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Childhood circumstances, psychosocial factors and the social impact of adult oral health

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Abstract – *Objectives:* The aim of this study was to determine whether childhood familial conditions are associated with the social impact of adult oral health and to investigate the role of psychosocial attributes as potential mechanisms by which risk might be conveyed from childhood to adulthood. *Methods:* Using a cross-sectional design, self-report data were obtained from a representative sample of adults in Australia with a telephonic interview and a self-completed questionnaire. The dependent variable was the sum of impacts on the short-form Oral Health Impact Profile (OHIP-14). Childhood familial conditions included socioeconomic position assessed by paternal occupation group, family structure and quality of rearing. Current adult sense of control, perceived stress and satisfaction with life were assessed with standard scales and social support was evaluated with four items. *Results:* Data were obtained for 3678 dentate adults aged 18–91 years. In bivariate analysis controlling for sex, age and household income in adulthood, parenting style was significantly associated with OHIP-14 scores (ANOVA, $P < 0.001$). Adults who were reared supportively had more favourable scores on all four current psychosocial attributes (ANOVA, $P < 0.001$). All four psychosocial attributes were associated with summed OHIP scores in the expected directions (ANOVA, $P < 0.001$). In the multiple regression, parental rearing style was significantly associated with social impact after adjusting for sex, age and household income in adulthood, but was no longer significant in the presence of the psychosocial factors. *Conclusion:* The importance of parental rearing to adult oral health may be mediated through the quality and nature of psychosocial attributes.

Key words: cross-sectional studies; oral health; parenting style; psychosocial; retrospective recall; social impacts

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Conditions and experiences early in life leave an indelible imprint on the individual. These exposures include, but are not limited to socioeconomic resources in the family of origin. The developmental literature points to the pivotal role of the family environment on the acquisition of social competencies, cognitive and emotional development and health habits that have lasting effects. Disruption in the developmental period between infancy and puberty is associated with deficits in physical growth (1) and increased risk for adulthood depression (2). In their meta-analysis of the literature pertaining to family environment, child development and health, Repetti et al. (3) found that families characterized by conflict, hostility and aggression and parent–child relationships that were cold, unsupportive and neglectful placed the individual at risk of behaviour problems in childhood, mental and physical disorders in adolescence and chronic health conditions in adulthood.

Studies linking familial conditions in childhood to oral health status in adulthood are sparse. To date, only one theoretical model has proposed such links. Nicolau et al. developed a model that included socioeconomic, biological, psychosocial and behavioural indicators in childhood and examined the associations between these

factors – reported retrospectively – and dental caries (4), gingival bleeding (5) and traumatic dental injuries (6) in adolescents. Familial circumstance variables included socioeconomic indicators, family structure (nuclear, single-parent, reconstituted family) parental support (trust, love, attention, understanding) and discipline (strictness, punishment). Results showed that family structure was significantly associated with gingival bleeding and family structure and paternal discipline and support were associated with traumatic dental injury. Biological and socioeconomic factors were associated with dental caries.

Apart from little theoretical attention, investigation of these relationships has been restricted by limited longitudinal data to identify whether childhood risk factors for oral health have persistent or cumulative effects over time. One exception is the Dunedin Multidisciplinary Health and Development Study. In this prospective birth cohort study, Poulton et al. (7) found that low parental socioeconomic position was significantly associated with greater dental caries and periodontal disease experience at 26 years. Moreover, they found no oral health benefit of upward socioeconomic mobility between childhood and adulthood, underscoring the importance of socioeconomic conditions to oral health early in life. Although the Dunedin Study examined family adversity, the relationship between these factors and adult oral health status has yet to be reported.

The approaches of these studies to explore how the imprint of childhood is conveyed over time to predispose individuals towards oral health outcomes later in life are consistent with the life-course epidemiologic perspective (8). Plausible pathways include a direct impact of socioeconomic resources on the affordability and accessibility of goods and services, or indirect pathways via the uptake of risk and protective behaviours, and the blocking or facilitating of psychosocial development.

We addressed this third pathway arguing that family-of-origin characteristics may diminish or enhance the capacity for psychosocial development and that certain psychosocial characteristics are associated with adult oral health status. Psychosocial attributes are increasingly being recognized for their role in influencing health outcomes. In particular, they appear to be important explanatory mechanisms for socioeconomic inequalities in health as, like health, their distribution follows a socioeconomic gradient. Taylor and Seeman (9) offer a detailed review on the relationships between psychosocial factors, socioeconomic position and health outcomes. The objective of this study was to examine associations between childhood circumstances and oral health status in adulthood, the associations of adult psychosocial factor and oral health status in adulthood. It was hypothesized that psychosocial consequences of family adversity in childhood have consequences for oral health measurable in adulthood.

Methods

Cross-sectional data were collected from the 1999 National Dental Telephone Interview Survey (NDTIS) (10) and a self-complete questionnaire mailed to adult interviewees ($n = 6{,}152$) immediately following their interview. Telephone numbers of households in all Australian states and territories were randomly sampled and a household occupant was randomly selected for the interview. Sociodemographic characteristics pertaining to adult life were measured in the telephone interview. The data set was weighted to account for differing sampling probabilities due to the sampling design and further weighted by age and sex characteristics for each sampling stratum across states and territories as estimated by the Australian Bureau of Statistics.

The theoretical relationships presented schematically in Fig. 1 show three familial characteristics in childhood and four psychosocial factors. The dependent variable, the social impact of adult oral health was measured with the short-form Oral Health Impact Profile (OHIP-14) (11) that evaluated the adverse impact of oral conditions on quality of life. Responses to the 14 items were summed with higher scores indicating a greater number of

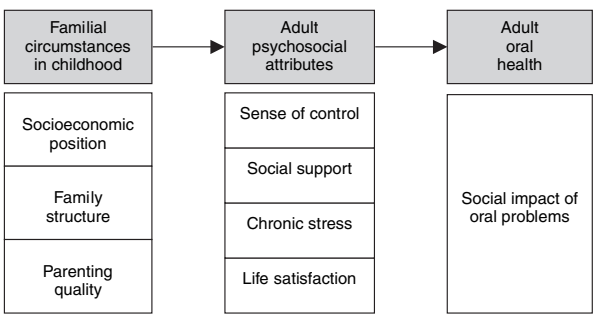

Fig. 1. Theoretical model for the associations between childhood circumstances and adult oral health hypothesized to operate via psychosocial pathways.

impacts, hence poorer oral health-related quality of life.

The selection of familial characteristics was guided by the research of Lundberg (12), who investigated associations between childhood living conditions and morbidity in adulthood using retrospective recall in a nationally representative sample of adults in Sweden. In that study, four questions were posed. One addressed economic hardship: 'Did your family experience economic hardship while you were growing up?' Family composition was operationalized as size of the family. Conflict or dissension in the family was assessed with the question: 'Was there any serious dissension in your family while you were growing up?' and the fourth question assessed parental cohabitation as a measure of family unity. Findings showed that adults who had been exposed in childhood to economic and psychosocial disadvantage had higher risk of illness and mortality later in life.

Middle childhood, the developmental stage extending from 6 to 12 years, was selected as the reference stage and adults were asked to recall different familial characteristics in childhood at the age of 10 years. Our decision to use this age was not based on any developmental significance in middle childhood but because we reasoned that children aged 10 years are sufficiently aware of these familial conditions, that they would be able to recall them later in life. Using an index age in middle childhood to measure familial circumstances retrospectively is a feature of both the Dutch GLOBE study (13) and the Kuopio Ischaemic Heart Disease Risk Factor Study (14).

Socioeconomic position was assessed with paternal occupation at the reference age of 10 years. Nine categories were offered plus a 10th category of 'unemployed' to describe paternal occupation (or that of the male carer living in the household). These categories were manager or administrator; professional; paraprofessional; tradesperson; clerk; salesperson or personal service officer; plant or machine operator, or driver; labourer; and domestic duties. A category of 'Other, please specify' enabled the assignment of unclassified occupations to one of the set categories. Family structure was assessed with the question 'When you were aged 10 years, did your parents live together or separately?' A third option of 'Unsure' was provided. The final question dealt with the parenting style. Parenting style generally refers to the elements of responsiveness (warmth or supportiveness) and demandingness (disciplinary approach) (15), among which styles such as indulgent, authoritarian, and uninvolved are distinguished. In this study, parenting style was defined as both generally positive and supportive, or generally negative and nonsupportive. The psychosocial quality of parenting was assessed with the question, 'How would you describe the parenting style of the person chiefly responsible for rearing you?' Response options were 'Generally positive and supportive', 'Generally negative and unsupportive' and 'Other, please specify'. Responses of the last option were individually assessed and reassigned where possible.

Validated scales assessed the psychosocial factors, in adulthood, of sense of control (16), perceived stress (17) and life satisfaction(18). Social support was assessed with four items based on attributes of social support – emotional, appraisal, instrumental and informational support. Questions on the sense of control, social support and life satisfaction were measured at the present point in time. The perceived stress scale asked adults to respond with respect to the previous year.

All bivariate relationships were tested for significance using one-way analysis of variance (ANOVA) having adjusted for sex, age and household income. Multiple linear regression models were used to estimate the sex, age and income-adjusted associations between familial conditions in childhood and adult characteristics on the dependent variable. Childhood characteristics were entered into the model in step 1, and continuous scores for four psychosocial factors were entered in step 2.

Results

Participation in the 1999 National Dental Telephone Interview was 56.6% ($n = 7829$). Of the 6152 interviewees who were sent the questionnaire, 3973 (64.6%) responded. In this study, we limited the analysis to dentate adults ($n = 3678$) and their ages ranged from 18 to 91 years (mean = 42.6). The sample was representative of the Australian adult population in terms of sex, age and geographic location characteristics (Table 1). Each of Australia's eight states and territories has a capital city. The label 'Capital city' refers to all these cities and includes Canberra, Australia's national capital city. In 1999, 64% of the population lived in these eight capital cities (19).

Table 1. Description of sociodemographic characteristics in adulthood and circumstances in childhood

	n	Percentage
Sex		
Male	1839	50.0
Female	1839	50.0
Age group		
18–34 years	1334	36.3
35–54 years	1475	40.1
55+ years	869	23.6
Geographical location		
State/territory capital city	2465	67.0
Noncapital	1213	33.0
Household income		
Up to $20 000	625	17.0
$20 000 to $50 000	1301	35.4
>$50 000	1507	41.0
Missing	246	6.7
Paternal occupation at age 10 years		
Executive, (para) professional	1224	33.3
Other	2364	64.3
Missing	91	2.5
Parental cohabitation at age 10 years		
Together	3284	89.3
Separately	276	7.5
Missing	119	3.2
Parental rearing style		
Positive and supportive	3201	87.0
Negative and unsupportive	304	8.3
Missing	174	4.7

About one-third classified the occupational group of their father as executive, professional or paraprofessional. At the age of 10 years, the great majority of respondents (89%) had parents who lived together, and a similar proportion (87%) reported that the parenting style of their primary caregiver was generally positive and supportive (Table 1). Overall, only 1.9% of the sample reported that their parents did not live together and that they were reared in a negative and unsupportive manner. Although significantly associated, the relationship was only weak (Spearman's rho $= 0.156$, $P < 0.001$).

Even after adjusting for sex, age and household income in adulthood, there was evidence of an association between childhood social conditions and social impact of oral health (Table 2). Although statistically nonsignificant after controlling for adult household income, adults whose father had been an executive, professional or paraprofessional had lower OHIP-14 scores than adults whose father had been in other work or unemployed. Similarly, those whose parents lived together reported lower OHIP-14 scores, although these differences failed to reach statistical significance. Adults who had been reared in a positive supportive manner had

Table 2. Mean (95% CI) social impact scores according to childhood circumstances

	Social impact (OHIP-14), Mean[a] (95% CI)
Paternal occupation at age 10 years	
Executive, (para) professional[b]	7.42 (6.95–7.88)[ns]
Other occupation[c]	7.49 (7.16–7.82)
Parental cohabitation at age 10 years	
Together	7.45 (7.17–7.73)[ns]
Separately	7.97 (7.01–8.93)
Parental rearing style	
Positive and supportive	7.35 (7.07–7.63)*
Negative and unsupportive	9.31 (8.41–10.20)

[a]Mean values adjusted for sex, age and household income in adulthood.
[b]Manager, administrator, professional, paraprofessional.
[c]Tradesperson; clerk, sales or personal service worker; plant or machine operator; labourer; domestic work; unemployed.
[ns]$P > 0.05$; *$P < 0.001$ – ANOVA.

significantly lower OHIP-14 scores indicating less impact from oral problems and hence better oral health.

The psychosocial factors were significantly intercorrelated, but not strongly so, signifying that they were separate constructs. Social support was weakly correlated with a sense of control ($r = 0.13$), stress ($r = -0.19$) and life satisfaction ($r = 0.17$). The strength of the association between control and life satisfaction was moderate ($r = 0.43$) as was the relationship between stress and control and life satisfaction ($r = -0.55$ for both).

Higher paternal occupation was associated with a lower perception of stress in adulthood and positive parental rearing was associated with a greater sense of control, more social support, less stress and greater life satisfaction in adulthood (Table 3).

After adjusting for sex, age and household income, a high sense of personal control and greater social support were significantly associated with lower OHIP-14 scores (Table 4). Higher stress scores were associated with significantly higher OHIP-14 scores.

In multivariate linear regression analyses (Table 5), the three childhood variables were entered in step 1. Negative and unsupportive parenting remained positively associated with social impact scores (OHIP-14) even having adjusting for the potential confounding of sex, age and

Table 3. Mean (95% CI) scores for psychosocial characteristics according to childhood circumstances

	Sense of control, Mean (95% CI)	Social support, Mean (95% CI)	Chronic stress, Mean (95% CI)	Life satisfaction, Mean (95% CI)
Paternal occupation				
Executive, (para) professional	2.81 (2.78–2.85)^{ns}	3.46 (3.42–3.50)^{ns}	1.53 (1.50–1.58)*	2.41(2.36–2.45)^{ns}
Other occupation	2.78 (2.76–2.81)	3.44 (3.41–3.47)	1.59 (1.57–1.61)	2.40 (2.37–2.44)
Parental cohabitation				
Together	2.79 (2.78–2.81)^{ns}	3.45 (3.42–3.47)^{ns}	1.58 (1.56–1.59)^{ns}	2.40 (2.37–2.43)^{ns}
Separately	2.84 (2.77–2.91)	3.43 (3.35–3.51)	1.55 (1.49–1.61)	2.50 (2.40–2.60)
Parental rearing style				
Positive and supportive	2.81 (2.79–2.83)**	3.48 (3.45–3.50)**	1.55 (1.54–1.57)**	2.46(2.43–2.49)**
Negative and unsupportive	2.67 (2.60–2.74)	3.20 (3.13–3.27)	1.74 (1.69–1.80)	2.03 (1.94–2.11)

Mean values adjusted for sex, age and household income in adulthood.
$^{ns}P > 0.05$; *$P < 0.01$; **$P < 0.001$ – ANOVA.

Table 4. Mean (95% CI) scores for psychosocial characteristics according to childhood circumstances

	Social impact (OHIP-14), Mean (95% CI)
Sense of control	
Low	9.67 (9.23–10.11)*
Moderate	7.18 (6.74–7.63)
High	5.50 (5.03–5.97)
Social support	
Low	7.50 (7.01–7.99)
Moderate	8.28 (7.80–8.75)
High	6.95 (6.52–7.37)
Chronic stress	
Low	4.65 (4.18–5.11)*
Moderate	7.08 (6.65–7.51)
High	10.53 (10.10–10.97)
Life satisfaction	
Low	9.61 (9.15–10.07)*
Moderate	7.24 (6.82–7.67)
High	5.53 (5.05–6.01)

Mean values adjusted for sex, age and household income in adulthood.
*$P < 0.001$ – ANOVA.

Table 5. Linear regression models (adjusted for sex, age and household income) for social impact scores with childhood circumstances entered in step 1 and adult psychosocial factors entered in step 2

	Social impact (OHIP-14)	
	B (95% CI)	*P*-value
Step 1		
Paternal occupation nonprofessional[a]	0.34 (−0.24 to 0.92)	0.244
Parents not together at age 10 years	−0.40 (−1.44 to 0.64)	0.446
Parenting negative, unsupportive	1.85 (0.90 to 2.81)	<0.001
Step 2		
Paternal occupation nonprofessional[a]	0.11 (−0.43 to 0.65)	0.692
Parents not together at age 10 years	−0.08 (−1.06 to 0.89)	0.868
Parenting negative, unsupportive	0.57 (−0.34 to 1.48)	0.218
Sense of control	−1.16 (−1.72 to −0.61)	<0.001
Social support	−0.41 (−0.82 to −0.01)	0.046
Chronic stress	3.94 (3.24 to 4.64)	<0.001
Life satisfaction	−0.54 (−0.94 to −0.14)	0.008

Adjusted $R^2 = 0.132$; $F(10, 3107) = 48.48$; $P < 0.001$.
[a]Tradesperson; clerk, sales or personal service worker; plant or machine operator; labourer; domestic work; unemployed.

household income. With the entry of the four psychosocial factors in step 2, paternal rearing no longer remained in significant association with OHIP-14 scores. Yet all four psychosocial factors were significantly associated with OHIP-14 scores in the expected direction.

Discussion

Findings supported the theoretical relationships that the psychosocial consequences of parental rearing may have long-standing implications on oral health outcomes over the life course. This study of associations between familial childhood characteristics and adult oral health is of value in that the sample size was large and representative of the adult population of Australia. The major finding was the relationship between the rearing style of parents and both psychosocial characteristics in adulthood and the social impact of oral problems. Our interpretation of this is that childhood circumstances might play a role in the pathway to adult oral health by influencing psychosocial development. This supports a growing body of evidence showing that psychosocial factors, such as stress (20) influence the population gradient in subjective health, even after adjusting for socioeconomic circumstances.

Although parental rearing style had a direct association with the social impact of adult oral health, we argue that the primary impact of childhood conditions on the oral heath-related quality of life was indirect and operated primarily through psychosocial mechanisms. Thus the importance of childhood characteristics to adult oral health may be mediated through intermediary mechanisms such as the quality and nature of psychosocial attributes linked to childhood environment.

The quality of parenting was significantly associated with psychosocial attributes in adulthood. Adults who described their rearing as unsupportive reported lower levels of control, support and life satisfaction in adulthood and greater stress. These relationships supported the hypothesized links between familial characteristics and oral health status in adulthood via a psychosocial pathway.

The estimate of one-parent households obtained in this study (7.5%) is lower than census rates of 15.5% in 2001. However, earlier census rates are lower reflecting the upward trend in this demographic characteristic (21). Given that respondents are reporting familial circumstances sometimes many decades earlier, the lower estimate in this study is understandable.

Parental cohabitation status was not significantly associated with adult psychosocial profile. Sole-parent status may not disadvantage the child's psychosocial development, especially if the parent provides a secure attachment figure for the child (22) and where socioeconomic resources are adequate. In comparison, children in two-parent households exposed to parental conflict may be at greater risk of poor psychosocial development.

All four psychosocial factors were significantly associated with oral health even after adjusting for sex, age and household income. Adults with high scores for a sense of control, social support and life satisfaction reported that oral conditions disrupted their quality of life less often while adults with higher OHIP-14 scores had significantly higher levels of stress.

There are several limitations to this study. Foremost among these is the cross-sectional study design. Because household income, OHIP-14 scores and psychosocial factors were measured at one point in adulthood, it is not possible to establish the temporal sequence of these events or to infer that any of the observed relationships played an important aetiological role. However, it is fair to conclude that familial characteristics of childhood preceded household income and oral health in adulthood. Whether childhood circumstances also preceded the psychosocial profiles is less certain. Our argument that parental rearing style influenced psychosocial development was examined with three characteristics pertaining to the family of origin while the literature recognizes that peers and school life also contribute to the psychosocial development of the individual. Yet we contend that primary socialization occurs during critical periods early in family life and that secondary socialization in middle childhood tends to fortify positive and negative characteristics established earlier. Another potential limitation is recall bias. For the 8% of adults aged ≥70 years, retrospective reporting to the reference age of 10 years necessitated participants to recollect circumstances from ≥60 years earlier. The validity of retrospectively reported information has been explored. In reviewing the literature on retrospective reports in adulthood of major adverse childhood experience, Hardt and Rutter (23) concluded that such recollections produced a high rate of false negatives and substantial measurement error. However, the extreme nature of these experiences was of high emotional salience to the respondents and this might affect judgement in ways that are not significant in this kind of study. Other findings are positive about the validity of retrospective recall. For example, Krieger et al. (24) found that childhood socioeconomic position and paternal education were accurately recalled in adulthood and that recall was not affected by adulthood socioeconomic position, ethnicity or age. In testing a temporal referencing system (lifegrid) to assist the retrospective collection of personal details, Berney and Blane (25) found that recall bias on information recorded 50 years previously was minimized if the material was not detailed. For example, occupational and residential information were accurately recalled, but childhood illness was less accurately recalled. There is no doubt that prospective data are preferable to that obtained by retrospective recall, but the cost of collecting it, loss to follow-up and the sheer paucity of data in areas of current interest means that methods other than longitudinal collections warrant investigation. The limitations of data obtained retrospectively by self-report are in part compensated by the fact that prospective cohorts are constrained by a fixed sample structure and the selection of data items are governed by the scientific principles relevant to earlier research interests (26).

An additional potential limitation is that all measures used in this study were self-reports and

hence may be affected by mono-method bias. This bias inflates relations among constructs measured by the same person and by using a single method. However, as with personality characteristics like negative affectivity (the tendency to accentuate the negative aspects of situations), we argue that it is the perceptions of situations that matter for health, irrespective of independent objective observations. In addition we selected paternal occupational group and parental cohabitation status as objective indicators that are not prone to subjective interpretation.

Psychosocial attributes remain relatively unexplored in the oral health literature, although they have gained prominence elsewhere (27, 28). The combined literature suggests that these factors may not be causally linked to health outcomes, but rather act as signposts of underlying social conditions that predispose population groups to risk (29).

We have plotted steps along a theoretical pathway linking childhood circumstances to adult oral health by proposing psychosocial factors as the key explanatory mechanisms. We have supported the theoretical links with empirical data and with findings from other research. This study makes a contribution to the oral health literature, particularly with respect to the contemporary interests in explaining variation in population health and conceptualizing of disease aetiology in a life course framework. Yet many questions remain unanswered. We used three simple binary measures of familial environment in childhood. On two of these measures (cohabitation, parenting style) the great majority of participants offered the same response (together, generally positive and supportive). More sensitive measures are needed that permit much finer measurement of variability in the population. Ways of obtaining valid measures of childhood environment that are relevant to theoretical models of disease aetiology are needed. For example, birth certificates often carry paternal and maternal occupation data.

Little is known about the biological mechanisms involved by which psychosocial factors affect disease risk. These relationships need to further explored. We used self-reported oral health. Future research is required using clinical findings from oral examination data, extending the research of Nicolau et al. (4–6) and Poulton et al. (7) to include larger samples and theoretically supported determinants of health from childhood.

The role of behavioural determinants over the life course in affecting adult oral health is relatively unexplored. In a British birth cohort, early life conditions were examined for their association with tooth retention in middle age (30). Apart from socioeconomic position, variables were birth weight adjusted for gestational age, housing conditions at birth, infant feeding and pacifier use. Against these factors, the relative impact of adult risk behaviours (smoking, alcohol use, total daily dietary sugars, hormone replacement therapy use) was examined. The study found that, compared with factors in adulthood, childhood variables contributed little to the explained variance in tooth retention. This finding is not surprising as there is little theoretical basis to support an association between infant feeding and pacifier use and tooth loss later in midlife. Based on findings from general health research, we would not expect that behavioural factors explain a substantial proportion of the relationship between childhood circumstances and adult oral health. Studies have attributed about 10% of the effect of childhood circumstances on adult health to unhealthy behaviour (31). Where behavioural studies would be more useful is to investigate whether psychosocial factors associated with childhood circumstance predict behaviours that influence oral health status such as dental visiting and dental self-care.

This study builds on substantial evidence that circumstances in childhood leave a lasting imprint on the individual. We found that retrospectively recalled childhood circumstances were related to psychosocial profile in adulthood and to varying degrees were also related to adult oral health status. All four psychosocial factors were associated with adult oral health. If the effects on subsequent oral health outcome of childhood exposures are irreversible, this area has serious implications for timing and targeting of health promotion. However a preliminary step involves advancing the present theoretical models in oral health for designing research that has sound conceptual underpinning to tease out the complex relationships between socioeconomic position, childhood circumstances and oral health outcomes. There is a challenge to develop better methodological approaches to yield valid measures of relevant exposures in childhood and to do so in ways that are simple and affordable, or to find ways to better utilize existing cohort data.

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