

## **Powered mobility interventions for young children aged <5 years: a systematic mixed methods review and economic model of effectiveness and cost-effectiveness**

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### **Summary**

The Early Mobility and Powered Wheelchair Review (EMPoWER) is an NIHR HTA funded evidence synthesis research project examining the effectiveness and cost-effectiveness of earlier provision of powered wheelchair interventions for children with mobility limitations. The results will be ready to present by the time of this conference.

### **Aims & Objectives**

The aim of the Early Mobility and Powered Wheelchair Review (EMPoWER) project was to examine and model the relative effectiveness and cost-effectiveness of powered mobility provision for young children (<5 years) compared to the more common practice of powered mobility provision for children aged ≥5 years. The review also reports evidence related to acceptability, feasibility, and pathways to change.

### **Background**

Mobility limitations are one of the leading causes of childhood disability in the UK (Department for Work and Pensions, 2018). Provision of early powered mobility interventions is an emerging health technology proposed to (i) support the immediate and life-course development, activity, and participation of children with mobility limitations, (ii) enhance the wellbeing of their families, and (iii) reduce societal impacts of mobility limitations.

Existing literature and expert opinion proposes that provision of powered mobility interventions for young children can reduce the negative effects of mobility limitations by enabling self-directed mobility, which in turn enhances children's development of life skills (Jones et al, 2003; Logan et al, 2015; Huang et al, 2014, Jones et al, 2003), independence (Bottos et al, 2001, Jones et al, 2003), and participation in daily life (Furumasu et al, 2008; Livingstone and Field, 2015). Subsequently, these benefits may also reduce the need for parental support (Jones et al, 2012) and related parental stress (Tefft et al 2011). By enhancing the outcomes of both children and parents, the provision of powered mobility interventions may in turn reduce the burden on public services across health, education and social care. There is a growing need to understand the incremental benefits of providing such interventions to very young children (>5 years) thus, to inform decision-making and further research related to early powered mobility interventions, we have undertaken a synthesis of all existing evidence as part of the EMPoWER project.

EMPoWER is an ongoing mixed-methods systematic evidence synthesis and economic modelling study, funded by the National Institute for Health Research (NIHR). We anticipate that the final results will be ready to present by the time of this conference.

The evidence synthesis used established methods to identify relevant quantitative, qualitative, and mixed-methods research from bibliographic databases, grey literature sources, and through consultation with topic experts including parents and young people. Two reviewers independently completed the screening, quality appraisal, and data extraction. All relevant outcomes were

considered, including: children's life skills, independence, autonomy, and participation; parental health; and social care and education costs. For the economic model, costs related to different components of powered mobility interventions were gathered from United Kingdom National Health Service (NHS) wheelchair services, charitable organisations, and published government reports. Wider economic costs and benefits to the NHS, families, and society were also considered.

7,128 papers were identified and 85 were included, comprising 88 discrete studies: 2 randomised controlled trials, 38 non-randomized comparative quantitative studies, 32 descriptive non-comparative studies, 2 mixed methods studies, and 14 qualitative studies. 26% of included studies involved a single participant, and 60% involved  $\leq 10$  participants. 69% of studies involved children with cerebral palsy, 26% involved only children with cerebral palsy, and 64% involved children aged  $< 5$  years. Data from included studies will be synthesised into a logic model and evidence maps, incorporating: key powered mobility intervention elements (i.e. provision and maintenance of equipment, training, and environmental adaptations), relevant outcomes and measures, pathways to change, intervention moderators, and factors related to acceptability and feasibility.

## Discussion

The evidence synthesis, logic model, and economic modelling will inform planning and recommendations for powered mobility provision and future research. In light of the scarcity of robust effectiveness studies, the current evidence is more informative for when: selecting outcomes for evaluations of early powered mobility provision; choosing pathways to target in intervention design; and considering feasibility and acceptability of implementation.

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