Growing up with hemophilia
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Chapter 2

Paediatric health-related quality of life: what is it and why should we measure it?

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Introduction
As a paediatrician, you follow a number of children with chronic health conditions in your practice. You provide them with a variety of therapies and would like to know whether your treatments are having an impact, in particular whether there has been a change in the patient's health-related quality of life (HRQOL). HRQOL measures have the potential to augment the information that clinicians have available, to enhance their clinical decisions and assess the impact of a chronic health condition on a child's life. How should you try to capture this information?

What is health-related quality of life?
The World Health Organization (WHO) defines quality of life (QOL) as “a child's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns” [1] and HRQOL as “a child's goals, expectations, standards or concerns about their overall health and health-related domains” [1, 2]. That being said, many other definitions of HRQOL have been proposed over the years, and a variety of terms are currently used [3, 4]. Although the term QOL is sometimes used interchangeably with HRQOL, QOL is actually a broader construct that encompasses aspects of life that may not be amenable to healthcare services [5]. Thus, spirituality and financial resources are, for example, often included in QOL, but are not necessarily included as part of HRQOL. In this paper, we regard QOL in children as a multidimensional subjective concept that includes social, emotional, cognitive and physical functioning as well as cultural aspects of the child and family, while HRQOL incorporates measures of physical symptoms, functional status and disease impact on psychological and social functioning [6, 7].

Children growing up with chronic health conditions (or suffered a severe acute illness and experience late effects) are at greater risk for psychosocial problems than their healthy peers [8]. Due to advances in medicine, more children with chronic health conditions are surviving. While this is a great success, it increases the number of children living with the long-term sequelae of chronic
health conditions, and compounds the impact on their HRQOL problems over their lifespan. Thus, HRQOL is becoming an increasingly important outcome measure in both clinical practice and research. This paper provides a global overview of the philosophy of and tools used in HRQOL research in children.

Why should we measure HRQOL?
Physical measures alone are clearly not sufficient to assess the impact of a specific health condition on a person’s life. The evaluation of HRQOL is essential for a full understanding of the influence of a health condition on a given individual [9]. HRQOL is subjective, by definition, because how it is perceived by the individual will alter the impact on the person’s life. So, the identical health condition may result in very different ratings of HRQOL in different individuals. Thus, when measuring HRQOL endpoints, it is widely accepted that the patient’s report is the best source of information about what he or she is experiencing [10]. HRQOL assessment is therefore a form of patient reported outcome (PRO). A PRO is any report of the status of a patient’s health condition that comes directly from the patient, without interference by a clinician or other third party [11].

HRQOL measurements were originally developed for a variety of purposes: 1) to assess the status of people at specific points in time, 2) to compare the HRQOL of patients with different health conditions (eg, the relative impact of heart disease vs cancer), 3) to measure changes in HRQOL over time (eg, in clinical trials, observational studies, healthcare delivery settings, or for population surveillance), and 4) to predict future outcomes [12-14]. As the experience in using these measures increased, it became obvious that there is a fifth purpose for using PROs: using individual PROs in routine clinical practice to give clinicians standardised information on patient problems to identify and monitor symptoms, evaluate treatment outcomes and support shared decision-making [15-19].

Challenges in measuring HRQOL in paediatrics
HRQOL questionnaires have been used in adult populations for a long time.
Starting in the 1990s, paediatric questionnaires have also gained acceptance. Initially, clinicians believed that children’s self-reported health information was unreliable, which resulted in the underuse of paediatric PRO data [20]. However, research shows that children over the age of 7 (and potentially as young as 5) years are able to reliably report their health status [21-26]. Overall, when using HRQOL measurements in paediatrics, the considerations and challenges about what measure to use share some similarities with adult populations. However, the relevant dimensions and the item content of paediatric HRQOL questionnaires differ substantially from those of adult questionnaires, and may vary with age [27]. Therefore, we will discuss some of the challenges in paediatric HRQOL measurement regarding generic versus disease-specific questionnaires, age-specific questionnaires with a narrow versus a wide age range, self-report versus proxy-report, and paper-pencil versus online questionnaires.

Generic versus disease-specific
Several classifications of HRQOL questionnaires have been made in the literature, one of which is the distinction between generic and disease-specific instruments. Generic questionnaires intend to measure all dimensions of HRQOL, and can therefore be applied in healthy populations as well as in any clinical population regardless of the type of health condition [28]. The advantage of generic questionnaires is that they provide a comprehensive overview of HRQOL and allow for comparisons between specific types of conditions when examining the impact on HRQOL. Disadvantages are that a generic questionnaire will not be able to provide a detailed or reliable measurement of dimensions that are specific to a certain condition and are not always sensitive to the impact of changes in clinical conditions or treatment on HRQOL [27-29]. For an overview of the most commonly used generic HRQOL questionnaires in paediatrics, see table 1. This table is based on a combination of questionnaires named in three review manuscripts written by paediatric HRQOL researchers [2, 3, 27]. Based on two of the three reviews, the PedsQL 4.0 generic scale is mentioned as the most frequently used questionnaire in paediatric HRQOL research. However, it has been questioned whether the PedsQL 4.0 generic scale measures HRQOL
or the concept ‘activities and participation’ described by the definitions found in the International Classification of Functioning, Disability and Health [2]. In our opinion, and with regard to Varni’s model [30], we believe that asking “do you have problems with” is a subjective vision of how you function, especially when asked with regard to emotional functioning, and therefore measures HRQOL. We have excluded two questionnaires from the overview (SF-36 and General Health Questionnaire (GHQ)) because they are not recommended for use with children, and one questionnaire (DUCATQOL) because it is only commonly used in the Netherlands.

In contrast to generic questionnaires, disease-specific questionnaires, for example, the PedsQL transplant module [31], focus on those dimensions that are likely to be affected by a specific condition and/or its treatment (eg, ‘I worry that my medicines will change the way I look’). Such questionnaires describe disease-specific HRQOL domains in more detail and are generally considered to be more sensitive to change in clinical applications for which they were developed compared with generic questionnaires (eg, ‘I cannot do things that other kids my age can do’) [32]. Some generic questionnaires have disease-specific modules. A combination of the two types of measures will give the most optimal information [32, 33]. Which questionnaire you should choose depends on the goal of the study, but also on what languages the questionnaire is available in and if there are norm groups available in your country.

Age-specific questionnaires with a narrow versus a wide age range
In contrast to adult care, HRQOL measurements in paediatrics should assess the potential for development to impact interpretation of the questions. Therefore, it is important to consider whether an age-specific instrument or an instrument for a wide age range is appropriate. At this moment, several age-appropriate measures are available to measure generic HRQOL for children up to 18 years old (see table 1). The content of questionnaires can differ between age groups. For example ‘I miss school because of not feeling well’ for ages 8-18 is changed to ‘I miss work or school because of not feeling well’ for young adults (18-25 years). Moreover, age-specific normative data are required. It is therefore
important to realise that the age of the child may influence HRQOL and that it is necessary to use an age-matched control group. In addition, when there are age-specific versions, it is critical to know how the various age versions relate to each other to support pooling of data across age groups in cross-sectional studies or in longitudinal studies where children may change versions over time [34]. However, other researchers state that one questionnaire can cover an age range from 7 to 18 years, because the items generated and retained by different age groups are sufficiently similar. Breaking measures into age ranges is a viable option only when there is extensive testing done to understand how one version relates statistically to the other. This is rarely done and is almost impossible in disease-specific measures for children because of limited sample sizes. It is important to be aware that PRO instruments developed for use in children of a wide age range are likely to be relatively insensitive to age-linked experiences, for example during transition into adolescence [34].

**Self-report versus proxy report**

Another consideration related to the developmental aspect of childhood is whether an HRQOL questionnaire should be self- or proxy reported (parents reporting on the child’s behalf). The validity and reliability of children as informants about their own status, using different HRQOL instruments, has been supported by several large-scale studies [5, 34]. Proxy report, however, may be required when a child is too young, ill, unwilling or lacking the necessary language skills, attention span, or cognitive abilities to complete a questionnaire [3]. The adult literature has shown that information provided by proxy respondents is not equivalent to that reported by the patient [5, 35]. And also paediatric literature often shows a disagreement on aspects of paediatric HRQOL and symptoms between parents and children [36-38]. A review on the differences between proxy and self-report in paediatrics states that parents and children offer unique information, which should not be considered interchangeable. Children are the best judge about their HRQOL and disease-specific symptoms, and they mainly report about their current HRQOL, while parents take into account aspects as the future of the child, periods when
the child was very ill and their report is influenced by their own well-being. However, relying on either child self-report or parent proxy report alone will result in an incomplete picture in the clinical setting. But because the child is the best observer of their own feelings and symptoms, the development of self-reported measures is essential [3]. With the use of self-reported PROs, the voice of the child may be better expressed in matters pertaining to their health and well-being [5]. Children as young as 8 years have the cognitive and socioemotional skills to complete self-reported PROs [34, 39]. Thus, in paediatric populations, parent proxy report is recommended when paediatric patients are not able to complete a HRQOL instrument or as additional information on, for example, family conflicts, but not as a substitute for child self-report when the child is willing and able to provide their perspective [5]. Both views are useful in providing a complete picture of the impact of disease on childhood HRQOL [27]. In the paediatric setting, teacher reports may also be relevant. Including different report reveals pertinent information on the functioning of paediatric populations from different point of views and in different environments [40].

**Paper-pencil versus online**

In the context of using PROs in clinical practice, some practical issues need to be considered. The use of the internet can be an efficient way to monitor HRQOL. Research has shown that participants prefer electronic formats for completing PROs. [41]. However, there may be differences between online, tablet and paper versions, so methods should not be mixed within one study [42]. Moreover, a web-based programme can easily overcome problems related to paper-pencil administration at the outpatient clinic, such as lack of space or lack of administrative personnel for data entry, and a high risk of missing data. Also, it is more convenient for patients and parents, as the timing for completion of the questionnaire is flexible. Other advantages of the use of a computer-based data collection are that the scoring of the questionnaires is conducted automatically and a text-to-speech function (ie, a spoken sound version of a text) may reduce limitations in low-literacy populations. Disadvantages include privacy concerns, cost of web or tablet application designs, availability of computer and internet
Table 1. Summary of commonly used generic measures of health-related quality of life in paediatric populations.*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Age range (years)</th>
<th>Items</th>
<th>Domains</th>
<th>Recall period</th>
<th>Range of Cronbach’s α across domains</th>
<th>Test-retest reliability</th>
<th>Validity</th>
<th>Disease-specific versions available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric Quality of Life Inventory (PedsQL) [43]</td>
<td>CR: 8–25 years PR: 2–18 years</td>
<td>23 item</td>
<td>23 item</td>
<td>Physical functioning Emotional functioning Social functioning School functioning</td>
<td>The past month/week</td>
<td>CR: 0.80–0.89 PR: 0.86–0.92</td>
<td>p = 0.001 (construct validity)</td>
<td>Yes</td>
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<tr>
<td>Child Health Questionnaire (CHQ-PF87) (CHQ-PF50) (CHQ-PF28) [65]</td>
<td>CR: 11–18 years PR: 5–18 years</td>
<td>87 items 50 items 28 items</td>
<td>87 items 50 items 28 items</td>
<td>Physical functioning Limitations in schoolwork and activities with friends General health Bodily pain Discomfort Limitations in family activities Emotional/time impact on the parent Impact of emotional or behavior problems on school work and other daily activities Self-esteem Mental Health Behavior Family cohesion Change in health</td>
<td>The past four weeks</td>
<td>CHQ-PF87: CR: 0.56–0.90 PR: 0.70–0.93 CHQ-PF50: 0.39–0.96 CHQ-PF28: &gt;0.70</td>
<td>CHQ-PF87: ICC 0.08–0.84 CHQ-PF50: ICC 0.08–0.84 CHQ-PF28: ICC 0.50–0.70</td>
<td>p &lt;0.01 (construct validity) No</td>
</tr>
<tr>
<td>Infant Toddler Quality of Life Questionnaire 47-item short-form (ITQOL-SF47) and 97-item form (ITQOL) [45]</td>
<td>PR: 2 months–5 years</td>
<td>47 items 97 items</td>
<td>47 items 97 items</td>
<td>Overall health item Physical abilities Growth and development Pain Temperament and moods Behavior overall General health Change in health item</td>
<td>The past four weeks, in general, compared with 1 year ago</td>
<td>ITQOL-SF47 PR: 0.76–0.84 ITQOL PR: 0.72–0.94</td>
<td>ITQOL ICC: 0.01–0.80</td>
<td>ITQOL: p &lt;0.05 d ≥0.80 (discriminant validity) No</td>
</tr>
<tr>
<td>TNO AZL Children’s quality of life questionnaire (TACQol) [46]</td>
<td>CR: 8–15 years PR: 6–15 years</td>
<td>42 items</td>
<td>42 items</td>
<td>Pain and symptoms Motor function Autonomy Cognitive functioning Social functioning Positive emotions Negative emotions</td>
<td>In recent weeks</td>
<td>CR: 0.65–0.78 PR: 0.71–0.89</td>
<td>PR ICC: -0.02–0.38</td>
<td>Yes</td>
</tr>
</tbody>
</table>
### Table 1. Summary of commonly used generic measures of health-related quality of life in paediatric populations*

<table>
<thead>
<tr>
<th>Measure</th>
<th>CR:</th>
<th>PR:</th>
<th>Items</th>
<th>In the last three months</th>
<th>PR:</th>
<th>ICC:</th>
<th>p</th>
<th>d</th>
<th>Discriminant Validity</th>
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<tbody>
<tr>
<td><strong>TNO AZL preschool children quality of life questionnaire (TAPQOL)</strong></td>
<td></td>
<td></td>
<td>43</td>
<td>Stomach problems</td>
<td>0.74-0.90</td>
<td>0.35-0.88</td>
<td>&lt;0.05</td>
<td>≥0.34</td>
<td>(discriminant validity)</td>
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<td>Skin problems</td>
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<td>Lung problems</td>
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<td>Sleeping problems</td>
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<td>Appetite</td>
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<td>Problem behaviour</td>
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<td>Positive mood</td>
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<td>Anxiety</td>
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<td>Liveliness</td>
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<td>Social functioning</td>
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<td>Motor functioning</td>
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<td>Communication</td>
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<tr>
<td><strong>Dutch children's AZL/TNO Quality of Life Questionnaire (DUCATQOL)</strong></td>
<td>5-15</td>
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<td>Physical</td>
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<td>Emotional</td>
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<td>Social</td>
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<td>Cognitive</td>
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<tr>
<td><strong>Kidscreen 52-item, 27-item and 10-item (index)</strong></td>
<td>8-18</td>
<td>8-18</td>
<td>52</td>
<td>Physical well-being</td>
<td>0.77-0.89</td>
<td>0.61-0.77</td>
<td>&lt;0.001</td>
<td>0.32-0.73</td>
<td>(discriminant validity)</td>
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<td></td>
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<td></td>
<td>Psychological well-being</td>
<td>0.80-0.84</td>
<td>0.42-0.68</td>
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<td>Moods and emotions</td>
<td>0.82</td>
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<td>Self-perception</td>
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<td>Autonomy</td>
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<td>Parent relations and home life</td>
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<td>Social support and peers</td>
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<td>School environment</td>
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<td>Social acceptance (bullying)</td>
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<td>Financial resources</td>
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<td><strong>DISABKIDS 37-items</strong></td>
<td>8-16</td>
<td>4-7</td>
<td>37</td>
<td>Mental</td>
<td>0.70-0.89</td>
<td>0.71-0.83</td>
<td>&lt;0.001</td>
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<td>(discriminant validity)</td>
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<td><strong>DISABKIDS 12-items</strong></td>
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<td>12</td>
<td>Social</td>
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<td>Physical</td>
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<td><strong>Health Utilities Index 2/3 (HUI)</strong></td>
<td>&gt; 12</td>
<td>&gt; 5</td>
<td>27</td>
<td>Sensation</td>
<td>0.81</td>
<td>0.767</td>
<td>&lt;0.001</td>
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<td>(construct validity)</td>
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<td>Mobility</td>
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<td>Emotion</td>
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<td>Cognition</td>
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<td>Self-care</td>
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<td>Pain</td>
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</tbody>
</table>

Table 1. Summary of commonly used generic measures of health-related quality of life in paediatric populations*. (Continued)

<table>
<thead>
<tr>
<th>Measure</th>
<th>CR: 3-17</th>
<th>PR: 3-17 years</th>
<th>Items</th>
<th>Physical well-being</th>
<th>Emotional well-being</th>
<th>Self-esteem</th>
<th>Family</th>
<th>Friends</th>
<th>Everyday functioning in school</th>
<th>The past week</th>
<th>CR: 0.63-0.84</th>
<th>PR: 0.62-0.89</th>
<th>CR: r=0.80</th>
<th>p &lt; 0.05 (discriminant validity)</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINDL-R [53]</td>
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<td>24</td>
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<tr>
<td>Youth quality of life instrument (YQOL) [54]</td>
<td>CR: 11-18 years</td>
<td>57</td>
<td>Sense of self</td>
<td>Social relationships</td>
<td>Culture and community</td>
<td>General quality of life</td>
<td>N/A</td>
<td>CR: 0.77-0.96</td>
<td>ICC: 0.74-0.85</td>
<td>p &lt; 0.001 (construct validity)</td>
<td>Yes</td>
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<tr>
<td>Satisfaction with life scale for Children [55, 56]</td>
<td>CR: &gt;10 years</td>
<td>5</td>
<td>Global life satisfaction</td>
<td>N/A</td>
<td>CR: 0.86</td>
<td>r=0.82</td>
<td>p &lt; 0.001 (construct validity)</td>
<td>No</td>
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</table>

* Table based on the most frequently used generic health-related quality of life questionnaires based on Klassen et al [3], Fayed et al [2] and Raat et al [27].

CR: child report; ICC: intraclass correlation coefficient; N/A: not applicable; PR: parent report.

It is equally important to consider the impact of the relevant culture and value systems on the assessment of HRQOL. The cultural context in which HRQOL is experienced may impact the types of questions that are relevant. Eiser and Morse [29] identified culture as key considerations in the development and selection of QOL measures for children.

As a result, methods have been developed to not only translate measures [58, 59], but also adapt them for different cultural contexts [60]. For example, the PedsQL has been adapted for a variety of cultures [61, 62]. In other cases, measures must be developed to reflect distinct conceptualisations of HRQOL. For example, a new measure was necessary to assess HRQOL for indigenous children in Canada [63], because of the importance of spirituality as a key component, that was missing from most North American and European HRQOL measures.

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affects the way in which children interpret questions. For example, while the concept of Likert-type responses is familiar to North American children, they are not as familiar to children in Germany [64].

**PROs in clinical practice and using HRQOL data on an individual level**

Research in adult patients shows that the integration of HRQOL PROs into clinical practice generally improves patient–clinician communication; PROs help identify and frame the discussion of HRQOL issues and add to the enhancement of a patient’s health outcome and satisfaction with care [65-67]. Studies on the use of PROs in paediatric clinical practice are scarce compared with adult practice, while there is a particular need to address HRQOL in a developmental perspective in paediatrics. So, the use of HRQOL PROs may make a valuable contribution with regard to the monitoring, identification, and discussion of HRQOL issues in children with chronic health conditions [68]. However, it is important to recognise that most HRQOL measures were not developed to support clinical decision-making. Thus, because they are an important aspect of the patient’s experience, the information provided must be considered alongside clinical data when clinicians are making clinical decisions.

In the past 10 years, there has been a growing interest in the use of HRQOL measurement in clinical paediatric practice. The use of HRQOL PROs in paediatric practice has shown to be effective in increasing discussion about emotional and psychosocial functioning [68-70]. De Wit et al [71] showed that periodic monitoring and discussion of HRQOL in adolescents with diabetes improved their satisfaction with care. In addition, the use of HRQOL PROs had a positive impact on their psychosocial well-being. In the context of a child’s development, the repeated measurement of HRQOL in different developmental stages can be a valuable addition to the clinical consultation [57].

When using questionnaires in daily clinical practice, it is important to be aware of the fact that some questionnaires have a 1-week recall period and other instruments 1 month. Depending on the frequency of the administration and how up to date the HRQOL information has to be, an instrument with a specific recall period can be chosen.
We are aware that there are different HRQOL measurement systems for using HRQOL information in daily clinical practice in adult care, especially in oncology settings [15]. However, as far as we know, there is only one online system used in paediatric clinical care available and described in the literature, which is the KLIK project.

**KLIK**

An example of using electronic HRQOL PROs in clinical practice is the KLIK system (in Dutch: *Kwaliteit van Leven In Kaart*, in English: *Quality of Life in Clinical Practice*). The KLIK system is a website (http://www.hetklikt.nu) that children and/or their parents access to complete an appropriate HRQOL questionnaire in the week prior to their clinic visit. The answers to the questionnaires are schematically presented into a so-called KLIK “ePROfile” [see 1A and 1B]. Paediatricians or other healthcare providers can subsequently retrieve these ePROfiles directly from the KLIK website during the consultation and discuss the answers with the patient and/or parents. The web-based ePROfile appears to be an efficient application that systematically pays direct attention to HRQOL issues in daily paediatric clinical practice. By providing the members of the multidisciplinary team with feedback from the responses to the questionnaires, multidisciplinary communication as well as communication between the team and the patient/parents is facilitated. Without detailed knowledge of the conceptual basis and content of PROs, it is difficult to interpret whether the observed change or lack of change is due to the intervention or to the instrument (or possibly both) [2]. It is therefore necessary to train the paediatricians or other members of the multidisciplinary team in how to interpret scores in daily clinical practice [72]. The training of paediatricians in how to interpret scores consists of a short theoretical component on HRQOL and PROs and an extensive practical component. The practical material includes short film clips presenting three brief patient case studies that represent real consultations and actual KLIK ePROfiles. After the case studies have been presented, the skills of the paediatrician shown in the film are evaluated, and the paediatricians/practitioners receive a list of reminders to assist them in the use of the KLIK ePROfile [68]. To date, >400
professionals (paediatricians, nurses, physicians, social workers, psychologists) have completed the training course and >5000 patients have been registered on the KLIK website in the Netherlands. The implementation of the use of HRQOL measures in daily clinical practice is a continuous process and creates new challenges and opportunities for care [68].

Discussion
This paper provides an overview of the challenges regarding measuring HRQOL in paediatric patients. We are not intending it to be comprehensive, but in our opinion these are the most relevant topics to keep in mind when considering the implementation of HRQOL measures in daily clinical practice or start a research programme measuring HRQOL in children.

The paediatrician mentioned in our introduction could use the information presented in this paper to select appropriate questionnaires for the use in daily clinical practice on an individual level. The paediatrician decided to include both a valid and reliable generic and disease-specific
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questionnaire to capture the impact of the disease on the child and also asked parents to participate to include their perspectives as a secondary outcome. The paediatrician started with providing paper-pencil questionnaires in the clinic and communicated with the families about the results. The clinic staff subsequently decided to migrate to a web-based system to have questionnaires administered and fed back more efficiently. This way, it also becomes possible to study HRQOL changes over time in a group of patients with only completing the questionnaires once.

With the increased use of HRQOL measures for a variety of purposes in paediatrics, it is necessary to take into account that the burden for patients will increase. Ideally, patients would complete a single set of questionnaires, with this information being used for multiple purposes: clinical care monitoring, clinical trial monitoring and possibly evaluating a department or health institution.

Another option to decrease the burden for patients is with the use of computer adaptive testing (CAT). For example, the patient-reported outcomes measurements information system (PROMIS) initiative in the USA, where item banks were developed. An item bank is a set of questions that all measure the same construct. The items from an item bank can be administered in short questionnaires with fixed items or more efficiently, through CAT [73]. PROMIS aims to develop self-reported item banks using CAT and item response theory (IRT) that are applicable across a wide variety of chronic disorders. By using PROMIS item banks in the future, patients or parents may only need to answer 4-8 items per item bank. As a result, the burden for patients and parents is diminished, while the reliability of the provided information is similar (or even better) compared with the information gained from the regularly used questionnaires [74-76].

As this manuscript only focuses on the collection of HRQOL information, a key problem that still limits successful HRQOL implementation is clinicians’ lack of knowledge on how to effectively utilize PRO data in their clinical encounters with patients effectively [77]. Therefore, it is very important that healthcare professionals get trained in how to interpret HRQOL scores [72].
Conclusion

HRQOL measures provide the unique opportunity to have insight into a number of different domains of the child’s functioning. Obviously the developmental stage of children should be considered when measuring HRQOL. Various other important topics have been addressed such as generic versus disease-specific questionnaires, age-specific questionnaires with a narrow versus a wide age range, self-report versus proxy report and paper-pencil versus online questionnaires. From a clinical point of view, taking HRQOL into account in clinical practice is of utmost importance. Adjusting to a disease during childhood has many challenges and consequences. Paying attention to HRQOL makes it possible to monitor a child and provide interventions where appropriate. Measuring HRQOL should therefore be an integral component of comprehensive care.
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