietary intake records need to be combined (average).

- Association between the eating pattern groups defined by CLA and obesity/diabetes will be explored through logistic regression models.

Thanks!

Slides address: wangcc.me/NDNS5slides