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Integrating the EORTC Computerized Adaptive Testing (CAT) Core in the European Oncology Quality of Life toolkit (EUonQoL-Kit) for the assessment of health-related quality of life in cancer patients and survivors

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Abstract

Purpose

To comprehensively describe how the EORTC Computerized Adaptive Testing (CAT) Core was developed and integrated into the European Oncology Quality of Life toolkit (EUonQoL-Kit) for assessing health-related quality of life in cancer patients and survivors across Europe. The EUonQoL-Kit includes both a dynamic version applying 'live CAT' i.e., selecting items in real time from calibrated item banks, and a static version including short forms derived from the item banks, that can be used where electronic methods are not feasible.

Methods

Mixed-methods, consortium meetings and discussions among stakeholders were used to select those EUonQoL-Kit subdomains and items that were suitable for CAT assessment for the three target populations (active treatment, survivors and palliative care). Considerations were given to the questionnaires' length, and CAT settings for the dynamic version (starting items and stopping criteria) and short forms' content.

Results

Eight CAT subdomains were selected for both EUonQoL-Kit's versions: physical functioning, role functioning, emotional functioning, social functioning, pain, fatigue, sleeping problems and financial difficulties. The dynamic version asks 6–7 CAT items per subdomain with a total of 50 items for each population, with the same starting items and stopping criterion across groups, except for physical functioning. For the static version the total number of CAT items are: 18 for the active treatment and survivors' questionnaires and 16 for the palliative care questionnaire.

Conclusion

The EORTC 'live CAT' and short forms were successfully integrated into the EUonQoL-Kit to be validated in a large pilot study including over 4,200 European cancer patients and survivors.

Introduction

The burden of cancer is growing worldwide, and it is estimated that by 2045 there will be more than 30 million new cases of cancer. Eighteen percent of these cases will be observed in the European continent, negatively impacting the health, survival and quality of life (QoL) of the patients, and putting a great strain on health care systems [1].

To reduce the cancer burden in the European Union and improve the health-related quality of life (HRQoL) of cancer patients, the European Union (EU) Mission on Cancer has launched a series of recommendations. Some of these recommendations highlight the importance of developing measures to identify the symptom burden and psychosocial needs of patients throughout the cancer care continuum, i.e., from diagnosis to survivorship [2]. This can be achieved through the use of patient-reported outcome (PRO) instruments, which allows for the assessment of patient health status as reported directly by the patient [3]. The use of PRO instruments in routine cancer care has been shown to improve symptom control, patient satisfaction, and patient-physician communication as demonstrated by several clinical studies [4, 5]. PRO data are needed in public health research and health care policy decision-making to transform health care into a more patient-centered model [6].

Traditionally, PRO instruments are static, i.e., they provide a fixed set of items to all patients, ensuring comparability across study populations. However, some items may lack relevance to the individual patient [7]. Dynamic instruments based on item response theory (IRT) calibrated item banks can reduce the number of irrelevant items and provide a more informative combination of items relevant to a specific population [8, 9]. Computerized Adaptive Testing (CAT) is an IRT-based assessment method providing varying sets of items (selected from a larger item bank) that are tailored to the individual patient [10]. IRT-based methods and CAT have been recommended by the EU Mission on Cancer to enhance PRO assessment at the individual level [2].

The European Oncology Quality of Life (EUonQoL) project aims to develop and validate the EUonQoL toolkit (EUonQoL-Kit), a unified patient-centered instrument for the assessment of HRQoL in cancer patients and survivors across European countries [11]. The EUonQoL-Kit has been designed from the patients' perspective, available in several European languages, electronically administered and available in static and dynamic versions. The EUonQoL-Kit static version comprises fixed set of pre-selected items, whereas the dynamic version will be achieved through the integration of the CAT methodology when relevant and feasible.

A scoping review on CAT-based measurement conducted in 2023 provided an overview of available IRT-based PRO instruments (including item banks, short forms and CATs) validated for the assessment of HRQoL in cancer patients and survivors and investigated the feasibility of the implementation of these IRT-PRO instruments in oncology. After retrieving 158 studies and identifying 257 unique IRT-PRO instruments, most of which were developed by the European Organisation for Research and Treatment of Cancer (EORTC), the scoping review found that the EORTC CAT Core has been successfully implemented in various contexts of European oncology research, providing measurement precision and relative validity across its 14 HRQoL subdomains [12]. The EORTC CAT Core can be used in two ways, as 'live CAT' selecting items or static short forms. Live CAT selects items in real time from a calibrated item bank and provides more precise assessment than traditional PROs, by adapting the choice of questions to the health state of the individual patient. If 'live CAT' is not feasible, static short forms composed of items from the calibrated item banks can be established [13]. The mode of administration for the EUonQoL-Kit is expected to be predominantly electronic through 'live CAT', but the static version can be

used in settings where electronic methods are not available, since 'live CAT' requires a specific centralized platform.

This paper aims to comprehensively describe how the 'live CAT' and short forms based on the EORTC CAT Core were developed and integrated into the dynamic and static versions, respectively, of the EUonQoL-Kit.

Methods

Target populations and initial development process of the EUonQoL-Kit

The target populations of the EUonQoL-Kit are cancer patients aged 18 years and above distributed across the whole cancer care continuum and stratified in three target populations: a) active treatment (patients receiving curative and non-curative intent), b) survivors (individuals with a disease-free interval greater than 1 year after active treatment) and c) palliative care (patients referred to specialist palliative care or patients with prognosis <12 months)[14].

Three systematic reviews were conducted in 2023 to investigate existing PRO measurement instruments and approaches to assess HRQoL among European cancer patients, and to review qualitative studies focused on disease-related outcomes, needs, experiences, preferences, concerns and QoL of European oncological survivors in the last decade and patients in need of palliative care [15-18].

Furthermore, the EUonQoL conceptual framework, i.e., a predefined list of domains including physical, psychological, social and overall health collected from the literature [19-21], was produced between January and March 2023 and improved using mixed methods. A total of 75 qualitative patient interviews and a Delphi survey (completed by 96 patients and 59 healthcare professionals) were conducted between April and August 2023 in Denmark, France, Germany, Italy, the Netherlands, and the United Kingdom [22]. Based on these evaluations the most important subdomains and items for the assessment of HRQoL in cancer patients and survivors were selected [14]. Qualitative and quantitative results from these four studies were triangulated through an international multidisciplinary consensus meeting, composed of the EUonQoL Executive Committee, the stakeholder board and co-researchers (i.e., persons that have been diagnosed with any kind of cancer and their caregivers), leading to the development of the first version, the EUonQoL-Kit v1[14].

The EUonQoL conceptual framework as well as the qualitative and Delphi study results were operationalized into items for the static version of the EUonQoL-Kit v1 taking also into account the results of the first systematic review, which concluded that the EORTC CAT and the EORTC QLQ-C30 questionnaire have demonstrated sufficient level of content validity to measure HRQoL for patients across the cancer care continuum [15]. Therefore, where possible, subdomains and items were selected from the EORTC CAT Core based on the relative symptom severity associated with each target population defined by participants of the international multidisciplinary consensus meeting [14]. The EUonQoL-Kit v1 comprised three static questionnaires: the version for active treatment included 75

items, for survivors 67 items, and for palliative care 79 items, of which about 58 were covered by CAT items across the three questionnaires and those items not covered by CAT were selected from validated HRQoL tools [14]. Additionally, each questionnaire included the open-ended EORTC WISP instrument allowing patients to report up to three additional issues not covered by the selected items [23].

The overall content and acceptability of the included HRQoL subdomains in the static version of the EUonQoL-Kit v1 for the target populations were evaluated in a usability study. This was carried out in 53 cancer patients across the same European countries where the qualitative and Delphi studies were performed, except Denmark [14]. Following this usability study, two online consortium meetings and an open public stakeholder forum were held in December 2023 to triangulate the results and finalize the second version of the EUonQoL-Kit i.e., EUonQoL-Kit v2 [14].

The EORTC CAT Core

The EORTC Quality of Life Group has developed a CAT version of the EORTC Core Quality of Life Questionnaire (EORTC QLQ-C30) to improve the accuracy and flexibility of measuring HRQoL in cancer patients. The EORTC QLQ-C30 is one of the most widely used, validated, translated and published PRO instruments for assessing symptoms and QoL in cancer patients [24]. It consists of 30 items distributed in five functional scales measuring physical, emotional, role, cognitive and social functioning; three symptom scales measuring fatigue, pain, nausea/vomiting; one scale measuring global health and QoL and six single items measuring sleeping problems, dyspnea, constipation, diarrhea, lack of appetite and financial difficulties. All items are scored on 4-points Likert scales ranging from 1 (not at all) to 4 (very much), except for the global health and QoL items, which are scored from 1 (very poor) to 7 (excellent) [25, 26].

The EORTC CAT Core comprises 14 item banks covering the five functional and the nine symptom domains included in the EORTC QLQ-C30. Each item bank comprises 7-34 items, reaching a total of 260 items [27]. Item banks include all items of the EORTC QLQ-C30, ensuring compatibility with the EORTC QLQ-C30, while enabling increased measurement precision and power and reduced sample size requirements [27, 28]. The EORTC CAT Core is available as ‘live CAT’ dynamic assessment and as short forms, i.e., static sets of items selected from the calibrated item banks.

In the ‘live CAT’ assessment, items are selected sequentially in real time based on the individual’s responses to prior items, i.e., in each step of the assessment a score is estimated based on the responses provided so far, allowing the system to select from the calibrated item banks the most relevant and informative item for the patient in the next step according to the estimated score level. This type of assessment requires the definition of specific CAT settings like the ‘starting item’ to initiate the assessment and the ‘stopping criterion’ to end the assessment, which should be defined considering the measurement precision and response burden expected for a specific population [7].

Static short forms can be applied when digital assessment is not possible, allowing patients to complete the questionnaires by paper and pencil. For each of the 14 CAT subdomains, six standard short forms

are available; a brief and a long version for each of three populations: patients experiencing mild, moderate and severe symptoms, respectively [13]. Therefore, a total of 84 EORTC CAT based short forms have been developed considering the content of the most informative items and their measurement precision. The brief versions include 3 to 5 items, whereas the long versions include 5 to 9 items. Compared to traditional standardized questionnaires, the 'live CAT' and short forms have the advantage of providing a more flexible questionnaire that can be tailored to a specific study population and/or clinical setting [13].

Integration of the EORTC CAT Core into the dynamic and static versions of the EUonQoL-Kit

1. Selecting the HRQoL subdomains to be covered by the EORTC CAT Core

The general principle of the EUonQoL project was that the HRQoL subdomains, that could be covered by well-validated CAT subdomains, should be assessed by CAT if they were considered important enough to be measured by at least 2 items. Hence, two online consortium meetings and weekly meetings among the stakeholders (i.e., the CAT team and two international multidisciplinary working groups) were held in November and December 2023 to define the content of the EUonQoL-Kit v2. This included the selection of subdomains and items that were suitable for CAT assessment and the definition of the length of each of the six questionnaires of the EUonQoL-Kit v2, which consisted of both a 'live CAT' and static questionnaire for each of the three target populations (active treatment, survivors, and palliative care). The EUonQoL-Kit v2 thus has a mixed design including dynamic scales covered by CAT and static items (the same as the static version) measuring additional subdomains selected at the consortium meetings, and extracted from validated HRQoL questionnaires [29]. The EUonQoL-Kit v2 is currently being tested in the validation pilot study among over 4,000 European cancer patients and survivors [30].

2. Designing the live CAT

When CAT subdomains were selected, further technical decisions and analyses were made to select the items and to determine the number of items for each questionnaire to integrate CAT assessment into the EUonQoL-Kit v2. Thus, for the dynamic EUonQoL-Kit v2, the best starting CAT item was identified for each subdomain taking both measurement precision (estimated average item information [13]) and content into account. Pain and fatigue are examples of when the selected starting item was based primarily on content, as it seemed "natural or intuitive" to start with "Have you had pain?"/"Were you tired?". Whereas, for physical functioning the starting item choice was very much guided by measurement accuracy, as we expected survivors overall to have better physical functioning than the other two target populations.

For the pilot study the plan was to use the 'live CAT' assessments as 'gold standards' in the sense that they will form the basis for final design of the 'live CAT' for the EUonQoL-Kit and to assess the measurement precision of the CAT short forms. Hence, the aim was to have precise 'live CAT' assessments while complying with the maximum total number of items defined by consensus for each target population during the working group and consortium meetings. The 'live CAT' for the pilot study

may include more items than the ‘live CAT’ of the final toolkit, as it is possible to reduce the number of items after analyzing the results of the pilot study [30].

In each step of all live CATs, the item providing the maximum Fisher information will be selected and scores will be estimated using expected a posteriori (EAP) [31, 32]. These are the standard settings for the EORTC CAT Core [7].

3. Designing the short forms

For the static EUonQoL-Kit, we selected the most informative CAT items for each subdomain based on the expected symptom severity (i.e., mild, moderate and severe symptom) in the target populations. Expected symptom severity for each subdomain was discussed and agreed within the working groups, e.g., it was expected that the survivors typically would have mild symptom severity/impairment, patients in active treatment typically mild to moderate severity/impairment, and patients in palliative care were expected to typically have moderate to severe severity/impairment.

Results

HRQoL subdomains covered by CAT

Table 1 shows the number of HRQoL subdomains covered by the EORTC CAT Core in both versions of the EUonQoL-Kit (v1 & v2). A total of 8 subdomains were selected to be covered by the EORTC CAT Core for the dynamic and static versions of the EUonQoL-Kit v2: physical functioning, role functioning, emotional functioning, social functioning, pain, fatigue, sleeping problems, and financial difficulties.

Five of the 13 subdomains covered by the EORTC CAT Core in the first static version of the EUonQoL-Kit (v1) i.e., lack of appetite, nausea/vomiting, constipation, dyspnea and cognitive functioning, were transformed into non-CAT subdomains to be tested in the pilot study by including a single item for each subdomain in the three static questionnaires of the EUonQoL-Kit v2 (Table 1). These decisions were made to reduce the number of items and to avoid potential overlap and redundancy of items as reported by some patients in the usability study. The only subdomain covered by the EORTC CAT Core but not included in the EUonQoL-Kit v1. or v2. was diarrhea.

Table 1
List of HRQoL subdomains covered by EORTC CAT for the EUonQoL-Kit.

Included CAT subdimensions	
EUonQoL-Kit v1 (Static version)	EUonQoL-Kit v2 (Static & dynamic version)
Mobility & activity/Physical functioning (PF)	Mobility & activity/Physical functioning (PF)
Social role & activities/Role functioning (RF)	Social role & activities/Role functioning (RF)
Pain (PA)	Pain (PA)
Energy/Fatigue (FA)	Energy/Fatigue (FA)
Sleeping problems (SL)	Sleeping problems (SL)
Anxiety & worry/Emotional functioning (EF)	Anxiety & worry/Emotional functioning (EF)
Family & relationships/Social functioning (SF)	Family & relationships/Social functioning (SF)
Financial difficulties (FI)	Financial difficulties (FI)
Lack of appetite	
Nausea/vomiting	
Constipation	
Dyspnea	
Cognitive functioning	

Integration of the ‘live CAT’ into the dynamic EUonQoL-Kit

To balance measurement precision and response burden it was decided that a total of 50 items could be asked in the ‘live CAT’, following the stopping criterion. To ensure precise measurement for all subdomains and individuals, the dynamic EUonQoL-Kit v2 was designed with fixed length CATs (i.e., asking the same number of items to all) including 6 or 7 CAT items per subdomain, with 7 items for the more complex physical and emotional functioning subdomains (Table 2).

For most CAT subdomains the same starting item was selected across the three target populations to keep it simple and to allow for harmony of items across versions. The exception was physical functioning, where the CAT for survivors was started with an item measuring a more physical demanding task (Do you have any trouble carrying a heavy bag upstairs?) than the start item for patients in active treatment and palliative care (Do you have any trouble walking for 30 min.?) (Table 2).

Table 2
Starting and stopping settings for each subdomain covered by EORTC CAT for the dynamic EUonQoL-Kit v2.

Subdomains covered by CAT	CAT settings for the dynamic EUonQoL-Kit		
	Active treatment	Survivors	Palliative care
Mobility & activity/Physical functioning (PF)			
Starting item	Do you have any trouble walking for 30 min.?	Do you have any trouble carrying a heavy bag upstairs?	Do you have any trouble walking for 30 min.?
Stopping criterion[a]	7	7	7
Social role & activities/Role functioning (RF)			
Starting item	Were you limited in doing either your work or other daily activities?	Were you limited in doing either your work or other daily activities?	Were you limited in doing either your work or other daily activities?
Stopping criterion[a]	6	6	6
Pain (PA)			
Starting item	Have you had pain?	Have you had pain?	Have you had pain?
Stopping criterion[a]	6	6	6
Energy/Fatigue (FA)			
Starting item	Were you tired?	Were you tired?	Were you tired?
Stopping criterion[a]	6	6	6
Sleeping problems (SL)			
Starting item	Have you had trouble sleeping?	Have you had trouble sleeping?	Have you had trouble sleeping?
Stopping criterion[a]	6	6	6
Anxiety & worry/Emotional functioning (EF)			
Starting item	Have you felt miserable?	Have you felt miserable?	Have you felt miserable?

Subdomains covered by CAT	CAT settings for the dynamic EUonQoL-Kit		
	Active treatment	**Survivors**	**Palliative care**
Stopping criterion[a]	7	7	7
Family & relationships/ Social functioning (SF)			
Starting item	Has your physical condition or medical treatment interfered with your social activities?	Has your physical condition or medical treatment interfered with your social activities?	Has your physical condition or medical treatment interfered with your social activities?
Stopping criterion[a]	6	6	6
Financial difficulties (FI)			
Starting item	Has your physical condition or medical treatment caused you financial difficulties?	Has your physical condition or medical treatment caused you financial difficulties?	Has your physical condition or medical treatment caused you financial difficulties?
Stopping criterion[a]	6	6	6
Total number of CAT items	**50**	**50**	**50**
Total number of non-CAT items[b]	**32**	**32**	**28**
Overall number of items in the questionnaires	**82**	**82**	**78**

[a]The stopping criterion corresponds to the length, i.e., the number of items to be asked. [b]Non-CAT items comprised 5–6 other single physical items covering appetite, nausea, constipation, diarrhea, and breathing problems; 11–16 mixed items covering fear of recurrence, future outlook, spirituality, concentration, body image, sex life/intimacy, maintenance of independence and health behavioral change; 6–7 items covering Patient Reported Experience Measures-PREMs; and the WISP instrument, where up to 3 additional issues can be reported and one general QoL open-ended question per questionnaire.

Integration of the short forms into the static EUonQoL-Kit

The static EUonQoL-Kit v2 includes 16 CAT items for the palliative care questionnaire and 18 CAT items for the active treatment and the survivors' questionnaires. Between one and three CAT items were

selected for each questionnaire among the most informative CAT items available in the standard short forms, covering a broad range of symptom severity from mild to severe for most of the CAT items (Table 3).

Table 3
HRQoL subdomains and items covered by EORTC CAT for the static EUonQoL-Kit v2.

Subdomains covered by CAT	Number and content of selected CAT items for the static EUonQoL-Kit		
	Active Treatment	Survivors	Palliative Care
Mobility & activity/ Physical functioning (PF)			
Do you have any trouble carrying a heavy bag upstairs?	x	x	
Do you have any trouble walking for 30 min.?	x		x
Do you have any trouble taking a long walk?		x	
Do you have any trouble doing strenuous activities, like carrying a heavy shopping bag or a suitcase?	x	x	
Do you need help with eating, dressing, washing yourself or using the toilet?			x
Total number of items	3	3	2
Social role & activities/Role functioning (RF)			
Were you limited in doing either your work or other daily activities?	x	x	x
Were you limited in pursuing your hobbies or other leisure time activities?	x	x	x
Total number of items	2	2	2
Pain (PA)			
Have you had pain?	x	x	x
Did pain interfere with your daily activities?	x	x	x
Total number of items	2	2	2
Energy/Fatigue (FA)			
Were you tired?	x	x	x
Have you required frequent or long periods of rest?	x	x	x
Total number of items	2	2	2
Sleeping problems (SL)			
Have you had trouble sleeping?	x	x	x
Total number of items	1	1	1

Subdomains covered by CAT	Number and content of selected CAT items for the static EUonQoL-Kit		
	Active Treatment	Survivors	Palliative Care
Anxiety & worry/Emotional functioning (EF)			
Have you felt miserable?	x	x	x
Did you feel depressed?	x	x	x
Did you worry?	x	x	x
Total number of items	3	3	3
Family & relationships/Social functioning (SF)			
Has your physical condition or medical treatment interfered with your social activities?	x	x	x
Has your physical condition or medical treatment interfered with your relationships with your family or friends?	x	x	x
As a result of your physical condition or medical treatment, have you felt isolated from your family or friends?	x	x	x
Total number of items	3	3	3
Financial difficulties (FI)			
Has your physical condition or medical treatment caused you financial difficulties?	x	x	x
As a result of your physical condition or medical treatment, have you had difficulties paying any of your regular expenses (e.g., rent, insurance, phone)?	x	x	
Total number of items	2	2	1
Total number of CAT items	**18**	**18**	**16**
Total number of non-CAT items[a]	**32**	**32**	**28**
Overall number of items in the questionnaires	**50**	**50**	**44**

[a]Non-CAT items comprised 5–6 other single physical items covering appetite, nausea, constipation, diarrhea, and breathing problems; 11–16 mixed items covering fear of recurrence, future outlook, spirituality, concentration, body image, sex life/intimacy, maintenance of independence and health behavioral change; 6–7 items including Patient Reported Experience Measures -PREMs; and the WISP

instrument where up to 3 additional issues can be reported and 1 general QoL open-ended question per questionnaire.

Discussion

Here we comprehensively describe how the EORTC CAT Core assessment i.e., the 'live CAT' and short forms, were integrated in the EUonQoL-Kit. In total, eight CAT subdomains were selected for integration into the dynamic and static versions of the EUonQoL-Kit v2: physical functioning, role functioning, emotional functioning, social functioning, pain, fatigue, sleeping problems and financial difficulties. For the pilot study, the dynamic version includes 6 to 7 CAT items per subdomain (with a total of 50 items) employing the same CAT settings (starting item and stopping criterion) for each subdomain across the three target populations (i.e., active treatment, survivors and palliative care), except for physical functioning. The static version includes 18 CAT items for the active treatment and survivor questionnaires and 16 CAT items for the palliative care questionnaire.

The eight CAT subdomains selected for the EUonQoL-Kit v2 have demonstrated a high level of cross-cultural validity and reliability in several oncology studies across Europe [33–38], confirming their suitability for implementation in the EUonQoL-Kit [15]. Five additional CAT subdomains (lack of appetite, nausea/vomiting, constipation, dyspnea and cognitive functioning) were originally included in the static EUonQoL-Kit v1 but reduced to single items in the EUonQoL-Kit v2 to limit respondent burden and to limit potential redundancy of items as reported by some patients in the usability testing [14]. These subdomains have the potential to be covered by CAT assessment at a later stage, e.g., after the pilot study is completed and the results are reviewed at the end of 2025.

Given that a relatively large number of CAT items and subdomains were selected for the static EUonQoL-Kit v1 to obtain patient input, the number of CAT items for the short forms was reduced from 58 to 18 CAT items in the static EUonQoL-Kit v2 after the usability testing. We deliberately selected a relatively large number of 50 CAT items, for each questionnaire in the dynamic version of the EUonQoL-Kit v2. However, as the principle of 'live CAT' is that it can be adapted for each study, future users may choose to reduce the number of items when employing the EUonQoL-Kit. Based on the pilot study results, it will be possible to evaluate the precision of CATs with different lengths, to provide detailed recommendations for the optimal length balancing precision and response burden, and to have a precise score estimate which could be used as a 'gold standard' e.g., for evaluation of the static version.

Regarding the CAT settings for the 'live CAT' integrated into the dynamic EUonQoL-Kit v2, the selection of the starting items and stopping criterion ended up being almost the same for each subdomain (except for physical functioning) across the three target populations; decisions were made based on the available evidence and evaluations performed while also seeking harmonization between the items [7]. Although the item "Do you have any trouble taking a long walk?" is the most informative among the 5 items available in the EORTC QLQ-C30 for the assessment of physical functioning according to literature [7], the consensus among the working groups was to use different starting item based on the target

populations. Survivors should be asked about a more difficult physical task, i.e., an item that is more informative for those with limited physical impairment. Therefore, the item ‘Do you have any trouble carrying a heavy bag upstairs?’ was chosen for survivors, while for patients in active treatment or palliative care the item ‘Do you have any trouble walking for 30 min.?’ was chosen as starting item, reflecting a less demanding task.

CAT has several advantages compared to traditional questionnaires. CAT can keep the measurement of HRQoL short and relevant for the individual, optimizing measurement precision, relevance to the patient and flexibility [28]. This is important, e.g., for patients in palliative care who need to complete PRO questionnaires during research or as part of clinical care, as lengthy questionnaires may increase response burden and missing data, especially in advanced stages of cancer disease [39, 40].

Since the dynamic and static versions of the EUonQoL-Kit v2 are not the final questionnaires for the EUonQoL-Kit, the testing of CAT during the pilot study will provide new knowledge based on which adjustments to starting items, length may be implemented. The EORTC CAT Core is a flexible system, such adjustments may also be implemented later based on new data and further experience or if new demands or needs arise to provide the best instrument to measure patients’ HRQoL across the whole cancer care continuum.

Conclusions

The EORTC CAT Core assessment was successfully integrated in the EUonQoL-Kit. Both ‘live CAT’ and short forms were incorporated into dynamic and static versions of the EUonQoL-Kit, respectively. The EUonQoL-Kit is being validated in the pilot study including over 4,000 cancer patients and survivors across Europe.

The development of the EUonQoL-Kit v2 is an essential step towards providing a patient-centered instrument that enables a comprehensive assessment of patients’ HRQoL assessment of patients’ health-related quality of life throughout the cancer care continuum.

Declarations

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