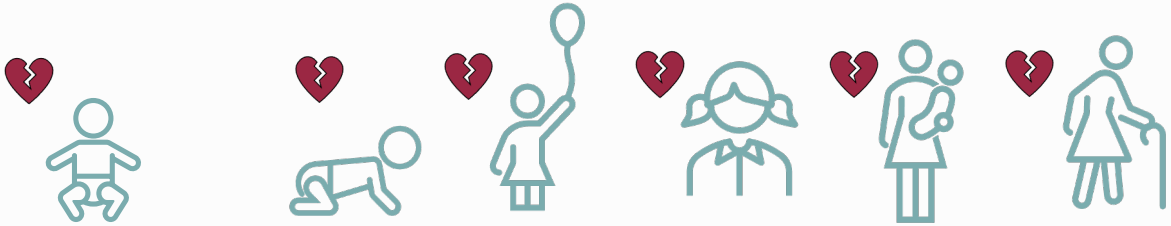
UNIVERSITY OF GOTHENBURG

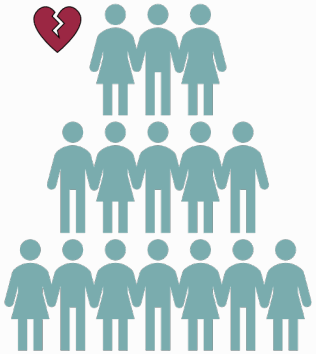
# Physical activity pattern in children with congenital heart disease compared to healthy controls: When methodological improvements matter

*Pia Skovdahl, PhD student*

*"New" patient group*

# Congenital heart disease (CHD)

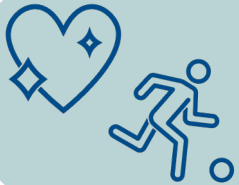




8-10 of 1000

>97% expected to reach adulthood

Risk of additional disease



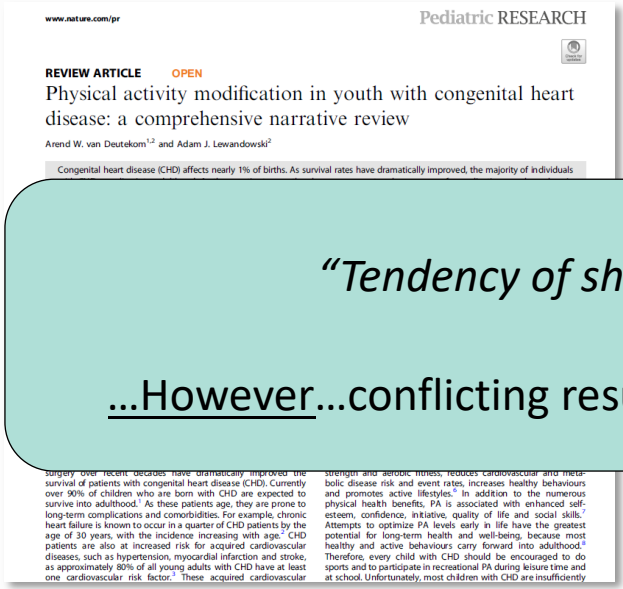
PA for health

Physical limitations in cardiovascular system
Restrictions from caregivers
Lower self-efficacy

*Morales et al 2019, Mandalenakis et al 2020, Amedro et al 2016 & 2018, Siaplaouras et al 2020, Bar-Mor et al 2000*

# What do we know about PA in CHD?

2020



www.nature.com/pr

Pediatric RESEARCH

REVIEW ARTICLE OPEN

Physical activity modification in youth with congenital heart disease: a comprehensive narrative review

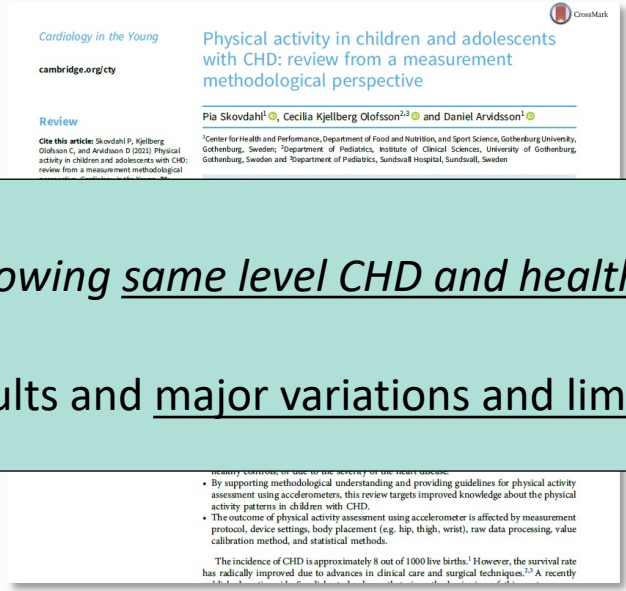
Arend W. van Deutekom[1,2] and Adam J. Lewandowski[2]

Congenital heart disease (CHD) affects nearly 1% of births. As survival rates have dramatically improved, the majority of individuals

surgery over recent decades have dramatically improved the survival of patients with congenital heart disease (CHD). Currently over 90% of children who are born with CHD are expected to survive into adulthood.[1] As these patients age, they are prone to long-term complications and comorbidities. For example, chronic heart failure is known to occur in a quarter of CHD patients by the age of 30 years, with the incidence increasing with age.[2] CHD patients are also at increased risk for acquired cardiovascular diseases, such as hypertension, myocardial infarction and stroke, as approximately 80% of all young adults with CHD have at least one cardiovascular risk factor.[3] These acquired cardiovascular

strength and aerobic fitness, reduces cardiovascular and metabolic disease risk and event rates, increases healthy behaviours and promotes active lifestyles.[6] In addition to the numerous physical health benefits, PA is associated with enhanced self-esteem, confidence, initiative, quality of life and social skills.[7] Attempts to optimize PA levels early in life have the greatest potential for long-term health and well-being, because most healthy and active behaviours carry forward into adulthood.[8] Therefore, every child with CHD should be encouraged to do sports and to participate in recreational PA during leisure time and at school. Unfortunately, most children with CHD are insufficiently

2021



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Cardiology in the Young

cambridge.org/cty

Review

Cite this article: Skovdahl P, Kjellberg Olofsson C, and Arvidsson D (2021) Physical activity in children and adolescents with CHD: review from a measurement methodological

Physical activity in children and adolescents with CHD: review from a measurement methodological perspective

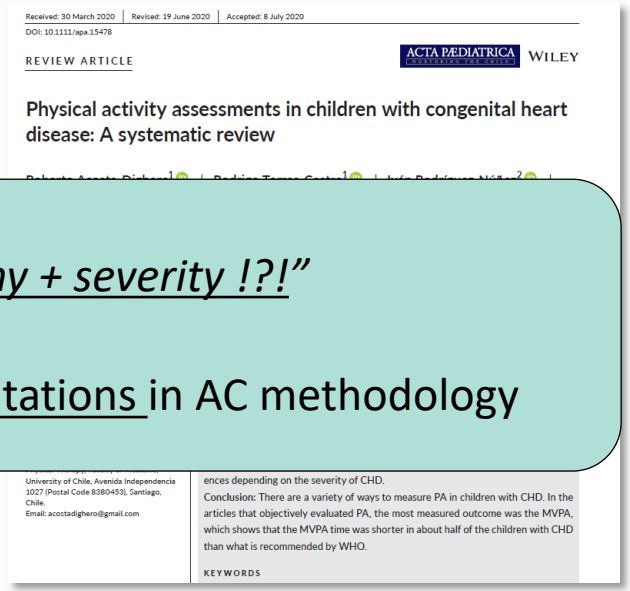
Pia Skovdahl[1], Cecilia Kjellberg Olofsson[2,3] and Daniel Arvidsson[1]

[1]Center for Health and Performance, Department of Food and Nutrition, and Sport Science, Gothenburg University, Gothenburg, Sweden; [2]Department of Pediatrics, Institute of Clinical Sciences, University of Gothenburg, Gothenburg, Sweden and [3]Department of Pediatrics, Sundsvall Hospital, Sundsvall, Sweden

- By supporting methodological understanding and providing guidelines for physical activity assessment using accelerometers, this review targets improved knowledge about the physical activity patterns in children with CHD.
- The outcome of physical activity assessment using accelerometer is affected by measurement protocol, device settings, body placement (e.g. hip, thigh, wrist), raw data processing, value calibration method, and statistical methods.

The incidence of CHD is approximately 8 out of 1000 live births.[1] However, the survival rate has radically improved due to advances in clinical care and surgical techniques.[2,3] A recently

2020



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REVIEW ARTICLE

ACTA PÆDIATRICA WILEY

Physical activity assessments in children with congenital heart disease: A systematic review

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Email: acostadighero@gmail.com

ences depending on the severity of CHD.

Conclusion: There are a variety of ways to measure PA in children with CHD. In the articles that objectively evaluated PA, the most measured outcome was the MVPA, which shows that the MVPA time was shorter in about half of the children with CHD than what is recommended by WHO.

KEYWORDS

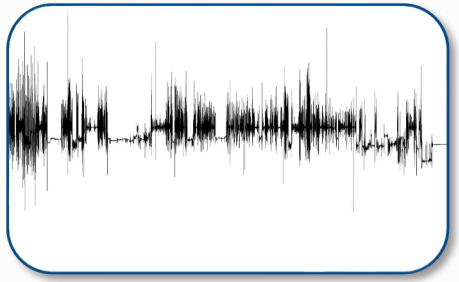
*"Tendency of showing <u>same level CHD and healthy + severity !?!</u>"*

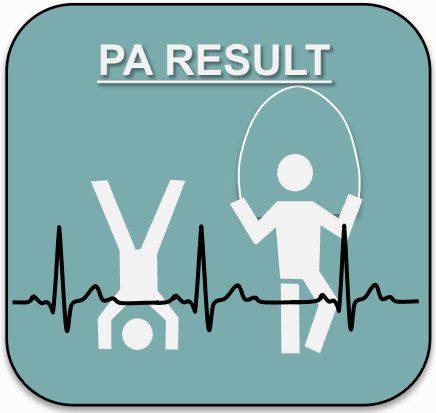
…<u>However</u>…conflicting results and <u>major variations and limitations</u> in AC methodology

# How to measure PA objectively?

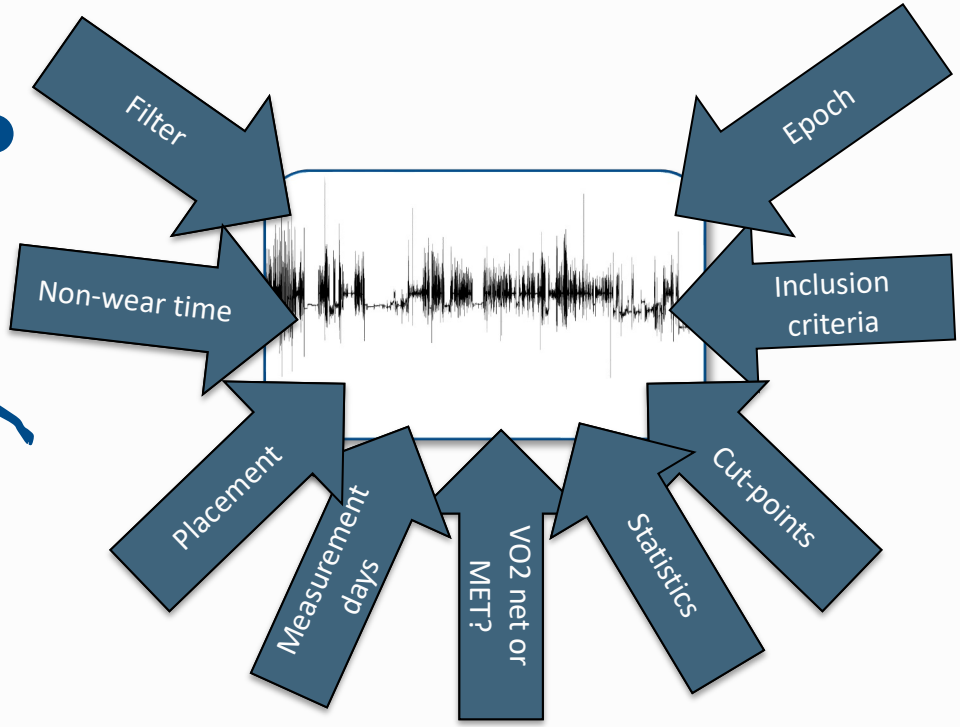
# How to measure PA objectively?

# Measuring PA using AC





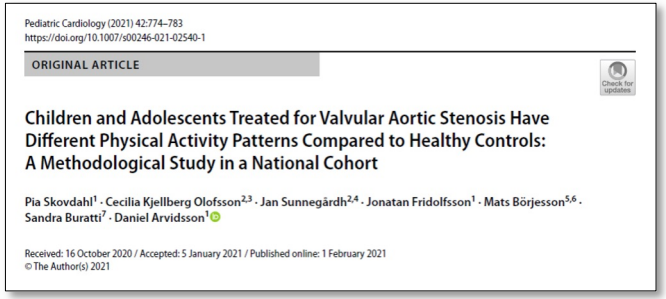
# Measuring PA using AC




**PA RESULT**

Totally dependent on settings!

# Pilot: PA in youngsters with VAS



Pediatric Cardiology (2021) 42:774–783
https://doi.org/10.1007/s00246-021-02540-1

ORIGINAL ARTICLE

**Children and Adolescents Treated for Valvular Aortic Stenosis Have Different Physical Activity Patterns Compared to Healthy Controls: A Methodological Study in a National Cohort**

Pia Skovdahl[1] · Cecilia Kjellberg Olofsson[2,3] · Jan Sunnegårdh[2,4] · Jonatan Fridolfsson[1] · Mats Börjesson[5,6] · Sandra Buratti[7] · Daniel Arvidsson[1]

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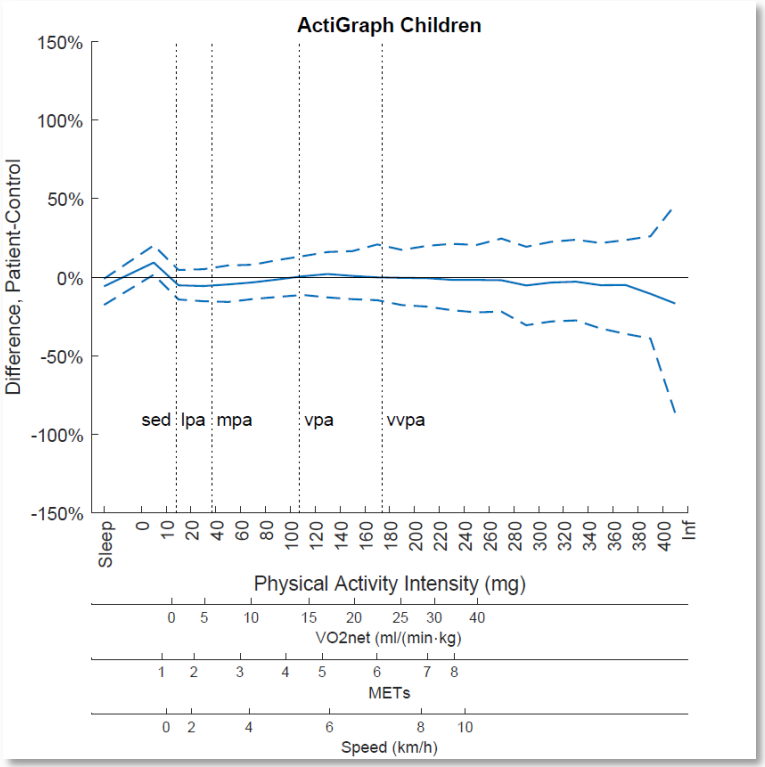
- Valvular aortic stenosis – CHD-group 2, large spread

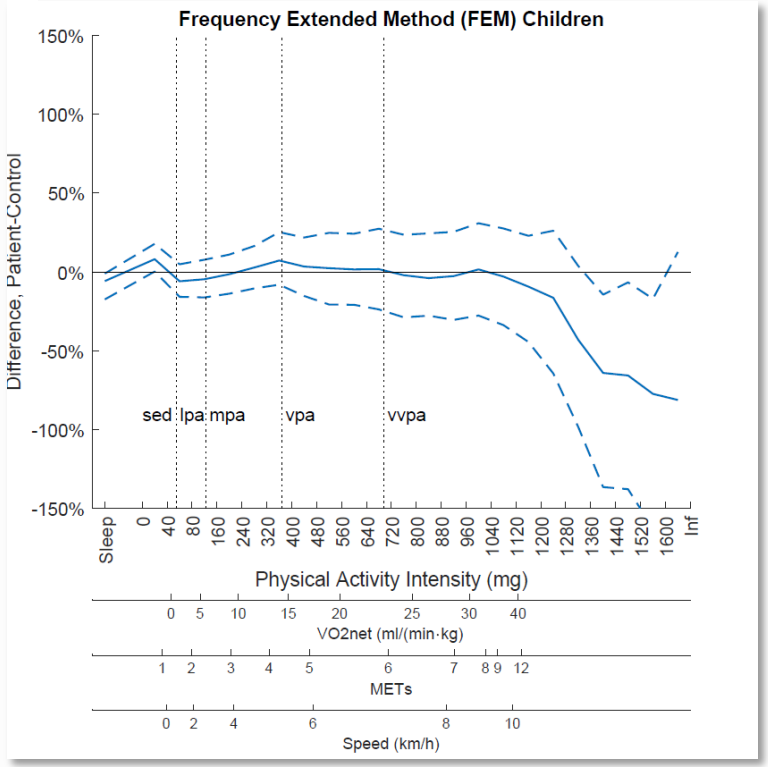
- 46 treated VAS-patients 6–18 years, 44 controls (matched: age, gender, geography)
  - Axivity AX3, 7-day at hip (>10h/day, >4 valid days(>3week/>1weeked), non-wear 60m 0 (<2 min exception))
  - 10 Hz,  8g
  - 3 sec epoch

ActiGraph (AG) & Frequency Extended Method (FEM)

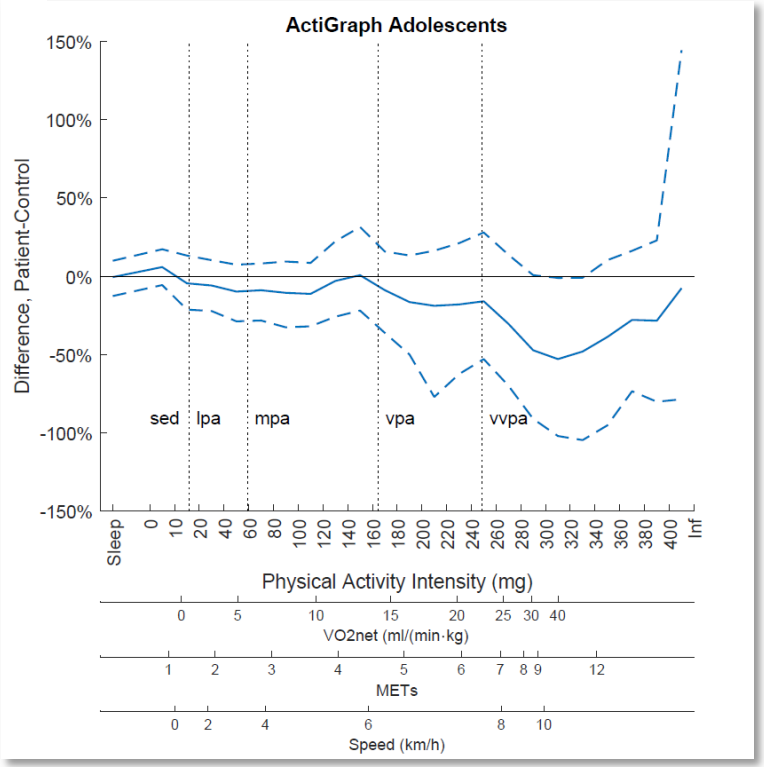
Crude PA & Spectrum

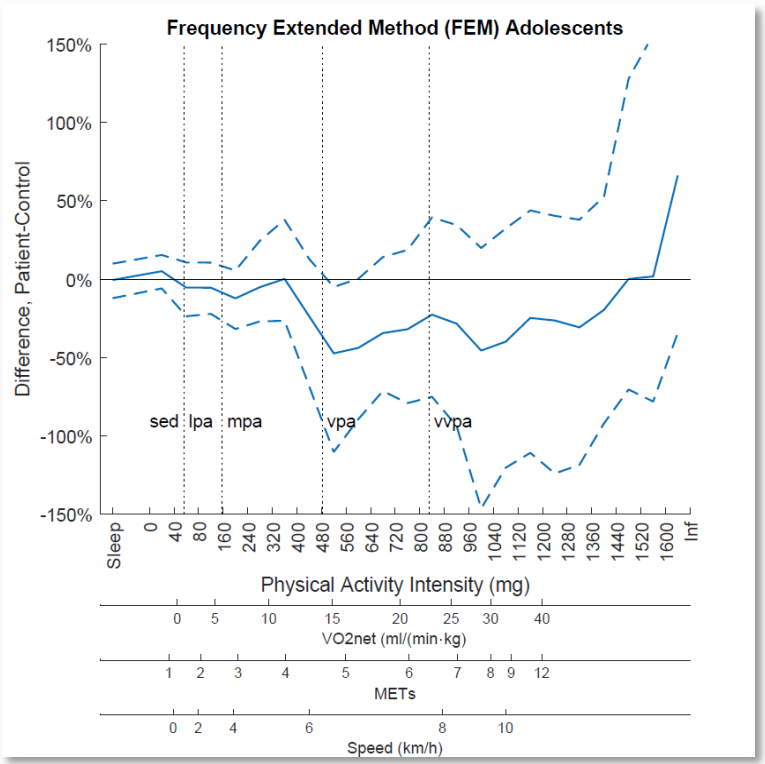
# Results VAS children vs. Controls, AG and FEM



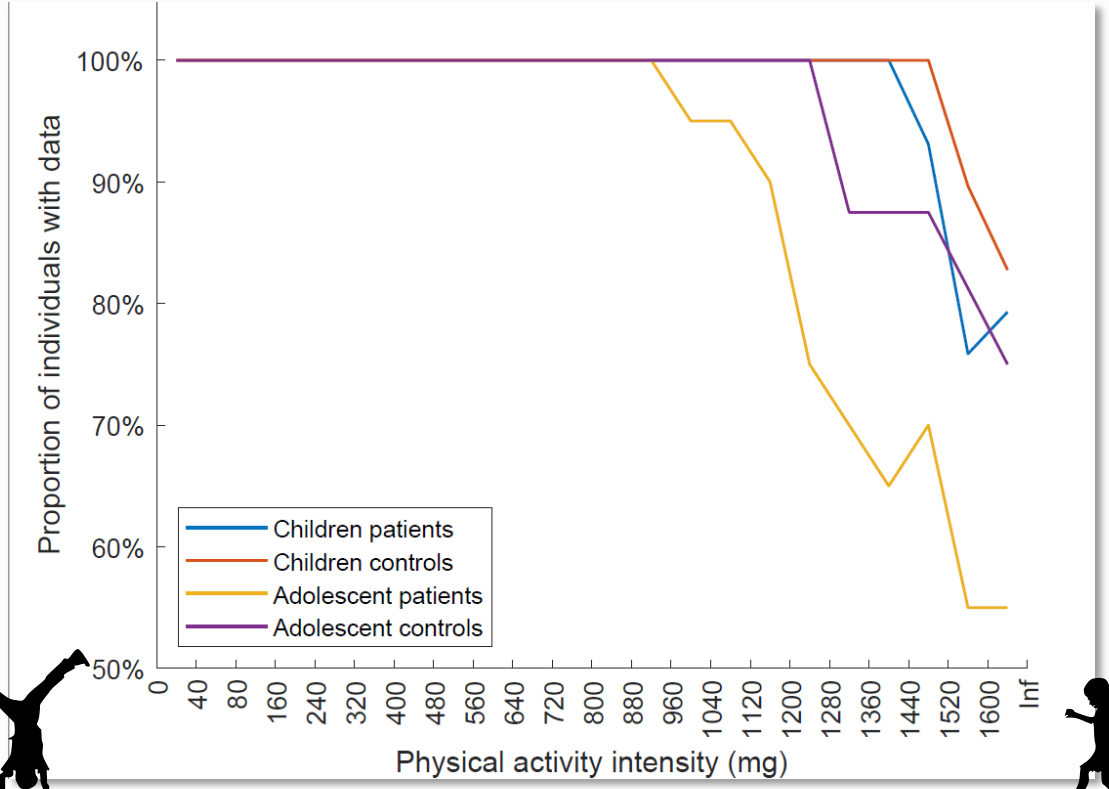



# Results VAS adolescents vs. Controls, AG and FEM



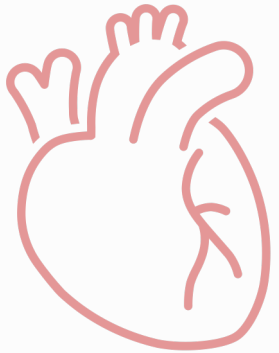



# Individuals in each group with data across PA spectrum

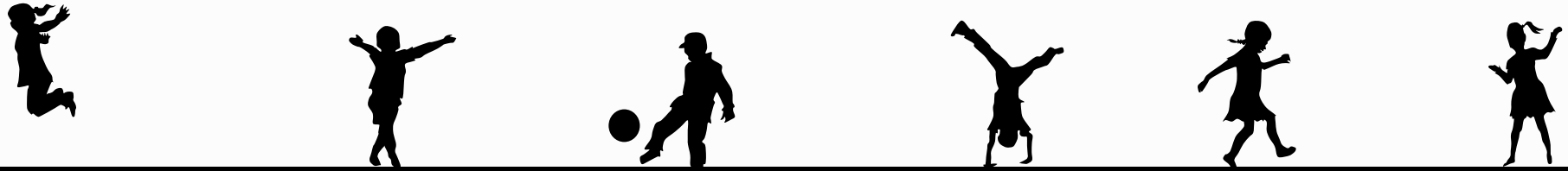


# *“Physical activity, motivation and quality in life in Swedish children and adolescents with congenital heart disease”*

**Collaboration study:**
CHP at GU + university hospitals in Gothenburg, Lund & Stockholm



CHD severity groups 1-3, 6-18 years + age, gender and location matched healthy controls, n=60/gr.



# What do we measure towards?

Objective measure transferable to subjectively based recommendations?


MVPA captures movement pattern of children?

- Of CHD children?
- Look at pattens!

What's the point?

Make the most of the method to enable correct PA support for CHD children.

Promote and prioritize interdisciplinary collaborations

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# Center for Health and Performance (CHP)

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