Identifying Distinct Physical Activity Trajectories from Adolescence to Adulthood and Subsequent Health Risks

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Fás Aníos in Éirinn
Growing Up in Ireland

RESEARCH QUESTIONS

1. What are the distinct physical activity (PA) trajectories for Irish youths?

2. What characteristics are associated with PA trajectory?

3. To what extent does PA trajectory predict subsequent health issues?

IMPORTANCE OF PHYSICAL ACTIVITY

- **Childhood inactivity** is a long-standing health issue
  - 80% globally don't meet PA guidelines
  - Little to no improvement in two decades

- PA **helps prevent, reduce risk or manage** NCD
  - CVD, diabetes, cancers, obesity

- Negative **impact accumulates** over time
  - Sustained, prolonged exposure leads to risks

- Highlights the importance of **PA trajectories**
  - Key leverage points

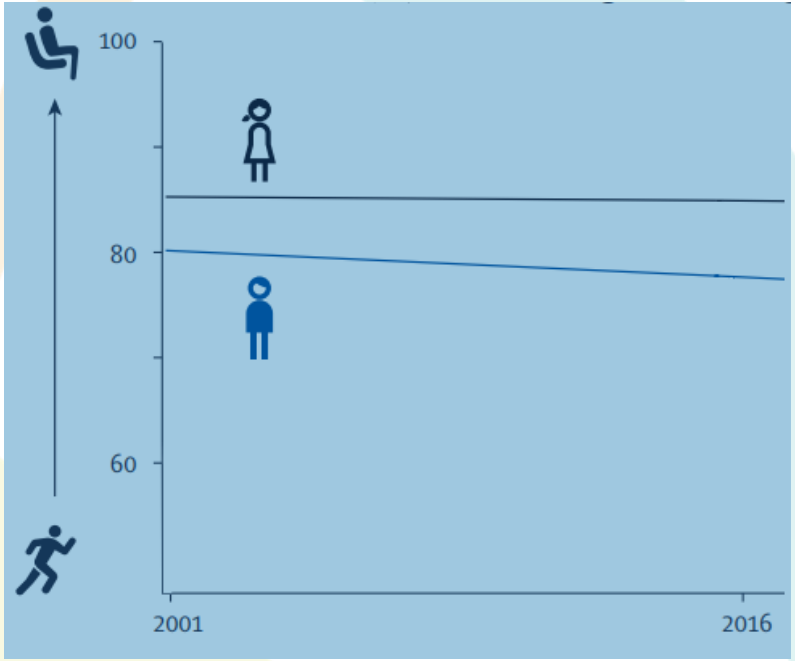


Fig. Global prevalence of inactive children 2001-2016 *(Guthold et al., 2020)*

PA TRAJECTORIES ACROSS THE LIFE COURSE

- **Population-level:**
  - Physical inactivity **risk increases** with age
  - People become less active as they get older
- **Individual-level:**
  - Physical activity tends to **track** across life course
  - Inactive child at increased risk of being inactive adult
- There is **heterogeneity** in individual PA trajectories
  - Don't all have the same long-term PA profile

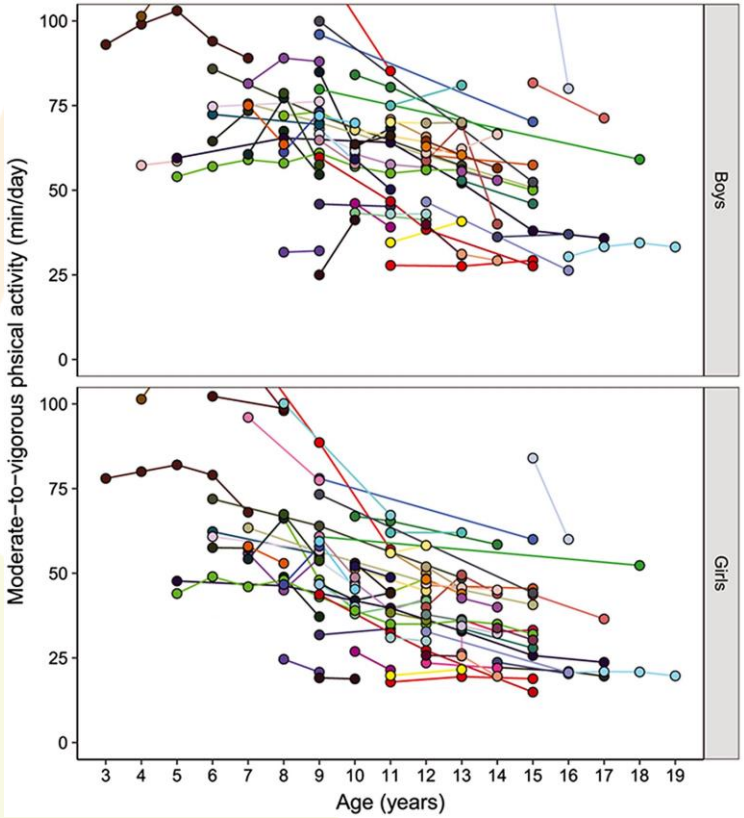


Fig. PA decline across 52 longitudinal studies *(Farooq et al., 2020)*

IDENTIFYING TRAJECTORY CLASSES

Growth Mixture Modelling:

- **Estimate** models with increasing number of trajectories
- **Identify** model with multiple unobserved trajectories
- **Assigns** each participant to one of these distinct trajectory classes

OUTPUT: PA Trajectory Class – can be used in two ways…

- *OUTCOME VARIABLE - what factors predict PA trajectory class?*
- *PREDICTOR VARIABLE - what outcomes does PA trajectory class predict?*

METHODS

Study Sample

- Growing Up in Ireland Cohort '98 recruited at 9yrs (n ≈ 8,500)
  - Revisited at ages 13, 17, 20 and 25 years (n=2,594)
  - Nationally representative sample

Data Collection

- Parent and child interviewed face-to-face*
- PA: child asked about frequency of moderate and vigorous activity per week
  - Answers used to calculate MET.mins/wk

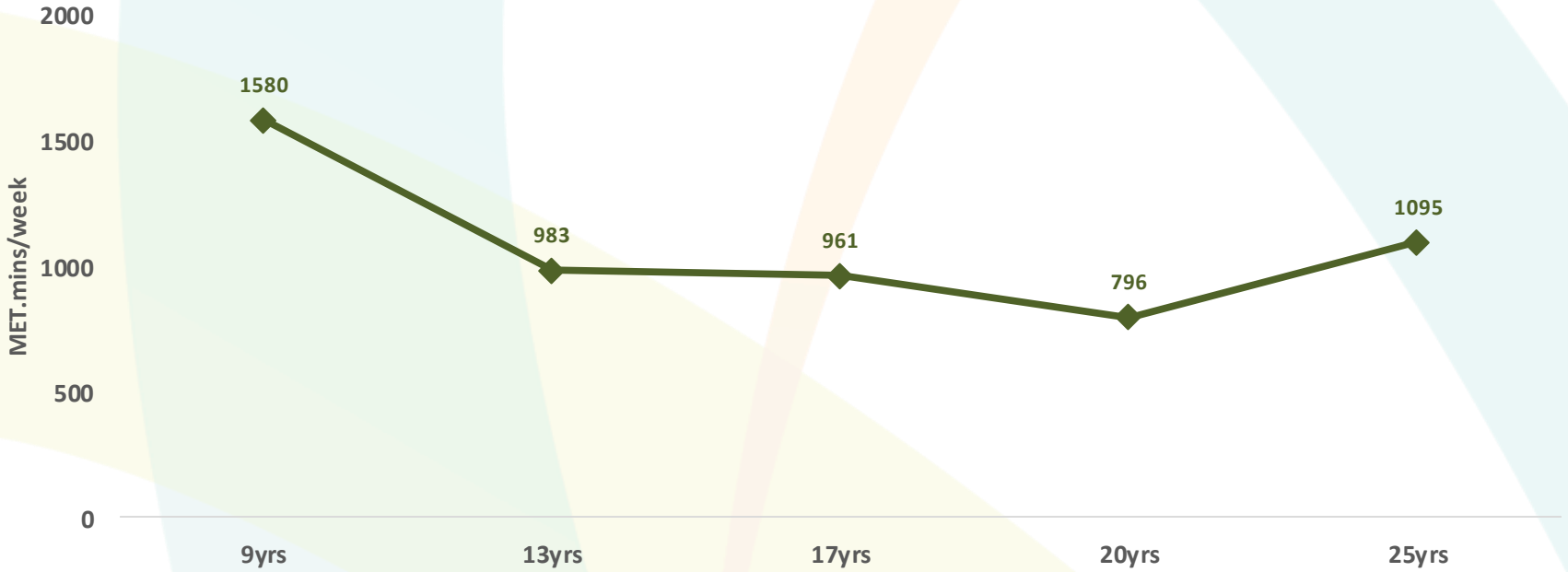
Analysis

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

FINDINGS…

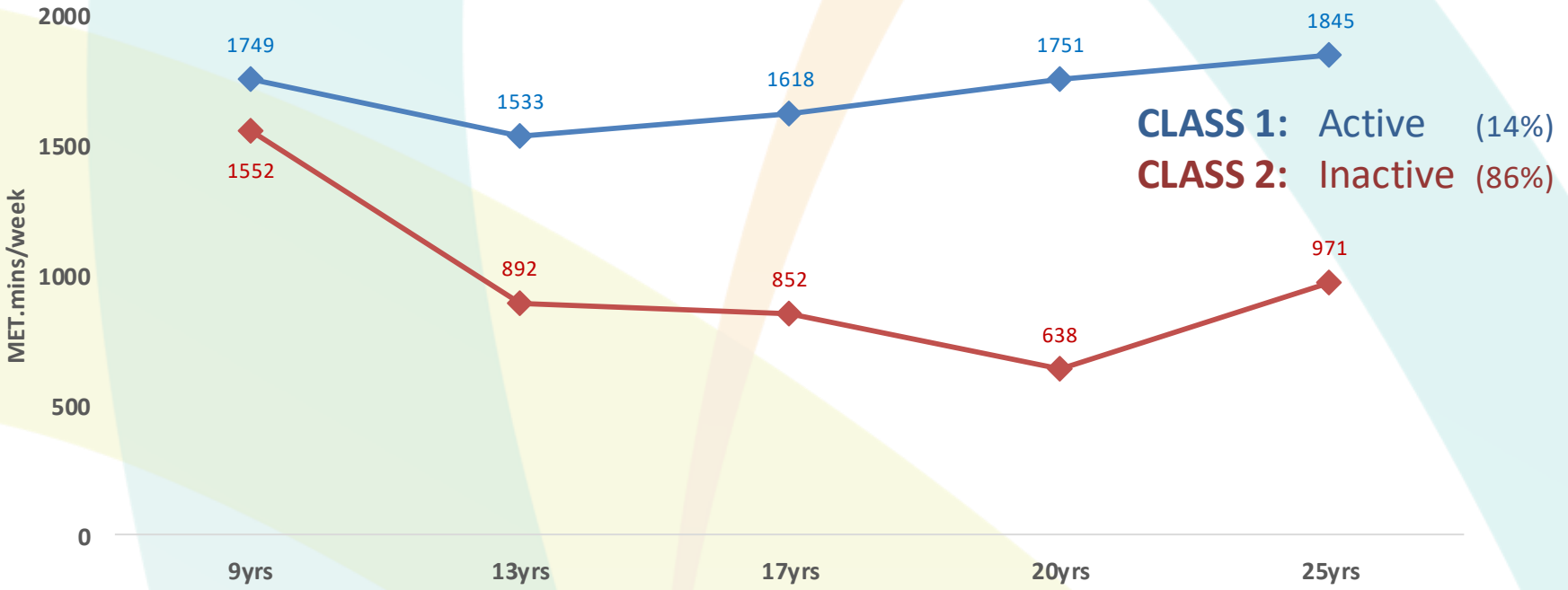
PA Trajectory - Overall

Fig.1: Overall trends in PA from 9-25yrs



PA Trajectory - Latent Classes (Q.1)

Fig.2: Two-class Model of PA Trajectory from 9 to 25yrs



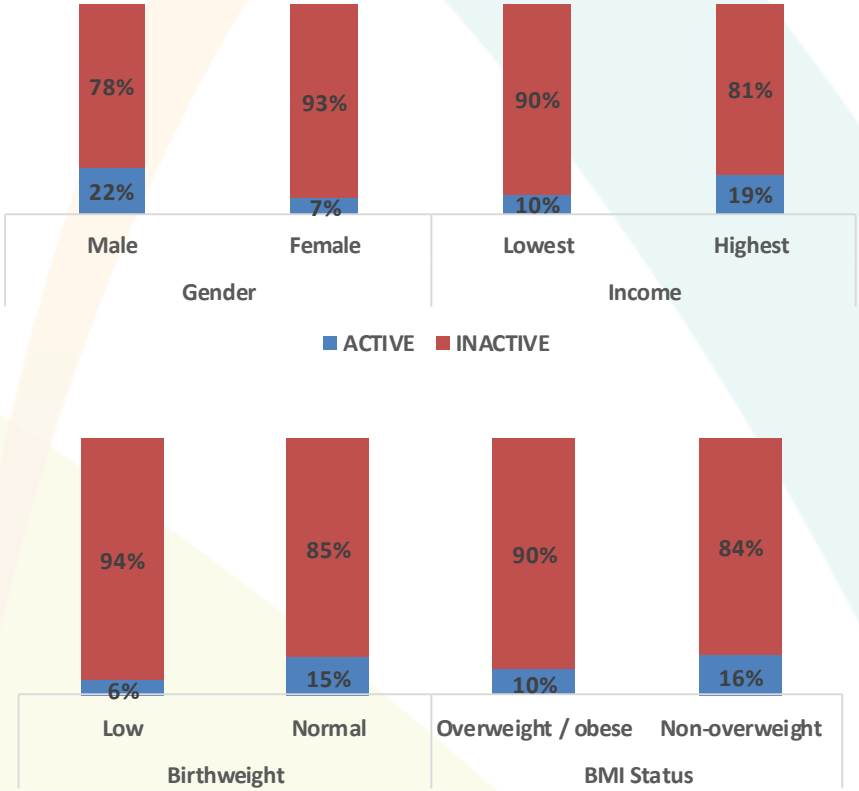
Characteristics of PA Trajectory Class Membership (Q.2)

Socio-demographic:

- ✓ Gender
- ✓ Family income
- ✓ Family social class
- ✓ Maternal education
- ⊗ Family structure

Health:

- ✓ BMI (9yr)
- ✓ General health (9yr)
- ✓ Breastfed
- ✓ Birthweight
- ✓ Maternal BMI
- ⊗ Chronic illness, paternal BMI



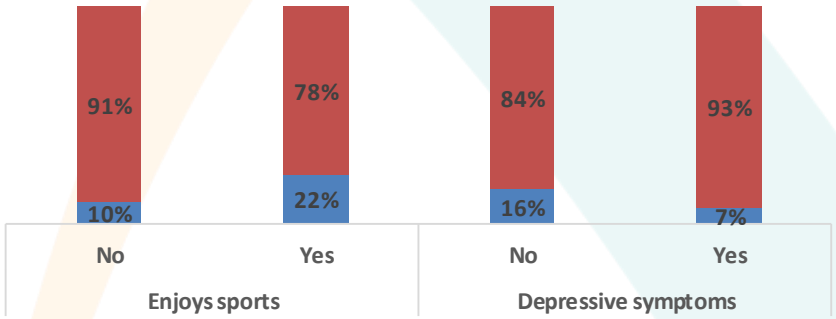
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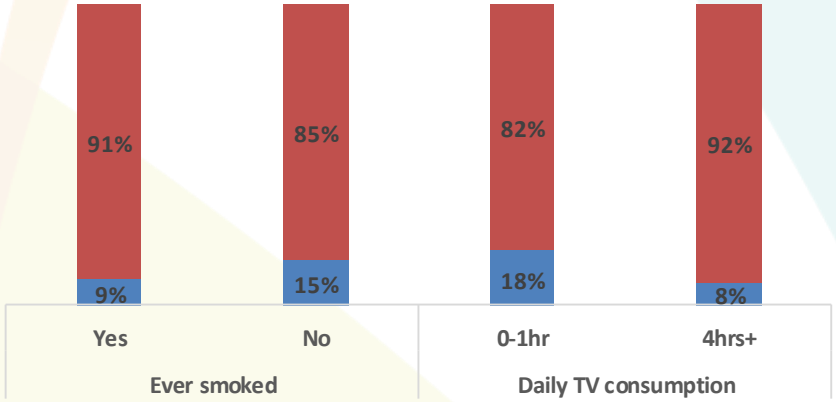
Psychosocial:

- ✓ Enjoys sport / exercise
- ✓ Enjoys sedentary activities (-)
- ✓ Depressive symptoms (-)

Behavioural:

- ✓ Plays sports, exercises
- ✓ Ever smoked (-)
- ✓ Excessive TV (-)
- ⊗ Ever drank





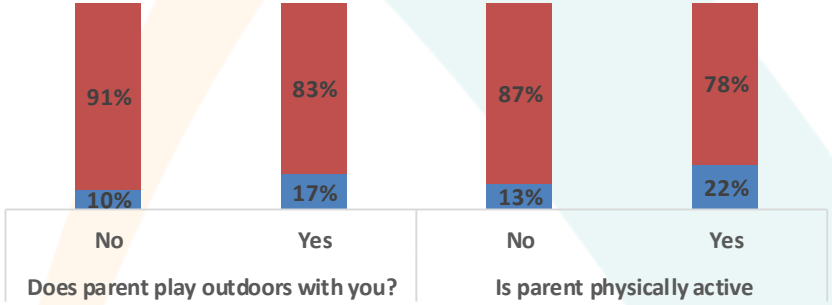
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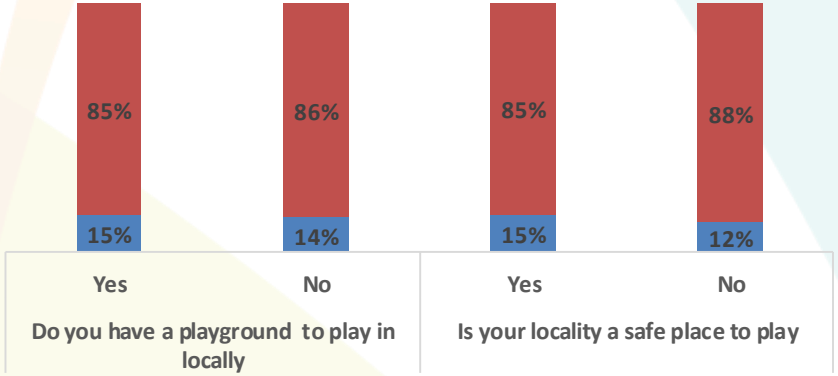
Social / Cultural:

- ✓ Parent active
- ✓ Active with parents

Environmental:

- ✓ Safe place to play
- ⊗ Access to green space
- ⊗ Access to playground
- ⊗ Excessive traffic
- ⊗ Commute type





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

Fig 6 – Regression: extent to which being 'Inactive' predicts health outcomes at 25yrs

	UNADJUSTED	
HEALTH ISSUE AT 25:	**Sig.**	**Odds Ratio**
- **Fair to Poor Health**	0.000	3.03
- **Chronic Illness**	0.000	1.78
- **Multiple Chronic Illnesses**	0.025	1.61
- **Persistent Overweight**	0.000	2.23
- **Hypertension (at 20)**	0.054	0.73

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

Fig 6 – Regression: extent to which being 'Inactive' predicts health outcomes at 25yrs

	UNADJUSTED		FULLY ADJUSTED	
HEALTH ISSUE AT 25:	Sig.	Odds Ratio	**Sig.**	**Odds Ratio**
- **Fair to Poor Health**	0.000	3.03	0.000	3.08
- **Chronic Illness**	0.000	1.78	0.001	1.63
- **Multiple Chronic Illnesses**	0.025	1.61	0.100	1.44
- **Persistent Overweight**	0.000	2.23	0.000	1.98
- **Hypertension (at 20)**	0.054	0.73	0.945	0.99

SUMMARY

Q1. Overall trend of PA levels decreasing over time

- One distinct class wherein PA remains high

Q2. Inactive group characterised as socio-economically disadvantaged

- Childhood health & parental factors also impactful, environment less so

Q3. Inactive group at increased risk for adult ill-health

- Further emphasises the need to address issue early

Future Research…

- Age 13 = key leverage point
- Age 25 = recovery
- This cohort as they get older; increased risk of cardiometabolic disease
- Younger GUI cohort to identify onset of issue

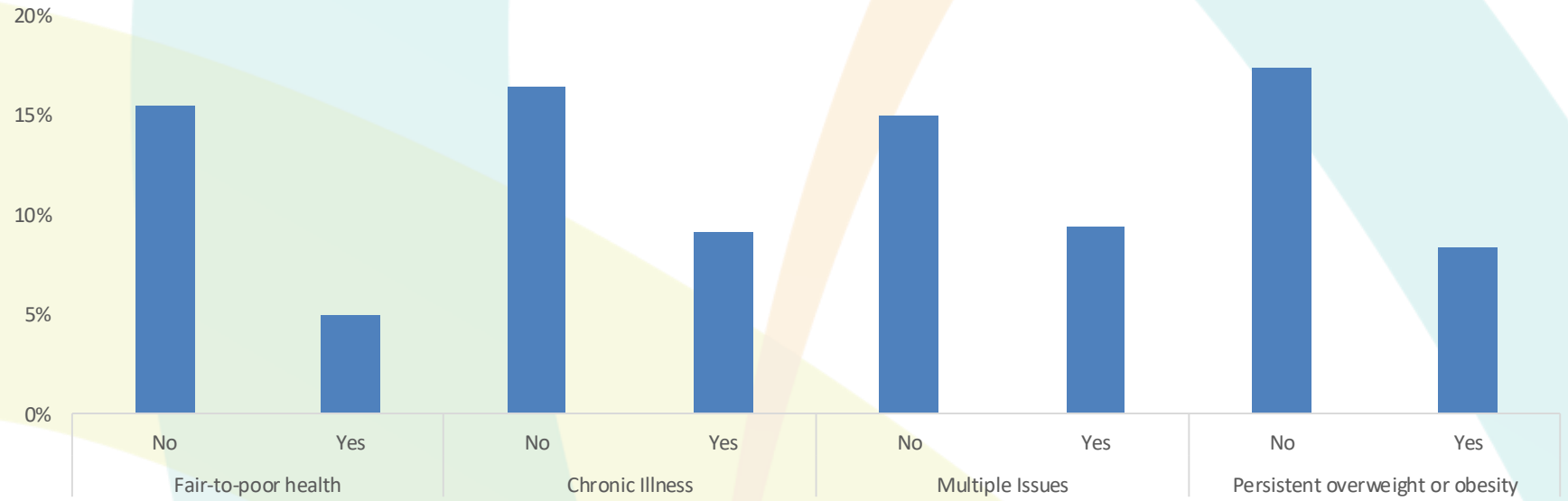
Thank You….

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

Questions….

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- www.growingup.gov.ie

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



PA Trajectory - Overall

Fig.1: Overall trends in physical activity

