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What matters to children with CFS/ME? A conceptual model as the first stage in developing a PROM

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ABSTRACT

Background Paediatric chronic fatigue syndrome (CFS)/myalgic encephalomyelitis (ME) is relatively common and disabling. Research is hampered because current patient-reported outcome measures (PROMs) do not capture outcomes that are important to children with CFS/ME.

Aim The aim of this study was to explore the aspects of life and health outcomes that matter to children with CFS/ME.

Methods Twenty-five children with CFS/ME were interviewed (11 males, 14 females; mean age 12.9 years (SD 2.2), range 8–17). Twelve were trial participants interviewed during the trial and 13 were recruited as part of a follow-up qualitative study. Parents were present in 19 interviews with their children. Three mothers participated in a focus group. All the interviews and the focus group were audio-recorded and transcribed. Data were analysed thematically using techniques of constant comparison. NVivo was used to structure and categorise data in a systematic way.

Results Children identified four key themes (health outcome domains): 'symptoms' that fluctuated, which caused an unpredictable reduction in both 'physical activity' and 'social participation' all of which impacted on 'emotional well-being'. These domains were influenced by both 'management' and 'contextual factors', which could be positive and negative. The relationship between healthcare and school was considered pivotal.

Conclusions Children's descriptions helped to inform a conceptual model that is necessary to develop a new paediatric CFS/ME PROM. Doctors need to be aware of how children conceptualise CFS/ME; the relationship between healthcare and school is fundamental to ameliorate the impact of CFS/ME.

Trial registration number ISRCTN81456207.

What is already known on this topic

- Chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME) is an important disabling illness in childhood.
- Children with CFS/ME attend less school and can have mood problems.
- There is currently a lack of qualitative evidence describing important outcomes to children with CFS/ME.

What this study adds

- Children with CFS/ME report a range of often extreme impacts on their health and ability to participate in school and society.
- A new patient-reported outcome measure for paediatric CFS/ME should measure symptoms, their impact on physical activities, participation in school and social activities, and mood.
- Supportive schools, family and friends and strategies to manage activity can help ameliorate symptoms.

INTRODUCTION

Chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME) is characterised by severe disabling fatigue[1] with additional symptoms including musculoskeletal pain, sleep disturbance, cognitive dysfunction, headaches, dizziness and sweats.[2] Paediatric CFS/ME is relatively common with a prevalence of between 0.4% and 2.4%[3–6] in population studies and between 0.06% and 0.1%[7 8] in studies based in hospital settings. It is disabling[9–11] with a negative impact on quality of life.[9–16] Despite this, research is hampered by the lack of high-quality patient-reported outcome measures (PROMs) for adults[17] and children.[18]

Well-developed PROMs enable clinicians and researchers to collect patient-centred evidence on outcome.[19 20] PROM development starts with a patient-derived conceptual framework that defines the key outcomes to be measured.[21–23] Qualitative exploration of the outcomes that really matter to children with CFS/ME is limited.[18] This paper describes the combined results from two studies describing the aspects of life and health outcomes that really matter to children with CFS/ME.

METHODS

Participants

Children with CFS/ME were recruited into two separate studies through a large regional specialist CFS/ME service in South West England by their specialist clinician. Children were eligible if they were diagnosed with CFS/ME using the National Institute for Health and Care Excellence criteria,[2] mildly to moderately affected (not housebound) and able to understand the patient information sheets. Consecutive children were approached to take part in the Specialist Medical Intervention and Lightning Evaluation (SMILE) trial from September 2010 to December 2011 and PROMS study from

June to August 2012 in assessment and follow-up clinics. If eligible, they were informed about the relevant study by their specialist clinician and given patient information sheets. Consent was obtained from the family to be contacted by a researcher to arrange an interview.

SMILE trial

Children (aged 12–18 years) and their parents were interviewed as part of the SMILE trial about whether PROMs used were suitable to assess the impact of CFS/ME and measure important outcomes.[24 25] Children and their mothers were interviewed at three possible time points using a checklist of topics[24 25] usually at the participants' homes. Purposive sampling ensured interviews included a range of informants, in terms of age, sex and families from both intervention arms (maximum variation sampling).[24 25]

PROMs study

We then extended this work in a further qualitative study recruiting participants from a wider age range (aged 8–18 years) to explore the key health outcomes important in paediatric CFS/ME (PROMs study). Semistructured interviews in participants' homes were used to explore how children with CFS/ME describe the impact of CFS/ME. A topic guide (see online supplementary appendix 1) informed by previous reviews[17 26] was sent in advance to children and their parents before the interview. We conducted one focus group for parents (without their child) to discuss aspects of quality of life that they felt were important.

Data collection and analysis

Qualitative data

For both studies, interviews were recorded and transcribed verbatim. Data analysis was an ongoing and iterative process. Interviews were stopped when we reached data saturation. We compared data collected from both studies for systematic differences in content before combining the data. Data were analysed thematically using techniques of constant comparison.[27] Data items were systematically assigned codes using NVivo.[28] Similar codes were cross-referenced and emerging themes were discussed with members of the research team to improve reliability. Two members of the research team independently analysed approximately 10% of the data to compare coding and enhance reliability. Descriptive accounts were produced, and theoretical explanations for behaviours, opinions and decisions developed.

Quantitative data

The service currently collects information routinely at assessment about fatigue, physical functioning, pain, anxiety and depression from the following inventories: Chalder Fatigue Scale,[29] 36-item short form (SF-36) physical function subscale,[30] EQ-5D,[31] visual analogue pain rating scale, Hospital Anxiety and Depression Scale[32] and the Spence Children's Anxiety Scale.[33]

RESULTS

Participants

Twenty-five children with CFS/ME were interviewed (11 males, 14 females; mean age 12.9 years (SD 2.2), range 8–17). Twelve (of the 15 approached) were interviewed during the SMILE trial and 13 (of the 17 approached) were recruited as part of the PROMs study. Parents were present with their child during 19/25 interviews. Twenty-five mothers were interviewed.

Table 1 compares those interviewed with those assessed in the specialist CFS/ME service in the same time period. Participants in the PROMs study were slightly younger. Participants were also less anxious and less likely to be female because we prospectively recruited male patients (38.5% compared with 72.6%, p=0.01). Initial clinical assessment data were available for 5/7 of the children who declined to participate. Analysis of these data shows that children who declined were broadly similar to those who participated in terms of the characteristics shown in table 1: mean (SD) age 14.4 (1.5) years; 80% (4/5) female; median (IQR) time to assessment 6 (6–10) months; median (IQR) Chalder Fatigue score 23 (22–25); median (IQR) SF-36 physical function 65 (60–80).

Living with CFS/ME—'feeling ill'

We propose a conceptual model (figure 1) of being unwell with CFS/ME that suggests interactions between four key themes (health outcome domains) that contribute to how children understand their illness and 'feeling ill': 'symptoms', 'physical activity', 'social participation' and 'emotional well-being'. These were influenced by two additional themes: 'management' and 'contextual factors'. Children described a linear relationship between symptoms, impact on activity, participation and emotional well-being. When symptoms were worse, children felt this had a direct impact on their activity, "When I am worse it is mostly just resting", and mood, "As I feel crash down I become a little bit less positive". Children also described mood effects as a result of a lack of participation, "I could have been doing better and it is very frustrating".

Symptoms

Most children described a range of symptoms: aches and pain, sleep disturbances, a lack of energy, tiredness and memory and concentration problems. Although the individual experience of symptoms differed, some described a collection of symptoms, "everything hurts".

> My legs felt like jelly, which was the cause of the …and um I got a sore throat, … um I got ear pain, headache, tummy ache, everything. (Female)

Several children described the cognitive impact; a reduced capacity to remember things, concentrate and a 'brain fog'. This was often described as a 'loss' in ability to participate in academic activities:

> I was just good at memorising stuff and now it's completely gone. (Female)

Fluctuation in symptoms

Many children described the unpredictable fluctuation in symptoms and an associated lack of control, often describing a boom and bust cycle. This was particularly linked to their perceived levels of energy "ever changing energy level" and impacted their mood and confidence in returning to usual activities:

> I'd like to do some certain sports again, but I am just worried about the energy levels…. (Male)

Physical activity

All participants described a reduction in physical activity and children often reflected on sport or hobbies that they had to give up, "used to be very sporty and active" (male). In some cases, symptoms stopped children doing activities at the time, in others, restricting activity led to a negative cycle of more and more limitation:

Table 1 Comparison of characteristics of children at initial clinical assessment who were interviewed as part of the SMILE trial and PROMs study compared with children who were assessed and treated by the specialist service during the same period (2010–2012)

	SMILE trial				PROMs study			
	Study sample (n=13*) unless otherwise shown		CFS cohort (n=511) unless otherwise shown	p Value†	Study sample (n=13) unless otherwise shown		CFS cohort (n=530) unless otherwise shown	p Value†
	Mean (SD)		Mean (SD)		Mean (SD)		Mean (SD)	
Age (years)‡	14.5 (1.5)		14.0 (1.6)	0.21	11.3 (2.7)		13.7 (1.9)	<0.001
Female	10 (76.9%)		387 (75.7%)	0.92	5 (38.5%)		385 (72.6%)	0.01
	n	Median (Q1–Q3)	n	Median (Q1–Q3)	n	Median (Q1–Q3)	n	Median (Q1–Q3)	
Time to assessment (months)	12	12 (6–17)	421	12 (8–24)	0.40	9	8 (6–12)	438	12 (8–24)	0.07
Chalder Fatigue score (0–33)	13	26 (23–28)	479	26 (22–29)	0.78	13	24 (17–25)	491	25 (22–28)	0.07
SF-36 physical function (0–100)	13	50 (45–55)	469	55 (35–70)	0.96	11	50 (30–75)	484	50 (30–70)	0.85
Anxiety (SCAS) (0–90)	12	45 (21–58)	449	30 (18–45)	0.12	10	16 (8–26)	465	29 (17–43)	0.01
No. of symptoms (0–14)	13	9 (7–10)	575	8 (7–10)	0.52	13	8 (7–10)	528	8 (6–10)	0.91
Anxiety (HADS) (0–21)	13	12 (8–15)	475	9 (6–12)	0.09	8	7 (4–9)	435	8 (5–12)	0.23
Depression (HADS) (0–21)	12	9 (7–11)	478	8 (5–10)	0.10	8	7 (2–9)	438	7 (2–9)	0.31
Visual analogue pain (0–100)	12	42 (29–57)	461	57 (24–73)	0.28	12	61 (46–81)	476	57 (24–73)	0.24
School attendance past week	n=13		n=541		n=13		n=559	
None	0 (0.0%)		101 (21.2%)	0.24	4 (30.8%)		104 (21.0%)	0.57
10%	2 (15.4%)		49 (10.3%)		0 (0.0%)		53 (10.7%)	
20%	2 (15.4%)		29 (6.1%)		1 (7.7%)		37 (7.5%)	
40%	1 (7.7%)		88 (18.5%)		0 (0.0%)		88 (17.7%)	
60%	3 (23.1%)		100 (21.0%)		3 (23.1%)		95 (19.2%)	
80%	3 (23.1%)		84 (17.6%)		4 (30.7%)		89 (17.9%)	
100%	2 (15.4%)		21 (4.4%)		1 (7.7%)		26 (5.4%)	
Not applicable	0 (0.0%)		5 (1.1%)		0 (0.0%)		4 (0.8%)	

*Characteristics included for one child whose mother was interviewed (the child was not interviewed).
†χ^2 tests for proportions, Kruskal–Wallis test for continuous measures.
‡Age for the SMILE study and the CFS cohort is age at first assessment. Age for the PROMs study is age at interview. This is because children were recruited from follow-up visits not at clinical assessment.
CFS, Chronic Fatigue Syndrome; HADS, Hospital Anxiety and Depression Scale; PROMs, patient-reported outcome measures; SCAS, Spence Children's Anxiety Scale; SMILE, Specialist Medical Intervention and Lightning Evaluation.

> I just dropped things and dropped things…so it is kind of a bit of a negative cycle and was going down, and down until I was literally doing nothing. (Female)

A few children acknowledged the consequences of not limiting activity resulting in 'paying the price':

> I organised a massive water fight the other day and I think I over did it a bit so yesterday I was inside all day, I just felt wiped out. (Male)

Social participation

Impact on school

Reduced school attendance and reduced timetables "I only do little amounts of school" was one of the most commonly reported consequences. Time off school varied from "two hours a day" to "a year off school". Children were worried about exams, falling behind and losing out on social interaction:

> it's not just the lessons I'm missing out on, it's the other stuff that's kind of there. (Female)

Returning to school was found to be quite challenging by children, "It was actually quite hard to get back to school". Children and their parents (box 1) reported anxiety caused by not keeping up with schoolwork. In some cases, children dropped subjects to reduce stress. In many cases, children were frustrated at not meeting their full potential:

> I get really frustrated because then I think if I was there full time I could have been in more lessons and I could have been doing better. (Female)

Impact on friendships

Despite parental encouragement, being unwell with CFS/ME affected children's ability and motivation to spend time with friends, often limited due to symptoms and reduced activities:

> It was hard because like my friends were going out and leaving me at home because I just couldn't do it. (Female)

Impact on home life and family

A few children reported that CFS/ME affected their ability to spend time with their relatives or siblings, going on family outings or on holiday. Parents emphasised the impact it had on

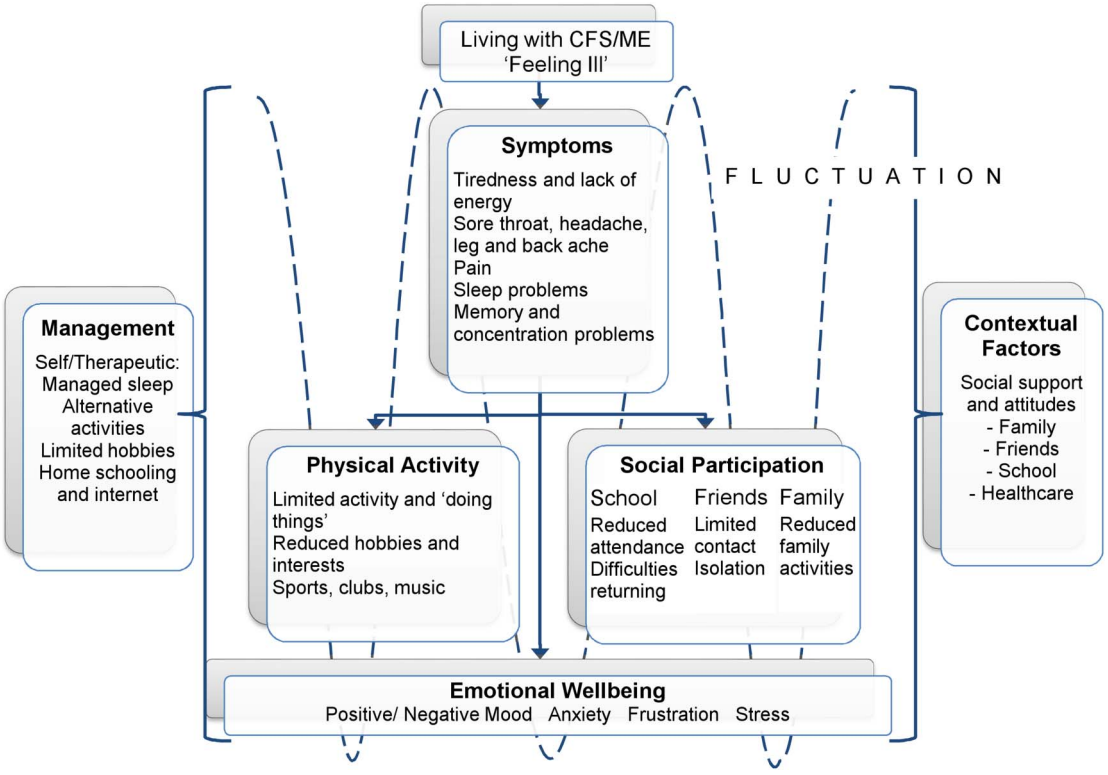

Figure 1 A child's experience of living with chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME): a conceptual model.

family life with the family having to work around the fluctuating symptoms:

> There aren't a lot of family days out…I really miss them. (Female)

Emotional well-being

Children and their parents described a fear and anxiety associated with having the illness. This was often related with the fluctuation and uncertainty about the duration of periods of feeling ill:

> …I was so scared of it lasting a long time again. (Female)

Activity restrictions often led directly to feelings of low mood and frustration. Parents noted that the loss of social interaction affected their child's morale.

> aaaah, it's a bit annoying and stressful, um I'm not always able to do what I want to do. (Male)

Management (self and therapeutic)

Children and their parents described a variety of management strategies for their CFS/ME. Some of these were described as strategies they had learnt 'naturally' or on their own through experience (self):

> I actually kind of naturally did quite a good balance between doing enough but not doing too much. (Female)

In other cases, children described managing activity using similar descriptions as used in the specialist service (therapeutic):

> …I just have to save a bit of energy up for it it's like money you have to save a bit, spend a bit. (Male)

Parents reinforced that important activities such as having a job were often adapted to minimise the impact of the illness. Where children had managed to continue with some activity, these were sometimes prioritised if they were particularly enjoyable although often limited to prevent an increase in symptoms.

Contextual factors

Contextual factors, such as support and understanding from family, friends, school and healthcare providers, influenced their ability to manage their illness. Friends were often willing to undertake less physical activities indoors, "We just invite them in and watch a movie or whatever". However, CFS/ME was often perceived as illegitimate and participants talked about the negative attitudes and comments they received.

> I am more happy to be in the sanctuary of my own home where my parents understand me than people at school who don't really have a clue. (Male)

Parents were more concerned about the impact on their child's emotional well-being than children themselves. Some parents talked about a lack of understanding from extended family members, "Grandparents they don't understand". Some children reported significant support from schools enabling them to manage their symptoms:

> …they have offered the best help they can get me as well, time off resting, if I am feeling ill I can go straight to the nurses' office and lie down. (Male)

However, others reported difficulties in having their condition recognised and appropriately supported by educational authorities. Parents and children described the importance of getting a diagnosis and being understood, "Relief really to be understood". The interaction between healthcare and educational institutions was fundamental to acknowledge the condition and

Box 1 Quotes from parents to support themes

Symptoms
"She's given up what was her best subject English, because. you know, there's an awful lot of reading and she can't focus to read". (Mother of female)
Physical activity
"She used to be active she used to run around all time". (Mother of female)
Impact on school
"So obviously there was apprehension from her point of view going back to school, a different peer group because she's in a different group". (Mother of female)
"She's ended up dropping one of the subjects just to stop the stress". (Mother of female)
Impact on friendships
"It is very difficult keeping friends on board because obviously they don't want to deal with the illness and they don't want to be around it". (Mother of male)
Impact on family
"We've also tried to prioritise so yes she does still go to Stagecoach on Saturday. Even if that means that the whole of the rest of the family have to work around that's when her energy is used". (Mother of female)
Emotional well-being
"I also see how by her not going out, how that affects her morale as well". (Mother of female)
Management
"… she'd also got herself a job. Um, again just 12 hours a week, so 4 hours, um, stint, um, in the evenings spaced out every other day because we were thinking about her activity levels". (Mother of female)
"If friends come over for two hours it's a really positive experience if friends stay for two and a half hours its turns into a negative experience". (Mother of male)
Contextual factors
"He's had all sort of comments whilst he's been at school about being a skiver and all the rest of it so he's had to deal with that". (Mother of male)
"I mean I… I don't feel very supported by the school. Yeah. Um, at all really. I mean they basically just let her come and go as she likes. Um, with very little sort of thought about how she could be helped". (Mother of female)

manage the impact. A mother and daughter described the interaction between a delayed diagnosis, lack of support from schools and impact on the daughter:

> Mother: …I was trying to get her off from school and they wouldn't let me take her from school
>
> Child: it was really annoying.
>
> Mother: …she was really struggling and then it wasn't, until she was diagnosed that they said that you can only do so many hours. (Mother and daughter)

DISCUSSION

CFS/ME was described as an unpredictable and fluctuating illness with a pervasive impact. Children described a linear relationship between four key outcomes: symptoms impacted on physical activity, school and social activities, which affected mood and emotional well-being. These can be ameliorated (or not) by contextual factors such as social support from family, friends, school and healthcare. The relationship between healthcare and school was considered pivotal.

Strengths and weaknesses

This is a large qualitative study (n=25), and participants were representative of those assessed in a specialist service. We are unable to generalise results for patients seen in primary care, those who are severely affected or younger than 8 years old. Most children chose to be interviewed with parents, which may have caused them to conceal problems.[34] To ensure the child's voice remained paramount, quotes from parents have been included where they have enriched their child's viewpoints, which may mean we have not included areas that are important to parents. Eleven children were recruited from a trial. Trial participants can differ from those that do not take part in a trial.[35] In addition, those who took part in the PROM study received the topic guide before the interview, which may have influenced their results; however, these groups and the data they generated were similar to the clinic population and to each other.

Results in context with previous literature

Child-derived measures specific to CFS/ME do not exist.[18] The identified themes underpin a conceptual model of the lived experience of paediatric CFS/ME, defining the health outcomes that should be assessed in children, and enhancing the relevance and acceptability of a new CFS/ME-specific PROM. This study supports and extends existing (largely quantitative) evidence of the impact of CFS/ME on children's schooling,[5 36] social activities[11 37–40] and emotional function.[15 16 39–42] Missing school was the most pervasive and important reported outcome in this study; the impact was wide-ranging, influencing social relationships and academic work. These effects were exacerbated when children returned to school because of changes in their peer group and anxiety about falling behind in their studies. Where educational authorities and schools were supportive, the impact of the illness was lessened.

We were surprised that most children described a linear unidirectional relationship between symptoms, activity and mood. Children describe anxiety, low mood and stress as a consequence of their symptoms and the reduction in usual activities, socialising and ability to keep up with school. This is consistent with previous studies that identified the social implications of the illness: loneliness, loss of normal adolescent life and worries about school.[16 40 42] We assessed the data for multidirectional relationships between the domains; however, in contrast to previous studies,[16] children in this study did not describe emotional well-being having an effect on physical activity, school or socialising. This may be because previous studies recruited children with comorbid mood disorders[16] who may have received cognitive behavioural therapy and explored the relationship between mood and activities.

Unlike other studies,[16] children did not describe bullying but did report that a lack of support outside the family negatively influenced their experience of CFS/ME. This may be because previous studies recruited adolescents with CFS/ME who were anxious[16] or after recovery.[40] Children did not report strained family relationships,[11 43–45] although they did report reduced family activities. This may be because parents were present in interviews and the results may have been different if children had been interviewed alone.

Implications

Paediatricians need to be aware that from a child's perspective CFS/ME is more than just fatigue; it impacts on activity, school attendance, socialising and mood. Contextual factors are important in how children experience symptoms and disability. Doctors need to develop strong relationships with schools. Current PROMs used for CFS/ME measure fatigue, disability and mood. A new PROM needs to collect data on symptoms, activity and socialising. Most of these themes are not currently assessed by PROMs used in paediatric CFS/ME.[18] Future research should explore which outcomes are most important to children to include in a new PROM. The conceptual model is informative for clinicians and researchers who often have different views from children on what is important to measure[46] in research and healthcare settings.[47]

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Competing interests EC is a medical advisor for the Association for Young people with ME (AYME) and the Sussex and Kent ME/CFS society.

Ethics approval A favourable ethical opinion was given for the SMILE Trial (08/09/2010, ref: 10/H0206/32) by South West 2 Local Research Ethics Committee. An amendment was approved (31/05/2011). The NHS Health Research Authority (NRES Committee East of England) approved the PROMs study (ref: 12/EE/0186).

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REFERENCES

1 Royal College of Paediatrics and Child Health. *Evidence based guideline for the management of CFS/ME (chronic fatigue syndrome/myalgic encephalopathy) in children and young people*. London: Royal College of Paediatrics and Child Health, 2004.
2 National Institute for Health and Care Excellence. *Chronic fatigue syndrome/myalgic encephalomyelitis (or encephalopathy): diagnosis and management of CFS/ME in adults and children (NICE guidelines CG53)*. London: National Institute for Health and Care Excellence, 2007.
3 Rimes KA, Goodman R, Hotopf M, *et al*. Incidence, prognosis, and risk factors for fatigue and chronic fatigue syndrome in adolescents: a prospective community study. *Pediatrics* 2007;119:603–9.
4 Chalder T, Goodman R, Wessely S, *et al*. Epidemiology of chronic fatigue syndrome and self reported myalgic encephalomyelitis in 5–15-year-olds: cross sectional study. *BMJ* 2003;327:654–5.
5 Crawley EM, Emond AM, Sterne JA. Unidentified chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME) is a major cause of school absence: surveillance outcomes from school-based clinics. *BMJ Open* 2011;1:e000252.
6 Crawley E, Hughes R, Northstone K, *et al*. Chronic disabling fatigue at age 13 and association with family adversity. *Pediatrics* 2012;130:e71–9.
7 Haines LC, Saidi G, Cooke RW. Prevalence of severe fatigue in primary care. *Arch Dis Child* 2005;90:367–8.
8 Nijhof SL, Maijer K, Bleijenberg G, *et al*. Adolescent chronic fatigue syndrome: prevalence, incidence, and morbidity. *Pediatrics* 2011;127:1169–75.
9 Rangel L, Garralda E, Levin M, *et al*. Personality in adolescents with chronic fatigue syndrome. *Eur Child Adolesc Psychiatry* 2000;9:39–45.
10 Crawley E, Sterne JA. Association between school absence and physical function in paediatric chronic fatigue syndrome/myalgic encephalopathy. *Arch Dis Child* 2009;94:752–6.
11 Kennedy G, Underwood C, Belch JJ. Physical and functional impact of chronic fatigue syndrome/myalgic encephalomyelitis in childhood. *Pediatrics* 2010;125:e1324–30.
12 Rakib A, White PD, Pinching AJ, *et al*. Subjective quality of life in patients with chronic fatigue syndrome. *Qual Life Res* 2005;14:11–19.
13 Sankey A, Hill CM, Brown J, *et al*. A follow-up study of chronic fatigue syndrome in children and adolescents: symptom persistence and school absenteeism. *Clin Child Psychol Psychiatry* 2006;11:126–38.
14 Garralda E, Rangel L, Levin M, *et al*. Psychiatric adjustment in adolescents with a history of chronic fatigue syndrome. *J Am Acad Child Adolesc Psychiatry* 1999;38:1515–21.
15 Taylor RR, O'Brien J, Kielhofner G, *et al*. The occupational and quality of life consequences of chronic fatigue syndrome/myalgic encephalomyelitis in young people. *Br J Occup Ther* 2010;73:524–30.
16 Fisher H, Crawley E. Why do young people with CFS/ME feel anxious? A qualitative study. *Clin Child Psychol Psychiatry* 2012;18:556–73.
17 Haywood KL, Staniszewska S, Chapman S. Quality and acceptability of patient-reported outcome measures used in chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME): a systematic review. *Qual Life Res* 2012;21:35–52.
18 Haywood KL, Collin SM, Crawley E. Assessing severity of illness and outcomes of treatment in children with Chronic Fatigue Syndrome/Myalgic Encephalomyelitis (CFS/ME): a systematic review of patient-reported outcome measures (PROMs). *Child Care Health Dev* 2014;40:806–24.
19 Devlin N, Appleby J. Getting the most out of PROMs. Putting health outcomes at the heart of NHS decision-making. London: The King's Fund, 2010.
20 Fitzpatrick R, Davey C, Buxton MJ, *et al*. Evaluating patient-based outcome measures for use in clinical trials. *Health Technol Assess* 1998;2:74.
21 USFDA. *Guidance for industry. Patient-reported outcome measures: use in medical product development to support labelling claims*. Silver Spring, MD: Food and Drug Administration, 2009.
22 Patrick DL, Burke LB, Gwaltney CJ, *et al*. Content validity–establishing and reporting the evidence in newly developed patient-reported outcomes (PRO) instruments for medical product evaluation: ISPOR PRO Good Research Practices Task Force report: part 2–assessing respondent understanding. *Value Health* 2011;14:978–88.
23 Matza LS, Patrick DL, Riley AW, *et al*. Pediatric patient-reported outcome instruments for research to support medical product labeling: report of the ISPOR PRO good research practices for the assessment of children and adolescents task force. *Value Health* 2013;16:461–79.
24 Crawley E, Mills N, Beasant L, *et al*. The feasibility and acceptability of conducting a trial of specialist medical care and the Lightning Process in children with chronic fatigue syndrome: feasibility randomized controlled trial (SMILE study). *Trials* 2013;14:415.
25 Crawley E, Mills N, Hollingworth W, *et al*. Comparing specialist medical care with specialist medical care plus the Lightning Process for chronic fatigue syndrome or myalgic encephalomyelitis (CFS/ME): study protocol for a randomised controlled trial (SMILE Trial). *Trials* 2013;14:444.
26 Hewlett S, Hehir M, Kirwan JR. Measuring fatigue in rheumatoid arthritis: A systematic review of scales in use. *Arthritis Rheum-Arthritis Care Res* 2007;57:429–39.
27 Corbin J, Strauss A. Grounded theory research—procedures, canons and evaluative criteria. *Zeitschrift Fur Soziologie* 1990;19:418–27.
28 QSR International Pty Ltd. NVivo qualitative data analysis software, Version 9. 2014.
29 Chalder T, Berelowitz G, Pawlikowska T, *et al*. Development of a fatigue scale. *J Psychosom Res* 1993;37:147–53.
30 Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 1992;30:473–83.
31 EuroQol Group. EuroQol-a new facility for the measurement of health-related quality of life. *Health Policy* 1990;16:199–208.
32 Snaith RP. The hospital anxiety and depression scale. *Health Qual Life Outcomes* 2003;1:29.
33 Spence SH. A measure of anxiety symptoms among children. *Behav Res Ther* 1998;36:545–66.
34 Grills AE, Ollendick TH. Issues in parent-child agreement: the case of structured diagnostic interviews. *Clin Child Fam Psychol Rev* 2002;5:57–83.
35 Rothwell PM. External validity of randomised controlled trials: "to whom do the results of this trial apply"? *Lancet* 2005;365:82–93.
36 Dowsett EG, Colby J. Long-term sickness absence due to ME/CFS in UK schools: an epidemiological study with medical and educational implications. *J Chronic Fatigue Syndrome* 1997;3:29–42.
37 Richards J, Chaplin R, Starkey C, *et al*. Illness beliefs in chronic fatigue syndrome: a study involving affected adolescents and their parents. *Child Adolescent Mental Health* 2006;11:198–203.
38 Garralda ME, Rangel L. Impairment and coping in children and adolescents with chronic fatigue syndrome: a comparative study with other paediatric disorders. *J Child Psychol Psychiatry* 2004;45:543–52.

39 Van Hoof ELS, De Becker PJ, Lapp C, *et al*. How do adolescents with chronic fatigue syndrome perceive their social environment? A quantitative study. *Bull IACFS/ME* 2009;17:16–31.
40 Jelbert R, Stedmon J, Stephens A. A qualitative exploration of adolescents' experiences of chronic fatigue syndrome. *Clin Child Psychol Psychiatry* 2010;15:267–83.
41 Crawley E, Hunt L, Stallard P. Anxiety in children with CFS/ME. *Eur Child Adolesc Psychiatry* 2009;18:683–9.
42 Winger A, Ekstedt M, Wyller VB, *et al*. 'Sometimes it feels as if the world goes on without me': adolescents' experiences of living with chronic fatigue syndrome. *J Clin Nurs* 2014;23:2649–57 .
43 Rangel L, Garralda ME, Levin M, *et al*. The course of severe chronic fatigue syndrome in childhood. *J R Soc Med* 2000;93:129–34.
44 Schweitzer R, Kelly B, Foran A, *et al*. Quality-of-life in chronic Fatigue syndrome. *Soc Sci Med* 1995;41:1367–72.
45 Missen A, Hollingworth W, Eaton N, *et al*. The financial and psychological impacts on mothers of children with chronic fatigue syndrome (CFS/ME). *Child Care Health Dev* 2012;38:505–12.
46 Hewlett SA. Patients and clinicians have different perspectives on outcomes in arthritis. *J Rheumatol* 2003;30:877–9.
47 Gandhi GY, Murad MH, Fujiyoshi A, *et al*. Patient-important outcomes in registered diabetes trials. *JAMA* 2008;299:2543–9.

PROMS Study Topic Guide

The questions listed below are a guide for the researcher to use in the semi-structured interviews. The questions may differ slightly between the younger (aged 8-11 yrs) and older children (aged 12-16 yrs)

Introduction: We are doing a project about the way in which CFS/ME affects children and are very interested to hear about your experiences. We want to hear about the way in which CFS/ME has affected you and continues to affect you now, about what matters to you and how CFS/ME stops you from doing things that you would like to do. We want to ask a few questions about the questionnaires you have used and whether they are relevant. We want to understand your story.

a. Tell me about being unwell with CFS/ME.

b. How does CFS/ME affect your life?

c. What would you like to do that you are unable to do at the moment?

d. How do you know if you are feeling better?

e. How do you know if you are feeling worse?

f. How do you know if strategies are working or not working?

g. What should we measure for recovery?

h. What would you want to improve if you got better?

i. What outcome would be important to you?

I. Seeing your friends more?
II. Feeling better?
III. Doing more exercise?

j. Tell me about the questionnaires you have filled in.

k. Here are some other questionnaires. Do you think they are better or worse?

l. Is there anything else that you would like to tell me about the way in which the CFS/ME affects you?

A range of prompts will be used, including:

Tell me more about that …

How did that make you feel?

How did that affect you?