# Infant growth trajectories and dyslipidemia in adolescence

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1. Background
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# Dyslipidemia in Children

# Cardiovascular disease and dyslipidemia

- Why is dyslipidemia important?
- A risk factor for cardiovascular disease
- contributes to the atherosclerotic process.
- Dyslipidemia affects xx proportion of the population with notable health disparities across racial/ethnic groups
  - Adverse lipid levels represent strong risk factors for mnay cardiovascular disease outcomes
  - Lipids are targets for intervention because they represent modifiable factors

# Disparities in Lipids

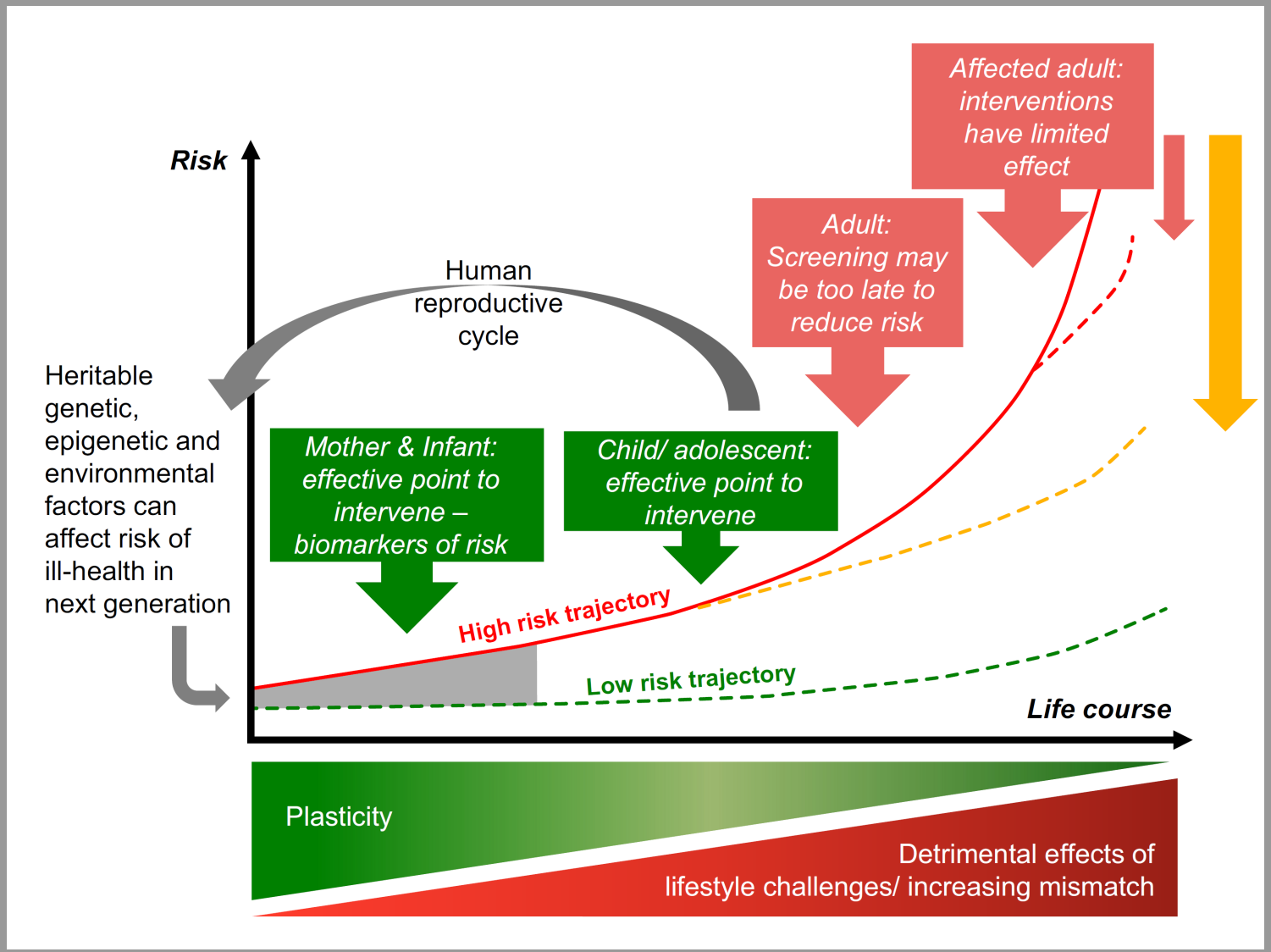
# Dyslipidemia can start in childhood

- How many have it in childhood?
- When you have it how likely are you to maintain dyslipidemia

# Early childhood determinants of chronic disesae

- Researchers have noted a wide range of chronic diseases linked to early life determinants.
  - Birthweight started as one widely noted early life determinant
  - Hypotheses have evolved and now include weight change over time in infancy: growth trajectories.

# Developmental Origins of Health and Disease[1] (DOoHAD)

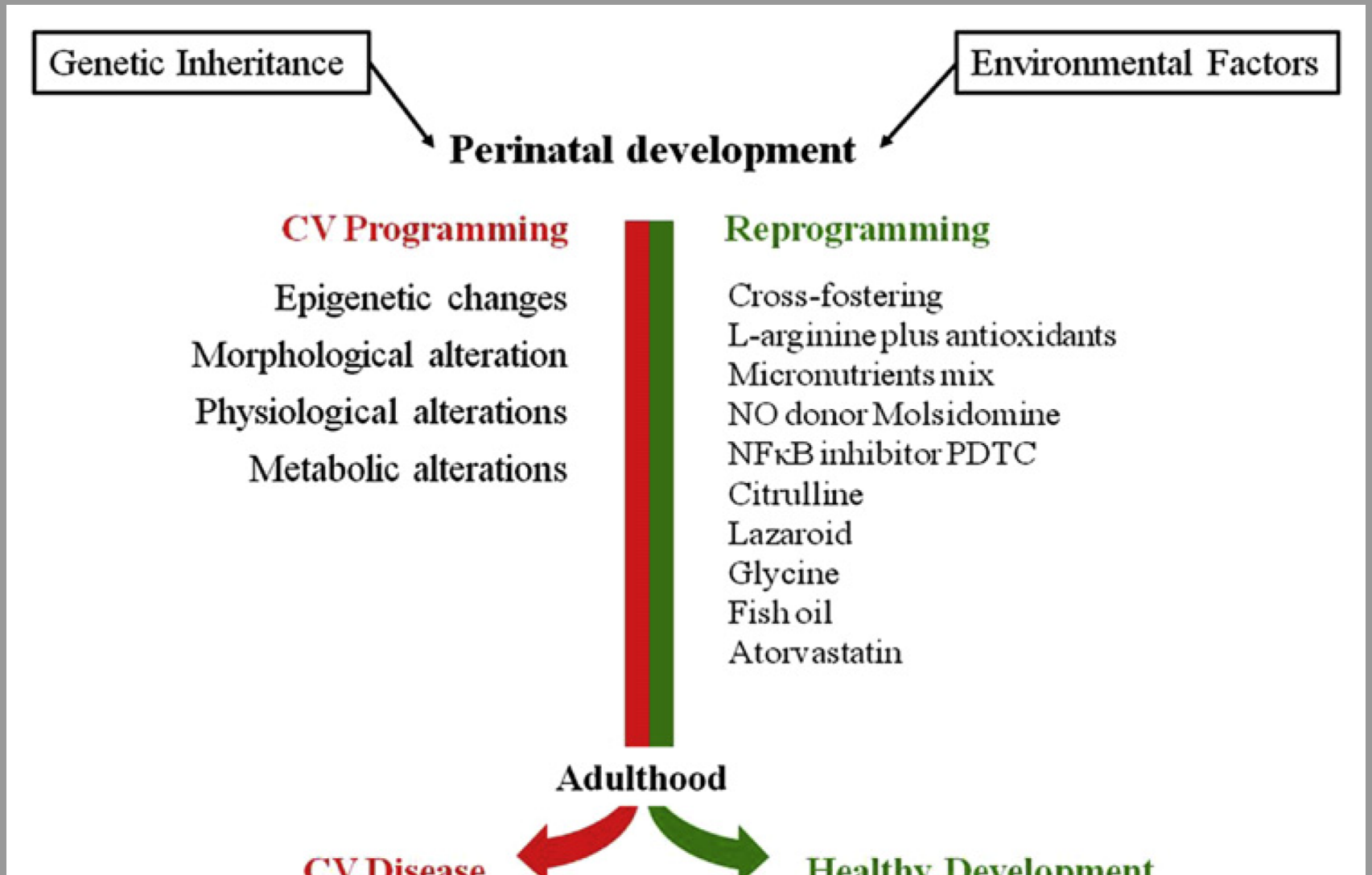



[1] Hanson MA; Gluckman PD. Early Developmental Conditioning of Later Health and Disease: Physiology or Pathophysiology?

# Prior studies point towards association between postnatal growth and dyslipidemia later in life.

| | Author | Year published | Direction of growth with increase in HDL-C | 2+ observations in change measure | Non-European sample? |
|---|---|---|---|---|---|
| 1 | Corvalan | 2009 | + | | ✔ |
| 2 | Ekelund | 2007 | + | | |
| 3 | Howe | 2010 | – | | |
| 4 | Kajantie | 2008 | + | | |
| 5 | Leunissen | 2009 | – | | |
| 6 | Oostvogels | 2014 | – | | |
| 7 | Tzoulaki | 2010 | + | ✔ | |

# The postnatal period is a critical window of time in which accelerated growth can influence risk of chronic disease later in life: developmental programming hypothesis



# Directed Acyclic Graph (DAG)

Figure 1: Directed Acyclic Diagram (DAG) for research topic.

# Aims

Overall:

- Investigate the association between postnatal growth trajectories and lipids in adolescence
  - Contemporary Chilean birth cohort with monthly measures of weight in the first year of life
  - High quality clinical measures of cardiovascular disease risk factors.
- Will investigate postnatal growth trajectories for weight-for-length, weight and length outcome measures.

# Aim 1

Characterize growth trajectories for infants from 0 to 12 months and what are some significant predictors?

**Aim 1** Characterize individual growth trajectories in the first year of life and replicate predictors of growth using external validation with an independent sample.

We expect to replicate previous findings[2] indicating a positive association between:

1. Maternal characteristics such as pre-pregnancy BMI, height and age with trajectory size.
2. Maternal education and trajectory velocity.

[2] **Pizzi C; Cole TJ; Richiardi L; dos-Santos-Silva I; Corvalan C; De Stavola B. Prenatal Influences on Size; Velocity and Tempo of Infant Growth: Findings from Three Contemporary Cohorts. PLoS ONE. 2014 Feb 27;9(2):e90291..**

# Aim 2

Do certain postnatal growth trajectories associate with dyslipidemia?

Aim 2 Examine the association between postnatal growth trajectories and dyslipidemia.

We expect:
Infants with faster growth trajectories will be more susceptible to dyslipidemia in adolescence.

# Aim 3

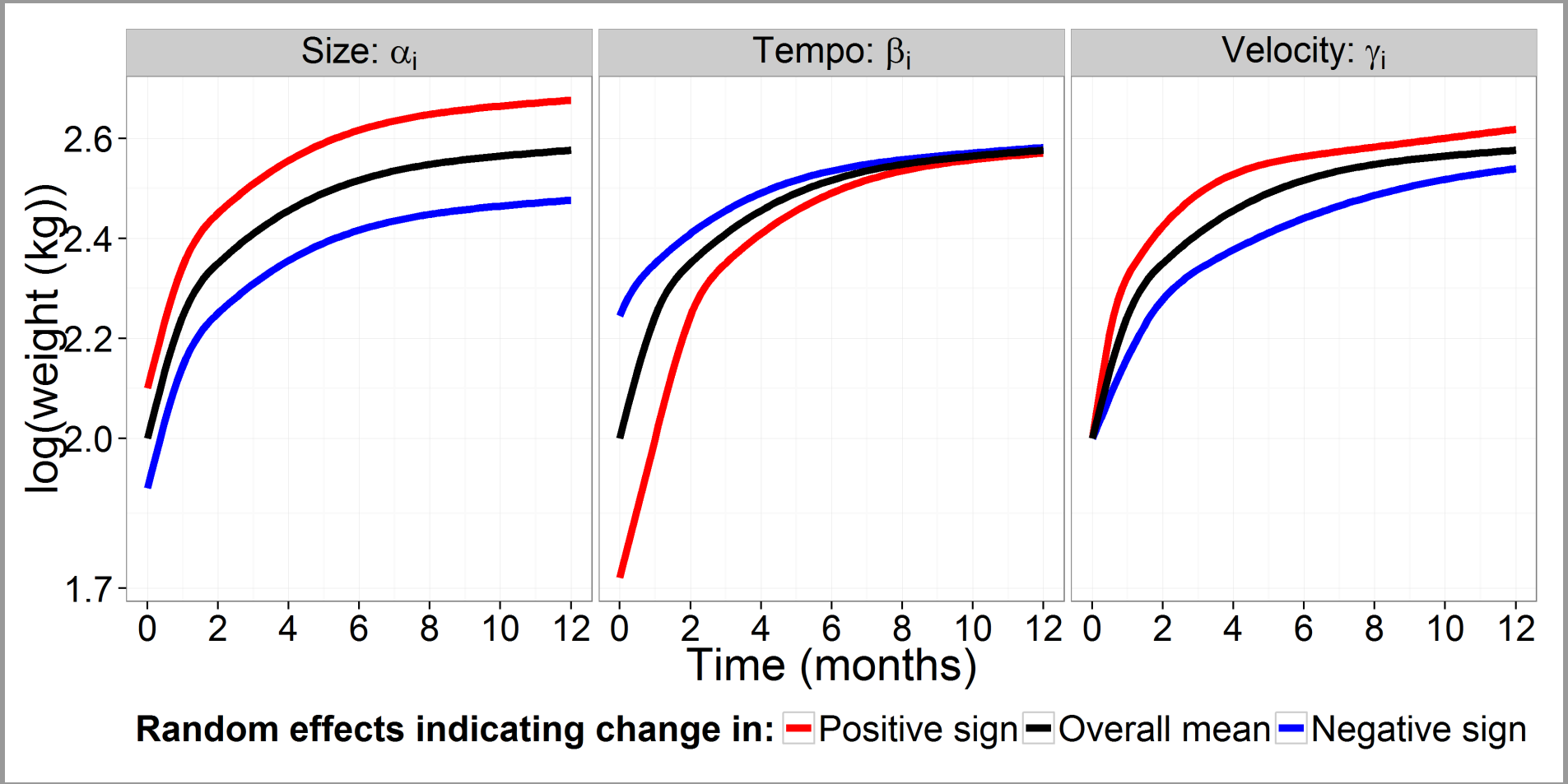
Question Do growth trajectories modify the association between genetic variants related to lipid metabolism and dyslipidemia in adolescence?

Aim 3 Assess gene-environment interaction between growth trajectory characteristics and genetic variants of lipid metabolism with dyslipidemia at 18 years of age as an outcome.

We expect:

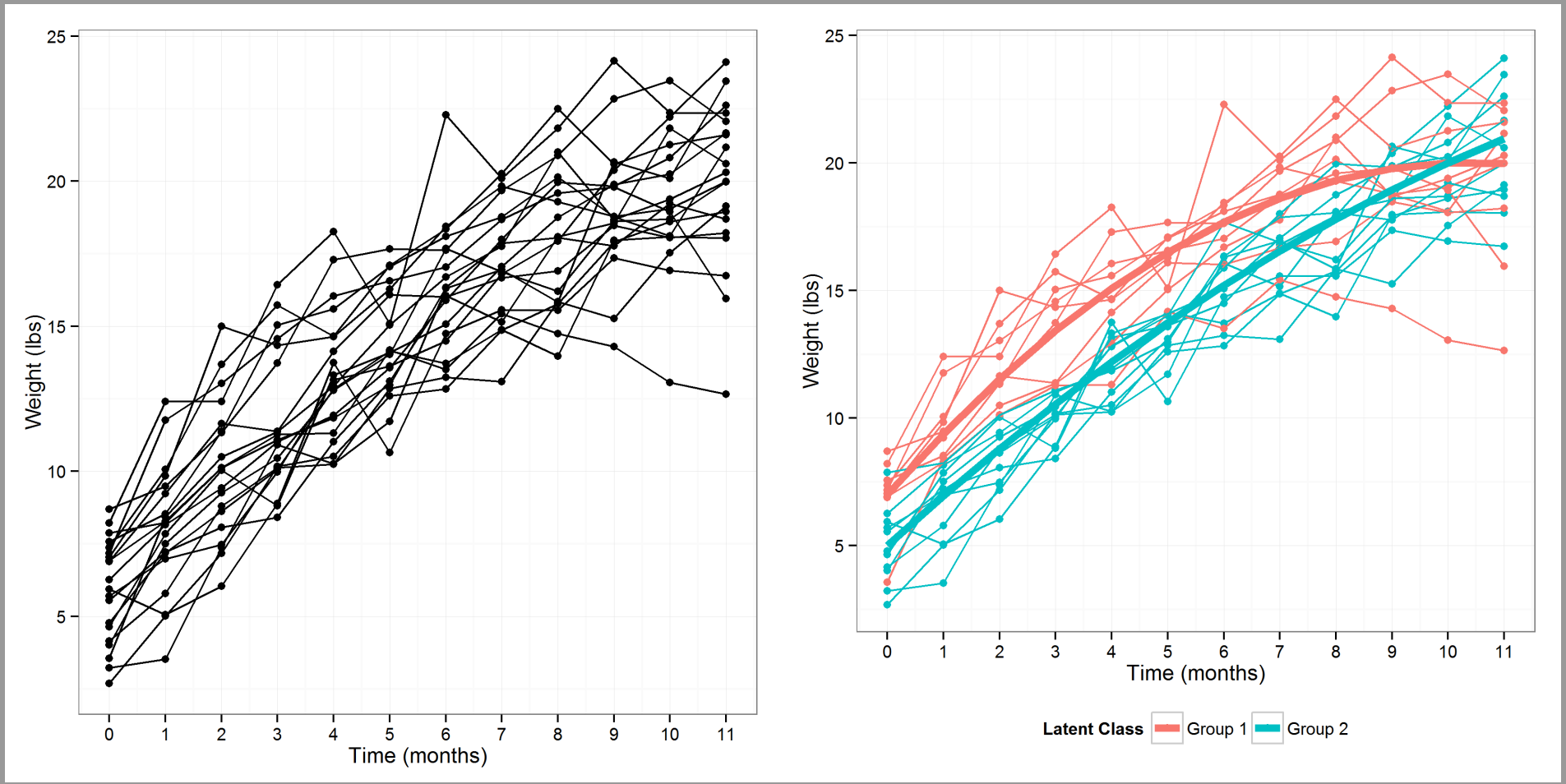
1. The selected genetic variants will associate with dyslipidemia in adolescence.
2. A gene-environment interaction exists in which extreme and less favorable growth characteristics will exhibit stronger, deleterious associations between the genetic variants and dyslipidemia.

# Use SITAR[3] method to measure 3 types of postnatal growth: size, tempo, velocity




[3] Beath KJ; Heller GZ. Latent trajectory modelling of multivariate binary data. Statistical Modelling. 2009 Oct 21;9(3):199-2
Ben-Shlomo Y. SITAR – a useful instrument for growth curve analysis. International Journal of Epidemiology. 2010 Jul 20;39(6)

# Latent growth mixture models (LGMM) can provide unobserved groups of peop



# SLCS lipid variants and dyslipidemia in adolescence

# Strengths and Limitation

- Strengths
- Limitations

# Public Health Implications

- Add information from Messer 2015 paper.

# Future Research

- Put new approaches here.