



Quality of life and impact of continuous subcutaneous insulin infusion for children and their parents

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Introduction

Living with the burden of diabetes can impact heavily on an individual's quality of life (QoL).¹ Thus, minimising the impact of diabetes (and its treatment) on QoL is recognised as an important goal along with achieving near normal glycaemia, minimising the risk of severe hypoglycaemia, and delaying or preventing late vascular complications.² A number of studies report that insulin pump therapy (also known as continuous subcutaneous insulin infusion [CSII]) improves glycaemic control and some aspects of health-related quality of life (HRQoL) in those with a history of sub-optimal glycaemic control.^{3,4} Three randomised controlled trials^{5–7} have focused on the use of CSII in children/young adults (i.e. <18 years). However, in two of these^{5,7} no QoL benefits were found while the other had mixed results. This is counter to qualitative research where individuals report profound QoL benefits.⁸ The lack of evidence for QoL benefits and the general inconsistencies between study findings may be a function of:

- Lack of sensitivity/specificity of the psychological measures used, e.g. not assessing aspects of life that are relevant or important for individuals or not assessing QoL *per se*.
- The problematic nature of collecting data (directly or indirectly) from children and young people.
- Failure to control for confounding variables (e.g. contact time, education).

These factors have been high-

ABSTRACT

This study aimed to identify key components of quality of life (QoL) and assess the impact of insulin pump therapy on children/adolescents with type 1 diabetes and their parents.

The Schedule for the Evaluation of Individualised Quality of Life (SEIQoL) interview was adapted to be (1) insulin pump-specific, (2) suitable for children and their parents, and (3) suitable for telephone administration. Interviews were conducted separately with children/parents to elicit the five most important aspects of life for their QoL and to identify the impact of insulin pump therapy on those domains.

All children (and parents) who were registered on the Roche Diagnostics insulin pump user customer database were invited to participate.

Participants included 15 children/adolescents (mean age 12.07±2.71 years; range 9–17 years) and 17 parents. Mean diabetes duration was 6.67±2.42 years (range: 2–12 years). There was no significant difference in length of interview between parents and children ($p=0.281$). All parents reported the impact of their children's insulin pump therapy on their own overall QoL as positive (47.1% very much better, 35.3% much better, 17.6% better). Fourteen children/adolescents answered this question and all responses were positive (28.6% very much better, 57.1% much better, 14.3% better). For parents, the most frequently reported aspects of life important for their QoL were 'health' and 'family' whilst children most frequently reported 'family', 'friends' and 'school'.

In conclusion, all children and their parents reported the impact of pump therapy on their QoL to have been positive. Furthermore, parents perceive many benefits of importance for their own QoL from their child(ren) using insulin pump therapy. Copyright © 2008 John Wiley & Sons.

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KEY WORDS

quality of life; SEIQoL; CSII; insulin pump therapy; paediatric

lighted previously^{9–11} and suggest that further research is needed to identify the issues that are both relevant and important for the QoL of young people using CSII therapy. Several studies have been conducted using the Schedule for the Evaluation of Individualised Quality of Life (SEIQoL), an interview technique that has been found to be sensitive to differences between patient groups.^{12–14} In the first study of 42 healthy individuals, only 35 (83%) nominated 'health' as a domain,

attaching weights for the importance of 'health' for QoL varying from three to 59 out of a possible 100.¹² In a study of 40 patients with gastrointestinal problems, reported in the same paper, only 70% nominated health. McGee and colleagues concluded: 'The assumption that health is the only, or indeed the major, QoL priority for patients appears unjustifiable. Patients are as concerned, or more concerned in many instances, about aspects of their lives other than health.'¹²

This supports the suggestion that

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diabetes and its treatment may not always be the highest priority for people with diabetes especially, perhaps, young people. The SEIQoL has since been used in a study of 15 adolescents with type 1 diabetes,¹⁵ who were asked to nominate five domains of life important for their overall QoL. To this list, a sixth domain, 'diabetes', was imposed, to determine its relative importance in the adolescents' lives. Surprisingly, the adolescents were unanimous in their nomination of three domains considered to be important for their QoL: 'family', 'friends' and 'school'. A further 22 domains were nominated, which were grouped into 10 categories, plus the 'diabetes' domain. Only four of the 15 participants considered 'diabetes' to be the most important aspect of life for their QoL, with the remainder rating it as fourth or lower on their list. The fact that diabetes was such a low priority for so many of the adolescents is indicative that 'treatment strategies that take account of the importance of other aspects of life are more likely to be successful'.¹⁵ For some individuals, CSII may well be such a treatment strategy. Furthermore, when the diabetes specialist nurse (who had known most of these patients since diagnosis) was asked to rate each of the adolescents' QoL, her rating was more closely related to their HbA_{1c} results than to the adolescents' own ratings (though neither correlation was significant). This finding confirms that estimating a patient's QoL is not intuitive and that there is no substitute for asking the patient to indicate how diabetes and its treatment affects his/her QoL.

Given the paucity of evidence relating to QoL benefits in young people using insulin pump therapy, the purpose of our study was to explore the impact of CSII on the QoL of (a) children/adolescents using CSII and (b) their parents, using the SEIQoL interview method.

Method

Following receipt of University of Southampton Ethics Committee approval, a series of structured interviews were conducted to explore subjective experiences of children/adolescents using CSII and of their parents.

Participants

Participants were invited to take part in the study if they were:

- Registered on the Roche Diagnostics insulin pump user customer database.
- Parents of a current insulin pump user aged ≤18 years.

Procedures

A letter was sent outlining the study to all eligible parents on the insulin pump users database (n=110), asking for written consent to approach them and their child(ren). Enclosed with the letter was a detailed information sheet and consent form for both the parent and their child(ren) to sign if they were willing to participate.

On receipt of signed consent forms, parents were telephoned to schedule the interview and were sent relevant materials (i.e. SEIQoL response sheets). Two trial interviews were conducted to ensure clarity and understanding of the interview, which were both uneventful. Telephone interviews were conducted separately with children/adolescents and their parents. No biomedical data were requested, as the focus of the study was to explore self-reported QoL and the impact of CSII on it.

The SEIQoL formed the basis for all interviews: using the generic SEIQoL, interviewees were invited to identify five domains of life relevant for their QoL, to rate how good or bad these domains are and the relative importance of each for their QoL overall. The SEIQoL was adapted to be:

- CSII specific: following elicitation of the five key areas of QoL, instead of rating the domain *per se*, participants were asked to identify how CSII use impacted on each domain and overall QoL.
- Suitable for each target population – i.e. parents, adolescents (aged 13–18) and children (aged up to 12 years). We reworded the schedule to a reading age of eight years for the children/adolescents.
- Suitable for use in a telephone interview, following successful adaptation in previous research.¹³

Analysis

For the quantitative data, statistical analyses were conducted using SPSS v14. Frequency analyses were con-

ducted for QoL domains elicited, the impact of CSII on those domains and on overall QoL, and rankings of domains. Overall QoL scores were calculated. Analyses were conducted for all participants and separately for the three cohorts – i.e. parents, adolescents (aged 13–18) and children (aged ≤12 years).

Content and thematic analyses were conducted to explore positive and negative experiences of CSII use separately in children, adolescents and parents. Content analysis focused on the number/frequency of 'instances', their context, meaning and whether they were common across participants. Thematic analysis concentrated on identifying key themes arising with a view to understanding the experiences of children/adolescents and their parents, exploring connections between themes and identifying how CSII affects QoL in ways that are important to children/adolescents and their parents.

Results

Fourteen (93%) of the child/adolescent participants had previously been using multiple daily injection regimens. All child/adolescent participants had been using CSII therapy for more than six months prior to the study.

Completion rates and validity

Thirty-two participants were interviewed by telephone from across the UK. Their data contributed to all statistical analysis conducted (see Table 1). Of these, 17 interviews were conducted with parents (16 mothers and one father) and 15 with children/adolescents. Due to database limitations (i.e. the database had not been maintained, so it was not possible to confirm its accuracy) and confidentiality issues, it was unclear how many participants met the inclusion criteria, or whether those responding were representative of the entire database population. Thus, the sample was opportunistic. All child/adolescent participants were established CSII users. All participants fully understood the purpose and content of the interview and appeared able to complete the judgement tasks using the adapted SEIQoL interview.

**Table 1.** Participant demographics

	Children (n=9)		Adolescents (n=6)		Parents (n=17)		p-value
	Mean±SD	Range	Mean±SD	Range	Mean±SD	Range	
Age (years)	10.2±1.39	9–12	14.8±1.47	13–17	–	–	–
Duration of diabetes (years)	5.78±1.86	2–8	8.0±2.37	5–12	–	–	–
Interview duration (mins)	15.89±3.06	11–20	12.83±5.04	9–22	19.64±5.38	12–29	0.281

Table 2. Impact of CSII therapy on overall QoL

Response options	Children (n=8)		Adolescents (n=6)		Parents (n=17)	
	n	%	n	%	n	%
Very much better	2	25.0	2	33.3	8	47.1
Much better	5	62.5	3	50.0	6	35.3
Better	1	12.5	1	16.7	3	17.6
No difference	–	–	–	–	–	–
Worse	–	–	–	–	–	–
Much worse	–	–	–	–	–	–
Very much worse	–	–	–	–	–	–

Quantitative analysis of the impact of CSII on QoL

Every child, adolescent and parent reported the impact of CSII on their own overall QoL to have been positive (see Table 2).

For parents, the three most frequently reported aspects of life important for their QoL were 'health' (n=16), 'family' (n=12) and 'work' (n=7), whilst children/adolescents most frequently reported 'family' (n=14), 'friends' (n=14) and 'school' (n=11). (See Table 3). Following the initiation of their child's pump therapy, parents indicated that their own 'health' had improved. Whilst 'health' was nominated as a life domain by 16 parents, only six (38%) of those rated it as the most important domain for their QoL. Four children (44%) and four adolescents (66%) nominated 'health' as one of their six domains, with none rating it as the most important domain for QoL.

Thematic analysis of cohorts

Children

The nine children cited six discrete life domains during their interviews (see Table 3); the three most frequently cited domains are explored in further detail here, with quotations detailed in Table 4.

All nine cited 'friends' as important for their QoL, with six reporting the impact of CSII to have been positive and three indicating that it had made no difference to this aspect of their lives. Responses focused on independence and freedom from perceived restrictions such as timing of injections, and mealtimes. Eight of the nine children listed 'family' (or home life) as one of their life domains. Of these, six reported the impact of CSII to have been positive, one reported no difference and one reported that it had had a negative impact (see Table 3). Comments reflected the reduced interference and greater freedom that the children associated with CSII in comparison with other forms of treatment. None of the participants mentioned family relationships or family interactions. Rather, respondents focused on the effect on everyday life of CSII and the lack of insulin injections. 'School' was raised as a domain by five children with each of them reporting that the impact of CSII had been positive. Again, issues of independence and the benefits of not having to inject were prominent.

Adolescents

The six adolescents also nominated six discrete domains during their

interviews (see Table 3), although these did not replicate exactly those cited by children; the three most frequently cited domains are explored in further detail here.

All six adolescents cited 'family' as an important domain, though they reported varied impact of CSII on this domain. Two participants reported CSII as positively impacting on food timing and choices, while others described the positive impact in terms of being able to function as a family without the interruption of insulin injections.

All adolescents cited 'school' (or education) as a domain, with five reporting a positive impact of CSII and one reporting no impact at all. No longer having to inject at school was considered beneficial both in terms of not leaving classes repeatedly to perform injections plus being able to focus more on 'school life' without the added stress of diabetes treatment. Participants reported being more able to focus on school as a teenager without the stigma of 'being sick' or of 'being different'.

Five adolescents cited 'friends' as a domain, reporting that their friendships were either 'no different' (n=3) or 'much better' (n=2) as a result of

Table 3. Impact of CSII on life domains

	n	%	Very much better		Much better		Better		No difference		Worse	
			n	%	n	%	n	%	n	%	n	%
Children												
Friends	9	100.0	1	11.1	2	22.2	3	33.3	3	33.3	–	–
Family	8	88.9	1	11.1	4	44.4	1	11.1	1	11.1	1	11.1
School	5	55.6	2	22.2	–	–	3	33.3	–	–	–	–
Leisure	5	55.6	1	11.1	–	–	1	11.1	1	11.1	2	22.2
Health	4	44.4	1	11.1	2	22.2	1	11.1	–	–	–	–
Religion	2	22.2	–	–	–	–	–	–	2	22.2	–	–
Adolescents												
Family	6	100.0	1	16.7	2	33.3	1	16.7	2	33.3	–	–
School	6	100.0	–	–	2	33.3	3	50.0	1	16.7	–	–
Friends	5	83.3	–	–	2	33.3	–	–	3	50.0	–	–
Leisure	4	66.6	–	–	3	50.0	–	–	1	16.7	–	–
Health	4	66.6	4	66.6	–	–	–	–	–	–	–	–
Happiness	2	33.3	1	16.7	1	16.7	–	–	–	–	–	–
Parents												
Health	16	94.1	9	52.9	3	17.6	4	23.5	–	–	–	–
Family	12	70.6	8	47.1	3	17.6	1	5.9	–	–	–	–
Work	7	41.2	1	5.9	1	5.9	3	17.6	2	11.8	–	–
Finances	6	35.3	–	–	–	–	2	11.8	4	23.5	–	–
Leisure	4	23.5	1	5.9	1	5.9	1	5.9	–	–	1	5.9
Friends	3	17.6	1	5.9	–	–	1	5.9	1	5.9	–	–
Security	3	17.6	2	11.8	1	5.9	–	–	–	–	–	–
Happiness	2	11.8	2	11.8	–	–	–	–	–	–	–	–

using CSII. Similarly to ‘school’, the main theme emerging for adolescents was the ability to fit in with friends rather than being identified as ‘different’. Connected to this was the increased dietary freedom reported by participants, which increased their ability to eat the same foods as their friends, at the same times, engendering feelings of similarity rather than difference.

Parents

The 17 participants in the parent cohort cited eight discrete domains important for their QoL (see Table 3), three of which are discussed here with quotations detailed in Table 4.

Health. Almost all parents raised ‘health’ as important for their QoL and all of those reported the impact of their child’s CSII on their own ‘health’ as positive. However, only six (38%) of these participants (35% of all parents) rated it as the most important domain for their QoL. Of the remaining 10 parents, three rated it second, five as third and two

rated it as their fourth most important life domain.

There were also a variety of meanings associated with the domain ‘health’. The impact of CSII was reported in terms of health benefits, particularly for their child with diabetes, but also in terms of the impact of CSII on their own health and that of other family members. Most commonly this referred to reducing their own stress levels since the introduction of CSII (n=5).

Other reported health benefits from CSII included their child’s improved blood glucose control (n=6). Whilst these comments related directly to the health of the child/adolescent, their frequent mention reflects the parents’ perceived importance of control over their children’s diabetes for their own QoL. Greater control was associated with better health for the parents, which in turn impacted on their QoL in terms of less worry and more confidence about the future (see Table 4). The long-term health benefits for their children were

mentioned by three parents. The ability to alter the insulin dose rapidly was raised by two parents, in terms of being able to reduce blood glucose levels more quickly than waiting for an insulin injection to be fully effective.

Family. Twelve parents reported ‘family’ as important for their QoL, all of whom reported the impact of CSII as positive. Seven parents defined the benefits for their ‘family’ in terms of the increased freedom that CSII had provided, particularly around food-related issues. Being able to function more as a family, without interruptions for meals at pre-specified times, was a major benefit. Some parents commented on their child’s happiness since the switch to CSII and the subsequent impact that this had on other family members.

Work. Seven parents cited ‘work’ as important for their QoL, with five indicating a beneficial impact of CSII and two reporting no difference. The

**Table 4.** Participants' comments for three most frequently cited domains important for QoL [participant ID]

Children	Adolescents	Parents
Friends 'When I'm out, I don't have to do an injection; I can just press a button and it's done for you' [113] 'I can go to friends' houses without my mum following me everywhere' [111]	Friends 'It didn't really affect it anyway, but it just means if I have anything to eat, I don't have to inject myself anymore, I can just get on with it' [119] 'Before [when] I wasn't on the pump and I couldn't do certain stuff like eat the same foods as them ... But now I can have them [snacks] whenever I want' [116]	Health 'It means life on a daily basis is much less stressful than before' [101a] 'I'm a lot calmer and less stressed about the condition with the pump' [112a] 'Her long-term health prospects are just looking far more positive than we could have achieved on multiple injection therapy' [112a]
Family 'It's just easier than having to do the injections' [113] 'More freedom with food' [108]	Family 'It makes cooking and stuff easier and choosing food shopping' [119] 'Before I had to eat at certain times, now I can eat whenever' [114] 'It just means everything's much easier so we can do stuff that we like together rather than being interrupted by injections' [118] 'I'm less narky and stuff with my parents; it's a nice atmosphere' [114]	Family 'It has given us considerably more freedom as a family. We're not restricted to mealtimes' [108a] 'He's happier – it's made us happier' [106a] 'The control is much better of her diabetes so she is much happier and much more relaxed which makes us all a lot calmer and more relaxed' [112a]
School 'If I'm high [hyperglycaemia], I can just go and phone Mum, say what I want and she can phone me and I can do it myself, save her coming in [to school]. It's a lot better really' [111] 'No injections at school any more' [108]	School 'It's better than injections, a lot easier. You don't have to inject at school' [106] 'We had to go to the first aid room when we had to do injections at school and that wasted time really' [119] 'It's just less stressful so I can concentrate on my school work and stuff' [118]	Work 'When she's at school I know she can be bolusing for her food and her general health is good, so I don't come to work and worry' [105a] 'She was in school and I used to get phone calls from school saying she's just had a hypo, she's not feeling well, she's this, she's that and since she's been on it [the insulin pump] we haven't had, touch wood, a single phone call' [114a]

major advantage appeared to be fewer interruptions at work with implicit implications for anxiety levels. Prior to their child's starting CSII, parents reported frequent interruptions to their working day and often being called away from work to administer insulin injections or deal with the effects of hypo- and/or hyperglycaemia. All parents who raised this issue said that these interruptions had stopped since their child had been using CSII. Not having to worry about their child whilst he/she was at school was mentioned

by five parents. The knowledge that their child was able to bolus their own insulin had reduced some of the stress and anxiety for parents.

Discussion

Our study demonstrates that QoL is indeed multifaceted and complex. Some common themes emerged and all children, adolescents and their parents reported the impact of CSII therapy on their QoL to have been positive. One third of parents reported 'health' as most important for QoL but none of the children did

so. Consistent with the literature,¹⁵ children most frequently reported 'family', 'friends' and 'school' as important for their QoL. For parents, the most frequently reported domains important for their QoL were 'health' (n=16), 'family' (n=12) and 'work' (n=7). Following initiation of CSII, most parents and children/adolescents rated these domains as having improved (sometimes substantially). In terms of leisure, however, (fourth most frequently cited domain for children), two child participants reported the impact of CSII as 'worse'. This was

explained by their dislike of the constant presence of the pump when socialising.

Our sample size, typical of qualitative research, was small but the fact that many themes were mentioned by the majority (if not all participants) suggests that saturation point was reached. However, due to database limitations, we cannot be sure that these results are generalisable to the wider population of children/adolescents using CSII (or their parents). Given that these participants were (a) listed on a Roche customer database, and (b) self-selected to participate, their accounts may well be more favourable than the average CSII user (or parent). Every opportunity was available for participants to suggest that CSII may have impacted negatively on their QoL but few reported their experiences as negative. However, all children/adolescents who participated had been using CSII for at least six months and, thus, were likely to have found the treatment to suit them.

When asked to identify five aspects of life important for QoL, participants sometimes found it difficult both to select five domains and to rank them in order of importance. This task requires people to think about issues that they might usually take for granted. It could be argued that having to engage in this thought process provides a better reflection of a person's QoL than simply ticking boxes on a questionnaire, where issues for consideration have been imposed by the researcher. Furthermore, having to think about individual aspects of life separately and in the context of overall QoL enables participants to piece together the different areas into one 'bigger picture'. QoL is subjective and may, indeed, represent a whole that is larger than its constituent parts.

The diverse list of life domains and the subjective descriptions of those domains reported by participants highlight the degree of difference between individuals when asked to define the five most important aspects of their life for their QoL. This is further exemplified in the range of responses received in terms of the impact of CSII on each domain. It is precisely because of such differences and the subjective

nature of QoL that 'there is no substitute for asking patients what is important to them, how good these things are in their life and how the elements of their life affect each other and their overall QoL'.¹⁵

Despite being rated most frequently by 16 of the 17 parents, 'health' was rated as most important for QoL only by six (35%). Only eight children/adolescents (53%) listed 'health' as one of their five domains, with none rating it as the most important aspect of life for QoL. Again, this finding is consistent with the literature, which suggests that 'health' is not the major QoL priority for everyone¹⁰ and indicates that the use of health status instruments (e.g. SF36 and EQ5D) are unlikely to be useful when evaluating the benefits of new treatments. It is widely recognised that QoL is an important health outcome in diabetes. During brief clinic consultations, it can be difficult to accommodate discussion of anything other than diabetes-specific issues. However, this and previous studies show that various aspects of QoL are affected by diabetes and its treatment. Given that health was a lower priority for children/adolescents than other aspects of life, such as friends and family, we can assume that, for many, their diabetes management is likely to be compromised in favour of other activities. Clinicians need to be aware of this and focus consultations on identifying ways in which treatments can be tailored to the individual.

Not only is health not the major priority for everyone, but the first area of importance reported by participants was not always the area that they considered to be most important when asked to rate the relative importance of each domain. Adolescents, however, were most likely to rate the first nominated domain as the most important.

In terms of 'health', parents cited improved blood glucose levels and the long-term good health of his/her child/adolescent in terms of their own health. The diversity in meaning of 'health' by parents may reflect their concern for the overall well-being of their family, particularly when combined with domains of 'finances', 'children's welfare' and 'security'. Furthermore, a number of

parents attributed a reduction in their own stress levels to their child's CSII. Feeling less worried about one's child/adolescent during lengthy periods of separation such as the school/working day had positive implications for a number of parents' own QoL in terms of their own emotional well-being.

Previous research suggests that the QoL of other family members is affected positively when the person with type 1 diabetes uses CSII.⁸ The results of the current study support this finding, not only in terms of effects on family life, but also on parents' working lives. Five parents (29.4%) reported less disruption to their working life (i.e. fewer telephone interruptions, not having to leave work to administer insulin injections or deal with the effects of hypoglycaemia and/or hyperglycaemia) with benefits for their work/career as well as for their emotional well-being (as discussed above). Interestingly, a larger percentage of parents than children or adolescents (47.1% compared to 25.0% and 33.3% respectively) rated the impact of CSII therapy on their overall quality of life as 'very much better'. This ties in with the reduced stress reported by parents and perhaps reflects the parents' ability to hand over greater responsibility for diabetes management to their children.

Issues around food, food choices, meal timing and not having to inject prior to eating were raised frequently by participants in all cohorts. Being able to go out as a family without having to plan for mealtimes or being able to engage in 'normal' family activities were perceived as important for a number of participants. Two adolescent participants reported CSII to have had a positive impact on food timing and choices (a factor also highlighted by parents). This, perhaps, reflects the opportunity that CSII offers for families to return to 'normal' family life, for example being able to go out for a meal together, with less intrusion from the demands of a traditional insulin injection regimen. This supports previous research, i.e. results from an adult cross-sectional study that showed all participants reporting QoL benefits associated with CSII.¹⁶ These are recurring



Key points

- All children, adolescents and parents reported improved QoL
- Family, friends and school are most important QoL factors for children and adolescents
- Health, family and work are important for parent QoL
- Health cannot be regarded as a major factor affecting QoL

themes in the recent literature and a recent pilot study reports food-related benefits for participants.⁸ The DAFNE programme has shown that dietary freedom (the most negatively impacted aspect of life for people with diabetes¹) is significantly improved following training in flexible, intensive insulin therapy,¹⁷ with QoL benefits well maintained at four-year follow up.¹⁸ The findings of the current qualitative study suggest that insulin pumps may also have benefits for people in terms of reducing the negative impact of diabetes on dietary freedom.

One factor that needs to be considered when analysing results from the different cohorts participating in this study is that individuals change with time. The basis on which they make a QoL judgement, therefore, is also likely to change. This phenomenon is referred to as response shift.¹⁹ This has important implications for assessing the effects of treatments, not least because a change in QoL may reflect a response shift, a treatment effect, or a complex combination of the two. The timing of QoL assessments needs to be considered and longitudinal assessment carried out to determine whether such response shifts (a) occur and (b) impact on self-reported QoL. The differing patterns of domains reported by children, adolescents and parents suggest that such response shifts may occur.

Overall, and despite concerns regarding generalisability, the results of this study highlight the largely positive impact of CSII on the QoL of those children/adolescents who have continued to use it for at least six months, as well as on their parents and (inferred by the parents) other family members. The introduction of CSII brought perceived benefits for most parents in terms of their own QoL, in addition to the QoL benefits reported by the children/adoles-

cents. This suggests that future research would do well to consider the wider benefits of diabetes treatments (i.e. not only for the person with diabetes but also for their immediate family).

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Conflict of interest statement

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