

MEASURED PHYSICAL ACTIVITY IN PEDIATRIC CHRONIC HD PATIENTS FALL SHORT OF RECOMMENDATIONS

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RENAL SERVICES

BACKGROUND

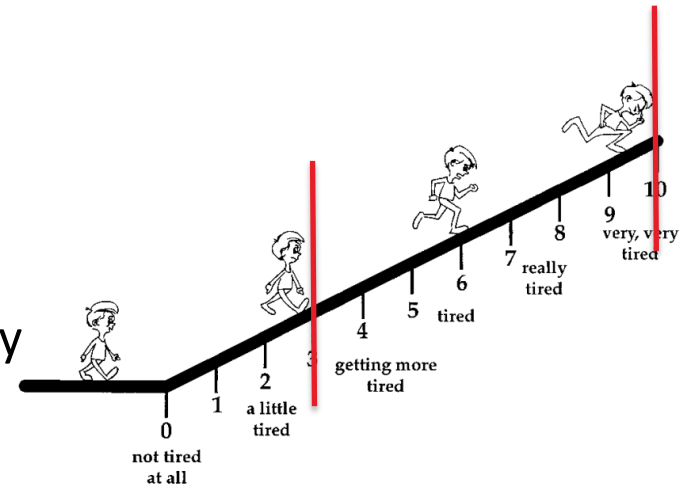
- 13% of children with CKD achieve physical activity goals
- Physical activity is measured and recommended in terms of:
 - Frequency, Intensity, Time, Type (FITT principles)
 - Increased time spent at moderate-vigorous physical activity (MVPA) intensities is beneficial to cardiovascular health

BACKGROUND

- Physical activity guidelines:

- >6 years of age, 60 minutes of MVPA daily
- What does that look like for a child?

- Difficulty talking to unable to talk with activity, light to heavy sweating
- Playing tag, movement piece ball sports, skipping rope, climbing, brisk walking speed



BACKGROUND

- Accelerometers: gold standard for physical activity assessment
 - Objective
 - Triaxial: simultaneous acceleration in three directions
 - Not used in pediatric dialysis population



GT3X+, ActiGraph LLC

AIM

Describe objective physical activity measures by intensity levels in children on hemodialysis (HD).

METHODS

- Single-center HD unit, 8-18 years of age
- Functional metrics:
 - Handgrip strength
 - 10 meter walk test
 - Leg extension strength test
- Anthropometrics
- Standard laboratory measures
- Physical Activity Questionnaire (PAQ) performed

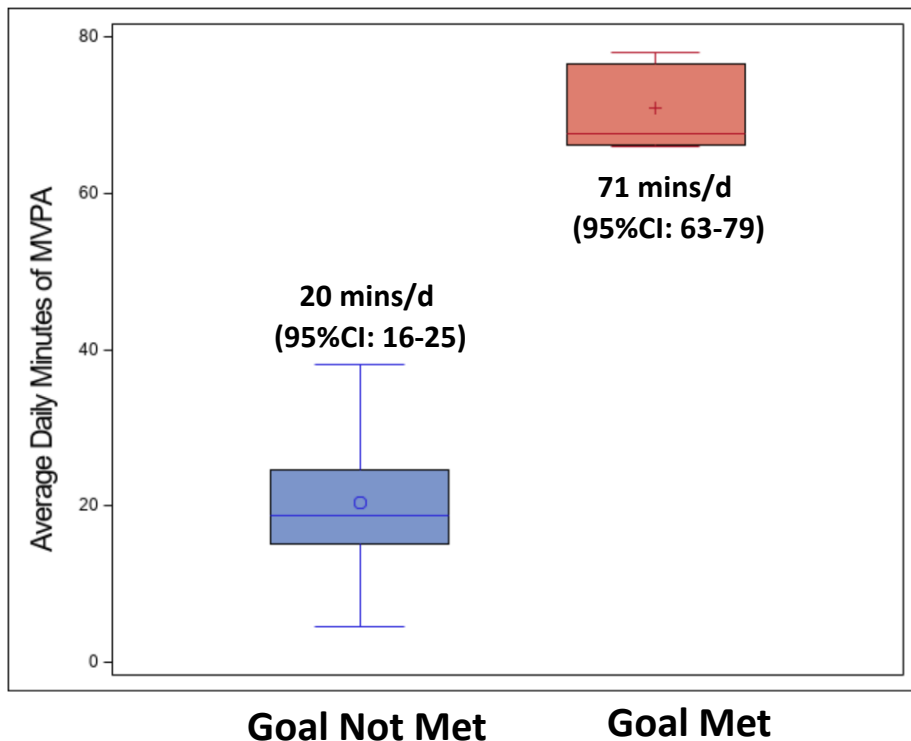
METHODS

- Accelerometer Wear:
 - Non-dominant wrist
 - 7 days
- Accelerometer Analysis:
 - Valid wear day ≥ 8 hours
 - 15 second epochs
 - Vector magnitude to assess intensities with pre-defined count cut offs
 - **Sedentary:** ≤ 305 counts/5 seconds $\rightarrow \leq 3600$ /min
 - **Light:** 306-817 counts/5 seconds $\rightarrow 3601$ -9815/min
 - **Moderate-Vigorous:** ≥ 818 counts/5 seconds $\rightarrow \geq 9816$ /min
- Reported as:
 - Average daily time (mins) spent at:
 - Sedentary
 - Light
 - Moderate - Vigorous
 - Average daily counts/min (CPM)
 - Adjusted for daily wear time

RESULTS

- 21 participants
 - 15 ± 2.9 years, 61.9 % male
- Mean daily Counts Per Minute (CPM): $2,297 \pm 777$
 - MVPA predicted CPM ($p < 0.001$)
 - MVPA accounts for 84.6% variance
 - Light intensities for 7.6% variance

RESULTS - 23.8% (N=5) MET MVPA GOALS

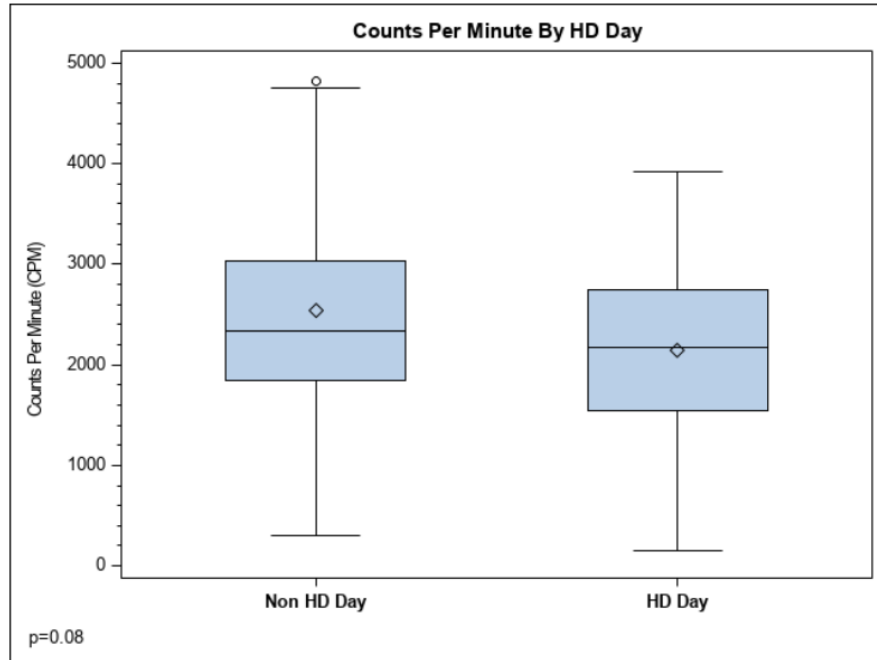


Intensity	Time (mins/day)
Sedentary	693 ± 59
Light	197 ± 58
MVPA	22 (IQR: 16-38)

RESULTS

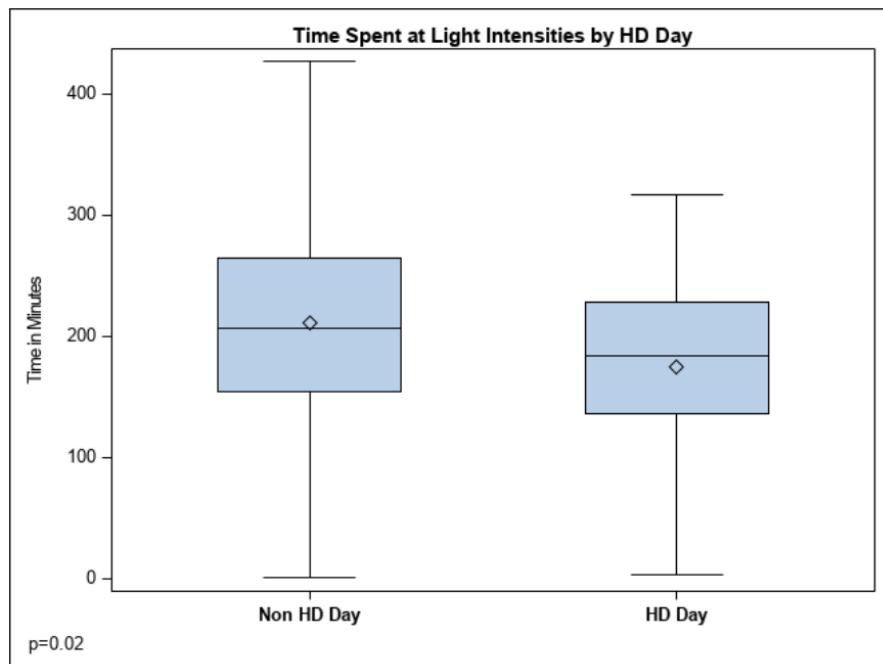
- Age inverse association with:
 - MVPA ($r=-0.51$, $p=0.02$)
 - Mean CPM ($r=-0.63$, $p=0.008$)
- Leg strength associated with average time spent at:
 - MVPA ($r=0.43$, $p=0.05$)
 - Light ($r=0.49$, $p=0.02$)
- No association with other measures

RESULTS – IMPACT OF HD DAY



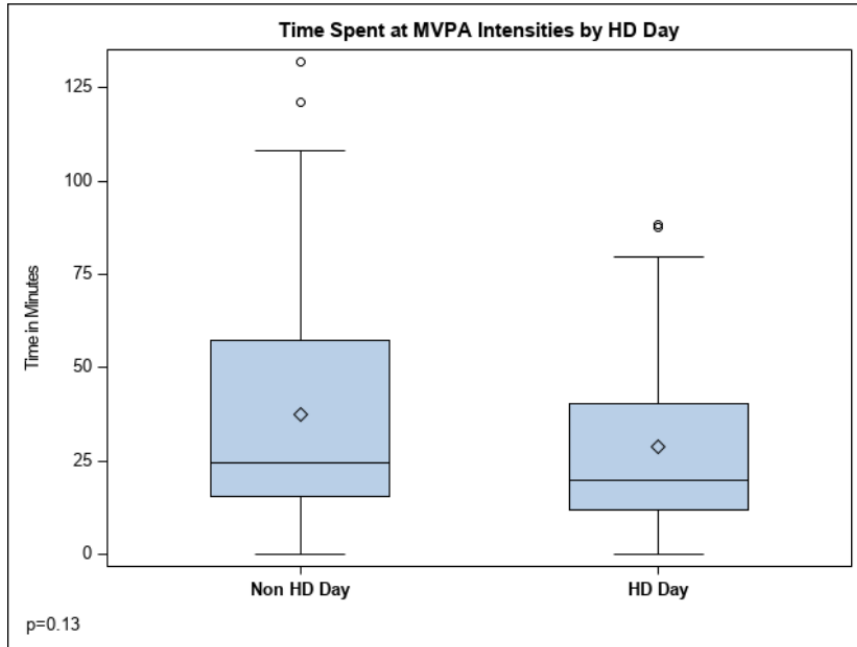
- No effect on daily mean CPM
 - HD day: 2,142 (95%CI: 1897-2388)
 - Non-HD day: 2,547 (95%CI: 2322-2772)

RESULTS – IMPACT OF HD DAY



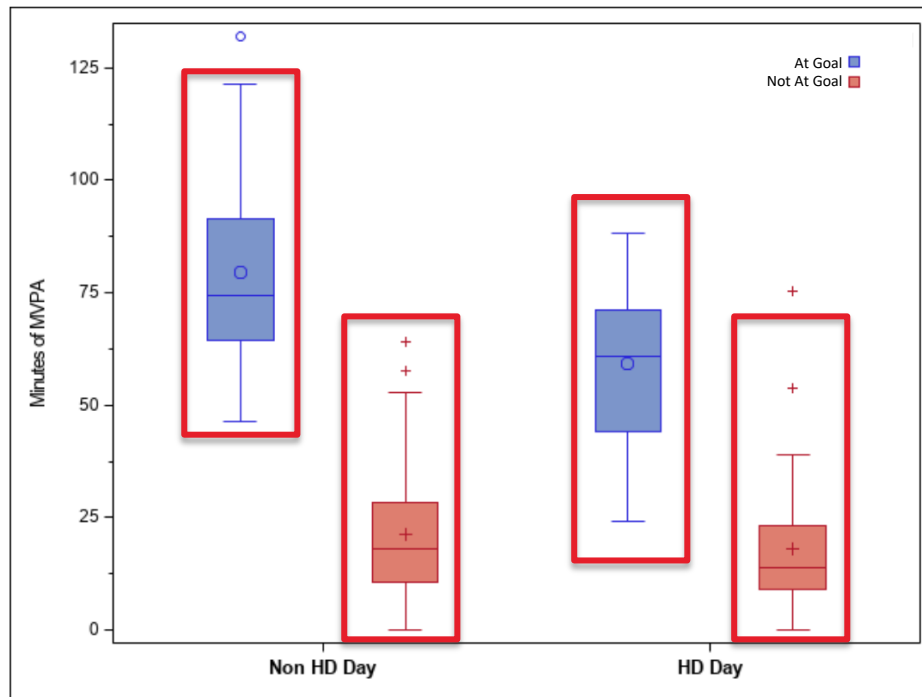
- Time at light intensity but not MVPA differed
- Light ($p=0.02$):
 - HD day: 175 mins/d (95%CI: 153-197)
 - Non-HD day: 212 mins/d (95%CI: 192-231)

RESULTS – IMPACT OF HD DAY

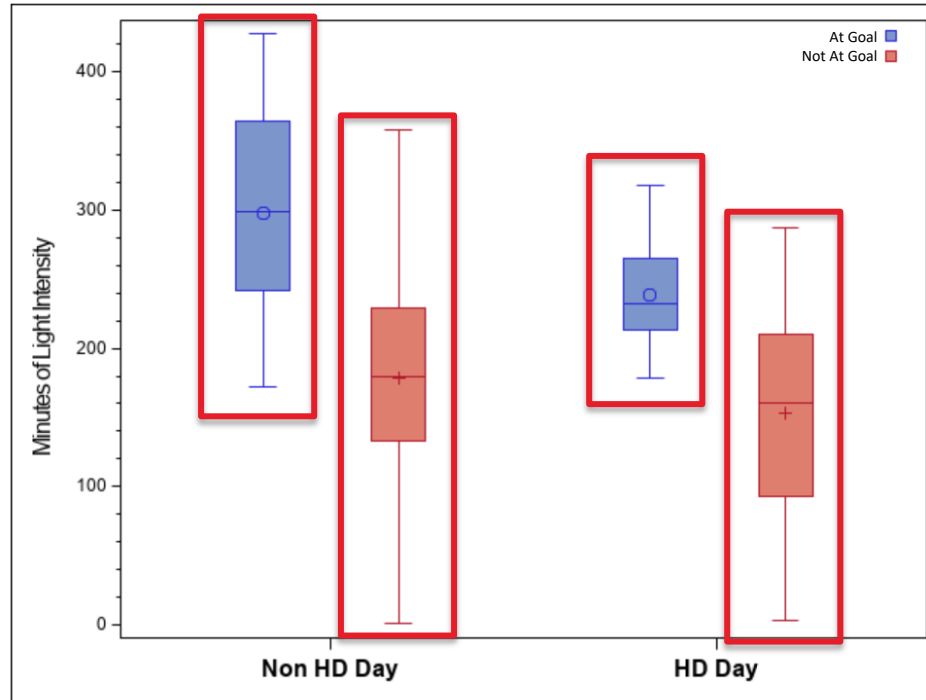


- MVPA (p=0.13):
 - HD day: 29 mins/d (95%CI: 22-36)
 - Non-HD day: 37 mins/d (95%CI: 31-44)

RESULT – A CLOSER LOOK AT MVPA

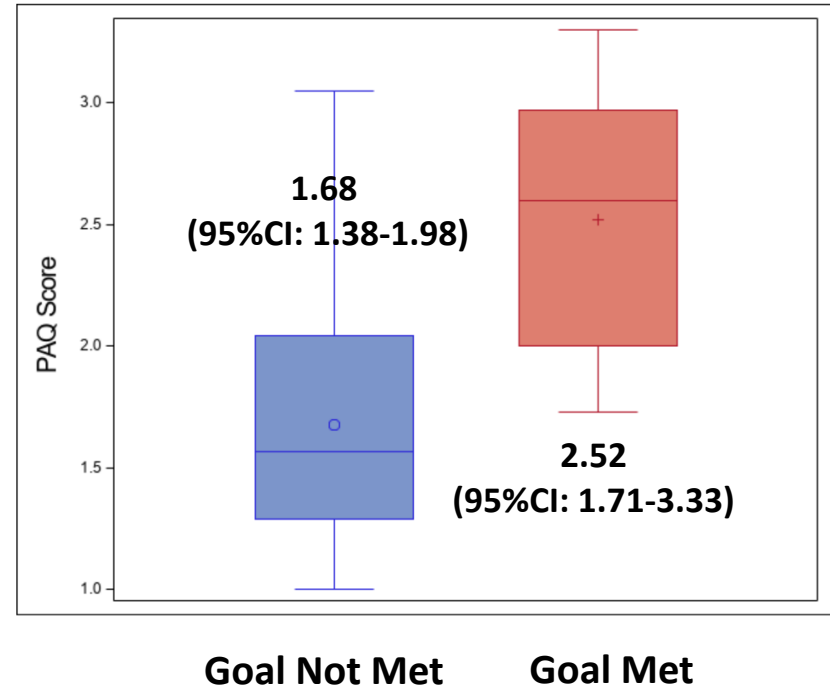


RESULTS – A CLOSER LOOK AT LIGHT INTENSITIES



RESULTS – PAQ SCORE

- Positive associations with:
 - CPM ($r=0.54$, $p=0.01$)
 - Time at Light ($r=0.6$, $p<0.01$)
 - Time at MVPA ($r=0.67$, $p<0.001$)
- MVPA predicted PAQ score ($p<0.01$)



CONCLUSIONS



Few children on HD reach MVPA goals



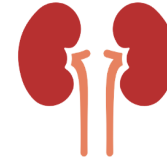
Activity declines with increasing age



Higher MVPA linked higher leg strength



PAQ score can help identify activity goals



Variation in activity due to HD day

QUESTIONS

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RENAL SERVICES



Fig 7. Measuring knee extension using a belt to stabilize the dynamometer. Standard body position of the patient and the device are shown with knees and hips flexed to 90°.