The Clinical Issue
- Cerebral palsy (CP) is the most common cause of physical disability in childhood.1
- Children with CP have motor problems that stem from weakness, impaired motor control4, and spasticity.5
- Increased aerobic capacity and strength are primary goals for many children with cerebral palsy (CP) and their families.
- Another important, yet often overlooked, goal is improving functional use and participation in meaningful activity.
- Studies have shown decreased activity levels in children with CP vs. typical age matched peers.6
- Mechanisms to improve strength, aerobic endurance, and participation in meaningful activities are paramount.

Background
Two prevailing ideas are beginning to resonate with healthcare clinicians: 1. Care practices must be supported by evidence. 2. Care practices must be family centered.

Evidence Based Practice: Mixed Training
- Recent studies illustrate the relationship of strength training, aerobic training, and subsequent improvement in functional use and participation in meaningful activity.8,9
- The study of therapeutic interventions that focus on improving the activity and participation domains of the International Classification of Function (ICF) are limited and the challenge to therapeutic efficacy researchers has been issued.
- Mixed Training (Fitness Training):
  - Combination of strength and aerobic training.
  - Green light therapy (high level evidence for effectiveness) for improving body structure and function domain.8
  - Yellow light (moderate level evidence for effectiveness) for improving activity and participation domains.8
- Functional context for activities/exercises performed was also an important tenant of our pilot program.

Family Centric Delivery Model: Group Based Episodic Care

Episodic Care vs. Traditional Model:
- Traditional model: Lower frequency administered over a long duration.
- Increased waitlist times for therapy.
- Greater potential for over-utilization of services.
- Episodic care model: High relative frequency administered over short duration.
- Recent literature supports the relationship between the episodic care model and family centered care or preference.11
- Decreased waitlist times for therapy.

Individual vs. Group Based Setting:
- Group based settings may offer more of a meaningful context for exercises.
- Addition of competition with age and ability matched peers may increase motivation and participation.

Limitations
- Strength and aerobic training have been shown to improve impairment level outcomes in the body structure and function domain of the ICF. However, these impairment focused interventions demonstrate limited transfer to functional performance or increase in participation in meaningful activities (activity and participation domains of the ICF).10

The Questions
- Is it feasible to administer a fitness program in children with CP that is group based and delivered within a episodic care framework? The program, targeting strength and aerobic capacity in a functional context, demonstrate improvements in the activity and participation domains of the ICF? The combination of strength and aerobic training within a functional and meaningful context mitigates their isolated disadvantages. The impact of a preferred service delivery model for fitness training on measures of engagement in valued activity. Adding a functional context to exercises may improve carryover to activity and participation domains of ICF.

Methods
- Design: Case series (pilot)
- Sample: Volunteer sample of 3 children with spastic CP (2 males, 1 female, 12-14 years of age: Gross Motor Function Classification System I)
- Treatment period: included 18 sessions of mixed training over the course of 6 weeks (3X per week).
- Intervention: 120 minute sessions with focus on strength training and aerobic training within the context of meaningful functional tasks (see handout for details of protocol).
- Assessment: 1 week prior to onset of intervention and at the end of the treatment period.
- Outcome measures included:
  - Participation Measures:
    a) COPM
    b) GAS
    c) Pedi-CAT
  - Activity Measures:
    a) 6 Minute Walk Test
    b) StepWatch
  - Body Structure and Function Measures:
    a) BiodeX
    b) Energy expenditure (net dimensional VO2)
  - Patient, family, and therapist perceptions of the treatment approach were surveyed.
- Home Exercise Program: Given at end of episode (see handout for details).
- Goal was to reduce sedentary time outside of PT.
- Limited evidence for long term benefits without exposure to regular exercise opportunities after episode.
- Essential that training continues on a regular basis and integrate into lifestyle to maintain gains.9

Results
- Participants:
  - All completed the intervention and assessments.
  - Patient and family reported tolerable treatment periods.
  - Children tolerated the higher intensity.
- Caregivers:
  - Reported very high satisfaction with the care that their child received, parents reported improvements in strength, endurance, and motivation for activity at home. Increased participation in valued activity was reported at home and in community.
- Therapists:
  - Group setting was easy to administer with the assistance of a rehab tech.
  - Independent ambulation of all subjects was an important requirement for groups to function with a single PT lead.

Future
- Use of the intervention of mixed training with a focus on functional activity delivered within an episodic care model has the potential to produce significant recovery in mobility, function, and participation.
- Need for long term follow up to gauge reduction of sedentary time at home and increased community participation.
- Future work is necessary to determine factors to assess candidacy for group based PT: cognitive level (ability to follow directions) and ambulatory status (need for a second PT if safety is a concern).
- Future work in this area will need to include comparative effectiveness studies and careful delineation of the content of sessions in order to better understand which activities best facilitate engagement.
- Future focus is needed on how best to increase participation at home and in the community after the episode has ended in an effort to maintain gains.
- Follow up pilot in summer of 2014.

Take Home Points
- The Good:
  - Effective at improving participation and activity domains of ICF.
  - Participants, therapists and families globally endorsed this intervention and their experience with it.
  - The group approach allowed a greater number of children to be seen during historically preferential time of the year, reducing traditional waitlist times.
  - This work suggests that this model of fitness training can be delivered in a manner that is safe, feasible, preferred by families, and may be an effective approach to enhanced participation in meaningful activity.

- The Not So Good:
  - Intensive, group based, PT can be challenging in terms of insurance coverage for some families.
  - Mixed training in a group based setting can be challenging when children are dissimilar in terms of age, developmental level, cognition, and ambulatory status.

References