Recurrent otitis media and behaviour problems in middle childhood: A longitudinal cohort study Ali AH Altamimi ,1,2,3 Monique Robinson,1 Eman MA Alenezi,1,2,4 Tamara Veselinovi c,1,5 Robyn SM Choi1,5,7 and 1,2,6,7 Christopher G Brennan-Jones School of 1Telethon Kids Institute, 2Medicine, 5Human Sciences, The University of Western Australia, 6Audiology Department, Perth Children's Hospital, 7School of Allied Health, Faculty of Health Sciences, Curtin University, Perth, Western Australia, Australia, Faculty of 3Life Sciences, and 4Allied Health Sciences, Kuwait University, Kuwait City, Kuwait Aim: To investigate the long-term effects of early-life recurrent otitis media (OM) and subsequent behavioural problems in children at the age of 10 years.Chris Brennan-Jones was supported by a National Health and Medical Research Council Fellowship (GNT 1142897) and a Western Australian Department of Health Emerging Leader Fellowship.This is similar to symptoms typically seen in children diagnosed with attention deficit hyperactivity disorder (ADHD) and may also overlap with symptoms seen in children with auditory processing difficulties (APD).16 To this connection, several studies have suggested a potential link between early-life recurrent and/or persistent OM with later ADHD17-19 and APD.20-23 In the current study, however, associa- tions between OM and ADHD could not be supported as the pre- dictive validity of the SDQ to screen for ADHD is controversial, with different studies showing different degrees of sensitivity.24 Nevertheless, our results add to the growing body of literature that links a history of OM with attention and hyperactivity prob- lems.Statistical analysis Descriptive statistics were conducted to summarise the character- istics of the study population and the frequency of each categori- cal variable for the SDQ and the PQ. Multiple linear regression models were used for cross-sectional comparisons of both groups and to predict the change in each SDQ subscale and the total, internalising, and externalising scales.For example, previous studies that explored the rela- tionship between a history of recurrent and/or persistent OM and behavioural problems reported increased internalising (i.e., inner-directed) and externalising (i.e., outer-directed) behav- ioural problems with emotional, social, attention, and hyperactiv- ity being amongst the most commonly reported problems.3-8 These problems persisted into the early adolescent years, suggesting a potential long-term impact even when any OM- related symptoms have presumably resolved.This finding aligns with other studies that revealed an increased likelihood for children and adolescents with early-life recurrent and/or persistent OM to be inattentive and hyperactive.3,4,6,15 In this study, the severity of these issues was further highlighted by the increased rates of diagnoses of attentional problems, indicating that the attention difficulties experienced by children with a history of recurrent OM may have severely impacted their development and academic achieve- ment to the point of warranting professional intervention.Previous investigations of behavioural outcomes in the same cohort revealed that behavioural problems were present in the rOM group at ages 5 and 8, which indicates a continuation of problems since early childhood.8 Conjointly, these findings sug- gest that the cumulative history of OM since early childhood is likely a significant contributor to the behavioural problems observed at 10 years of age, which has also significantly impacted children's cognitive and educational outcomes.The SDQ is a widely used screening tool to assess behavioural strengths and difficulties in children and adoles- cents aged 2-17 years.11 It consists of five subscales that measure emotional and behavioural functioning and include: emotional symptoms, conduct problems, hyperactivity-inattention,

and peer problems, in addition to the prosocial subscale that measures per- sonal strengths. This emphasises the need for future studies to implement more rigorous, validated assessments of attention to differentiate between different types of attentional difficulties, if any, and to determine whether attention problems observed in this popula- tion reflect the involvement of other cognitive processes linked to ADHD and APD. Therefore, it is crucial to understand the nature of these associations, if any, as behavioural problems in early childhood may interfere with a child's academic achieve- ment.9 This study aimed to investigate: (i) whether an early his- tory of recurrent OM can result in behavioural problems in children at 10 years of age; and (ii) the likelihood of these chil- dren receiving a clinical diagnosis for mental health or a develop- mental disorder from a health professional. All regres- sion analyses were adjusted for key confounding variables previ- ously identified in the literature, including sex, ethnicity, exposure to passive smoking, family income, day care atten- dance, premature birth and birthweight.12 For all analyses, a P