Title: Moving from Heuristic to Precision Approaches to Treat and Prevent Chronic Diseases in Adults with Cerebral Palsy.

Purpose: Prevalence of lifestyle-related chronic conditions is significantly increased in adults with cerebral palsy (CP). This session will cover the fundamental differences between classic heuristic approaches to handle symptom management among children, adolescents, and young adults with CP, versus a lifespan approach to improve screening and tailoring of interventions to preserve function and cardiometabolic health, increase longevity, and improve overall quality of life in this population.

Course Summary: While the incidence of CP has remained stable in recent years, the mortality rate of children with CP has declined, suggesting that adults with CP represent a growing population whose health status and healthcare needs are poorly understood. Premature declines in function among adults with CP may occur as a result of early and accelerated muscle atrophy and weakness, beyond that which is expected for typically-developed adults. Evidence confirms that children and adults with CP have less lean body mass, greater relative adiposity, and lower fitness and physical activity participation. Although decrements in muscle mass and strength are typically considered the primary contributing factors of gross motor decline in this population, it is conceivable that these changes are actually the direct consequence of years spent accumulating extremely sedentary lifestyles. These modifiable behaviors lead to substantially increased risk of multiple chronic disease processes, such as obesity, diabetes, hypertension, asthma, and stroke. We have recently completed a study which represents a substantial addition to the current body of literature pertaining to characterizing the link between risk factors and prevalence of chronic diseases among a large, clinic-based sample of individuals with CP.

Course Format

• Presenter: Edward A. Hurvitz, MD; 15 minutes
  o Patient case-studies to demonstrate the issues related to functional loss, pain, diminished quality of life, and frustration pertaining to lack of life-course and lifespan approaches.
  o The progression of a non-progressive condition: Losses of function during the transition into and throughout adulthood.

• Presenter: Mark D. Peterson, Ph.D., M.S.; 20 minutes
  o New findings on risk factors for chronic disease and associations with hallmark function and symptom phenotyping in CP.
  o New findings pertaining to the association between physical activity, sedentary behavior, and risk factors of individuals with CP.

• Open forum Q&A; 15 minutes
  o Issues of screening for risk factors for obesity-related conditions among individuals CP.
  o Chronic disease surveillance in CP, and items that should be considered for future registries

Learning Objective 1: Describe the risk of chronic diseases in adults with cerebral palsy compared to the general population.

Learning Objective 2: Develop an approach to clinical care of the adult with cerebral palsy that includes greater attention to chronic disease risk, sedentary behavior and physical activity.

Learning Objective 3: Discuss the need for surveillance of health risks in individuals with cerebral palsy.

Learning Objective 4: Identify and discuss relevant risk factors for chronic conditions in CP, and offer guidance for lifestyle interventions to prevent losses of function and disease, and to improve quality of life.
As a greater proportion of individuals with CP live longer lives, it has become increasingly evident that they may be subject to secondary health risks due to unhealthy lifestyles.\textsuperscript{1, 2} Specifically, there is mounting evidence that individuals with CP have lower fitness, less muscle mass, diminished bone density, neuromuscular inefficiency and reduced functional reserve throughout adulthood.\textsuperscript{3-9} These factors place middle-aged adults with CP at a heightened risk for numerous secondary health concerns such as frailty and obesity-related cardiometabolic diseases.\textsuperscript{10} In order to facilitate the development of appropriate prevention strategies and allotment of treatment resources, it is critical to better understand the extent to which chronic diseases are elevated among aging adults with CP, as well as to identify which factors are associated with heightened risk for multimorbidity (i.e., presence of multiple chronic diseases).

**Multimorbidity in Middle-Aged Adults with Cerebral Palsy.**

We recently completed a study to analyze the prevalence and predictors of multimorbidity in an established clinical registry of middle-aged adults with CP. Prevalence of 12 common chronic conditions were evaluated, including existing diagnoses or historical record of: osteopenia/osteoporosis, myocardial infarction, stroke, coronary artery disease, impaired glucose tolerance/type 2 diabetes, other cardiovascular conditions, rheumatoid arthritis, osteoarthritis, asthma, emphysema, pre-hypertension/hypertension, and hyperlipidemia. Prevalent multimorbidity was found in 252 patients (57.8%). There were 137 unique multimorbidity combinations, and the most prevalent were: (a) pre-hypertension/hypertension and osteopenia/osteoporosis; (b) osteoarthritis and osteopenia/osteoporosis; (c) pre-hypertension/hypertension and osteoarthritis; and (d) pre-hypertension/hypertension and asthma. Multimorbidity was significantly more prevalent among obese versus non-obese individuals for both GMFCS I-III (75.8\% vs. 53.6\%) and GMFCS IV-V (79.0\% vs 64.2\%), but was also significantly higher in non-obese individuals with GMFCS IV-V (64.2\%) compared to individuals with GMFCS I-III (53.6\%), respectively. In the fully-adjusted models, both obesity status (OR: 2.20; 95\% CI 1.32-2.79) and the GMFCS IV-V category (OR: 1.81; 95\% CI 1.32-3.68) were significantly associated with multimorbidity (Figure 1).

![Figure 1](image_url)
References


