



Body Mass Index Trajectories from Adolescence to Early Adulthood

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Fás Aníos in Éirinn
Growing Up in Ireland

RESEARCH QUESTIONS

1. What are the distinct BMI trajectories for Irish youths?

2. What factors predict BMI trajectory class?

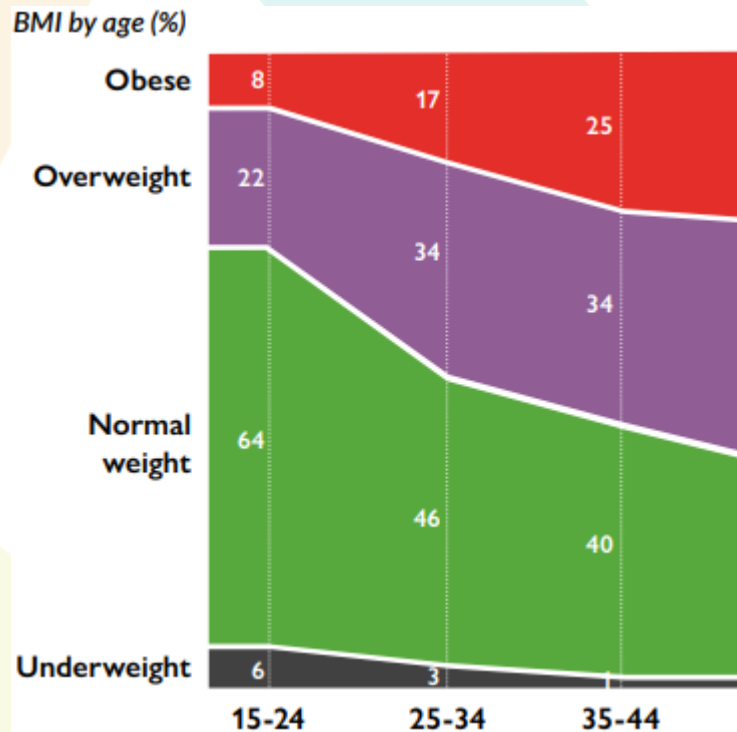
3. To what extent does BMI trajectory class predict subsequent chronic illness?

IMPORTANCE OF A HEALTHY WEIGHT

- Childhood obesity prevalence has quadrupled in the last 50yrs (WHO, 2016)
 - Levels projected to increase
- Contributes substantially to the global burden of disease
 - Increased risk of chronic diseases (diabetes, heart disease, hypertension & disability)
- Negative **impact accumulates** over an extended period
 - Sustained, prolonged exposure to obesity leads to health risks
- Important to identify risk early in life and enact interventions
 - Identifying key socio-demographic characteristics
 - Gauge where/when key leverage points lie

WEIGHT TRAJECTORIES ACROSS THE LIFE COURSE

- Overweight/obesity **risk increases** over time
- Individual level: obesity tends to **track** across the life course
 - Obese children are at increased risk of becoming obese adults
- BUT there is **heterogeneity** in individual BMI trajectories
 - Don't all have the same long-term profile
 - Some people lose weight, others stay same



Ref: Healthy Ireland Survey 2022

IDENTIFYING TRAJECTORY CLASSES

Latent Growth Modelling

- Longitudinal techniques used to identify multiple growth trajectories
 - Assign people to distinct latent trajectory classes
- Growth Mixture Modelling:
 - Allows for random intercepts and slopes
 - Estimate models with increasing number of classes, find best fit
- Class membership can act as an **outcome variables and a predictor**
 - What are predictors of BMI class membership?
 - What outcomes does BMI class membership predict?

METHODS

Study Sample

- GUI's Cohort '98 ($n \approx 8,500$) recruited at 9yrs
- Nationally representative sample
- Revisited at ages 13, 17, 20 and 25 years ($n=2,594$)

Data Collection

- Parent and child interviewed face-to-face*
- Height and weight measured by a trained interviewer

Software

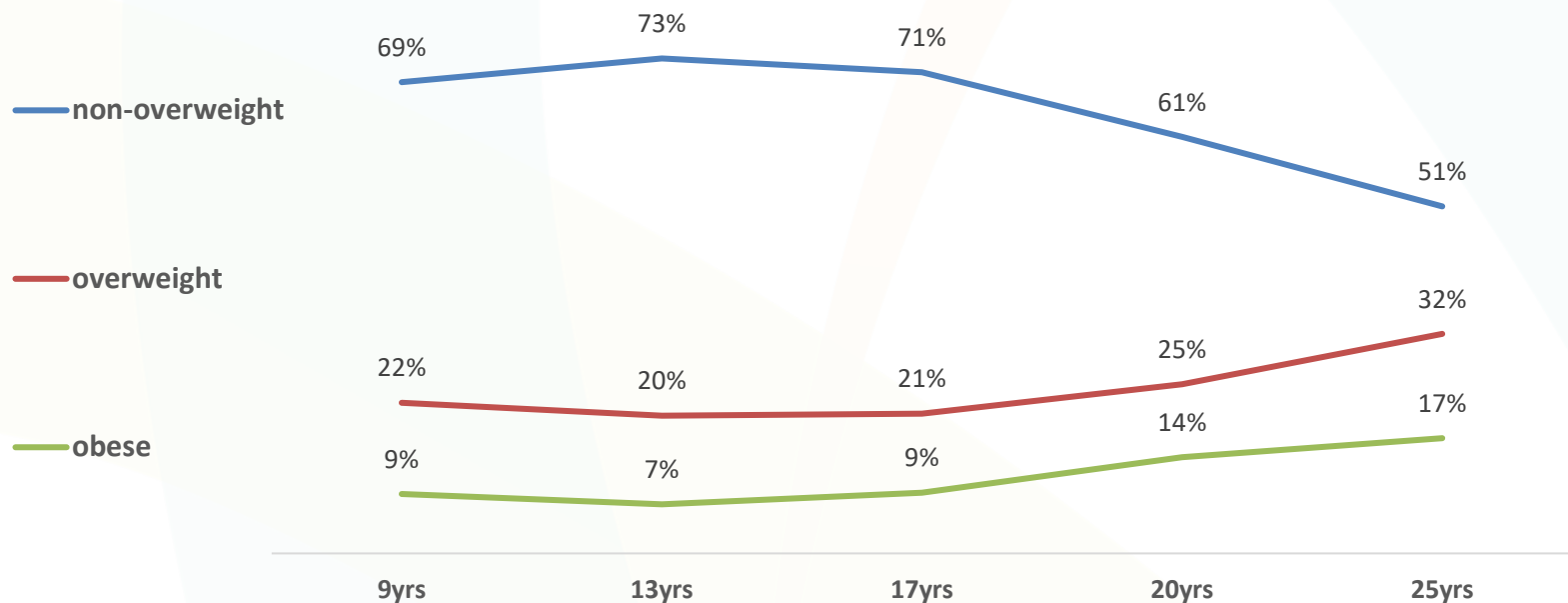
- **GMM:** R package '*lcmm*'
- **Subsequent analysis:** SPSS, including multinomial logistic regression



FINDINGS...

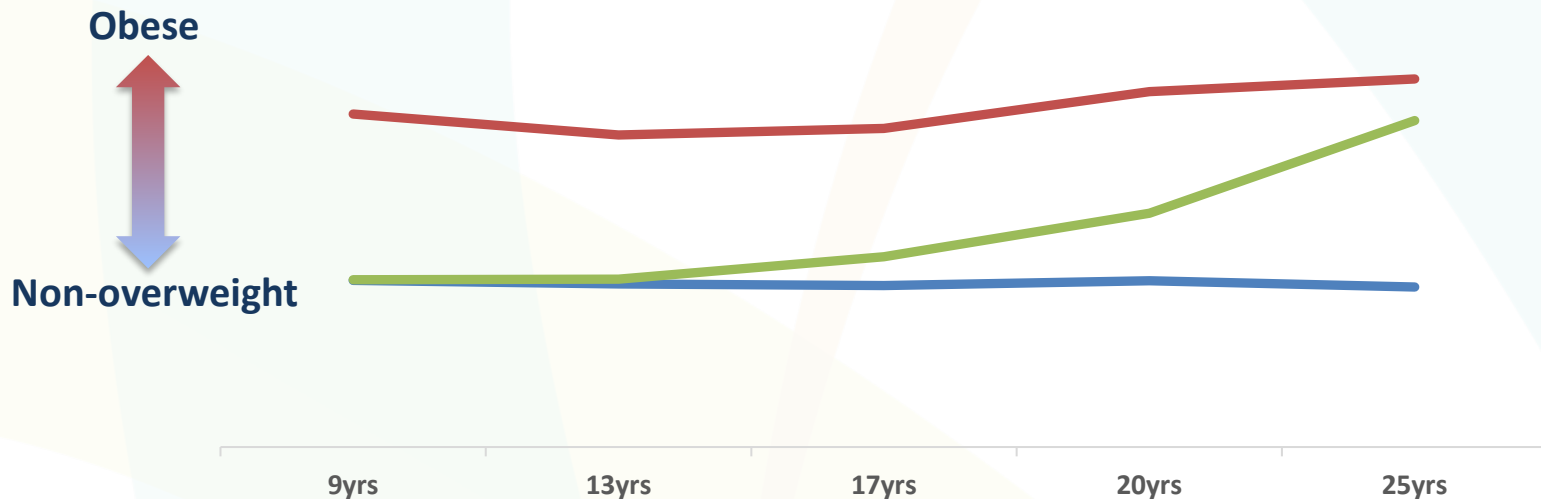
BMI Trajectory - Overall

Fig.1: Overall trends in BMI Status



BMI Trajectory - Latent Classes (Q.1)

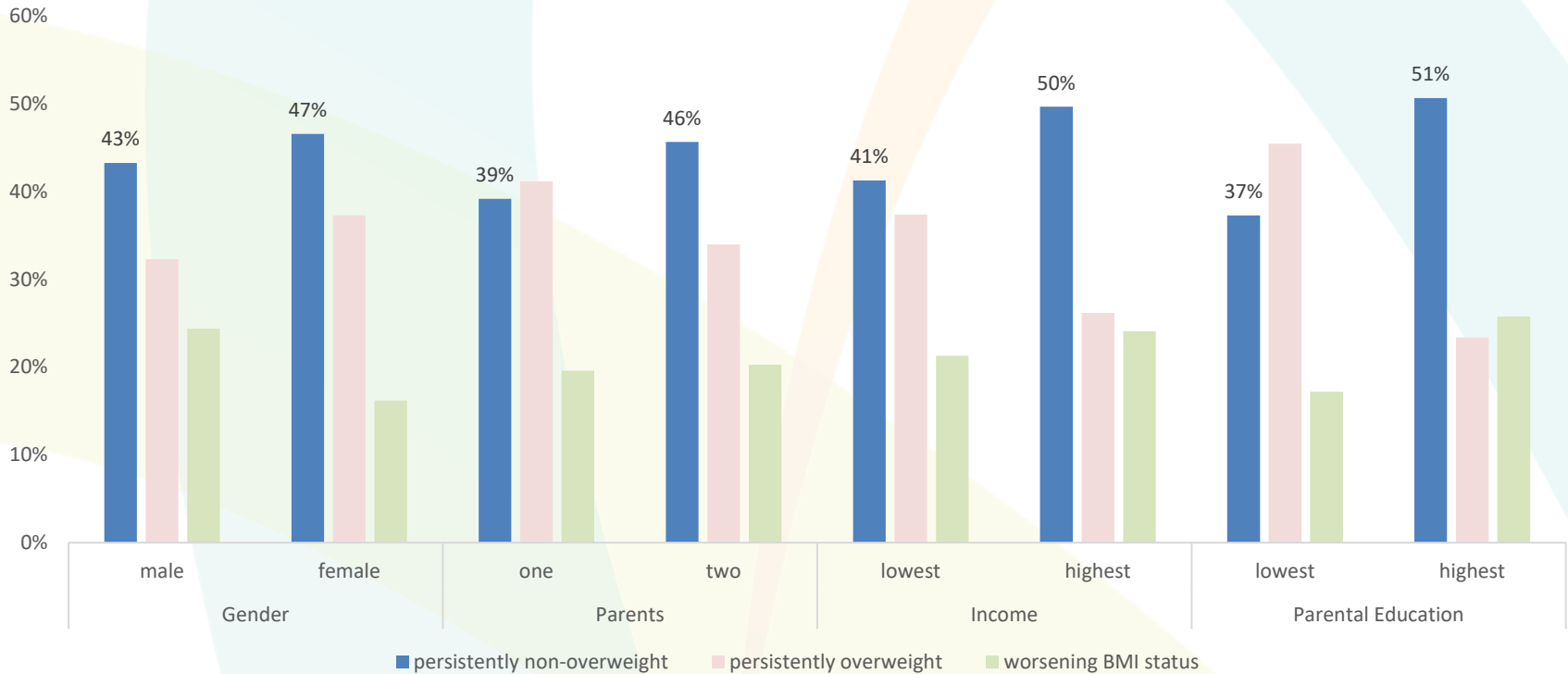
Fig.2: Three-Class Model of BMI Trajectory from 9 to 25yrs



- CLASS 1: *persistently non-overweight* 45%
- CLASS 2: *persistently overweight* 35%
- CLASS 3: *worsening BMI status* 20%

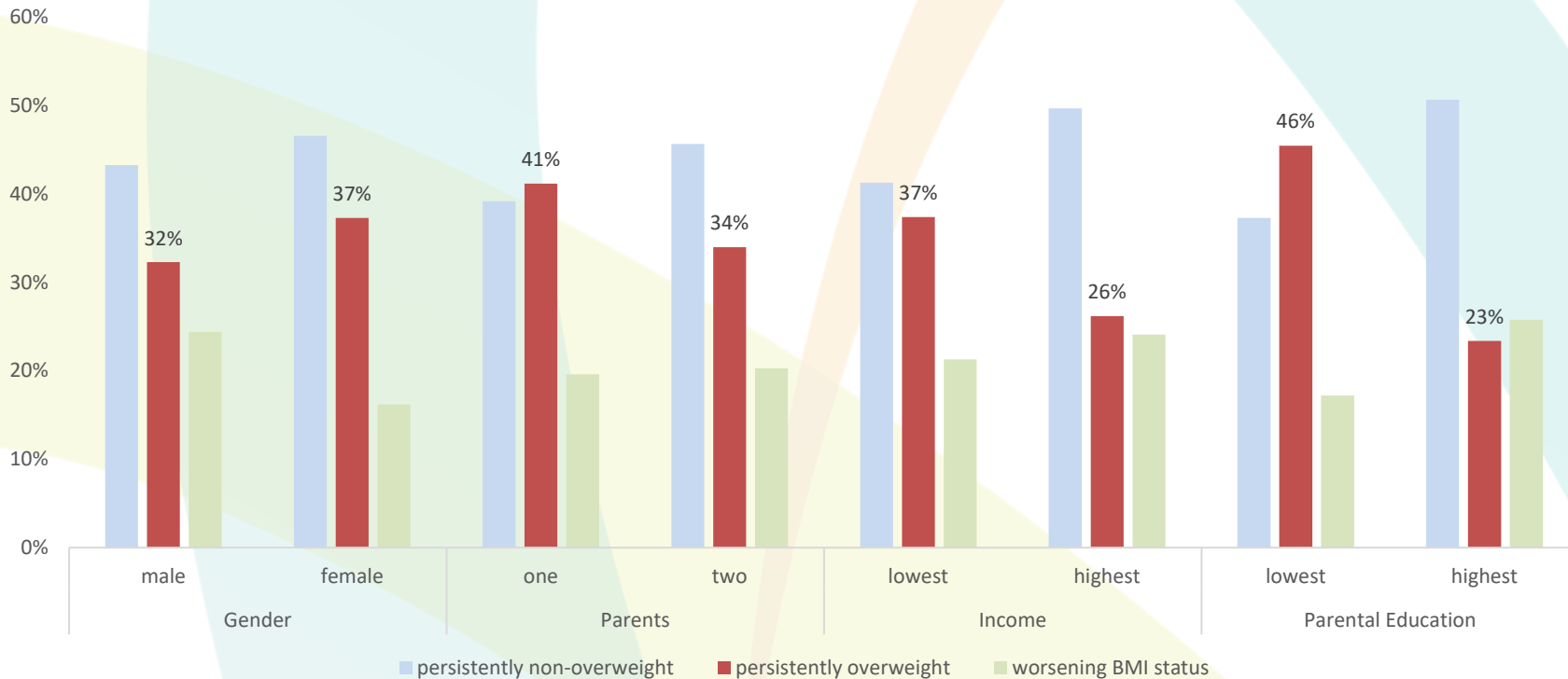
Characteristics of BMI Trajectory Class Membership (Q.2)

Fig 3 – BMI Trajectory by Socio-demographic Indicators



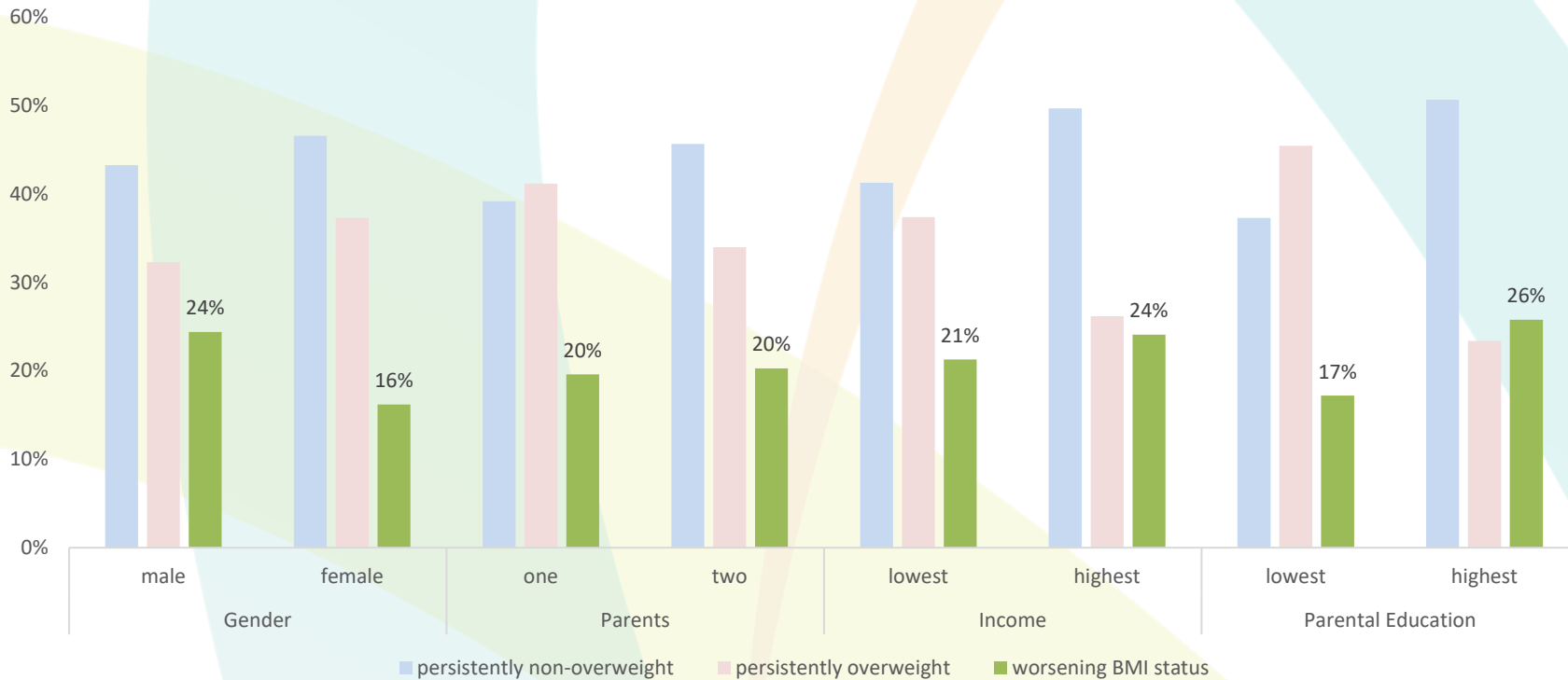
Characteristics of BMI Trajectory Class Membership

Fig 3 – BMI Trajectory by Socio-demographic Indicators



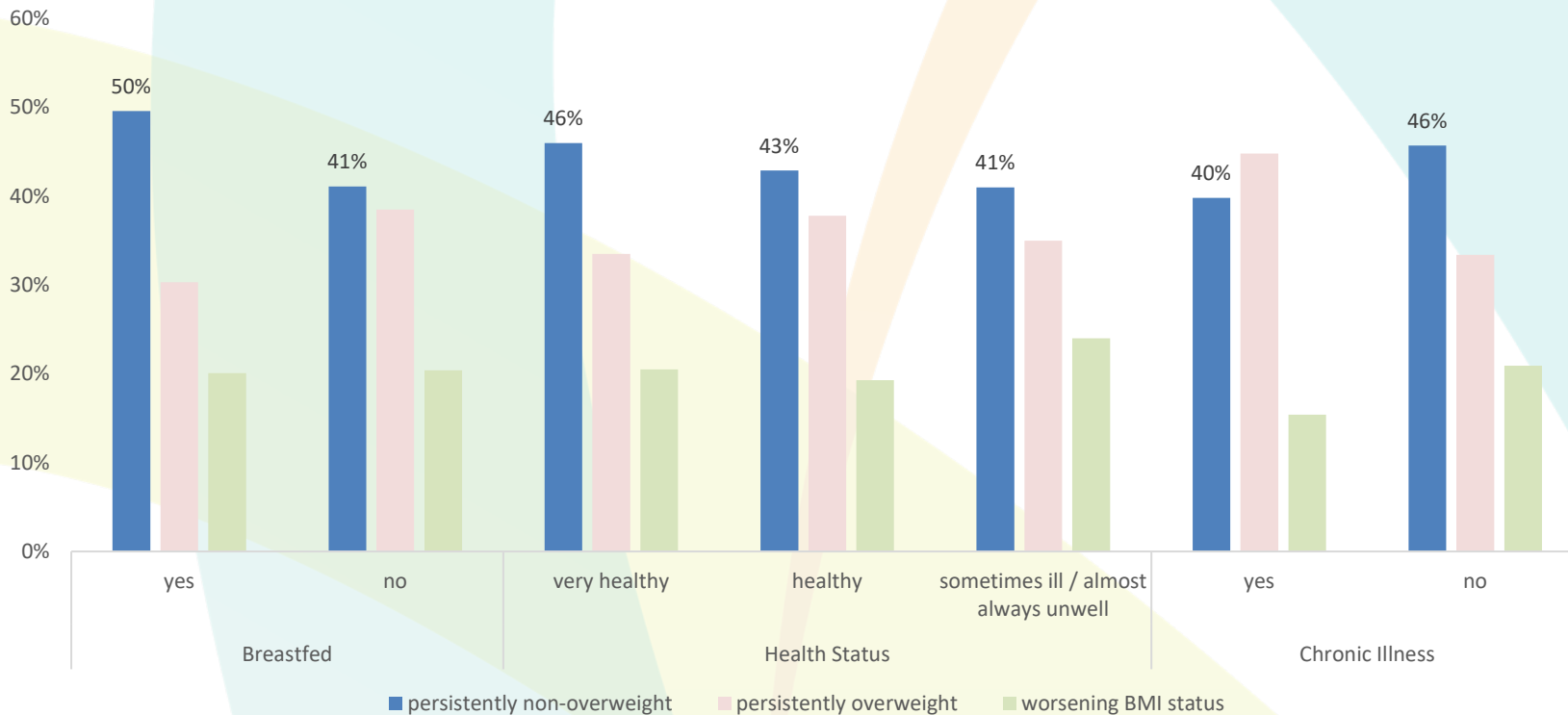
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Fig 3 – BMI Trajectory by Socio-demographic Indicators



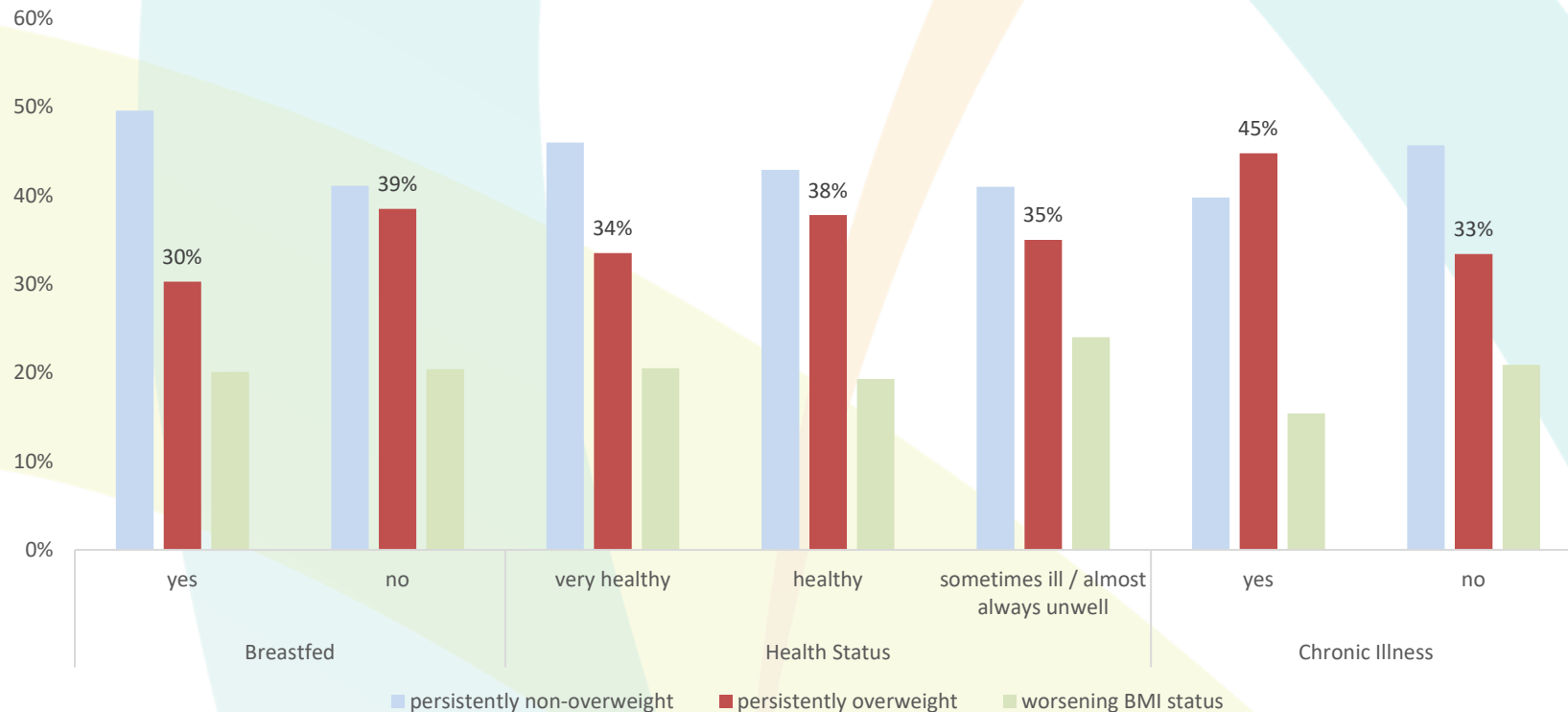
Characteristics of BMI Trajectory Class Membership

Fig 4 – BMI Trajectory by Childhood Health Indicators



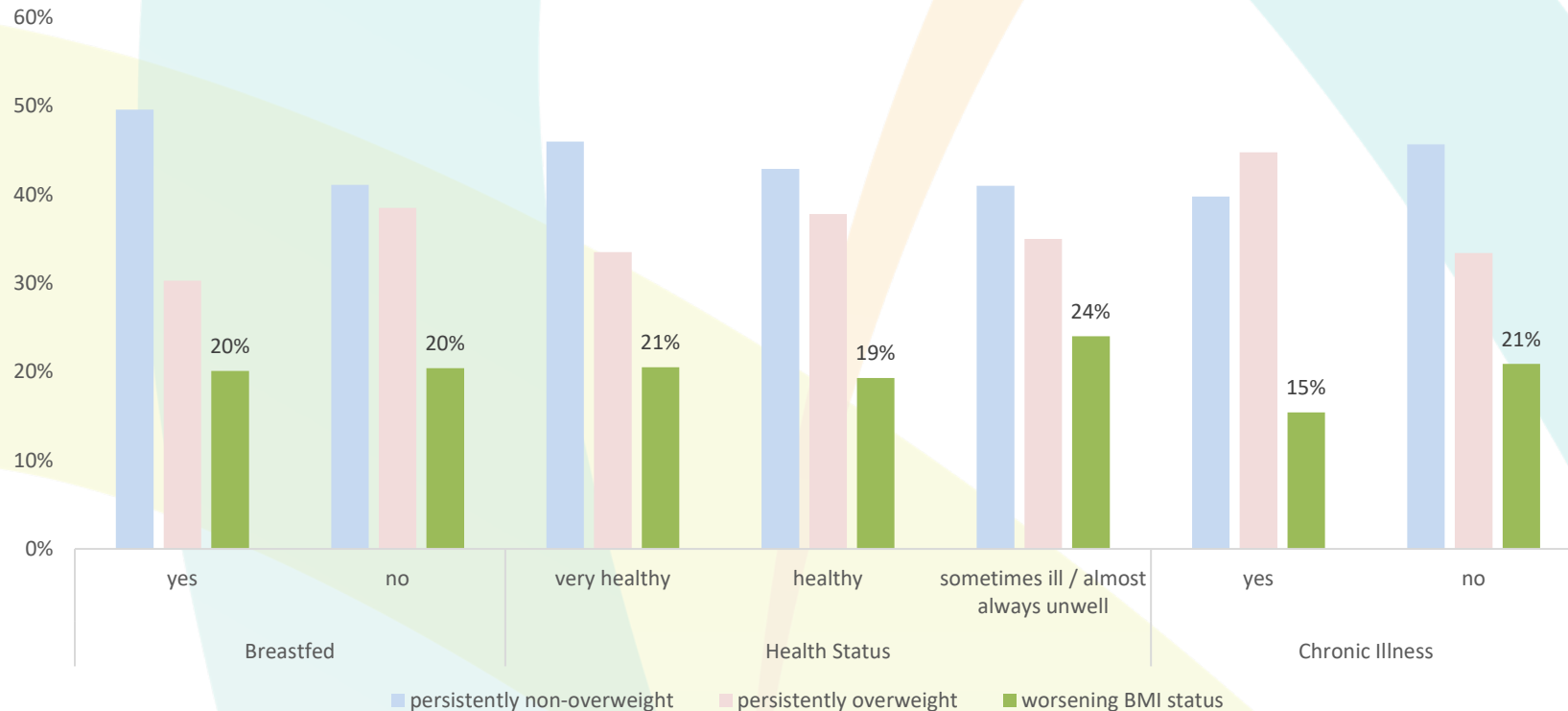
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Fig 4 – BMI Trajectory by Childhood Health Indicators



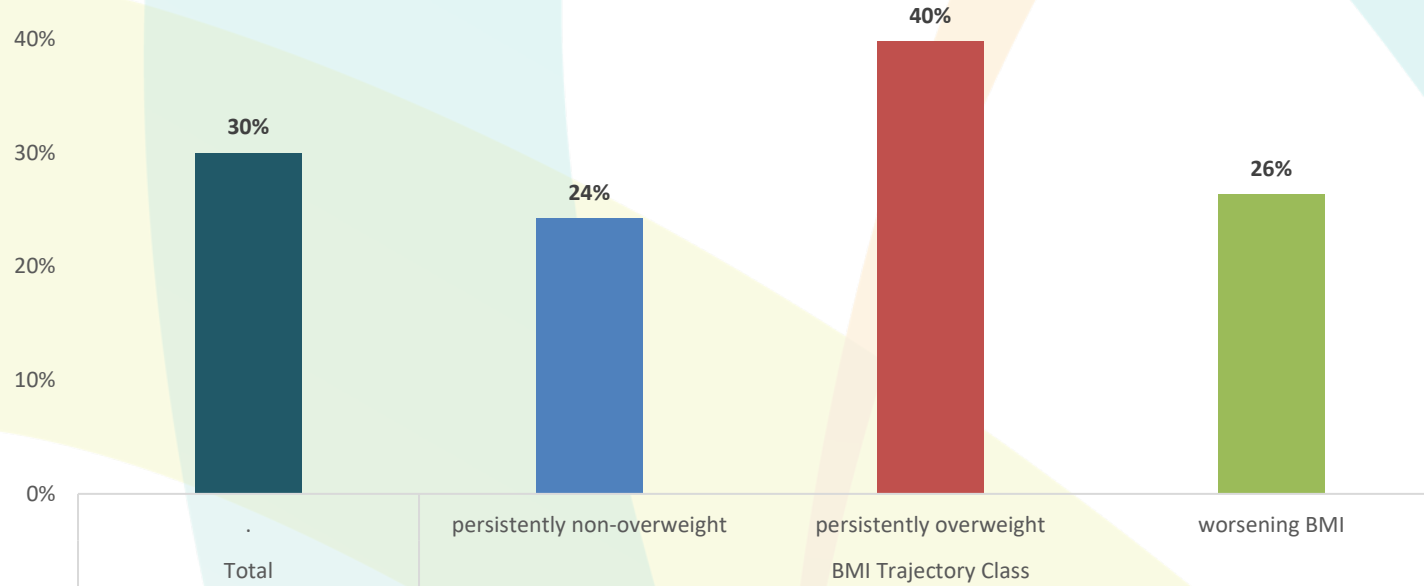
Characteristics of BMI Trajectory Class Membership

Fig 4 – BMI Trajectory by Childhood Health Indicators



BMI Trajectory Class as a Predictor of Adult Chronic Illness (Q.3)

Fig 5 – Adult Chronic Illness according to BMI Trajectory Class



BMI Trajectory Class as a Predictor of Adult Chronic Illness

Fig 6 – Regression: Factors that Predict Chronic Illness in Adulthood

		UNADJUSTED		FULLY ADJUSTED	
		Sig.	Exp(B)	Sig.	Exp(B)
BMI CLASS:	Worsening BMI Status	0.976	1.003	0.356	1.108
	Persistently Overweight	0.000	1.488	0.000	1.414
Gender:	Male	0.000	0.625	0.000	0.623
Family Type:	Two-parent	0.000	0.543	0.001	0.600
Family Income:	Lowest	0.003	1.526	0.290	1.193
Parental Educ:	Lowest	0.025	1.308	0.463	0.898
Past Chronic Illness		0.000	2.212	0.000	2.368

BMI Trajectory Class as a Predictor of Adult Chronic Illness

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SUMMARY

- We observe overall trend of BMI levels disimproving over time
 - A distinct class wherein BMI status is worsening
- BUT **persistently overweight/obese group at most risk** of chronic illness
 - Characterised as socio-economically disadvantaged
- Further emphasises the need to **address issue as early as possible**, social inequality in health outcomes

Future research can look at:

- Nature of chronic illness
- This cohort as they get older; increased risk of cardiometabolic disease
- Younger GUI cohort to identify onset of issue

Thank You

- Participant young people and their families
- Colleagues at DCDE & CSO

Happy to take questions, or for more info...

- eoin.mcnamara@dcde.gov.ie
- www.growingup.gov.ie

FINDINGS:

Regression: Persistently Overweight

		UNADJUSTED		FULLY ADJUSTED	
		Sig.	Exp(B)	Sig.	Exp(B)
Gender: Male		0.000	0.711	0.000	0.731
Partner: Yes		0.000	0.749	0.009	0.797
Income:	Lowest	0.000	1.469	0.865	1.016
	Second	0.000	1.405	0.620	1.042
	Third	0.001	1.274	0.649	1.036
	Fourth	0.017	1.185	0.546	1.045
Parent Educ:	Jun. Cert	0.000	1.992	0.000	1.679
	Leaving cert	0.000	1.531	0.000	1.342
	Non-degree	0.000	1.365	0.001	1.280
Chronic (W1)		0.000	1.438	0.000	1.398

Regression: Worsening BMI Status

		UNADJUSTED		FULLY ADJUSTED	
		Sig.	Exp(B)	Sig.	Exp(B)
Gender: Male		0.000	1.437	0.000	1.441
Partner: Yes		0.000	1.522	0.095	1.258
Income: Lowest	Lowest	0.001	0.673	0.176	0.827
	Second	0.010	0.757	0.146	0.843
	Third	0.146	0.864	0.355	0.907
	Fourth	0.991	0.999	0.785	1.027
Junior cert	Junior cert	0.000	0.672	0.028	0.758
	Leaving cert	0.065	0.852	0.250	0.894
	Non-degree	0.688	0.964	0.684	0.962
Chronic (W1)		0.731	0.962		

FINDINGS:

Fig 5 – BMI Trajectory Class as a Predictor of Adult Health Indicators

		UNADJUSTED	
		Sig.	Exp(B)
CHRONIC ILLNESS:	Worsening BMI Status	0.976	1.003
	Persistently Overweight	0.000	1.488
RESPIRATORY ISSUES:	Worsening BMI Status	0.014	1.773
	Persistently Overweight	0.000	2.707
MULTIPLE ISSUES:	Worsening BMI Status	0.019	1.417
	Persistently Overweight	0.000	1.816