

Mendelian Randomization in HUNT4

Mats Flaaten

Institute of Public Health and Nursing

NTNU

Genotypes and phenotypes

Genotype

	<i>B</i>	<i>b</i>
<i>B</i>	<i>BB</i>	<i>Bb</i>
<i>b</i>	<i>Bb</i>	<i>bb</i>

Monogenic



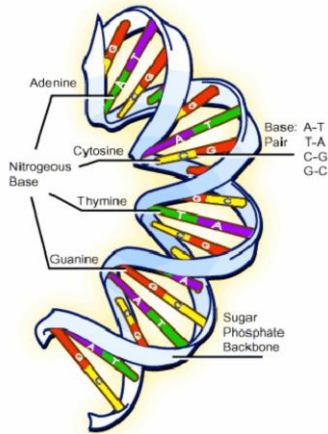
Phenotype



Easy to measure

Genotypes and phenotypes

Genotype



Polygenic

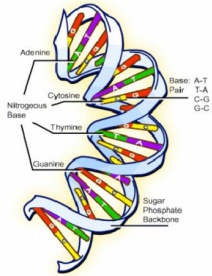
Phenotype



Harder to measure

Genetic variation as instruments

Genotype



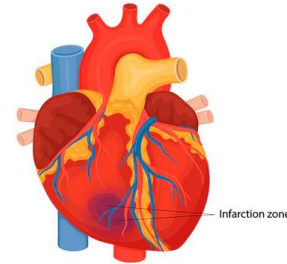
Instrument (Z)

Phenotype



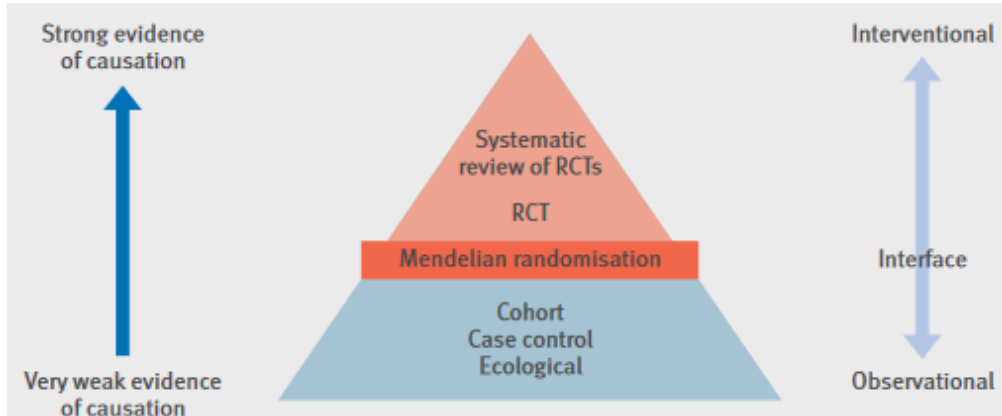
Physical activity (X)

Outcome

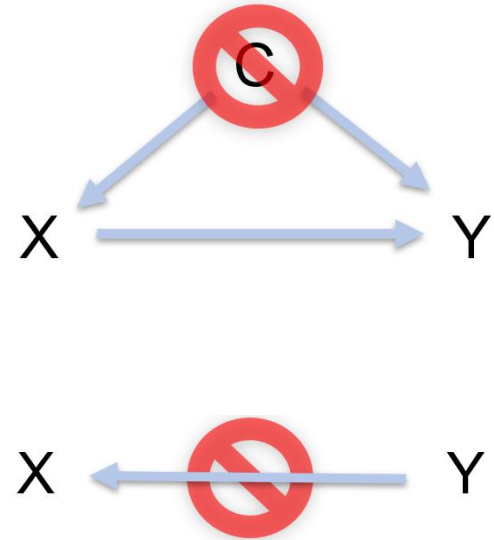


Disease (Y)

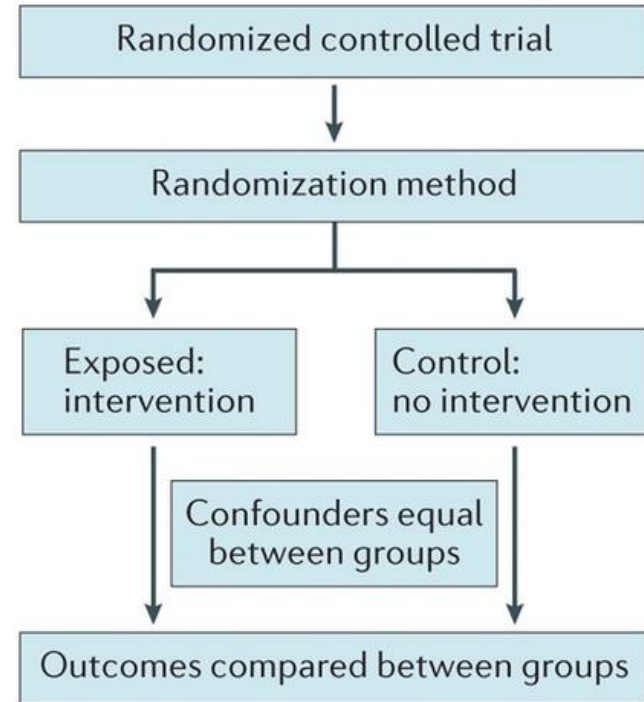
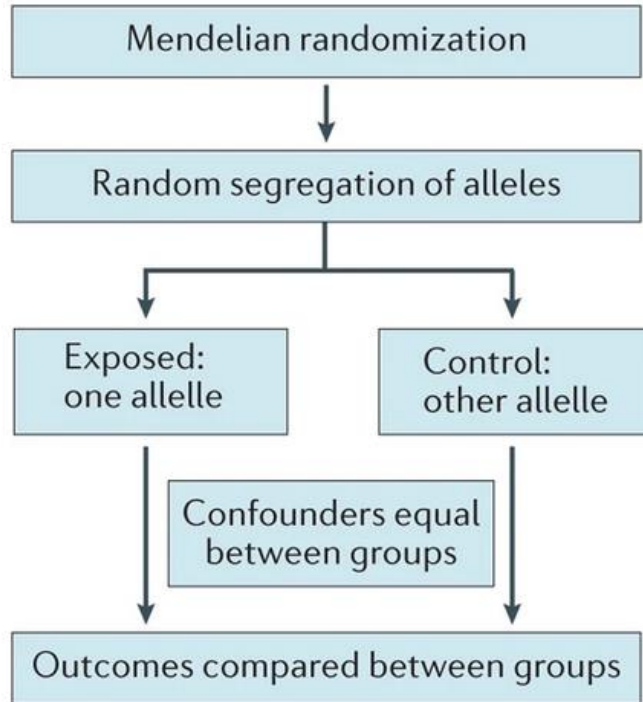
Why Mendelian Randomization?



Neil M Davies et al. (2017)

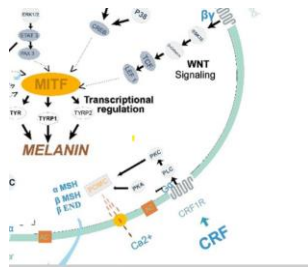


Mendelian Randomization design



Choosing a genetic instrument

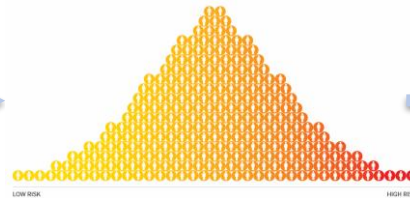
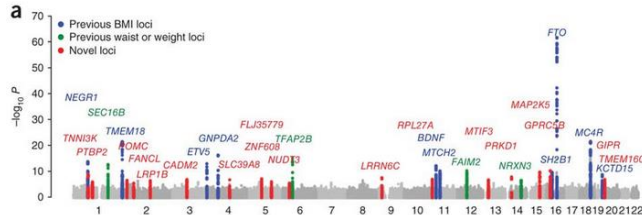
1. Genetic variants with plausible biological effects



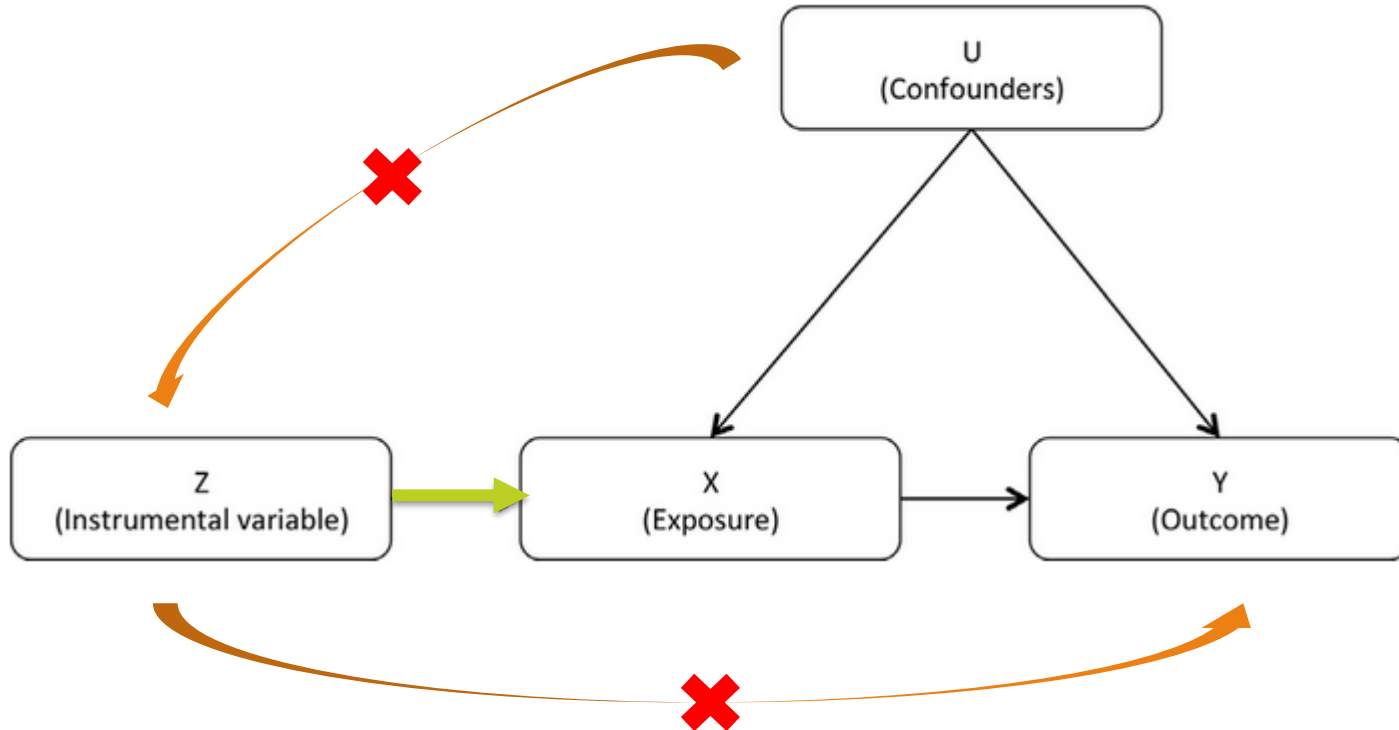
	<i>B</i>	<i>b</i>
<i>B</i>	<i>BB</i>	<i>Bb</i>
<i>b</i>	<i>Bb</i>	<i>bb</i>



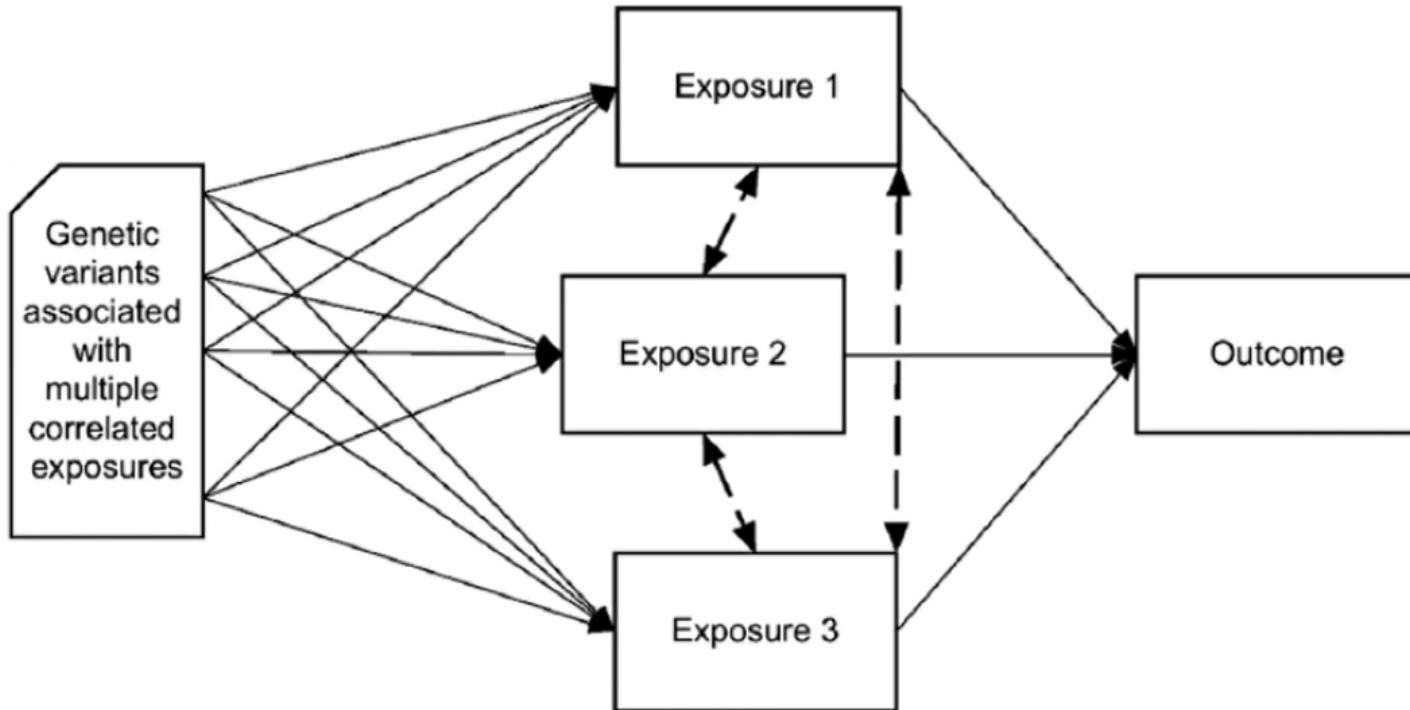
2. Genome-wide association studies (GWAS)



Genetic instruments – assumptions



Multivariable MR



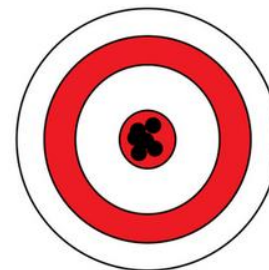
Possibilities within HUNT4



The HUNT cohort



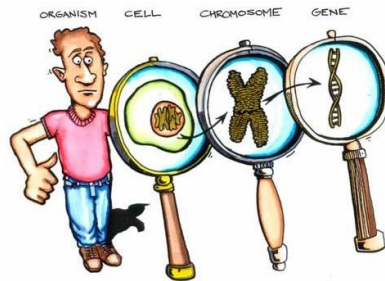
Registry linkage



Precise phenotypes



Device measured PA



Genetic information

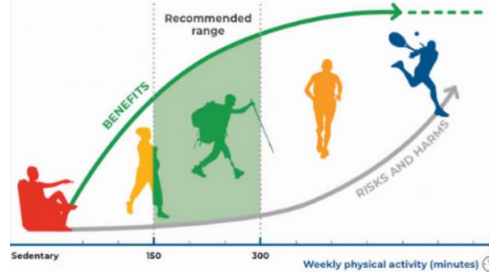


Family designs

Phenotypes in HUNT4



Different activities



PA recommendations



Walking intensity



Weekdays vs Weekend



Bouts of activities



Work vs leisure

Thank you for your attention😊